



49115

SEPTEMBER 1976

\$1.50



radio control MODELER

THE WORLD'S LEADING PUBLICATION FOR THE RADIO CONTROL ENTHUSIAST



CASSUTT

CLUB 20 PYLON RACING

500 ML

SPORT OLD TIMER

BAKERSFIELD FORMULA I RACES PLUS MINT JULEP '76

FEATURES

FROM THE SHOP	2
frequencies . . . another round	
A FEW SECONDS TO LIVE . . . OR DIE	7
. . . and it could happen to you	
ENGINE CLINIC	10
questions and answers	
RADIO SPECTRUM	12
electric motor speed control, et al	
VARIVIGGEN	16
a most unusual scale model	
FOR OLD TIME'S SAKE	18
rcm's old timer column	
YELLOW PERIL	22
this is a construction article?	
500 ML	25
.15 powered old timer for all-around flying fun	
RC DESIGN MADE EASY	30
part I of a new chuck cunningham series	
HAPPY FACE	33
an excellent standard class sailplane	
RCM PROPELLER PITCH GAUGE	37
an rcm how-to article	
SENIOR FALCON IV	41
a multi engine trainer for four .15's	
MINT JULEP 1976	48
rcm visits the fourth annual mint julep	
CLUB 20 PYLON RACING	52
a new racing event for the sport flyer . . .	
CLUB 20 CASSUTT	54
. . . and a design to go with the new event	
SOARING	56
a poem by don ashenfelter	
SUNDAY FLIER	57
letters - - - and some good ideas	
ROTATING STRUT RETRACTABLE LANDING GEAR	58
. . . for your corsair or p-40	
HERE'S HOW	60
jerry smith's how-to page	
PRATHER PANTHER	61
rcm product test	
BAKERSFIELD FORMULA I RACES	62
nations top racing competition	
HAVE YOU THOUGHT ABOUT QUARTER SCALE?	66
try the big ones for a change of pace	
PIERCE 970	67
rcm product test	
DICK'S DISCOVERIES	68
product applications by rcm's photo editor	
RACING AT RANDOM	70
a first attempt at formula I	
STUK	71
a new three part adhesive system	
REV-OLUTION	72
rcm builds the new american rc helicopter	
THOSE TWO OLD FALLACIES EXPOSED	79
upwind - - - downwind	
POWER BOATING	80
rcm's boating column	
U.S.S. GUADACANAL	82
rcm visits chief likes' flying circus	
FOR WHAT IT'S WORTH	84
rc hints and kinks	
SHOWCASE '76	86
new products	
RCM PUZZLE	100-101
be a winner!	
MODEL OF THE MONTH	150
september winners	
READERS EXCHANGE	174
classified advertisements	
ADVERTISERS INDEX	175
alphabetical listing	
READERS SERVICE	175
information coupon	

Editor and Publisher

Don Dewey

Executive Editor

Patricia Crews

Technical Art Editor

Dick Kidd

Graphics Editor

Barbara Richardson

Assist. Graphics Editor

Mary Robillard

Art Editor

Susan Steele

Photo Editor

Dick Tichenor

Associate Editors

Bernie Murphy — Ken Willard — Jim Oddino — Jerry Smith
Chuck Cunningham — David Thomas — Clarence Lee
Don Dombrowski — Fred Reese — Al Kendrick

Contributing Editors

Bill O'Brien — Joe Bridi — Randy Carman — Tony Estep
Grady Howard — Dick Sonheim — Ben Strasser
Gil Horstman — Jim Simpson

Office Staff

Beverly Calhoun — Jane Wall — Pat Johnson — Lynne Gillett
Chris Nicholson — Barbara Norton — Sheila Pierce
Bridget McCloskey — Tawnya Cariker

Plans Dept.

Danny Nicholson — Mike Franceschini



This Months Cover

Wanda Perkins was about to launch Amie Bender until the airport police put a stop to this foolishness. An ektachrome put-on by Dick Tichenor.

SEPTEMBER

R/C MODELER MAGAZINE is published monthly by R/C Modeler Corporation, Don Dewey, President. Editorial and Advertising offices at 120 West Sierra Madre Boulevard, Sierra Madre, California 91024. Telephone: (213) 355-1476. Entered as second class matter at Sierra Madre, California, and additional offices. Contents copyright 1976 by R/C Modeler Corporation. All rights reserved. Reproductions in whole or part, without written permission of the publisher, is prohibited. **EDITORIAL CONTRIBUTIONS** are welcomed by R/C Modeler Magazine, but cannot be considered unless guaranteed exclusive. Manuscript must be accompanied by return postage and any material accepted for publication is subject to such editorial revision as is necessary, in our discretion, to meet the requirements of this magazine. Editorial material is selected on the basis of general interest to the radio control enthusiast and the publisher assumes no responsibility for accuracy of content. The opinions stated in published material are those of the individual author and do not necessarily reflect those of the publisher. R/C Modeler Corporation assumes no responsibility for loss or damage of editorial contributions. Upon acceptance, payment will be made within 30 days of publication, at our existing current rate, which covers all authors rights, title to, and interest in, the material mailed including, but not limited to, photos, drawings, and art work, which shall be considered as text. Submission of the manuscript to R/C Modeler Magazine expresses a warranty, by the author, that the material is in no way an infringement upon the rights of others. **SUBSCRIPTION RATES:** The United States \$16.50 per year, \$32.00 two years. Single copies \$1.50 each. Add \$2.50 per year for postage outside of the U.S. (except APO's and FPO's). Change of address notices, undelivered copies and orders for subscriptions are to be sent to P.O. Box 487, Sierra Madre, California 91024. Allow 6 weeks for new subscriptions and changes of address. **ADVERTISING:** Send advertising copy and complete instructions to Advertising Department, R/C Modeler Magazine, P.O. Box 487, Sierra Madre, California 91024. Telephone: (213) 355-1476.

FROM THE SHOP

Don Dewey



● The San Fernando Valley Silent Flyers was one of fourteen clubs to compete in the Great "Spirit of '76" Sailplane Race on July 17, 1976. The 76 kilometer race, held in conjunction with the S.O.A.R. Nats, finds its uniqueness not only in the distance and date chosen, but because all the entries must be red, white and blue, and sport a Bicentennial slogan or motto.

The SFVFSF entry is somewhat atypical, since it took the full-size race concepts and adapted them to models. As with the big soarers (as well as powered racers) it takes a team effort. Most members of the club pitched in to assist in completing the model.

To carry the full-sized example further, industry sponsors were obtained, much like the Smirnoff Derby, Reno Air Races, etc. Kraft Systems donated one of their 1976 Bicentennial Series (what a tie-in!) radios, Top Flite shipped out a bunch of red, white and blue MonoKote, Hi-Johnson came through with linkages, and Don Clark of Soaring Products got a thermal sensor working to perfection.

The Silent Flyers aren't ones to do things in a small way, so they set out to obtain recognition (and publicity) for their contribution to the 200th birthday celebration. The Los Angeles Bicentennial Committee was contacted and, within a week, not only did the flight of the Goose (as the model design is called) have the City's commendation, but the Bicentennial Newsletter carried an item on the flight - a bit of good PR.

The plane was dubbed the "City of Los

Angeles," to further emulate full-scale racing (ala the famous Brown racer) and the City's Bicentennial slogan "Unity through Diversity" was adapted as the official club entry motto (we also used "Don't glitch on me" for a little flavor).

The Goose, bedecked in flag array, soars as an eagle representing not only the Silent Flyers' spirit of teamwork, but also the industry's fine support of such colorful contest events. Best of all, a group of modelers has made a lasting contribution to it's City's "Spirit of '76" celebration.

★ ★ ★

Dear Don,

The day after the March RCM came out, in which you published my letter, I received a copy of the letter that John Worth sent to you from the AMA. At that time, as I took exception to several things that he said, I started a letter to you, but decided against it, as I just didn't want to get involved. However, in view of recent developments, I feel that some comments are necessary.

It seems as though everybody at the AMA missed the point I was trying to make. The way things stand now, there is no way to find out if there is a station licensed to use a given frequency. You can find out the hard way, as I did, that the frequency is in use by a public service station. During which time somebody can get killed. If nothing else, we need to know what frequencies are being used by other services in a given area. The local FCC office doesn't have this information. I wrote to the Washington FCC office on Dec. 15th for this information, but to date they have not replied.

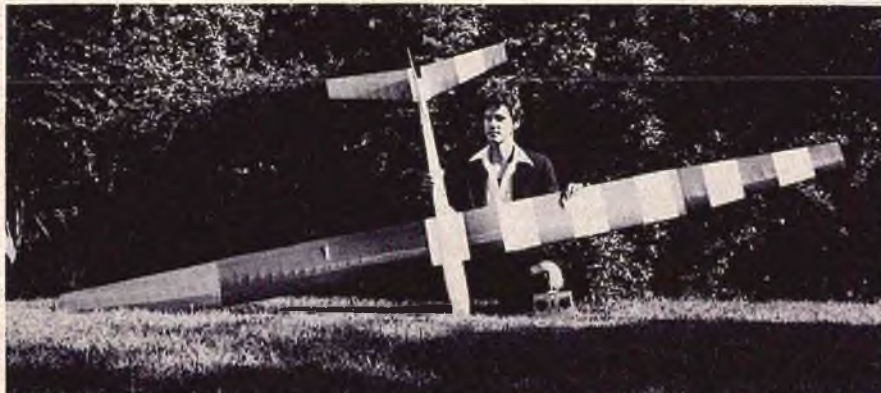
It appears that the only recourse that the

AMA has, as to why nobody was aware of the fact that our frequencies were not exclusive, is because we didn't read the regulations. I would like to suggest that somebody else read it. Let's take a good look at part 95.41, a very contradictory paragraph. The first part of the paragraph is more or less a priority of interference statement. The last sentence says, "the following frequencies are available solely for the radio remote control of models for hobby purposes!" The following frequencies are specified: 72.08, 72.16, 72.24, 72.32, 72.96, 75.64 MHz. Webster defines the word sole as follows: that is the only one; alone; solitary; isolated; one and no more; without assistance or interference. There is no way to make it any plainer, exclusive. In my opinion, and others, including some attorneys, is that any one using the above specified frequencies for any purposes, other than which is stated, namely, hobby purposes, is, in effect, in violation of part 95.41 of the regulations. It appears that was not the intent, but that is what it says, and how can one take any other interpretation? The first part of the paragraph says "no protection will be afforded from interference due to the operation of fixed and mobile stations in other services assigned to the same or adjacent frequencies in the band." It must mean other frequencies in the 72 MHz, because it specifies that the above frequencies are sole (exclusively) for the use of hobby purposes. Therefore, the word same, could not apply to those frequencies. Anyway, who would want to set up a killing situation like that? I think we should get an interpretation on this.

John Worth, in his letter to you, suggested that I read his article in the October 75 RCM, entitled "What has the AMA done for me lately?" I read it, several times, and I found that I was still asking the same question. I found out that the Sport fliers were supporting the Competition fliers, financially, that is. That didn't make me too happy. I also found out that the AMA doesn't have enough money to do a good PR job, or give legal assistance where needed. With regards to the flap over the model airplane and an airliner, the incident was published in a few newspapers, but it was widely publicized by the AMA. As an ex-airline pilot, I am very conscious of safety in the air, but I haven't seen any bulletin from the FAA about hazards to flight from model airplanes. How excited did they really get? Seagulls are certainly more dangerous.

John has also written several pages about what a great job they have done in conjunction with the American Radio Relay League, to get

Patrick Potega and "Goose" entry in the Great Bicentennial 'Spirit of '76' sailplane race.



to page 162

A FEW SECONDS TO LIVE OR DIE!

BY C.J. VIOSCA

This is not fiction it is a true account of an incident that happened to the author and one that almost cost him his life. It could happen to you

Before I begin, let me make it perfectly clear that this accident was my fault. I feel that I am as cautious as one can be and I know this accident can happen to anyone. All of us, no matter how careful, do have moments of carelessness and that's when we get caught. Every modeler I know treats model fuel like a can of water. Fellow modelers, we are carrying a possible bomb and all of us need to be made aware of this.

This particular Tuesday afternoon, I was ready to go to the lake and test run two boats. My wife was fixing an early supper and I told her that I would load the van to be ready to go. That day, I had been breaking in an engine and had my can of fuel along with the 12 volt battery and starter sitting by the garage door. I had made a new box to hold all of my usual junk and had just painted it. Since it was still wet, I figured I would use the old ice box, I had been using, just one more time. I picked up the can of fuel in my left hand and the battery in my right hand with the starter still hooked up. I almost put the battery down to disconnect the starter but figured I would do it after I put them in the ice box. I bent over to set these items down, then all of a sudden there was a funny glow and my vision disappeared followed by a terrible explosion and fire. Well, there I was, blind and on fire. I must tell you that the urge to run was tremendous and, had I run, it would have been fatal. I stood up and told myself not to panic and that I was alone, on fire and had better save my own life or die. I immediately stopped breathing when the explosion occurred and knew that if I inhaled the fire, it would kill me. I was standing on my concrete drive and knew that I had to get to the grass in my backyard and groped for the latch on the gate. My second thought was to hit the flimsy gate and force

it open if I couldn't find the latch. Yes, all of these thoughts were as they happened. You'd be amazed to know how fast your mind does work. Well, after opening the gate, I dove into the grass and rubbed the fire out on my face. To eliminate any chance of inhaling flame, I held my shirt in front of my face as a filter to breathe through. My next motions were to roll in the grass to the water hydrant about fifteen feet away. I turned the the water on and bathed in it and put out the fire. I was lucky here, too, as I had modified my hydrant to shoot the water out, rather than down, and this made it much easier to get the fire out. After all this, my wife saw me and came out. This was when I discovered I could see only silhouettes and told her what happened. I then went into the house and got the fire extinguisher and put the fire out in the driveway and garage. Next, I had my wife call the eye doctor, as my primary concern was for my eyes rather than the burns, since I make my living as a jet pilot and my eyes are a necessity. Next, I took a bath and put on some cotton pajamas and had my son, David, drive me to the fire station where I got into an ambulance for the ride to the hospital.

Let me go back and confirm one thing that might sound confusing — that is the part about the flash and sound of the explosion. Yes, I was burned in the eyes before I heard the sound. All of the skin was burned off my eyeballs before I had a chance to close them. My eye doctor told me that I came as close to being blind as possible without actually being blind. About all there is left to tell you is that I was a very lucky fellow. Both my hands, face, right arm, leg and knee received second degree burns along with my ears. The eyes are doing fine and still check 20-20. I am home now and consider what happened to me can happen to someone

else. If it had happened at a different location, at a flying field, etc., I might not have been so lucky. All of what I told you took place in about eight seconds. Any longer would have resulted in more extensive third degree burns which would have meant a long hospital stay and skin grafting.

Not too long ago, you may have read about the modeler who had a can of fuel explode in the trunk of his car with the result that everything was a complete loss including the car. I also know that firemen in some cities are advocating eliminating the fuel in plastic jugs. Well, all I can say here is that this particular accident would not have happened had the fuel been in plastic. The reason the fuel blew up was the fact that the starter battery clips touched the can and, when they did, the can got red hot at the two contact points and acted just like a glow plug. The fumes at the top of the can ignited and blew the bottom out of the can splashing the remainder of fuel (about 1/2 gallon) all over me. Now that this is all over, I do not relish the use of electric fuel pumps although they are used thousands of times every day. While the fuel pump didn't cause the accident, I feel it could be a source of danger. If you do use an electric pump, keep the wires in good shape and be careful of batteries around that metal can. I, personally, plan to use plastic jugs for fuel and a hand crank fuel pump from now on. I do not advocate leaving fuel cans or jugs in hot cars or out in very hot direct sun.

One last parting thought is that I do credit my emergency training as a pilot with keeping me calm and really saving my life. Keep calm and you can help yourself through many perilous situations, but, if you panic, it can mean disaster in many cases. Remember . . . be careful.

□

engine clinic

By
Clarence
Lee



● Our first letter this month is a little long and asks several questions. Normally, I try to avoid the longer multi-question letters and stick to the shorter single question letters. However, the questions asked are ones that other readers have also sent in so, rather than run three or four separate letters, I have run this one.

As you fellows know I need your letters to keep the column going. Unfortunately, I cannot use every letter sent in as space and time does not permit. Then, too, many letters, although of major importance to the sender, would be of little interest to other readers. Many letters ask questions that have been answered many times before, etc. Quite a few letters are just plain too long. I receive many letters five and six pages in length asking up to a dozen questions. There just isn't time nor space to answer this type of letter. So when you write, keep the questions down to one or two and the letter as short as possible. You will have a lot better chance of seeing your letter in print. Many fellows ask for a personal reply. If your letter is short and to the point, and you include a self-addressed stamped envelope, I will try to send back a short reply. Don't send in a five or six page letter with a dozen questions and request a personal reply. Time does not permit me to answer this type of letter. Many times readers will ask questions that would take several pages to answer --- questions such as "how do I break in my Webra", "how do I mix my own fuel", etc. Topics such as these have been previously covered and available in the RCM Anthology Library Series Books, "The R/C Engine", Volumes I and II. Naturally, I cannot send back a personal reply to this type of question. So let's get on to the letters this month.

Dear Mr. Lee:

Allow me first to say that I thoroughly enjoy your column, and find it most informative and interesting. I have a weakness for engines and, therefore, find your comments very helpful. Since I read in one of your

more recent columns that you appreciate letters from your readers, I thought even I could take the opportunity to ask you for some advice. My questions will refer to specific engines as well as to model engines in general.

(1) I presently own two Webra .20's. As you will recall, the carburetor has a threaded shaft, which is secured by a locknut. My questions are as follows: In the event of a crash, it seems inevitable that, providing the force is sufficient, the crankcase would either crack or become warped should the carb be hit. Would it be possible to reach out the venturi (getting rid of the threads) and replace the Webra carb with a different one? If practical, which one? I have run one engine and realize the stock carb is a very good one. I am using the one engine in a Kyosho car and resent the problem of having to dismantle the carb to make it work in the car as it must be rotated 180° from "normal" position as in an aircraft.

(2) I have a brand new K & B .40 F.R. R/C, series 71F. Since I suspect you designed this engine, you will be thoroughly familiar with it. The problem is this: upon removing the front housing to check for filings, etc., I noticed that the crankshaft counterbalance has a wobble of several thousandths which is easily detectable just by turning the shaft over. Is this normal? For a high performance engine, I would hardly think so, and have, therefore, not run it. If the shaft should be replaced, will K & B replace it, or will I have to purchase a new one? Also, I intend to run the engine with a Semco super muffler of the flow-through version. Would it be advantageous for me to incorporate the stock baffle? I expect to use the engine for sport flying, probably never for racing.

(3) This question is a general one. I am the proud owner of a Webra Schneurle .60; I have also seen one perform. I seem to recall the claim that the engine burns 2 ounces (approx.) of fuel per minute. The engine I have observed is used in a pattern ship, and runs on no nitro fuel. The tank is of 14 ounce

capacity, which would indicate a maximum flight of 7 minutes. The ship has, however, been flown full bore for over 10 minutes with fuel still remaining in the tank. I realize the consumption would be greater if high nitro fuels would be used, but my experience seems to indicate that the engine does not have as voracious an appetite as it has been touted to have. Any comments? I also read in your April 1975 column of your comparison of the above engine with a Perry pump/regulator equipped Veco .61. You state the top rpm's of both engines varied only slightly, but that the Veco had a much lesser fuel consumption than did the Webra. I understand the Webra was also Perry pump/regulator equipped. This does not make sense. In order to produce the similar revs, the pistons of both engines would have to be displaced an approximately equal number of times. This takes fuel and air, great amounts of both at high revs. Now if both engines are of the same displacement and both are turning over at the same rpm, equal amounts of fuel must be consumed. The Perry pump, in that it supplies fuel to the carb under pressure, simply allows the utilization of a larger bore venturi, because the engine no longer needs to suck the fuel to the carb. The air/fuel ratio would be the same in both engines, regardless of porting, if both are turning the same revs. Therefore, even if the Webra were left stock, and the Veco equipped with the Perry pump/regulator, and both still turned similar revs, the consumption should also be very similar, in that approximately equal amounts of fuel would have to be burnt to produce similar rpm. Your comments have left several of our local flyers puzzled; perhaps our thinking is all wrong? Your clarifying remarks would be most appreciated.

(4) My last question concerns an O.S. Max .30 R/C. Some years ago, I modified an old Enya .29 standard (square throat) to accept an O.S. .30 carb. The engine works magnificently, although it needs the high compression head to sustain a reliable idle.

to page 94

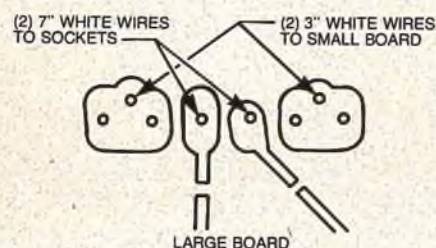


● The Christy Mixer article, which appeared in the July 1976 issue of RCM, contained several minor errors, and the following corrections are presented with our apologies:

(1) Page 88: Figure 4 small board. Black wire from large board goes into spare hole just above the upper MPS 2924 on left hand side.

(2) Resistors R11 and R12 are shown as 68K on the small board in Figure 4 and 56K in the text at the end of the first paragraph middle column, page 89. Guide was 22K instead of the original 56K — either value okay and within range of 50K adjustable pre-sets.

(3) Page 102: Negative pulse modifications. The white wires going to the sockets didn't appear on Figure 3 (not Figure 4 as in text). These white wires should go to the two cut-through lands at the top end as per sketch:



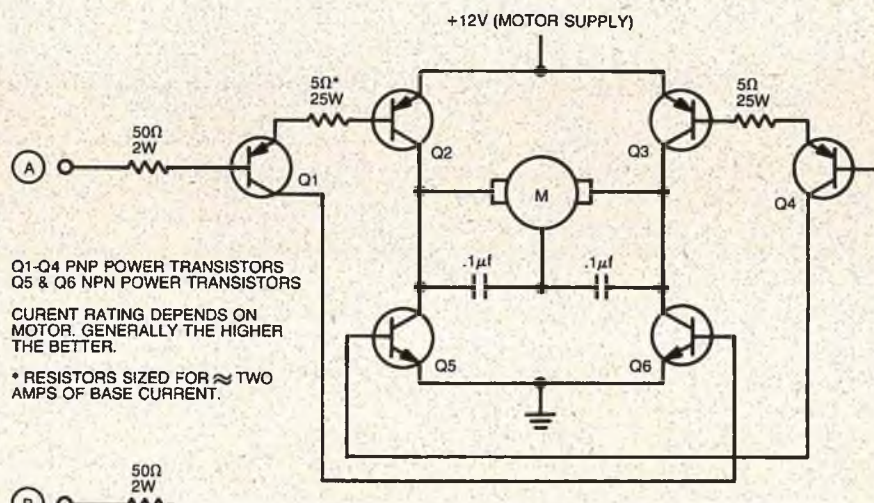
(4) The sockets that contain the yellow and green wires may have to be reversed in order to achieve the correct operation desired.

There has been a lot of weeping and gnashing of teeth in RC circles this year due to the FCC's proposal to give "our" 27 MHz frequencies to the Class D C.B.'ers. It is typical of our bureaucratic government to reward the Mob who have been irresponsibly breaking the regulations and penalizing the quiet ones that have been doing a pretty good job of policing themselves.

However, this time I think some good might come of the CB problem. It seems

that the CB'ers will interfere with themselves if the FCC allows "upward expansion" on the 27 MHz band. They have shown in laboratory tests that intermodulation products would be generated if two

Class D stations were operating 450-460 KHz apart and these could be of sufficient magnitude to wipe out other receivers. Therefore, the FCC would limit Class D CB to page 147

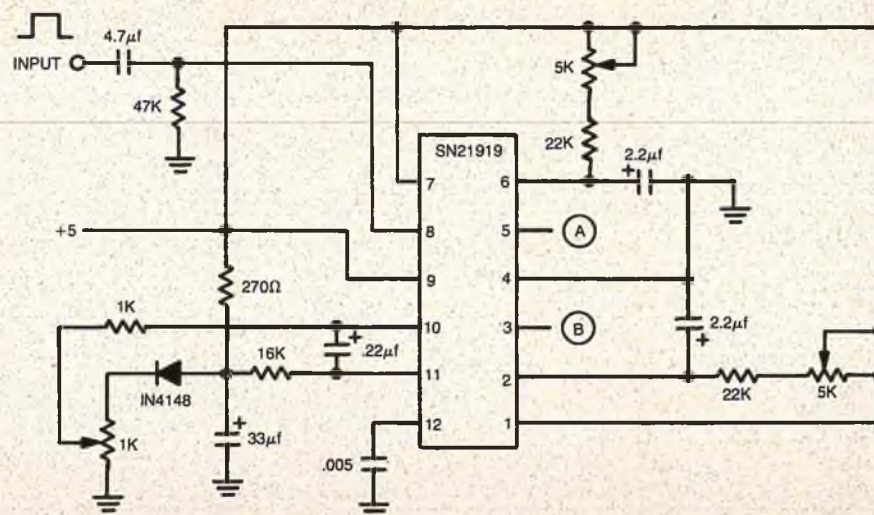


Q1-Q4 PNP POWER TRANSISTORS
Q5 & Q6 NPN POWER TRANSISTORS

CURRENT RATING DEPENDS ON
MOTOR. GENERALLY THE HIGHER
THE BETTER.

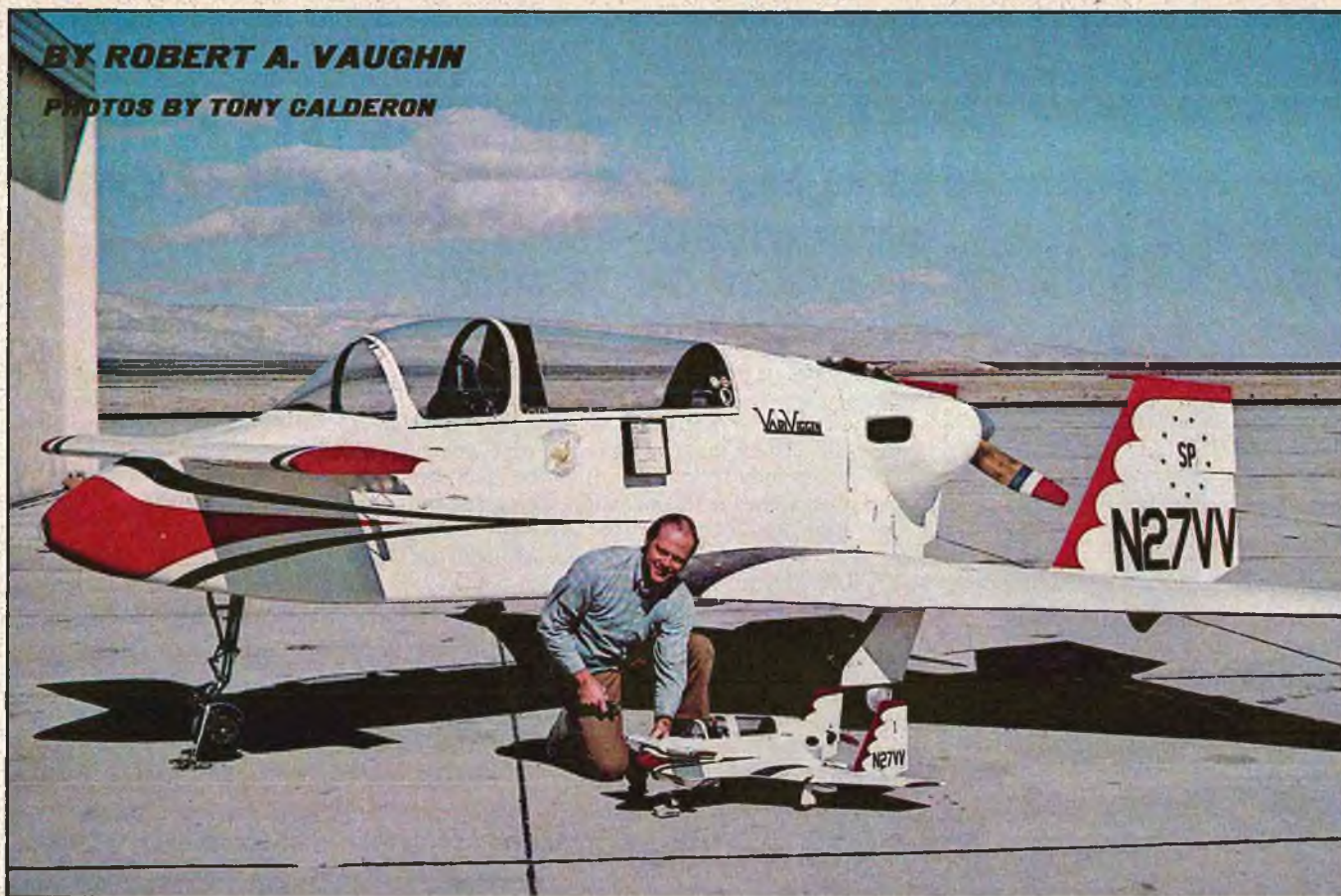
* RESISTORS SIZED FOR ≈ TWO
AMPS OF BASE CURRENT.

A SERVO AMP SIMILAR TO THAT SHOWN
IN APRIL WILL DRIVE IT.



BY ROBERT A. VAUGHN

PHOTOS BY TONY CALDERON



Bob Vaughn and model with full size Variviggen.

VARIVIGGEN

Introduction To Full-Size Aircraft And To Model

The VariViggen is a two-place sport plane of unusual design, featuring a pusher power plant and a canard-controlled delta wing. Designed by Burt Rutan as a homebuilder's project, this full-size aircraft has won many awards for outstanding design. It is a highly maneuverable aircraft that displays no vicious characteristics and will not stall or spin. These safe flying qualities, its uncomplicated construction, and two-place utility, make it a very desirable project for amateur builders/aviators. The prototype has been flying for about three years and has approximately 600 hours of low-maintenance flying time on it. Several of the kits are nearing completion and are expected to be in the air by January 1976.

Prior to construction of the prototype, an 18% scale radio controlled model was built by Burt Rutan to evaluate flying characteris-

tics of this configuration. Success of the model and its purpose is demonstrated by the remarkable end result, seen flying in many airshows and in demonstrations.

ABOUT THE AUTHOR

Robert A. Vaughn is a 43 year old modeler employed as a flight test engineer for Northrop Aircraft at Edwards Air Force Base. A modeler for over 30 years, Bob has designed and built R/C models for use by NASA's Flight Research Center in their high-altitude air sampling, "Mini-Sniffer" program. He is a weekend flyer at the Antelope Valley Tailwinds Club flying site on Rosamond Dry Lake. Recently, Bob has taken up flying full-size sailplanes, making good use of the ideal soaring conditions within the Antelope Valley area.



Rutan Aircraft Factory is located at Mojave Airport, Mojave, California.

Description Of Plans

Following the practice of modelers everywhere, looking for a subject that would be challenging and unusual, I was happy to come across a catalog of products offered by Rutan Aircraft Factory. One of the items was a complete set of construction plans for the 18% size R/C model. A subsequent visit to the factory in nearby Mojave resulted in purchase of a \$4.95 set of plans with several 8½ x 11 photographs of full-size aircraft details. The full-size airplane was shown as well as many pre-fabricated components to simplify construction for homebuilders. A strong impulse to move the cars out of the family garage and start an aircraft assembly area was overcome and I left with no more than model plans.

The plans consist of 14 sheets, the first 6 being detailed typewritten pages outlining all steps from how to construct a foam cutter to final checks prior to first flight. Information on how to adapt the model to control-line flying is included as well as a complete list of materials required. Full-size (18%) plans of the fuselage with many scale details

to page 142

Specifications

	Model	Full Size
Wingspan	41.2 in.	19 ft.
Wing Area	555 sq. in.	119 sq. ft.
Canard Span	17.4 in.	8 ft.
Canard Area	85 sq. in.	18.3 sq. ft.
Empty Wt.	7.00 lbs.	950 lbs.
Engine	OS Max 60	Lycoming 150 hp.

FOR OLD TIME'S SAKE

BY RANDY CARMAN



George Wagner displays his snappy little American Ace.

On May 16th, ten hearty souls braved the elements to meet at Lakehurst Naval Air Station in New Jersey to try their hand at a new form of R/C assisted Old Time free-flight.

The meet was hosted by the Old Time Eagles and sponsored by S.A.M. President, Joe Beshar, who introduced his set of rules for the competition in the March issue of RCM. You'll recall they included no down thrust, rudder-only in the climb, hands-off the transmitter after the engine run, and timing to stop upon operation of the transmitter to retrieve the plane. The object was to more or less resemble free-flight of the thirties.

The rules necessitated delicate care in trimming for the powered climb and glide transition, plus an easy push on the throttle (too much without elevator control and over she goes)! No easy feat under ideal weather



Arnold Hernandez and his amazing Powerhouse (see text).



Bob Neulin put a lot of love into this KG1 (see text for more).

conditions, let alone on a cloudy, breezy, drizzly day. That's right, Ma Nature goofed again! Two out of two contests!

The weather may have had an influence on the contestant turnout, but it certainly didn't dampen the spirits of the spectators. Boy! Were there spectators! Scads of cars and people lined the field. This was attributed to the voluminous pre-contest publicity and the fact that the Naval Air Station was hosting an aviation exhibit in the nearby Hindenberg Hilton (hangar).



That's some rig you got there, Bob!

There was plenty to see, too! Some beautiful airplanes showed up. Bob Neulin of Hellertown, Pennsylvania brought a gorgeous KG1, equipped with an original Brown Jr. ignition set-up. Although not rigged for R/C, it's a beautiful piece of craftsmanship — stained and varnished landing gear struts and wing supports, silk, tissue and lots of dope. Took Bob quite a while in his spare time to create this beauty. He should be duly proud.

Another piece of love and devotion was Arnold Hernandez's Powerhouse. Arnold must like to live dangerously - - an R/C plane with a Madewell .49 ignition engine and no shielding! Even S.A.M. Prexy, Joe Beshar flew it and was amazed at the lack of

interference. Arnold built the bird from a three-view plan in an "Air Age Annual," scaling it up — now that's work!

Dale Myers of Maryland arrived with a Playboy Sr. outfitted with an O.S. Max .30. This man really came prepared — rudder-only, no elevator. He built it especially for the contest. One of the better trimmed ships, too, as evidenced by the fact that Dale took a first in Class "B". Plan to see more of him at upcoming meets.



Frank Fay gives his 'Snuffy' a little help.

Naturally with a new mode of R/C old time flying the contestants were a bit skittish about the climb. It seemed a few competitors were practicing their aerobatics! Loops galore. Sure do miss that elevator! And what a hairy way to run an airline! And there were a few mishaps. Ray Hinds dunked his Playboy Sr. full bore when he lost his orientation on the climb. Ouch! The wing was a shambles, but the fuselage was in pretty good shape considering the impact. Don Lamkin busted the tail on his monstrous Cloud Cruiser also in the climb. The climb seemed to be the biggest culprit for accidents — too much power and "oops", not enough and "groan"! A very delicate situation.

Jack Van Deusen had a two hour hunt for his plane when it landed in the woods downwind of the field. Lucky man, he got it back without too much damage.

The results were somewhat predictable — short flights. No ten minute max's here! If a flier got two minutes, he was doing well. Most flights averaged about 1½ minutes. And the winners were:

Class A

1st Place — Woody Woodman

2nd Place — Mark Patrolia

3rd Place — Jack Van Deusen

Class B

1st Place — Dale Myers

to page 138

MODEL ACCESSORIES



WING HOLD DOWN SET
To attach wing to fuselage. The set includes: steel bolts, threaded blocks, moulded protective washers and all mounting hardware. \$1.49 per pkg.



NY-ROD KEEPERS
To secure Ny-rod and Golden rods to fuselage sides. Bend metal tab around rod and attach to fuse with double sided tape (included). \$.79 for four.



LANDING GEAR STRAPS
Strong nylon for main gear. Includes screws. \$.69 per set.



REMOTE SWITCH LEVER
An easy way to operate on-off switch located inside plane's fuselage. \$.98.



SKIS
For trike or tail dragger planes. Easy to install - available in four lengths: 8, 12, 15, 18". Molded in runners for good tracking. \$8.95 per pair. Nose wheel ski - \$4.50

Semco makes more than 280 accessories for models. Send 25¢ for a catalog of all of the mufflers, tools, hardware, and accessories available from Semco.



Semco
Model Engineering Co.

60 Felton St., Waltham, MA 02154
Telephone: (617) 899-9249

YELLOW PERIL

With the looks of a World War II fighter and the gentle habits of a trainer, Yellow Peril is perfect for the novice and a delight for the sport flier. It's Yellow Peril, but it's pure pleasure.

BY TOM MEHL

First let me say I'm not a famous designer like Lee Renaud or Joe Bridi. No, I'm not a hot pilot, either. No threat to the likes of Terry Prather or Rhett Miller. As a matter of fact that's why I designed the Yellow Peril. I thought it would help me be — well, be somebody. You know, a V.I.P. like Don Dewey. The stuff of which legends are made.

Everybody respects and envies Dewey. He has about him an aura, an air of assurance, a commanding confidence that mesmerizes the meek and humbles the mighty. And he is rich; yes, richer than a king. I had the opportunity to witness the Dewey phenomenon personally at Tangerine once. I shall never forget it.

There I was, a mere face in the crowd who by luck of fate found himself standing next to Rachel Walsh.

"How's the grape juice business, Sugar," I said, trying to be suave.

She didn't even hear me. Like everybody else she was waiting for Dewey. He was nowhere to be seen and there was an air of urgency about the crowd — a kind of nervous expectation that hung in the air like a swarm of gnats. Then it happened.

Dewey arrived amid the howling cacophany of a hundred police sirens, flanked by his own personal bodyguard who protects him from the throngs of nubile young RC groupies who follow him everywhere. The crowd was drawn to him as a magnet draws shards. Gad! The electrifying PRESENCE of the man! Jauntily clad in his day-glo Nomex flying suit, his 17-foot long velveteen scarf, his sealskin boots and antelope flying gloves, Dewey cut a wide swath through the pits, evincing a nameless thrill from casual spectator and seasoned pro alike. Smiling benignly in acknowledgement of the adoration of the masses, he strode purposefully to the registration area, the essence of urbanity and sophistication.

"More than just a pretty face," whispered Rachel in a voice reserved for heroes.

Then we heard the famous Dewey oratory, which rivals that of Churchill himself, honed as it has been by years of insightful wordsmithy in editing RCM. Raising a gloved hand to silence the ovations of the multitude, Dewey spoke in a voice rich with timbre and the authoritative ring of steel: "Me Fly Now," he said.

Rachel was beside herself (in more ways than one). "Why he's a veritable Adonis,"

she breathed in a voice aflame with passion. Her lips were quivering, her pupils dilated in desire. The gossamer whisp of fabric that served as her blouse was strained to the breaking point by her heavy breathing and sensational figure. And it was all for Dewey.

I wept.

Fame and fortune were Dewey's, not mine. And this, dear reader, was the awful thorn, the burr under my saddle, so to speak, that drove me to design **Yellow Peril**. Incidentally, Dewey failed to qualify for the meet when he flew his Wen-Mac powered Tin Lizard into the judges stand.

"Radio failure," someone said.

"He did it to save that busload of innocent school children." That's what most people said.

Later, in the privacy of my own home, I pondered my fate. "Damn it," I said, kicking over a lamp. "I'm tired of being a faceless nobody while fellows like Dewey get all the swell girls! I'm going to risk a postage stamp and send for Walt Mitchell's free book, 'How Ability In Airframe Design Earned Me a Measure of Respect From the Entire Atlanta RC Club, Not to Mention World Acclaim.'" Better yet, I'll hitch-hike down to Atlanta and talk to him personally. I needed all the help I could get on this project, my knowledge of aircraft being somewhat limited. Empennage? I always thought that was a French perfume. And I didn't know any Reynolds numbers. Not even their area code. Balsa sands easier than aluminum, anyway.

Enroute to Atlanta I began to get really excited about the stir my new design would cause. "Boy," I thought, "this'll be the biggest news in RC since Phil Kraft got his third conviction for stealing hub caps!"

At length I found myself standing before a magnificent Georgian mansion — like the one in "Gone With The Wind" except bigger and prettier. I knew I was in the right place because, carved in solid jade on the facade of the structure were the words, "The Entire Atlanta RC Club."

The Atlanta RC Club certainly has its "tone" — antithetic of the deportment of those great rowdies, the Fort Worth Thunderbirds, who brashly boast that "every man in our group kin hold his likker, spark the gurlies, 'n fight like hell." The Atlanta Club has a very distinguished, very proud history and, in this respect, they have reason

to page 135



500 ML

BY PAUL DENSON

Back in July 1940, a sport type plane appeared in the Air Trails Magazine that was so small that it didn't even meet the weight requirements based on engine displacement according to the "new Academy rules", therefore, it couldn't be entered in competition.

The plane, the Half Pint, was "so small it could be carried to the flying site in a shopping bag, so the aeromodelist would be spared much embarrassment and explanation on the way to the field. Jeers from the neighborhood kids, truck drivers, and dogs, will cease when you tuck your Half Pint under your arm and set out for the field."

The above is quoted from the article by the designer, the late Lou Garami, who also said he had never seen a "sporting flyer". Since Garami didn't design the Half Pint for competition, then perhaps he was our first sport flyer.

In 1971 I designed a plane with a 1/4A engine which I called the Quarter Pint. I was not then aware of the above article and plans; I had only a side view of the plane along with the wingspan and length. The Quarter Pint faintly resembled its famous ancestor, but it flew like a dream. It started out to be a single channel R/C but, because of various and sundry difficulties, it would end up being free-flight. It flew through many flying sessions before it was retired. Those wheels sticking way out in front were intended to protect the plane from hard contact with the ground, although they were really never necessary for that. With power off, it floated to the ground in a wide flat circle and many times I caught it without having to move a step from where I originally launched it.

Recently, when we lost our field and moved to the nearby San Diego Charger football stadium for our sport flying, I wanted a plane that could use the light poles to advantage rather than flying above them like everyone else did. I wanted something that would take-off short, land even shorter and turn on a dime. I wanted to play ring-around-Rosie with the light poles, which is similar to pylon racing, I am told.

Why not scale up the Quarter Pint and put in a 3 channel radio, have a highly undercambered wing so it would fly backwards in a gentle breeze, and could be taken to the field, in a "shopping bag" which has more carrying capacity than some of our compact cars?

Why 500 ML? Well, as you know, the metric system is on its way and, to introduce you to millimeters, centimeters and cubic centimeters, all the dimensions on the plans are metric. Have no fear, the English equivalents are just below. There are no exact



500 ML

Designed By: Paul Denson

TYPE AIRCRAFT

Old Timer

WINGSPAN

57 1/2 Inches

WING CHORD

9 3/4 Inches

TOTAL WING AREA

560 Square Inches

WING LOCATION

Pylon Mounted

AIRFOIL

Undercamber

WING PLANFORM

Constant Chord

DIHEDRAL, EACH TIP

3 1/4 Inches

O.A. FUSELAGE LENGTH

30 3/4 Inches

RADIO COMPARTMENT AREA

(L) 9 1/4" X (W) 2 1/2" X (H) 3 3/4"

STABILIZER SPAN

17 Inches

STABILIZER CHORD (Incl. elev.)

5 3/4 Inches

STABILIZER AREA

97 Square Inches

STAB AIRFOIL SECTION

Flat Bottom

STABILIZER LOCATION

Mid-Fuselage

VERTICAL FIN HEIGHT

6 1/2" (twin rudder)

VERTICAL FIN WIDTH (Incl. rudder)

6" Each

REC. ENGINE SIZE

.15 Cubic Inch

FUEL TANK SIZE

4 Ounce

LANDING GEAR

Conventional

REC. NO. OF CHANNELS

3

CONTROL FUNCTIONS

Rud., Elev., Throt.

BASIC MATERIALS USED IN CONSTRUCTION

Fuselage Balsa, Ply, Spruce

Wing Balsa, Ply, Spruce

Empennage Balsa & Spruce

Weight Ready-To-Fly 44 Oz.

Wing Loading 11.34 Oz./Sq. Ft.

equivalents for the dimension in which balsa wood comes without going to decimals so these are just eyeball equivalents. I don't want you science students writing in bothering our Editor telling him that 1/16" isn't exactly 1.5mm - - - I know, I teach Chemistry. (Actually 1/16" is 1.5874999mm. - Ed.) Originally, the Quarter Pint was almost called the .125 Liters which is 1/4 of a pint. Since the new plane is about twice the size of the original Half Pint that would make it a full pint and that brings a lot of things to mind, but they aren't metric, so 1 pint is equal to .5 liters which is 500 milliliters or 500 ML. Confused?

In building the fuselage, it saves time if you cut the two 3/32" sides to shape and build the frame around them. It will be confusing if I use metric in the text, so all measurements here will be English. To build your left and right side, pin the sheet to your building board and build around it with 3/16" spruce longerons and 3/16" square balsa for the cross members. To make the other side, shim up the 3/32" sheet with 3/32" scrap and build around it the same as the first side. The cross members behind the sheet are 3/32" x 3/16" strips. Finish the fuselage in your conventional manner but be sure to use 1/2" triangular strips to reinforce the joint between the fuselage and the firewall. Coat the firewall with epoxy for strength and fuel proofing after the landing gear is sewn in. The landing gear wire is bent to fit outside the blind mounting nuts used to attach the motor mount. Drill 1/16" holes in the firewall and lace the landing gear on with fine copper wire and epoxy.

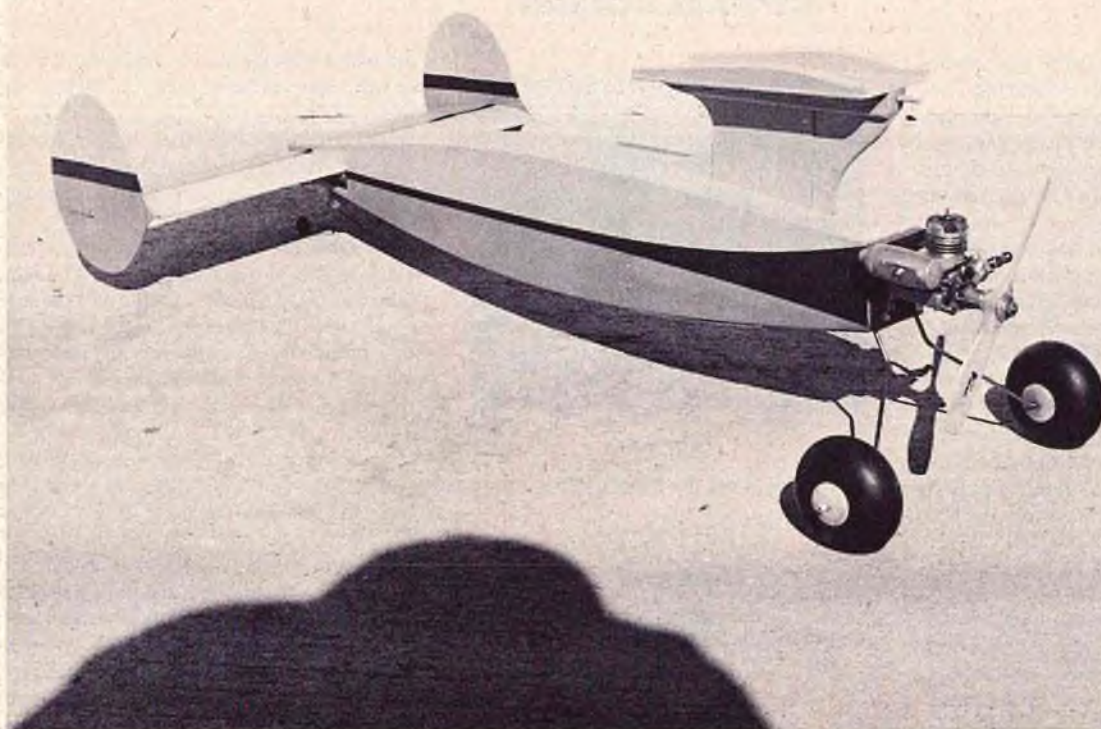
This is a good time to get the tank in place. A 4 ounce tank is more than sufficient with a .15 and, if you mount the tank horizontal with the top of the fuselage, there will be room enough under the tank for the battery. I used a 500 mil battery pack and it must be up against the back of the firewall to get her to balance where Mr. Garami recommended on the Half Pint — 40% from the trailing edge of the wing.

The pylon makes installation of the radio gear through the bottom necessary. Cover the bottom back to the first cross member with 1/16" ply, then leave the remainder open back to where the side sheeting stops. This will be your compartment access and can be covered later with a 1/16" cross grain ply hatch cover.

The stab and elevator are standard, no problems here. The stab is installed on its platform and the sides of the fuselage are sheeted in above it with 1/16" balsa. Be sure it is installed at right angles to the centerline of the fuselage and has no tilt.

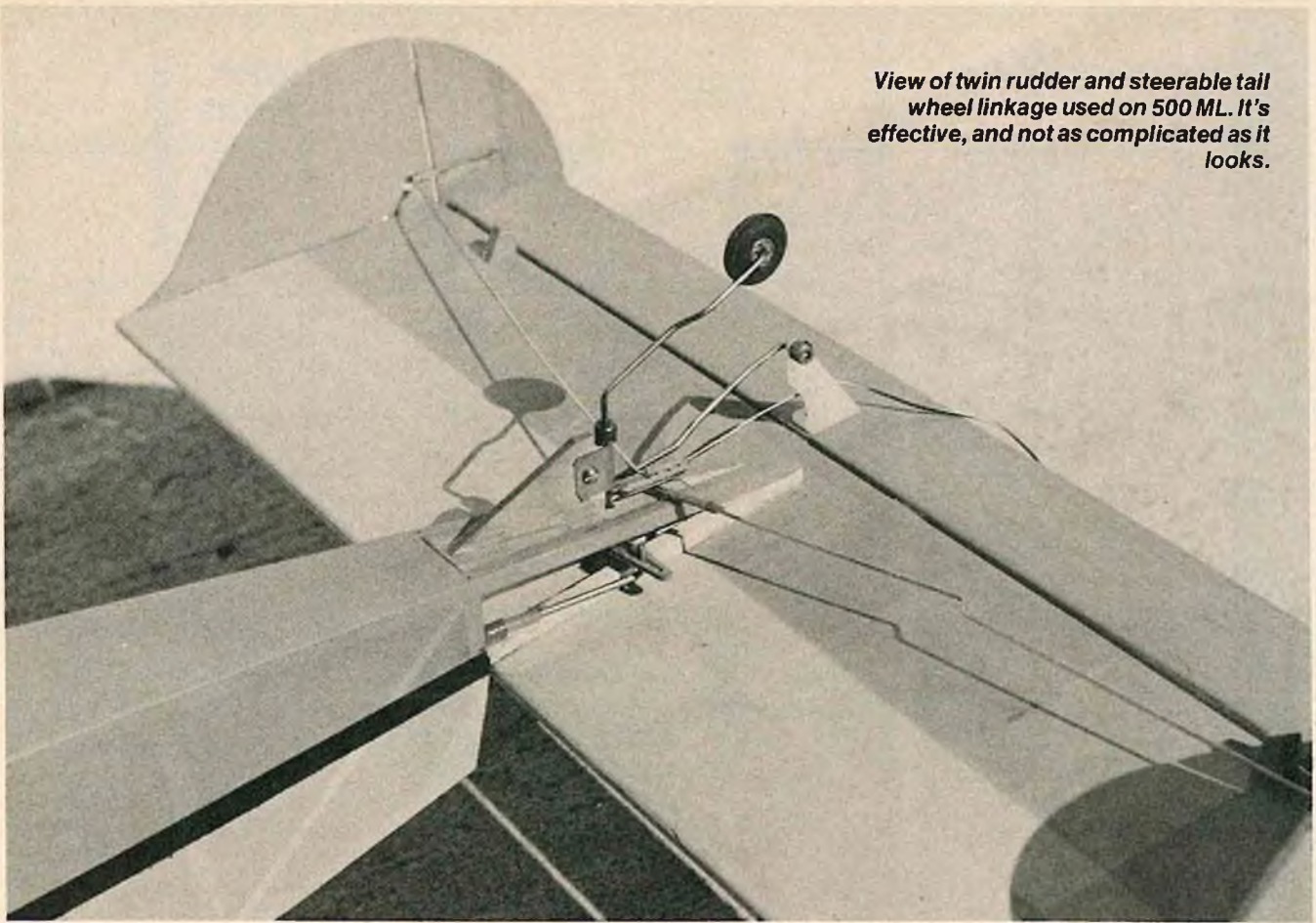
The wing is unconventional in that the

The 500 ML, with wing removed, showing the pylon mount and wing saddle.



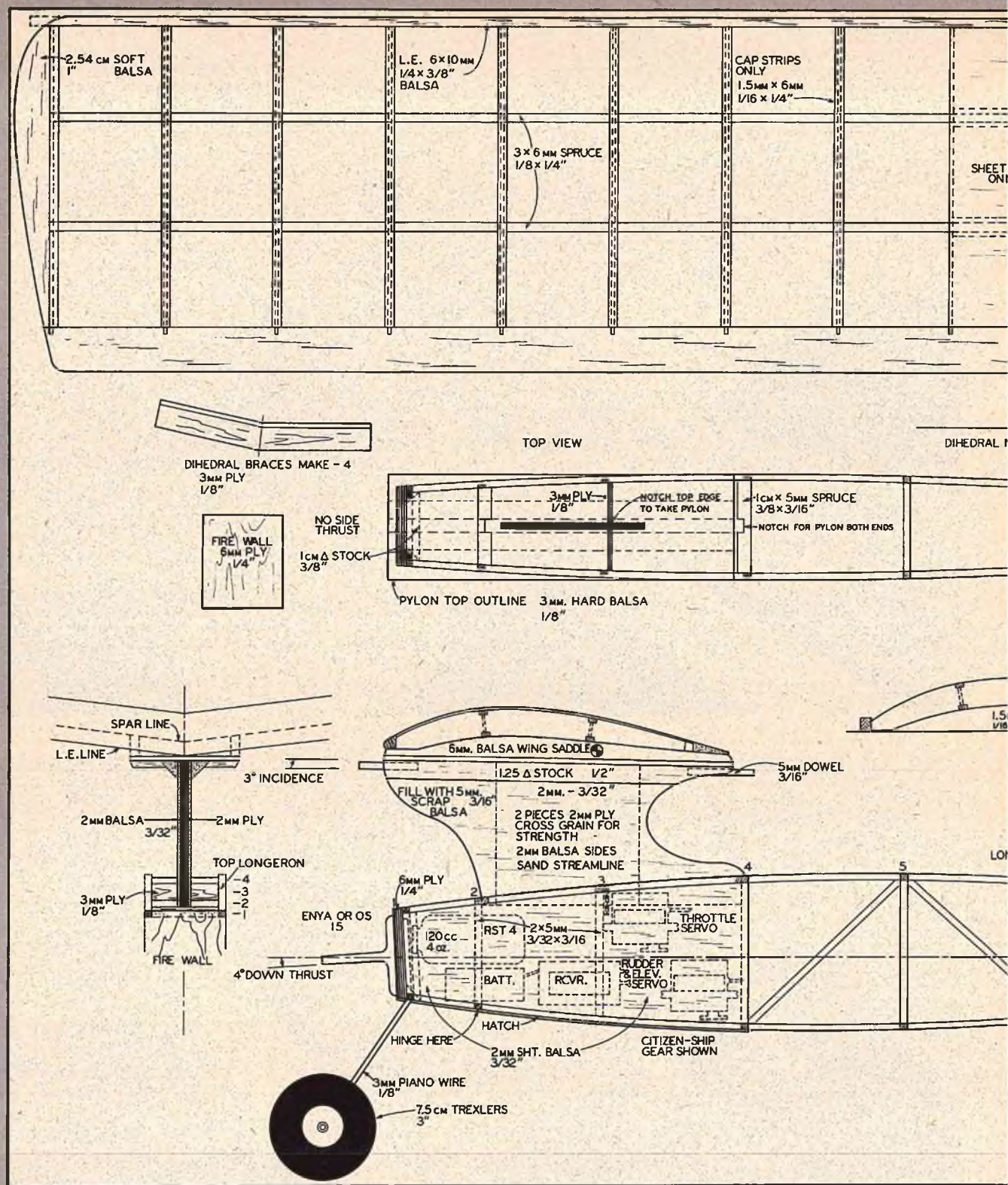
Close-up view of wing attachment to pylon wing hold-down dowels. Enya .15 engine used on prototype.

View of twin rudder and steerable tail wheel linkage used on 500 ML. It's effective, and not as complicated as it looks.



The 500 ML ready-to-fly. For sheer flying pleasure, high and thermalling or low and slow, this design just can't be beat.



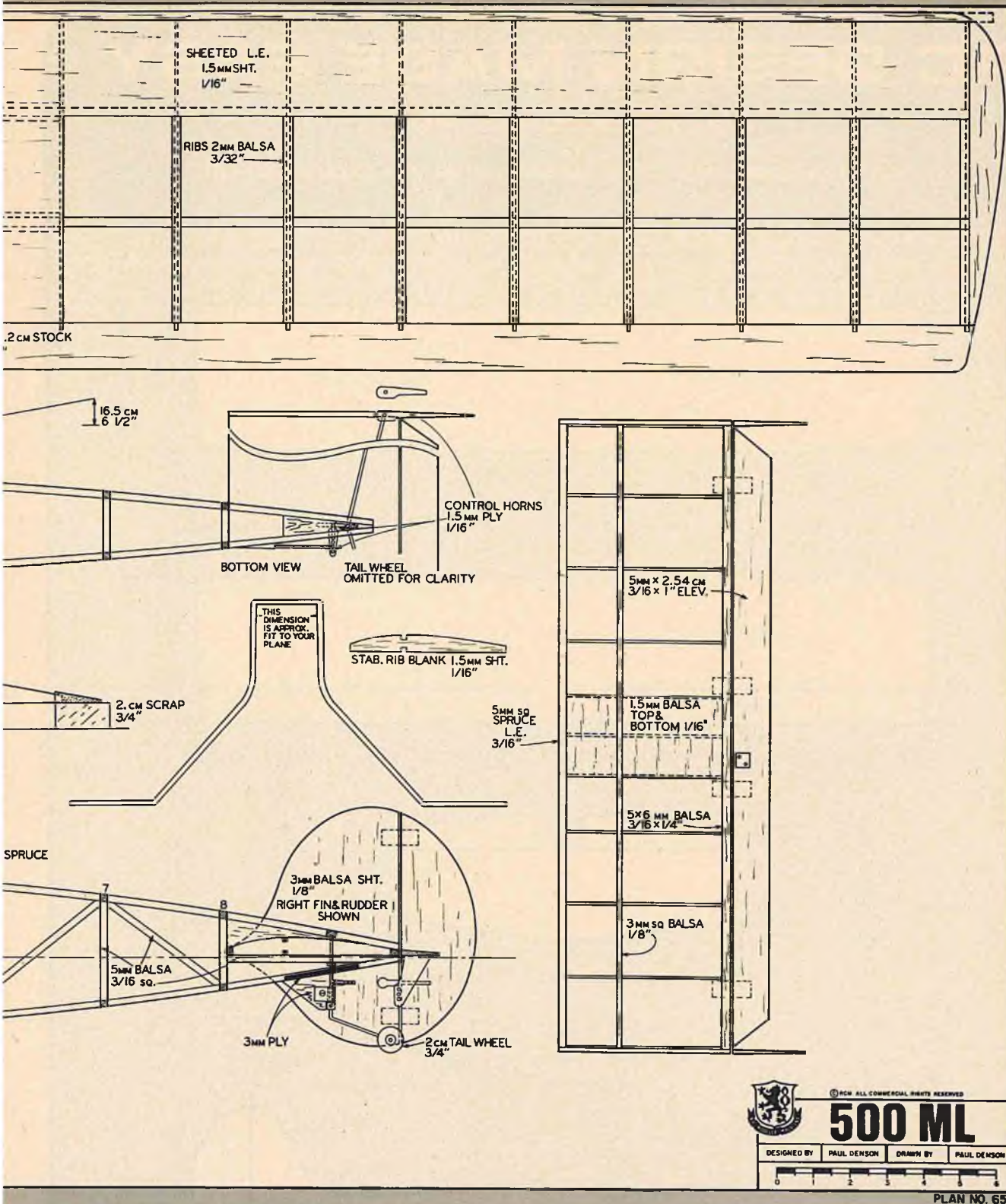


bottom spars are put on before the top, even though it is built right side up. Notch the trailing edge to take the ribs. I tape pieces of hack-saw blades together to cut these notches, two blades equal 1/16" and three equal 3/32". A piece of 1/8" square stock taped length-wise to the blades 3/16" from the cutting edge acts as a depth stop. The trailing edge is shimmed up with a scrap piece of 3/4" lumber and the leading edge is flush on your building board. Install the ribs

between the leading and trailing edge and glue in place. Allow to dry thoroughly then apply the bottom spars, making sure they do not stick out of the notches on the bottom of the ribs. When dry, glue the 1/16" webbing between the ribs. If necessary, trim flush with the top rib notches, then apply the top spar. Prop one wing half up 6 1/2" and fit the dihedral braces, one on each side of the spars, front and back alike. Add the wing tips and either use cap strips on the top of

each rib from the leading edge to the trailing edge or sheet the wing back to the front spar with 1/16" sheet then run the cap strips from there back to the trailing edge. Sheet the center section of the wing.

How do you transmit servo motion to the tail wheel and both rudders located out on the ends of the stab? Study the plans carefully, look at the picture, and you are on your own. 1/16" piano wire can be bent back double on itself if you are careful (a



wise helps). The actuator is a single piece of 1/16" wire from just under the stab all the way to the tail wheel. Be sure to get the wire in the plane before you epoxy the horns in place. A narrow slot about 1/2" in length and 1/16" wide will allow the wire to be pushed up through the ply triangular filler which acts as a support for the whole mechanism.

500 ML, in addition to being a fun plane, was a test bed for color. I wanted the plane

to be in the Fall colors of orange, brown, and yellow. I could not find brown dope or brown MonoKote. The rudders were sanded, then covered with Silkspan, while the fuselage and pylon were also covered with Silkspan. All this was given three coats of filler, sanding between coats, then sprayed with yellow and orange dope. When this was dry it was masked and given a coat of brown automotive undercoat then a coat of brown acrylic laquer. All of this was

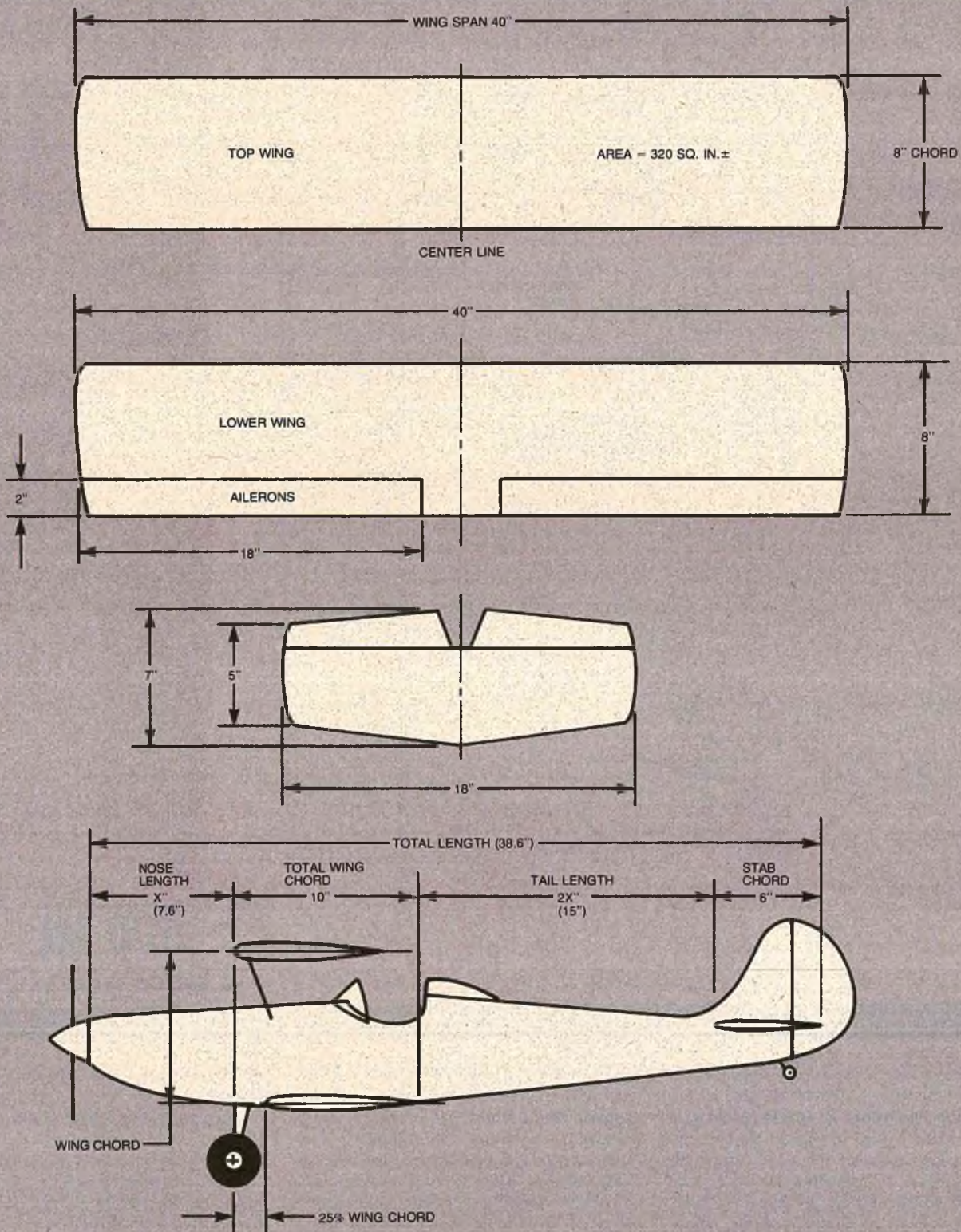
over-coated with clear dope for fuel proofing. The aft two-thirds of the wing was covered with orange MonoKote, the sheeting forward was covered with yellow. The brown stripe was made by applying a 1" strip of transparent MonoKote, which holds paint, to the juncture of the yellow and orange. It was then masked and given the same coat of brown that the fuselage had. The paint was purchased at a retail paint

to page 135

RC DESIGN MADE EASY

BY CHUCK CUNNINGHAM

PART I: A BASIC BIPLANE DESIGN FOR .40 SIZE ENGINES



● In 1965 RCM presented my article entitled "RC Design Made Easy". This was followed up in 1969 by a three part series with the same title. Now, several years later, it seems that this same article is again in demand. So, sports fans, here we go one more time.

A lot of the ideas that I'm going to pass along to you have been gleaned from study of popular aircraft over the years. Many model designers have their own rules of thumb when it comes to designing their aircraft. If you have designed your own ship prior to this, or have been successful in translating your dream ship to paper before, then you no doubt have guidelines that you follow, and it's quite possible that your own guidelines will be similar to those that I am about to detail for you. And, you may have read similar design articles in other publications. The earlier series has been rewritten and reprinted in model magazines all over the world. One was reproduced almost word for word.

But, enough of this - - - if you're interested in translating your sketches to a workable, flyable model, then read on. We will try to make it very simple for you to get the fun of saying . . . "I designed it myself . . ."

The Art Of Biplane Design

Since the good old, beautiful biplane has been with us for many years, and because so many of us like to fly sport and fun type aircraft, I thought that for Part I of "RC Design Made Easy", we would kick off with a bit on designing biplanes. Later we will take a look at trainer type aircraft, pattern type designs, and a bit of simple glider designs. But, for this month, you biplane lovers sit up and take notice. I will not be talking about scaling down an existing biplane design, since I went into this aspect last month. Rather, I am going to give you some insights into designing your own biplane, be it a 300 square inch cutie, or a 1600 square inch lazy Sunday afternoon floater, or someplace in-between.

To begin, the wings of a biplane are not as efficient as are the wings of a monoplane. As a matter of fact, a biplane's wings are just about 80% as effective as are a monoplane wings, so we need to increase the wing area that we are going to consider for our aircraft about 25% to arrive at the same lifting capacity. Take, for example, a Quickie 500 type racing aircraft for a .40 engine. If you apply this theory to a biplane, and want it to skip around the sky in the same manner, then we should begin by increasing the wing area about 25% or, in this case, having wings that total out to 625 square inches of wing area.

Early in full scale biplane design, most of them used top wings that were larger than were the lower wings. This ratio worked out to be 58% for the top wing and 42% for the lower wing. I have designed a number of successful biplanes with this ratio. Later full scale designers moved to having both the top and bottom wing with the same area. Either way works very well both in full scale, and in modeling. If you want to use a

smaller lower wing, then use the ratio set up above. For our example of 625 total square inches of area, the top wing would turn out to have 362.5 square inches, and the lower would have 262.5 square inches. But, for this inquiry into model design, we are going to take a look at an aircraft that has equal wings top and bottom, so each of our model's wings will utilize a wing area of 312.5 square inches, or at least pretty close to this area.

If you paid attention last month you will remember, I hope, that we found that it was most pleasing to the eye, and to the ultimate flying ability of the aircraft to have wings with an aspect ratio of from 5:1 to 6:1. This means that the span is from 5 to 6 times greater than the chord. Once again to find this relation from a given wing area we use the simple formula of $S \text{ (span)} = 5C$ (5 times the chord). $S \times C = \text{Area}$. Substitute $5C$ for S , and we get $5C^2 = \text{Area}$, which equals, in our case,

$$5C^2 = 312.5 = C^2 = \frac{312.5}{5}$$

which equals $C^2 = 62.5$, which, when we find the square root of 62.5, gives us a wing chord of 7.9 inches. Let's round it off to 8", and a wing span of 40". This gives us a wing area of 320 square inches for each wing, lop off a bit for the corners, and we are just about at our three-twelve. Or, if you wish an aspect ratio of .6:1 we can come up with a wing that looks like: span 43.5" and chord of 7.25", and a wing area of 315 square inches. Of course, you can fudge any of these dimensions to give you what you want, or to work around an available airfoil that you want to use.

Since I am putting the cart before the horse in this series of design, I am going to skip some explanation and give you answers only, with the explanation saved for later in this series. So; with that in mind, let's take a look at the ailerons on our biplane.

I have long believed that ailerons should be in the range of 12% of the total wing area to be the most efficient. With faster flying aircraft, the area of the ailerons can shrink somewhat, as does the aileron movement, but for a sport type aircraft, 12% is pretty good. If we look at our little biplane with a wing area of 625 square inches in this light, we find that we need ailerons of a total of 75 square inches. Now, this 75 square inches can be divided between the top and bottom wing, or it can be lumped all together in either the top or bottom wing. Since I am a lazy builder, I like to keep the ailerons in the bottom wing only, but you can do as you like. If we stick them in the lower wing (and we are using wings that are 8" x 40") we will have ailerons that are 18" long and 2" wide in each lower wing panel. Ailerons of this size will make your aircraft move when you want it to and will more than compensate for the drag of the top wing in the rolling maneuvers.

Next, let's study the relationship between the two wings when placed upon the fuse-

lage of our aircraft. If you plan to use a stagger in the wings and, by that I mean that you are going to have the leading edge of the top wing ahead of the leading edge of the bottom wing, then you must decide just how much stagger to use. Again, drawing from full scale design, the stagger has seemed to work out at an optimum of not more than 50% of the chord. This spreads the wings out quite a bit, and I have found that it is a little easier to get everything working together to use a stagger of about 25%. In the case of our 8" x 40" wings this gives us a stagger of 2", or, the top wing is ahead of the lower wing by 2". This gives us a total wing chord, measuring from the leading edge of the top wing to the trailing edge of the bottom wing of 10". To locate the Center of Gravity, take 25% of this distance or, in our case, this turns out to be 2.5" and this is the balance point of your model.

Next, how about the vertical separation between the two wings? Experimentation has shown that, for best all around flying, a separation equal to the wing chord will give you no "funnies". You can figure this separation between the zero chord line of each wing if you are using symmetrical or semi-symmetrical type airfoils or, if you are using flat bottom airfoils, then measure from the bottom of each wing. If you squeeze the wings together you may get a bunch of "funnies" from the air compressed between the two wings. This did happen to several full scale aircraft designed as fighters for the Navy during the late twenties and early thirties. Too tight a squeeze and you've got lots of problems. I agree that a tighter placement of the wings tends to look better, but don't do it, and you will be happier in the long run.

Okay, so what do we do about the tail feathers? How do we figure out what size we are going to use on our double winged bird. Again, don't ask "why" this month, just accept the fact that if you work on a horizontal tail area of 17% of the total wing area for a biplane you will have a great flying aircraft. It works perfectly every time. Using our 625 square inch wing pair, and taking 17% of this we get a horizontal stabilizer, including the elevator, of 106 square inches. If we use an aspect ratio of 3:1 for the stab we come up with a rectangular layout of 6" x 18". You can make this a tapered planform by adjusting the center and tip chords so that you have an average chord of 6", say, a center chord of 7" and a tip chord of 5". Get the idea? Use an elevator area of 25% of the total horizontal stab area and you will come out just fine. Make the total vertical tail area in the order of 1/3 of the area of the horizontal and you will complete the tail grouping. Use a rudder area of about 1/2 of the total vertical area and things will work out great on the aft end of your aircraft.

So now you ask, and rightly so, how do we tie the wings, tail and engine together to get a pleasing looking biplane. In other words, how do we go about designing the fuselage? Well, if you work on the relationship of the fuselage to one of the wings, you

to page 134





● Having flown as well as towed full size sailplanes, it was only natural that my first interest in RC model aircraft would center around gliders. After learning the basic skills involved in both thermal and slope soaring, albeit numerous mishaps including three near wipeouts, it was with keen interest that I welcomed the RCM series of articles on Basic Sailplane Design. Here were the needed parameters and relationship one to another that would enable me to develop my own ideas into a model that should truly perform. Then the issue of R/C Modeler arrived announcing the annual RCM Design Contest. This was the final impetus and I was off and running.

The experience I gained while constructing and flying two sailplanes from kits led to the establishment of certain criteria which are incorporated in Happy Face. These criteria include the following: provide space for a 500 mah flat configured battery pack to fit in the most forward nose compartment; reduce drag by eliminating rubber band wing attachment and attendant dowels protruding through the fuselage; minimize tail weight through light construction and min-

BY ERROLL L. WILLIAMS Major, USAF Retired

imal tail moment arm in order to keep ballast to a minimum; conventional construction and building techniques to stay within the skills of the average modeler; and, finally, the resulting model must be stable during a hi-start launch.

Let's get started with the construction.

Fuselage:

The flat bottom fuselage allows construction directly over the plan to assure perfect alignment. The 1/8" plywood bottom gives required strength and provides for a simple tow hook installation. Bulkheads and formers 1 through 5 are constructed of 3/32" plywood while 6 and 7 are made from 1/8" sheet balsa. Drill 3/16" diameter holes in bulkheads for Gold'N-Rod installation before fuselage assembly. The hole location for these will depend on the servos used. The plans show the correct location for a Hobby Lobby 5 installation.

Construct the fuselage bottom using the plan template for a pattern. Notches for the bulkheads provide for positive-lock assem-

bly. If not desired, the bulkheads must be shortened accordingly. The fuselage sides are made from 3/32" hard balsa and are cut to the size indicated by the heavy arrows on the fuselage side view. Glue the 1/4" x 3/32" spruce stringers to the fuselage sides prior to assembly as well as the 3/32" square soft balsa longerons aft of the wing. Be sure to taper these for a close fit at the aft end to assure a sturdy structure for the tail loads. Glue the bulkheads to the fuselage bottom making certain that they are perpendicular. Next glue both sides in place making sure that they contact all bulkheads. The nose block is made from three pieces of one inch pine board cut to shape and laminated. Bore a 3/4" hole for ballast. The nose block is now glued in place and sanded to fit. Rough shape the two balsa blocks and glue to the top of the forward nose. Glue the 1/8" plywood aft wing attach gussets to former 4 and the fuselage sides. Do not sheet the fuselage top aft of the wing until the Gold'N-Rods are installed. Set the fuselage aside at this time.

Wing:

It is desirable to construct each wing half

A Standard Class sailplane that has logged hundreds of flights, many over an hour in duration. Equally at home on a slope or in a thermal, its structural integrity is designed to withstand virtually any maneuver or rough landing terrain.

HAPPY FACE

as a unit. This will require a folding, or improvised, building board with the outboard section raised to the correct height for the outboard polyhedral angle. This method of wing construction will assure a true wing upon completion and is well worth the slight extra effort. The ribs are 1/16" medium soft balsa except the root ribs which are 1/16" plywood. Make 1/16" plywood templates using ribs 3 and 4 as a pattern. Sandwich 7 rib blanks between the templates and sand to shape. Repeating this operation will yield the required number of ribs for both outboard wing panels.

Begin construction by pinning the lower 1/16" balsa sheeting over the plans and glue the lower main and rear 1/4" x 3/32" spruce spar caps in place. Next, glue the lower rib caps and butt glue the 1/4" x 1/2" hard balsa leading edge. All balsa ribs, except the polyhedral joint rib, are now glued into position. Use the root rib dihedral gauge to properly cant the root rib. Bevel the 1/16" upper trailing edge. The upper spar caps are now glued into position and then the 1/16" plywood polyhedral braces. Cut the polyhedral rib as required and glue. Fit the spar webs between the ribs and glue. These are 1/16" vertical grain balsa except at the wing joiners which are 1/16" plywood. Do not install the forward wing joiner webs on the main and rear spar at this time. Cut the 3/16" O.D. brass tubes for the aft wing-to-fuselage attachment and epoxy to the wing web and the 1/8" plywood doubler. Construct the opposite wing panel using the same procedure. Locate, but do not secure, the four 3/16" O.D. brass tubes. These are positioned on the lower spruce spar cap touching the rear web. Cut two 5 1/2" lengths of 5/32" steel rod. Insert these into the front and rear tubes. Position the two wing halves flat on the workbench with the root ribs touching. Re-align the 3/16" tubes and epoxy in place. When dry, the wing halves may be separated. Fill the void around the tubes with balsa and epoxy and then close the box spar with the front 1/16" plywood web. Glue the 1/16" plywood root ribs in place. The 5/32" steel rod wing joiners are now bent to shape. Place each rod in a vise and tap with a hammer. Make certain they are bent to identical angles. Assemble the wing halves and position on the fuselage. After assuring a perfect alignment, by measuring from each tip to the fuselage tail, drill two 3/16" diameter holes horizontally through the wing leading edge, using the holes in bulkhead #3 for a guide. Drill 1/8" diameter holes through the aft wing attach gussets using the 3/16" wing brass tubes for a guide. Epoxy the forward wing-to-fuselage 3/16" attach dowels in place with the wing still positioned on the fuselage. Add the 1/8" balsa doubler to reinforce the dowels. When dry, remove the wing from the fuselage and complete the sheeting. Add the upper rib caps. Shape the leading edge and then glue and shape the wing tips. Again, position the wing on the fuselage and add the balsa filler to the top surface of the wing from the main spar forward. Shape to the outline of bulkhead 3 and blend into the

wing. The wing can now be sanded and set aside.

Tail Surfaces:

The flying tail design of Happy Face gives good positive control response, yet is not over sensitive. The horizontal leading and trailing edges are medium hard balsa and the spar is spruce. Cut the ribs from 1/16" sheet medium hard balsa and slide on to the spar. The 1/16" plywood control horn

the two halves in the following manner: Drill an appropriate size hole to fit the inner rod of a Gold'N-Rod in the forward section of the right and left horizontal. Cut a length of inner Gold'N-Rod to extend through both holes to the root rib. Assemble the horizontal with the Gold'N-Rod epoxied in each half making sure that the leading edges are aligned at the break. When dry, cut through the Gold'N-Rod and all break points will be perfectly aligned. Cut a 1" length of 1/16" piano wire for this joint.

The vertical is constructed of a 1/8" plywood load carrying member and 1/8" medium soft balsa to keep weight to a minimum. The lightening holes in the plywood do not affect strength. Be sure to install the 1/4" x 1/8" medium hard balsa strips to carry the hinge loads. The horizontal hinge tube is cut from 1/16" I.D. brass. It must be installed perpendicular to the vertical stab. A length of 1/16" piano wire inserted through the tube will assist in this alignment. The airfoil shaped members glued to each side of the vertical stab provide the necessary rigidity for the horizontal. The slot for the horizontal aft break point must provide for full travel without binding. Check this during control system checkout. Cut slots for the hinges but do not install until surfaces are covered.

Canopy:

The canopy framework is constructed in place on the fuselage to assure a perfect fit. Pin the canopy base to the fuselage and glue the front and rear formers in place. Saran Wrap, placed between the formers and fuselage, will prevent gluing to the fuselage. Install the two 1/8" dowels. When the assembly is dry, sand to shape. Drill a 1/8" diameter hole through the aft former using the appropriate hole in bulkhead 3 as a guide. Remove canopy and glue a 1/4" length of 1/8" dowel in this hole. After painting the inside of the canopy frame to the desired color, the clear plastic may be cemented to the frame. Duco Glue is an excellent adhesive for this purpose and dries clear. Apply glue to the top edges of the canopy formers and place the canopy frame upside down on the plastic. Weight down and let dry. Now apply glue to one side of the canopy formers and the edge of the canopy bottom. Wrap plastic around the canopy frame and fit into a 90° corner between the workbench and wall. Weight the assembly and, when dry, repeat the operation for the other side. Trim the plastic and canopy is complete.

Finishing The Fuselage:

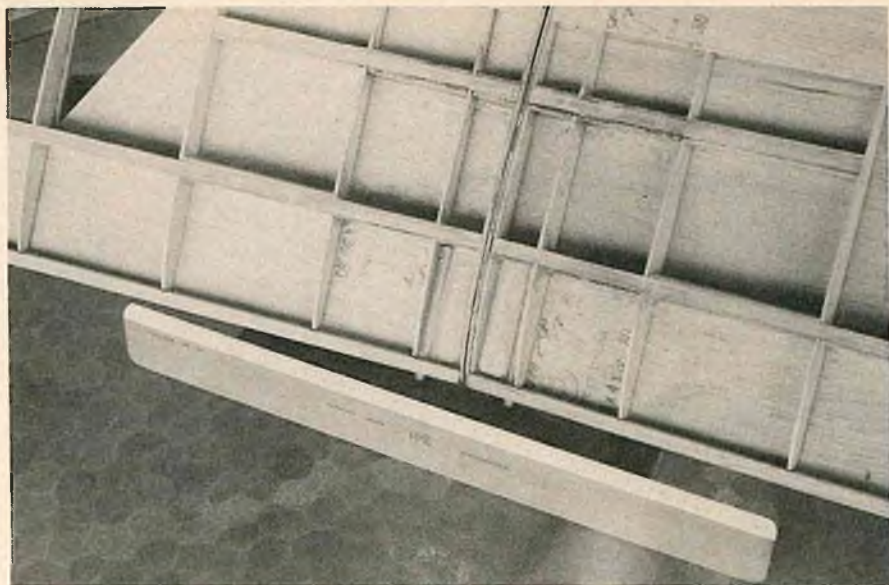
Locate the Gold'N-Rod rudder exit hole in the right fuselage side. A small round file is an excellent tool for making this hole. Do the same for the horizontal tail surface filing the hole through the 3/16" square longeron. Install the two Gold'N-Rods, making sure that there is no binding, and then secure to the bulkheads. (Silicone sealer is an excellent product for this operation.) The top of the aft fuselage is covered with 1/16" sheet balsa. Locate the horizontal Gold'N-Rod exit hole in the sheet, then slide over the rod

text to page 132

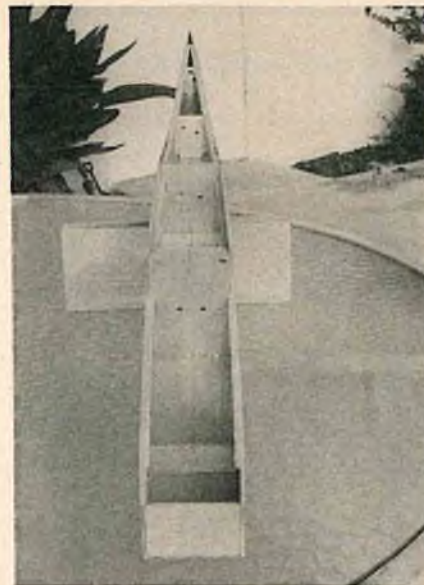
HAPPY FACE Designed By: Erroll L. Williams

TYPE AIRCRAFT	
Standard Class	
WINGSPAN	
85 Inches	
WING CHORD	
7 3/4" Root — 5" Tip	
TOTAL WING AREA	
610 Square Inches	
WING LOCATION	
High Wing	
AIRFOIL	
Mod. 4309 (flat bottom)	
WING PLANFORM	
Constant Chord Center	
Tapered Tips	
DIHEDRAL, Each Tip	
5 Inches	
O.A. FUSELAGE LENGTH	
43 1/4 Inches	
RADIO COMPARTMENT AREA	
(L) 10" X (W) 2" X (H) 1 1/4"	
STABILIZER SPAN	
22 1/2 Inches	
STABILIZER CHORD (Incl. elev.)	
4 1/4" (Average)	
STABILIZER AREA	
85 1/2 Square Inches	
STAB AIRFOIL SECTION	
Symmetrical	
STABILIZER LOCATION	
Mid Vertical Fin	
VERTICAL FIN HEIGHT	
7 3/4 Inches	
VERTICAL FIN WIDTH (Incl. rudder)	
5" (Average)	
REC. ENGINE SIZE	
NA	
FUEL TANK SIZE	
NA	
LANDING GEAR	
NA	
REC. NO. OF CHANNELS	
Two	
CONTROL FUNCTIONS	
Elevator and Rudder	
BASIC MATERIALS USED IN CONSTRUCTION	
Fuselage	Balsa and Ply
Wing	Balsa, Ply, Spruce
Empennage	Balsa, Ply, Spruce
Weight Ready-To-Fly	32 Ounces
Wing Loading	7.55 Oz./Sq. Ft.

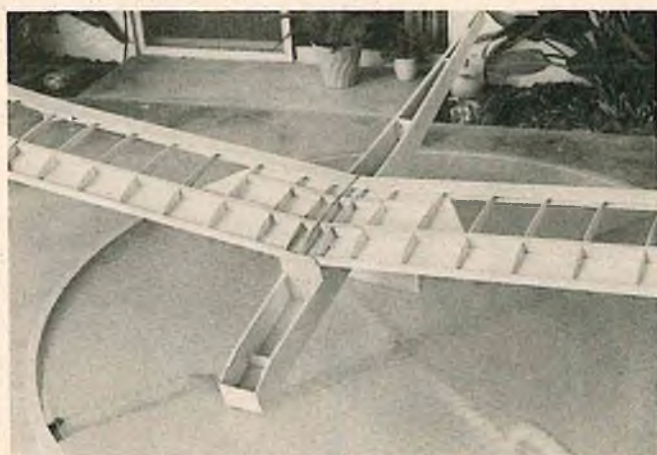
is installed after completion of the horizontal and is inset into the root rib. The horizontal is constructed with three break points. This assures a rigid surface that will be free of any tendency to flutter. The hinge and aft break points are constructed from 1/16" I.D. brass tubing epoxied to the left horizontal with 1/16" piano wire aligned and epoxied to the right horizontal. The forward break points is installed after completion of



View of wing center section minus top sheeting.



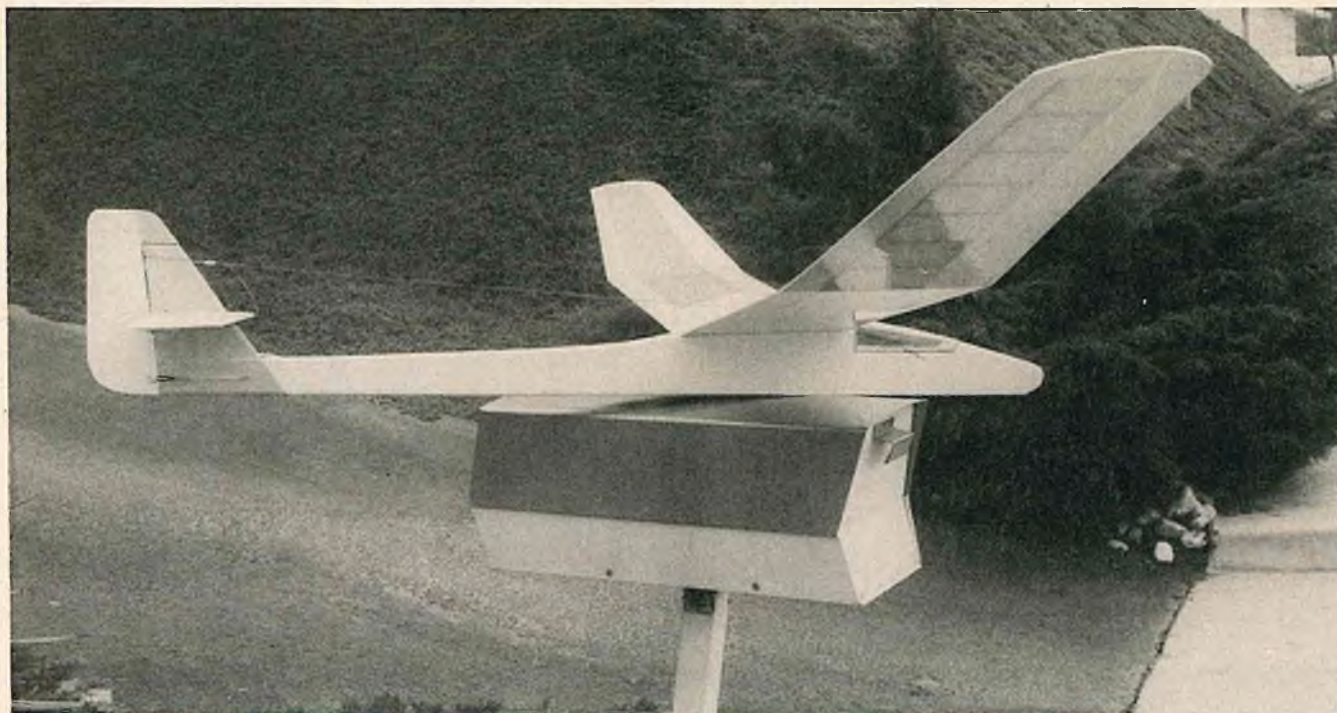
View of fuselage bulkheads.

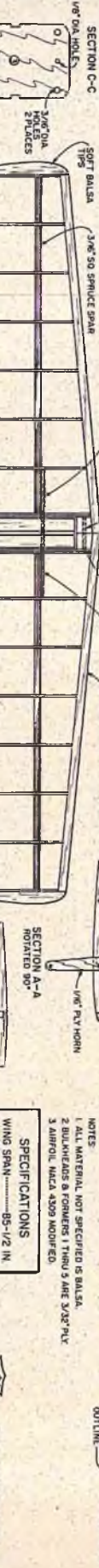
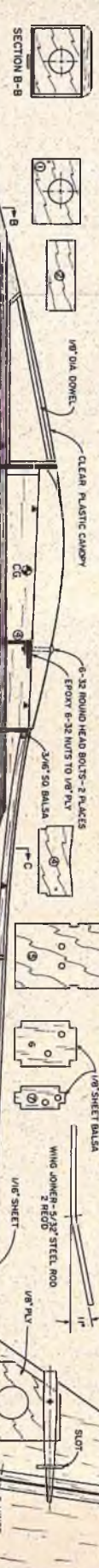
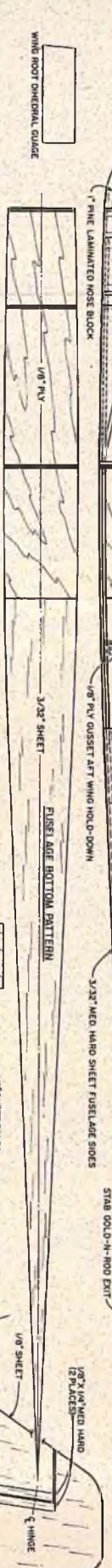
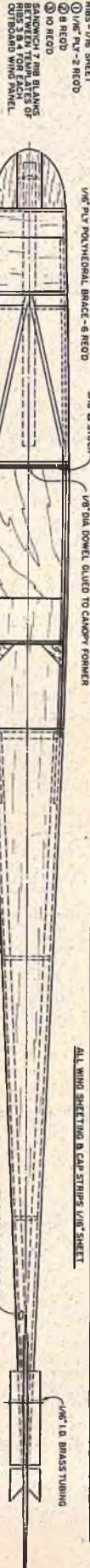
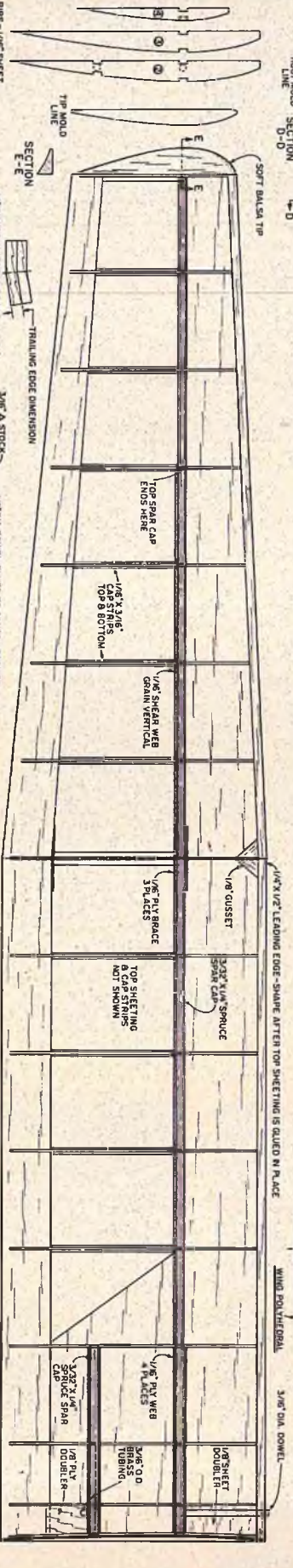


Basic fuselage structure with semi-finished wing in place for trial fit before sheeting.



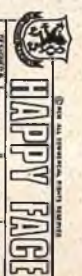
The completed Happy Face, ready for covering. Rugged, light, and easy-to-build.

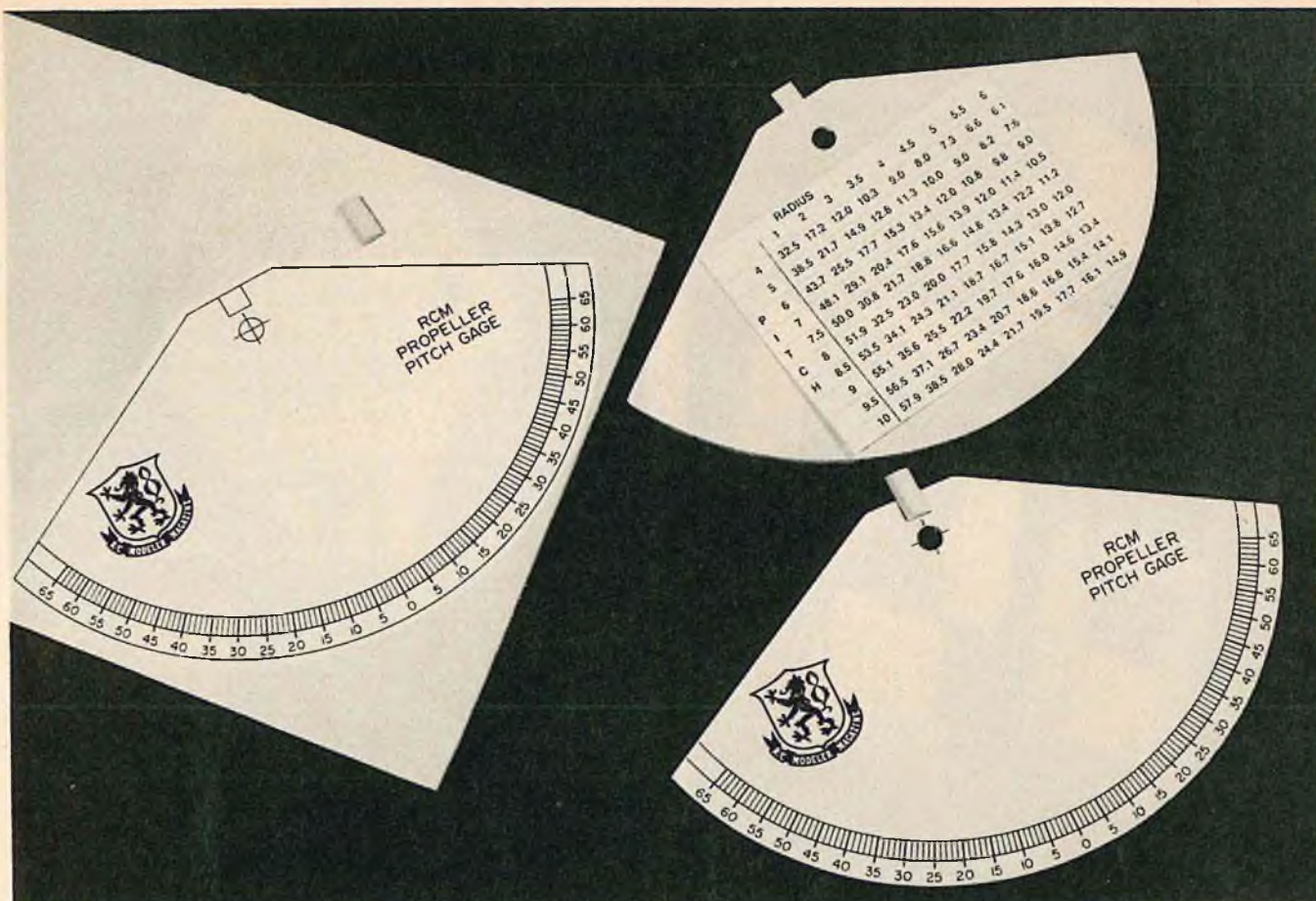




NOTES
1 ALL MATERIAL NOT SPECIFIED IS BALSA.
2 BULKHEADS & FORMERS 1 THRU 5 ARE 3/32" PLY.
3 AIRFOIL NACA 4309 MODIFIED.

SPECIFICATIONS
ING SPAN 85-1/2

WING AREA.....610 SQ. IN.
LENGTH.....43-3/4 IN.



Cut base layout from plans and glue to 1/8" plywood. Saw base to size and drill 1/4" diameter hole. Epoxy locator pin in position as shown. Glue pitch chart to back side of base.

HOW TO BUILD THE

by dick tichenor

RCM PROPELLER PITCH GAUGE

● It's a small world! Mr. Juan Carlos Pesce, Buenos Aires, Argentina, submitted a suggestion for a prop pitch gauge to RCM's "For What It's Worth" column. Don Dewey forwarded the letter to our engine expert, Clarence Lee, for evaluation and comments. Clarence replied as follows:

In 1946, right after getting out of the Air Corps, I built a prop pitch checker almost identical to this one sent in by Mr. Pesce. I built it from plans that appeared in one of the model magazines at that time. I have been using the thing for 30 years and have yet to find anything that works better. I have always been going to draw the thing up for an article myself, but never had the time.

You should have Dick Tichenor, or someone, make it into a construction article. If you would like, I can send you the one that I made. It is a little beat up after 30 years, but still works.

I don't know if Mr. Pesce came up with this on his own, saw the drawing I made mine from 30 years ago, or what. It is a darn good tool.

Clarence

Thanks Clarence, I needed another project!

Why bother with a prop pitch gauge?

Well, everyone knows that props should be static balanced to make sure both blades weigh the same or the vibration from an unbalanced prop can shake apart your engine, airplane and radio. Lack of dynamic balance can inflict the same havoc. If the blades of your prop do not have the same

pitch angle, they will each be producing different amounts of thrust when the engine is running which also creates vibration. When a prop has both static and dynamic balance, the engine will run smoother and deliver higher rpm's.

We have slightly revised the design of the
text to page 130

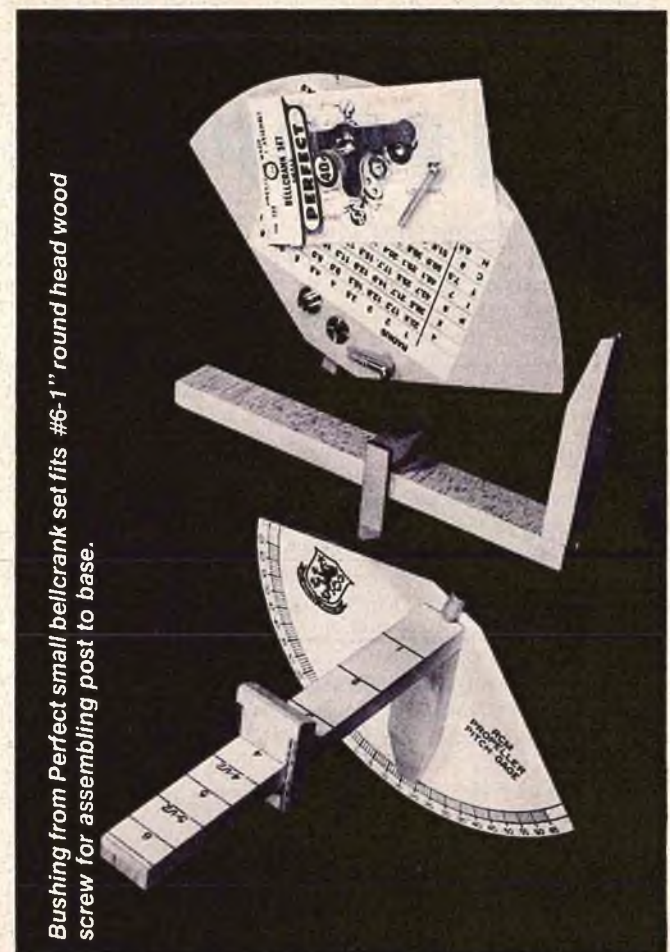
RADIUS		1	2	3	3.5	4	4.5	5	5.5	6
4		32.5	17.2	12.0	10.3	9.0	8.0	7.3	6.6	6.1
5		38.5	21.7	14.9	12.8	11.3	10.0	9.0	8.2	7.6
P	6	43.7	25.5	17.7	15.3	13.4	12.0	10.8	9.8	9.0
I	7	48.1	29.1	20.4	17.6	15.6	13.9	12.0	11.4	10.5
T	7.5	50.0	30.8	21.7	18.8	16.6	14.8	13.4	12.2	11.2
C	8	51.9	32.5	23.0	20.0	17.7	15.8	14.3	13.0	12.0
H	8.5	53.5	34.1	24.3	21.1	18.7	16.7	15.1	13.8	12.7
	9	55.1	35.6	25.5	22.2	19.7	17.6	16.0	14.6	13.4
	9.5	56.5	37.1	26.7	23.4	20.7	18.6	16.8	15.4	14.1
	10	57.9	38.5	28.0	24.4	21.7	19.5	17.7	16.1	14.9



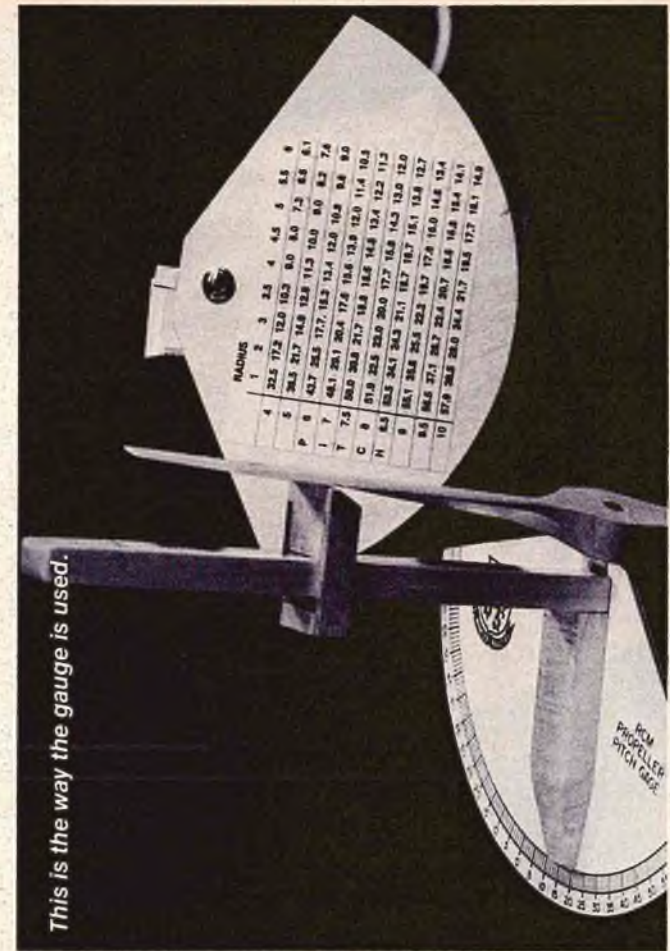
Assemble pointer and post with epoxy or white glue and two small nails. Glue radius scale to front of post.



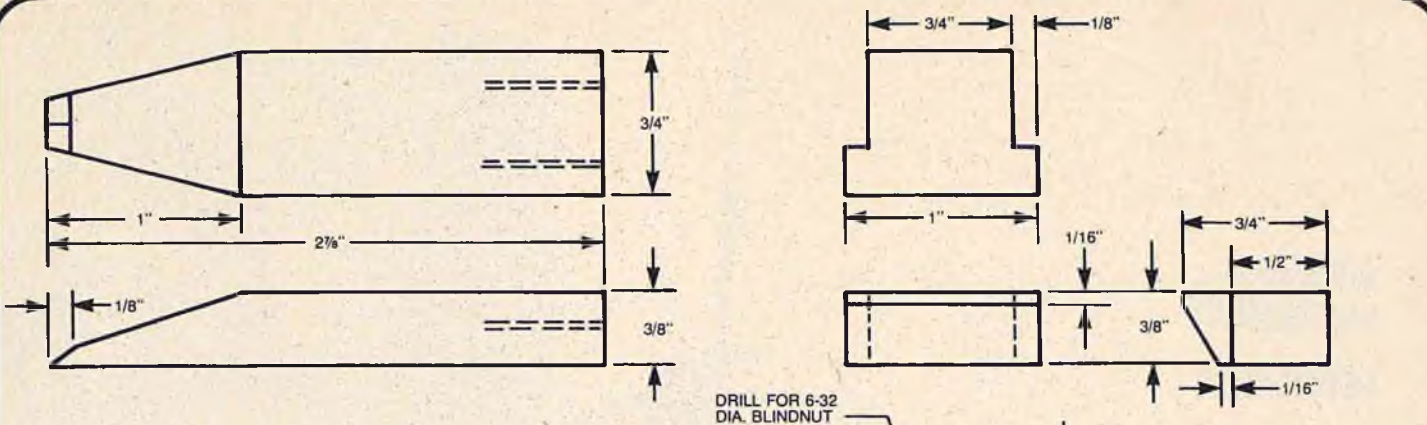
Slider is assembled with epoxy or white glue. Screw and blind nut have 6-32 threads.



Bushing from Perfect small bellcrank set fits #6-1" round head wood screw for assembling post to base.

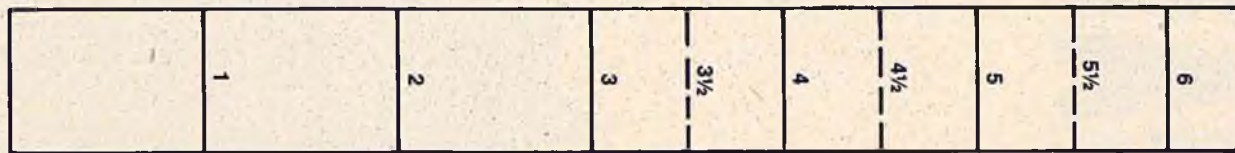
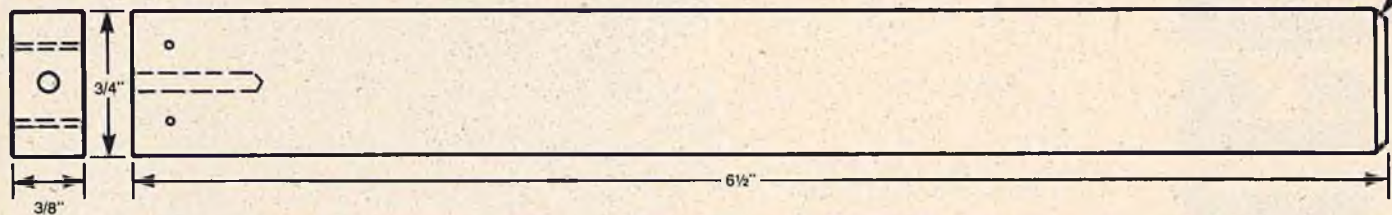
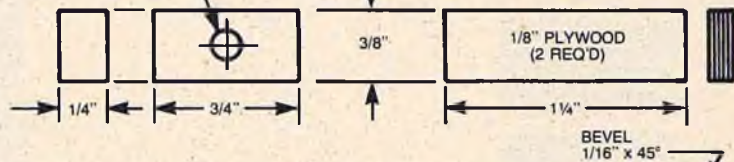


This is the way the gauge is used.



NOTE: PARTS MADE FROM 3/8" x 3/4" MAPLE MOTOR MOUNT STOCK EXCEPT AS NOTED.

DRILL FOR 6-32 DIA. BLINDNUT

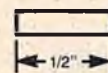
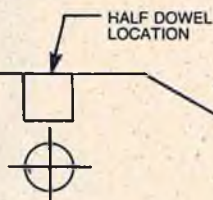


RADIUS SCALE

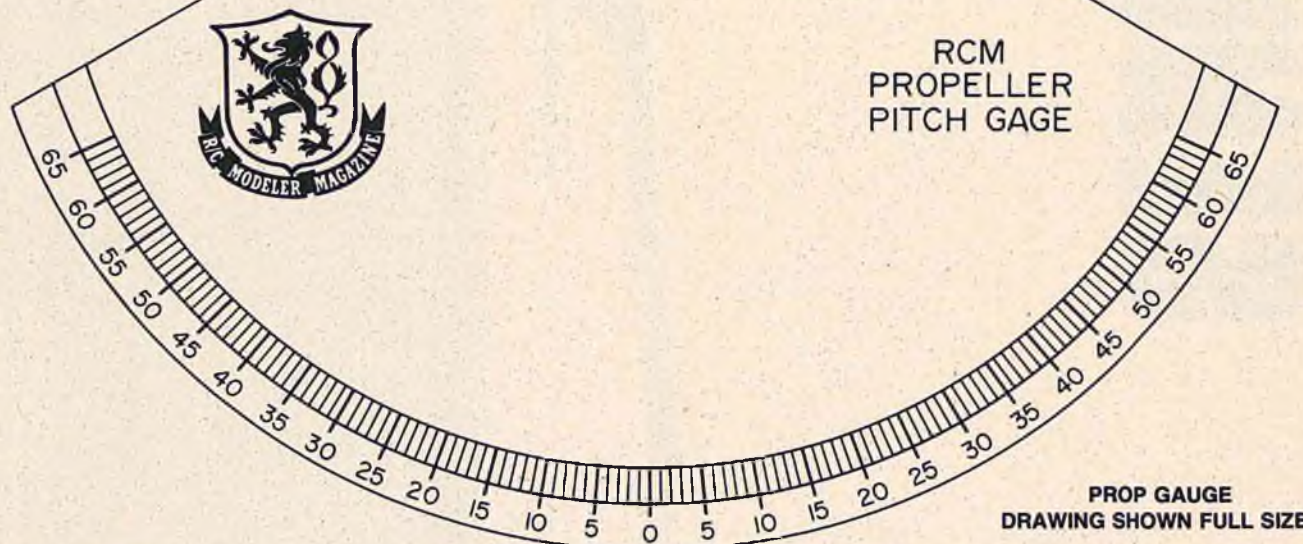
3/4" x 6 1/2"



SLIDER ASSEMBLY



BASE
MAKE FROM 1/8" PLYWOOD (5 PLY)



SENIOR FALCON IV



A modified Carl Goldberg Models Senior Falcon kit makes an ideal multi-engine trainer and sport ship with four Enya .15's. Weight, ready-to-fly, is 130 ounces for a wing loading of 23 ounces per square foot. Five channels are used operating rudder, elevator, motor, aileron, and brakes. Four six ounce tanks are required.

● A four engine Senior Falcon? You have to be kidding!

This is what I hear every time I bring the Sr. Falcon to the field. Seems to be appropriate words though, but I am **not** kidding.

How would anyone ever venture into a project like this? Well, it seems ever since I started flying R/C models, back some 8 years ago, I dreamed of some day having a four engine craft of some kind. I think that every RC'er has thought of building and flying a big four, at one time or another. You say, "One has enough trouble with one lousy engine, let alone four." Well, that could be true, but I figured if I took my time and moved up to a project like this using a reliable proven flying platform, the project would go smooth and easy.

I started by selecting, as I said, a stable platform to work from. I wanted something that was a proven flier and had a lot of wing area. Looking over the scale jobs available, showed me nothing but disappointment. What you hear and see is nothing but trouble if you are not a super experienced pilot. If I wanted something to fly I had better forget about anything on the market that had multi-engines. It would be sheer disaster with my experience. I wanted my four engine turning bomb to fly, and as easily as possible. You see, I know my capabilities and wanted something that took very little hassle to become airborne. I consider myself a typical Sunday flier.

BY GEORGE STEINER

My experiences with the Carl Goldberg Falcon group seemed to be what I was looking for. The Sr. Falcon would be ideal to modify and, besides, I already had a kit on hand. The wing area was large enough to pack the extra load that would be impressed on it. The basic airframe was strong, straightforward, simple to build, had no compound curves, and I knew that basically it would fly.

All I had to do was concentrate on the engine nacelles and that horrible linkage that would drive anybody up a wall. But as you read on, you can see how I solved the linkage problem. Remember this project objective was to have a multi four-engine plane that didn't take a super expert to get it off the ground and back.

One of the first things I did when planning to get the project off the ground was to select the power plants. Like a lot of things in life, you tend to follow the direction of least resistance and, at this time, I just happened to have two Enya 15's, half-way there so to speak. All I had to do was find and purchase two more. This was no problem. One at one hobby shop and another at another one. To top it off, one of my flying friends gave me a well broken-in one. This all turned out to be a big mistake and caused most of the irritating problems of this project. So what I recommend is that, when purchasing your en-

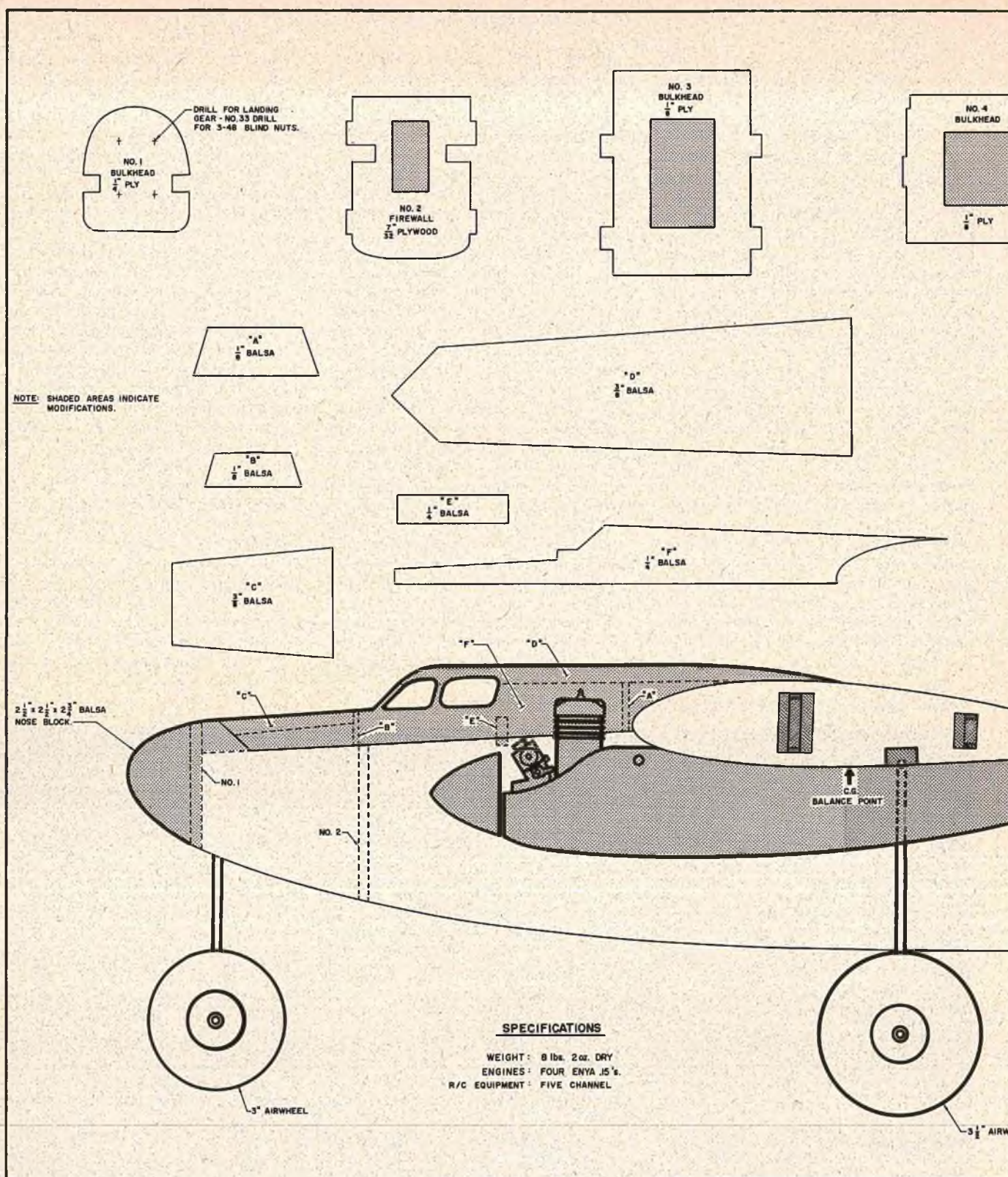
gines, get them all at once from the same place and, hopefully, they will be out of the same mould. Out of five engines to fool with, they all ran at top rpm differently. It has taken many hours of block testing on the bench to get them broken-in to the point of being synchronized. Be sure to run all of your engines real well if you intend to take on this project. Note the little difference between each so when installing the engines you can balance the power output on each side.

The construction of the engine nacelles seem to be in order at this stage. If you can't get through making your engine nacelles, you can forget the whole project. The nacelles are time consuming but once you get started it's not all that bad. In looking over the nacelle's layout, the best way is to start by gluing formers N-2 and N-3 to the hardwood motor engine rails. N-1 can be glued after N-2 and N-3 are dry. N-4 was glued to the tail block to give an idea for its shaping. Place the 1/8" side sheeting on and glue the tail block in place. Do the bottom sheeting next. These should be a bit oversize so sanding will let the quarter side planking fit snugly.

N-5 is glued in place later after the mounting dowels are put in place. It is best to wait until the wing is under construction before gluing or epoxying the dowels in the nacelles. This will be done after the "P" blocks have been drilled and placed in the wing.

Author George Steiner with his Senior Falcon IV.





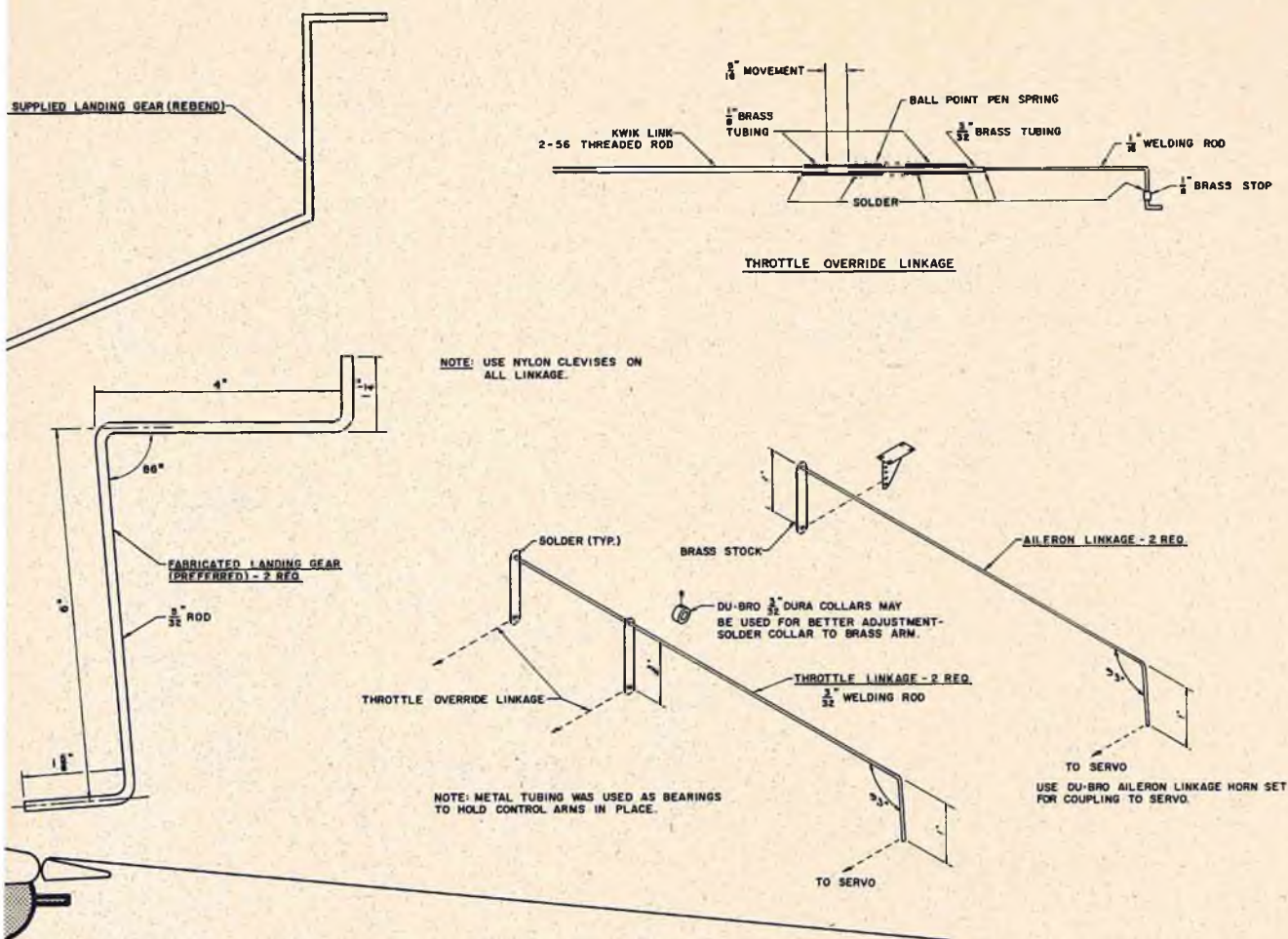
When installing a 6 ounce square tank in the nacelle, you will notice that it is a bit too large for the space. This is remedied by placing the plastic tank in boiling water for a minute. Remove and press the tank down into the nacelle so that it fits snugly. If you blow it, and the tank shape is wrong, just place it back in the boiling water. The tank will return to it's original shape. You can start all over again. Don't let the tank stick up above the top edge of the nacelle. A four

ounce tank will work but, when fooling around with four engines at the field, one needs that extra fuel for time so you don't have to hurry. The 6 ounce tank and 15 engine will give a guaranteed 15 minutes of running time.

At this point, I want to point out the reason for using the ugly #64 size rubber bands for holding on the nacelles. The little bit of flexibility with the foam cushion between the wing and nacelle is well worth it.

Vibration back to the receiver and servos in the wing and fuselage is almost eliminated. Also, inspection of the fuel tanks can be easily made. On one occasion, after a run, the clunk in the tank fell off. You can see that a repair job is made easy without major surgery.

To get started with the wing is no big task. Use and follow the building format that comes with the kit. But, before you frame up the wing over the plans, be sure to alter a



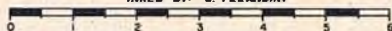
SEP RADIO GEAR AFT OF C.G. BALANCE POINT
THIS AREA OR SHIP WILL BE NOSE-HEAVY.

©RCW ALL COMMERCIAL RIGHTS RESERVED

SR. FALCON IV

FOUR ENGINE CONVERSION

DESIGNED BY: G. STEINER
INKED BY: S. PELANDINI



SHEET 1 OF 2 - FUSELAGE DETAILS



(2) PLAN NO. 660

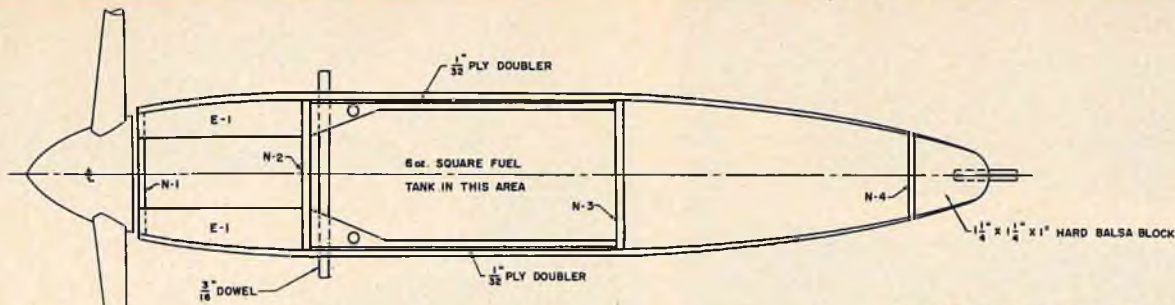
few of the ribs. These are shown on the conversion plans. Four extra 1/32" ply ribs will have to be made to help support the landing gear mount. They are used as doublers. Don't forget to trim the ribs as noted, otherwise the sheeting won't lay down right. In the kit they use 5/64" sheeting. This is such an odd size, I don't think it's too readily available. Just go to a more standard size of 3/32" balsa. A little more sanding might be required, but the extra strength is

worth it.

You will note on the conversion plans that part "T" and "B" that come with the kit are not used. The use of one piece sheeting for the wings from the root to the outboard nacelle, along with the long hardwood landing block, gives an almost indestructible wing base. After gluing the P-1 blocks in the wing, fit the nacelles in place. (No sheeting on top or bottom as yet.) Drill the holes and glue the mounting dowel into the nacelles.

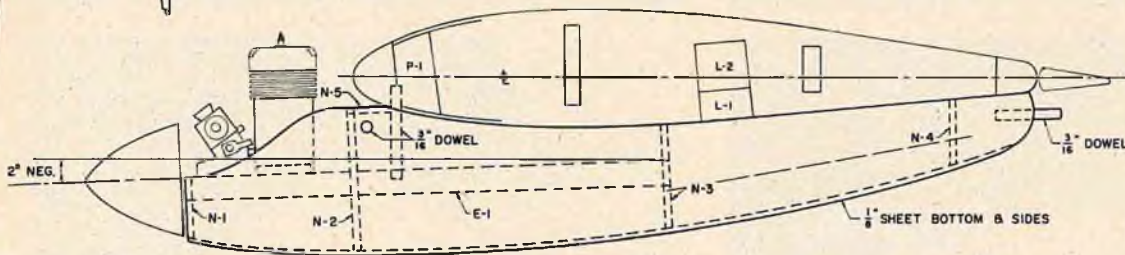
Sheet the bottom then and fit in the nacelles once again. Be sure to use some sort of pressure sensitive foam cushion between the nacelle and wing when finished. The engines can be fitted now. The offset for the engines is noted on the plans. Make sure the distance between the nacelles and the center of the wing is as shown on the plans. This will let a 9" prop swing with ample clearance. The control linkage and servos should be placed in the wing at this time. It has a



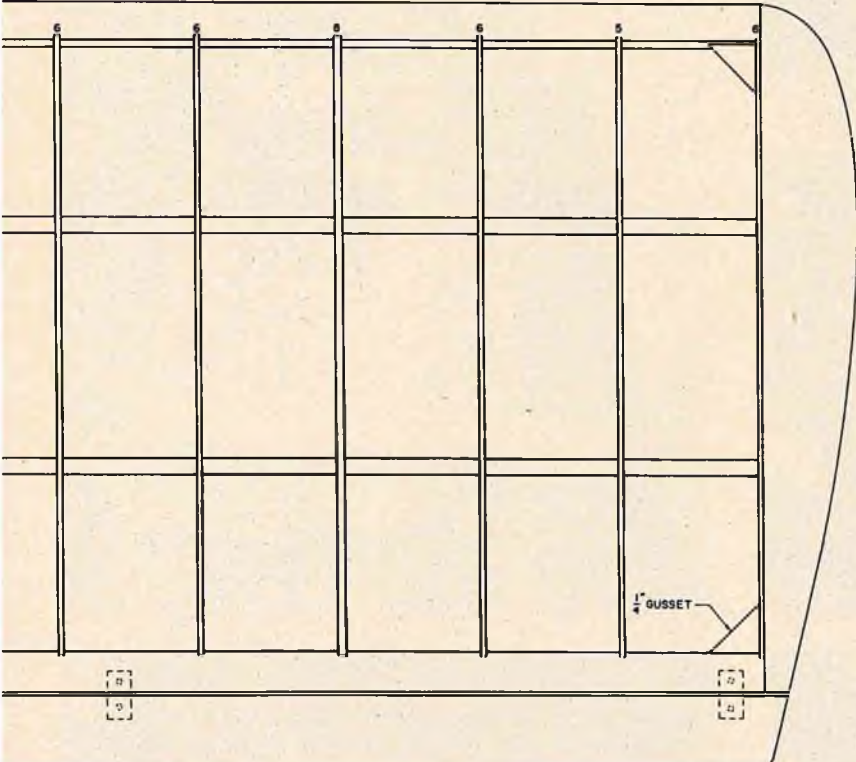
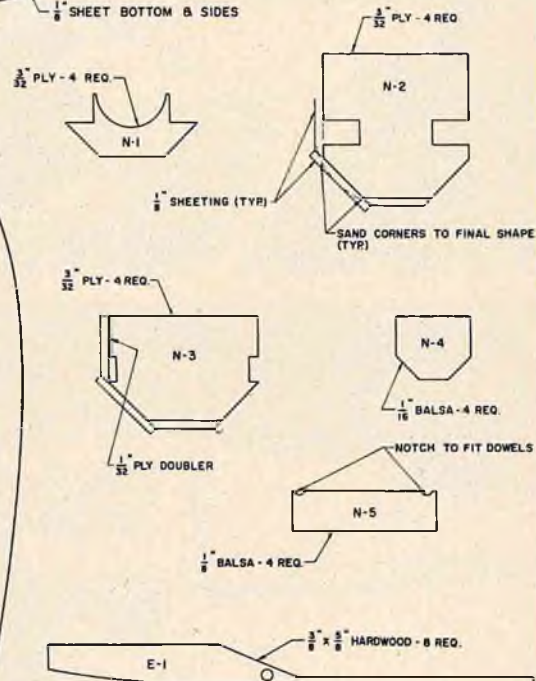


ENGINE NACELLE - TOP VIEW

NOTE: ENGINES WERE MOUNTED OFFSET FROM CENTER THRUST
OUTWARD - LEFT SIDE ENGINES 3"; RIGHT SIDE ENGINES 5".



ENGINE NACELLE - SIDE VIEW



© RCM ALL COMMERCIAL RIGHTS RESERVED

SENIOR FALCON IV
FOUR ENGINE CONVERSION

DESIGNED BY: G. STEINER
INKED BY: S. PELANDINI

0 1 2 3 4 5 6

SHEET 2 OF 2 - WING DETAILS

PLAN NO. 660

engine. Here again I want to stress that in order to have a trouble-free engine group, be sure all linkage works before sheeting the top of the wing. If Duro Collars are used on the control linkage, it will enable you to completely remove the controls at anytime. This makes it easier when you get to the covering.

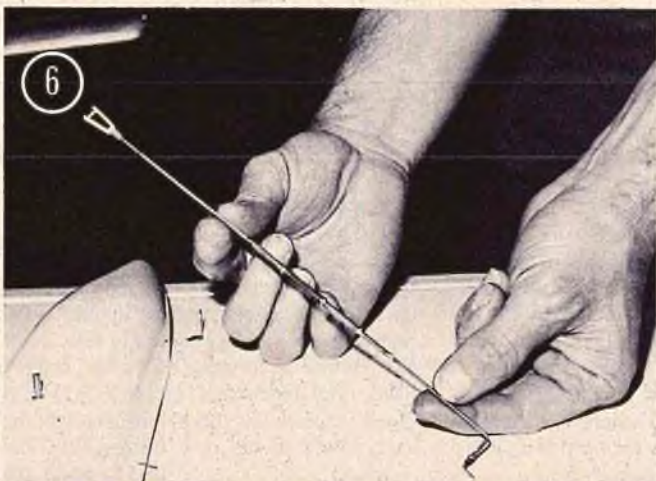
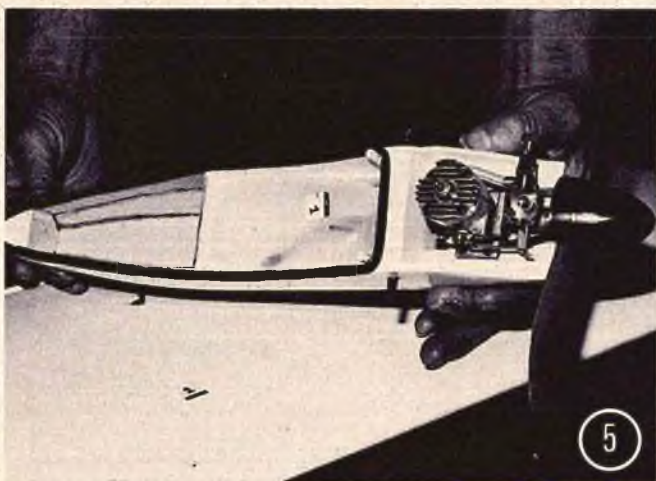
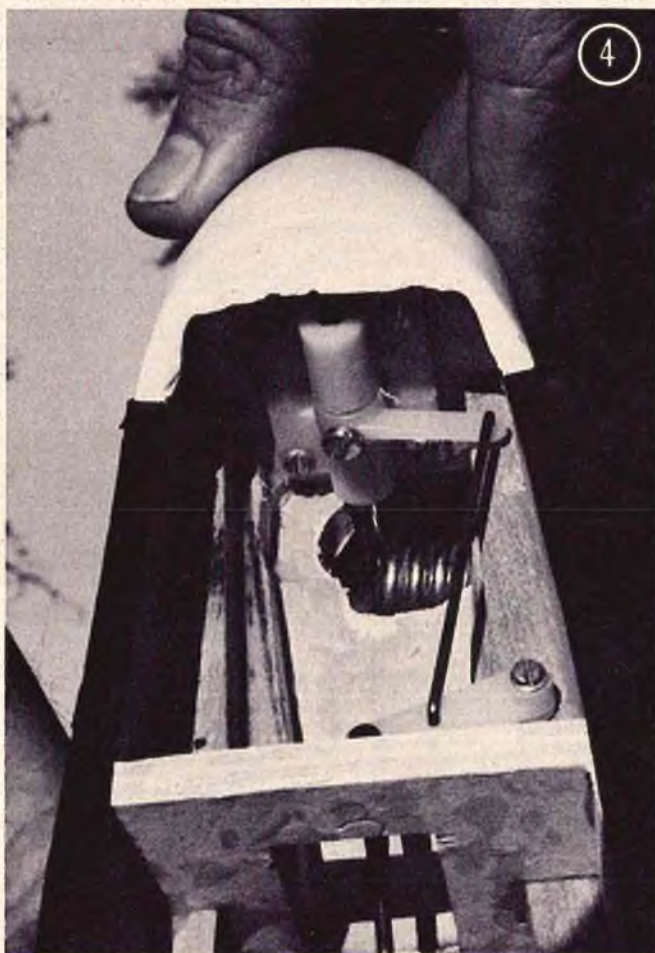
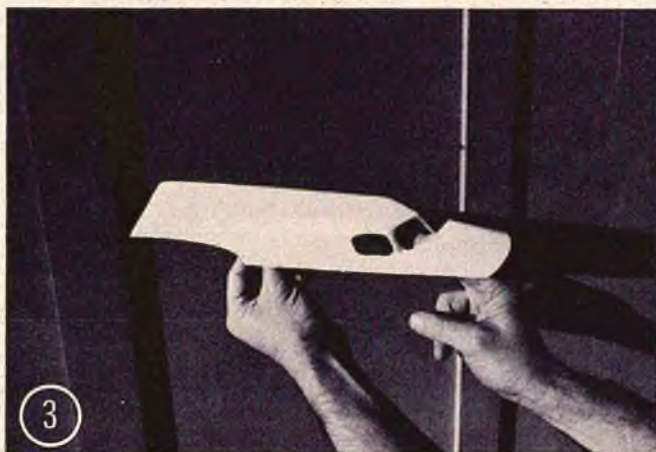
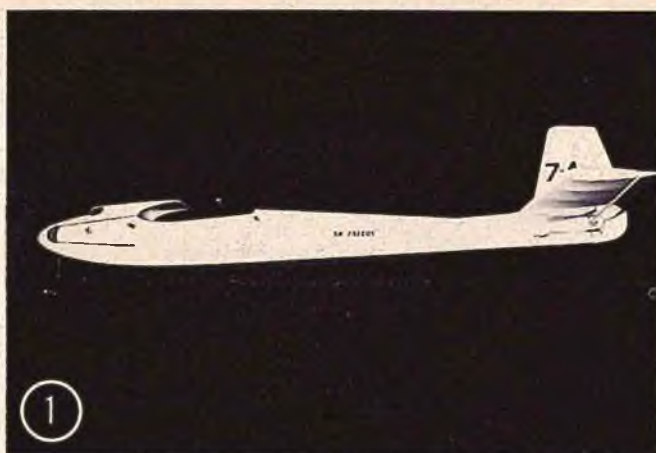
The fuselage and tail group can be easily constructed with material out of the kit. No modifications are needed from about the

C.G. point back to the tail.

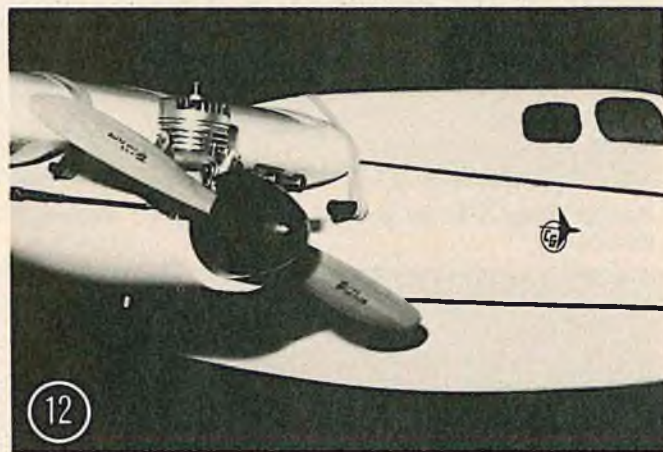
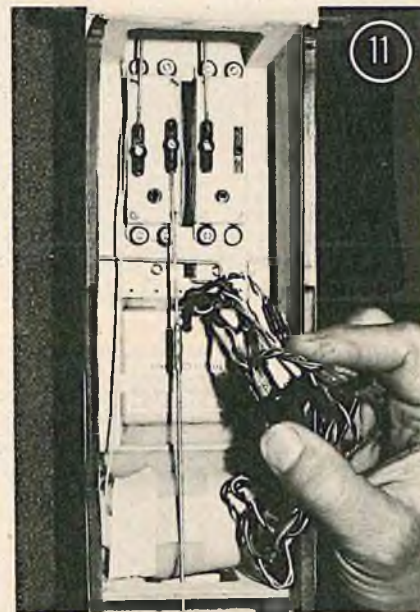
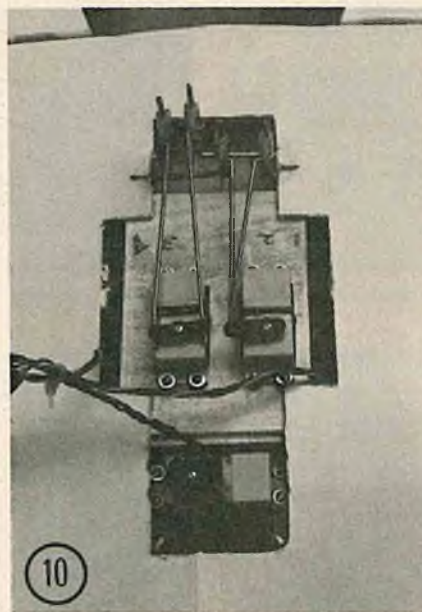
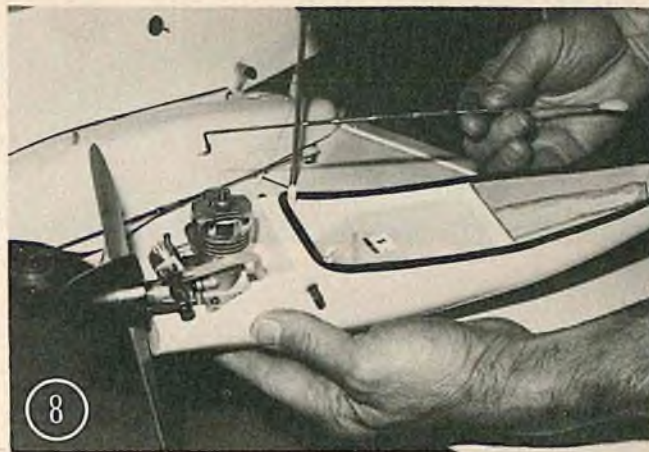
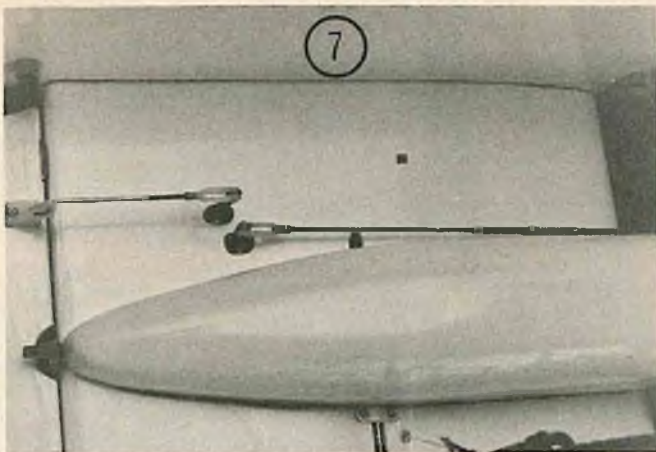
Omitting some of the detail work around the existing kit landing gear mount assembly is one of the things you could do. Be sure to do the cut-outs on formers 2, 3, and 4 as shown on the conversion plans. You will have to make new #1 formers as shown. Even though no engine is going to be in the nose, the birch engine barriers were made and glued in place. They are needed to help support the nose and landing gear.

In the kit B-1 has a cut-out on it. This is part of the bottom fuselage sheeting. Punch it out and then just glue it back in. A hole will have to be made for the landing gear in the large balsa block, making up part of the bottom of the fuselage assembly forward of B-1. Before the forward 2½" x 2½" x 2¾" balsa nose block (not supplied in kit) is glued in place, fit the nylon nose landing gear mount to the new former #1. The

text to page 128



(1) Wing removed, showing position of cabin. (2) View illustrating how the cabin fits on the fuselage. (3) Photo of the finished pilot's cabin hatch. (4) Steering control arm. Note modified bellcrank for steering reduction. (5) Basic engine nacelle showing anchor dowels and tank location. (6) Override throttle arm getting ready to be placed next to the engine nacelle.



(7) Aileron and throttle linkage outlet in the wing. Note position of landing gear under engine nacelle. (8) Engine nacelle and override throttle are ready for placement. Note anchor dowels. (9) Steering compartment in the nose. Note modified bellcrank for steering reduction. (10) Mid-wing view of servo complex showing linkage to throttle on the left and brake servo on the bottom. Note how the torque rods come through the wing. (11) Radio gear and KPS-9 servos for rudder and elevator. Note position of battery pack in the main part of the fuselage. (12) Basic heart of the modified system with engine nacelles along with the wing held on with rubber bands.





Local color guard officially opened the 4th Annual Mint Julep Meet.



Colorful pattern planes line the pit area waiting to fly.



James Poe with his Bicentennial painted Tom Cat.



Rocket firing P-51 by Gerard Davit. Veco .61 engine, Rom-A retracts.



Shrike Commander by Billy Fryman uses two OS Max .60's and Futaba radio.



Ryan STA by Denzil Fowler, finished with K & B Epoxy with HP .1 engine, Kraft radio.

JULY 1976



Steve Naber's Fw90D with K & B resin and Aero Gloss dope, OS Max SR .60 with Perry Pump and Rom-Air retracts, Kraft radio.



Jim Martin's Beechcraft Musketeer Sport uses Heathkit and OS Max .60.



John Gunther's FW190D featured weathered paint scheme.



Unique judging table rotated while the judges remained seated. Zlin Akrobat by Leonard McCoy.



Lucchi C-202 by Bud Atkinson used Enya .60 and EK radio and Rom-Air retracts.



Ten foot wing spans on these cardboard airplanes by the Du-Bro helicopter team. This was a big hit with the spectators.



Masters class winners, left to right: Mark Radcliff, 2nd; Dave Brown, 1st; Ivan Kristensen, 3rd.



Expert winners left to right: 2nd Place, Bill Ney; 1st Place, Chuck Shade; 3rd Place, John Bloom.



Advanced winners left to right: 2nd Place, David Hale; 1st Place, Bob Latham; 3rd Place, Dick Carpenter.



Novice winners (l. to r.): 2nd Place, Pete Parnica; 1st Place, L.M. Kirkpatrick; 3rd Place, Thad Pawlikowski.



Sport Scale winners, left to right: 2nd, Ralph White (P-51); 1st, Gerard Davit (P-51); 3rd, Joe Naber (FW190).

May 15 and 16 saw the 4th Annual Mint Julep Contest get underway under cloudy skies and rain showers. The Kentucky-Indiana R/C Society again had planned for a fantastic weekend not only for the flyer, but for his family also. The Greater Cincinnati Radio Control Club had a big part in helping to run the Mint Julep meet this year, and Doug Early, the CD, said that without their help, the meet would not have been possible. This is what is needed in more areas of the country. With greater cooperation between clubs, this sport and hobby of R/C flying would see a tremendous growth and larger and better flying sites. Friday night there were heavy thunderstorms and much apprehension about the contest getting started on Saturday. When morning dawned, there were scattered clouds and some low fog. After only a 50 minute delay, the 4th Annual Mint Julep meet began. The sky cleared by noon and everyone was convinced that the rain had gone for the day. Not so, for by 4 p.m. the sky in the west had clouded with an ominous black cloud that was moving directly toward the airfield. With the radio on, the weather broadcast tuned in, we learned that a tornado warning had been posted for the area. With this announced, everyone began to take down their canopies and pack up for the rough weather ahead. The 3rd round had just started and was canceled for the day. The field had just cleared when high winds and rain hit the area. The storm lasted about 2 hours, and then moved on. The rain did not dampen the spirits of the flyers, as there were flyers back on the field practicing immediately after the rain stopped.

The rain had not dampened the chef's intentions to put on a fantastic banquet on Saturday night at the Lodge. The buffet table was laden with delicious foods and a large paraffin biplane as a centerpiece. The banquet is always enjoyed by everyone who attends.

Sunday morning and light rain showers. Partial clearing came early, and hopes were high that the rain would leave for the day. Again, disappointment, as the showers remained throughout the day. Some contestants that were low in the standings dropped out, so the rest could move faster and get in the required rounds before the rain got any harder. By 3 p.m., all flying was complete and the flyers retired to the lodge for trophy presentations.

A new system of judging for the Mint Julep was used this year. The Novice and Advanced classes flew a round with

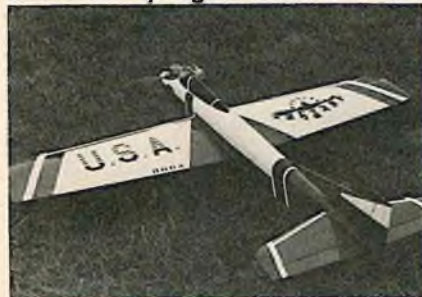
the Expert and Masters being used as judges; then the Expert and Masters flew with the Novice and Advanced flyers judging these flights. Four Novice and Advanced judges were used to judge the Expert and Masters with the high and low scores thrown out, leaving the other two scores. Only two judges were used to judge the Novice and Advanced. I heard lots of comments about this type of judging for the Expert and Masters contestants. Most that I talked to were concerned about the inconsistency of scores between the flight lines. I overheard one Novice flyer volunteer to judge by saying, "I'll try anything once." This is as bad as having just anyone from the clubs to judge without any training at all. Granted, this flyer would know more than the average "Joe" Sunday flyer, but a novice flyer could not recognize a properly done rolling or non-rolling Figure M that he, himself, does not fly in his pattern. Again, I am editorializing, but I feel that a contest should know who is going to judge before the morning of the contest. Don't depend on untrained volunteers to get a smooth running contest started. Train your judges and helpers before hand, and you'll have a better contest with much less complaints from the contestants.

After the final flights and the judging problems were over, everyone's spirits were high and even with the rain, everyone knew that the 4th Annual Mint Julep meet was another success. The Mint Julep workers always supply activities for the families and children. The Du-Bro helicopter team provided flying demonstrations during the lunch breaks, which is always a welcome sight to the spectators. This year, the Du-Bro factory team added something different to their flying. Can you imagine a 10 foot wing span airplane, made entirely of cardboard, except for landing gear and firewall? Two of these were flown by Dave Gray and Bob Bentley from Du-Bro. These two large, slow airplanes were the hit of the Mint Julep as far as the spectators were concerned. Sport Scale saw 11 entries with fantastic models from a Beechcraft Musketeer to twin engine Shrike Commanders and a rocket firing P-51. The color pictures can tell more about these beautiful airplanes than my poor attempt at words.

The 4th Annual Mint Julep meet can be closed with one word, "Success," despite the bad weather that plagued the flying for the first time in the meet's four year history.



Official starting provided by high school color guard with a recording of the Star Spangled Banner.



Bicentennial colors much in evidence. Here is Joe Naber's self-designed Thunder Panzer.



Another Bicentennial colored ship called the "A-Star" by Bill Keller.



T2A flown by Advanced flyer Carl Allen.



Paraffin Biplane as a centerpiece for the banquet table.



Contestants and workers waiting for the start of the 4th Annual Mint Julep Meet.



More self-designed airplanes. These by Paul Clements and he calls them "Super Skynight 5".



Roy Pinner showed his own design called the "Exterminator".



Many original designs keep showing up at contests; this one by Jim Slatter is called the "Pheon".



The Saturday banquet is enjoyed by everyone who attends.



A group of flyers watch as a competitor flies his round.



"Master Flyer's III" - Left to right: Bob Reuther, Tom Moore, Mark Crobit.



Dirty Birdy by George Miller used Kraft engine, Rom-Air retracts and Kraft radio.



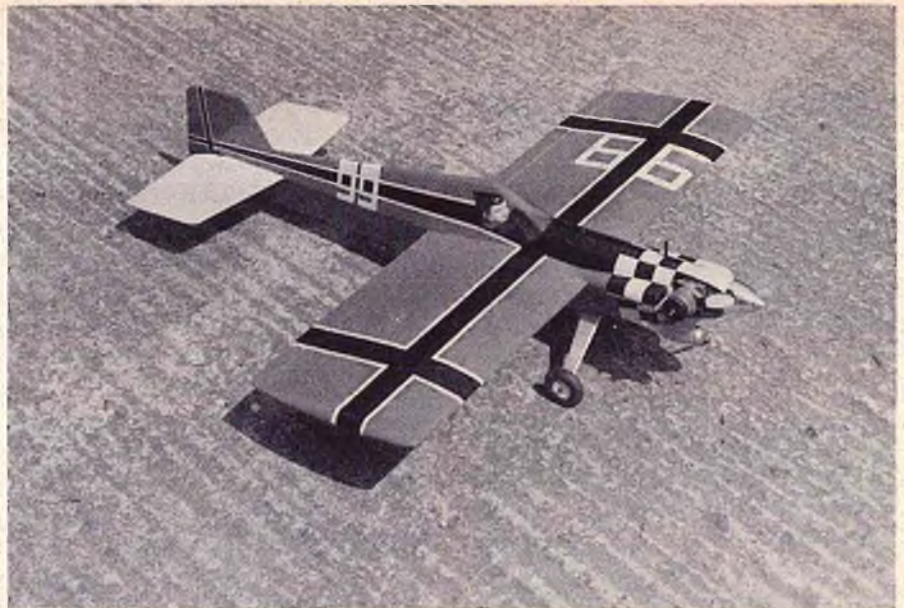
The Du-Bro helicopter team sets out their helicopters for inspection and answers many questions.



Trophies and merchandise await the winners in each class.

Quarter Midget and Half-A Pylon Racing, conceived and introduced by R/C Modeler Magazine as competition events for the sport flyer, have nearly reached the degree of specialization of Formula I. Whether racing stock Volkswagens or Indy 500's, the speed is relative, as long as each is racing in its own class against equal machines conforming to standard parameters. This is why Club 20 racing has become the most popular sport racing event in the United Kingdom. RCM is proud to introduce it in the United States, along with plans for a Cassutt Club 20 racer.

By Gordon E. Whitehead



CLUB 20 PYLON RACING

● The stated purpose of the smaller pylon racing classes which have been introduced over recent years has been to establish a cheap, simple class of pylon racing in which anyone could compete who couldn't afford Formula I or FAI. Two classes which are enjoying popularity at the moment in the U.S. are QM and 1/2A. These classes only lasted for a brief period in Great Britain, while it appears that they are becoming specialist events in their own right in the United States. They died in the U.K. because of this specialization.

Over the past year, a new pylon class has become popular over here, called "Club 20". Thinking that your Editor might be interested in a plan, I sent him the Cassutt described later, suggesting that it would at least make a good sport job. Don replied that, rather than just submit a plan for a non-existent racing class over on your side of the Atlantic, I should accompany the plan by a description of Club 20. So here goes!

The originator of the Club 20 pylon class is David Boddington, who writes a regular "Sport and Single" (i.e. "Sunday Flier")

column in one of our magazines. In August 1974, having never previously evidenced much interest in pylon racing, he suddenly wrote that he thought that 1/2A (at the time our one remaining small class) was too hairy for our average weather conditions, and that a less specialized version of QM was needed if cheap pylon racing was to survive. In September, a set of rules appeared, and throughout 1975, Dave's enthusiastic efforts to de-tune pylon racing bore fruit.

Why the name "Club 20"? Well, the original idea of the class was for inter-club team competition for models with a maximum engine displacement of .20 cubic inches. By specifying an event for 4-man teams, it was hoped that the advantages of practiced top-line fliers would be 'diluted'; it is unlikely that any one club would be able to field a team of four Clive Walls or Bob Violetts. The team idea never caught on, but the name stuck, and the class has become popular. Speeds are slower than QM as one would expect, and about average for a .40-.60 powered pattern ship. For instance, at last year's RAF MAA Championships, in

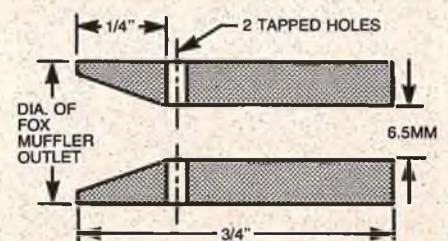
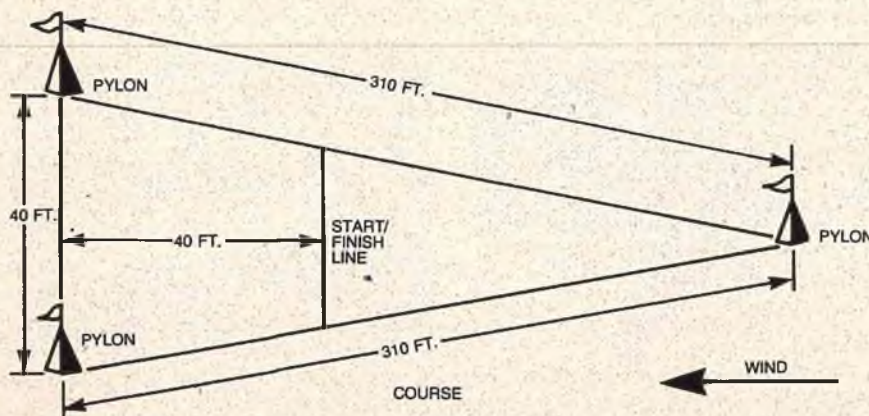
the open pylon event, my Club 20 racer came second to a ship of New Era II size powered by an OS .40; we both beat an HP .61 powered Super-Star! All three used fixed gear, mufflers and straight juice.

The Model:

One factor which contributed to the rapid growth of Club 20 was the quick reaction of kit manufacturers. Several redundant QM kits were quickly changed to meet the rules, while Dave Boddington had three of his own designs on the market before the 1975 season started. Virtually all models are flown on aileron-elevator, while throttle control is optional. Models are launched by hand, and a fixed two-wheel undercarriage is normally worn by the models, unless the grass is long, in which case the gear may be removed — at the discretion of the contest director! Dimensional differences between Club 20 and QM include thicker tips, and a lighter minimum weight restriction. Micro radio gear is a must in order to achieve the 34 ounce minimum using three functions, but with 2-function mini-propo 36 ounce is practical. Model shape is unlimited, except by a semi-scale requirement which relies on a strong contest director to use his authority correctly.

Motors:

It is now well known that for a pylon class to become accepted at club level, costs must be on a par with normal flying (give or take a



few extra prangs!) In order to help control costs, a 14 Pound (say 30 Dollars) engine price limit was introduced. In 1974, all popular .19's were thus allowable. The limit held good for only a few months, when inflation elevated the costs beyond the limit. The rules were quickly changed, and now only unmodified 'named' engines are acceptable. Who names the engines? Well, up to now in the United Kingdom, Dave Boddington, I guess. If this appears too autocratic to you, I'm sorry. If a manufacturer, importer, or modeler thinks that his engine should be included in the "Acceptable Engines List", he can submit a suggestion to Dave. Dave Boddington will then evaluate the engine using published figures, and accept it, or reject it on performance and noise grounds. If a manufacturer up-rates his .19 or .20, or produces a new design, then the new engine will have to be reviewed on its merits. Actually, since the BMPRA only had the FAI class left for which to organize events, it has 'accepted' the Club 20 specification as an 'official' class, but one hopes that engine selection will still be pursued using present criteria. The main essential is that a means of publicizing engine acceptability is readily available, and the model magazines can perform this service.

Only the standard manufacturer's muffler may be used, (but see later) and no engine modifications are permitted.

Standard R/C carbs (excluding Kavan) or ordinary free-flight carbs are permitted, as is pressurization. To help enforce the no-modifications rule, if a competitor seriously thinks that a fellow competitor has 'breathed on' his engine, he may insist after the racing, and on the deposit of 2 Pounds (4 Dollars) that the suspected engine be taken apart for inspection. Should the complainant's beliefs be found groundless, the accused modeler will get the money deposit. Should the engine be found to have been re-worked, the owner forfeits his comp points (and those for previous comps if in a league) and the objector will recover his deposit. Having witnessed a successful complaint progressed, all I can add is that it seems necessary to make the rules more specific, e.g., no carb improvements and all nuts and bolts to be original. There aren't many modifiable parts in a 2-stroke; perhaps a list of parts susceptible to modification, together with all possible mods, should be drawn up, and a specific prohibition of all such mods publicized to satisfy barrack-room lawyers.

Certain modifications may be mandatory. In the case of the Fox .19, the size of the muffler outlet is not acceptable, from noise and power considerations. In the future, a restrictor insert of 6.5mm I.D. and 3/4" length will have to be fitted to make the Fox .19 compatible with Club 20. Sorry Duke! But surely a modified silencer is better than the indignity of a complete ban?

The list of presently acceptable engines is as shown in the rules:

Propellers:

Only nylon props are allowable, though one may modify the blade shape if required. Since much of our club flying is done over

rough grassland, a ban on wood and grp props was instituted to help minimize breakages.

Fuels and Tanks:

A standard 5% nitro mix is to be provided by the organizers. At first, 'straight' fuel was suggested and tried, but the small nitro addition eases engine adjustments, yet only raises power output slightly. Metal tanks are recommended, with single vent — fill and pressurize via the same vent.

Courses:

The course used is the old British 1/2A course — two base pylons, 40 feet apart, and a third pylon 310 feet upwind of these. Race times now average 1-25 for a 10-lap course; if this is not as fantastic as QM, remember that there is another factor affecting enjoyment of racing besides pure speed — that of relative speed. A VW Beetle race would be exciting if the chosen course was conducive to close racing — the Club 20 course exactly matches the model specification, and racing is close and exciting.

Conclusions:

Well, here we have yet another attempt at defining that elusive "everyman's pylon race class". Club 20 isn't a class for novices — it's a class for novice racers — or even the more expert if they're interested. So far the class has survived without the deadly seriousness of FAI pylon racing, and everyone thoroughly enjoys himself. I hope that the foregoing will provide food for thought. The present rules are outlined below. (The 'other engines' paragraph in Rule 7 is my interpretation of the present situation — no definite ruling has yet appeared, even though what I have written is what occurs in practice. The situation is eased, however, because most people use the Veco .19.)

RULES

1. OBJECTIVE

To provide closed course racing for the sport flyer and novice racing enthusiast.

2. GENERAL

Models should be scale-like in appearance and similar to full-size propeller-driven aircraft. The Contest Director shall have the discretion to disqualify any model that he considers does not represent a full-size aircraft in a practical form. There is no restriction on the type of radio control or the number of functions. Any hazardous or dangerous flying, in the opinion of the Contest Director, will be cause for immediate disqualification.

3. MODEL REQUIREMENTS

a) **FUSELAGE:** At the widest point the basic fuselage must be a minimum of 2 1/4" and the depth of the fuselage must be a minimum of 5" at its deepest point. These dimensions must occur within the wing chord but need not coincide.

b) **WING:** The wing area shall be a minimum of 300 square inches and have a minimum thickness of 7/8" measured outside the fuselage/wing fillets. The wing thickness may decrease in a straight taper from root to tip with a minimum thickness of 5/8" at the tip.

c) **LANDING GEAR:** The landing gear is to be fixed with two wheels of a minimum diameter of 1 1/2". Conventional tail wheel/skid configurations of landing gear

are to be used. At the Contest Director's discretion, the landing gear may be removed and hand launch permitted — usually when racing over rough pasture.

d) **ENGINE:** Displacement of the single engine shall not exceed .20 cubic inches. The engine must be stock, available through normal retail channels, fitted with the manufacturer's recommended muffler. The use of an R/C carburetor is optional. Pressure feed from muffler or crankcase to the tank is permitted. No re-working of the engine, carburetor, or muffler will be permitted, except as specified in these rules.

The only engines permitted for use in Club 20 races are as follows:

- (1) OS .20
- (2) Enya .19 or .19 BB
- (3) HB .20
- (4) Veco .19
- (5) PAW .19 Diesel
- (6) Webra .20
- (7) Fox .19 with closed front silencer and muffler outlet restrictor shown in sketch.

Other engines must first be scrutinized by the Club 20 organizing body. If accepted as meeting Club 20 requirements, the engine must be publicized in an appropriate publication (e.g., 'Racing at Random' in RCM).

e) **SUSPECTED ENGINE MODIFICATIONS:** After all racing is ended, on depositing 2 Pounds with the Contest Director, a competitor may insist that a fellow competitor's engine be dismantled to be inspected for re-working. If the complainant's belief is found to be groundless, the accused may keep the 2 Pounds. If the engine is found to be re-worked, the accused forfeits all points in that race, and all previous races if in a league; the complainant's deposit is then refunded.

f) **PROPELLER:** Only fixed-pitched nylon propellers are allowed. Propellers may be re-worked if desired.

g) **SPINNERS:** A rounded-nosed spinner must be fitted with minimum diameter of 1 3/4".

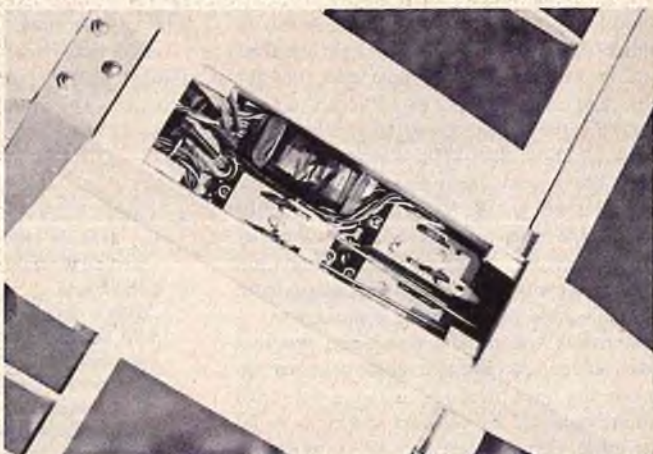
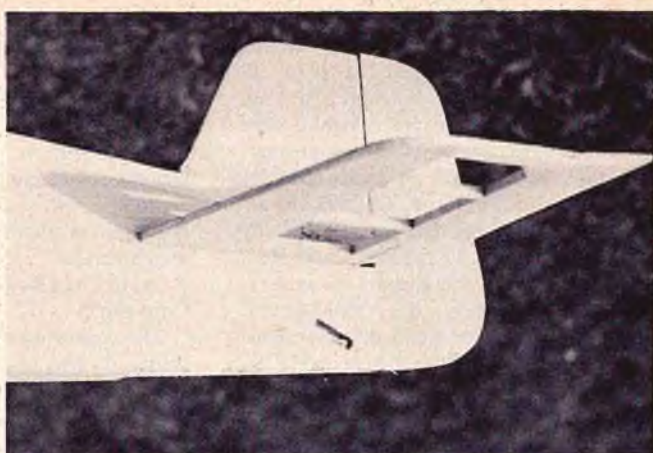
h) **WEIGHT:** Flying weight must be between 34 ounces and 50 ounces.

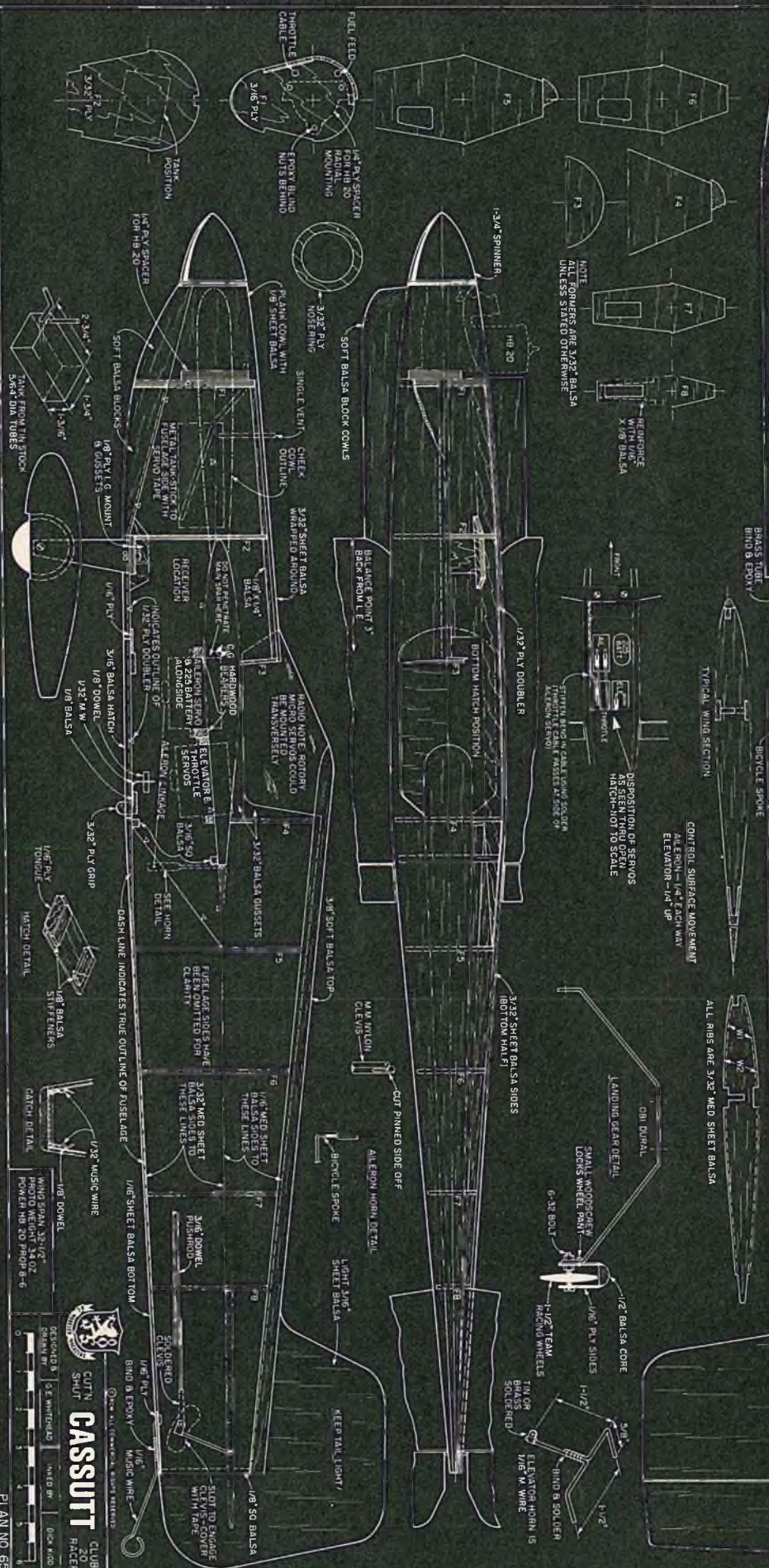
i) **FUEL:** Standard commercial 5% nitro fuel, provided by the race organizers, is to be used.

j) **RACE COURSE AND PROCEDURE:** A maximum of four aircraft will be flown in each heat. Models will be hand launched from behind the start-finish line. Two minutes will be allowed for starting engines. A total of six minutes will be allowed for the race from the commencement of engine starting; any model not landed within this period will be disqualified. A normal complement of flag marshals, pylon judges, starters, and other race personnel will be employed. All laps will be flown counter-clockwise with turns to the left.

k) **SCORING:** Points for heats will be as follows: 8 points for first place, 6 points for second, 4 points for third, and 2 points for fourth. One cut equals automatic fourth place, two cuts equals zero points for that heat. (Scoring is not fully sorted out yet, as some club events are timed, others pointed. You take your choice, but our national league is scored on a points basis at present).

The Cassutt modeled here is semi-scale, because I've stretched and squashed it here
text to page 124





SOARING — By Don Ashenfelter

*The mute bird drifts skyward,
Gaining grace with each inch - - majesty with each foot.
It's going to ride the sky,
And impatiently strains against its bond to Earth.
Higher and higher . . .
Finally, it is free.
Home, where none dwell but many visit.
Razoring the wind with a gentle slice,
Seeking the fountain of lift.
It rises up the azure fields, treading the halls of air,
And stops to play awhile, comrade to the clouds.
Yet flight is a transient thing, an elusive ether.
And all too soon it must descend,
With only a sigh from the wings to break the silence.
Once more it reaches the grass,
Wistful yet satisfied - - exhausted but renewed.
So seek the wind and ride the lift,
Though fleeting in time, it is immortal in the soul.*



● This month I'd like to share with you the contents of three letters which I received. More than most, they typify the great range of personal interest which our fascinating sport and hobby provides. One of them has spiritual overtones, one is ingenious and innovating, and the third is theoretical, with a good chance of being controversial.

Let's begin with this letter from Dan Ashenfelter of Fort Dodge, Iowa:

Dear Mr. Willard,

As an avid reader of RCM for the past several years, I have watched with growing interest the blossoming of R/C soaring into one of the most popular facets of our sport.

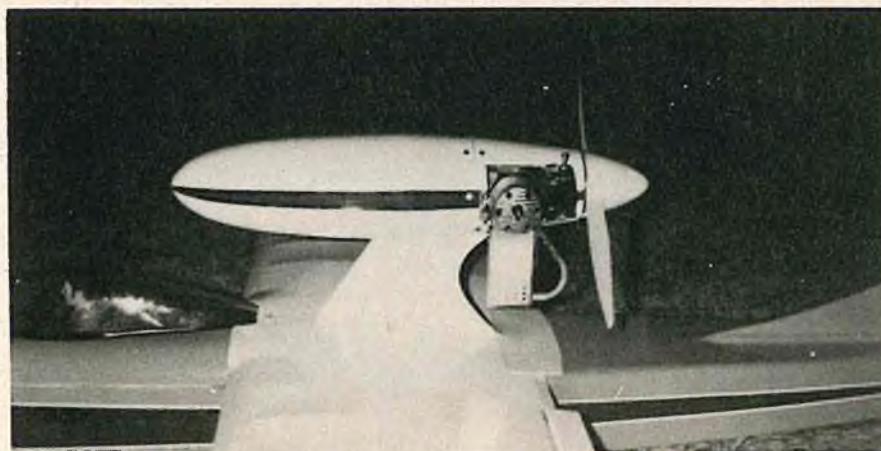
Up until about a year and a half ago, I was a grease jockey looking down on those "toy gliders" with some disdain. That was before I saw a sailplane fly.

Shortly after my arrival at the University of Iowa, there was a sailplane meet held at the Quail Creek Golf Course just north of Iowa City. My brother, Jerry, whose passion at that time was free-flights, suggested we go and spend the day at the meet. Never having seen a sailplane fly, we were both curious as to what people saw in them.

When we arrived, we were impressed with the size and beauty of the crafts, but I was still not convinced that I should throw out my prop balancer. Then I watched as Jim Porter launched his 16' plus, curved tipped Shrike W into the morning sky. It was a scene I shall never forget. From that instant on, I was hooked deeply by silent flight. The rest of that day passed much too quickly. Flight after flight, the glistening wings swung high over the Iowa cornfields and showed me what I had been missing. I came away with something that has stayed with me ever since. Perhaps the enclosed free verse can convey it.

Thanks for a great column.

Dan Ashenfelter



So, we put them together on the opposite page. And thanks, Dan, for a very moving tribute to one phase of our great sport.

★ ★

When I published the "Pondhopper" design, I had to go to some lengths to describe various ways to make the pylon that contains the engine and gas tank. But, as always, one of you came up with an ingenious variation that is not only applicable to the Pondhopper, but to any design where there is need for an engine pod that also encloses the fuel tank. Donald Olson of Everett, Washington, sent me the following letter:

Dear Mr. Willard,

During the building of your Pondhopper, I started thinking about the tank and engine pod. For me to build the pod, it would have cost about \$10.00 and two to four nights of work. The pod I built cost \$2.50 and was completed, except for painting, in less than two hours. I used the plastic model of the Hindenburg Zeppelin AMT kit #T557.

This method of building an engine pod is very fast, cheap, and easily done. The lines of the super structure on the Hindenburg

makes this an impressive looking engine pod for sport or scale aircraft or boats.

I hope you will pass this on to the Pondhopper builders and your readers.

Thanks,

Donald R. Olson
Everett, Washington

Gee, I wish I'd thought of that, and I'm glad that Don sent in the letter telling us about the idea. There'll be a lot of stumpy Hindenburgs flying through the sky as engine pylons, I'll bet.

☆ ☆

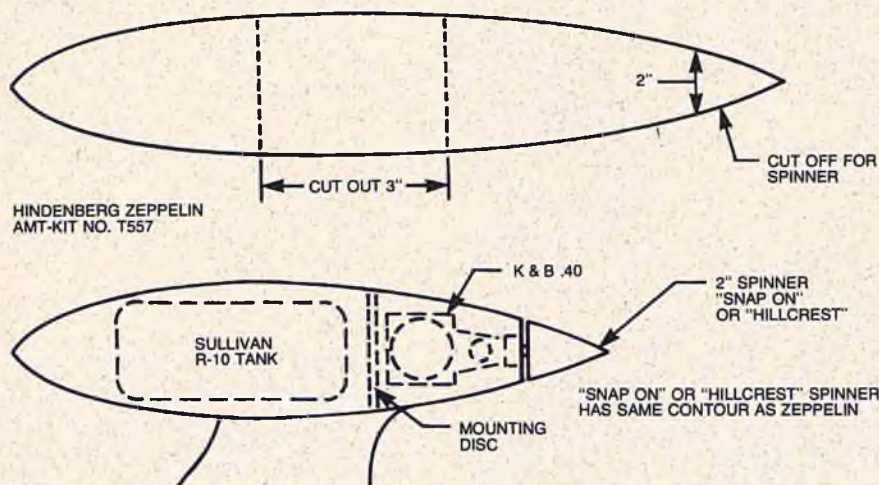
Some time ago, I published a letter from a reader "explaining" the alleged loss of altitude experienced in downwind turns. The response was fantastic — and the issue still is not settled, nor will it be. But it sure made for an interesting column.

And now along comes this letter from Eric Tomasson, who lives in the Community of Gardahreppi, Iceland, in which he explains the reason for engine offset. It is a very interesting theory:

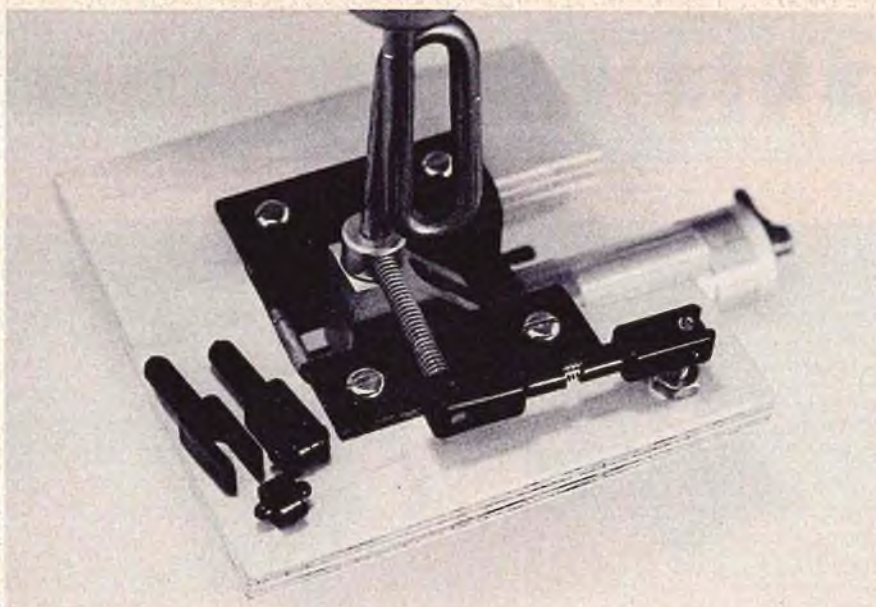
Dear Mr. Willard,

I would like to correct a misunderstanding that seems to be very widely spread. It concerns the effect that off-setting the engine on a model (or on a full-sized plane for that matter) has.

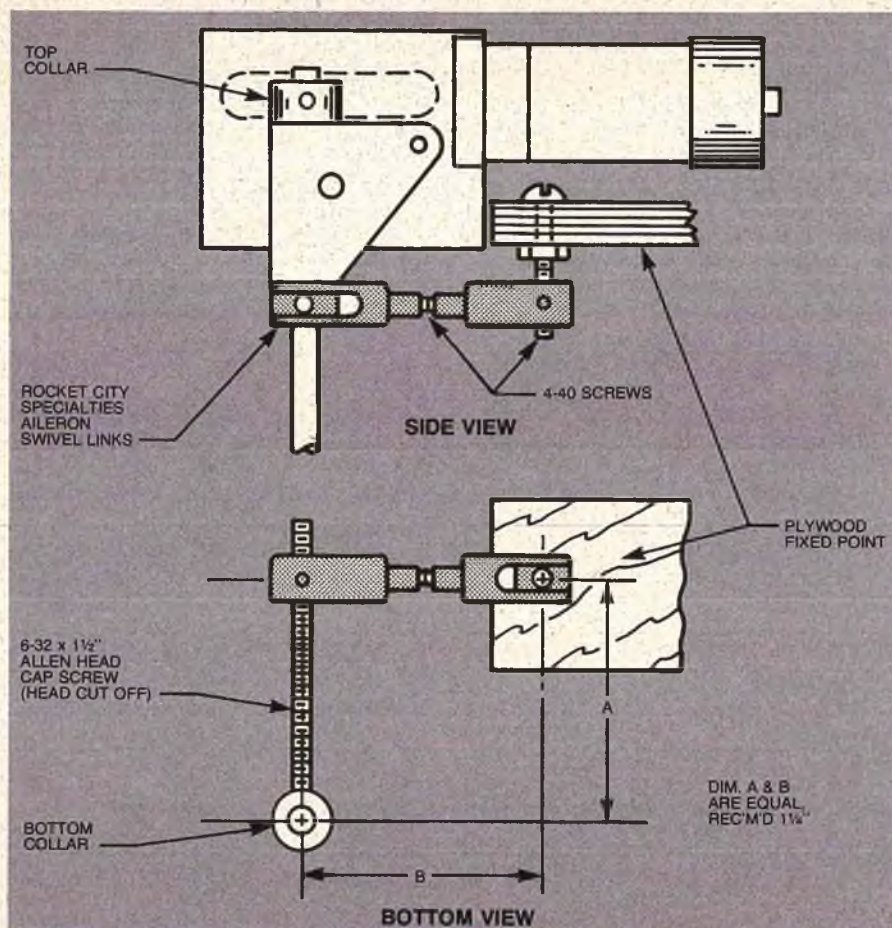
It appears to be believed, that engine off-set is used to counteract torque forces, generated by the propeller. This is **not** the case. Sure, a prop creates torque, but this torque acts in the opposite direction of the propeller rotation. Thus, torque acts on the longitudinal or roll-axis of the airplane, thus tending to roll the airplane, opposite to the prop rotation. This can be shown by a diagram:



to page 120



DOES YOUR CORSAIR OR P-40 NEED A ROTATING STRUT, RETRACTABLE LANDING GEAR?



The growing interest in R/C Scale has created a demand for more realism. Most full size aircraft since early WW II had retractable landing gear, which means that you just aren't "with it" if your wheels are hanging down while you bore holes in the sky. There are several excellent retractable landing gear systems available but, to our knowledge, no one is manufacturing a gear with a rotating strut that duplicates the action of a Corsair or a P-40.

Through the courtesy of Bridi Hobby Enterprises we are presenting the mechanism they use on their Shrike Commander model. The wheels on the Shrike rotate 90° as they retract in order to lay flat in the thin engine nacelles.

We assembled a mock-up using a standard Rom Air unit. This is a representative unit to show the mechanism and is **not** designed for a specific model. Left and right hand sides can be made by swapping sides with the linkage.

The heart of the system is the Rocket City Specialties Aileron Swivel Links (threaded), stock number 69. The shaft of each clevis must be cut off approximately 3/16", drilled out and re-tapped with 4-40 threads. Cut the head off a 4-40 x 3/4" screw to make a stud for connecting the two clevises. One swivel must be drilled out and re-tapped with 6-32 threads.

Remove the set screw in the Rom Air pivot block and remove the strut. A Du-Bro 5/32" wheel collar is slipped over the strut, the strut is inserted in the pivot block, and another collar is secured to the top of the strut. Replace the set screw in the bottom collar with a 6-32 x 1 1/2" Allen head cap screw. Tighten the screw and cut off the head. Screw the reworked swivel on to this screw and snap on the clevis assembly. A 4-40 screw through the landing gear mount and into the aft swivel completes the linkage.

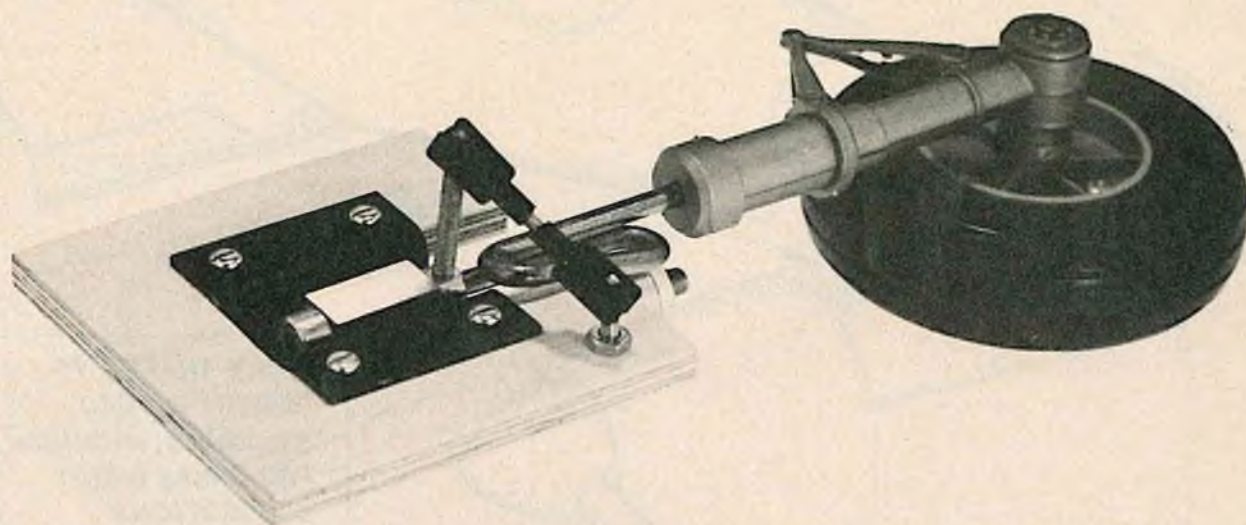
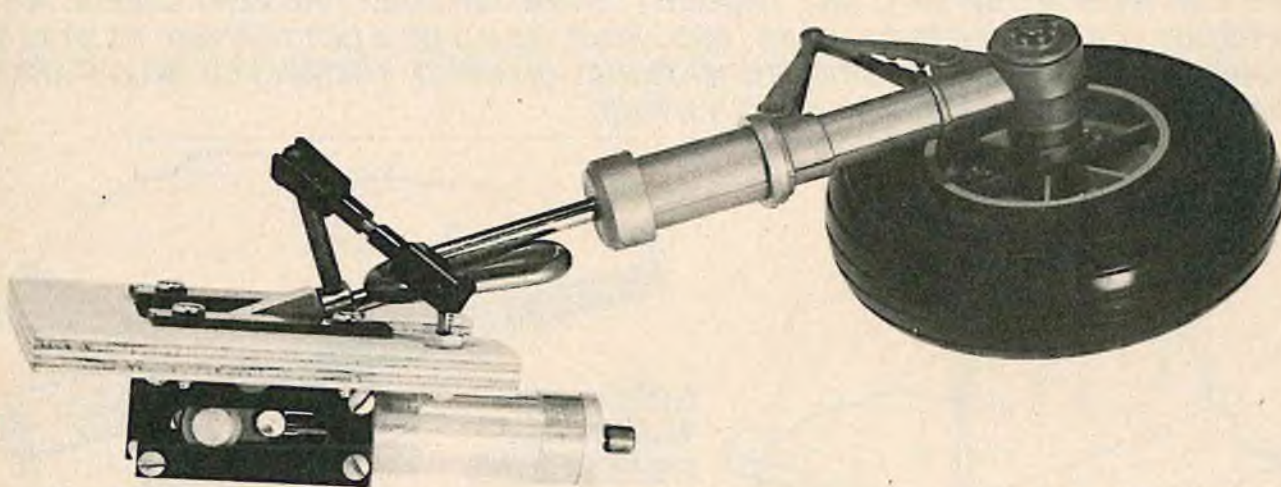
The linkage operates on a parallelogram principal that requires equal and right angle dimensions between the center of the strut and the centers of the swivels. A 1 1/4" dimension is recommended for the linkage. All of the moving parts must work smoothly and freely with no binding.

We suggest that a 1/4" plywood mounting platform be built to fit your particular model so that you can conveniently assemble and adjust the mechanism on the bench and then install the complete unit in your airplane.

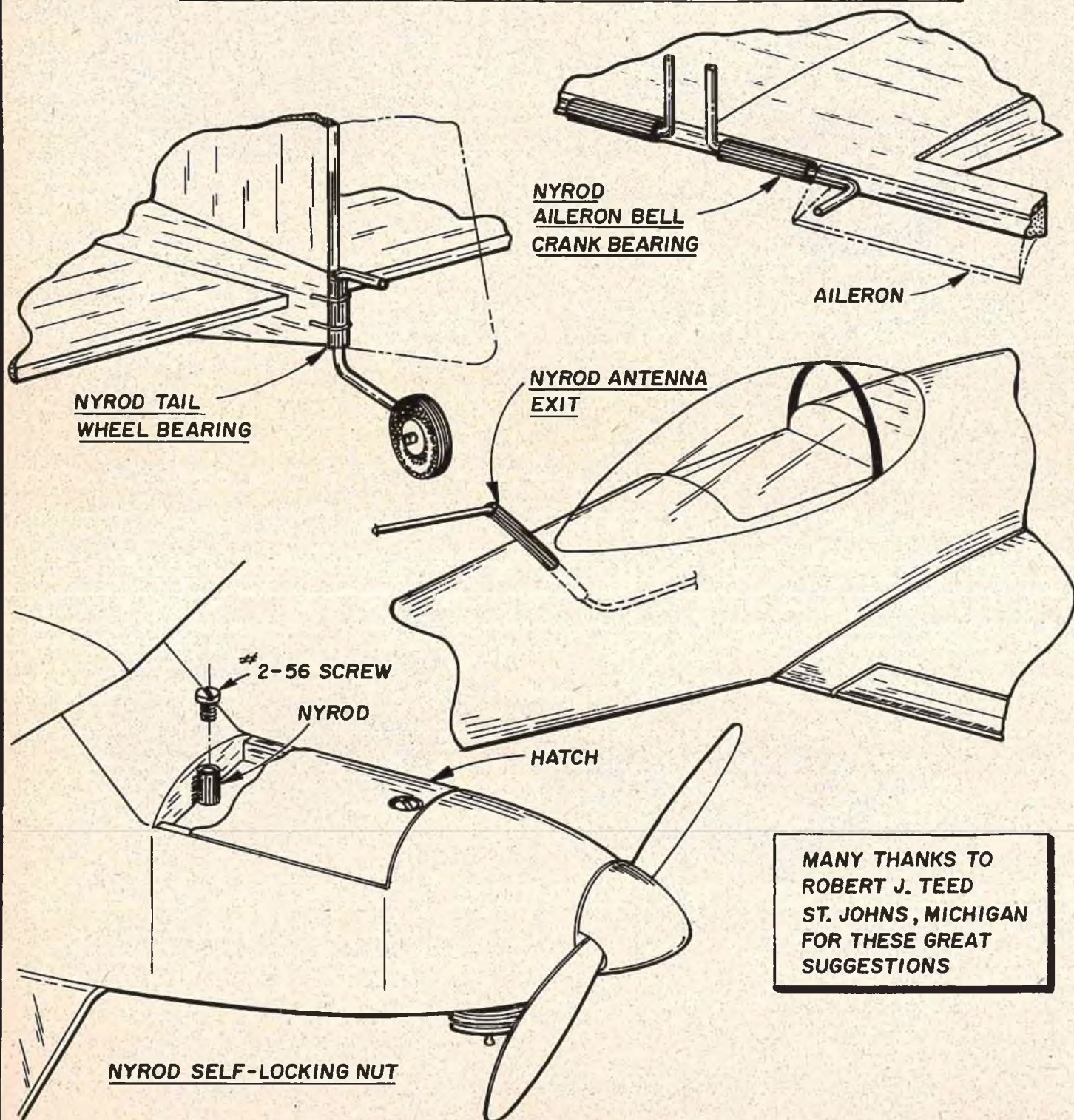
This mechanism works equally well on the Kraft Multicon electric retract system. It could probably be adapted to some other systems and, like many things, other applications depend on the modeler's ingenuity.

Happy rotating! □

ABOVE: Landing gear in extended position. Rocket City Specialties Aileron Swivel Links on left side of photo. ABOVE, RIGHT: Partially retracted and rotating. RIGHT: Fully retracted with wheel rotated 90 degrees.



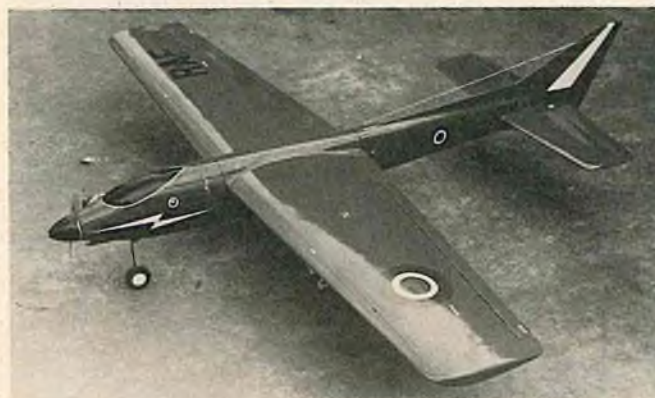
THE SUBJECT OF LEFTOVER PIECES OF INNER NYROD HAS BEEN BEATEN AROUND EXTENSIVELY. THERE ARE MANY WAYS TO USE THOSE SHORT LITTLE PIECES THAT YOU CASUALLY TOSS IN THE TRASH. MAYBE YOU HAVE YOUR VERY OWN SPECIAL IDEAS ON THEIR USAGE OR, PERHAPS YOU HAVE'NT GIVEN IT ANY THOUGHT. HOWEVER, THEY ARE VERY USEFUL AND COME IN HANDY FOR ALL SORTS OF IDEAS. AND, WHAT COULD BE A BETTER WAY TO STRETCH YOUR HOBBY DOLLAR THAN BY USING THE MATERIAL ON HAND. PRESENTED BELOW ARE FOUR GOOD WAYS TO USE SCRAP PIECES OF INNER NYROD.



MANY THANKS TO
ROBERT J. TEED
ST. JOHNS, MICHIGAN
FOR THESE GREAT
SUGGESTIONS

RCM PRODUCT TEST

PRATHER PRODUCTS PANTHER



● The Prather Panther is a competition pattern aircraft, manufactured by Prather Products, 1660 Ravenna Avenue, Wilmington, California 90744, priced at \$99.95, and available from hobby shops or direct from the manufacturer. With a wingspan of 64" and a total wing area of 720 square inches, the Panther utilizes a symmetrical airfoil and is designed for four channel operation and a .60 engine. The fuselage is molded of epoxy glass, while the wing and tail surfaces are foam and plywood. Hardware included in the kit consists of pushrods, hinges, control horns, landing gear, nosewheel block, wing bolts, blind nuts, aileron torque rods and nylon clevises. There is a 32" x 19 1/2" plan sheet with building instructions included on the plans, as well as an additional 14 page instruction manual. The wing and stab skins are pre-cut to shape and the wing is held on by three bolts that are installed from the bottom of the fuselage through guide tubes leading to the wing.

Our prototype weighed 129 ounces ready-to-fly with a wing loading of 26 ounces per square foot. Power was a Webra Blackhead .61 engine with Semco muffler. The radio used was a World Engines' Expert single stick.

We could find no modifications that could in anyway improve upon either the building or flying characteristics of the Prather Panther. In fact, our only comment about this kit is that it is excellent in all respects. During construction, be sure to take extra care in planning when drilling and locating the wing dowels. If you do not ensure that they are on the same angle as your guide tubes, you may miss them when drilling for your wing hold-down bolts and blind nuts. We can best describe the flying characteristics of the Panther as stable as a trainer, but with the maneuverability of that approaching the best pattern ships available today. Loops are true and stalls fall straight through. Landings are slow and nose high. An excellent all around aircraft for the advanced sport flier or the competition pilot. □

IMPRESSIONS	E	G	A	F	P	IMPRESSIONS	E	G	A	F	P
Packaging	●					Pre-Shaped Parts	●				
Plans	●					Parts Match to Plans	●				
Written Instructions	●					Overall Parts Fit	●				
Quality of Hardwood	●					Ease of Assembly	●				
Quality of Fiberglass	●					Fidelity to Scale			NA		
Other Materials	●					Flight Performance	●				
Accessories	●					Overall Appeal	●				
Die-Cutting			NA								

E=Excellent / G=Good / A=Average / F=Fair / P=Poor

SPECIFICATIONS

Name	PRATHER PANTHER
Aircraft Type	.60 Powered Sport
Manufactured by	Prather Products 1660 Ravenna Avenue Wilmington, California 90744
Mfg. Suggested Retail Price	\$99.95
Available From	Retail Outlets & Manufacturer
Mfg. Recommended Usage	General Sport Aircraft
Wingspan	64 inches
Wing Chord	13 3/4" at root
Total Wing Area	720 sq. in.
Fuselage Length	60 inches
Radio Compartment Dimensions	(L) 13 1/2" x (W) 3 3/4" x (H) 2 3/4"
Wing Location	Shoulder Wing
Airfoil	Symmetrical
Wing Planform	Double Taper
Stabilizer Span	26 1/4 inches
Stabilizer Chord (incl. elev.)	8 1/4" at root
Total Stab Area	184 sq. in.
Stab Airfoil Section	Symmetrical
Stabilizer Location	Mid-Fuselage
Vertical Fin Height	9 1/2 inches
Vertical Fin Width (incl. rudder)	11" bottom — 3 3/4" top
Mfg. Rec. Engine Range	.60
Recommended Fuel Tank Size	12 Ounce
Landing Gear	Tricycle
Recommended No. of Channels	4
Recommended Control Functions	Rud., Elev., Throt., Ail.
Basic Materials Used In Construction:	
Fuselage	Epoxy glass
Wing	Foam and plywood
Tail Surfaces	Foam and plywood
Hardware Included In Kit	Very complete kit
Plan Size	32" x 19 1/2" (1 sheet)
Building Instructions on Plan Sheets	Yes
Instruction Manual	Yes (14 pages)
Construction Photos	Yes
Kit Includes	Shaped parts
Mfg. rec. flying weight	120 oz.
Wing loading based on rec. flying wt.	24 oz./sq. ft. approx.

RCM PROTOTYPE

Weight, ready to fly:	129 oz.
Wing Loading	26 oz./sq. ft.
Covering and finishing materials used	Resin, K & B Superpoxy
Engine Make and Disp.	Webra Blackhead .61
Muffler Used	Semco
Radio Used	World Engines
Tank Size Used	12 ounce



Expert winners Terry Prather (L), First Place, and Kent Nagy, Second Place.

TERRY PRATHER WINS BAKERSFIELD FORMULA I RACES BY 2 TENTHS OF A SECOND

In what has to be the most exciting Formula I race of all time, Terry Prather nosed out Kent Nagy in a tie-breaking fly-off for first place. They were clocked at 1:16.6 and 1:16.8 respectively for the 2½ mile race, nose to nose for 10 laps!

The BARKS Club of Bakersfield, California, did it again! Their annual Grand Prix of Formula I racing was bigger, faster, and better than ever. Contest Director Jim Hill was on top of the two days of racing. The BARKS efficient operational work crew were supervised by Les Redwine, while Anne Redwine and her group of ladies, Barb Baker, Vickie Boyce, Peggy Lee and Betty Stream, handled the desk chores. Bob Bleaden and Dick Sonheim took turns keeping everyone informed with the P.A. system. It takes an organization with their kind of experience and dedication to conduct the world's greatest model races.

From 14 states, Canada and Mexico came the 114 entrants (59 Expert and 55 Standard). Including the back-up aircraft with the models lined up wing tip to wing tip for

ground judging, they stretched out over a quarter of a mile across the Famosa Airport. The 100° temperature contributed to lean runs and blown plugs. The famous Florida Flash is now known as the Florida Flameout with a perfect score, all goose eggs. Jim Maki will admit that even the best have their bad days.

Most of the prominent names in Formula I racing were there. Bob and Chuck Smith were calling for a young man — his name is Paul Smith — their younger brother, and from all indications he is as talented as Bob and Charlie. Young Mike Atzei, Jr., is in his second year of racing and placed 4th in Expert. R/C sailplane champion, Mark Smith, was racing with a beautiful Thunderchicken.

A few of the long distance travelers were Bob Barnes from Hawaii; John McDermott, North Carolina; Bob Violett, Maryland; Jack Langdale and Paul Zink, Long Island; Adam Sattler and Bill Zautner, Albany, N.Y. These people, as well as the representatives from nine other states, Canada, and

Mexico, will be quick to tell you that if you like Formula I, Bakersfield is the race to attend.

We congratulate the BARKS and their sponsor, Model Airplane News, for their annual Formula I races.

1976 BAKERSFIELD FORMULA I RACE RESULTS

Fastest Heat Perpetual Trophy Bob Violett — 1:14.5

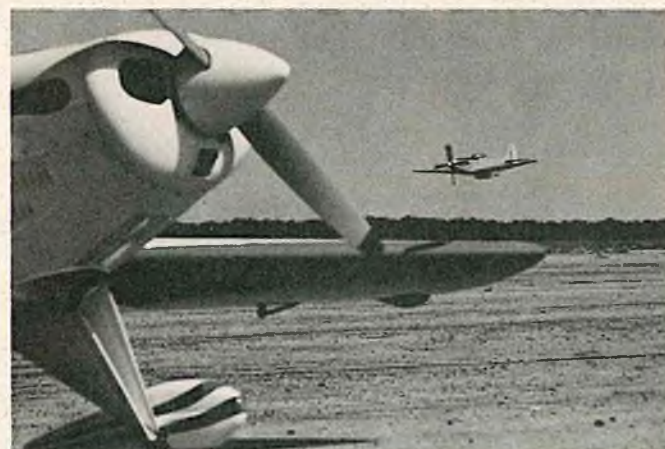
Expert Class

1. Terry Prather
2. Kent Nagy
3. Jim Jensen
4. Mike Atzei
5. Tom Tusing
6. Bob Smith
7. Bob Violett
8. Steve Sica
9. T. Christopher
10. Jack Lee

Standard Class

1. Ron Hadaway
2. Laird Owens
3. Dave Shadel
4. S. Smithwick
5. Chuck Brown
6. Russ Kime
7. Ray Floyd
8. Bob Baker
9. Sonny Meyers
10. Gary Farrish

RIGHT: Standard Class winners (1st Place) Ron Hada-way, and (2nd Place) Laird Owens. **2ND ROW (L):** Bob Violet captured the Fastest Time Perpetual Trophy with a sizzling 1:14.5. Annette Redwine helps with the trophy. **(R):** The happy group from Mexico are hot competitors. **3RD ROW (L):** The Texans do everything well, they even travel on a corporate turbo prop airliner! **(R)** RCM's Executive Editor, Pat Crews, watches the action with 'Mr. Pylon Racing', Glen Spickler. **4TH ROW (L):** Bob Bleadon arrives in his P-51. **(R)** Phil Kraft's air force was among the fly-in's.





1ST ROW: (L) Gary Farrish and Bob Wilde with their machines. (C) Laird Owens took 2nd in Standard Class, his parents, Bob and June, in background with Java. (R) Ray Floyd was 7th in Standard. 2ND ROW: (L) John Brodbeck was awarded the infamous Hound Dog. (C) The Sica family. Steve was 8th in Expert. (R) Bob Wilde's patriotic machine. 3RD ROW: (L) Bob Violet's fastest heat winner. (C) Jim Maki's distinctive color scheme. (R) Steve Sica's Rats. 4TH ROW: (L) We didn't get the name of this racers owner. (C) Wayne Browning brought this one from Ft. Worth, Texas. (R) Bob Emery entered this beauty. 5TH ROW: (L) We think this one belongs to Gene Molmar. (C) No. 13 is the work of Paul Benezra. (R) No. 40 belongs to Jack Stafford. No. 81 belongs to Keith Davidson.



1ST ROW: (L) Barb Baker and Vickie Boyce organized the heats, Dick Sonheim on the PA system. (C) Anne Redwine, Betty Stream and Peggy Lee handled the tabulation chores. (R) The silver loving cups were a classy set of trophies. 2ND ROW: (L) 1976 NMPRA President Ron Schorr. (C) Bob Barnes came from Hawaii. (R) John McDermott, Hickory, N.C. 3RD ROW: (L) RCM's Don Dombrowski did his thing. (C) Whit Stockwell was racing after nearly a years absence. (R) Steve Keller, Ogden, Utah. 4TH ROW: (L) Mike Atzei, Jr., took 4th in Expert, Mike, Sr., called. (C) Gary Hawk, California. (R) Jim Rogerski, California. 5TH ROW: (L) Jeanie Jaheka helped Scott Johnson. (C) Ever popular Carol and Ed Hotelling. (R) Tony Lopez and John Creagh.

HAVE YOU THOUGHT ABOUT ONE QUARTER SCALE?

This Quarter Scale (3" = 1'-0") Mooney Mite is by Eddie Morgan, Las Vegas Nevada. Eddie was well known several years ago for his outstanding Quarter Scale Piper J-3 Cubs and would like to start a nationwide organization for these large scale models.

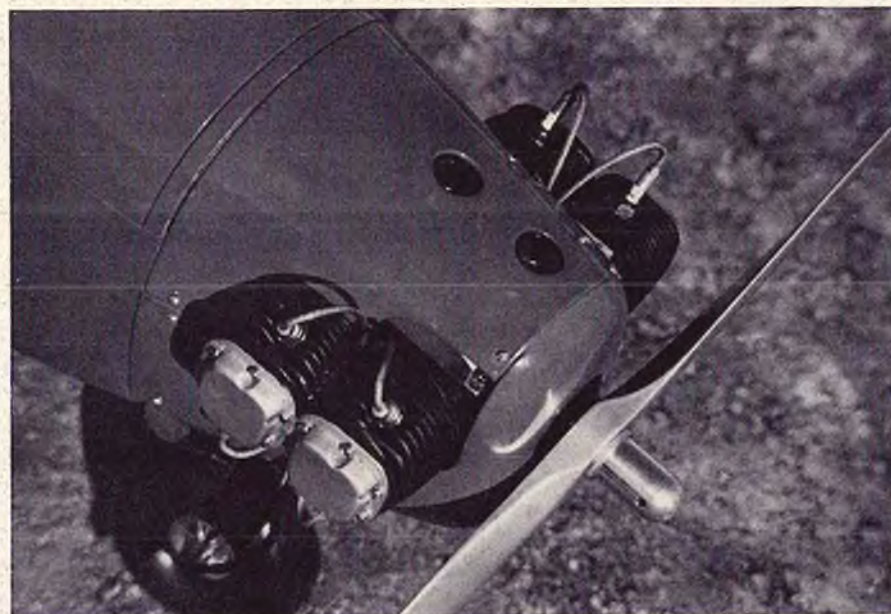
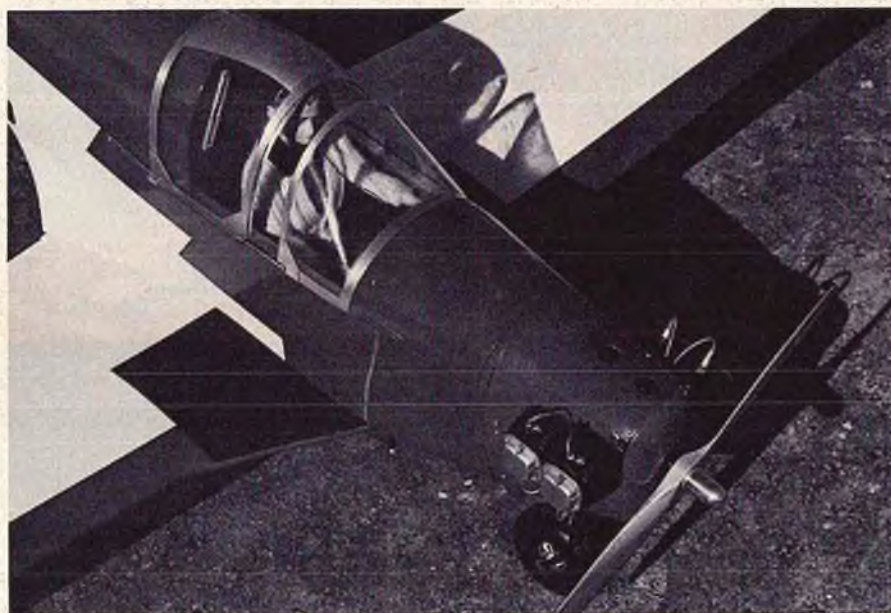
● Eddie Morgan of Las Vegas, Nevada has! In fact he has been building quarter-scale R/C models for some 15 years.

Why bother with big models? There are quite a few very good reasons — here are some of them. They are most impressive due to their size. They are easier to fly because the large surfaces are more efficient and, with their lighter wing loadings, they fly much slower than smaller models.

They are easier to build as the parts are bigger and you have more room in which to work. Duplicating the gadgetry found on full size aircraft is much simpler and the details are very effective because they are big enough to be seen and appreciated.

Eddie's models have inspired a good many modelers to build quarter-scale ships after they have seen his fly. From his correspondence with numerous quarter-scale enthusiasts, he feels there should be an organization for the exchange of information to further promote the activity. Anyone interested in quarter-midget scale models should drop a line to Edward Morgan, 1244 Bernard Drive, Las Vegas, Nevada 89102.

Think about it, they are great! □



RCM PRODUCT TEST

PIERCE AERO CO. PIERCE 970



● The Pierce Aero Company, 9626 Jellico Avenue, Northridge, California 91324, manufactures the Pierce 970, an Open Class sailplane with a wingspan of 120" and a total wing area of 970 square inches. The suggested retail price is \$79.95 and the 970 is available both from hobby shops or direct from the manufacturer. A 9% flat bottom airfoil is used on the Pierce 970 with constant chord center section panels and double taper tip panels forming the polyhedral. Either two or three channels can be used for controlling rudder and elevator and optional landing spoilers. Construction is conventional balsa and plywood and spruce used throughout the sailplane. The pushrods, tow hook, control horns, clevises, wing wire and brass tubes, stab wires and brass tubes, hinges and canopy are all included in the kit. Two sheets of plans, measuring 36" x 54" with building instructions included on the plans sheets are a part of the Pierce 970 kit. The quality of the pre-cut parts was only exceeded by the high quality balsa this manufacturer is able to obtain. Construction is very rapid and would present no problems to anyone who has one R/C ship under his belt. Our RCM prototype weighed 59 ounces ready-to-fly for a wing loading of 8.5 ounces per square foot. Super MonoKote and acrylic lacquer was applied for the finish. A Unicom three channel radio was used and a Soaring Products Thermal Sensor was installed for thermal telemetry. Although not shown on the plans, we definitely feel that spoilers are required since this ship developed a lot of inertia during landing approaches. Discussions with the designer about this were held and he felt that the builder would prefer to use his own favorite spoiler scheme. For sport flying, where there is an emphasis on spot landing, one can land without spoilers, but this would require a large area or be prepared for a go-around if you come in high with your 970. This Open Class sailplane is extremely stable in flight, which is highly desirable when being flown at high altitudes. Turns were tight with no tendency to fall off on one wing. The large wing area is a plus for visibility which allows altitudes that would be out of sight with the smaller ships. The ability of the 970 to go up in the lightest lift was dramatically demonstrated when flown with the thermal sensor. All-in-all, we found the 970 to be equal to any of today's popular Open Class ships. We feel that the price of \$79.95 is quite attractive considering the overall quality and completeness of the kit. □

IMPRESSIONS	E	G	A	F	P	IMPRESSIONS	E	G	A	F	P
Packaging	●					Pre-Shaped Parts	●				
Plans	●					Parts Match to Plans	●				
Written Instructions	●					Overall Parts Fit	●				
Quality of Hardwood		●				Ease of Assembly	●				
Quality of Fiberglass			NA			Fidelity to Scale			NA		
Other Materials	●					Flight Performance	●				
Accessories	●					Overall Appeal		●			
Die-Cutting			NA								

E = Excellent / G = Good / A = Average / F = Fair / P = Poor

SPECIFICATIONS

Name	PIERCE 970
Aircraft Type	Sailplane
Manufactured by	Pierce Aero Co. 9626 Jellico Avenue Northridge, California 91324
Mfg. Suggested Retail Price	\$79.95
Available from	Retail and Mfg.
Mfg. Recommended Usage	Competition Aircraft
Wingspan	120 inches
Wing Chord	9 inches
Total Wing Area	970 sq. in.
Fuselage Length	50½ inches
Radio Compartment Dimensions	(L) 2-9/16" x (W) 2¼" x (H) 2-3/16"
Wing Location	Shoulder Wing
Airfoil	Flat Bottom
Wing Planform	Constant chord, double taper
Polyhedral	6 inches
Stabilizer Span	32¼ inches
Stabilizer Chord (incl. elev.)	4½ inches (avg.)
Total Stab Area	150.3 sq. in.
Stab Airfoil Section	Symmetrical
Stabilizer Location	On Fin
Vertical Fin Height	8-5/16 inches
Vertical Fin Width (incl. rudder)	7¾ inches
Recommended Engine Size	NA
Recommended Fuel Tank Size	NA
Landing Gear	NA
Recommended No. of Channels	2-3
Recommended Control Functions	Rud., Elev., Landing Spoilers
Basic Materials Used In Construction:	
Fuselage	Balsa & Ply
Wing	Balsa, Ply, Spruce
Tail Surfaces	Balsa
Hardware Included In Kit	Very complete hardware kit
Plan Size	36" x 54" (2 sheets)
Building Instructions on Plan Sheets	Yes
Instruction Manual	No
Construction Photos	No
Kit Includes	Shaped Parts
Mfg. Rec. Flying Weight	48-64 oz.
Wing loading based on rec. flying weight	8.3 oz./sq. ft.

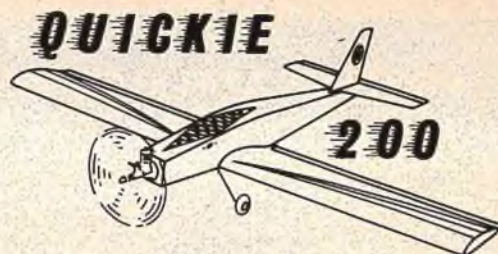
RCM PROTOTYPE

Weight, ready to fly	59 ounces
Wing Loading	8.5 oz./sq. ft.
Covering and finishing materials used	MonoKote, Acrylic lacquer
Engine Make & Disp.	NA
Muffler Used	NA
Radio Used	Unicom
Tank Size Used	NA



Quarter Midget

BY
DON DOMBROWSKI
AND FRED REESE



RACING AT RANDOM

● The first time I witnessed a Formula I race was back in 1968 at Sepulveda Basin. I stood there with my mouth wide open and my eyes 2" out of their sockets as I watched Granger Williams turn a blistering time of 1:56 with a K & B .40 powered La Jollita. It amazed me that someone could control an R/C airplane around pylons with such precision, especially when I was having problems getting my .19 powered trainer up and down in one piece! Seven years later, at Whittier Narrows, I watched with sheer amazement again as Ron Gilman turned a 1:13 with a Super Tigre X40 powered Prather Little Toni.

I did get proficient enough, after numerous crashes, to finally get into 1/4 Midget and 1/2A racing but, for some reason, never felt that even though I could fly a 1/4 Midget and turn a 1:39, that I had the capability to handle a Formula I. After two years of coaxing from friends who fly both 1/4 Midget and Formula I, I decided to give it a shot. Probably because they were starting to threaten me with great bodily harm if I didn't!

My opportunity came when Danny Kane brought out his retired Little Toni and Joe Zdankiewicz put in a good running X-40. So off to the Basin we went to give the chubby Pollack the thrill of his life. After Danny put in a trim flight and got everything set, I knew that all the excuses I had thought up on the ride out to the field weren't going to do me any good. This was it. Well, just standing behind that Toni with an X-40 barking out the pipe at 21,000 rpm is a thrill in itself, not even considering that your knees, thumbs and teeth are oscillating about the same rpm!

Okay, we are set, 1/4 up elevator, 1/4 right rudder and let her rip. Then came the OH!! - - - What did I get myself in for! This situation of OH - - - 's along with the airplane oscillating continued for about 10 wide very high circles around the field until I noticed that, as my thumbs stopped shaking, the airplane became smoother and it would go and stay in any position I pointed it. With each subsequent flight it felt smoother and easier to point and that, on the 5th flight, the grooviness and control of the airplane was so impressive that the speed becomes relative and it became fun. I can honestly say if you can fly a Rossi powered 1/4 Midget around a course, you can fly a

Formula I with no problem. I think that the biggest thing you have to overcome is the fear of fear itself, because these airplanes fly like a dream and do exactly what you want them to do.

Now with all that behind, the next step was to get in some racing and the next race was May 15 and 16 at Bakersfield, California. Bakersfield, in Formula I circles, is by far the biggest event of the year, evidenced by the fact that racers come from all over the U.S., Canada, Mexico, and even from Japan to compete at this contest. So, on goes a new paint job and in goes a new engine. Send in your 10 bucks to NMPRA and your entry form to the BARKS and you are set.

The big weekend arrives and off we go. We arrived at the flying site Friday afternoon to get a trim flight in and run the new engine. The site is fantastic! The first thing that comes into your mind is miles of concrete - - - no problem landing here. The next thing is, "what are all these people doing here?" Then you find out they are here for the same reason you are - - - last minute adjustments.

Friday night is registration time and you find out that there are 57 Experts and 55 Standard pilots entered. Saturday morning at 9:00 there is static judging of 200 plus airplanes lined up wing tip to wing tip. Then the first heats are called up and the racing starts. Out to the line we go for our first heat: I even managed to get up and down in one piece, turned a 1:50, and took 2nd even though I had trouble setting the needle valve on the engine. When I got back to the pits I asked Jim Jensen what I was doing wrong. He told me to change the plug (you burn one out every race), re-fuel, and he would show me how to set it. He said you fire the engine, turn in the needle to its peak rpm and remember that figure. Then shut it down. Then you turn in the needle and remember the number of turns to close it, in my case 6 turns. Now, when you go out to the line, you open the needle seven turns, fire it, and then turn it in until you read 400 rpm lower than your peak rpm and don't go above that point. If you do, you take a chance of distorting the plug element and, on the 8th lap or so, it may flame out.

During the next heat I did exactly what he said and it worked great, and even cut my time by 5 seconds. Round 3 was a disaster! A wheel axle screw loosened on the line and

it nosed over on take-off. I found out that you have to Locktite the screw when you install it. Round 4 was another disaster. The radio switch went out, probably due to high vibration when I lost the prop on Round 3. Round 5 was still another disaster — I didn't hold enough up elevator and nailed a prop again. Round 6? You guessed it!

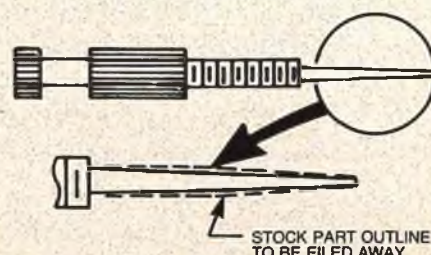
Well, at least I got off twice and had an airplane still in one piece. One of the big things I noticed is that people like Jim Jensen and Terry Prather, and others, are glad to give you all the help you need. If any of you guys out there are in the same boat as I am and would like some questions answered by some of the experts in Formula I, drop us a line and we will try to get the answers you need.

All-in-all, it was a fantastic weekend of good racing, with Kent Nagy and Terry Prather fighting it out for top honors in Expert in the closest race I've seen in a long time. Neck and neck all ten laps with Terry coming up on top. And, let's not forget about the Standard Class winners: Ron Hadaway had it all together and ended up with a perfect score and all the marbles after two days of races. Laird Owens is a young up-and-coming pilot who also flies 1/2A, is very constant, and walked away with the #2 spot. Dave Shadel, one of the top glider pilots in this country, in his first Formula I race, took 3rd — congratulations, Dave!

If you are a racing nut like I am and you want to see some of the most fantastic racing anywhere, plan on spending a weekend in Bakersfield around the middle of May — you won't be disappointed!

Thanks to Ed Berman of Seattle, Washington, for the following hint:

Half-A enthusiasts might find the needle valve setting a little difficult to adjust on a Cox TD .049-.051 when running on a pressurized fuel system. This can be easily cor-



to page 114



STUK

The newest entry into the rapidly growing field of alpha cyanoacrylate instant contact adhesives is actually an "adhesive system" from Economy Plus, P.O. Box 4145, New Windsor New York 12550. This adhesive system consists of three parts . . . Stuk Instant Contact Adhesive, Stuk + Set and Stuk + Timed Contact Adhesive.

Basic Stuk is a revolutionary new bonding liquid that makes ordinary adhesives old fashioned. It requires neither solvents, catalysts, nor heat treatments and it bonds practically all materials in seconds such as wood, rubber, plastics, porcelains, and glass. Chemically, Stuk is a compound of alpha cyano-acrylate monomer in a liquid state. When applied in a thin coating to the bonding surface it solidifies instantly through polymerization to produce an extremely strong bond that holds tenaciously for years.

Stuk + is a high viscosity alpha-cyanoacrylate timed contact adhesive designed for bonding porous surfaces. All the advantages of the basic Stuk adhesive can now be applied to applications of porous materials. Stuk + also acts as a gap filler because of its ultra-high viscosity of 2000 centipoises as compared with Stuk which has a viscosity of 3 centipoises. This allows its use on rough parts as well as parts that don't quite fit. Stuk + sets most materials in 90 seconds giving you ample time to position parts. In addition Stuk + has all of the holding properties of the instant setting

Stuk.

Stuk + Set is a filler setter and, when sprayed on the timed contact adhesive, causes the latter to cure on command. Stuk + Set fills in gaps in porous materials and may be used by spraying on one surface and allowing to dry followed by an application of Stuk or Stuk + on the other surface at which time the pieces can be joined instantly. Immediately after bonding the pieces together with Stuk +, spray Stuk + Set on them for instantaneous curing. Alternately, you can spray the surfaces to be joined with Stuk + Set and then join them with Stuk or Stuk + Adhesive.

When using the basic instant curing Stuk, be sure the parts fit tightly and the surfaces are smooth. Be sure also to use small amounts, since Stuk goes a long way and will find its way into the smallest spaces. Fit the parts together before applying Stuk since it cures in such a short time that you will not have time to re-set the parts. For example, a wing can be pinned to the plans and Stuk applied. As soon as you have finished applying the adhesive, the pins can be removed and, in a matter of minutes, you have an assembled wing. When trying a new material with Stuk, test a sample for compatibility. Make sure parts are clean before using. Stuk can also be used on extra-thin parts without worry of warpage. Since Stuk has a low viscosity and a superior wetting property, it is rather difficult to build up a thick layer using only this instant setting adhe-

The Alpha Cyanoacrylate adhesives have virtually revolutionized model building. The newest entry into the field is a three-part bonding system that increases the versatility of the instant glue by providing immediate or timed release along with the capability to bond porous surfaces and fill gaps without fillers.

sive. However, if sprayed with Stuk + Set, the hardening time is shortened and a thicker layer can be obtained.

The application of Stuk + Set on a porous material prevents the penetration of Stuk and makes for an easy bond. Material that is difficult to join by conventional adhesives can be primed by Stuk + Set. When a fast bonding of Stuk + is required, the usage of Stuk + Set will shorten the hardening time.

This three part adhesive system from Economy Plus has proved to be excellent and is designed to provide you with maximum versatility with the new alpha cyanoacrylate adhesives. When not in use, Stuk and Stuk + should be stored in the refrigerator. As with all alpha cyanoacrylate adhesives, if skin contact occurs, avoid vigorous attempts to remove. In such cases apply a solvent such as acetone, or nail polish remover to the contacted area of the skin and gently remove the adhesive. Wash the solvent off the skin with water. The solvent should not, however, be used in the case of contact with eyes or open wounds. In case of eye contact, hold the eyelids open and immediately flush with water. Medical attention should be obtained in the case of eye contact.

The advent of the alpha cyanoacrylate adhesives has virtually revolutionized model building. The introduction of the Economy Plus Stuk adhesive system has increased this versatility three-fold. □

RCM BUILDS THE

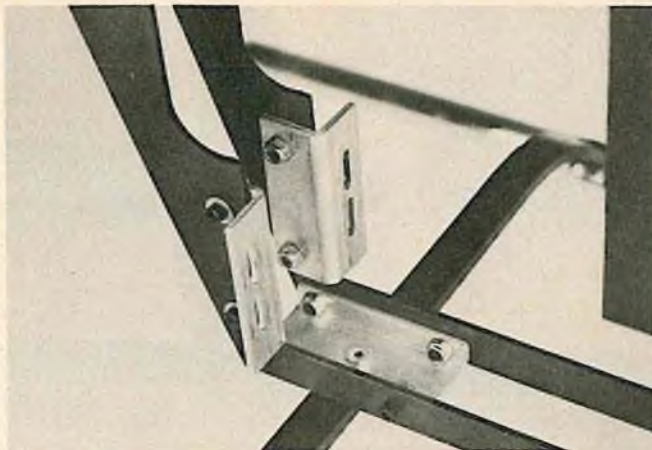
NEW
WORLD
TRUCK

BY DON DEWEY (N1A)





The blue anodized frame halves bolted together with the flat center channels. Note PEM nuts in channels.



Engine brackets attached to inside of frame halves. Note slots for engine alignment.

● The Rev-olution is the newest .40 size helicopter to make its appearance. Designed by John Simone, Jr., and produced by American R/C Helicopters, Inc., 26071 Via Viento, Mission Viejo, California 92675, the Rev-olution has a rotor span of 41" and a flying weight of 5¾ pounds.

Some of the unique features of this totally American designed and produced helicopter include a virtually unbreakable one piece polycarbonate canopy, sealed ball bearings, a fail-safe clutch, titanium main rotor shaft, plus a custom designed Semco muffler and adapter designed to fit the .40 engine of your choice. In addition, all main metal body parts with the exception of the skids are anodized in either blue or red. The Rev-olution kit, including muffler and adapter, is priced at \$185.00, less engine and radio, or \$219.00 with the K & B .40 engine. Another welcome feature is the fact that the spare parts for the Rev-olution are immediately available at prices well below those normally charged for helicopter replacement parts.

The Rev-olution kit, due to its assembly sequence and the fact that some parts are pre-assembled for you, can actually be put together in approximately 6 hours. In other words, it is entirely possible to build the Rev-olution one day, and fly it the next. Part

of this short assembly time is due to the extremely complete and comprehensive instruction manual that accompanies the Rev-olution. This manual is written in a check-off, step-by-step method complete with photographs of the important assembly steps and full size plans that are complete and detailed. It is obvious that the plans have been written so that, if this is your first helicopter, you will have no difficulty whatsoever in assembling the kit. It is also quite apparent that the assembly sequences have been well thought out by the designer, John Simone, Jr., since you'll be working from one assembly to another, so that no particular assembly becomes tiresome and, when it is time for final assembly, all of the sub assemblies have been completed and the final stage is rapid to say the least.

Once the construction is completed, the instruction manual has a section on radio and control check, final adjustments as well as a complete section balance, main rotor and engine set-up, starting procedure, engine and pitch adjustment, tail rotor set-up and flying tips. In addition, there is a simple-to-build training gear illustrated in the manual that can be built for less than \$4.00 and virtually ensures an absolute minimal amount of damage to your Rev-olution.

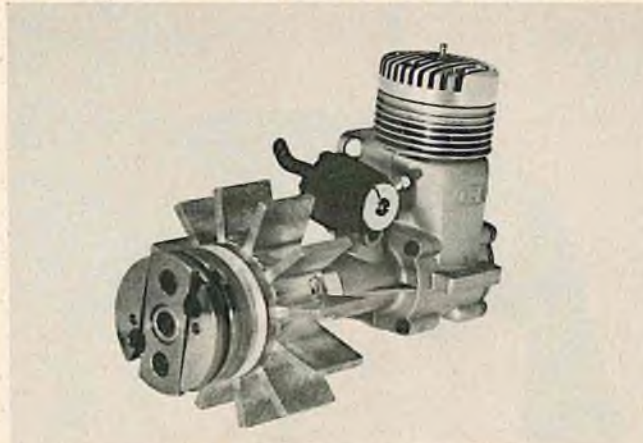
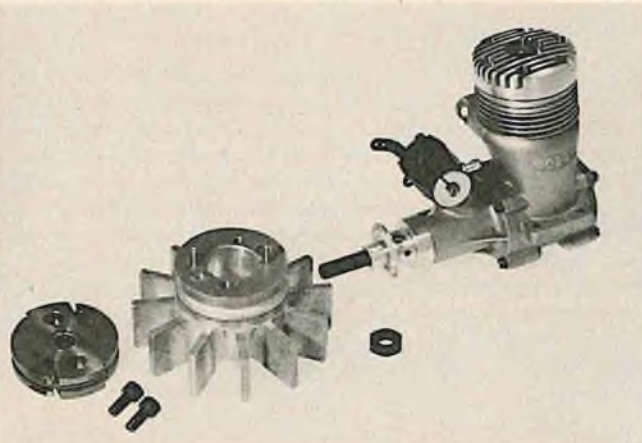
With regards to construction, the only modification we made was to replace the single wire tail skid with a 3/32" diameter music wire "continuous loop" tail skid to further reduce the possibility of tail rotor damage or having the single wire skid stick in the grass upon impact. The entire helicopter is extremely well made, well packaged, thoroughly engineered both from a construction and flight performance standpoint. Compared to most helicopters, it is extremely reasonably priced and, if purchased with the engine, requires only a 4" length of fuel tubing and a radio in order to be ready to fly. Top grade components are used throughout, including American Standard socket head screws, nylon lock nuts, Sullivan fuel tank, custom designed Semco muffler, an extremely rugged white ABS seat and instrument console, the rugged one piece canopy, and the unique titanium main rotor shaft which is virtually impossible to bend except in the most severe crash.

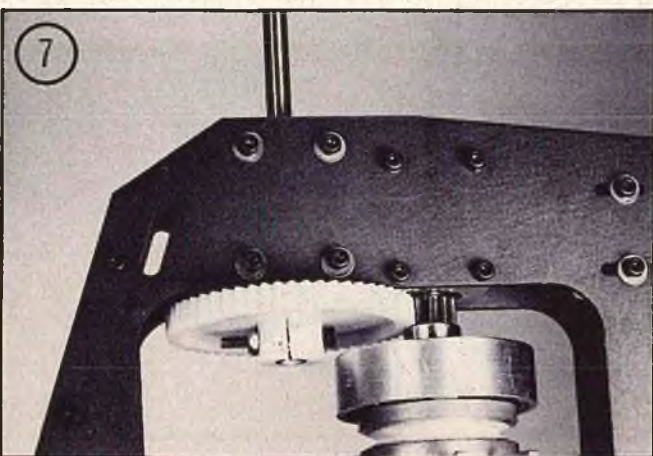
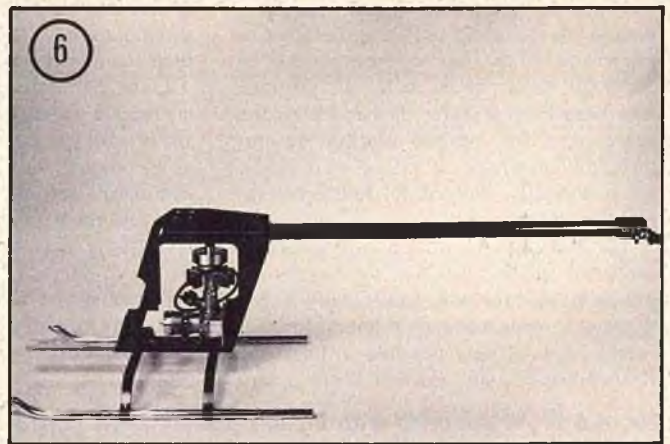
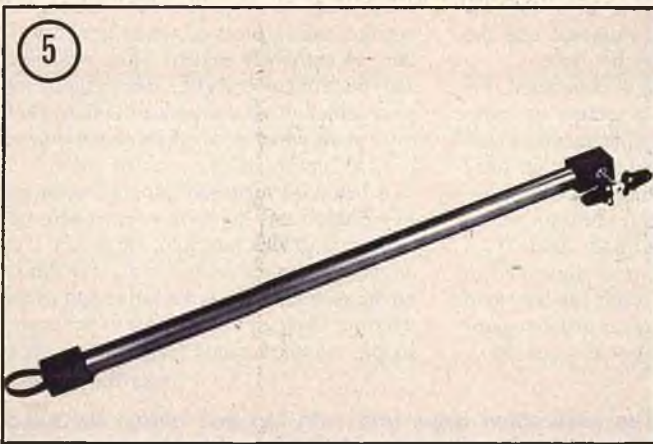
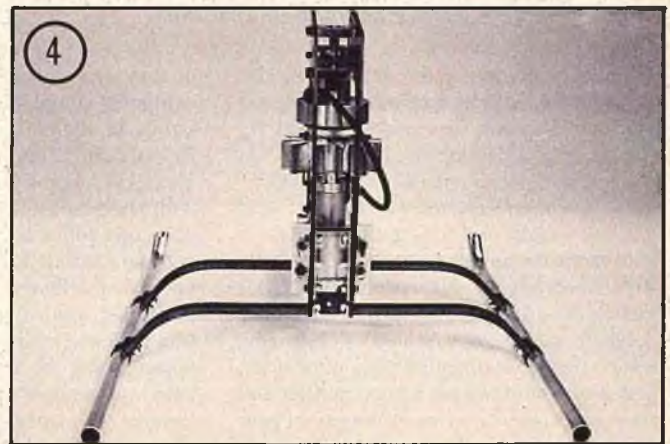
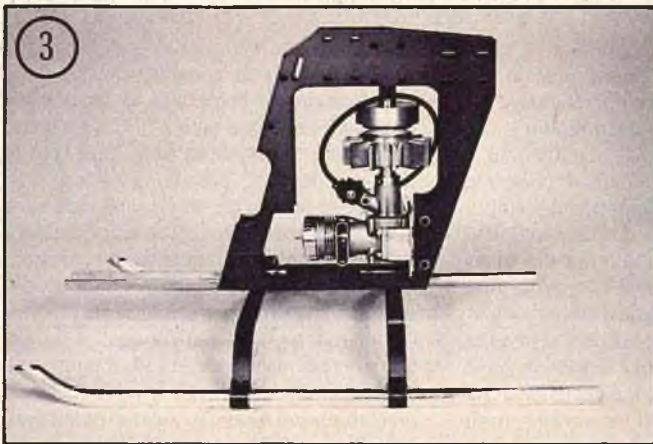
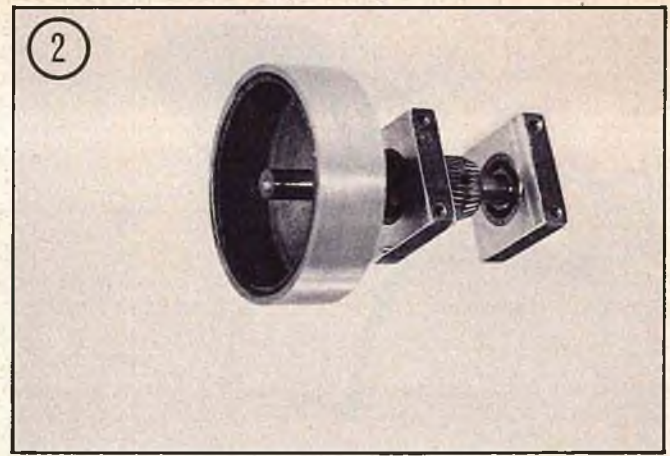
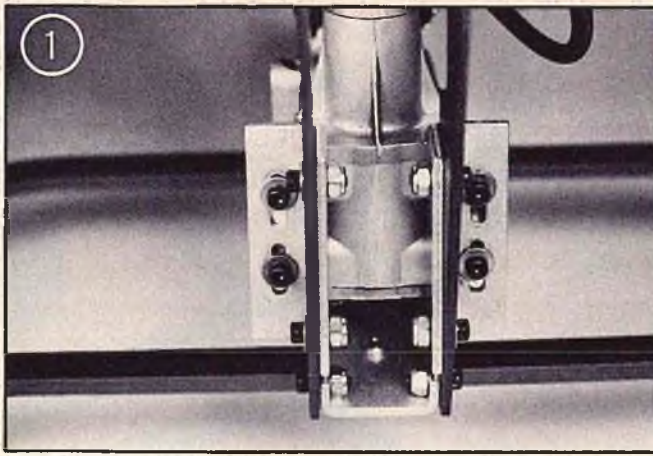
A belt drive to the tail rotor is used on the Rev-olution and, due to the tremendous tail rotor rpm of this machine, we would recommend using the smaller blade size shown on the plan rather than the full length of the tail rotor blades if you are new to helicopter flying. Another unique feature of the Rev-

text to page 112

The K & B .40 supplied with kit has pre-adjusted throttle arm. Fan and clutch shown.

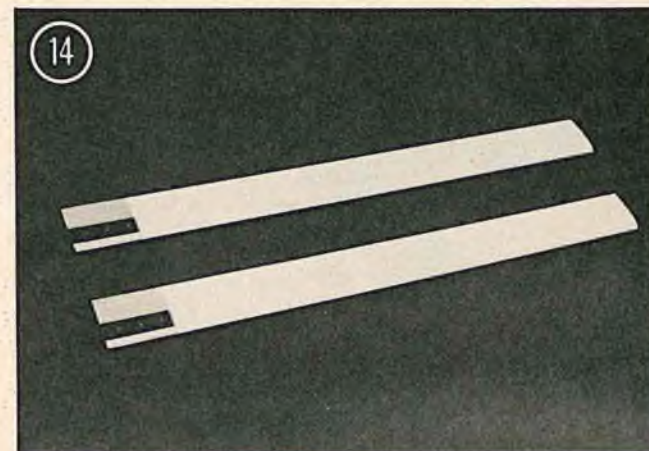
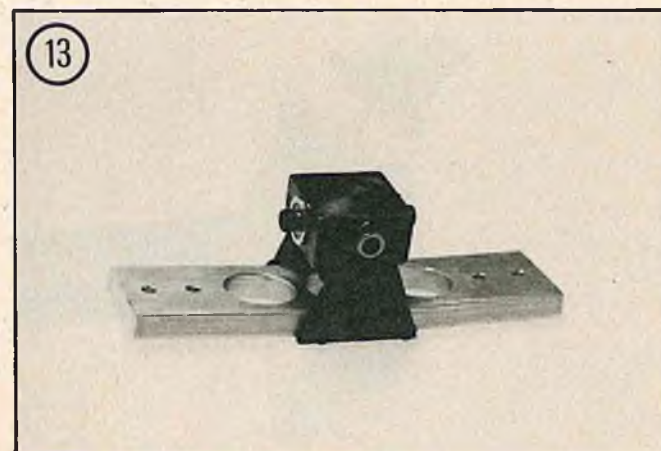
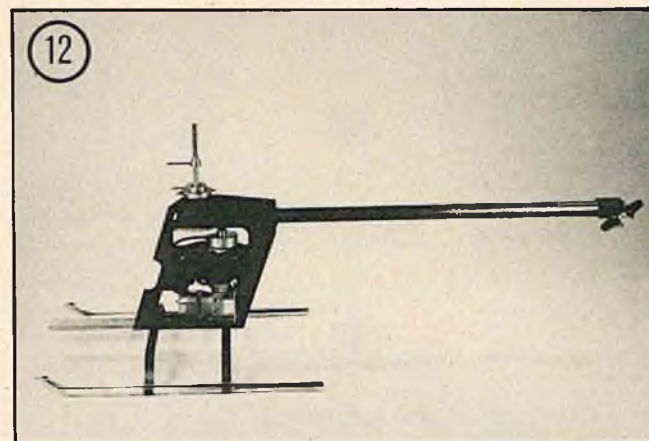
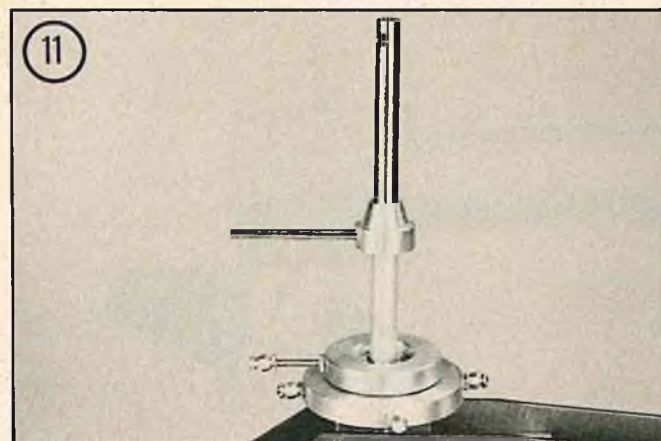
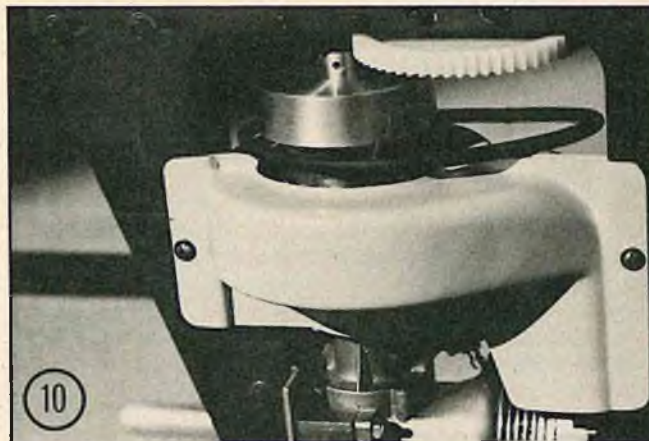
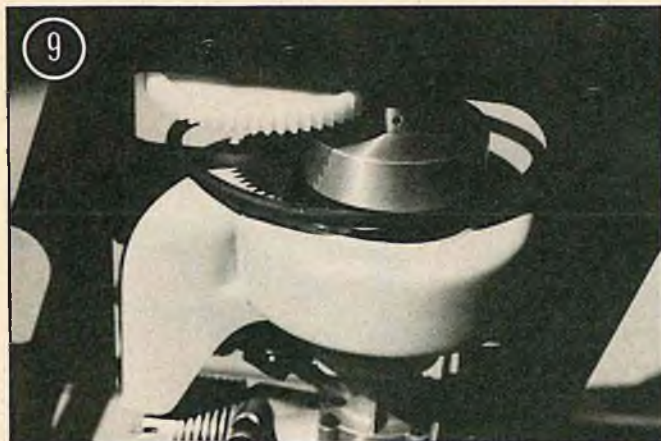
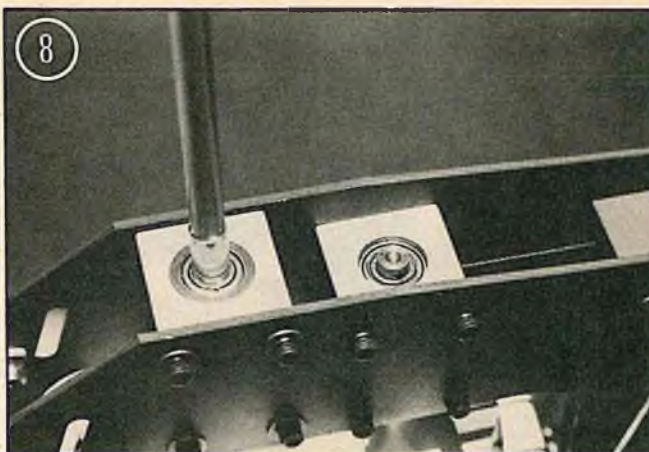
The assembled drive unit with fan and clutch installed. Clutch shoes cannot break off and make full contact with lining.

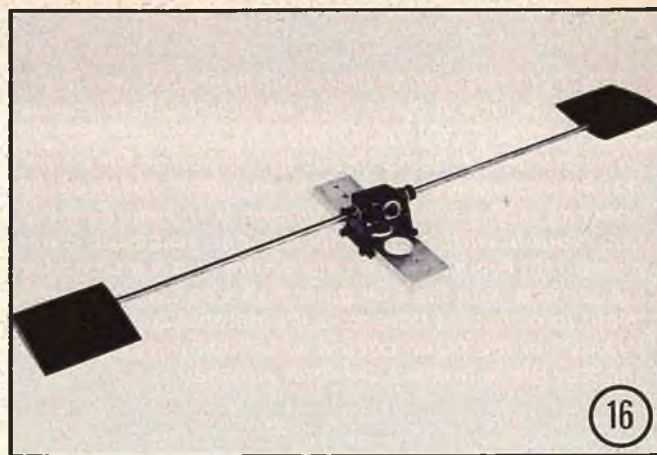
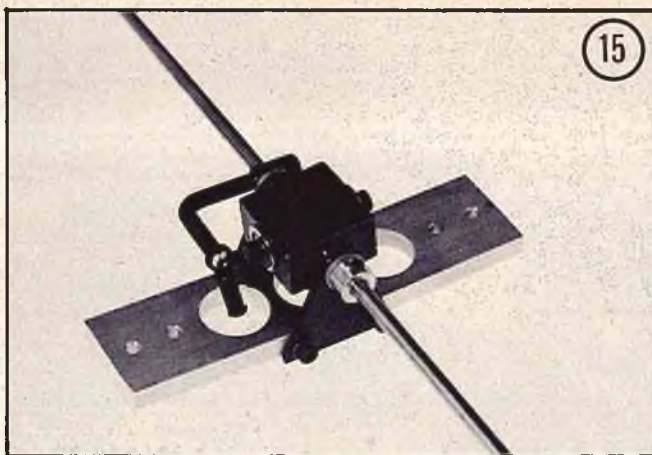




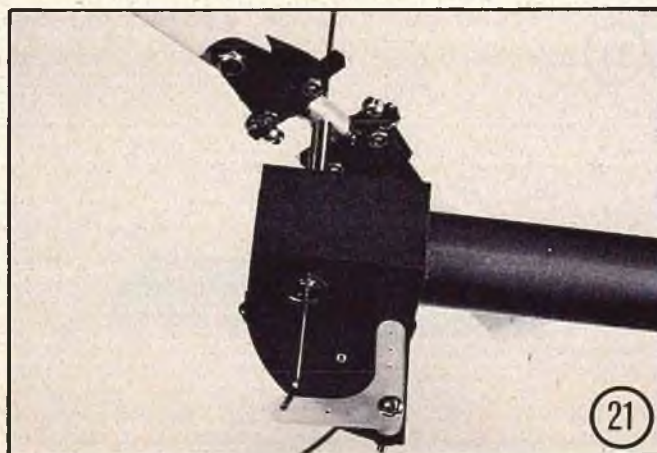
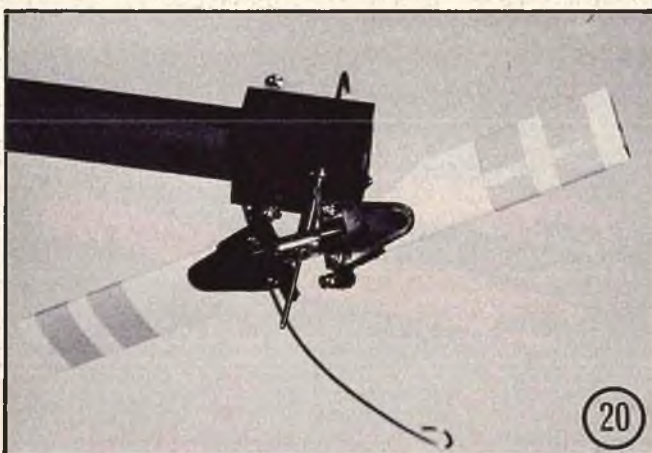
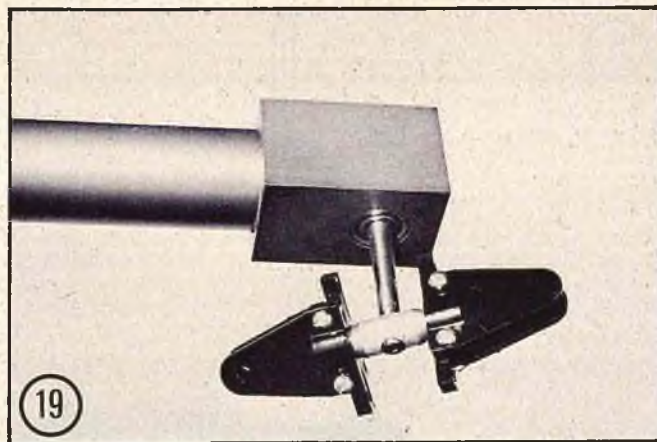
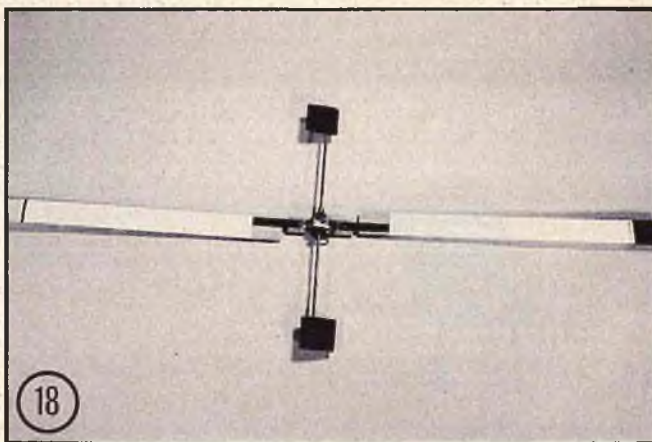
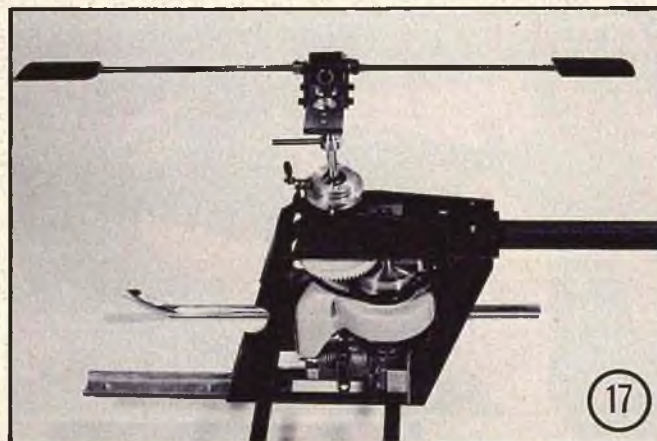
(1) K & B .40 mounted in place. Note adjustment range for various makes of engines. (2) Pre-assembled bell housing with pinion gear and sealed bearing blocks. (3) Engine and drive system mounted on side frames and aligned. (4) Rear view showing position of bearing blocks. (5) Pre-assembled tail boom with drive belt, front and rear blocks and tail rotor blade holders. (6) Tail boom mounted in place. Lift up rear of boom and pull back before tightening mounting bolts. (7) Front bearing blocks and large drive gear installed and aligned.

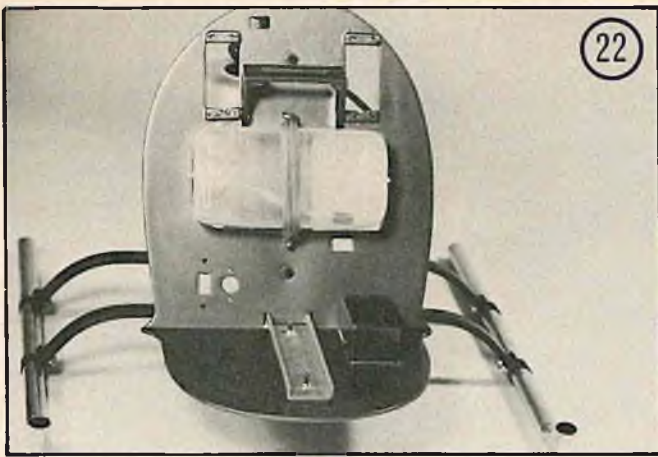
(8) View of front bearing block with main shaft and lower swashplate lock in place. (9) View of left side of engine cooling shroud. (10) Right hand side of shroud. Note lip on each side that holds shroud in position on the frame. (11) Pre-assembled swashplate installed, followed by upper swashplate lock and follower. (12) Overall view of Rev-olution with major mechanical assembly completed. (13) Pre-assembled main rotor hub is attached to the see-saw with the triangular hub side supports. (14) Main rotor blades covered with material supplied. The inner 2" of the blade coated with Superpoxy resin and sanded. Blade holders are then attached.



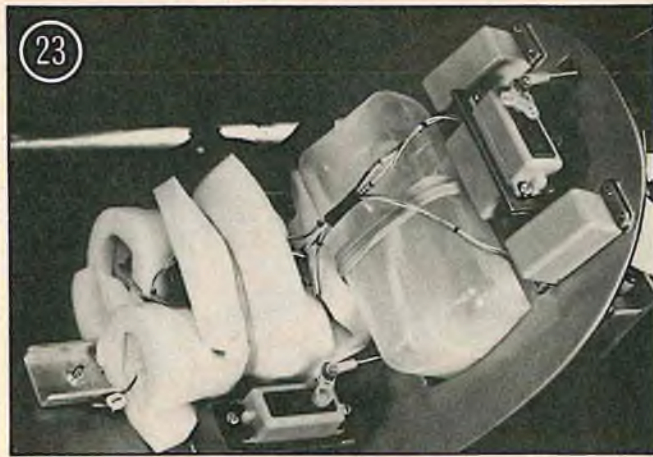


(15) The stabilizer rod, brass washers, collar, and main rotor control arm are assembled to the main rotor hub. (16) The flybar paddles are screwed on to the flybar and checked to see that they are parallel to each other. (17) The head assembly, minus rotor blades, is balanced on the main rotor shaft and the collar and main rotor control arm locked in place. (18) The previously covered main rotor blades are attached to the see-saw and the blades carefully balanced per the instructions. (19) The tail rotor assembly prior to installing the bracket and pitch control assembly. (20) The blades and pitch control rod wire installed. Cut blades to length shown on plan if you are a new chopper pilot. (21) Bellcrank brackets, and bellcrank installed in place.

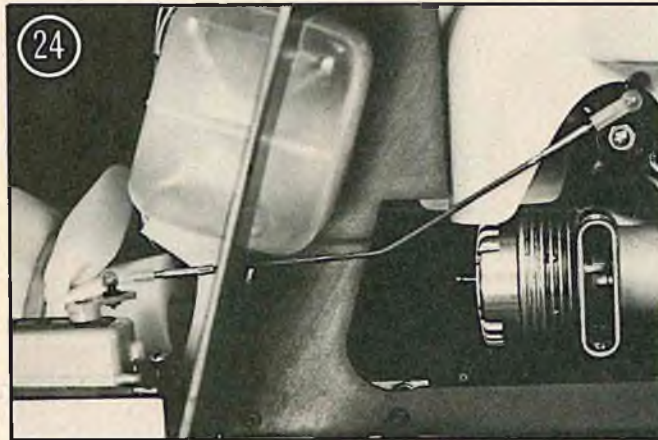




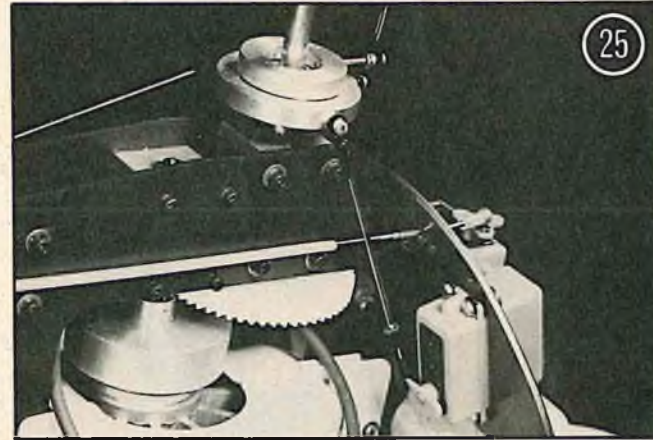
22



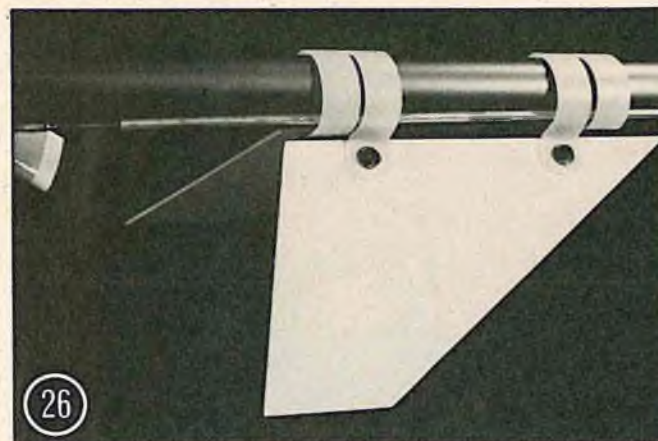
23



24

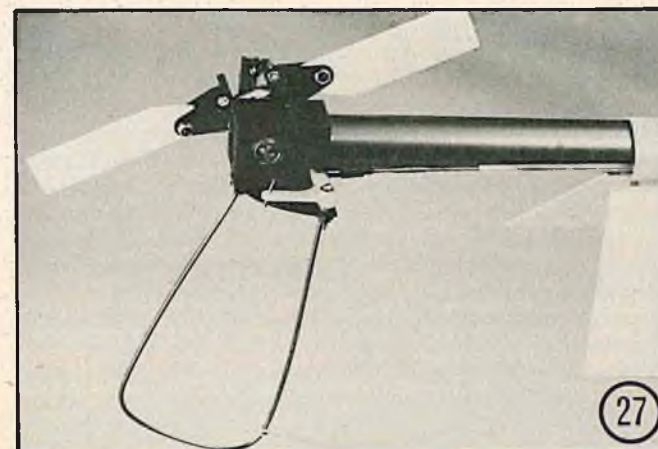


25

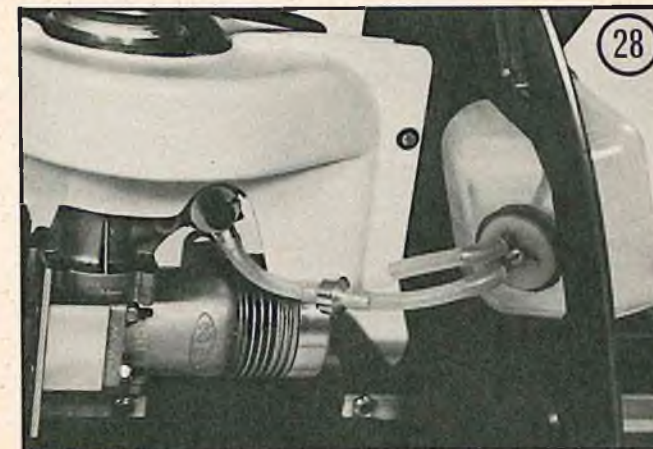


26

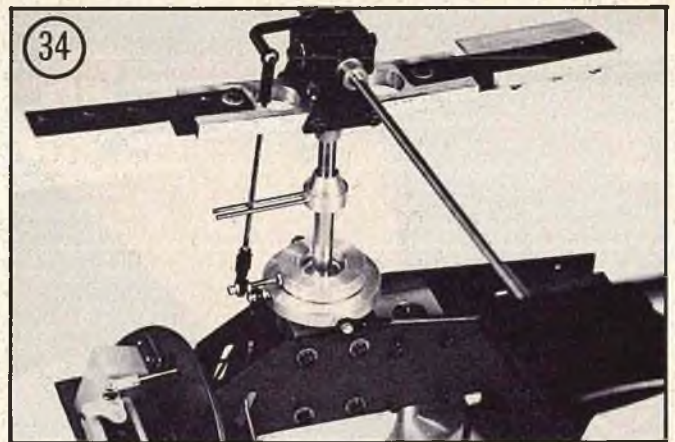
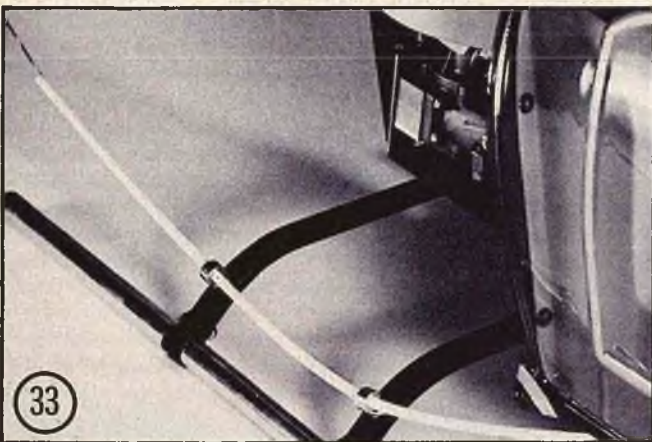
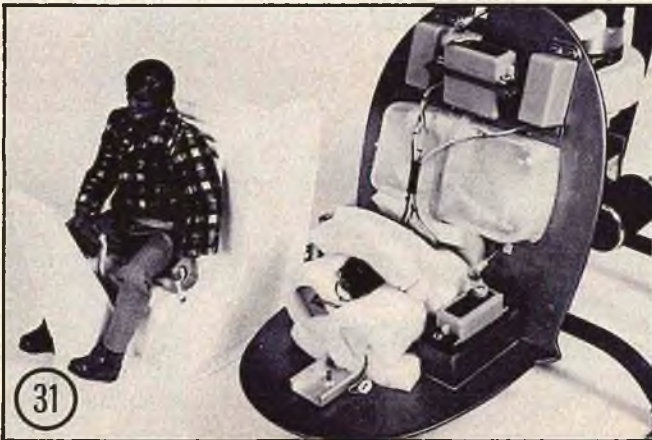
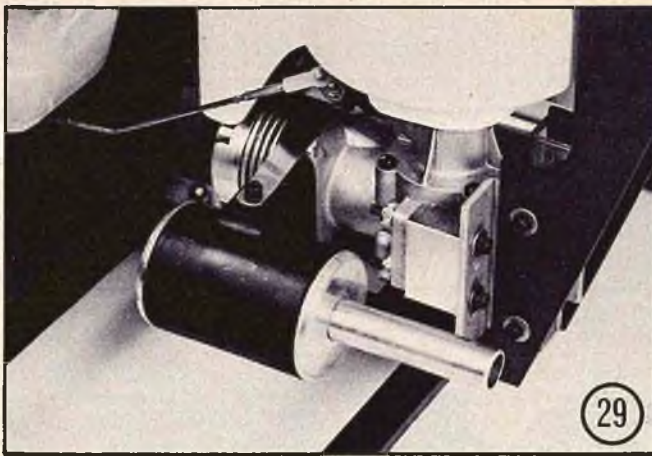
(22) The two plywood canopy formers are cut from the plywood provided. Our prototype coated with K & B resin, sanded, and sprayed with metallic blue DupliColor acrylic lacquer. Fuel tank provided in kit is installed with J-bolts and rubber bands. (23) Completed radio installation. RS Systems used in this prototype along with the new Du-Bro ball and socket links. (24) Throttle pushrod linkage. (25) Left and right cyclic control pushrod and tail rotor pitch change pushrod installed. (26) Stabilizing fins cut from material provided and held in place with nylon clamps. Clamps also hold tail rotor control rod tubing in place. (27) Connection of tail rotor pushrod to bellcrank. Note new tail skid installed to replace single wire skid. (28) Fuel line connection with Perry Aeromotive filter fin installed in fuel line.



27



28



(29) Special Semco muffler is provided in Rev-olution kit. (30) Console and instrument panel glued together and trimmed to fit. (31) Big Jim installed on seat with rubber band, and entire unit ready for installation over radio equipment. (32) Seat and console installed with four sheet metal screws. One piece, virtually unbreakable polycarbonate canopy, is trimmed to fit over plywood formers, then ribbed door outlines trimmed with silver DJ's Multi-Stripe. (33) Antenna installation uses 6-32 bolts, nylon cock washers, and Du-Bro wheel collars as Stand-Offs. Antenna passes through a length of Kavan tubing. (34) The main rotor head control rod is installed at this point. (35) The completed Rev-olution ready to fly.

THOSE TWO OLD FALLACIES EXPOSED!

BY LEN SALTER

The subject matter of this article is directed in particular to flyers of radio controlled model aircraft, which, for all intents and purposes, react to control movements in exactly the same way as full size conventional aircraft, and are subject to all the same forces.

I will deal first with the fallacy of 'wind effect' and, in this respect, let me define wind as a smooth moving air mass. I am fully aware that this condition of 100% smooth moving air rarely exists at heights flown by pilots of model aircraft. From the many hours that I have spent flying single, twin and four engined full sized aircraft, I can assure you that smooth air is not often encountered at altitudes below 3000 metres either.

I am very well aware of the effects of turbulence on an aircraft, but this is an incalculable factor, and frequently unpredictable, and no allowance is made for it when courses are plotted for long distance flights.

Wind shear — the slowing down of wind speed caused by objects on the earth's surface can also affect the reactions of an aircraft coming in to land.

In order to maintain simplicity let us ignore the side issues and whenever wind is referred to, think of it as a smooth moving air mass.

As we are normally earth bound creatures, we naturally tend to relate everything to the earth, but with an aircraft **in flight**, the only force acting upon it related to the earth is gravity. The **only** effect that wind has on an aircraft in flight is to make navigation difficult, as it is affected 100% as per the wind speed and direction.

If an aircraft flying down wind strikes an object on earth, the impact speed — being the sum of airspeed plus windspeed — will be much higher than the impact speed if flying into the wind — airspeed minus windspeed. This fact I fully appreciate.

In this article we are only considering an aircraft **in flight** when its performance can only be related to the air in which it flies, and **not** to the ground. A very important difference.

When we stand on earth watching an aircraft fly, the wind blows against us, but it does not blow **against** the aircraft because it has been affected 100% by the wind, and as far as the aircraft is concerned, it is flying in still air. It is moving **with** the air mass and **through** it at the same time.

The thrust derived from the propeller of a conventional aircraft can only propel the plane forward, thereby creating its own **relative** wind (airspeed). Therefore, as far as your aircraft is concerned, it **always** flies into wind. I think some confusion is caused by people thinking of wind as something blowing through the air. Thinking of wind as a moving air mass will help.

Another possible source of confusion is the terminology used. A car or an aircraft is called by the same name whether it moves or not, but when air moves it is renamed **wind**.

An aircraft taking off in a cross wind will not immediately drift 100% with the wind owing to initial inertia (more about that later). Before, and immediately after, lift off the wind will be blowing against it until inertia relative to the wind is overcome in a short length of time. If you apply Newton's 'opposite and equal reactions' here, the wind is creating a pressure on the windward side of the aircraft, with nothing on the leeward side to counteract this pressure. Eventually the pressures must become balanced out — the aircraft will then drift 100% with the wind.

All untethered airborne objects, irrespective of size and weight, are affected exactly alike by the wind. A man descending by parachute in a wind hangs perpendicular below the canopy. A falling bomb will also be affected 100% by the wind (as the aircraft also was, before releasing the bomb).

Let us now take an imaginary balloon trip, you are drifting west at 24 km/h, and decide to light a cigarette. This presents no problem as you are in perfectly still air, and you watch the smoke going straight up, even though the wind is blowing you at 24 km/h across the ground.

Let us go a step further in our imagination

— you are not flying a model aircraft from the balloon, and wish to fly up and downwind with 180° turns at each end. In which directions would you fly?

In actual fact, you cannot fly up and downwind, or across wind for that matter, because as far as you and the aircraft are concerned there is no wind. I have heard (perhaps you have too) of people modifying models to make them fly better across wind — a ludicrous waste of time.

Let us now deal with the second fallacy related to 'inertia effect'. Inertia can be defined as an inherent force in all objects which resists motion, or changes in speed or direction. When applied to an aircraft in flight, it can be thought of as kinetic energy, or momentum.

In using the expression "upwind", "downwind", or "crosswind" flying in this article, bear in mind that this is **only** in relation to the ground.

The following misguided quotes from various articles portray how the fallacy regarding 'inertia effect' is perpetuated.

"During the transition stage when the model decelerates to a slower speed (turning into wind) the inertia or mass/speed effect causes ballooning and climbing. Similarly, a drop in height follows when turning with the wind (downwind) after flying against it. This inertia effect only happens for the short time of the speed transition and its effect is minimized the faster the model is trimmed to fly, relative to the wind."

"Model airplanes are affected by wind due to inertia effect."

"This is why multiple rolls into wind look ragged towards the end, the airplane didn't have much inertia to start with."

Through a sad lack of understanding of
to page 108

	Flight 1	Flight 2	Flight 3	Flight 4	Total across	Average
Into Wind	13	11	12	12	48	12
Downwind	10	15	13	14	52	13
Crosswind	12	11	13	11	47	11,75
Crosswind (Opposite Way)	11	15	13	15	54	13,5

FIGURE 1: AVERAGE OF ALL DIRECTIONS 12,75.

POWER BOATING

BY DAVID THOMAS



The author with the review *Spearfish*. See column for details.

● In the June 1976 issue I told you how to make a sheet of glass-fibre that can be used for the bulkheads in the boat. Of course, it can be used for the deck, too and, in fact, can replace plywood in most jobs where weight is not important. So, you are now ready to install the two bulkheads. But if there is one thing I have learned about building boats, it is to make haste slowly. Sure, I know, you are in a hurry to get that model on the water and running. But if you do hurry, chances are you are going to get something in the wrong place, or

forget a bit, and then you will have to do it all over, and in the end it will take even longer before you actually get around to piloting. So, before you fit those bulkheads in place, sit down in front of the model, and think it out. Draw a pencil line where you think the bulkhead which separates the radio from the engine compartment should go. Now take the tank, and see if it fits in. If it does, okay. Now make another mark where the rudder is due to go, and see if there is enough room for the radio installation. Move things back and forth

until you are quite sure that there is going to be enough room, with a bit left over to get your fingers in there. (A lot of people forget that the trick is not just to get it all in, but to be able to work on the things once they are in there).

Let's suppose that you have worked out where everything is due to go; now you can stick the forward bulkhead in place. Here's how I do it, and the same method works equally well on polyester or plywood. First of all, cut the bulkhead to shape, using a brown-paper template first, to avoid waste. When you are sure you have a good fit, mark around the template on the glass-fibre or ply, whichever you are using, and cut it out. And be careful - - you can get a pretty bad cut from a fret-saw, so keep your fingers well away from the blade. Make sure that if the saw slips, the blade is going to hit the saw-table before it hits your fingers; if you don't, don't tell me I didn't warn you! Fit the bulkhead in place, and hold it there with a piece of cellotape across the top of it and down each side of the hull. Cut up some strips of glass cloth, about 3/4" wide, and mix up a little resin. Now glass the thing in place and leave it to dry.

The next step, logically, is to do the same with the aft bulkhead. But is it? Before starting, stop, and ask yourself what sort of silencer you are going to use. If the boat is a fun model, the chances are you will be using a aircraft-type silencer and, in this case, there is no problem, because it will fit easily into the engine compartment. But if you are going to race the boat, you will probably want to fit a tuned pipe, or resonator. And here life begins to get a bit complicated. You should know by now that there are going to be some pretty strong laws coming into effect about noise emissions, and these concern our models as much as any other source of noise. (We have the same laws over here and, in fact, Naviga, the World body governing model boats, has laid down a rule all boats competing in national or international competitions under Naviga auspices must be at or under 80 dbs.) Now, then, as you probably know - - and if you didn't, then I'm telling you - adding a resonator to a motor not only makes it more powerful, it also makes it one heck of a lot noisier. This is a pretty complex subject, and we'll take a detailed look at it later on. For the moment, let's just say that one of the ways to quiet the brute down a bit is to have the pipe, as it is called, inside the boat, instead of sticking up in the air. In this case, the best place to have it is running along the inside of the hull, on the port side. (Fig. 1).

From this you can see that it will be necessary to make a hole in the bulkhead in order to leave room for it. So, if you are going to fit a pipe, now is the time to try it for size, and make sure that it fits before you stick that bulkhead in place permanently. You can cut a hole in later, but it is a very awkward job, and it's much better to do it now. Okay, you should now have your boat looking a bit like the photo, and the next job would seem to be fitting the deck. But no, once again, think through the situation, there are a lot of other internal organs to be fitted, and it is much easier to put them in before the deck, rather than fiddle around in a restricted space, almost blindly. The things that have to go in are: the rudder tube; the water scoop; the radio installation, and the tank. If you are going to fit an automatic bailer, then this can be fitted at the same time.

The next job, then, is to install the rudder tube. You can buy this from a model shop, ready-made, or you can make one up yourself. Personally I always make my own, and here's how. First of all you need a couple of bearings - I use the same ones as in the prop-tube, self-lubricating phos-

to page 90

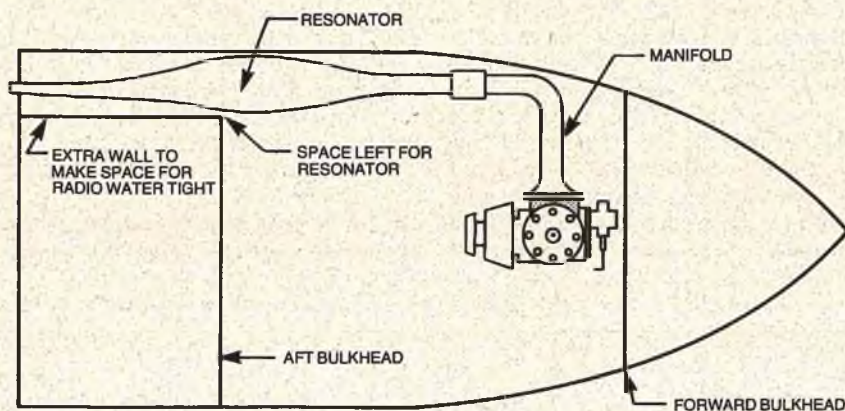


FIGURE 1

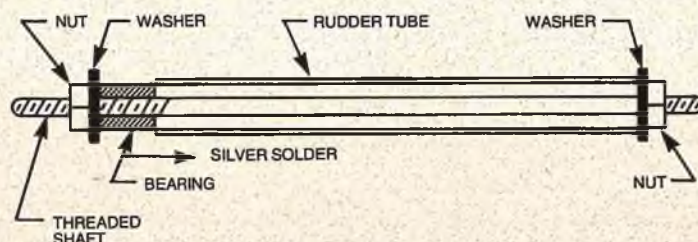


FIGURE 2

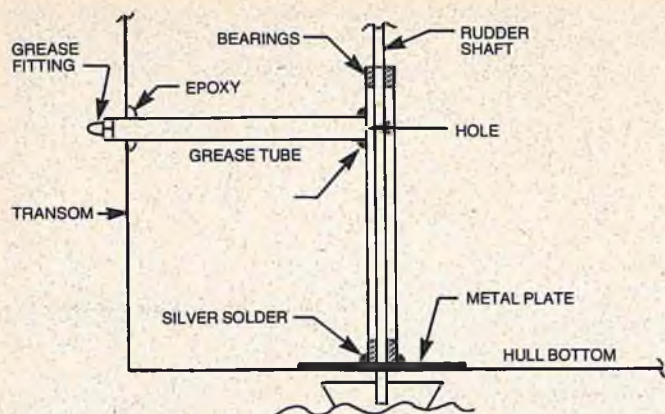


FIGURE 3

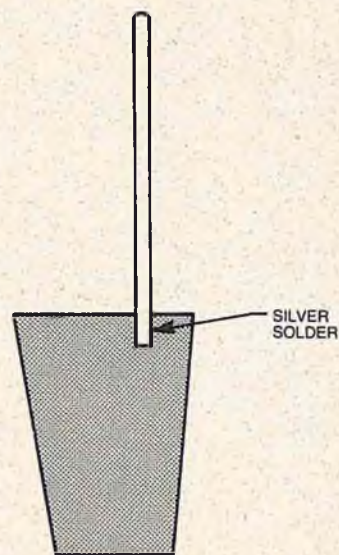
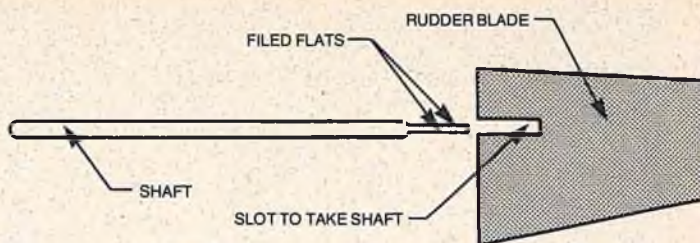
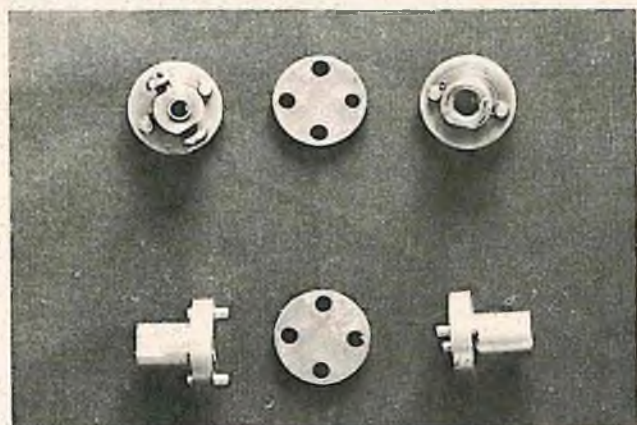
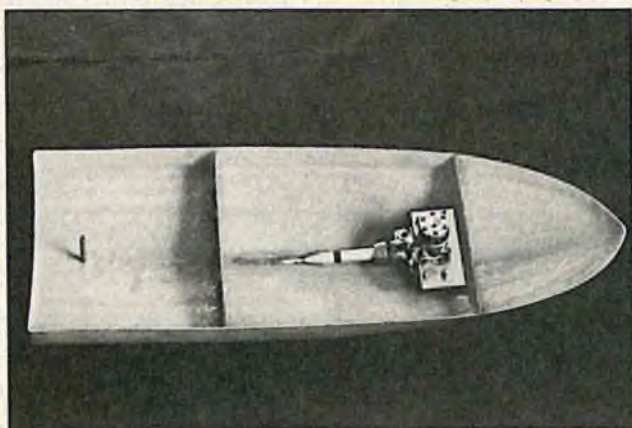
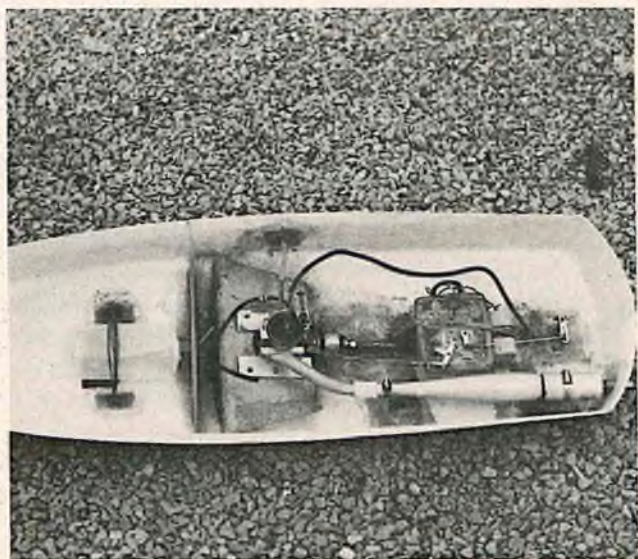


FIGURE 4



ABOVE: View of a hull with engine, shaft, two bulkheads and very simple rudder tube installed. The boat is a Force 3 with Veco engine. **LEFT:** An extremely good coupling from Stidwill Racing Products. The center disc with the holes is a special plastic and one disc lasted a whole racing season on author's tuned Rossi Speed .60. **BELOW, LEFT:** Inside the Spearfish. Note resonator with expansion chamber, and waterproof radio box. **BELOW:** The Spearfish at rest. This is a very pretty boat and builds very quickly.





RCM VISITS CHIEF LIKES FLYING CIRCUS ABOARD THE U.S.S. GUADACANAL

Official U.S. Navy Photographs

While deployed to the Eastern Mediterranean Sea, aboard the USS Guadalcanal LPH-7 (a helicopter assault carrier), an event took place that is now looked forward to, by the crew members.

On 25 April, a helicopter made a successful take-off and landing from the flight deck of the Guad (as she is known to the crewmen). Why was it an event for a helicopter to take-off and land on an LPH? This helicopter was a radio controlled model. It is believed that this event marked a first in U.S. naval ship history.

The ship had been underway for more than a month and, on 25 April, Chief "Hank" Likes requested, and received, permission to put on an airshow for the crew's entertainment. The show consisted of a take-off and landing of the helicopter, in more than fifteen knots of wind across the flight deck. This event was followed by a 45 minute display of talent in maneuverability by an R/C fixed wing sport aircraft. The seagulls will never forget the feeling of suddenly becoming aware they were not being chased by another bird. Every evasive maneuver they could muster was put into practice to evade Chief Likes and his aircraft. Since then, the crew of the Guad have come to expect a Sunday airshow by the Chief. His show has been affectionately billed "Chief Likes and His Flying Circus".

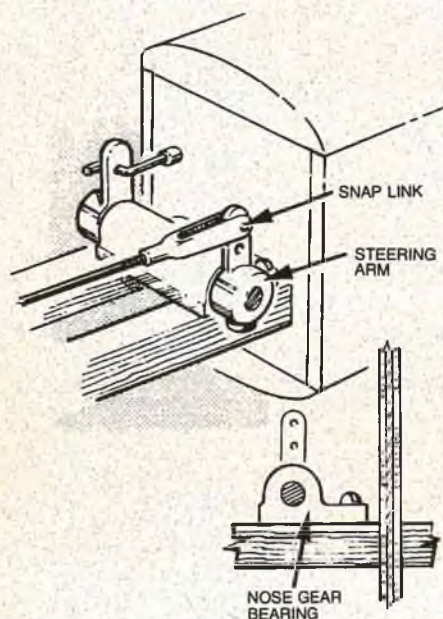
Chief Likes says, "Flying from a ship is quite unlike flying from land." The deck of the ship is, at times, unstable, limited in size, and subject to wind eddies, thus requiring much finesse during landings and take-offs. The only mishap to take place during these events occurred a while back when the aircraft ran out of fuel in a dog fight with the duty seagull. The aircraft was maneuvered back to the ship only to come in a little low, thus striking the after port fantail, just below flight deck level, before spiraling slowly into the crystal clear aquamarine waters of the Mediterranean Sea. Luckily the only thing hurt in the incident was the Chief's "pride". When flights are made now, a SAR boat is on hand for rescue, if needed.

Chief Likes is the Chief Meteorologist aboard the Guadalcanal. This is his last assignment before retirement after 20 years service. He has entered and placed in numerous events in the Lakehurst, New Jersey area, which is his local residence. He is planning retirement next April, at which time he and his family plan to return to central Kansas to pursue a civilian career. □



FOR WHAT IT'S WORTH

Occasionally, a change of engine may find one faced with the problem of the throttle arm on the wrong side. One may find room to fit a simple cross-over shaft using a nosegear bearing and two shortened steering arms. Use a length of the appropriate size wire for the actual shaft and cut off one flange of the bearing if needed. This also allows you to work the throttle arm manually without turning on the transmitter if you open the snap link. This idea reprinted from the "Feedback", newsletter of the Shawnee Mission Radio Control Club.

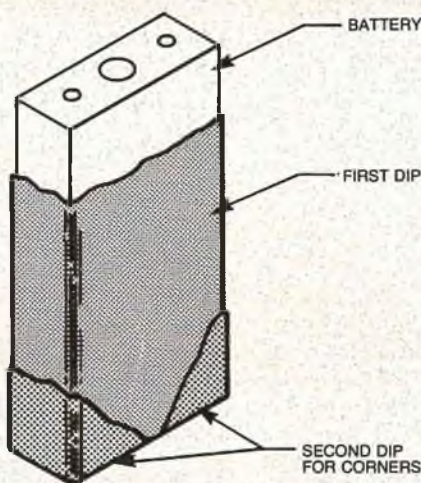


For those modelers with air, or Freon powered retracts, who hate to lose that expensive Freon every time they remove the wing, there is a simple solution. By using two of the Sonic Systems filling adapters with two of their male Quick-Disconnects, the pressure can be retained in the tank by installing the filling adapters on the tank side of the wing retract tubing lines. The filling adapters sell for \$3.00 each and the fliers using Freon retracts are probably using the Quick-Disconnects already. At any rate, they are \$2.98 a pair. While \$9.00 may seem a little too much, it won't take too long to realize the savings in the cost of that expensive Freon. This idea was submitted by Ernest R. Spinks of North Las Vegas, Nevada.

Walt Kirby of Oshawa, Ontario, Canada, writes that he reads and re-reads RCM and finds the right side of the magazine cover gets rubbed off. (Perhaps too much cover gazing? — Ed.) However, Walt keeps his magazines over the years and preserves the later issue covers from wear, or rubbing of the color finish, with a light coat of varathane Satin Gloss spray.

Don Olson of Metairie, Louisiana has found that marking on balsa with most conventional products is difficult or deforms the surface. Pencils and ballpoint pens make indentations in the wood while felt tips tend to run or widen for an inexact mark. However, the Wallace Pencil Company, St. Louis, Missouri 63144, makes black, red, and blue marking pencils which were intended for cellophane, plastic, glass and metal but, which produce a fine dark line on balsa without deforming it. Do keep it sharp for an exact line.

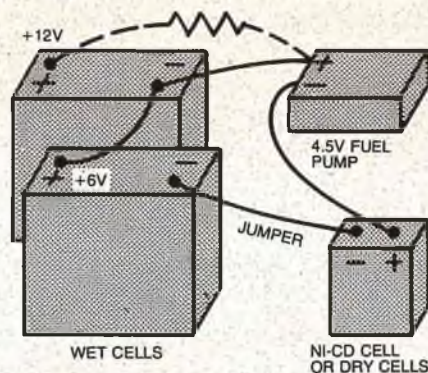
For those fliers who use the plastic case type 1.2 volts NiCad for starting batteries (or for that matter, any 12 volt motorcycle battery for a starter), here is Duie Matenkosky's of Pittsburgh, Pennsylvania, solution for protecting the plastic cases from damage which can occur when the plastic case gets bashed onto a hard, paved flying strip. Bouncing these plastic batteries can crack the case, leading to a loss of fluid and eventual battery failure. Take your brand new battery to any tool and die shop, or machine shop, and ask to have it dipped into the rubbery molten solution they use to protect delicate cutting tools after machining. This warm material forms a cushioning layer perfectly over your battery preventing any kind of future damage when in use. Have each corner double-dipped for added protection.



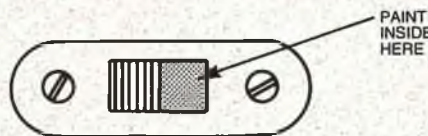
If you have a Heathkit 8 channel GD-405 proportional system, you will find that the on-off switch on the transmitter is black plastic against the black background. After a flying session, while checking out something which wasn't just right during the flight, Wallace Ladue of Cheswick, Pennsylvania, found that he had left the transmitter turned on. That being the last flight of the day, he packed up and went home. Later that evening, he discovered the transmitter was on and the battery almost dead. Wallace has done this several times

and has concluded that a visual indicator was required because the "sight" check of the switch is almost worthless because of the black-on-black switch. As a solution, Wallace drilled a 7/32" hole in the transmitter case next to the antenna and epoxied a red LED in place. He then soldered the Cathode (-) side of the LED to the negative side of the off-on switch. He then soldered an 1800 ohm resistor in series with the anode (+) side of the LED to the positive side of the switch. Now, whenever the transmitter is on, the LED glows a bright red and the drain on the transmitter battery is approximately 5 milliamps. Wallace can see at a glance if the transmitter is on and the additional drain on the battery is almost non-existent.

Wendell B. Seward of Los Angeles, California, suggests that you can charge your glow plug battery while refueling your plane and eliminate, or reduce, the power loss in the series resistor to the electric fuel pump. In fact, the resistor can be about 15% fewer ohms. Note that the glow plug battery is reversed so that it subtracts voltage. The only accessory required is the jumper. The sketch should be self-explanatory.

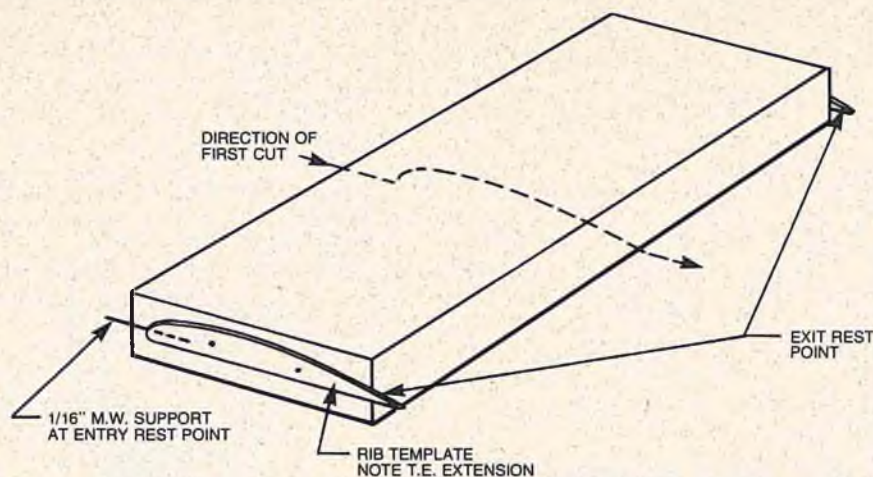


Jack M. Harvey of Hixson, Tennessee, can tell at a glance if his airborne switches are on, since he took a small paint brush and painted the inside of the switch white while it was in the off position. Similarly, the interior portion, while the switch was in the on position, was painted red with model plastic enamel. Now there is no doubt to whether your airborne switch is on or off.



In cutting foam wings, true leading edges and generally improved cores will result if a 2" length of 1/16" music wire is inserted 1" into the 1/8" aircraft plywood rib template at its reference on the leading edge. The hot cutting wire can rest on this extended wire about 1/2" ahead of the leading edge, just prior to cutting the core. Be sure

FOR WHAT IT'S WORTH



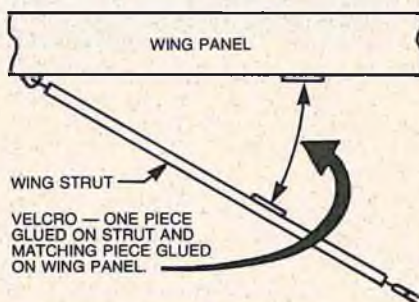
the rib template tapers to a smooth place to support the wire after it exits the trailing edge. Cut from the support wire over the rib template and exit at the trailing edge and rest the hot wire on the trailing edge extension until the entire wire has exited the foam block. The rest point is $1/2''$ to $3/4''$ outside the core. Next, turn the block over and, again, start at the leading edge and cut above the rib template exactly as before. It is easy to drill a $1/16''$ hole in line with the length of the $1/8''$ rib template by the eyeball method if you hold the rib in your hand and watch from the top as you use a common electric drill. It is extremely important, incidentally, to reverse your ribs as you cut right and left cores. Thus the top surface of your template will determine the top surface of your wing (the same is true for stabilizers). Do not assume that the symmetrical rib template is exactly symmetrical. You can avoid confusion if you label all rib templates on both sides. Mark one side "right," and the other side "left." By always cutting above your rib template, you will put similar pressure on your ribs on similar cuts. This is not true when you cut both above and below the template as commonly suggested. The drag marks of the hot wire caused by center lag are both minimized and equalized by this method. Cutting actual "right" and "left" cores is also superior to cutting two "rights" and flopping one over. This idea was suggested by Dr. Ralph J. Leidner of Coral Gables, Florida.

When soldering small parts, a large gummy eraser eliminates a multitude of problems as suggested by Randall L. Courts of San Jose, California. By placing the part on the eraser there is no need to clamp or hold it as it will not slip. Heat transference, due to conduction, is kept at an absolute minimum. Erasers can also be cut to desired angles when required for fabrication and support.

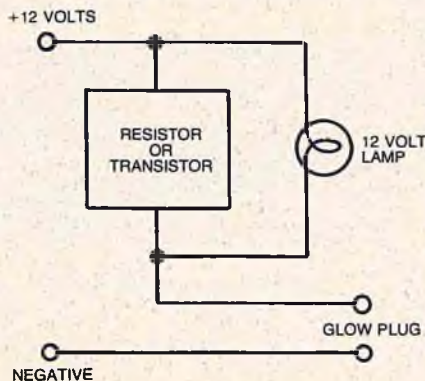
A $1''$ square of double sided adhesive tape, placed over the end of a quarter inch diameter dowel, or a pencil, acts as an excel-

lent starter for nuts. The nut may be placed on the side, or end, of the dowel and the tape will hold it securely while you start the screw. This idea was submitted by J. Elliot Brown of San Mateo, California.

On planes with wing struts, it is very easy to rig for self storage of the struts if one glues on a little piece of matching velcro on the strut and on the adjoining area of the wing as shown in the sketch below submitted by John Goodrich of Troy, Michigan.

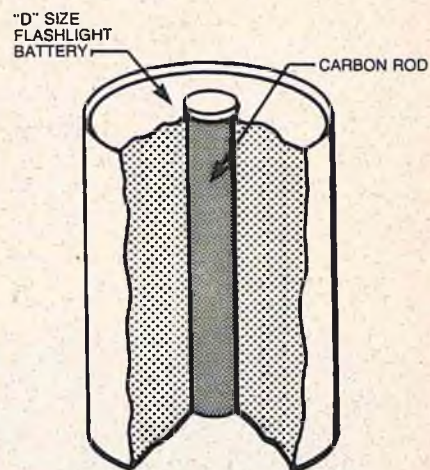


Many R/C enthusiasts use 12 volt battery supplies for electric starters with voltage reducing circuits for glow plug, fuel pump, etc. A useful addition to these circuits is a 12 volt lamp as shown in the sketch to indicate glow plug operation. The glow plug completes the circuit to turn on the lamp. This is cheaper and easier to add on than a current meter and will tell you if your glow plug is working. This idea was submitted by Ed Carew of Carleton Place, Ontario, Canada.



Lining retract wheel well cut-outs in foam wings can be simplified considerably by building the round balsa lining circle before installation into the wing. However, sometimes a round item of the correct diameter is difficult to find to use as a building guide for construction of the liner. A roll of paper adding machine tape can be used as an endless number of diameter variables for the building guide. Simply remove as much paper from the roll as necessary to get the correct diameter to build your well lining around such that it fits perfectly into your wheel well sides. When it comes to gluing the completed liner into the foam wing cut-outs, the paper roll can once again be used as a building aid. The finished balsa liner can be slipped back over the paper tape roll and glued into the cut-out as a unit. After the glue dries, the paper rolls can be removed and the wheel well will be lined with a perfect balsa circle. This idea was submitted by LeRoy Stuczynski of Madison, Wisconsin.

John Tempest of Elmont, L.I., New York, suggests that if your 12 volt or 6 volt starter won't work, check the brushes. They may have become shortened by wear and have reached the point where they are too short to make good contact with the armature. New ones can be made from the carbon rod in an old flashlight battery as shown in the sketch.



Here is an idea used by Noel A. Beardsley of Centerburg, Ohio, which might be of interest to other modelers. After a plane has been flown many times, and subjected to many hard landings, the nosegear sometimes loses its set and/or becomes too spongy. A simple cure is to buy a $1/4''$ or a $3/8''$ machine bolt (whatever size fits inside the coil of the gear) and tighten this down to give the desired tension. This is a cheaper and simpler way around the problem than buying a new nosegear. This trick has revived a well used Goldberg Skylark that was unable to get off the grass due to the spongy nosegear. □

NEW

THE BROWN B-2

"Miss Los Angeles" Thompson Trophy Racer**Stand-Off Scale 2 5/8" = 1 ft.****AVAILABLE
NOW****\$129.95**

Epoxy-glass fuse and fin with rivets, louvers, and stringers molded in. Foam wing with all 3/32 balsa sheeting. Balsa stab and rudder. Uses .60 engine, operating flaps, and fixed gear. Wheel pants and special hardware included.

THE RCM TRAINER .60 SHRINKS AGAIN. SOON THERE WILL BE A

TRAINER .10

\$24.95

All balsa construction. Flies with engine, rudder, and elevator controls and a .10 engine. Steerable nosewheel. Bridi Hobby engine mount and special hardware included. Will accept all bricks or small servos.

BRIDI HOBBY ENTERPRISES

1611 E. Sandison St., Wilmington, Calif. 90744 / Overseas Reps.: Logictrol-Canada, 200 Bannerman Ave.,
Winnipeg Man. / Kraft Australia

from page 80

phor bronze bearings, which are quite easy to find if you shop around a bit; or you can make them up from odd bits of teflon, or they can quite simply be spare bits of brass tube. But a word of warning, concerning the self-lubricating type, and this also applies if you are using them in the prop-tube. These bearings are made of a very porous bronze, the pores of which are filled with a lubricating oil. They have to be treated carefully, or they won't work. For instance, never try to solder or braze them, or all the oil will disappear. Don't try using an epoxy on them either, because it won't take, due to the oil. Don't try running a drill through them to free them if they are tight, because this will tend to block the pores. The best thing to do is to find a tube which is just the tiniest bit too small, and to make them a force fit. This is, in fact, very simple.

Having found your rudder tube, cut it to the right length. Then take a piece of steel rod, the same size as the inside diameter of the bearings, and put a thread on both ends of it. Put a nut and a washer on one end, slide one of the bearings on, down to the washer, and slip the rod into the tube. Now fit another washer and nut at the other end, and then, slowly and carefully, tighten the nut nearest the bearing. As you do so, the bearing will be forced into the tube, and once it is in there, it will not come out in a hurry. If you want to make really sure, and if the bearing has a fairly thick wall, a light blow on each side with a center punch, and it is in there for life. You can use exactly the same system for teflon bearings, but if you use pieces of brass tube, then these can be simply soldered in place. (Fig. 2). Do the same thing for the other bearing, and you have a rudder tube.

However, there are a couple of things you

could do to refine this set-up. First of all, in order to fix the tube in the hull, it is a good idea to solder, or braze, a metal plate onto the tube, and then glass-fibre the whole thing onto the floor of the hull. Secondly, a lot of people like to fit a second tube, at right-angles to the main tube, in order to be able to inject grease. This is a good thing to do, because capillary action will bring water up through the bearings when the boat is running, and you may find that your water-tight radio compartment is not so water-tight, after all! All you have to do is to drill a hole in the wall of the tube, just below the upper bearing, and silver-solder another piece of tube on to it. (Don't use ordinary solder, it may crack). This second tube passes through the transom, where a small motorbike grease nipple is soldered into it. In this way, each time you use the boat, all you have to do is to give it a shot from a grease gun, without

to page 103

Flight Pay!

Sure...with all that RC modeling experience you've had! Why shouldn't it pay, at least enough to finance the hobby you love most. You could cover your own expenses, and more, if you live in an area (not served by an RC oriented hobby shop) with other RC enthusiasts, who, like yourself, spend regularly on their sport.

We invite you to become a Hobby World RC representative in your area. Help your fellow RC hobbyists obtain items they want and need (at a substantial savings) and make something for yourself as well.

Contact Bob Reuther or Tom Moore today and learn how you can become the hub of a thriving, enthusiastic RC modeling community...and make FLIGHT PAY!

BOB REUTHER'S
HOBBY
WORLD

6602 HIGHWAY 100 • NASHVILLE, TENN. 37205 U.S.A.
 24 HOURS: DAY (615) 356-1225 • NIGHT (615) 646-9863

ENGINE CLINIC

from page 10

.... This engine replaced my O.S. .30 because it had a great deal more power than the O.S. The question is this: I have purchased a crankcase pressure tap (designed for the Max H .35 and similar engines), and plan to use it to give me a little more power from the .30. Will this work? If so, will it work as well at idle as at high revs? Will any sport R/C engine perform better on crankcase pressure? Incidentally, the Max is just nicely broken in. I use Dukes fuel, mainly because it's the only one available to us.

I would greatly appreciate hearing from you on any of my questions and thank you in advance for taking the time to read my letter. I would also like to encourage you to keep up your excellent work and column!

Sincerely yours,
 Rudy H. Ewert
 Victoria, B.C., Canada

Taking your questions in order, Rudy:

(1) There is no reason why you cannot replace the Webra carburetor with one of the optional replacement carburetors available. There in Canada the Tarno would be the most easily obtained although both Perry and Kavan also have .20 carburetors available. I do not recall off-hand if the venturi has bosses for set screws or not. If not, you would have to hold the carburetor in with epoxy which many fellows are doing already when installing .60 size carburetors on the .19's and .20's.

(2) Only the Veco .19, Veco .45, and K & B/Veco .61 were my designs. The K & B .40 front rotor engine evolved from Bill Wisniewski's rear rotor .40 design. The counterbalance on the K & B .40 crankshaft has an aluminum ring pressed over the crankshaft disc. This is probably what you note wobbling. Sometimes they do get pressed on slightly crooked. This will not hurt the performance of the engine in any way. If the crankshaft counterbalance disc, itself, were bent it would be a serious problem, but I doubt if this is the case. Naturally, if the crankshaft was bent K & B would replace it. I would like to mention that the new 75 series engines no longer have the aluminum ring pressed over the crank disc but now use a crankshaft counterbalance with cut away sides.

If you can retain the exhaust baffle and still mount the Semco muffler, by all means do so. The baffle will help both idle and acceleration. The muffler retaining strap interferes with the baffle linkage which presents a problem, however. This is the reason for removing the baffle.

(3) Most of your high performance Schnuerle .60's do go through the fuel pretty fast but 2 ounces per minute is a bit fast even for the Webra Speed. With a 14 ounce tank and medium nitro fuel (15%-20%) the engine should run 10-12 minutes. Naturally, this depends on how lean the engine is run, whether you throttle back occasionally for spins, etc. With straight FAI fuel you should be getting well over 10 minutes. Although you do not consider this consumption excessive, many fellows do not seem to realize that power takes fuel and, when they cannot get 12-14 minutes on a 12 ounce tank, become a bit upset. The 14 ounce tank has become pretty well standard for the competition ships where as a couple of years ago the 12 ounce was the norm.

Just because two engines are turning the same propeller at the same rpm does not necessarily mean that they will also have the same fuel consumption. One engine can be more efficient than the other. Port timing, compression ratio, com-

to page 96

MAGNUM Power Fuels

cooler! cleaner! longer running!

**R/C Glow-Plugs - Patented Seal
With Special Wide or
Narrow Idle Bars**

Write or Phone: Aldrich Products, Inc.
P.O. Box 1426
Mission, Texas 78572
(512) 585-7681



PROCTOR'S NIEUPORT

A LIFETIME OF MODELING EXCELLENCE BROUGHT TO A BRILLIANT CLIMAX BY LOU PROCTOR WITH THIS AWARD-WINNING MASTERPIECE... ABSOLUTELY THE MOST COMPLETE & ACCURATE MODEL EVER KITTED! CONTAINS HUNDREDS OF PRE-FORMED, DIE-CUT, EXTRUDED, MACHINED & HAND-MADE PARTS. THERE ARE 5 FULL-SIZE PLAN SHEETS & A 32 PAGE STEP-BY-STEP CONSTRUCTION MANUAL JAMMED WITH LARGE PHOTOS, SKETCHES & EASY TO UNDERSTAND TEXT.

For additional information and a detailed brochure send 50¢ to:
PROCTOR ENTERPRISES
P.O. BOX 8841
SAN DIEGO, CALIF. 92109



The Great Western Aeroplane Factory

Has T-Shirts For YOU!

Your favorite brand name is available in the manufacturer's original colors and style. These are high quality shirts in all the regular sizes.

Available now are: KRAFT, FOX, PRO-LINE, K & B, WORLD ENGINES, HOBBIE HAWK, R/C SPORTSMAN, MODEL BUILDER, WEBRA, SUPERTIGRE ... and others.

Order one for each of your favorite brands.

\$5.95

GWAF P.O. Box 8885 Boise, ID. 83708 • (208) 376-4624



Precision Swiss-Made Spinners

\$ 5.95 * 3 1/2" 80 Gr.  TopFilte P-40/P-39 D. Platt Spitfire	\$ 5.95 * 3 1/2" 80 Gr.  TopFilte P-51	\$ 7.95 * 3 1/2" 105 Gr.  D. Platt FW 190 D-9
---	--	--

True running scale spinners in four colors: white-black-red-yellow. Adaptable to two, three and four blade props. Pin guides and aligning grooves are molded in for quick and easy alignment. Will not distort under pressure of electric starter. Other sizes available: 1 1/2", 1 3/4", 2", 2 1/4", 2 1/2", 2 3/4".

* Price includes shipping by airmail. Sent International money order or bank draft, no personal cheques accepted.
Dealer and distributor inquiries invited.

Blue Max MODELLFLUG-TECHNIK AG
CH 8800 Thalwil/Switzerland, Alte Landstr. 122

ENGINE CLINIC

from page 94/10

bustion chamber shape, etc., all play a part in combustion efficiency. One engine may burn all of the air/fuel mixture whereas another may allow unburned fuel to go out the exhaust.

(4) Generally speaking, an engine will have a better idle with low compression than high. I'm guessing that the idle on your Enya .29 improved with the high compression head due to the fact you are using FAI fuel which runs pretty cold.

You cannot use crankcase pressure to pressurize your tank and still expect the engine to idle. Residual pressure in the tank when throttling back will cause the engine to load up and die. If you try to set the idle mixture leaner to compensate for this, as the pressure in the tank gradually lowers, the engine, in turn, goes lean and dies. Without complicated regulating devices as used by the U-control Navy carrier fellows, etc., the only type of pressure you can use is exhaust.

Dear Clarence:

I hope you can help me with a few problems. I am scratch-building an F-7-F-3N "Tigercat" in 1 1/4" scale. The wing span is 67 1/2" (area approx. 760 sq. in.). The length is 60". The props are 14" diameter three blades, and the overall weight is to be approximately 10-14 lbs. Now, Clarence, could you tell me what size engines and the pitch of the props I would need for scale operation of this type of aircraft. I would like engines that are easy starting, good performance, good idling and reasonably priced.

The second problem is that I would have to extend the prop shaft about 1"-2" to accommodate a modified version of Williams Bros. Wright J5 Whirlwind engine kit. Would this extension create more vibration on the aircraft?

Yours Sincerely
Ronald G. Purnell
Sarnia, Ont., Canada

Ron, I am afraid you have created a monster. At 10 lbs., 760 sq. in. is a pretty heavy wing loading. At 14 lbs. you are going to have a real tiger! For that airplane to fly it is going to have to move fast which means at least 7" and, more preferably, 8" pitch props. The largest model engine available is the O.S. .80 and in no way could it turn a 14/7 or 14/8 three bladed prop. A 14/6 two blade is about maximum. You would need one of the drone type engines being used in the RPV's and these are not cheap. Having had some contact in this field you are talking about \$500.00-\$1500.00 per engine! Your only solution is to keep the weight in the 10-12 lb. range and forget about the 14" three bladed prop. Because of the cowl sizes I realize the need of a 14" prop but you will have to use 14/6 two bladed props.

An inch to an inch-and-a-half extension should not cause any problem as long as you are sure the unit runs true, balance your prop, etc. Many of your old time engines such as the McCoy .60 came with extension spools. I wouldn't go much beyond 1 1/2" however — 2" getting a bit much.

Dear Mr. Lee:

I have been an RC enthusiast for about four years. I have always enjoyed reading your column and have found it very informative.

Lately, I have been thinking of building a Stand-Off Scale model. However, as in most Scale and Stand-Off Scale models I've watched, it seems a bit odd seeing a large model flying with what appears to be a very small propeller.

I realize, as most modelers do, that today's

to page 101

from page 96/10

model engine was designed to have high rpm's with relatively low torque. Perhaps you or one of your readers could develop a reduction unit or transmission small enough to be used to drive a large scale-like propeller.

I believe such a device would be very much appreciated by scale modelers around the country.

Do you have any thoughts on my idea?

Yours truly,
Carlos R. Grageda
Washington, D.C.

Hardly a month goes by in which I do not get a letter from a scale modeler inquiring about a gear reduction box. Unfortunately there is nothing along this line available. Due to the limited sales it would not be profitable for a manufacturer to tool up and manufacture such an item. The cost would be prohibitive. Many years ago I built a gear reduction box for a McCoy .29 that worked very well. I know of several other fellows who did so also. These were intended to be used in U-Control team racers — the theory being that a larger prop turning slower would be more efficient than a smaller one turning faster. As far as speed went it did not prove out — the small prop winding up resulted in more speed. However, the reduction box did prove one thing — static thrust was terrific, the model really pulling on the ground. It would be a useful item for scale operation. The design of the reduction box is no problem — but producing it is!

Dear Mr. Lee:

I own an O.S. .60 Goldhead engine which has about 20 hours running time. It has a problem in that I'm unable to richen the fuel mixture with the needle valve. The needle valve is one turn from falling out, yet the engine is on the verge of being over-lean although it's flyable. All the bolts and gaskets are in place and tight and there are no restrictions or dirt in the fuel lines or needle valve assembly.

I have observed other O.S. .60's and several also seem to have difficulty with an insensitive needle valve. I was wondering if this particular engine has inherent fuel draw problems and, if so, would using another carburetor, such as a Perry, be helpful.

I would appreciate any insight and help you may have concerning this problem.

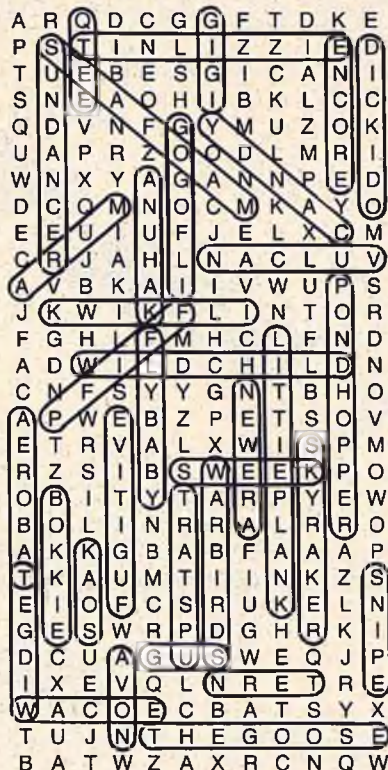
Sincerely yours,
Roger Phillips
Portland, Oregon

It is pretty hard to say exactly what your problem is, Roger, as there are too many variables involved. This is not characteristic of the O.S. Goldhead and you can be sure the problem is somewhere in your fuel system. Somewhere you either have a blockage or air leak. If you are using one of the sintered filter type clunks, get rid of it. These plug with varnish. Be sure your fuel line is not sucking closed when the engine is running. Pressure test the whole system for leaks. This includes the needle valve, gas line fitting, etc. Check for an obstruction in the spray bar passages. I know this is all pretty vague, but I don't have much to go on.

As far as the insensitive needle, the O.S. Goldheads are pretty broad. Many fellows prefer the needle this way and others don't. This is mainly a matter of the number of threads on the needle and taper. You can change the taper and increase the sensitivity. A steeper taper will make the needle

to page 161

ANSWERS TO AUGUST PUZZLE



JULY PUZZLE WINNERS

J.W. Macready
Danny Anderson
Paul Gassen
Al Tabor
Richard Vallee
George Finch
Penn Hess
James R. Brubaker

William McCaw
Robert Platteter
Richard E. Heppler
Ron Brown
Stephen B. Springer
Bill Rees
Keith A. Voelker
L.F. Maire III

Jack Tracy
Charles E. Staton
R. William Catlin
Ken Ramsburg
Gerald R. Zeigenfuse
Christopher D. Pilla
Bob Kowaleski

A 2 Channel RADIO CONTROLLED TRAINER / RACER

FEATURING the most DURABLE possible construction and design for the most DIFFICULT flying conditions and hazards including COMBAT!

silver SLICER

RUDDER-ELEVATOR OR AILERON-ELEVATOR

Crash resistant, shock absorbing, rubber-band attached motor mount for .020 to .10 motors

Change motors like camera lenses, a Golden Bee for training or radio testing, a TD.051 for dog-fighting, racing, or stunt

Conforms to all RCN 1/2 A Pylon Racing Rules

Full-size plans (available to scratch builders for \$5, we pay First Class postage)

Deluxe hardware package includes Klatt hinges, 12" threaded pushrods, etc.

All ply parts and ribs precision Pre-cut from the finest woods

Order direct, or dealer
Sorry, no COD's
We pay delivery charge

Michigan residents add 9% sales tax

KIT
\$ 22.50

12 HOUR CONSTRUCTION TIME
We have purposely tried to make SilverSLICER THE WORLD'S STRONGEST R/C PLANE !!!

Whether we have arranged our 8.75oz of wood and glue into a magic combination for you and your club is ultimately your decision. We have detractors who say such strength is unnecessary. It may well be, for expert fliers who are using well-manicured fields. For the rest of us "cartwheelers" it's nice to find the wires still in the servos!

JEROME BRACK
MODEL AIRCRAFT
28101 STEELES — FARMINGTON HILLS, MICHIGAN 48334

The Wing:

30 1/2" span — 205 sq. in. area — Constant chord
7/8" thick — Dihedral 7/8" for R&E, 3/8" for A&E
Builtup with diagonal ribs, hardwood dowel
leading and trailing edge, full balsa
sheeting — 3.8ozs. before painting — Slightly
swept — High lift airfoil for maximum
glide and minimum turn radius
Fuselage, rudder, elevator
weight: 4.9 ozs. before
painting

... A NEW **POWER TRAIN!**

MARINE DRIVE ACCESSORIES BY PEERLESS/KYOSHO

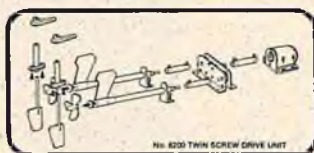
HERE AT LAST ...

A line of top quality electric marine drive accessories at unbelievable low prices ... and the star feature is a special 12 volt D.C. Mabuchi motor of *fantastic power* engineered and manufactured by the largest motor manufacturer in the world ...



And, you can buy them separately or as a set ... motor with single screw drive and motor with twin screw drive. Also available are the marine drive parts individually packaged.

Only the finest materials are used in the manufacture of these units. For example, the motor mount is zinc plated steel, the flexible coupling is durable heavy rubber with metal ends. The Propeller Shaft, Stuffing Box, Stuffing Box Bracket and Rudder Assembly are all Chrome Plated steel! The Propeller and Propeller Bracket are CHROME PLATED BRASS!



SEND S.S.A.E. FOR MARINE DRIVE LITERATURE ONLY
COMPLETE CATALOG 50¢ U.S.A. ONLY DEPT. R/C

JUST COMPARE ... SAVINGS OF UP TO 50% OVER COMPETITIVE BRANDS!

TECHNICAL DATA PEERLESS/KYOSHO RS-54 MOTOR	
VOLTAGE	Operating Range 6.0 - 12.0 V. DC Nominal 12.0 V. Constant
NO LOAD	Speed 14800 rpm Current 0.48 amp
AT MAXIMUM EFFICIENCY	Speed 12500 rpm Current 2.65 amp Torque 2.03 oz-in

MARINE ACCESSORIES

CAT. NO.	DESCRIPTION	RETAIL
8000	12V DC MOTOR WITH BRACKET	\$ 9.95
8100	SINGLE SCREW DRIVE UNIT KIT WITH MOTOR	19.95
8200	TWIN SCREW DRIVE UNIT KIT WITH MOTOR	32.95

MARINE DRIVE PARTS

CAT. NO.	DESCRIPTION	RETAIL
8001	GEAR BOX ASSEMBLY	\$3.00
8002	FLEXIBLE COUPLING WITH SCREWS	1.25
8003	PROPELLER SHAFT	.50
8004	STUFFING BOX	.85
8005	NYLON SPACER WASHER	.15
8006	PROPELLER, BRASS	3.40
8007	PROPELLER BRACKET, BRASS	4.00
8008	STUFFING BOX BRACKET	.30
8009	RUDDER ASSEMBLY	4.65

If no dealer available, direct orders accepted with
10% additional charge for handling & Shipping

**PEERLESS
KYOSHO**

PEERLESS CORPORATION
3919 'M' STREET
PHILADELPHIA, PA. 19124

POWER BOATING

from page 90/80

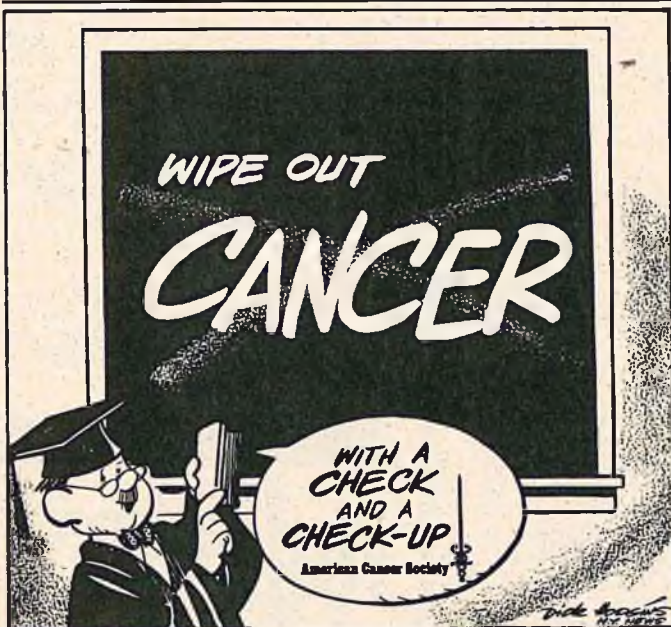
having to remove the top of the radio compartment, and you will be quite sure that no water will run up the rudder tube. (Fig. 3.)

Of course, there are other ways of doing this, using self-sealing joints, etc., but these cost money, and I like to try and keep my models both simple and cheap, as far as possible. One last

point — do remember to fit the metal plate, and the grease tube, **before** you put the bearings into the tube. If not, the heat necessary for the soldering will cause all the oil to flow out of the bearings.

Once the tube is finished, it just remains to drill the appropriate holes and glass the whole thing in place. An additional advantage in using a grease tube is that it makes the assembly much stronger. (I use 5mm rudder shafts, and I have broken, or severely bent, quite a few of these, but I never yet managed to make a rudder tube built in this way come adrift.)

Having secured the tube firmly in place, we can now turn our attention to the rudder itself. And here we enter into the world of weird and mysterious things. Go to any big meeting and you will see as many different rudder shapes as there are boats. Ask for the reasoning behind them, and you will get just as many different explanations, and every explanation will be given in tones of such sincerity that you will have a job not to believe each and every one, even though 50% conflict with the other 50%! The simple answer is that there is no one single correct rudder shape and that each explanation could be correct, but



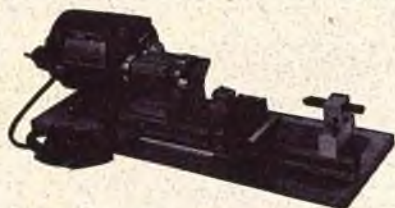
The largest and most active organization for soaring enthusiasts operates under a set of written constitution and Bylaws and is run by modelers for modelers. We invite you to join a fraternity of soaring pilots.

Request application from:

Dr. Stan Pfost
1481 Howell Branch
Winter Park, Florida 32789

HOBBY WAREHOUSE "1/2 A R/C SPECIALS"

ACE	
Pacer	12.50
Littlest Stick	2.99
Whizard	12.40
Mach-None	12.50
Ace High	12.50
Upstart II	11.50
Constant Chord Wing	4.95
1" Spinner	.99
1 5/16 Spinner	.79
1/2 A Motor Mount	.99
1 1/2" Wheels Pr.	1.25
1 3/4" Wheels Pr.	1.25
1/2" Wheels Pr.	.35
ALLIED HOBBIES	
1/2 A Streaker	16.95
AIRTRONICS (Cox)	
Q-Tee	14.97
049-051 Spinner	.69
1 1/4 Spinner	.89
GMC MODELS	
1/2 A-Chaos	18.95
1/2 A-Stick	15.95
1/2 A-Kwik Stick	15.95
GOLDBERG	
Jr. Falcon	8.95
Jr. Skylark	9.95
HOBBY WAREHOUSE	
Freedom 7	8.95
HOUSE OF BALSA	
P-51 Mustang	19.95
KUSTOM KRAFT	
1/2 A Rod Reset Tool	2.65
Racing Needle Valve Assy	4.05
1/2 A Racing Wheels	1.10
049-051 Pressure Backplate	3.15
MILE HIGH MODELS	
1/2 A-Joy Stick	14.95
SIG	
Witch Doctor - X(FF)	6.50
SPICKLER	
Quickie 200	16.50
SOUTHWESTERN	
1/2 A Honker	12.95
Lil Gypsy	17.95
SUREFLITE	
Volks Kit	18.95
Baby Birdie	11.50
SPAN AERO	
Eyelash	19.95
COX ENGINES	
049 Baby Bee	6.95
Teddee 049	12.95
Medallon 049 R/C	11.95
Teddee 051	13.50
QRC 049	
TATONE	
Short Beam Mount	2.05
Long Beam Mount	2.05
BIBI GLASSIFIED MOUNT	
1/2 A #BHE 05	1.97
WILLIAMS SCALE WHEELS	
1" Wheels Pr.	.59
3/4" Wheels Pr.	.49



MICRO LATHE
Complete Lathe Shop 159.00
w/3 Jaw Chuck, 7 pc. tool set
1/6 HP Heavy Duty Motor



PENFORD (SPECIAL 50% OFF)
Veri-Glow Kit Reg. \$20.00 9.95
Eliminate flooded engines with the
Veri-Glow, Glow plug regulator
(WRITE FOR R/C PRICES)

HOBBY WAREHOUSE
4128 SOUTH STREET
LAKEWOOD, CA 90712
(1/2 block west of Lakewood Blvd.)

POST & HANDLING
ADD 10% MAX. 2.50

only when applied to that particular hull.

Personally, for some time now, I have used one single, simple shape on all my boats, and that includes speed, endurance and precision models. Take a look at Fig. 4, and you will see what I mean. I have used this on all types of hulls, and it has never given me any trouble. I am not saying that there does not exist a better shape — there undoubtedly does — but I am saying that this one will work, and work quite well. And it is very simple to make. Take a piece of sheet plate, 1mm thick, and cut it to shape, including the slot in the top edge. Take a piece of steel rod of the correct diameter, and file a flat on each side. Now slide the flats into the slot in the blade, out with the silver solder, and the job is done. What's that, you don't know how to silver solder? Right, here's how you do it.

First of all clean all the metal parts until they show bright metal. Fit them together, and lay them on a brick, or some other non-conducting material. If you can fit a second brick behind, to reflect the heat, so much the better. Now, take a commercial flux, which is usually a white paste, and put a little on the joint to be made. Don't worry about spreading it all over, it will do this very well itself, when it is heated. Now take a blow-torch and start heating. Spread the heat around well so the whole job gets pretty hot, but obviously the maximum heating effect must be around the joint itself. Keep heating, and after a while the white paste will become almost black, and then suddenly start running. This is the signal that the temperature is right. Take the silver-solder rod and touch the end of it on the hot metal. After a few seconds, still with the flame on the job, the solder will melt and flow all over the joint. When it has done this, turn off the flame, let the metal cool, and it's done.

No kidding, it really is just as easy as that. Now then, some people say that to get rid of the flux, which cools to a hard layer over the metal, you should plunge the job, still red-hot, into water, and this will crack the flux off. Okay, that's true, it will. But at the same time, it will also temper the rudder shaft, and, in my opinion, this is a bad thing. Look at it this way - - - sooner or later you are going to do something stupid, like running in too shallow water, or, through a pilot error, running over another boat. If the rudder shaft is tempered, nine times out of ten a blow is going to break it off, and you will be out of control. But if the shaft is not tempered, it will bend. The chances are that though bent, there will be enough movement left for you to throttle back and bring the boat ashore safely. So my advice is to not temper the shaft; that casing of flux will come off if you lay the rudder on the jaws of the vice, and tap it smartly all over with a light hammer. Once that is done, your rudder is ready for use.

I have been trying out a model sent to me by a British manufacturer, Model Flight Accessories. The boat in question is the Spearfish — a semi-scale model, of a cross between the famous Swordfish and the Huntsman. As you can see from the photo, this is a very pretty model, and for those who want a boat that looks like a boat this is just the thing.

On opening the box, I found the following items: hull and deck, very nicely moulded in glass-fibre; prop tube and shaft, complete with prop; water scoop and outlet; complete rudder assembly; coupling, tank, wooden engine mount, pulpit and hand-rail in chromed wire; windscreen, and a packet of hardware. All that's needed to finish the boat is some glue, fuel tube, a motor and the radio. The recommended engine size is anywhere between .29 and .60 c.i. and it is also possible to fit an electric motor.

to page 106

super value super sport



When you buy the Royal Super Sport 6-channel system, you buy the performance-proven set that will give you trouble-free flying for years to come. When you buy... buy ROYAL — and be sure.

SYSTEM INCLUDES

- 6-channel transmitter
- 6-channel receiver
- 4-servos (RS-4 or RS-5)
- 500 ma power pack with switch harness
- Dual charger
- Any 72 MHZ frequency

CHOICE OF SERVOS

RS-4

RS-5



PLUS
PROVEN ROYAL QUALITY

\$329.95

with 4 servos

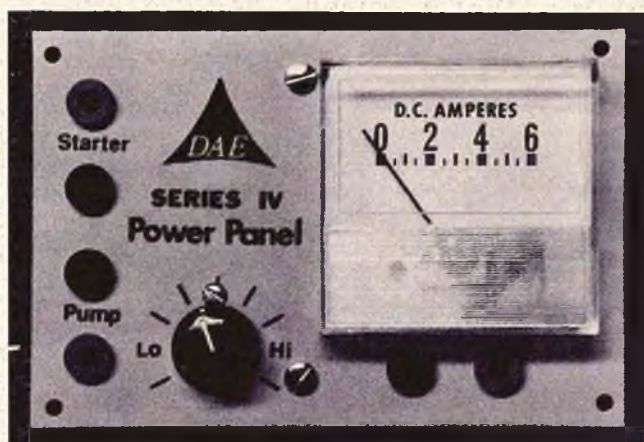
write for FREE catalog

royal

ELECTRONICS CORP.

6190 East Evans Ave.
Denver, Co 80222
(303) 758-5272

One Battery Does It ALL! SERIES IV POWER PANEL



-TRANSISTORIZED SOLID STATE CIRCUITRY-

POWERS any starter, fuel pump, and glow plug
FAST CHARGE your transmitter and receiver at the field
ALL from your 12 volt starter battery

- SOLID STATE CIRCUITRY
- VARIABLE GLOW PLUG OUTPUT
- VARIABLE FAST CHARGER OUTPUT
- AMMETER MONITORING OF PLUG & CHARGER
- POST CARD SIZE FOR EASY MOUNTING
- HARDWARE AND INSTRUCTIONS INCLUDED

Only \$34.95

See It At Your Favorite Dealer Now!

SEE DEALER FIRST. If unavailable, order direct including \$1.00 for handling. Indiana residents add 4% sales tax.

SEND FOR FREE CATALOG



DA Enterprises

BOX 335
HAUBSTADT, INDIANA 47539
Phone No. (812) 768-6029

POWER BOATING

from page 104/80

I received mine on Monday morning, and I had it on the lake, running, on Tuesday evening! Okay, so I build fast, but even so, it has to be admitted that this is definitely the type of model for someone who wants to get out there and pilot. Not having a spare .60 at the time, I fitted a rather old .40 but, in order to give it a bit more go, I stuck a resonator on the engine. The actual building was very straightforward, and posed no problems at all. The instruction book has a whole series of photos, and it would be difficult for even a beginner to make a mistake.

Having built it, off to the lake. And there I had a surprise. Normally, when a boat is first tried out, it needs a lot of trimming, just like a plane (in fact, I intend to devote a couple of articles to trimming boats, this is a very important, but often-overlooked aspect of the game). Well, the Spearfish just didn't need any trimming. Right from the word go, it behaved beautifully. And don't think that this is one of those boats that are just good for going chug-chug 'round the pond on Sunday afternoons, either. I took it to an endurance meeting, and got permission to run it in a spare slot, to see how it would behave under racing conditions. In addition, I passed the transmitter around, to see what reaction I would get from the other modelers. The result was totally favourable—fast on a .40, no signs of instability, so it would easily take a .60; good rough-water handling, and no vices in the turns.

Back home, I hooked up a couple of my skiers to it, and tried them over the jump. And that was really good. The moderate V hull (with twin spray rails) is exactly what is needed for that game, because once you have got the boat on a line, it will hold that line, and not deviate easily. This is a great advantage when lining the skiers up for the jump. Then I increased the deflection of the rudder blade, and tried it around the Naviga Steering circuit. The hull is a bit large to pass through buoys one metre apart, but the boat will turn, flat out, in a radius of about four feet, which can't be bad.

Summing up, a neat craft, well-designed, complete, easy to build, runs well, and good value for money at about \$40.00 (British retail price.) The manufacturers are M.F.A., The Mill, Mill Lane, Worth, Kent England.

And that must be it for this month, I'm off to the workshop, build some more boats for the World Endurance Racing Championships in South Africa, this September. But I'll be back next month (if Big Chief Whirly Bird lets me!). □

SUPER LUCKY FLY

Low wing, Contest Aircraft, that can be assembled quickly. Tapered wing. Engines 45 to 74. Jig built Balsa fuselage only requires gluing top back & front in place. Wings are completely made only require joining, painting or monokoting. Wing span 62 inches by 651 square inches.



SUPER LUCKY FLY
KIT NO. JC118 \$79.95

LITTLE SUPER LUCKY FLY
KIT NO. JC114S \$69.95

ATTENTION DEALERS: We pay freight to your door!

JOHNNIE CASBURN MANUFACTURING CO.

P.O. BOX 8039 5821 E. Rosedale Ft. Worth, Texas 76112 817/457-5511

The "EXETER"



Contest quality machined balsa parts

R/C Power .23 to .35 engines
PATTERN Wt. All Up - 3 to 3½ lbs.

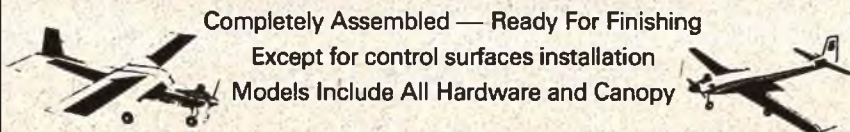
Wing Span - 45 inches
Wing Area - 371 sq. in. only: **\$41.95**

See your dealer or order direct from --

MICROX MICRO-X-PRODUCTS
Dept. D
P.O. Box 1063
Lorain, Ohio 44055

IS YOUR TIME TOO VALUABLE?

Our Planes Are Ready to Fly In 4 to 5 Hours



Completely Assembled — Ready For Finishing

Except for control surfaces installation

Models Include All Hardware and Canopy

★ FIBERGLASS DIRTY BIRDY ... \$150.00

- | | |
|-------------------------------|-------------------------------|
| • Super Kaos 60\$95.95 | • 15-500 Trainer\$69.95 |
| • Super Kaos 40\$80.95 | • T-20\$65.95 |
| • RCM Trainer 60\$83.95 | • RCM Trainer 40\$74.95 |
| • Kaos\$85.95 | |

Zone 1-2-3 add \$4.50 / Zone 4-5 add \$5.50 / Zone 6-7 add \$6.50

Prices Subject To Change Without Notice

ARF MODELS

1635 W. Main St.

El Centro, Calif. 92243

Phone 1-(714) 353-2610

COD Orders — 50% down

Need Number
and
Expiration Date



2 to 3 Weeks Delivery

COMPET-TOTE



\$14.95

- Compact Size 18" x 7" x 14"
- Sturdy Model Support
- Gallon Fuel Can Compartment
- Rugged Interlocking Parts
- Fuel Resistant Foam Rubber Cushion
- Room For Starter, Batteries, Props, Tools
- Easy Balance Carry Handle
- Pre-cut Parts For Fast Assembly

The Amazing MITER SANDER



\$24.95

- Bevel or Square Parts For Precise Assembly
- Make Perfect Wing Butt Joints At Precise Dihedral Angles
- Sands Bevel Angles To 50° In Balsa, Styrofoam, Etc.
- Work Capacity 3" Thick x 14.5" Wide; Wing Halves 36" Long
- Quick Build Kit. All Parts Pre-cut & Drilled
- Unique Fast Change 2 Grit Size Sanding Block
- Pre-assembled Slider Track Assembly

Add \$1.50 postage and handling
We Accept Checks & C.O.D. Orders

CUSTOM CRAFT PRODUCTS

19 FLORGate RD., FARMINGDALE, N.Y. 11735

KRAFT

PCS

KRAFT GREAT LAKES, INC.

For

THE FINEST FACTORY

AUTHORIZED

REPAIR SERVICE.

Fair prices

Fast service

ALL MODELS KRAFT and PCS

KRAFT GREAT LAKES, INC.

6787 Wales Road P.O. Box 2482

North Canton, Ohio 44720 Phone (216) 499-8310

THOSE TWO OLD FALLACIES

from page 79

.... the subject about which they write, the authors of these articles implant false theories into unsuspecting minds. These authors all make the same mistake of relating the inertia of an aircraft in flight to the ground, when it should only be related to the air. It is very easy to prove to yourself the error of their ways. This is what you do.

With a colleague beside you equipped with a stop watch, a pen and note pad, you fly your aircraft to a safe height, then carry out the four following test runs.

(1) Fly full bore at maximum airspeed (for repeatable accuracy) into wind, then, when ready, call 'now' to your timekeeper and fully close throttle at the same time. On hearing 'now' timekeeper starts watch.

You fly straight and level for as long as possible. Inertia is now your only energy source, but of course drag will slowly dissipate this energy, till you eventually stall. On seeing the nose drop, the one with the stop watch clicks again and notes the duration of the level flight.

(2) Repeat the above procedure downwind.

(3) Repeat the above procedure crosswind.

(4) Repeat crosswind in the opposite direction.

For greater accuracy, you can, if you wish, repeat the above schedule two or three times. When you check the recorded figures, you will find they are all the same — apart from slight variations due to human error (not maintaining constant height, etc.).

In whichever direction you flew, your (decreasing) airspeed was the same, but of course the differences in your ground speeds would have been very large.

On completion of your test schedule, you will have proved to yourself — by the (approximate) equal 'level flight' times recorded (during which time inertia was the sole propelling force) that 'inertia effect' is not related to the ground, and certainly not influenced one iota by the wind. This test can also be carried out in a full size aircraft.

What happened to all that (imaginary) extra downwind inertia? Your aircraft stalled in the same length of time when flying into wind.

Have you not proved conclusively that fallacies have been applied to 'inertia effect'?

It only remains to appreciate that as 'inertia effect' cannot be varied by wind, and is not related to the ground, it doesn't matter a damn which way you turn, your aircraft's reactions will always be the same (ignoring turbulence).

As a side issue of this experiment you have also proved of course, that wind has no effect on an aircraft's performance, (because, as far as the aircraft is concerned, it is flying in still air).

On the subject of 'prove it yourself', if you still have any doubts about 'crosswind flying effects' on your aircraft, try out this easy experiment (no assistance required).

Tow up a banner (preferably) on a length of cord, or failing that, a streamer. Next, fly up and down over your head crosswind, or in any direction you choose. Observe the cord and banner (streamer) and you will note that it stays directly in line with the axis of your aircraft.

This, of course, will prove something to people who are tempted to modify their aircraft to make them fly better across wind. I'll leave you to guess what that something is.

The aspects of flight referred to in this article also apply to gliders.

to page 112



OVER 300 DIFFERENT KITS & ALL R/C ACCESSORIES IN STOCK

K&B: *w/muffler

*3.5cc (21) R/C	44.95
40 R/C Series 75	34.95
40 R/C w/pump	56.95
40 R/C marine	49.95
6.5cc (40) SR II	57.95
*61 R/C	49.95
*61 R/C w/pump	64.95

OS MAX: *w/muffler

*15 R/C	23.95
*35 R/C	31.95
*40 R/C	42.95
40 SR w/cut off	49.95
40 SR w/throttle	57.95
*40 FSR R/C	54.95
60 BH R/C	54.95
*60 SR R/C	74.95

COX:

049 Golden Bee	7.95
049 Black Widow	8.95
049 ORC	8.95
051 Tee Dee	11.95
Conquest 15R/C	39.95
Conquest 40R/C	49.95

Also Super Tiger & Fox Eng.

—ACE R/C—

Litttest Slick	2.95
Pacer	11.95
Super Pacer	19.95
Dick's Dream	9.95
Ace High Glider	11.95
Upstart II	10.95
All Star Bipe	14.95
Whizard	11.95
Mach None	11.95

—AIRTONICS—

Acro Star Bipe	53.95
Square Soar	13.95
Olympic II	32.95
Q-Tee	12.95
Aquila	43.95
Gere Sport	24.95
New Era III	34.95
Grand Esprit	89.95
Super Questor	29.95
Questor	25.95

—ANDREWS—

H-Ray	25.95
-------	-------

—BRIDI—

Trainermaster	36.95
A-Ray	32.95
Aeromaster	46.95
Kaos	42.95
Basic Trainer	27.95
Sportster	27.95
Trainer 40	33.95
Trainer 60	39.95
15-500	27.95
S. Kaos 40	31.95
S. Kaos 60	47.95
T-20	31.95
Shrike	129.95
Dirty Birdy (Glass)	79.95
Dirty Birdy (Wood)	56.95
Tweety Bird	29.95
Compass Cope	31.95
P-51	93.95

—GOLDBERG—

Ranger 42	18.95
Falcon 56	19.95
Jr. Falcon	8.95
Skylark 56	23.95
Jr. Skylark	9.95
Skylark 42	10.95
Skylark 62	34.95
Sr. Falcon	34.95
Shoestring	30.95

—JENSEN—

Das Ugly Slick	43.95
----------------	-------

—LANIER—

Rebel	59.95
Scamp	36.95
Comel II	40.95
Comel 35	36.95
Jester II	48.95
Invader	49.95
Caprice	46.95
Cessna	33.95
Transit	31.95
Transit 29	29.95
Pinto	33.95
VRT	55.95
Dart	42.95
Midgel	42.95
Sio Comet	39.95
Hawk	26.95
P-51	42.95

—MIDWEST—

Lil-T	13.95
Tril Squire	16.95
Lil Tri Squire	10.95
Little Slick	19.95
Cardinal ARF	17.95
Super Chipmunk	17.95
Sweet Slick	25.95
Strikemaster	33.95
Easy Flyer	59.95
Mach I	44.95
Cardinal Squire	44.95
Plits Special	58.95

—MACO—

Vaga	41.95
Simplex Trainer	25.95
Jel Star	42.95
Tiger Cat	32.95

—BUD NOSEN—

Aeronca Champ	79.95
Cessna 310	139.95
Citabria	79.95
Gere Sport	99.95
Mr. Mulligan	109.95

—PROCTOR—

Antic Bipe	78.95
Antic	63.95
Mini Antic	44.95

—SIG—

Piper J-3	24.95
Doublet	10.95
Yak 18	45.95
Zlin Akrobat	34.95
Aerobipe	12.95
Clipped Wing	23.95
Ryan STA	46.95
450 Mustang	22.95
Komet w/Balsa Skin	34.95
Citabria	33.95
Kadet	24.95
Komander	30.95
Liberty Sport	44.95
Skybolt	35.95
Kougas	29.95
Klipper	14.95
Super Sport	13.95
Sup. Chip. (KBRC)	38.95
P-51 Must. (KBRC)	38.95
Minnow (KBRC)	20.95
Cessna 150 (KBRC)	44.95

SOUTHWESTERN

SAILPLANES

Honker	13.95
Honker Bipe	24.95

Top Cat

Baby Bowles	20.95
Lil Gypsy	14.95

—SOARCRAFT—

Glasslugel 604	68.95
Diamant	59.95
Libelle	54.95
Centurion II	35.95
Magnum 12	89.95
Skybolt	68.95
Zap 1/2 oz.	2.49
Zap 1/4 oz.	4.49

—STERLING—

Fiedgling	23.95
Waco SRE	45.95
Stenson Reliant	38.95

—SURE FLITE—

Cessna	24.95
Baby Birdy	10.95
Deadbeat Glider	52.95
Eye Soar Glider	14.95

—WORLD ENGINES—

Jr. Box Fly	19.95
Box Fly	27.95
Box Fly (40)	34.95
Das Box Fly (low wing)	25.95
Das Box Fly (Hi wing)	20.95
Das Box Fly (Bipe)	29.95
Miss World	38.95

SENIOR

TELEMASTER

—WOLFF-PAK—

Tadpole	24.95
Toad	32.95

R/C CARS

—PEERLESS—

Pop Buggy	64.95
Racing Cycle	55.95
Amphibious Buggy	94.95
09 Peanut Buggy	52.95
09 Peanut Wagon	52.95

RADIO'S

—KRAFT—

KP5C	279.95
KP7C	379.95
South East	219.95

—MRC—

Model 765	199.95
-----------	--------

—COX SANWA—

2 Ch w/2 servo's	64.95
3 Ch w/2 servo's	129.95
4 Ch w/4 servo's	199.95

—WORLD ENGINES—

5 Ch Expert	209.95
-------------	--------

MUTCHLER'S HOBBIES

217 E. 5th St., New Albany, Ind. 47150
PHONE 812-944-2771

Mon.	12:00-9:00	Thurs.	12:00-5:30
Tues.	12:00-5:30	Fri.	12:00-9:00
Wed.	12:00-5:30	Sat.	9:00-5:30

POSTAGE & HANDLING \$2.00, OVERSIZED PACKAGE EXTRA

Dealer's Wanted

THE MOST COMPLETE STOCK OF AERO AND BOATS IN THE FAR EAST.

HANDLING EUROPEAN, U.S.A. AND JAPANESE RADIO CONTROL, KITS AND ACCESSORIES.

ENQUIRIES INVITED

RADAR CO., LTD.

3, OBSERVATORY RD., KOWLOON, HONG KONG.

TEL.: 3-680507

THOSE TWO OLD FALLACIES

from page 108/79

APPENDIX

Since writing the above article I have had the opportunity of producing some figures which will suffice for people who do not have the opportunity to try out the suggested test for themselves.

I do not suggest that the figures produced below are 100% scientifically accurate, as human error has obviously crept in, but they certainly prove the point.

On Sunday, February 22, I motored out to Rietveld with the object of recording the results of the test pattern but, unfortunately, the celebrated south-easter precluded any test flights.

From there I drove to Helderberg Radio Flyers (my other club) at Frigrove, and was fortunate to find conditions improved. Flying was possible in a fairly stiff wind — ideal conditions for the test.

I had the willing cooperation of the following people: John Sweet (H.R.F. Chairman), Ian Fraser (Chairman SAARF Soaring Subcommittee), Andrew Hirst (member of SAARF Soaring Subcommittee) and John Bothma (H.R.F. Secretary). Thank you, gentlemen. All these people are SAARF members and are prepared to testify that the figures accompanying this article are correct.

Johnny flew the first two test flights with his Mustang and Ian flew the last two with his Snap Dragon. The times in Figure 1 in seconds are the duration of straight and level flight (almost anyway) from throttle closed — to the point of stall.

If you incorrectly relate inertia to the ground during flight, the resultant difference between up and downwind flying could be as follows: Assume a wind speed of 25 km/h. Assume maximum airspeed of model to be 96 km/h (60 mph). Assume basic stalling speed is 32 km/h (20 mph). This would give us an average airspeed of 64 km/h during level flight time under the test conditions. The average downwind ground speed would be 89 km/h. The average into wind ground speed would be 39 km/h. From these figures your downwind inertia is more than double that of into wind flight when related to the ground.

If inertia was, in fact, approximately doubled during downwind flight, why was not the downwind flight time of the test flight approximately doubled compared to the upwind flight?

Having proved in the test flights that 'inertia effect' remains constant regardless of the direction you fly relative to the wind, it becomes very obvious that you cannot relate the 'inertia effect' of an aircraft in flight to the ground. You must relate it to the air in which you fly. □

REV-OLUTION

from page 73

... olution is the reserve power available. Using the standard K & B front rotor .40 engine, the Rev-olution will come off the ground at approximately 1/4 throttle rather than at 1/2 throttle or more which is common to most helicopters.

In the performance department, the Rev-olution seems to leave little to be desired. It is stable in the hover mode, yet has instantaneous response required for extremely precise maneuvering or full bore flight performance. It has

to page 114

PRO LINE'S '76 TEAM



Champions All... Anyway You Stack 'Em!

QUALITY —

No compromise engineering that puts state-of-the-art electronics at your fingertips.

DEPENDABILITY —

An extra margin of reliability attainable only with superior circuit design and quality components.

SELECTIVITY —

5 Models to choose from in 3, 5, & 7 channel systems to fit any R/C model from sailplanes to scale.

LEADERSHIP —

The consistent choice of champions for over seven years.

Pro Line Electronics Inc.

A Subsidiary of Pace Industries, Inc.

10632 North 21st Ave., Suite 11, Phoenix, Arizona 85029



Aceptamos:



¿VIENE PRONTO A MIAMI?

No deje de visitar el Super Hobby Shop de las Americas. Solamente a unos minutos del centro de la ciudad y del Aeropuerto Internacional. Tenemos la mayor seleccion de equipos de radio control, kits, repuestos y accesorios para aviones, helicopteros, veleros, lanchas de motor, tanques, modelos plasticos, de madera y de metal, cohetes, herramientas, replicas de armas, juegos de todos tipos y una muy amplia seleccion de trenes en todas las escalas. Aqui hablamos su idioma. Visitenos!

ORANGE BLOSSOM HOBBIES, INC.

1975 N.W. 36th ST.

MIAMI, FLORIDA 33142

TEL.: 305 / 633-2521

REV-OLUTION

from page 112/73

ample power for loops, straight up vertical 360 degree tail rotor ascents, stall turns and the like.

To sum it up, the Rev-olution from American R/C Helicopters, Inc., is an excellent machine that has been thoroughly engineered in all respects both from a construction and a performance standpoint. It is priced lower than any comparable machine and replacement parts are immediately available from American R/C Helicopters, Inc., or their service centers.

We could throw in all kinds of adjectives to describe this excellent machine, but perhaps one of the best testimonials is the recent Shreveport Area Radio Kontrol Helicopter Contest which was held on May 9th, 1976 in Bossier City, Louisiana. There, 14 year old Mark Moore of Shreveport, Louisiana, flew a Rev-olution to 3rd Place in the Novice category — and Mark only had his Rev-olution two weeks prior to the contest.

Need we say more? The photos taken of RCM's prototype will tell the rest of the story of the Rev-olution. □

RACING AT RANDOM

from page 70

...rected by filing a longer taper on the needle valve as shown in the accompanying sketch.

Chuck the needle valve in a securely mounted hand drill, drill press or lathe and file lightly with a fine file until a smooth taper is obtained. It's easy to follow your progress because the part is coated with black oxide. Be careful not to file on the thin tip. This portion is already the correct size and needn't be made any thinner. The modification does not interfere with performance if you decide to go back to fueling by suction again.

The Northrop and North American R/C Clubs of Southern California have come up with the following set of rules which sound interesting. The event is called 1/2A Enduro.

1/2A ENDURO RULES

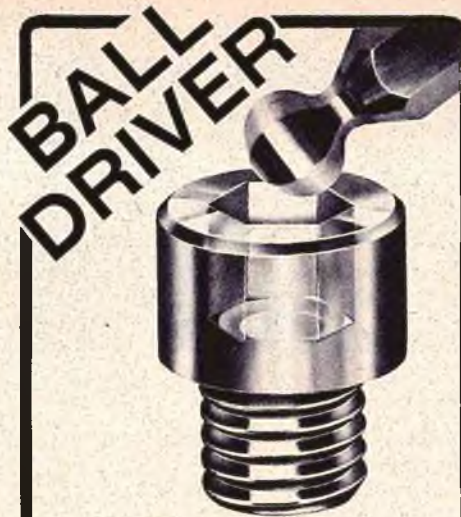
A. EQUIPMENT

- Engines: 0.051 cu. in. max., glow-plug, no diesels.
- Aircraft: (Standard 1/2A racers as currently accepted at our club races).

B. RACE RULES

- General: Race is a 30 lap enduro with minimum of 1 pit stop required. The start will be a Le Mans type start with the aircraft fueled and placed on starting line; the pilots and helpers lined up on north side of runway. On a signal, pilots and helpers will proceed to their aircraft and start and launch at will. Lap counters will keep track of complete laps and pylon judges will count cuts. Aircraft making a pit stop must be carried to its starting line station to be re-fueled, started and re-launched. The race heat ends when someone completes 30 laps or 15 minutes passes or all aircraft in the heat are obviously out of commission. Once the leader gets the checkered flag for 30 laps, each pilot must shut-off as quickly as possible and land.

to page 116



- Works at any angle
- Choice of 17 sizes from .028" to .500"
- Available in metric from .71mm to 10mm
- L-Wrench style also in all sizes

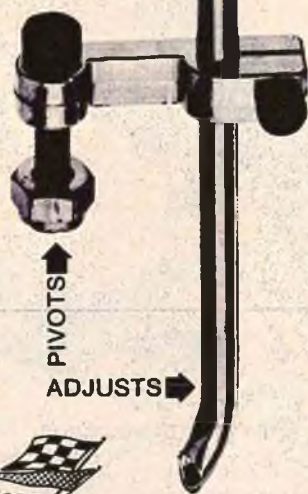
Send for a free catalog with prices... and information on our Nybolts, Cable Controls, ACCUTAC tachometer.

DEALERS & DISTRIBUTORS INVITED
PLEASE NOTE OUR NEW ADDRESS

BWT
SYSTEMS

161 Anita Drive
Pickerington, Ohio 43147
Phone: (614) 837-1100

CLAMPING WATER PICK-UP ASSEMBLY



**MARINE
SPECIALTIES**

CWPA
\$1.95

for R/C Boats - may be installed on any existing M.S. Rudder/Outdrive Assembly or mounted directly on the hull.

P.O. Box 588, Saratoga, Ca. 95070
Catalog \$1.00 Dealer Inquiries Invited

RACING AT RANDOM

from page 114/70

2. Scoring: One point is awarded for each lap completed, two points are subtracted for each cut. If a pilot has not made the required pit stop before the heat ends, 10 points will be subtracted from his score if he's on lap 26 to 30, and 5 points if he's on lap 21 to 25.
3. Cuts: Cuts will be called any time a plane cuts across the race course or cuts a pylon before a heat ends. Cuts will be called whether plane is under power and racing or gliding in for a pit stop.
4. Safety: A pilot landing for a pit stop must call out "Landing" (or something similar) so that other pilots will know the runway is in use. Planes in the air must be kept high enough over the runway to allow safe retrieval of landed aircraft.
5. Fly-offs: In case of ties, fly-offs will be run as normal 10 lap heat races.

The Northrop and North American R/C Clubs have a race scheduled in the next couple of weeks using these rules. So we will let you know how it turns out in our next column.

NMPRA/QM PRESIDENTS CORNER

Mel Santemyers brought up the interesting problem of mid-air and what our policy should be regarding them. There is no explicit rule on the QM books to deal with any type of mid-air situation. In the absence of a rule, many CD's revert to the established rule in the F.A.I. It seems that Formula 1 has no specific rule about mid-air either. The closest it comes is 39.9.2.

F.A.I. rule F3D.12.13. mandates both aircraft involved in mid-air contact land at once. No score is given. The heat is not rescheduled. The aircraft involved must be approved as airworthy by the CD before flying subsequent heats.

At first, this seems a bit stiff. But if examined with a safety first attitude, it makes good sense to get those aircraft down ASAP. The damage involved, though minor, is not always visible from the ground. I have witnessed aircraft shaking apart due only to a badly unbalanced prop, the result of a minor mid-air. Antennas are sometimes cut by what appears to be near misses. Continuing on means the pilot can run out of his newly shortened range, but fast.

There are plenty of good reasons to have all involved aircraft called down immediately. The controversy, if one exists, revolves around what happens next. Obviously, the CD must examine all the aircraft before they are allowed to race again. But, what do we do for scoring and re-scheduling. Should we go further than the present rules and penalize flying which is conducive to mid-air. Tail wagging in front of an overtaking aircraft; is it part of the game or should it cause disqualification. What other practices are controversial in regard to safety?

If all this sounds as though we expect to hear from you about this subject, you are absolutely correct. In addition to the mini-questionnaire below, please send along your comments.

Code

- 0 = no opinion
- 1 = definitely in favor
- 2 = slightly in favor
- 3 = slightly opposed
- 4 = definitely opposed

NITROTANE

The Controlled Combustion Fuel

WINNER OF

- NO VARNISH
- NO RUST
- BURNS CLEAN
- NO CORROSION

23

- OUT PERFORMS THEM ALL
- METAL CANS

FIRST PLACES AT THE NATS

WRITE:

Space Age Fuels

R. R. 3 — KEWANEE, ILLINOIS 61443

**Please send information on your
SPECIAL BONUS OFFER.**

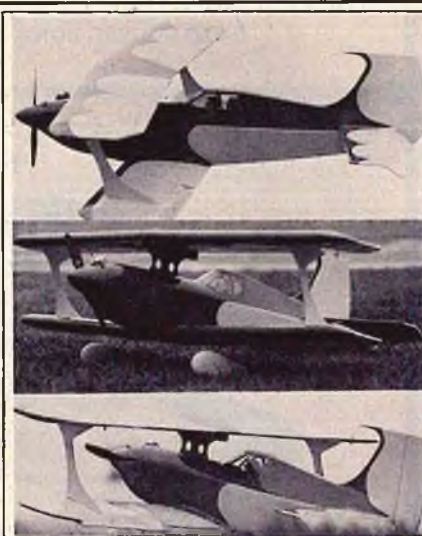
Name _____

Address _____

City _____ State _____ Zip _____

Club Name _____

RCM



Have you ever wanted...
to steal the show?

Stinger.....can!!
Balsa construction...
Bolted wings...
Hardware pkg...
Moulded cowl...
Preformed ldg. gear...
Full size plans...
4.5 lbs. flying wgt...
40 inch wing spans...
.35-.45 Engine...
Connecticut Res. add 7% sales tax

easy fly
const. photo
fun
\$59.50
looks
like a
real plane
aerobatic look

MK MASTER-KIT 6 FOX RD.
PLAINVILLE, CT. 06062
dealer inquiries
invited

to page 120



(714)
547-3055

72-Hour Turnaround

ORBIT MICRO-AVIONICS PRO-LINE ROYAL

Genuine Parts, Factory Trained Specialists

MILLCOTT

MILLCOTT CORPORATION
Radio Control Electronics & Services
1420 VILLAGE WAY, UNIT E
SANTA ANA, CALIFORNIA 92705

Weekdays 8 AM-5 PM Saturdays Until Noon

NEW FROM SUPERIOR FLYING MODELS FOR THE RABBIT WITH A TASTE FOR TIGER!

BE YOU BUNNY OR BUFF, THIS NEW
SOARER HAS THE QUALITIES YOU NEED.

- RUGGED YET LIGHTWEIGHT
- QUICK AND EASY TO BUILD
- HANDS-OFF PITCH STABILITY
- EXCELLENT SPEED-RANGE
- TOP-PERFORMER, THERMAL OR SLOPE
- COMPLETE HARDWARE PACK
- CUSTOM-MACHINED WOOD PARTS
- SELECTED, TOP-GRADE MATERIALS

Send S.A.E. for brochure.

Standard discount to dealers.



SUPERIOR FLYING MODELS, 4027 So 275 Place, AUBURN, WA 98002

EXPO



'76
EXPORTATIONS

WORLD WIDE EXPORT DISTRIBUTORS OF RADIO CONTROL EQUIPMENT, MODELS AND SUPPLIES

Wherever in the world you are located; write, cable or phone
EXPORTATIONS for all your radio control needs.

Our "MODELLING INDUSTRY BUYERS' GUIDE" shows the latest and best export trade discounts and a wealth of shipping info. The new "EXPO '76 HOTLINE" newsletter will bring you up-to-date on the newest products, prices, delivery, sale items, etc. Send for both today!

EXPORT WHOLESALE ONLY.

EXPORTATIONS

125 N. San Gabriel Blvd., San Gabriel, Ca. 91775
Tel: (213) 285-5843 — Cable: EXTRONIC

WOOD COVERED WINGS

WINGS AVAILABLE FOR:

Shrike	Tiger Panzer	Citron
Gladiator	Ugly Stick	Triton
Kwik Fli III Straight	Sun Fli IV	P-40 Warhawk
Kwik Fli IV	Invader	P-51 Mustang
Daddy Rabbit (MAN)	Intimidator	PH-5 40 size
Kaos & Super Kaos	Spectra	Blue Angel
Cuda & Super Cuda	Sport Master	Instigator
Banana	Vulcan	Zeus Mark III
Beachcomber	Pagan	Kaos 40 size
Sportmaster	Magnum	A-6 Intruder 40 size
Fli Fli 2 10	Tiger Tail	Belloire MK-2
Nut Cracker	Phoenix 5	Trainer Master
PH-6	Banshee	Cutlass Supreme
Dragon Fli	Falcon 56	Troublemaker
El Camino	Eyeball	Cajun Queen
New Orleanson (MAN)	Debolt Jenny	Coyote
Fli Perfection	Air Coupe	Daddy Rabbit (RCM)
Californian	Sr. Falcon	P-63 King Cobra
A-6 Intruder	Taurus	Strip Ailerons

ALL WINGS FOR STRIP AILERONS — \$24.95

DELUXE KITS

Shrike	P-51 Mustang (40 size)
Vulcan	A-6 Intruder
Phoenix 5	P-40 Warhawk
M & M PH-6	Nut Cracker
The K-Bird (40 Size)	

Kits come with veneer covered wing, fiberglass fuselage with fin molded on, bulkhead, foam stab, instructions & plans. Cores are machine cut, panels have the correct dihedral cut in.

\$59.95

"NEW"

THE K - BIRD

Designed by Larry Barber. .40 Sized Aircraft for Pattern or Fun Fly. Fiberglass Fuselage with Wood Covered Wing. \$44.95

M & M Wood Covered Wings

20408 71st East Sumner, Wash. 98390

Phone (206) 863-8042

RACING AT RANDOM

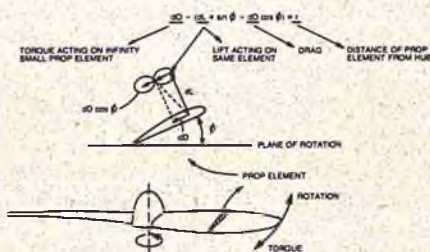
from page 116/70

1. All participants in a mid-air contact must land as soon as possible.
2. All participants in a mid-air contact will receive 0 points for that heat.
3. There will be no rescheduling of a heat in which mid-air contact occurred.
4. Flying in a manner to obviously obstruct the path of other aircraft in the race shall be cause of disqualification from the heat.
5. Same as 4, except disqualified from the entire race.

Send both questionnaire and comments to: George Zink, 80-28 222 St., Jamaica, New York 11427. □

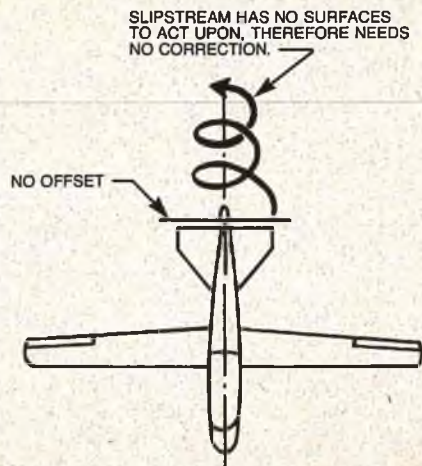
SUNDAY FLIER

from page 57



Actually, this is the same effect that tends to yaw a helicopter if it hasn't got a tail rotor to counteract the torque.

Okay, then why are we building right-thrust into our models, one might ask. Well, the engine off-set is there to reduce the effects of the slipstream caused by the propeller. This slipstream, that looks like a corkscrew, tends to force the vertical stab of the aircraft to the right, thus causing yaw to the left, which is counteracted by holding right rudder. Seen from above, it would look like this:



to page 122



You have a CHOICE with K&B SUPER POXY

SPRAY or BRUSH/SATIN or GLOSS



PAINT & CATALYST

The easiest to apply and most durable EPOXY PAINT AVAILABLE—The "Ultimate Finish"

A development of the space age, Super Pox Paint is formulated exclusively for models . . . mix and use (NO WAITING TIME — NO HAND RUBBING). Fast curing. Quick drying. Sets up rapidly. Minimum dust adherence. Stays glossy longer. Least affected by ultra-violet sun rays or manufactured fuels.

11 BASIC COLORS

— SPRAY OR BRUSH —
Red • Blue • Yellow • Orange
• White • Black • Aluminum • Metallic
Green • Metallic Blue • Metallic Red
• our own K & B Purple • All above
packed in 1/4 Pt. or 1/2 Pt. cans
plus 22 ADDITIONAL COLORS
available by mixing.

CATALYSTS

- **SPRAYING** — Satin or Gloss
1/4 Pt. or 1/2 Pt.
- **BRUSHING** — Satin or Gloss
1/4 Pt. or 1/2 Pt.

- **CLEAR • PRIMER**
- **PRIMER CATALYST** 1/2 Pt. only

• THINNER

For use with K & B SUPER POXY—
Pints or Quarts



K & B FIBERGLAS — for covering

The highest quality, toughest weave—fiberglass available. For use with polyester or epoxy resin. Excellent contouring qualities make it easy to apply to compound curves.

Available in 3 weights — 38" wide —
LIGHT 3/4 OZ. CLOTH. For all wood airplanes—cover 100%.

MEDIUM 2 OZ. CLOTH. For increasing structural strength around fillets, nose, or interior of plane.

HEAVY 6 OZ. CLOTH. For joining wings or molding your own parts.



K & B Micro-Balloons FILLER —

Mixed with K & B Resin is perfect for fillets or filling in defects (or repairing later damage). Sands beautifully to a smooth, strong hard finish.

1 OZ. CARTON



K & B SUPER POXY RESIN — for sealing and applying glass cloth

Created to include all the characteristics desirable in a resin and its application. Easily workable: Requires minimum sanding. Little, if any, clogging of sandpaper. Curing time adjustable by the amount of catalyst.

Durable: Does not become brittle
1 QT. CAN (including catalyst)



K & B MEASURING/MIXING CUPS

Twenty-four one ounce, unbreakable plastic cups. Epoxy resin and most model and craft cements will not adhere. Accurately graduated, from milliliters to fluid ounces.

Cat. No. 8172. 24 to Package

Send for your K & B Catalog, "Matched Finish System" Handbook and Super Pox Paint Chart. Include 25c to cover postage and handling. Address to Dept. SR-2



K&B MANUFACTURING

DIVISION OF AURORA PRODUCTS CORP.

12152 WOODRUFF AVE., DOWNEY, CA 90241

OLD-TIMER R/C SCALED FOR .049-.15 POWER

"Small enough for a schoolyard - large enough to compete."



1938 "Mercury"
45" Span
\$24.95



1940 "Panther"
46" Span
\$27.95

- True Scale
- FF Stability
- Pre-cut Parts
- Detailed Plans
- Meets S.A.M. Rules
- 1 to 3 Channel

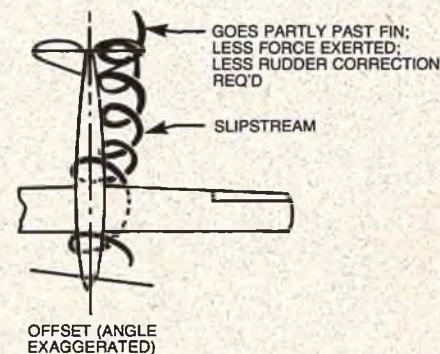
MICRO MODELS

P.O. BOX 1273
COVINA, CALIF. 91722

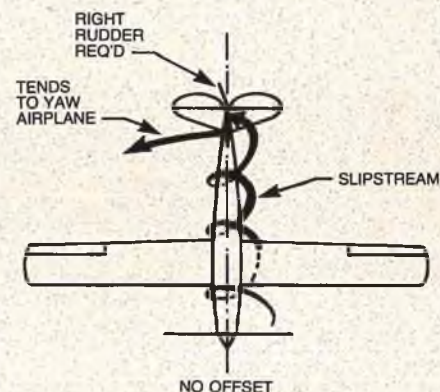
Standard terms to Dealers & Distributors.
Mail orders add 10% handling/shipping.
California residents add 6% sales tax.

SUNDAY FLIER

from page 120/57



Now it can also be seen, that no engine off-set is required on pusher types that have the engine behind all surfaces like the BD-5.



This is one reason why pusher types are desirable, because no undesirable side-effects are exerted on the plane.

If you could explain this to RCM readers in one of your columns, I'm sure it would be much appreciated. Yours is a great magazine by the way!

Sincerely,
Eric Tomasson
to page 124

When Writing To RCM, Don't Forget Your Zip Code

IN NEW HAMPSHIRE . . .

Your complete R/C Center is Fitts Photo and Hobby Shop, Kings Hwyway Plaza - Route 108 Stratham, N.H. (603) 778-8802. Open weekdays 10-9, Sundays 1-6. Kraft - MRC - EK - Enya - OS Max - Fox - Kits and accessories. We fly ourselves.

TEMPLATES



DEALERS WANTED

**SEE
TEMP**

New improved. Won't crack or shatter. Easiest and most accurate way to make Templates. Rigid, will not twist or distort. Can be cut with modeling knife or scissors. Exact templates are made by scoring plastic right over the plans with modeling knife. The template is easily broken out after this and the plans are saved. No Glare Plastic Sheet is 20" by 50" by .015. Label and trace templates with ballpoint pen or pencil. \$3.95 per sheet, two sheets for \$7.00 ppd. Send check or money order please.

P.O. BOX 676, MENOMONKE FALLS, WI. 53051

STAGGER WING



- SCALE 1 5/8" LENGTH 46 in.
- WINGSPAN 55" WING AREA 1000 in.
- ENGINE .60 WEIGHT 8 lb.
- FIBERGLASS FUSELAGE COWL
- FOAM WING CORES FOAM STABILIZER & RUDDER
- SPECIAL MOTOR MOUNT INCLUDED IN KIT
- ALSO LANDING GEAR HARDWARE
- HARDWARE FOR MOUNTING COWL
- ALL LEADING EDGE & TRAILING EDGE STOCK
- ALSO ALL PLYWOOD FOR FORMERS SUPPLIED IN KIT
- ONE OF FEW BIPLANES CAPABLE OF USING RETRACT GEAR

'119⁹⁵

Scale 3 pc. Aluminum spinner optional. Price \$15.00

LENGO

PRODUCTS

219 FIRST STREET • BUCHANAN • NEW YORK 10511

ONAT SPORT BIPLANE



- FUSELAGE LENGTH 32 in.
- WING SPAN 38 in. WING AREA 489 in.
- ENGINE .23 to .40 WEIGHT 3 to 4 lbs.
- Balsa FUSELAGE JIG BUILT WITH ALL FORMERS
- GLUED IN PLACE FOR TRUE ALIGNMENT
- FOAM WING CORES AND SHEETING
- ALUMINUM LANDING GEAR & WING STRUTS
- FIBERGLASS RADIAL COWL
- ALL WOOD SUPPLIED IN KIT PRESHAPED
- ADJUSTABLE CABANE STRUT FOR EASY TOP WING LINE UP

'59⁹⁵

DEALER INQUIRIES INVITED

SUNDAY FLIER

from page 122/57

Do you agree? If not, then tell me what you think.

To show that Eric is not just a theorist, he also sent in an item for the feature "For What It's Worth." I've turned it over to the editor for consideration.

☆ ☆

To wind up this month's column, I'd like to repeat what I've said before. This is a column for Sunday Fliers, about Sunday Fliers, and by Sunday Fliers. Your letters are virtually the sole source of information I have as guidance when deciding what goes into a column. If you include a stamped, self-addressed envelope, you'll get a personal reply, and in addition, if it is of general interest to all Sunday Fliers, it'll go into the column — maybe not for several months, but at a time when it will fit into the general theme.

So, don't forget to write. □

CLUB 20 CASSUTT

from page 53/52

.... and

there to fit the Club 20 rules. The tail area is 20% of the wing area, and the tail moment was kept long to ensure a smooth flying ship.

CONSTRUCTION

The wing is simple, but the fuselage is a little more complicated and should not be started until the wing has been built and the aileron horns installed. Cut out all parts before you start and assembly will flow easily.

Wing:

Lay down the bottom spar, glue the notched web and ribs in place, followed by the top spar and false leading edge. The ribs will need blocking up until the above assembly is dry. Then remove the assembly, and add the trailing edge by pinning and gluing the ribs down onto the lower trailing edge sheet, followed by top trailing edge and 1/4" squares. When dry, add the leading edge and center sheet followed by the tips. Add the aileron horns and carve the ailerons to shape.

Fuselage:

Evo-stick (contact cement) the 1/32" doublers in place, then mark all former positions. Assemble the lower half of the fuselage. Leave the 1/8" x 1/8" stempost about 6" high and use it to sight along the fuselage for removing twists and "banana bends". When thoroughly set, epoxy the wings in place. Add the upper fuselage sides, top decking, tail group and cowl. A standard metal or nylon mount will fit inside the cowl, but the HB .20 has the advantage of radial mounting already. When planking the cowl, I bolt the center of the cowl ring to the motor shaft, then support the cowl front ring 1/8" behind this, using scrap balsa. I plank the cowl around the engine — this means a close and accurate fit between spinner and cowl is assured.

Finishing:

My first prototype was tissue and doped; when completed it weighed 34 ounces with three channel W.E. Digit Migit. My next two were also tissue all over, but my team mate/helper has sheeted the L.E. and used iron-on film. We are using tip weight to counterbalance the engine as well — the first prototype needed left aileron trim under power.

Flying:

With the C.G. and control movements shown on the plan, the Cassutt is a smooth, yet respon-

to page 128

ALL ELECTRONIC *Flight Timer*



actual size: 1 x 1.5 x .6

\$12.50

KIT

\$17.50

ASSEMBLED

FIRST CLASS

POSTPAID

ONE YEAR

GUARANTEE

THE FLIGHT PACER IS TESTED & APPROVED - RCM

• An Automatic Recycling timer that gives mid-flight signals as well as end of flight warning. You pace yourself.

• A Safety Monitor which sounds its alarm when your transmitter is left or accidentally turned on.

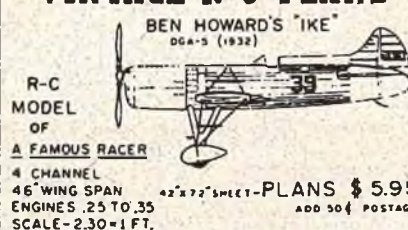
• IC Reliability • 70db Audio Output • Instant Set/Reset • Pre-select 2-10 min • Custom Molded Case • 9-12V Transmitter powered at 7ma drain • 2 hour assembly time • Guaranteed Success — Direct Mail Only — Send Check or Money Order.

Over seas Air Mail Add \$1.50 Wa State Res Add Tax.

TELECRAFT P.O. Box 495

Kirkland, Wa 98033

VINTAGE R-C PLANS



R-C
MODEL
OF

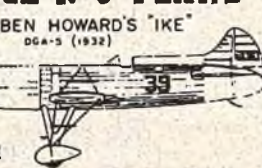
A FAMOUS RACER

4 CHANNEL

46" WING SPAN

ENGINES .25 TO .35

SCALE - 2.30 = 1 FT.



42" x 72" SHEET - PLANS \$ 5.95

ADD 50¢ POSTAGE

SEND 50¢ FOR ILLUSTRATED CATALOG TODAY!!

DEALERS & DISTRIBUTORS WANTED

DISTRIBUTED IN CANADA (MANY OTHER PLANS AVAILABLE)

R&M SALES

1027 CLARKE SIDE RD. LONDON, ONT. N5Z 3B1

WORLD WIDE

SID MORGAN

13157 ORMOND, BELLEVILLE, MICH. 48111 U.S.A.

KIT INCLUDES: Pre-cut parts, hardware, 14 page Photo Instruction Book (160 photos), 5" diameter wheels, plywood and fuelproof foam construction.

14 page Photo Instruction Book (160 photos) is sold separately for \$7.50 p.p. (This cost may be deducted from the total price if a kit is ordered at a later date.)

Wing Load,
11 1/2 oz. per sq. ft

Flies rudder, elev.,
& throttle

Chord, 18"



Bldg. Time, 3 evenings

\$97.50

postpaid

Dealers: Standard Discount
Four Minimum.

16 ft. span
Flying Wt., 17 lbs.
For .60 engines or larger

YOUR ORDER ACKNOWLEDGED BY TELEPHONE

duke's mixture



Special thanks to GARY FROST & DICK RITCH who took several days of their time to help me de-bugg our 1976 Combat Special. As a result of their contributions we have re-made the heads to accept more nitro & the rods to have more beef. These motors are now being delivered and we think you will like them. They are fitted for a bladder tank, but we are including a conventional needle valve and carb insert so they can be run in Slo Combat, beginners sport models or whatever.

We have run into a distribution snag in our efforts to produce a series of competition oriented motors. Wholesalers and Retailers are reluctant to stock a special purpose motor for which they may never find a Buyer. So if you want one Do Not hesitate to order direct from us. We are happy to fill Individual and Dealer orders in such cases. Specials we can supply: 29 version of our Combat Special @ \$39.95 36 Rear Exhaust motor @ \$59.95 w/ choice of high or low compression head and intake stack fitted for bladder tank or small bore intake for suction tanks. Carburetor \$10.00 additional. Ball Bearing on main \$10.00 additional. 36 Bushing motors with intake bored for bladder tank @ \$24.95.

FOX 40, 45, Eagle, Hawk & 78 can all be supplied with suction control line intake or pressure control line intake.

FOX purchased METAL TANK line, WHEEL line, and FUEL TUBING line from Clary. Now struggling to learn ins and outs of making production go. We are now making deliveries on most items

Conventional muffler for FOX 40 & 45 in the works. If all goes well should be in stock by the time this reaches print. Price \$7.95.

Nitromethane price skyrockets - Commercial Solvents Corp. the only producer of nitromethane has been sold. The first thing the new owners did was to practically double the nitromethane price. Fortunately the price of castor oil has gone down and this offsets the nitro rise enough that we are able to hold our price on cans. For bulk buyers we can supply drums as follows:

FAI Mix	No Nitro, 20% Oil	125.00
Duke's Fuel	10% Nitro, 22% Oil	175.00
Superfuel	5% Nitro, 28% Oil	185.00
Missile Mist	25% Nitro, 22% Oil	220.00

Prices include drum, but not shipping.

Advertisement paid by:

FOX MANUFACTURING CO.
5305 Towson Avenue
Fort Smith, AR 72901
Phone 1/501/646/1656

CLUB 20 CASSUTT

from page 124/52

sive, little ship. Hand launches are recommended for first flights until you get used to her. Although easy to fly, she is competitive, and even on a cooking .19, will climb vertically until out of sight — and that doesn't take long!

The tank shown allows you to stop the motor by rolling inverted, but will still permit plenty of aerobatics. So even if you don't want to race, you can still have loads of fun. □

SENIOR FALCON IV

from page 45/41

nylon mount will have to be notched out in the middle to allow the use of a steering arm in the middle of it. If not, it will interfere with the hatch.

Before sanding the nose block to its final shape, it might be well to hold off till the hatch has been built.

The pilot's cabin hatch is constructed per the conversion plans. When constructing it, you will want to make it a bit oversize. This is done in order to make a tight fit ala sanding. 5 minute epoxy was used here to speed things up. This hatch requires no strength, so soft balsa was used. When ready to fit the hatch, place the wing on the fuselage. Use masking tape to hold a piece of sandpaper over the top leading edge of the wing. Move the hatch back and forth to acquire the shape and fit to the wing. Balsa part "E" will be glued in place later. Be sure that the forward part of the hatch is against former #1.

Now with the hatch fitted, place some glue on the face of former #1 and the face of the hatch. Not too much, but just enough to let the forward parts become glued together. Set the hatch in place and hold down with masking tape. While this is in position, you can finish sanding the nose to shape. When dry, take a razor saw and cut at an angle as shown on the conversion plans. Off comes the hatch (you hope). The windows were routed out with a Moto-Tool. Clear MonoKote was used for the windows.

Covering turned out to be real easy using MonoKote. The only places I was unable to cover were the nose and engine nacelles. There I used Epoxy paint to match the MonoKote.

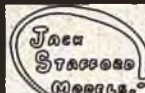
The radio installation was kept as far back as possible. Quite often a Sr. Falcon comes out tail heavy, but not with four engines hanging on it. The Enya is somewhat heavy for its size, so if something else like OS engines are used, you might not have to be so concerned. As it turned out, the C.G. balance point came out just as prescribed in the kit plans.

When finished, be sure your angle of attack is on the right plane. Don't let the nose position become too negative. It'll take forever to take-off. Position the nose gear height with the steering arm lock screw — this should give you the adjustment needed. The angle as shown on the plans works well (relationship of nose gear to mains).

The best way to describe the flight characteristics is to tell what happened on the Senior Falcon IV's maiden flight.

Belonging to a large R/C club, I, like any RC'er, brought it to the club meeting. I had just finished it and wanted it for show-and-tell. The remarks, like I said, were "You got to be kidding, a 4 engine Falcon?" Well after everybody stood agasp and picked it apart, they badgered me into saying I would fly it the next day at our club field. "My gosh, what am I saying?" I thought to myself. No, that isn't what this project was all about.

to page 130



12111 Beatrice St.
Culver City, CA 90230



Send Stamp For New Catalog



90" MUSEUM SCALE LIBERATOR



55" SPORT SCALE AIRACOBRA



P-51 MUSTANG



44" SCALE SPERRY MESSENGER



48" PATTERN SCALE EAA ACRO SPORT



72" SCALE COMANCHE



63" SCALE AIRCOUPE



59" PATTERN SCALE CHIPMUNK



63" TRAINER WEEKENDER



FORMULA 1 RICKEY RAT



FORMULA 1 SUPER MINNOW



TOM KITTY MK 15 & MK 40

PHOENIX R/C

EXCLUSIVELY
R/C AIRCRAFT & BOATS

HOBIE HAWK SPECIAL

	Retail	Phoenix
Finished	\$164.95	\$119.95
Semi-Fin.	\$109.95	\$ 84.95

AVAILABLE WITH
ORANGE, YELLOW, BLUE
OR RED WINGS

Balsa Special Sheets			
20 - 1/16" x 3" x 36"	14.00	8.75	
20 - 3/32" x 3" x 36"	17.00	10.75	
20 - 1/16" x 4" x 36"	23.00	14.75	
15 - 3/32" x 4" x 36"	18.75	11.75	

BRIDI		
RCM Trainer 40	49.95	34.97
RCM Trainer 60	59.95	41.96
Kaos 60	63.95	44.95
Super Kaos 40	52.95	37.06
Super Kaos 60	69.95	48.96
T-20	44.95	31.46
Dirty Birdy Fgl.	119.95	89.95
Dirty Birdy Wood	84.95	59.47
Shrike Fgl.	184.95	138.95
P-51D Fgl.	129.95	97.46
Tweedy Bird	43.95	30.70
Bat. Test Meter	24.95	18.00
12V Quick Chg.	29.95	22.00
Tweedy Bird and K & B 21 Sch.	111.45	71.95

Free Hot Stuff and Bridi Super Stik Glue with purchase of any BRIDI KIT.

JENSEN		
Das Ugly Stik	62.50	44.25
Wing Kit	26.00	19.75
Fuse Kit	28.75	21.50
U/S & ST Lt. Wt. 60	84.95	

CARL GOLDBERG		
Falcon 56 Dlx.	29.95	20.50
Senior Falcon Dlx.	55.95	38.75
Retracts 3-gear	24.95	17.00
Retracts servo	29.95	19.75

RADIOS:



KP-3C or 3CS	219.95	174.95
KP-5C	375.43	290.00
KP-7C or 7CS	515.43	405.95
Add .32¢ to Phoenix price for Dual Conv. Receiver. Phone or write for component prices.		

1/2A SPECIAL		
1/2A West Norway-Cox FD 049	\$43.25	FSC \$29.95
1/2A Q-Free-Cox 049 Ser. 124.02 FSC \$25.75		

KRAFT SOUTHEAST		
KSE sport 5 ch.	349.95	229.95

1976 PROLINE		
PL-50	485.00	377.95
PL-55	505.00	389.95
PL-70	525.00	396.95
PL-75	535.00	414.05
PLC-5	345.00	267.95
Proline Retracts	59.95	50.95

1976 FUTABA		
FP-6FN	339.95	254.96
FP-5FN	329.95	247.46
FP-4FN (3 ser.)	264.95	198.71
FR-4F (3 ser.)	239.95	179.96
FP-3FN (2 ser.)	179.95	134.96
FP-2E or 2F	139.95	104.96
FP-2GA	84.95	63.71

1976 WORLD ENGINES		
5 chan. D/S	359.95	215.97
5 chan. S/S	374.95	224.97
7 chan. D/S (4 ser)	389.95	233.97
7 chan. S/S (4 ser)	403.95	242.37
7 chan. D/S (5 ser)	418.95	251.37
7 chan. S/S (5 ser)	434.95	260.40
4 chan. S/S (4 ser)	265.00	159.00

K & B ENGINES		
K & B 40	41.85	

OPS Ursus 60 R/C \$99.95

Phone or write for our price on Cox/Sanwa R/C Systems.

PRICES AND TERMS TO CHANGE WITHOUT NOTICE

HOW TO ORDER: We accept COD, BankAmericard, Master Charge, certified checks and money orders. Add \$2.00 to each order for full insurance postage and handling. Oversize sent freight collect. Arizona residents add 5% sales tax. Prices listed include 5% cash discount. All orders sent UPS where possible. For rapid service, send us a money order or certified check. If you would like our new catalog which includes many modeling hints, send us a dollar.

P.O. Box 596, Glendale, AZ 85311 (602) 959-4512

NEW! Heath Pack-17™ 3-Channel R/C!

HEATHKIT GDA-1405-1
Three-Channel Pack-17™
RC Transmitter
\$94.95

With batteries
and charger,
1 plug-in
module



Heathkit Pack-17™ is the only way to fly! 17 separate plug-in frequency modules get you up and flying while others wait! Instant frequency change — no crystals to align, no tricky adjustments. Find an open frequency, plug in the modules and TAKE OFF!

Prices and specifications subject to change without notice

Heath Company,
Dept. 82-20
Benton Harbor,
Michigan 49022



FREE! HEATHKIT CATALOG
Over 400 easy-to-build
money-saving electronic kits.

Heath Company, Dept. 83-21
Benton Harbor, Michigan 49022

Name _____

Address _____

City _____ State _____

RC-119 _____ Zip _____

SENIOR FALCON IV

from page 128/41

If one was to realize success, I would have to follow through.

The next day at the field there was a crowd of fellow fliers eager to help in any way.

I got with it just like it was a single engine job. I fueled up #1, 2, 3, and 4 engines, got the electric starter out, and started #1, 2, 3, and 4. I ran the engines up and down. Oh what a sound! My legs felt like Jello. I opened the throttle and checked each engine for top rpm. A little tweak here and a tweak there. Everything was ready. I taxied out to the runway with everybody watching. Once on the runway, I turned into the wind and, looking down the runway, set the brakes. Again, I ran the engines up and down to clear them out. I took my left hand off the transmitter for a moment and rubbed it on my pants to wipe off the castor oil. I then released the brakes and pushed the throttle full forward and off it went.

You know what? It flew! It took off so smoothly, I couldn't believe it. It went right straight down the runway. I put in a little aileron and made a nice gradual right turn and flew back over my head at a hundred feet of altitude. I had succeeded! In fact, this plane was easy to fly. It handled so smoothly, I could hardly believe it. All the trim adjustments were right on.

"Wow!" I made a couple of 10 foot high off-the-deck fly-bys. What a thrill! The type of approach I had taken had paid off. A Sunday Flier can handle a four engine machine with ease. Before the flight was over, I even did a loop or two. The landing was very deliberate and smooth.

Since then I have made many flights. It is an extremely stable craft and it really grooves through the sky. I really enjoy flying it. A simple approach has paid off in producing a stable multi-engine plane. The sound of the four engines screaming by in the sky is a real show stopper. Try it and I know you will also enjoy every minute of it as I have.

One final thought. The type of flexibility of construction this conversion lends itself, one could even leave off the two outboard nacelles. This would make a very impressive twin. The nacelles are large enough to hold two S.T. 23's. If done though, watch out for the C.G. The radio gear will now have to be placed well forward in the fuselage to make the balance point come out. As you can see, I have given the twin idea some thought. Maybe some day I will try it, but for now, I am hooked on the four. □

PROPELLER PITCH GAUGE

from page 37

gauge that Clarence built in order to use materials available from any hobby shop. Our plans and photos show the materials and procedures for construction.

Now that you have built the gauge, here is how you use it. Align the top edge of the slider with a line on the radius scale. Place the propeller over the locator pin with the back face of the hub against the baseplate. Rotate the post until the slider lies flat against the blade. Read the angle from the protractor scale. Repeat this procedure with the opposite prop blade. Both blades should have the same angle reading. Using the pitch chart, determine the pitch by locating the angle reading below the proper radius number and then look across to the left for the pitch value. Repeat

to page 132

they sure look real
because they're Scale.

for the first

12.95

KIT E13 SPAN 33"

SCALE $1\frac{1}{8}" = 1 \text{ Ft.}$



DE HAVILLAND TIGER MOTH

Unique because such amazing scale detail is achieved with these kits that are relatively easy to build. They can be built many ways, such as: Rubber Powered (as supplied), Electric Motor, .020, .049 or CO2 Engine Power. For Free Flight, Control Line, R/C (pulse or Single Channel) or Static Scale.* Any version makes a museum-like model. Frame members are accurately Die Cut from the finest quality Balsa Wood, and every part is numbered to insure fast and accurate assembly as clearly shown on the easy step-by-step plan. Highly detailed Plastic Parts simplify assembly adding a touch of realism-in-miniature. Covering material, formed wire parts, Wheels, Decals, Hardware that includes Control Line parts is a partial list of the contents of these fine kits.

* Dry Kit. Rubber power material supplied. Other equipment not included.

PROPELLER PITCH GAUGE

from page 130/37

the above at several radii.

Minor variations can be corrected by reworking the blades. If the variations require too much re-work, the prop should be discarded. While this sounds wasteful, it is low priced insurance against the damage potential. The faster you run your engine, the more important is equal pitch on both blades. The most consistently successful Formula

I pylon racing pilots religiously balance their props for both static and dynamic balance.

If you use this gauge you may not have to yell, "I ain't got it!".

HAPPY FACE

from page 34/33

.... and glue to the fuselage. Trim the Gold'N-Rods flush with the fuselage. Epoxy two 6 x 32 nuts to the 1/8" plywood aft wing-to-fuselage hold-down gussets. These must be in line with the holes. Shape the aft

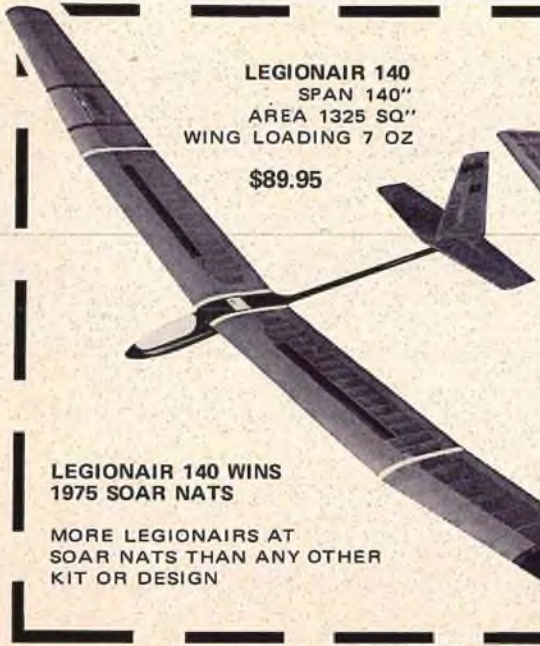
fuselage as shown in Section C-C. The fuselage should now be finish sanded.

Covering:

Cover all surfaces with your favorite material. The fuselage may be covered or painted as desired.

Final Assembly:

Install the rudder hinges and attach the rudder to the vertical stab. Slide the vertical stab into the fuselage. It should fit snugly and may require shimming. Now glue the rudder into position, assuring that it is aligned with the fuselage centerline as well as being vertical. Install a rudder horn

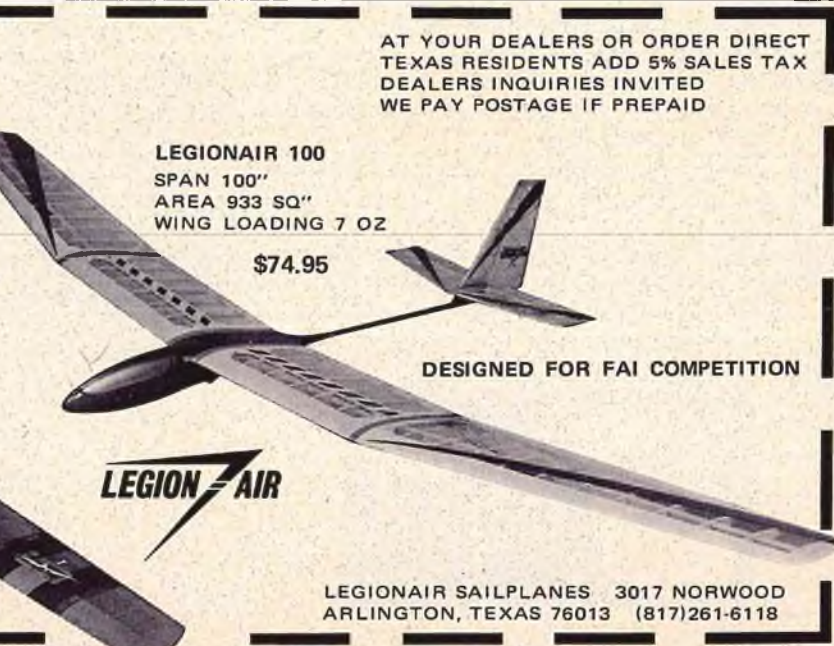


LEGIONAIR 140
SPAN 140"
AREA 1325 SQ"
WING LOADING 7 OZ

\$89.95

LEGIONAIR 140 WINS
1975 SOAR NATS

MORE LEGIONAIRS AT
SOAR NATS THAN ANY OTHER
KIT OR DESIGN



LEGIONAIR 100
SPAN 100"
AREA 933 SQ"
WING LOADING 7 OZ

\$74.95

DESIGNED FOR FAI COMPETITION

LEGION AIR

AT YOUR DEALERS OR ORDER DIRECT
TEXAS RESIDENTS ADD 5% SALES TAX
DEALERS INQUIRIES INVITED
WE PAY POSTAGE IF PREPAID

LEGIONAIR SAILPLANES 3017 NORWOOD
ARLINGTON, TEXAS 76013 (817)261-6118

time ever!

new Stick Model
"6 Way Kits" . . .

Sterling
MODELS
INC.
PHILA. PA 19134 U.S.A.



11.95

KIT E12 SPAN: 34 $\frac{3}{16}$ "

SCALE $\frac{15}{32}$ = 1 Ft.

FORD TRI MOTOR

GET OVER AND SEE THEM NOW . . .
THEY'RE AT YOUR DEALER



STERLING MODELS • 3620 'G' ST. PHILA. PA. 19134

If no dealer available, direct orders accepted — with 10% additional charge for handling and shipping. (60¢ minimum in U.S., \$1.25 minimum outside U.S.)

- ☐ Catalog of entire line of airplane control line model kits, R/C scale and Trainer kits, boat model kits, accessories, etc. 50¢ enclosed.
- ☐ "Secrets of Model Airplane Building". Including design, construction covering, finishing, flying, adjusting, control systems, etc. 25¢ enclosed.
- ☐ "Secrets of Control Line and Carrier Flying". Including preflight, soloing, stunting, Carrier rules and regulations, Carrier flying hints and control line installation instructions 25¢ enclosed.

No checks. Only U.S. money orders or currency accepted.

Name _____

Address _____

City _____

State _____

Zip _____

to line up with the rudder Gold'N-Rod. Install the tow hook. An Olympic type tow hook is a good choice. The forward position should be used when winds are above 5 mph. Two 8 x 32 bolts are used for the aft wing-to-fuselage attachment. A Happy Face decal is used to secure the front of the canopy to the fuselage.

Radio Installation:

The battery should be placed full forward in the battery compartment. Placement of the receiver and radio is dependent on the size of the equipment used. Size permitting, servos may be located forward of bulkhead 3. In this case, two

additional holes must be drilled in bulkhead 3 for Gold'N-Rod installation. If servos are mounted under the wing, place adjacent to bulkhead 3. Rig the horizontal for 0 degrees of incidence. Check both controls for correct throw and freedom from binding.

Flying:

The model should balance as shown on the plans. With the Hobby Lobby 5 radio installed, no ballast was required. The completed model with radio installed weighed 31 $\frac{1}{2}$ ounces giving a wing loading of approximately 7 $\frac{1}{2}$ oz./sq. ft. The stab setting of 0 degrees was found to be a good

starting point for initial trim. Several hand launches convinced me that Happy Face was ready for the acid test on the hi-start. Away she went and I was delighted to find her very stable with no tendency to weave. The glide was nice and flat with ample rudder control. Response to lift was immediate and positive, leaving no doubt when lift was encountered. The second flight was a seven minute flight on a day when lift was not readily found. No adjustments to trim settings were necessary. Stalls were straight ahead with no wing roll and recovery was positive — just relax on nose-up control.

Is It Real Or **D&B** ?

A6M2 ZERO MODEL 21

THE ULTIMATE IN
"EYEBALL SCALE"



SPAN: 59"

AREA: 604 SQ. IN.

IF YOUR DEALER CANNOT SUPPLY
ORDER DIRECT

POWER: .60

WGHT.: 7 $\frac{1}{2}$ LBS.

DEALER-DIST. INQUIRIES INVITED
COMPLETE CATALOG 50¢

INCLUDES: Fiberglass Fuselage with molded in fin and firewall installed, scale cowling, sliding canopy, spinner, foam wing cores with all cutouts, foam stab core, interior cockpit, all exterior fairings, fiberglass dropping belly tank, authentic decals, wheels (including tail wheel), all wood needed to complete model, complete hardware package, scale split flaps, complete building plans including retract information, full construction manual, all rods, arrow shafts, and more . . .

\$134.95

D & B Model Aircraft Co., Inc.
6823D Colonial Drive
Mentor, Ohio 44060



BLUE RIBBON HOBBY DISTRIBUTORS

ANNOUNCES SUM FUN FLI



An all balsa .19 powered great flying fun airplane. Die-cut ribs. Other parts machine cut and sanded. All hardware and motor mount.

4 ch, 400² in. Wing Area,
.19 - .29 Engine, 3½ - 4½ lbs.

\$24.95

BLUE RIBBON BULK BALSA BUYS

Order Form

36" AA Grade Premium Balsa Sheeting in 10 Packs
36" A Grade Sheeting in 10 Packs, 20% less than listed price

Qty Grade 1" width	Qty Grade 2" width	Qty Grade 3" width	Qty Grade 4" Width
___ AA/A 1/16 3.80	___ AA/A 1/16 5.00	___ AA/A 1/16 5.40	___ AA/A 1/16 9.40
___ AA/A 3/32 3.90	___ AA/A 3/32 5.90	___ AA/A 3/32 6.60	___ AA/A 3/32 9.80
___ AA/A 1/8 4.10	___ AA/A 1/8 6.90	___ AA/A 1/8 8.00	
___ AA/A 3/16 4.60	___ AA/A 3/16 7.80	___ AA/A 3/16 9.40	
___ AA/A 1/4 5.40	___ AA/A 1/4 9.60	___ AA/A 1/4 10.80	
___ AA/A 1/2 8.50	___ AA/A 1/2 13.20	___ AA/A 1/2 19.30	

To order, cut out this ad, indicate the number of 10 packs you want and circle the wood quality desired; AA or A. A grade sheeting is 20% less than the price listed. Send cash, a check, or a money order. Sorry, no C.O.D.'s. Postage and handling included. California residents add 6% sales tax.

P.O. BOX 195

SEAL BEACH, CALIFORNIA 90740

Landing control was excellent all the way through the touch-down. Every one around was smiling upon completion of the successful first flights. When I got home and announced to my wife that my project was complete, she had the biggest smile of all. This removed any doubt in my mind — my sailplane was to be tagged Happy Face.

Good luck with yours. □

BASIC RC DESIGN

from page 31

.... are going to come out with an aircraft that doesn't look good. The fuselage is going to be much too small and you're just not going to like it. So, let's take another look at the relationship of our biplane to a monoplane, set up a fuselage that will be just about right for a mono-

plane and then translate it back to a monoplane. Got that?

We started out by saying that our biplane would employ approximately a 25% greater wing area than a monoplane, and we were working with a mono wing area of 500 square inches. If we were using an aspect ratio of 5:1 we would have had a mono wing of 10" x 50". If we apply my time-worn ratio of the fuselage being 75% of the wing span we would then have a fuselage length (from the rear of the prop to the trailing edge of the elevator) of 38". Ratios, which I will try to justify in up-coming issues, of a nose length (rear of prop to leading edge of wing) of 20%, and tail length (trailing edge of wing to leading edge of horizontal stab) of 40% (all in relation to total fuselage length) then gives us a nose length of 7.6", a wing chord (including stagger) of 10", a tail length of 15", and a horizontal stab width of 6" (or 7" if you tapered the stab planform). This,

then, is a total length of 38.6" which is pretty darn close to our 75%. A look at the drawing will show this all tied together in a neat little package. Go back and re-read all of the mish-mash one more time and see how everything looks to you. Keep in mind that none of these rules are so specific that they can't be juggled around to suit your own desires.

One more item to look at is the placement of the landing gear if your biplane is to be a tail dragger. Keep the landing gear location such that the wheel axles are under the leading edge of the top wing. With the gear located here, you will avoid the unpleasant "dump-overs" that do tend to plague tail dragging biplanes. Also, this location will allow the aircraft to track out well on take-off.

I like to have both the top and bottom wing set on the same line with reference to the fuselage. In other words, I don't like to use positive in the top wing. You don't need it. I do recommend that you

R / C ELECTRIC FLIGHT SYSTEMS*

U.S. Patent
3957230

from **A**

ASTRO FLIGHT INC.

PIONEERS IN SILENT FLIGHT

13377 Beach Avenue

Venice, California 90291

3 CHANNEL SPORT TRAINER
3-4 CHANNEL
ALL BALSA
DESIGNED FOR ASTRO 25
BUSHMASTER \$39.95

SPAN: 60" 36"
AREA: 500 SQ. IN.
FLYING WT: 5 LBS.

ELECTRA TWIN
\$99.95
Span — 72"
Area — 780 Sq. In.
Flying Wt. — 7-9 Lbs.
4 Channel Radio

Fiberglass Fuselage — Balsa Wing
Sport Flyer — Astro 15 Twin
A/B Pattern — Astro 25 Twin

FOURNIER RF/4. \$39.95
3 CHANNEL R/C
SPAN — 76"
AREA — 600 SQ. IN.
FLYING WT. — 80 Oz. w/Astro 15

Scale Electric Powered Sailplane
All Balsa / Spruce Construction
DESIGNED FOR ASTRO 15 ELECTRIC OR 15 GLOW MOTORS

2 CHANNEL SPORT TRAINER
DESIGNED FOR ASTRO 5-10 MOTORS
\$22.95
ALL BALSA

Span — 45"
Area — 350 Sq. In.
Flying Wt. — 34 — 44 oz.

ELECTRA-FLI

PARTENAVIA P-68 VICTOR
All Balsa
Designed for Astro 05 Twin
4 CHANNEL R/C
\$44.95

Span — 49"
Area — 390 Sq. In.
Weight — 56 Oz.

FOR ASTRO 020, 5 AND MARINE 10 INDICATES
CONDITION OF BATTERY AND AUTOMATICALLY
TERMINATES CHARGE
RAPID CHARGER
\$24.95

CHARGES ALL ELECTRIC
SYSTEMS AS WELL AS
TRANSMITTER AND
RECEIVER COMPART-
MENTS FOR TRANS-
MITTER AND PROPS.
FOR ASTRO 10, 15, & 25
FIELD CHARGER
\$38.00

12V BATTERY CHARGER
\$8.95
CARRY THIS MINI
CHARGER IN YOUR
FIELD BOX. DON'T BE
CAUGHT WITH A
DEAD BATTERY.

**NEW R/C SYSTEM
ANALYZER — RAPID CHARGER**
R/C SYSTEM ANALYZER-RAPID CHARGER

This is the answer to your battery problems. Two years of development by the company that knows batteries best — Astro Flight — has resulted in a great little unit that will:

- Charge your receiver in 15 minutes.
- Charge your transmitter batteries in 15 min.
- Test for a high resistance cell in two min.
- Test for a shorted cell.
- Indicate the capacity remaining after a day's flying in 10 minutes.
- Measure the capacity of a fully charged battery in 10 minutes.

This unit tells you what you have and allows you to do something about it at the field, not after you get home. This unit obviates the need for battery discharge units, expanded scale voltmeter and quick chargers.

\$38.00 retail

ASTRO-5 (Astro Pup) \$39.95
ASTRO-10 \$69.95
ASTRO-25 \$99.95
ASTRO 15 \$84.95

ASTRO-020 \$19.95 F.F.
\$22.95 R.C.

BATTERY INCLUDED

NEW MARINE SYSTEMS

MOTORS
ASTRO 05 \$10.95
ASTRO 10 \$32.95
ASTRO 15 \$32.95
ASTRO 25 \$44.95

SYSTEMS
\$27.95
\$59.95
\$84.95
\$99.95

Shown Above in Dumas SK20

R/C SAILPLANES AND ACCESSORIES

AS - W15
\$54.95

MALIBU
\$25.95

AS - W17
\$79.95

MONTEREY
\$34.95

Stake, line, reel, parachute, all hardware included. Std. Hi-start, 100 ft. Surgical Tubing — \$31.95. Heavy duty Hi-start — \$34.95. Astro Start — for big planes — Bungee — \$38.00.

use some down thrust and a bit of right thrust in the engine mounting, but you don't need very much, just a couple of degrees.

I hope that this will allow you, who have been just a little bit timid in designing your own biplane, to give it a go and try your hand at this fascinating part of our sport. Send us some pictures when you get done, and let's see how your dream child looks.

Good luck, and good pencil pushing. □

500 ML

from page 29/25

... outlet store and it seems to hold its color well and be fuel-proof. Be sure it is acrylic lacquer or enamel. Always try a test spot to see if the material applied over it is compatible.

Test flying was interesting to say the least.

Turn on a dime, that is what the prototype did on its first flight. The elevator pushrod was in the inner hole. The servo had a long tab. The plane was in a shallow dive and I discovered old light pole J4 was coming into my peripheral vision so I had better pull up and get above the light poles. I applied what I thought was a little up and Zaaaaaaap! — there I am flying in the opposite direction upside-down and full bore! So, be sure to use your smallest servo tab and the outside hole on the elevator horn for your first flight then she becomes as docile as a lamb. Move the pushrods in a hole or so, only as you know her better. Give yourself all the rudder you can. Pylon planes with lots of dihedral are inherently stable and even resist turning.

Get it way up there and cut the engine, it becomes a glider and really doesn't want to come down. This would be a good way to practice your LSF landings. Pick out your landing spot, launch,

climb to altitude, cut the engine and try to land on the spot. Beats chasing winch and high start parachutes.

Good luck - - - I hope you learned the metric system and enjoy your 500 ML as much as I have. □

YELLOW PERIL

from page 22

... to be somewhat haughty and aloof. Still, I was a bit miffed when they made me go around to the servants entrance. Who did they think I was, Columbo?

Waiting for an audience with Mitchell I began to have second thoughts about this trip. I was all by myself in an immense foyer filled with Norman tapestries and paintings of Jefferson Davis

to page 138

FAST TAK

SUPER STRENGTH GLUE

FAST TAK is specially formulated for balsa model construction with a new kind of resin. It will out-perform all so-called Aliphatic Resin Glues. FAST TAK gives exceptionally high shear strength. Its bond strength develops fast and increases with time. Sands cleanly with no clogging of sandpaper. Neutral color. Available in 4 & 8 oz. poly bottles.

.98 4 FL. OZ.

1.80 8 FL. OZ.

Dirs. & Dist. Inquiries Invited

Custom Model Products
27 FULTON STREET / BROCKTON, MA 02401



Write For FREE BROCHURE

On Our Complete Line Of

R/C PROPORTIONAL EQUIPMENT

including

WORLD'S SMALLEST SUPERLIGHT DIGITAL CONTROL SYSTEMS

SMALLEST SIZES

LOWEST PRICES



13400-26 Saticoy Street
North Hollywood, Calif. 91605
Phone (213) 764-1488

PUT YOURSELF IN COMMAND OF THE SPORTY TIGER CAT. YOU'LL BE DELIGHTED WITH THE PLEASURABLE EXCITEMENT IT GENERATES.



\$38.95

\$54.50

TIGER CAT

• SPECS •

WINGSPAN: 38"
WING AREA: 600 Sq."
ENGINES: 35 to 46 DISP.
INTERLOCK ASSEMBLY
ALL Balsa CONSTRUCTION.

TRIKE GEAR KIT

DEALER & DISTRIBUTOR
INQUIRIES INVITED

SIMPLEN *Trainer*
• SPECS •

WING SPAN: 49"
WING AREA: 508 Sq."
WEIGHT: 3 1/2 to 4 lbs.
RECOMMENDED ENGINE: .29 to .46

FOR INFORMATIVE BROCHURE
SEND 25¢, NO CHECKS PLEASE.

MACO
MODEL AIRCRAFT INC.

694 Shadow Wood Lane, Webster, N.Y. 14580

YELLOW PERIL

from page 135/22

holding a Pro Line transmitter. The atmosphere was a melange of smells from Wall Street Journals, rich leather, copies of RCM, and the musty odor of old money. A grey haired, elderly gentleman wearing black tie 'n tails shuffled softly past bearing a large silver tray with a brand-new Fox Hawk BB 60 resting on it. I'm just a country boy and not used to such opulence. I felt like a pork chop at a Jewish wedding. Then too, there was the nagging realization that some critics have claimed that Mitchell has received more praise in the modeling press than he deserves. On the other hand, Mitchell has never been one of these. As one of his club members told me: "We heap accolade upon accolade on old Walt, but he keeps crawling out from under them."

I didn't know what this meant, but it didn't matter because I never got to see Mitchell. It seems he wouldn't see me unless I destroyed the wicked witch of the North. The old ideas die hard. For all I know he's still sitting on his throne of gold in the club mansion, a sceptered genius wrapped in the solitude of his own originality.

Now you know why there's no blueprint for the Yellow Peril. And no construction suggestions in this article. Oh, the ship exists, alright, but only in the aerodrome of my mind. My brain, like a capped well, won't release the ideas to flow into the design. I did think up one construction hint, though. It would appear on the plans as a note to dentists, suggesting that they follow their usual practice of making the wing fillets out of gold. The rest of us, strapped by more modest budgets, would have to make do with micro-balloons. Or in my case, oak leaves and straw masticated to a thick paste.

Dentists will find much in the name Yellow Peril, since it suggests the wretched social consequences of poor brushing. As for the rest of you, I hope you'll forgive this little quirk of mine - - I mean writing a construction article without a stitch of construction in it. After all, nobody's perfect. Look at Mitchell. He thinks he's the Wizard of Oz (maybe he is). And Dewey, for all his success, makes mistakes too. But Rachel Walsh can't see them. She really believes that "radio failure" jazz. As for the Dallas/Fort Worth Thunderbirds, the last I heard they'd all married girls from Tijuana.

Happy landings, Yellow Peril, wherever you are. □

FOR OLD TIME'S SAKE

from page 18

2nd Place — George Wagner

3rd Place — Ray Hinds

Class C

1st Place — Al Schwankert

2nd Place — Larry Fair

3rd Place — Ted Patrolia

Joe handed out the hardware and thanked all for their support. Comments ranged from "This should be held at the end of the season as a fun-fly when you want to get rid of the planes you don't like" to "A good special event - - more like free-flight." On the whole, the opinion of the meet was good, but that it should not replace the present system of R/C assisted old time free-flight. We agree.

It's a shame the weather couldn't have been better. Under good conditions this could be an interesting event.

'Til next month, Happy Landings! □



Hegi DS 22 Engstrom
 Engine: .61
 Fuselage Lgth.: 59" Fiberglass
 Rotor Span: 55"
 Flying Wt.: 8½-10 lbs.
 Radio: 4-7 Channel
 Collect. Pitch: Optional



Schluter Heli Baby
 Engine: .40
 Fuselage Lgth.: 36" Bolt together
 Rotor Span: 40¼"
 Flying Wt.: 6½ lbs.
 Radio: 4 Channel
 Collect. Pitch: Optional



Hegi Bell Huey Cobra
 Engine: .61
 Fuselage Lgth.: 72" Fiberglass
 Rotor Span: 60"
 Flying Wt.: 8½-14¼ lbs.
 Radio: 4-7 Channel
 Collect. Pitch: Optional



Kalt Hughes 500
 Engine: .40 to .60
 Fuselage Lgth.: 59" Fiberglass
 Rotor Span: 56"
 Flying Wt.: 7-10 lbs.
 Radio: 4-7 Channel
 Collect. Pitch: Optional



Graupner Bell 212
 Engine: .61
 Fuselage Lgth.: 55" Fiberglass
 Rotor Span: 63"
 Flying Wt.: 9 lbs.
 Radio: 4-7 Channel
 Collective Pitch

RC Helicopter Builders! Flyers! Even Dealers!

Have we got a Copter for you

The largest and most extensive fleet of Radio Controlled Model Helicopter Kits in the country today. Now even larger through the acquisition of **Model Helicopters of Tustin, California.**

Look what we have in stock, ready for instant delivery.
 Compare with what you can find anywhere else.

- SCM Bell 222*
- SCM Scorpion TOO*
- WiK Boeing BO 105
- Graupner Bell 212 Twin Jet
- Graupner Bell 47G
- Hegi Huey Cobra
- Hegi DS-22 Engstrom

- Schluter Gazell
- Schluter Heli-Baby
- Schluter Super-Baby
- Micro-Mold Lark
- KALT Hughes 500
- KAVAN Jet Ranger
- KAVAN Alloutte II
- *Coming Soon

Every model built, tested and approved by our own RC Heli experts, headed by renowned builder and flyer, **Lloyd Wheeler.**

- Largest stock of back-up parts and accessories . . . to keep you flying.
- Free advisory service . . . to keep you informed.

Come in, write or call us.
 Model Helicopters Division



S.C. MODELER
 HOBBY SHOP

Helicopters, Planes, Cars, Boats, Radios,
 Parts for RC Hobbyists

995 N. McLean Avenue, Elgin, Illinois 60120
Dept. 101 312-697-3737

VARIVIGGEN

from page 16

... and templates for each of the foam blocks are provided. A one-half scale view of the wing assembly shows relationships of all wing parts.

Construction Techniques

The model fuselage is of conventional struc-

ture, all wood with sheet sides and bottom. Plywood formers are used where required for strength and balsa blocks are used for engine cowl, nose section and turtleback. A two-piece removable canopy/windshield section was fitted, allowing unrestricted access to all four servos located in the forward cockpit and radio receiver in the aft cockpit. The fuel tank is easily removed through the rear cockpit and the nose section comes off for battery and nose gear access.

All flying surfaces are made of styrofoam. My

first attempt at foam cutting was on this project and, armed with information from RCM's Anthology Library Series Book "Foam Wings", I couldn't wait to try out some of the techniques described. I purchased a monstrous chunk of foam from a local boat shop and have just about enough left to build a whole squadron of Vari-Viggen. As a matter of fact, I did build two wings — but more of that later. A total of eleven different blocks are required to assemble the wing, two vertical stabilizers and the canard.

Not wanting to do it like everyone else, I

NEW! **Fw-190D-9** 40 Size "Standoff Scale"

"Features New Self Aligning, Self Jigging, JEM LOC Super Fast Fuselage Construction"

JEMCO



KIT INCLUDES:

- MOLDED CANOPY, EXHAUST, GUN BLISTERS & COWL.
- ALL DIE CUT FUSELAGE PARTS.
- FOAM CORE WING & BALSA SHEETING.
- WRITTEN INSTRUCTIONS.
- CUSTOM DECALS.
- COMPLETE HARDWARE.

\$48.50

DEALERS WANTED
 Write For Special Promotional Details, And Our Exclusive Dealer Program.

Available Only Thru Your Local Dealer Or Direct.

50 IN. SPAN .29 - .40 ENGINE 4 - 4½ LBS. 450 SQ. IN. AREA

1305 Foothill Drive, Vista, California 92083
 (714) 724-3242

ONLY TOOL
OF ITS KIND!



KIT MODEL
371 AND 381

DREMEL'S Variable-Speed Moto-Tool®

Dial-a-speed to fit the job . . .
for Home, Hobbies, Crafts, Workshop

An exciting new concept in portable, hand held creative power tools. Now, you can perfectly match the Dremel Moto-Tool's speed to the material you're using . . . wood, plastics, stone, metals, ceramics and others. Just dial the built-in speed control from 5,000 through 25,000 RPM.

The home do-it-yourselfer, craftsman, miniaturist, scratch model airplane builder, model railroading kitbasher, lapidarist, gunsmith and pattern maker has a power tool with finger-tip control to do precision work . . . unlimited creative expression in all materials.

Select the speed to match materials and applications. Do intricate wood carving, eggery, make model parts, repair and restore ceramics, glass and porcelain artifacts. Work with metals, gems, jewelry . . . power carve, shape, drill, rout and grind.

MOTO-TOOL KIT 371 **\$54.95** Suggested Retail
 ■ Model 370 Moto-Tool
 ■ 34 accessories plus storage case
 ■ .8 amp motor, 115V, 60 Hz AC
 ■ 5,000 to 25,000 RPM
 ■ Oil impregnated bearings
 TOOL ONLY \$44.95

MOTO-TOOL KIT 381 **\$59.95** Suggested Retail
 ■ Model 380 Moto-Tool
 ■ 34 accessories plus storage case
 ■ .9 amp motor, 115V 60 Hz AC
 ■ 5,000 to 25,000 RPM
 ■ Ball-bearing construction
 TOOL ONLY \$49.95

Write for FREE literature today or see them at your
hardware, hobby and crafts retailer.

DREMEL® MFG. DIVISION

Emerson Electric Co., P.O. Box 518, Dept. T27-5L, Racine, Wls. 53406

elected to cover all the surfaces except the canard with cardboard. I used Poster Board from a stationery store, about .032" thick and surprisingly, obtained fine results. Wing #1 was a work of art, and I proudly took it to our hobby shop one day for showing off. My error was in leaving it on top of the car later that afternoon when I left for work. My wife, Bev, recognized it about 2 blocks from home that night still in the road where several coal trucks and a Greyhound bus had run over it! The airfoil was shot, but it was still pretty strong, and still in one piece! The canard was

sheeted with 1/16" balsa, since a contoured slot had to be carved in its trailing edge to accept the elevators. NyRod pushrods were used for all wing controls and inset in the foam before sheeting. The main gear support is a slotted block which doubles as a wing spar. A steerable nose gear is mounted on the fuselage front bulkhead.

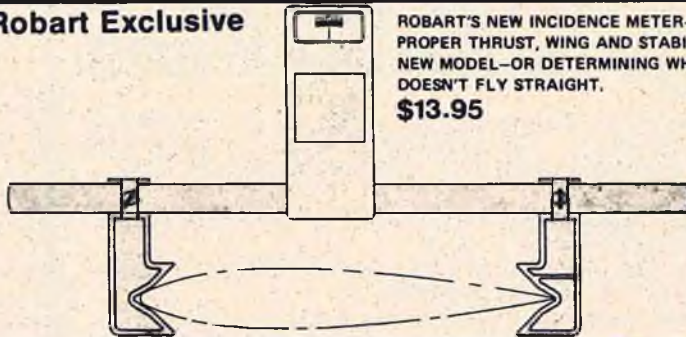
Finishing

The fuselage and canard assembly was covered with Super Coverite, with K & B Superpoxy primer applied in several coats to the fuselage assembly and directly on the cardboard on the

wing/vertical fins assembly. After the final sanding with 320 grit paper, two coats of white gloss Superpoxy were applied. The final surface was obtained after several days cure by wet-sanding with 600 grit paper and polishing with Dupont white No. 7 compound. Trim colors were put on to duplicate the full-size prototype airplane. Numerals were cut from Scotchcal material and "VariViggen" emblems were made from a Decal-it transfer process. The model, complete and ready to fly, weighs about 7 pounds and required approximately 5 ounces of nose ballast

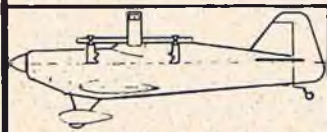
NEW Model Incidence Meter

Another Robart Exclusive

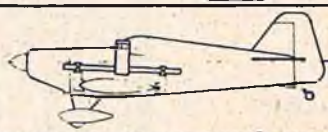


ROBART'S NEW INCIDENCE METER—A MUST FOR SETTING PROPER THRUST, WING AND STABILIZER INCIDENCE ON A NEW MODEL—OR DETERMINING WHY YOUR PRESENT MODEL DOESN'T FLY STRAIGHT.

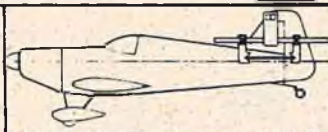
\$13.95



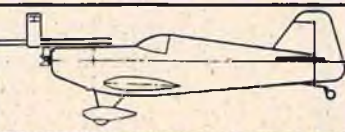
STEP 1: LEVEL THRUST LINE WITH WORK SURFACE. (0° ON INDICATOR DIAL—SANDBAGS AND A SUPER STAND EASE THIS TASK.)



STEP 2: SET PROPER WING INCIDENCE (SET 0° OR PER PLANS). YOU CAN ALSO CHECK WASHOUT BY SIMPLY MOVING THE DEVICE OUT THE WING TIP AFTER STEP 2 AND READING THE ANGULAR DIFFERENCE.



STEP 3: SET STABILIZER INCIDENCE (USUALLY 0°)



STEP 4: SET ENGINE THRUST (IF ANY, IF NONE SET AT 0°)

robart
P.O. BOX 122 WHEATON, ILL. 60187



THIS ELECTRONIC THROTTLE GIVES FULL SPEED CONTROL OF YOUR ELECTRIC MODEL

- * Solid-state motor speed control Model ET-3 for electric powered cars, boats, planes
- * Eliminates the servo and cumbersome rheostat
- * Plugs into receiver throttle servo connector, positive or negative pulse
- * Controls Astroflite 02 thru 25, all Dumas motors and others rated 6-30 volts
- * Extends flight time by as much as 300%
- * Same size and weight as servo



LOW, LOW PRICE! \$39.95
(Calif. residents add 6% tax)

No risk 15-day trial. Send check or money order. We'll buy it back if not completely satisfied.

VANTEC 443 S. Oakhurst Drive
Beverly Hills, CA 90212

Send me my Vantec ET-3.
I enclose \$39.95

Name: _____
Street: _____
City: _____
St: _____ Zip: _____
Motor used: _____
R/C Equip: _____

DUNHAM'S GUARANTEED SERVOS



Bob Dunham, world famous R/C flyer and manufacturer says: It is not necessary to spend another dime on servo repair parts. Our guarantee says we will replace free of charge any part of this servo that fails for any reason, crash damage included*. Return the damaged part or parts to our factory, and new parts will be sent to you by return mail.

D-1 rotary only \$6.95, D-2 dual rack & rotary \$7.95.
Mechanics only — assembled.

*Guarantee applies only to parts manufactured by Dunham's R & R.

DUNHAM'S R & R
P.O. BOX 34002
1100 N. LAKE HAVASU AVE. SUITE I
LAKE HAVASU CITY, ARIZONA 86403



A FUEL THAT'S A LITTLE DIFFERENT BUT A LOT BETTER

COOL POWER FUELS ARE COOL CLEAN BURNING FUELS THAT LET YOUR ENGINE PERFORM ITS BEST AND LAST LONGER. THEY CONTAIN ALL THE TIME HONORED INGREDIENTS PLUS A FEW DIFFERENT FEATURES THAT GIVE THEM A DIFFERENT EDGE...

- **ANTI-FOAMING**
- **WETTING ACTION** THAT ALLOWS THE LUBRICANT TO FLOW MORE FREELY INTO BUSHINGS AND BEARINGS
- **SUPERIOR FILM STRENGTH AND ANTI-WEAR QUALITIES** THAT CUT FRICTION AND ALLOW MORE POWER WITH LESS NITRO
- **MILD DETERGENT ACTION** THAT HELPS PREVENT VARNISH EVEN WITH A MUFFLER

COOL POWER IS OFFERED WITH A CHOICE OF LUBRICANT PACKAGES...
TOTAL SYNTHETIC OR A CASTOR SYNTHETIC BLEND.

	(Gallon)	(Drum)
FAI	6.95	170.00
5%	7.95	180.00
10%	8.95	190.00
15%	9.95	200.00
25%	11.95	220.00

All Prices F.O.B. Except For 100 Gallons Plus
In Plastic 1 Gallon Bottles.



**SPECIAL RATES TO DISTRIBUTORS,
DEALERS, CLUBS**

**25% DISCOUNT ON DIRECT INDIVIDUAL
ORDERS IN 4 AND 6 GALLON CASES.**

MANUFACTURED BY **MORGAN'S HOBBY ENTERPRISES INC.**
200 WEST LEE STREET
ENTERPRISE, ALABAMA 36330
PHONE (205) 347-3525 (DAY)
(205) 347-8221 (NIGHT TO 8 P.M.)

to locate the C.G. in the center of the range specified.

Propulsion System

An O.S. Max .60 Goldhead engine drives a handcarved 12/6 pusher propeller. The original model's pusher propeller, made by Burt Rutan, was given to the author and used on the first few flights. The engine exhaust baffle came off in flight and went aft, damaging the propeller slightly. Following the plans suggestion, templates were made up from a tractor prop and reversed. The first prop made turned out fine and works perfectly so, as a result, two additional back-up copies exist but have not yet been required. One nice feature of this model is the fact that this configuration pollutes only the air with exhaust oil residue and leaves only a trace of oil on the thrust trim plate aft of the engine. 99% of the model's surface requires no cleanup.

Flying Adventures

When no other excuses could be found, I had to face reality and the fact that the day had arrived to hurtle headlong into the air. I had conducted numerous engine runs and taxi tests at home in my driveway and was satisfied with radio operation, fuel system, and starting techniques. I had anticipated a problem flipping the propeller and avoiding the vertical stabilizers, but no difficulty was experienced. A very solid feeling resulted from holding the model tipped back on the main gear with the tail wheels (on lower verticals) on the ground.

Reluctantly, G.I. Joe vacated the front cockpit for fear he'd get something caught in the servos on which he'd been seated. As it turned out, it would have been better if he'd stayed there!

After a final range check for the Heathkit radio, we taxied out onto our Rosamond Dry Lake runway. It's as flat as a pool table, no obstructions for as far as you can see, no wind, about 75°F temperature and even the other club members courteously shut down their engines. I lined up, swallowed my gum, and slowly came up on the power. The model accelerated well and seemed to have plenty of speed before I got to full power, so I left it at about three-quarters throttle. With only slight back stick pressure, the nose came up and the airplane eagerly jumped into the air. And I mean **jumped!** At about 6 feet altitude, I sensed that a vertical climb was not optimum nor were the 90° bank-to-bank rolls a necessity this early in the flight program. I pushed forward and was impressed with the response, as were all the on-lookers, struggling to shield their bodies or their models, whichever they valued most from what seemed to be the inevitable.

Somehow, I overcame the tendency to over-control and got stabilized to a degree, when the model's altitude was about 200' O.T.C. (over the cars). Thinking to myself, "Wow, I'm glad that's over, I better throttle back," I pulled back the power and I was in a bucketfull of trouble again. I involuntarily performed every maneuver possible, with the exception of level flight, during the time the model descended to ground level. Miraculously, it swooped out level and touched down. I couldn't believe it and was so entranced that I failed to pull the power clear off until the model was 10 feet in the air again and starting another series of Hoop-De-Doos. The second landing was not so smooth, although no major damage was sustained. One strut door was hanging limply, a rudder hinge had failed, and a small crack was noted on top of the left wing panel.

Later that day I visited Burt Rutan and the full-sized Vari Viggen. After relating my experience to Burt, he made a check on the Center of Gravity, and will all assurance, he said, "Here's your problem, (you idiot) the C.G. is way aft of the limit shown on the plans." He also stated he

to page 147

from page 144/16

didn't know how I ever got it down in one piece (that made two of us).

The day turned out just fine, though, VariViggen will fly again — even better, and I was rewarded with a complimentary ride with Burt in the real VariViggen. Thank goodness it handled much better than my model's first attempt. The real villain was 'ol G.I. Joe whose weight was required for an in-limits C.G. condition. He says, "I'm not riding in that thing till you put in a chair — and a parachute!"

Sequel

After repairing the wing and other minor scuffs, 5½ ounces of lead ballast was fitted in the nose and the flight test program resumed. Later flights indicated a significant pitch trim change with throttle movement that required constant attention, particularly during take-offs and landings, when your heart's in your throat anyway. A larger contoured thrust trim surface was finally fitted, which successfully eliminated thrust-induced pitch trim changes. The airplane has comfortable roll response and is capable of extremely tight turns. Ground handling is exceptional, crosswind and downwind taxiing is a cinch in winds that most models are afraid to look away from.

Conclusion

If you dare to be different, and like to attract attention, order a set of plans from the Rutan Aircraft Factory and build your own VariViggen model, or if ambitious enough, a full-size airplane! □

RADIO SPECTRUM

from page 12

... channel assignments to the existing band so no two frequencies can be 455 KHz apart.

The intermodulation problem is similar to the condition we talked about some time ago that occurs when someone reverses his transmitter and receiver crystals, and then flies at the same time as someone on his original frequency. There would then be two transmitters radiating on the same band with frequencies 455 KHz apart. They could, theoretically, bother everyone else on the band because the RF from both transmitters would be picked up by all receivers on that band even though they weren't tuned to either transmitter and the 455 MHz would go booming through the selective IF circuits. My own experience indicates this is not a serious problem with RC systems all at the same location, so I would think two legal CB'ers at some remote location would cause little or no problem to our models. If they're using 200 watt linear amplifiers however, that is something else.

The FCC asked the RC industry to investigate using the upper end of the band that the CB'ers can't use (27.395 to 27.535 MHz). We might be wiped out from the Class D intermodulation products in some locations, but I think overall we would be a lot better off than we are now with the CB'ers right on top of us and in some cases using RC crystals.

To convert our present equipment could be a simple matter of changing crystals and retuning. Even if this doesn't come about, (it will probably be decided by the time you read this), there are other possibilities for new RC frequencies as a result of the CB problem bringing the RC problem out into the open. There are other frequencies in the 30 to 40 MHz range that could be made available, or other modulation techniques could

The Hobbyist

P.O. BOX 15066

In Pressley Park • Charlotte, N.C. 28210

Telephone (704) 525-2283

N.C. sales subject to 4% tax

MAIL ORDERS

Freight Prepaid
In Continental USA
for Check,
Money Order,
or C.O.D.
(except drum fuel)

SHIPPED DAILY

All prices
subject to change
without notice
NO HIDDEN CHARGES

* OUR OWN * HOBBYIST FUEL

	SINGLE GALLONS (Freight Prepaid)
Sport Fuel	4 ⁹⁵
10%	7 ⁴⁵
15%	8 ⁴⁵
25%	10 ⁸⁵

CLUBS

Check Our Prices

- TOP QUALITY
- CLEAN BURNING

SUPER SPECIAL

10% Nitro

30 Gal.

Drum

F.O.B.

Charlotte, N.C.

\$109⁹⁵

5 GALLON

CAN

(Freight Paid!)

24⁹⁸

28⁴⁹

30⁹⁸

36⁹⁸

55 GALLON DRUM

F.O.B.

Charlotte, N.C.

145⁰⁰

175⁰⁰

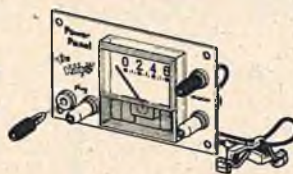
195⁰⁰

245⁰⁰

**CASTOR OIL AVAILABLE ON REQUEST
SAME SUPER LOW PRICES**

- Provides output for starter, glo-plug, 6V to 8V fuel pump.
- Operates from 12V starting battery.
- Amp meter to monitor plug & battery condition.
- Complete with all connecting hardware and wiring for fuel pump.
- Full instructions.
- Size 3" x 5".

One Year
Warranty



HOBBYIST POWER PANEL

\$11⁹⁵

Compare At \$19.95

For Your Starter Or Electric Boat Motors M.E.N.

12 Volt Gell Cell

These are two 6 volt Gell Cells in series to produce 12 volts. They may be installed one on each side of flight box or boat for good balance. 6 amp/hr.

OUR PRICE — \$19⁹⁵ ppd

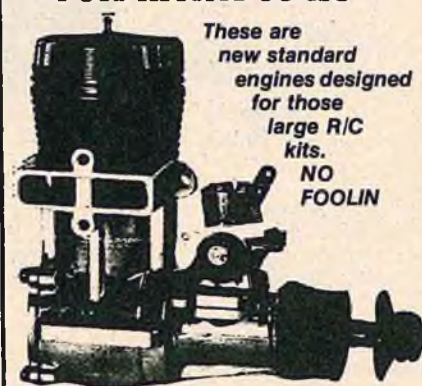
Self-limiting charger for above

\$10⁰⁰ ppd

YES!!!

Still Available — Limited Quantity
At Ridiculous Price

FOX HAWK 60 RC



These are
new standard
engines designed
for those
large R/C
kits.
**NO
FOOLIN**

M.E.N. R/C BUZZARD BOMBSHELL



**For the Old Timers &
trainer for the young.**

Reg. \$49.95 — Compare —

Our Price — \$38⁹⁹ ppd.

CHECK THESE FALL SPECIALS

Amco Trainermaster	\$34.98
Sureflite Cessna 182	\$23.48
So. R/C Gator Flea	\$44.98
Top Flight Headmaster	\$18.00
Top Flight Schoolmaster	\$10.10
Sig Kadet	\$25.98
Bridi Tweedy Bird	\$33.98
Ace Super Pacer	\$21.98
Midwest Tri Squire	\$16.98
Midwest Sweet Stik	\$26.00

**— HURRY —
QUANTITY LIMITED**

FLITE GLAS SPAN AERO NEAL'S MODELS JEMCO

BEST FOR LESS

KWIK SET EPOXY \$5.95
STYRO STICK ADHESIVE \$2.50
ZIP ENGINE ADDITIVE \$9.98
MOTOR KLEEN \$3.98
AIRCRAFT INSTRUMENTS \$9.98

GAS MODEL PRODUCTS
9376 WILCOX DRIVE
CINCINNATI, OHIO 45239
DEALER INQUIRIES INVITED

HELICOPTER BLADES

MACHINED CLARK Y AIR FOIL.

You fit and finish, matched sets of select hardwood.

THO SIZES - 2-1/8 cord x 30 long, and 1-3/4 cord x 20 long.

Shipped Air Prepaid - \$7.65 Pair.

For the scratch builder, we have a limited supply of small ball bearings, write for list.

We also do custom machine work. Send your specification for quote to

ROTOR EAZE Box 1066, Ogden, Utah 84401

JAPANESE MODELS AVAILABLE

WE EXPORT ALL TYPES AND MAKES OF JAPANESE ENGINES, R/C EQUIPMENTS, KITS AND ACCESSORIES TO ANYWHERE IN THE WORLD. WRITE TODAY SPECIFYING THE MAKE AND MODEL YOU DESIRE.
IMPORTERS INQUIRIES INVITED

NOVA LIMITED

ADACHI P.O. BOX 22
TOKYO 120-91, JAPAN

Specialists in the R/C Models field.

be used to get more frequencies in the 72 MHz band. Narrow band FM has been introduced in West Germany and I'm told it works great. These latter solutions would be more expensive, but in the long run might be a benefit to all.

As I mentioned in last month's column, there was a lot of interest in the electric motor speed control circuit published in the April issue. It sounds like a lot of people will be trying to build this circuit so let me give you a little insight into the problems of working with power transistors such as the Motorola 2N6282 Darlington. There are three limitations on the power handling ability of a transistor. The bonding wire that connects the transistor chip to the pins provides a maximum current limit. Thermal limitations that affect the junction temperatures as a function of power dissipation provide another limitation and a phenomenon called second breakdown provides a third. These are shown in Figure 1, and define the safe operating area for the 2N6282.

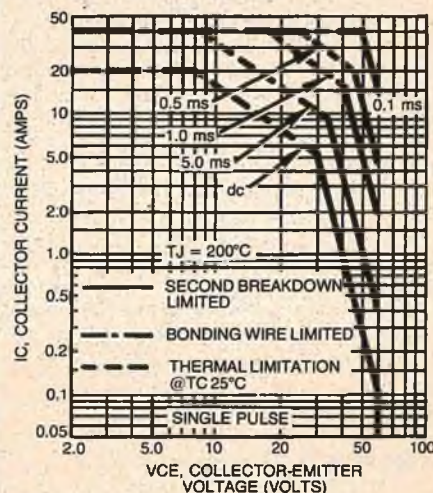


FIGURE 1

The curve says that if you had a drop across the transistor of less than eight volts, the transistor could handle 20 amps. If the drop across the transistor is 30 volts, it can only handle slightly more than 5 amps and at 50 volts, 250 ma is the maximum safe collector current.

In the speed control circuit, we operate the 2N6282 in a switching mode which means we turn it full on and full off. When it is off, it has the full supply across it but it has near zero current flow so it is in the safe operating area. When it is full on, it has one to two volts drop which says we can go up to 20 amps. Now the normal operating current for most electric motors in our hobby is less than 20 amps, but we must also worry about abnormal conditions such as a prop that is stalled out in the weeds or on the beach. The current in a motor goes way up when it is stalled because it doesn't develop any back EMF. You can measure the resistance of your motor with an ohmmeter and calculate the stalled current by OHM's Law. A typical resistance on a motor used for propulsion is 1/2 ohm. If you use a 12V supply, the stalled current is:

$$I = \frac{E}{R} = \frac{12}{.5} = 24 \text{ amps}$$

You can see that your transistor isn't going to last very long at that rate.

To be reliable, the circuit must be designed to handle the stalled motor current. Don't get trapped into thinking you will never stall the

to page 151

FALCON 56
\$19.95

DULANEY ENTERPRISES
Discount Model & Crafts

5 Channel
\$218.95

Standard
\$62.50

	Reg.	Dis.
Ace Baby System	69.95	61.20
Ace Stomper System	74.95	65.59
Dyna Jet Engine	74.50	59.60
H.P. .40 Engine	89.95	71.60
H.P. New .61 Engine	129.95	103.95
Profi .40 Engine	79.50	63.60
Profi .61 Engine	129.50	103.60
Profi .76 Engine	159.50	127.60
Cox .049 T.D.	18.25	14.60
Sullivan Starter	31.95	22.95
Sonic-Tronics		
Elec. Fuel Pump	13.95	9.95
Midwest Cardinal	23.16	17.95

	Reg.	Dis.
1/2A Streaker	19.95	14.00
1/A Pacer	19.95	14.00
1/2A Mach-None	19.95	14.00
1/2A Joy-Stick	18.95	13.95

We Accept Master Charge & BankAmericard
Indiana residents add 4% tax — COD OK
207 E. Jackson, Galveston, IN 46932
Phone: (219) 699-7323

SPLIT SECOND ADHESION

NEW LOW PRICE

Extra applicator tubes.

7 GMS. \$3.25
14.1 GMS. \$5.50

LAB TESTING ON EACH BATCH
BOTTLE CODING
EXCELLENT SHELF LIFE



FREE!
Package of ZAP-A-GAP Included with every bottle.



Dealer and distributor inquiries invited.

1550 DELL AVE. ■ CAMPBELL, CALIF. 95008 ■ (408) 379-9701

RADIO SPECTRUM

from page 148/12

motor out, because you will be doing essentially that when you slow it down to low rpm. The back EMF is a function of rpm and when you see how nice and slow you can go, you will end up spending a lot of time in a condition that is for all practical purposes stalled. There is a way around this problem with a more sophisticated circuit that switches at higher frequency. I didn't make it clear in the April column, but the circuit as shown, plugs directly into the receiver and the motor speed control is done by pulse width modulation at the transmitter encoder rep rate which is 50 to 60 Hz. By going to a higher frequency, the inductance in the motor winding resists the sud-

den change in current such that the peak current is much closer to the average current which is low when you are running at low speed. The principle is depicted in Figure 2.

These are not actual wave shapes, but are intended to illustrate that the peak current can be considerably less while maintaining the same average current. The power into the motor and therefore out of it is a function of the average current, so with a given load, both schemes will turn the motor at the same rpm for the same average current.

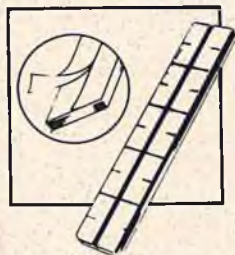
So once again, do not exceed the safe operating conditions shown in Figure 1 even for short repetitive pulses. The transistor can take an occasional pulse above the DC limits as shown in the figure but don't expect it to take fifty, two millisecond, forty amp pulses per second very long.

Another consideration is the gain of the output

transistor. In order to get the "on" voltage drop down to one to two volts, at high collector currents, you must have high gain and plenty of base current. You should only assume a beta (current gain) of 10 for a normal power transistor which would mean you would need two amps of base current which means you would need another power transistor to drive the output. With the Darlington which is actually two transistors in one, the base current can be considerably lower (≈ 200 milliamps). In an airplane, this can be a considerable savings in weight. In a boat, the two power transistors is probably a less expensive configuration. Notice that all of the specifications are good only if you keep the transistor case temperature below 25°C. This implies a good heat sink, with either forced air or water cooling. You can't button it up inside a fuselage.

to page 154

STICK-ON WEIGHT



6 OZ. LEAD

- Sticks into place
- Forms to Contour
- Fits in hard to get areas
- Increments of 1/4 & 1/2 oz.

\$1.98



NOSE WEIGHT

Balancing Made Easy

\$1.98

\$1.69 - \$1.99

NEW PROP BALANCER

- Accurate
- Easy To Use
- Fits Most Engines .049 Up



- PUT THE WEIGHT WHERE IT BELONGS - "UP FRONT"
- Tightens behind prop nut
 - 4 sizes available (1/2 to 2 oz.)

PRATHER PRODUCTS

1660 RAVENNA AVENUE, WILMINGTON, CALIFORNIA 90744

THE M.E.N. TRAINER STORY

The M.E.N. TRAINER was specifically designed for the absolute beginner in Radio-Control flying. It is by far the best trainer available on the market today. Over four years of extensive design engineering and development have led to its proven success. Its unique design, construction and flight characteristics makes your introduction to R/C flying an enjoyable experience. Even seasoned flyers have found the M.E.N. TRAINER a truly exciting and relaxing plane to fly. The M.E.N. TRAINER enables you to learn radio-control flying with minimum supervision and flight training time. Its slow flight and ease of command virtually allows hands-off control, while its distinctive size and shape assure you maximum visibility and ease in recognition of plane attitude when flying beyond normal ranges. Beginner... or seasoned pilot. Choose the M.E.N. TRAINER and see what flying R/C is all about.

FEATURES: Under-cambered wing with ample dihedral for slow, stable flight. The M.E.N. Trainer flies 8-10 M.P.H. • Trainer will recover hands-off from any attitude in 100 feet or less of altitude loss when properly trimmed—allows beginner to re-orientate himself • 3 1/2 lb. Flying weight with average radio-control sets. 13 oz./sq. ft. Wing Loading • Uses

.15-.25 engine for fuel economy • Large, roomy fuselage for ease of radio installation...old or new • Sturdy Plywood-Spruce-Balsa construction withstands beginner abuse • For those first landings...the M.E.N. Trainer will virtually land itself with little input required from the beginner pilot.

M.E.N. KIT: Light Plywood-Spruce-Balsa construction for durability and lasting performance • Precision die-cut ribs, fuselage sides, bulkheads, dihedral braces, etc. for quick assembly and ease of construction for the beginner • Pre-formed landing gear and brace • Wrapping wire included • Easy to follow plans and instructions including a Monokote cutting guide for the most economical use of covering material • Generous hardware package included with each kit • Quick building—Approximately 12-25 Hours.

M.E.N.
Model Engineering of Norwalk
54 Chestnut Hill • Norwalk, Connecticut 06851

DEALER AND DISTRIBUTOR INQUIRIES INVITED



If not available at your dealer, order direct. Conn. residents add your tax.

\$31.95

DON'T FLY

without a
POWER CYT™

THE ORIGINAL IN-PLANE BATTERY MONITOR!

Now...fly with confidence. One glance at your POWER-CYT and instantly you know the charge condition of your battery pack. Three times brighter than any other, POWER-CYT goes off when batteries are at a 10 to 20 minute safety margin. Detects bad cells. Easy installation. Weighs 1/2 oz. Guaranteed 1 year.

CYT-4 INDUSTRIES

617 S. East Ave., Oak Park, IL 60304 (312) 848-8955



4.8 V.

STANDARD... \$11.95
DELUXE 17.95
(as shown below with plugs)



PATENT PENDING

Dealer and Distributor inquiries invited

PRICE WILLIAMS DISTRIBUTORS

Wholesale Mail Order Division

*FOR ALL YOUR
FLYING MODEL NEEDS*

LOOK

PRICES SUBJECT TO
CHANGE W/O NOTICE

19.95 Sullivan Starter STD Dremel Tool Kit #245 Dremel Tool #260 Fox Eng. #14000/40 Suction N. V. Fox Eng. #14500/45 Suction N. V.	34.95 MRC 40 ENYA-Eng. 39.95 MRC ENYA 40 TV MRC ENYA 45 TV FOX ENGS. #13800- 36 C.L.	39.95 FOX ENGS. 24100- 40/B.B. DREMEL #371 MOTO TOOL KIT DREMEL #701 MILLER 2017 SPRAY OUTFIT	49.95 K & B 8360 FRT ROTOR W/PERRY PUMP & CARD K & B 61 R/C FOX 27800 78 R/C MRC-ENYA 60 B.B. III T.V.
--	--	---	--

SPECIAL
KRAFT
61 R/C **\$75.00**

MRC MARK V
5 CHANNEL, DUAL STICK
RADIO, 4 SERVOS, NI-CAD
BATTERIES
CHARGER. **\$199.00**

HOW TO ORDER BY MAIL

Write down all the items you want along with their stock numbers and prices. Check, money order or C.O.D. Call for fast C.O.D. service. We pay postage on all prepaid orders. Foreign orders, add \$10.00. Excess refunded. Pennsylvania residents add 6% sales tax.

—ALL MAJOR CREDIT CARDS ACCEPTED—

PRICE WILLIAMS DISTRIBUTORS

Wholesale Mail Order Division

3250 Chichester Avenue

Linwood, Pa. 19061

215 - 485-2078

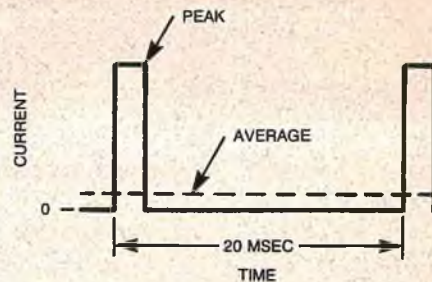
get high with a RUBBER DUCKY

- THERMAL DURATION, SPEED, AEROBATICS
- THERMALS AND PENETRATES IN 40 MPH WIND
- SLOPE AEROBATICS, SPEED, JUST PLAIN FUN
- 60" OR 75" SPAN, 7.7 OR 9.1 OZ LOADING
- NACA 2R12 SEMI-SYMMETRICAL AIRFOIL
- CONVENTIONAL OR BRICK, 2 TO 4 CHANNELS
- EASY TO BUILD FORMED PLASTIC FUSelage
- ACCURATELY CUT, LIGHT FOAM WING CORES
- FORMED PLASTIC WINGTIPS, CLEAR CANOPY
- COMPLETE HARDWARE PACKAGE INCLUDED
- EVERYTHING BUT ADHESIVES AND COVERING
- COMPLETE PLAN AND INSTRUCTION BOOKLET
- GREAT FOR POWER FLYERS' FIRST SAILPLANE
- RUDDER AND ELEVATOR ONLY, OR ADD
- ALERONS, FLAPS, VEE-TAIL OPTION
- WEAR YOUR DUCKY PATCH WITH PRIDE
- DISTRIBUTOR, DEALER INQUIRES, PLEASE

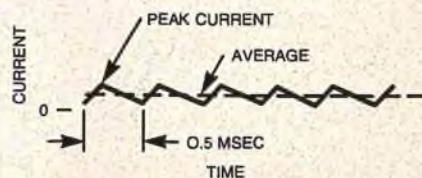
• INTRODUCTORY PRICE: \$44.95

PFS

PERFORMANCE FLIGHT SYSTEMS
2940 Santa Monica, Los Angeles, California 90046
Area Code 213 851-7920



A) LOW REP RATE — SLOW SPEED



B) HIGH REP RATE — SLOW SPEED

FIGURE 2

RADIO SPECTRUM

from page 151/12

As you can see the problem is not simple from an electrical, thermal, weight and cost standpoint. Many have asked why there aren't more commercial units on the market. This might help answer the question. Actually the electric airplanes I've seen do not have an excess of power and it seems that a simple on-off control would be quite adequate.

In a scale boat, a speed control is probably practical and quite useful. In addition, the ability to get reverse would be kind of nice. You could use a split supply like our old servo amplifiers, but a bridge similar to the new servo amps would be better. The power circuit would look like the sketch on page 12.

The circuit is not very efficient because the base current does not flow through the motor. If it were two amps, you would be wasting 24 watts. In a big boat with a big battery this may not be a problem.

The 1K pot can be set for neutral (or motor off) for any throttle position on the transmitter. The two 5K pots can then be set for the speed desired in each direction. I haven't built this version so you're on your own. If someone comes up with a nice packaging job, maybe they'll share it with our readers.

Pete Reed of Plainville, Connecticut, sent us an excerpt from a Martin Marietta Study Report on long-life assurance for manned spacecraft hardware. It included guide lines for design and application of Ni-Cad batteries and included some things that were surprising to Pete.

1. Keep depth of discharge below 25% of rated capacity to assure longer life.

2. Maintain battery within a -20°C to +22°C temperature range to retard separator deterioration.

3. Store Ni-Cad batteries at approximately 0°C in a discharged and shorted condition to obtain a storage life of about five years.

4. Erase most memory by discharging battery, short for 16 hours, and then recharge if application permits and need arises.

They claimed that with the shallow depth of discharge, limited overcharge and low temperature

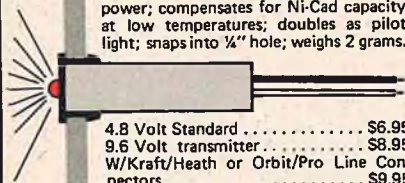
to page 159



NEVER AGAIN

With FLITE LITE you will never again have to see your investment destroyed by in-flight battery failure.

Flite Lite, which continuously monitors onboard battery condition, installs simply and quickly through the fuselage side. The light goes out instantly 10 to 20 minutes before batteries are low enough to affect system performance. Features: detects bad cells; integrated circuit; low power; compensates for Ni-Cad capacity at low temperatures; doubles as pilot light; snaps into 1/4" hole; weighs 2 grams.



4.8 Volt Standard \$6.95
9.6 Volt transmitter \$8.95
W/Kraft/Heath or Orbit/Pro Line Connectors \$9.95

ADVANCED DEVICES, INC.
P.O. Box 152, Rockville, MD 20850
Phone: (301) 762-0578

SPOKES



- Foam Tires
- Formed Steel Rims
- Steel Spokes
- Nylon Bushings
- Beautifully Nickel Plated
- Treaded or Smooth

8 Sizes from 2 3/8" to 5".
Priced from \$19.95 to \$24.95.
Dealer Inquiries Invited.



Engineering Co., Inc.

3448 Bishop Road
Chehalis, Wa 98532
(206) 748-0028

RADIO SPECTRUM

from page 154/12

ture, service life can approach 7000 charge/discharge cycles and five years.

I have never put any numbers on it, but I have said the worst enemy of Ni-Cd batteries is deep discharges and high temperatures. The numbers that Martin quoted are not practical for RC unless you live in Alaska and recharge after every couple of flights, but they do illustrate the point. I can't comment on the storage and memory erasing techniques because I have no experience. However, I do know that you had better discharge them and short them on an individual cell basis which is not easily done on RC batteries. It is also interesting that they recommend replacing them after five years even if they have been operating under "favorable usage".

Well let's see if we can save some airplanes this month. I've got two experiences to pass on. The first happened to Paul Benezra and his beautiful Mach I at the Pioneers contest. He lost the machine screw that holds the output wheel on the servo, and of course it had to be the elevator servo. During the inevitable debriefing over the wreckage, a couple of guys mentioned they have had this problem with the KPS-15 machanics. Paul's was the Pro-Line version, but I'm sure the color has nothing to do with it. It looks like it would be a good idea to put some Loctite or at least model airplane cement on these for insurance. No Hot Stuff or epoxy please. Number two experience happened to one Jim Oddino, but he was lucky. After that same Pioneer contest, a bunch of guys were looking over my Dirty Birdy (I guess they figured I must have had some tricks), and they pointed out the worn clevises and horns on elevator. I've been flying the plane for over a year, and I must admit they were pretty sloppy. Anyway, I went home and cut off the end of the pushrod with the clevis and replaced it with a piece of wire with a right angle bend and a snapper keeper. I attached this assembly to the old pushrod with a solder sleeve. At my second flying session, during an outside maneuver, heading straight down . . . the usual down elevator wasn't bringing the nose around. A panic full down got the nose up, lucky there was a valley out in front of me, and I rolled out, dropped the gear and landed. The solder sleeve had come loose and one elevator would take an up command where the pushrod is in compression, but there was no way to get down. Luckily, I had a split pushrod and the other side was okay. There is more than one fix for this problem, but the main thing is to learn how to make solder joints. Many of us who work around electronics don't like acid core solder or flux around the shop, but it has got a purpose and solder sleeves on pushrods is a good spot to use it. Also cleaning of the wire is important. It was the old pushrod side that came loose which means I probably didn't get the oxides off and never got it tinned. If you've got the equipment, silver solder is the way to go.

The following are excerpts from a letter from a concerned reader of RCM:

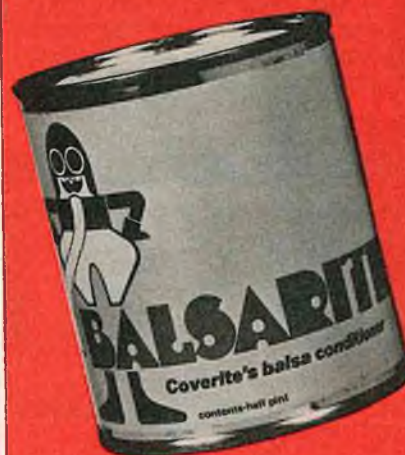
Dear Mr. Oddino,

I am writing you, as I don't know just whom to write to on the staff of R/C Modeler, with a few comments regarding the Low Voltage Alarm by George P. Steiner (May issue, p. 56). The reason I am writing is that I feel the readers of R/C Modeler should be aware of certain characteristics of the Low Voltage Alarm before they trust one in either a plane or transmitter. Otherwise, I

to page 161

DON'T GAMBLE

On covering your next model
Use fantastic new Balsarite.



- Crystal Clear Liquid
- Brush or Spray
- Protects Wood Models from Moisture
- Makes Coverings Stick Better (especially iron-ons like Monokote, or Silk & Tissue)
- Eliminates Wood Warp, Cover Sag, Fuel Creep
- Makes All Models Stronger (planes, boats)



COVERITE

2779 Philmont Ave.
Huntingdon Valley, Pa.

DON'T RUN DRY IN THE SKY

Set it—Forget it
Adjusts 30 sec. to 15 min.

MELMAX MKI TIMER

Solid state IC controlled Automatic reset and recycle. Internal battery. Size 3 1/2 x 2 1/2 x 1. Wt. 4 oz. Assembly 1 1/2 hrs. 1 yr. warr. Kit \$12.95. Wired \$19.50. (No COD) NYS residents add sales tax. Order from:

ELEKTRO-SERV CO.
PO Box 73, W. Hempstead, NY 11552

from page 159/12

am afraid that there will be a lot of crashes if people trust this device without some kind of testing.

The crux of the problem is with the low voltage Zener diodes used in the circuit. First the Zener voltage can vary at least 10% for the 8.2 volt units and at least 50% for the 3.9 to 4.3 volt units. Furthermore, with the latter, the Zener curves are not at all sharp and the Zener voltage depends on the current through the diode the way it is used in the circuit. The result is that the toggle point of the LED can be anywhere from 3.0V to 5+ volts for the flight pack! This was determined by actual experimentation by me.

In closing, I'd like to say that I tried a number of Zener diodes in the circuits made by RCA, Motorola, Sylvania and GE. The results were all the same. Vz and hence the lighting of the LED varied all over the map. Mr. Steiner's circuits are good and the device is useful to indicate any voltage below a critical value as long as the ratings of the transistors aren't exceeded. It will indeed toggle fully within about a 20 millivolt range. It is just that in the low voltage range used in RC equipment with NiCad batteries a few tenths of a volt makes a critical difference. That difference can easily mean the loss of a model or worse.

I hope the readers of R/C Modeler can be made aware of the above. The fault lies not with Mr. Steiner, but with the characteristics of low voltage Zener diodes where the breakdown is not sharp and true Zener voltage varies with the current.

Very truly yours,
Thomas A. Whitney
Roselle, N.J.

I must agree with Tom and point out that you will also have some temperature problems with Zener diodes. He added a P.S. that is very apropos. "A safety device should do its job, not be the cause of an accident."

Our exar servo amp discussion in the May issue prompted a letter from Mr. Hans Stellrecht of Signetics. They have developed a new servo amp designated as NE 544 which has many neat features such as a linear one shot which uses a constant current source. The output stage has built in PNP transistors (actually compound PNP-NPN), but external PNP's can be added for top performance. The circuit is available in a flat pack as well as a dual inline package. We'll have more on it if we ever get a chance to test it.

Well I met my deadline again, but it sure isn't helping me get my new airplane out to the field. □

ENGINE CLINIC

from page 101/10

more sensitive. Fuel can also affect sensitivity.

Dear Clarence:

I'm building a Pitt Special using a Veco 61 side mounted, with a Taone Manifold. I wish to use a pressure fitting to pressurize my fuel tank. Would it be better to use exhaust pressure or crankcase pressure. Where should I tap the manifold for exhaust pressure, or should I tap or use the pressure fitting in one of the rear cover mounting screws.

Sincerely,
Bob Desjardins
Madawaska, Me.
to page 162

GOT IT! WE'LL GET IT FOR YOU! IF WE DON'T GOT IT! WE'LL GET IT FOR

WAREHOUSE hobbies

P.O. BOX 8039 5821 E. ROSEDALE FORT WORTH, TEXAS 76112
PHONE: DAY 817/451-1570 NIGHT 817/461-0148



ENGINES

VECO 61 with muffler	\$85.00	\$54.95
K.B. 40	\$56.50	\$39.95
O.S. 40 SR with muff.	\$69.98	\$52.95
O.S. 60 B.H.	\$74.95	\$59.95
WEBRA 60 B.H.	\$130.00	\$79.95
KRAFT 60	\$119.95	\$89.95
WEBRA SPEED	\$147.50	\$88.50
FOX HAWK 60	\$99.00	\$64.95
O.S. 60 SR with muff	\$100.00	\$69.95
11" PROPS	.69¢ each	

MONOKOTE REG.	\$5.60
MET.	\$6.60
10 ROLLS REG.	\$54.95

JOHNNIE CASBURN KITS

SUPER LUCKY FLY	\$79.95	\$58.95
LITTLE SUPER LUCKY FLY	\$69.95	\$46.95
MIDDLE TEX (40 SIZE)	\$64.95	\$45.95
BIG TEX R/C TRAINER	\$69.95	\$49.95
LITTLE TEX R/C TRAINER	\$33.95	\$23.95
LITTLE SUPER FUN FLY	\$59.95	\$44.95
WING KITS	\$34.95	\$23.95
LFX-2 BASIC	\$74.95	\$59.95
SUPER DELUXE LFX KIT	\$139.95	\$89.95



FIBREGLAS
FUSELAGE

FIELD BOX KIT	\$17.95	\$13.95
FIELD BOX KIT	\$25.95	\$19.95
ASSEMBLED (Unfinished)		

SIG CLIP	
WING CUB	\$26.95
SIG KADET	\$24.95
SUG CUB	\$26.95
SIG RYAN STA	\$52.95

FLIGHT GLASS		
SATURN BASIC	\$59.95	\$44.95
SATURN DELUXE	\$89.95	\$69.95
P51 SPECIAL LOW PRICE	\$79.95	\$59.95

RADIOS

CANNON TINI TWIN 3 CHAN. 2 SERVOS	\$169.95
CANNON TINI TWIN 3 CHAN. 3 SERVOS	\$165.00
ADD \$9.95 for 72mhz	
CANNON SPORSTER "5"	\$209.95
5 CHAN. 4 SERVOS, FULL NICADS, 72mhz	



RADIO SUPER MARKET
FOR

KRAFT—CANNON—
E.K.—ROYAL

SUPER CYCLE \$43.95

GOLD MEDAL FORMULA FUEL

10% NITRO CONTENT. \$5.98 per gal.
in cases. (4 per case) \$6.98 single gallon.
15% \$6.98 per gallon in cases. Shipped
Freight Collect. We use UPS when
possible.

ASK ABOUT
CLUB DISCOUNTS!

\$5.98

SOLAR FILM

\$4.95 ROLL

SPEED WEBRA & PHOENIX VI	\$137.95
PHOENIX VI KIT	\$51.95
NUTCRACKERS	\$73.50
	\$51.95

SEMCO MUFFLERS

DELUXE MUFFLERS		
SEMCO	\$12.95	\$ 9.95
ADAPTERS		
FOR ALL		
ENGINES	\$ 2.98	\$ 2.25

DAVE PLATT KITS

T28B — SPITFIRE — FW 190
CALL FOR OUR LOW PRICE

STERLING

GAZARIATOR	\$51.95	\$41.95
FLEDGING	\$33.95	\$26.95

WAREHOUSE LONG GLO PLUGS

IDLE BAR	.59¢	LIMIT 10
----------	------	----------

BRIDI SHRIKE COMMANDER

	\$184.95	\$149.95
--	----------	----------

BI PLANES

SIG SKY BOLT	\$41.95
ACE ALL STAR BIPE	\$19.95
SIG LIBERTY SPORT	\$45.95
ACRO STAR	\$56.95

KRAFT RETRACTS less amp	\$63.50
With LF-52 Amplifier	\$85.50

SULLIVAN DELUXE STARTER

	\$26.95
--	---------

JOY STICK	\$18.95	\$14.95
-----------	---------	---------

HEAT GUN	\$25.95	\$18.95
----------	---------	---------

MOTOR CYCLE

STARTING BATTERY \$12.95

TOP FLIGHT IRONS	\$17.95	\$13.95
------------------	---------	---------

SHIPPING INSTRUCTION

Specials based on present list prices,
subject to change without notice.

C.O.D. - MONEY ORDER

CHECK

Texas Residents add

- 5% sales tax

Shipping Charge: \$1.50

Add \$2.50 for oversize and heavy boxes.
(FUEL SHIPPED UPS — COLLECT)
CHARGE IT!



IF WE DON'T GOT IT! WE'LL GET IT FOR YOU! IF WE DON'T GOT IT! WE'LL

SWIFTEE TOO

Span 48 inches
Area 515 inches
Weight 4-5 lbs.
Power .29-.40

JUST AS YOU SEE IT

\$89.95



- READY TO FLY
- FULL HOUSE
- FUN PLANE

REV MODEL PRODUCTS

430D Kay St., Addison, IL 60101 / (312) 543-3211

FOAM WING
BALSA AND PLYWOOD FUSELAGE

Distributor Inquiries Invited

As mentioned in the first letter, only muffler pressure, or in this case, manifold pressure, can be used to pressurize the fuel tank if you also intend to have the engine idle. The reason for muffler pressure working is due to being very low at high speed so no residual tank pressure is built up. At idle there is practically none. Where you place the muffler tap is not all that critical. With a normal muffler anywhere on the main body just to the rear of where it attaches to the manifold is usually the most convenient. With the Tatone manifold, it can be installed anywhere on the body that is convenient.

We'll end the column this month with another handy hint for you Taipan .21 users. Next month I'll have another old time engine article for you. The Condor Kopper King — an engine with several unusual features.

Dear Clarence,

Anyone who has installed a muffler on a Taipan "21" engine knows what a time consuming and four letter word producing job it can be. The task can be made very quick and easy if the muffler mounting holes in the engine are re-tapped with a 4-40 tap. This can be done without re-drilling the holes. This allows the use of 4-40 Hex-Head screws which can be easily tightened with a Hex-Head screw driver. The screws should be cut to 1/2" and 3/8" for rear and front respectively as this will allow them to be started through the holes in the muffler mounting flange between the flange and the main body of the muffler. The rear screw may be more easily installed if the pressure fitting is first removed from the muffler.

I found that this minor modification requires no more time than involved in mounting the muffler

with the hardware provided by the manufacturer.

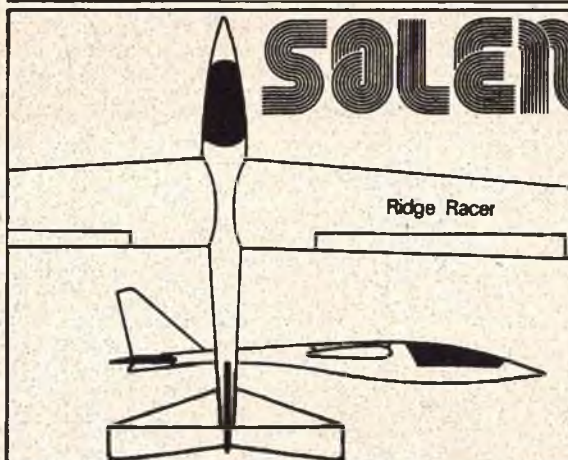
Respectfully,
James W. Allen
Long Beach, California

FROM THE SHOP

from page 2

the military to abandon the 72 and 53 MHz bands. Most of the published frequencies were in the 53 MHz band. All that I can see that was accomplished was to get the "hams" less interference in this band, which invites them to make more use of these frequencies, and less usable for R/C purposes. We can get shot down by a ham or a commercial station just as easily as by the military.

to page 164



SOLENT SAILPLANES

"THE RIDGE RACER"

A truly de-luxe A.R.T.F. kit featuring a beautifully finished white Gekote fibreglass fuselage, deep blue tinted canopy, special light density foam wings, veneered in Obechl, with full width inset ailerons of greater width outboard than inboard, giving you the ultimate in crisp positive control response. This machine is an attractive fast flying pylon racer that is also fully aerobatic and has been designed and developed during six years of all-weather soaring. Due to outstanding handling characteristics it is fully capable of giving you the sport flier top contest winning performance. All balsa and ply parts are pre-shaped; also included are F.G. wing joining kit, plus one of the most comprehensive hardware packs yet seen in any kit. Span: 72 in. Wing area: 650 sq. in. Wing loading: 10oz/sq. ft. (Average). Length: 42 in. Weight with Radio ready to fly 2 lbs. 14 oz. (Average). Price \$95.00 PP and Express Airmail included. C.W.O. (Dealer enquiries invited.)

SOLENT SAILPLANES, 7 CARLTON PLACE, SOUTHAMPTON, HANTS, ENGLAND

DO YOU WANT TO BE A FAMOUS RACE CAR DRIVER ?

- TRY 1/8 SCALE R/C CARS
- SEND FOR FREE CATALOG
- NATIONAL CHAMPIONS
- WE SHIP AROUND

THE WORLD
ASSOCIATED
1928 EAST EDINGER
SANTA ANA, CA. 92705



'Flyin' Box'



USED BY THE TOP MODELERS IN THE WORLD

- Rugged lightweight fiberglass construction.
- Bright molded-in fuel-proof Gelcoat finish.
- Available in 3 models — Kit to "'Lectric Flite Caddy'.

KIT — \$59.95, ASSEMBLED — \$69.95
(Specify color — red, orange, blue)
and 'Lectric Flite Caddy which comes complete with Dual Range Power Panel, H.D. Battery, and built-in charger, Plus aluminum legs & plane supports.

\$139.95

SEND FOR FREE CATALOG

See your dealer. Direct orders add \$3.50

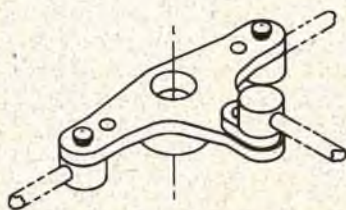
C.O.D. add \$1.00 extra

Phone Orders (203) 735-0998

AEROTREND
PRODUCTS

Dept. BC
11 Park St.
Shelton, CT
06484

NEW! RETRACT ARM



Furnished with special snap in push rod holders. Choice of 2 different throws.

Outer holes 1-1/16" throw.

Inner holes 13/16" throw.

Stk. # 41 - for KPS-10 servo.

Stk. # 42 - for World E. servo.

Stk. # 71 - for KPS 14 & 15 -II servo.

Price \$1.29 each

See your dealer or order direct
add .25¢ for post. & handling

ROCKET CITY SPECIALTIES
103 Wholesale Ave., N.E.
Huntsville, Ala. 35811

FROM THE SHOP

from page 162/2

Why not do something about the commercial stations? At least publish the frequencies that are in use. This information could help to avoid a serious accident.

I realize that our membership doesn't approach that of the ARRL, National Rifle Association, or the CB'ers, but it would seem as though we should have some influence, at least enough to protect what frequencies that we have. When you see what it looks like is going to happen to our little segment of the 27 MHz band, you begin to wonder. John's timing was pretty bad when he suggested that we make more use of the 27 MHz band.

I appreciated your printing my letter. I hope that it did some good. At least it has kept some people busy answering my question, "Just what does the AMA do for us?"

In regards to that, my feelings are, "Thou dost protest too much!"

Sincerely yours,
William R. Jacobs
Dunedin, Florida

★ ★ ★

Dear Don;

Your 'From the Shop' column in the May issue (I got to it a bit later than usual) prompts me to write in regard to the Editorial written by Ed Moorman.

I think it is necessary for us to take this a step or two further in order to preserve (and hopefully expand) the number of frequencies we now have. It seems pretty obvious there is a converted effort afoot to take the 27 MHz band away from us entirely, and as yet there does not appear to be any appreciable effort to preserve these frequencies.

As a director of MAAC (Canadian equivalent of AMA) I and my contemporaries are encouraging our equivalent of your FCC to assign additional frequencies to fill out the 72 MHz band. In addition, there are still some much higher frequencies legally usable for RIC, but I don't have the information on them at hand.

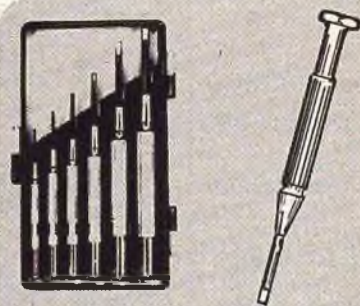
Our principal concern is that there is an International Telecommunications Union (international equivalent of Canadian DOC and U.S. FCC) meeting in Paris in 1979 to allocate frequencies internationally. This includes, remember, ALL uses of frequencies and, as Ed points out, we are a pretty small minority any way you want to look at it. We cannot afford to be complacent about the 1979 date, it isn't that far off as things go internationally.

We must have the co-operation and assistance of everyone, the model press, the AMA, the FCC (and all others internationally), along with every single individual in the modeling fraternity on an international basis in order to protect and improve our position. From past experience in other organizations, I know that a massive campaign of letter writing to government bodies can be effective despite our individual belief that we alone can do nothing. This belief is in error. What the government realizes people want, they can get, but it takes a lot of ink and a lot of people to be effective. Every single one of us needs to get at it right now!

As a couple of examples, Australia currently has 52 frequencies available (partly through narrower band width separation that we use), and I hear that Germany has 83, although I haven't seen anything official on that as yet. This sort of change will obviously involve the manufacturers as well, and we should be encouraging their in-

to page 166

PRECISION TOOLS



TOOL SETS

Sets of K & S top quality tools with individual swivel handles. Ideal for home, workshop, and field use.

Set of 5 Nut Drivers #422 \$3.95

Set of 5 Open-End

Wrenches #423 \$3.95

Set of 5 Phillips-Allen #424 \$3.95

Set of 6 Screwdrivers #426 \$3.50

Catalog 25c



NOW IN ORANGE COUNTY

KRAFT ORANGE COUNTY AUTHORIZED SERVICE CENTER

Also Tower Radios West Warranty Service and we also repair KSE Super Sport and KGL All American Five systems.

CONTACT: GEORGE KILLEEN

2817 E. Lincoln Ave., Anaheim, Cal. 92806

Phone: (714) 630-5061

Also at same address, contact Andy Anderson for repair of the Bonner, Micro-Avionics and any other old-timers, as well as all radios currently available. Write or give us a call for your particular radio needs. Andy also maintains an Ace Warranty Service Center.

CANADIANS



For

Fast, Efficient, Economical MAIL ORDER service of all your AEROMODELING Supplies, write

CALGARY HOBBY SUPPLY LIMITED
Box 3173, Stn. B., Calgary, Alta.

DEALER ENQUIRIES invited for Du-Bro, Sullivan, Swanson, Franklin, K & B, Webra, Perfect Paint, Superstrong Covering, RDM Balsa, Kraft, Soarcraft. Store Address: 118-40 Ave. N.W. Calgary. Phone: 277-4664

You Are Invited
To Become A Member Of
NRCHA

Sponsored by R/C Modeler Magazine, the National R/C Helicopter Association has been established to promote and encourage active participation in sport and competition R/C helicopter flying.

Your dues will expire 12 months after date you send it in. You will be billed 1 month prior to expiration date.

MEMBERSHIP APPLICATION
NRCHA _____ Date _____
R/C Modeler Magazine _____ AMA # _____
P.O. Box 487
Sierra Madre, Calif. 91024

Name _____
Address _____
City _____
State _____ Zip _____
Please Fill Out The Above And Enclose \$4.00 for Annual Dues — Foreign Dues \$5.00.

FROM THE SHOP

from page 164/2

volvement. Without the frequencies, we would all be 'out of business', and nobody even remotely (pun) connected with RIC wants that.

Best regards to all our U.S. Counterparts and to RCM — you and your group are doing a super job. Don, may you live forever!

Best regards,
R.H. Phillips
MAAC 9198 L

★ ★ ★

The Board of Trustees of the Reno National Championship Air Races have announced September 10-12 will be the dates for this year's event.

The three-day competition of Unlimiteds, Formula I (midgits), Sport Biplane and AT-6/SNJ will be preceded by three days of free qualifying events, September 7-9.

The Reno races are entering their 13th lucky year and are the longest continuous running air race in the world.

Headquartered at the Reno/Stead Airport, nine miles north of downtown Reno, the Reno event always combines the best in air racing competition with top aerobatic acts.

Jerry Duty will once again direct the activities

of the Reno races, in cooperation with E.J. "Ed" Oaks, chairman of the Reno Air Race Board of Trustees.

Chairman Oaks said additional details regarding the races and activities would be announced as they are finalized.

★ ★ ★

Since we, at RCM, answer well in excess of 500 letters per month from you, our readers, and still never seem to get caught up with our correspondence, it was indeed gratifying to see that John Lusk, President of the Madison Area Radio Control Society has the same problem. The following letters, addressed to President Lusk, along with his answers printed in the February 1976 issue of the MARCS "Sparks":

Dear Prez.,

My airplanes have a habit of screwing them-

60
TO
GO

PROFESSIONAL HAND CRAFTED MODELS

Now available, professionally built models of quality balsa, plywood and superlight sheeted foam wing cores. These planes are individually hand-crafted in the tradition of old world craftsmanship. Just assemble components, finish, add your own hardware and gear and go at a price you won't believe. Models available are
MACH 1 (60) PHEONIX 6 (60) SUPER KAOS (60)
other designs available soon

60 TO GO LOGICROL CANADA LTD.
In USA/BOX 12, HOVELS, MINNESOTA ZIP CODE 56740
IN CANADA/200 BANNERMAN AVE., WINNIPEG
MANITOBA, CANADA R2W 0T4
phone 1-204-582-1154
distributor and dealer inquiries invited.



STANFIELD MANUFACTURING CO.

Presents the
KING BEE

\$59.95
RETAIL

The FIRST
Fibreglass Fuselage -
Mid Size Trainer



★ AN ALL AROUND FUN PLANE TO FLY

★ FOR THE BEGINNER AS WELL AS THE EXPERIENCED FLIER

STANFIELD MANUFACTURING CO.

P.O. BOX 6333 FT. WORTH, TEXAS 76115

get
STUK

AMAZING NEW ADHESIVE



1 oz. STUK \$8.50
1/2 oz. STUK \$5.00

STUK is Alpha Cyanoacrylate contact adhesive. Competitors offer 1/2 oz. for \$5.70 and up. ECONOMY PLUS offers 1 oz. for \$8.50 or 1/2 oz. for \$5.00. YOU CAN'T GET STUK ANYWHERE ELSE BUT HERE! Dealer and Distributor inquiries invited.

economy plus

DIVISION OF STORM KING INDUSTRIES, INC.
P.O. BOX 4145
NEW WINDSOR, N.Y. 12550

selves into the ground from great heights. Help!
Signed, Earthworm

Dear Earthworm,

Your letter is common of many I have received, please pick one or more of the following cures: (1) Try screwing on your antenna. (2) If your antenna is screwed on, extended, and all the sections accounted for, then try screwing on your head. (3) Apply for a job as a wine steward.

Dear Prez.,

My airplane roars from one end of the field to the other, but fails to get airborne.

Signed, Forever Grounded

Dear F/G

Remove the bricks, if this fails install a metal prop and do the club a favor and keep the grass trimmed. Better yet, with a little modification, install a 2,000 horsepower two staged supercharged Pratt & Whitney R-2800-10 engine. Once you get the prop clearance adjusted, lift off should be the last of your worries. P.S. Be sure to apply just a tad of rudder to the flight field.

Dear Prez.,

Every time I try to start my engine, it kicks back and bites my finger, hand, elbow and anything it can get close to.

Signed, Short on Blood

Dear Short Blood,

You must train your engine correctly in order to stop this nasty habit. The next time it bites you, bite it back! Stop it first or you will need a plastic surgeon, I wonder if they make them out of balsa? The surgeon that is - Hey, how about a balsa prop, or better yet, buy an electric finger.

Dear Prez.,

I have folded 11 pair of wings in the last year and have badly damaged many airframes and much of the flight field.

Signed, Slightly Bent

Dear Slightly,

You ain't the only one bent. Ya ever see one of our past Presidents with a few drinks in him? Back to your problem, go to the nearest train tracks and rip up 36' of rail, take it home and cut to the right length for your main spar and then refer to Forever Grounded letter.

to page 171

HELICOPTER CONTEST

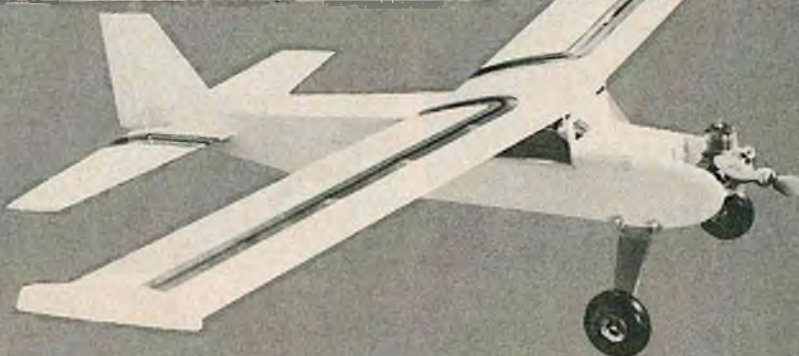
September 5th and 6th
Labor Day Weekend
Montreal, Quebec, Canada

This contest will be part of an air show and there will be two classes:

NOVICE and EXPERT

For further information and entry forms, please contact Carls Hobby Shop, 6056 St. Hubert Street, Montreal, Quebec, Canada H2S 2L7. Phone (514) 273-6008.

HARDWOODY FOR THE SPORT FLYER ALL WOOD - NO BALSA



For .15 to .19 Engines, 3 Channel
48 in Span, 360 sq in Area
3.25 lb Flying Wt. 21oz/ft W-Load
Built Up Type Construction
Precision Machined Parts
-SEE YOUR DEALER OR ORDER DIRECT-

Special Hardware
Full Size Plans \$26.95



BAUER MODEL AIRCRAFT

1035 WILLOW LANE, HOWELL, MICHIGAN 48843

WINNING

Model & Hobby Supplies

2A, Austin Ave.,
Kowloon, HONG KONG.

Tel. 3-684184

10:00 AM - 7:00 PM
(Monday - Saturday)

R/C Model Airplanes, Soarers,
Helicopters, Cars, Motorcycles,
Tanks, Boats, Yachts,
Accessories Etc.

1976 NEWS

WINNING HK BRANCH

already opened

34-36, Yik Yam St., B1,
Happy Valley, H.K.

Tel. H-753493

Price List-US\$ 1, by Air.

AND NOW, AN ELECTRONIC IGNITION FOR GLOW PLUG ENGINES!

ONLY
\$24⁹⁵

- TAKES ADVANTAGE OF THE POWER IN A 12 VOLT BATTERY
- MAKES STARTING EASIER
- WORKS WITH ANY PLUG
- HIGH EFFICIENCY CIRCUIT
- GUARANTEED FOR ONE YEAR
- SATISFACTION GUARANTEED (21 DAY TRIAL)



TRY THIS EXPERIMENT:

Heat a plug the usual way with a 1½ or 2 volt battery. Then blow on the heating element. You will see it cool off. The Electroglow won't let this happen. It automatically adds power, about 4 to 6 times more, on demand from your glow plug to keep it hot. It doesn't make the plug hotter; it just keeps it from cooling. Other units only tell you when the engine is flooded... The Electroglow does something about it.

(Battery not included.)

To order, just send \$24.95 in check or money order. For C.O.D., add \$.85. Ohioans please add 4% sales tax.

THE D. L. WRIGHT CO.

10190 Dupont St. - Columbia Stn., Ohio 44028 - (216) 236-5607

FROM THE SHOP

from page 167/2

Dear Prez.,

Every time I go to the flight field, some turkey cons me into a low inverted pass contest. "Help" I'm running out of rudders!

Signed, Frankie

Dear Frankie, (he-he)

Try installing another set of landing gears on the other side. Next time you are out at the field, I bet you I can do more outside loops inside the shelter house than you can! You go first!

Dear Prez.,

My wife wants to know why my copy of RCM arrives at the house each month in a plain brown wrapper and why the front cover is always dog-eared?

Signed, Curious

Dear Curious Person,

Have it sent to your office. We all know sex sells everything: radios, airplanes, engines and lots of magazines. Besides, Uncle Don is a prevert, mind you, my kind of prevert, but never the less.

Dear Prez.,

The boys at the flight field keep playing tricks on me with the wrong transmitters and things like that. After all, I'm a professional person in the medical field with a BA., MA., & a PHD and politically center of the road, maybe leaning a little to the Right.

Signed, Dickie

Dear Dickie,

From the sound of it, you are 3 degrees out of trim to the right, adjust the rudder servo accordingly. Second step would be to get your weirdo buddy, Nellie, to unscrew your Mickey Mouse ears 2 turns. I think they are a bit too tight.

Dear Prez.,

Some ratchet jaw west bound flakey 18 wheeler with the handle of 1K was smoking up the interstate the other day and he keyed the mike on his CB. Well that 1,000 watt kicker he uses to keep his feet warm, made a crispy critter out of my receiver.

Signed, Still Looking For The Pieces

Dear Still Looking,

Ain't we All! The next time this happens, hop in your Honda Civic and go run him off the road. Ask him please not to do that anymore. If this has negative results, then when you are discharged from the hospital, you can take up free-flight. □

*1/2 A, sport, stand off scale
2 channel radio*

P-51D Mustang

by Fred Reese



The House of Balsa P-51D Mustang is a big step ahead in low cost RC that gives both realism and performance. The high quality kit builds quickly, using preshaped balsa fuselage sides, light weight moulded fuselage top including the canopy, and shaped blocks. Rugged balsa and plywood construction make a light yet strong model that is ideally suited for schoolyard and small field flying.

Price \$24.95

See your local dealer first. Distributor and dealer inquiries invited. California residents add 6% tax.

House of Balsa

2814 East 56th Way, Long Beach, CA. 90805

Aqua Boss R/C



Air Boats

Length 36" Beam 14" Rec. Eng. .29-.46

- Precut plywood parts
- Detailed plans •Fast building
- A boat for "all the family" year around
- Fantastic on snow and wet grass

Photo brochure \$1.00, refundable first order \$39.95 plus \$1.50 shipping to:

Windsor Manufacturing
6617 Mahoning Ave. Youngstown, Ohio 44515

ATTENTION R/C MODELER SUBSCRIBERS

If you're moving, want to write us about your subscription, or have missed an issue, fill out this form, attach your old mailing label, and mail to RCM.

ATTACH YOUR MAILING LABEL OR PRINT YOUR OLD ADDRESS HERE

Name _____
Street _____
City _____
State _____ Zip _____

PRINT YOUR NEW ADDRESS HERE

Name _____
Street _____
City _____
State _____ Zip _____

R/C MODELER MAGAZINE
P.O. Box 487, Sierra Madre, Calif. 91024