

May 1970 75c



RC MODELER

THE WORLD'S LEADING MAGAZINE FOR RADIO CONTROL ENTHUSIASTS



THIS MONTH

VOLUME 7, NUMBER 5

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COVER: Miss Penny Kratz with Joe Bridi's remarkable profile R/C sport and competition design. For .45 to .60 with an all up weight of less than three pounds! To be presented in June RCM. Ektachrome transparency by Tom Roe. **FRONTSPIECE:** Bill Coons photographed Jim Jennings Buckner at a 1969 Meroke R/C Meet.



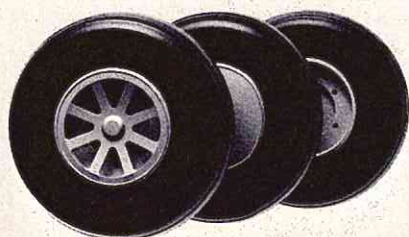


VIEWPOINT

By DON DEWEY

With the Spring and Summer flying season rapidly approaching, the RC industry is turning out new products almost faster than we can review them. In order to avoid making the Kits & Pieces segment of RCM look like a catalog, I'm going to try to help out this month with a few of the new products with which we have been working.

The first is one of the most outstanding new products I have had the pleasure to test in many months — a new set of wheel and tires, called Universals, and manufactured by Camis Mold and Tool, P.O. Box 353, Morton Grove, Illinois 60053. This rubber tire is available in six sizes from 2½" to 3¾" in diameter. The rims and the hub caps are a poly-carbonate Lexan plastic with both plain and perforated caps included with each set. The hubs are webbed to accept popular brakes, and the entire unit is lighter than many other tires in corresponding sizes. Universals retain their pressure through the seal formed by the snug assembly of its wheel halves. This wheel should also end scale wheel problems on almost all



aircraft subjects from 1930 onward, and will be at home on any contest or sport ship. Universals are packaged, unassembled, in sets, each set including 2 tires, 2 rim sets, 4 hub caps, and assembly screws. Assembly is quick and easy, and these units constitute one of the most impressive products we have had the pleasure of testing.

One of the newest advertisers in RCM is Franz Kavan of Nurnberg, Germany, manufacturer of many outstanding RC accessories. As an interesting sidelight, this company, in order to test their Kavan propellers, glow plugs, and all other accessories under actual flying conditions, uses a unique telemetry link from the airplane to the ground. The engine RPM, in the air, is converted to a frequency signal by means of a strobe disc on the backside of the spinner and a photo diode. This information is transmitted to the ground via a miniature transmitter, which weighs only 1 ounce. This receiver is located in the model and transmits the necessary information to a VHF receiver on the ground — this information being available while the aircraft is within a 3 mile range. The receiver is coupled to an ultra-precise digital frequency counter and the RPM readout is exact to 1 revolution per minute! This is an example of some very unconventional techniques being used by one manufacturer for the benefit of every modeler where modern research means improved products for our benefit.

Rocket City R/C Specialties,
1901 Polk Drive N.E., Huntsville, Ala-

bama 35801 is now manufacturing their popular Override Device for Throttle to fit the World Engines S-4A servo. This accessory will retail for 59 cents each. Rocket City is also adding a small Wing Mounting Bolt to their line (10-24 x 1") which is identical in design to their larger wing mounting bolt. These units will retail for 59 cents a pair.

Nelson Model Products, Inc., 1414 W. Winton Avenue, Hayward, Calif. 94545, has been appointed exclusive USA Distributor for the 1970 Hirttenberger front rotor 61 RC engine. The letters "HP" also signifies horsepower and the HP 61 FR-RC has plenty of it — 11,000 to 12,000 RPM with 11-8 propellers, to be exact. This is ideal for those 7 pound FAI stunt models, Open Pylon racers and heavy scale models. Weighing 15 ounces, less muffler, the new HP 61 features a Schnurl bypass porting system with 3 bypass ports; flat top piston design; single piston ring; ball bearings on crankshaft; adjustable idle mixture control; excellent fuel draw ability; reliable idle characteristics; designed for use with mufflers (and required for maximum low speed); front rotor for standard type mounting systems; and manufactured under military type quality control standards with a 6 months warranty. Handcrafted in Austria, the HP 61 is priced at \$64.95 with muffler, or is available at \$69.95 with the KO Muffler; and as an optional extra the Perry Carburetor is available for this engine for an additional \$5.00. Nelson Model Products invites dealer inquiries. Watch for the HP 40RR available soon.



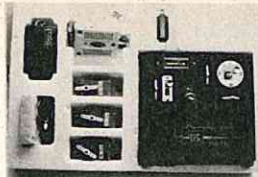
Canadian Solarfilm Distributors, P.O. Box 3412, Station C, Hamilton, Ont., Canada, announces the availability of their new transparent Super Solarfilm. With the same flexibility and excellent working characteristics of their opaque materials, the new transparent film is available in red, yellow, and blue.

Sonic-Tronics, 8042 Craig St., Philadelphia, Pa. 19136, is in production on their Nifty Starter. This new computer-designed 2-inch diameter starting motor is for all model aircraft engines. It is most ideal for the more temperamental .40 racing and speed engines. The Sonic-Tronics Nifty Starter will save a great deal of time to say nothing of injured fingers. The unit features a vinyl jacket, enclosed pushbutton starting switch, propeller drive with replaceable rubber insert and heavy duty 10 foot power cord with battery clips. The starter is 100% American made with no surplus parts. It operates from a 12 volt battery or your automobile battery which the 10 foot cord was designed to reach. Available now at your local hobby shops and dealers, the retail price is \$31.95 less battery.



A new variable speed control where the right speed can be dialed for more effective use of power tools and home appliances has been developed by the Dremel Manufacturing Co., P.O. Box 518, Racine, Wisconsin 53401. The Solid State Motor Speed Control, unlike conventional half-wave controls, affords con-

(continued on page 74)



OS 3 CHANNEL DIGITAL PROPORTIONAL \$149.00

This is an unheard of low price for a new 3 channel digital. If you've been debating about getting into RC you should act right now. Here is a 3 channel digital at single channel or pulse prices. Only a limited number are available at this price, so please call or write us immediately. Outfit includes: Transmitter, receiver, 3 servos, wiring harness, full nickel cadmium batteries, charger, transmitter carrying case. This is NOT a kit, but comes to you ready-to-fly. Orders can not be filled at this low \$149 price after May 15, 1970.

SPECIAL - Limited Time!



HOBBY LOBBY'S 24 HOUR TELEPHONE ORDERING SERVICE

area code 615 / 297-6361

NEW! UNIVERSAL SCALE WHEELS

A very scale-like wheel that really caught my attention. The hub covers the axle end, and the tire even has a scale tread. But, the best feature is that this is sort of a "neutral-bounce" tire — a good contest feature. Six sizes and prices:

2 1/2" dia. — \$4.99pr. 3 1/4" dia. — \$6.49pr.
2 3/4" dia. — \$5.39pr. 3 1/2" dia. — \$7.29pr.
3" dia. — \$5.89pr. 3 3/4" dia. — \$7.99pr.



NEW! Major Models Semi-scale Kits! \$39.95 ea.

52" spans for 40—.60 engines.



FW-190



P-47



"Assembled outfit pictured"

CONTROLAIRE-MAN 4 CHANNEL DELUXE DIGITAL PROPORTIONAL KIT

\$159.00

SPECIAL!

An incredible price for a full-house digital kit. "Deluxe" means that all nickel cadmium batteries are included. Outfit includes kits and clear instructions for transmitter, receiver, 4 servos (S-4A), charger, wiring harness. \$159.00 price in effect until May 15, 1970.



I-M ENGINE TEMPLATES 29¢ each

Steel templates for: Max 10,15,19,35,40, 40P,60, Enya 09,15,60,STG60, Veco 61, K&B40RR.

NEW! Auto-start Electric Engine Starters

M-1 Auto-start without battery . . . \$24.95
M-2 Auto-start with battery . . . \$39.95

We're HOPING to have these in stock when this ad comes out.

DEVCON 5 MINUTE EPOXY \$1.25

If you haven't tried this remarkable new product you are in for a surprise! A customer of ours (whose name I WON'T mention) wrote us: "Devcon 5 minute epoxy is better than girls!" I threatened to quit shipping to him until he gets things straightened out. Devcon epoxy isn't THAT good, but it does speed up your building efforts almost unbelievably.



NEW! Kavan Glow Plug Caddy & Wrench 98¢



A clever contest necessity. Wrench stows spare glow plug.



I-M Scale Instrument Kits 5 per kit 98¢

Exact duplicates of actual aircraft instruments which have square-shaped mounting into instrument panel. Specify size: 9/32" rim dia., 11/32" rim dia., 15/32" rim dia. 5 instruments per kit.

I-M DELUXE PRIMER BOTTLE \$1.50

Clunker fuel pick-up, wide base, adequate size, narrow injector that works with mufflers. Rotating fuel shut off.



I-M Nylon Pin-type Knife Slit Hinges

17 Med. Size \$1.99
5 Small Size 59¢

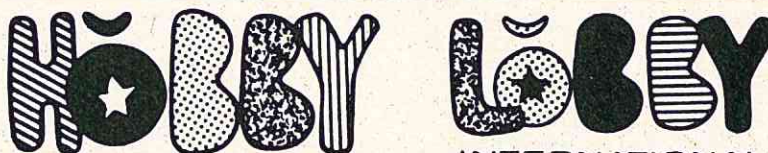


Very THIN hinges requiring only knife slit to install. Holes to permit good glue bond.

TRY US: A. S. did . . .

"I received your shipment . . . and was amazed at the very prompt and personal service. I could not begin to tell you how much it is appreciated! At any rate, you have gained a steady customer!"

A. S., Tel Aviv, Israel



2604 FRANKLIN ROAD, NASHVILLE, TENN. 37204

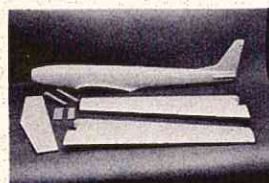
DROP YOUR ORDER IN THE MAIL BOX, THEN JUMP BACK BECAUSE WE SHIP FAST!

We pay postage on all orders accompanied by check or money order. The United States Post Office demands that we use your ZIP CODE on all shipments, so be sure to use your ZIP Code. Satisfaction guaranteed or money refunded. Phone 615-297-6361 store hours 10 A.M.-5 P.M. except Sunday.

SPECIAL!
SEALECTOR DELUXE HEAT SEALING IRON

\$8.99
(Reg. \$10.95)

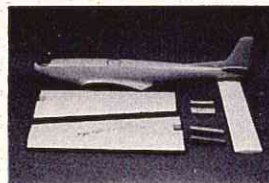
For one month only the industrial quality heat sealing iron at a special low price. Price will be \$8.99 until April 30, 1970.



Sun Fli IV

**SKYGLASS
FIBERGLASS
AND FOAM
KITS**

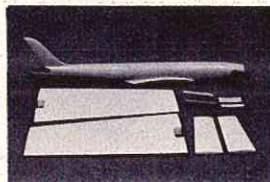
\$39.50 ea.



Citron



Quick Fli III



Twister



Long Midget

OUTFITS A - B - C
Hobby Lobby's unique "package" that enables a beginner who knows nothing whatever about R/C to fly R/C successfully a week after he gets the package.

Outfit A is for the newcomer who has no local flying instruction available. Outfit B is for the newcomer who has an experienced R/Cer to help with the first flights. Outfit C must be flown by an experienced R/C flyer.

All outfits are based upon digital proportionals, no hard-to-install or gimmicky pulse systems or Galloping Ghost systems are used. Outfits use Lanier Ready-to-fly planes, and include ALL accessories needed to complete the R/C model.

Our Assembly and Flying Instruction Book is included with each outfit. Write Hobby Lobby today and ask for ordering information about the Outfit (s) that interests you.



World Engines Scale-like
K nee Action Nose Gear **\$5.97**

**New!
CAMP STOOL**
\$2.99

We've had a lot of calls for these. They are particularly handy to take to the flying field because they are very light. Aluminum tubing with waterproof seat material.



**NEW! Tatone
Exhaust
Manifolds**

.09-.19 \$3.95
.29-.35 \$4.50
.45-.65 \$4.95

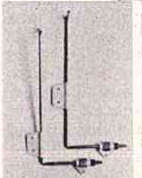
Solves the problem of ducting exhaust out from a cowled-in engine. 3 tail pipes are cast into the manifold, unblock the one you want and you can saw off the other two. Extension tubing and primer fitting included.



**10 FEET
\$1.95**

**HOBBY LOBBY
SPECIAL
SURGICAL
FUEL LINE
TUBING**

**I-M
Adjustable
Strip
Aileron
Horns
99¢ pr.**



WINDICATORS
59¢

Frequency ribbon with antenna clip. Bright, clear colors. Indicates wind direction. Specify frequency.



**I-M Special 11 oz.
Short Clunk Tank**
\$1.75



Unique. Designed for short-nose scale airplanes.

**I-M HOODED DELUXE
EXIT GUIDES**
Pair 25¢

Extra length, carefully molded. REALLY DELUXE!



DEVCON SILICONE RUBBER
\$1.95 3oz. Tube

One of the handiest items to keep in your shop or field box. Uses: Glue Nyrods in place, makes fuel-proof wing saddles, gaskets between muffler and engines (is unaffected by temperatures up to 500 degrees F.).



**I-M NYLON
"NOISELESS"
CARBURETOR
ARM**
25¢

HOBBY

LOBBY

INTERNATIONAL

2604 FRANKLIN ROAD, NASHVILLE, TENN. 37204



THE MODEL WIFE

By HORTENSE STEED
Guest Editor

This is a new column written by, and for, the model wife. Contributions to this column are invited and may be about any subject of appeal to the RC wife.

You men agree that building and flying models is a wonderful hobby, but do your wives agree? I do, except occasionally. The other night I turned a little sour on the whole thing.

My husband had been out of town for a few days and we really missed him around the house. Therefore, I put on my most beautiful trappings (and I do mean trappings; perfume, pale pink lipstick, the whole bit), fixed us a relaxing drink and floated down the stairs to his shop. My see-through negligee swirled into the mist of red paint from his spray gun; he peered at me through the fog as my coughing spasm took hold. I stumbled from the room. If the smell of dope had not overpowered my Chanel No. 5, things might have been different. Oh, well, it has been this way for years!

If your wife needs a few pointers on how to stay on your good side, pass this along to her. First, my credentials. We have been married over twenty years and are still talking to each other. Now, for the pointers.

Always be nice to model buddies when they arrive unexpectedly on your threshold. Ask them to come in and have a cup of coffee. You'll enjoy the reputation of a fine "model" wife if you pay strict attention to greeting model buddies warmly, supplying coffee and bragging on every model that passes before your eyes.

It helps to know where the Scotch tape is located and have a good supply on hand. Never borrow a tool from his workbench. However, be prepared to give up your sewing machine screwdriver, your thread, straight pins, wax

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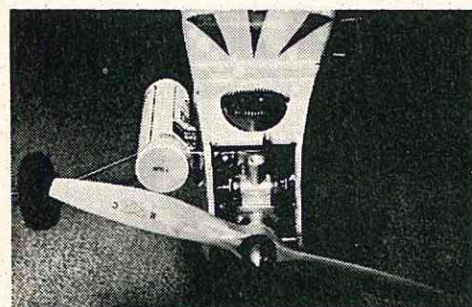
GROVER LOWERY FLIES HIS FOX 74 POWERED "NORTHWIND" 2,086 MILES DOWN ALCAN HIGHWAY



THE AIRPLANE - 8' Span, Home-built. Fox 74 Engine. Fox Glo-Plugs. Missile Mist Fuel with anti-freeze additive. Royal Classic Radio.



The model was flown from the right seat of Grover's bus, as his daughter, Regina, drove.



View of the power department. Fox 74 was unmodified in any way. What looks like a muffler was merely an exhaust deflector to prevent castor oil from freezing on surfaces.

Cold weather won't stop a model-builder...or a FOX engine. The 74 performed flawlessly through weather down to a minus 62 degrees.

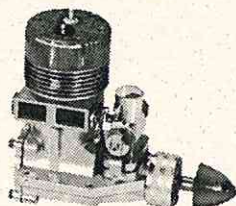
Fuel economy - slightly under 10 gallons were used on the entire trip. This figures to over 200 miles per gallon.

Endurance - the second day's flight of 311 miles non-stop, taking 6 hours and 17 minutes in minus 45 degree weather, sets some sort of record, we think. About 1/2 gallon of fuel remained when he landed.

Equipment reliability - no needle adjustments were made. No Glo-Plug changes were made.

As his daughter, Regina, drove their small bus, Grover flew his "Northwind" from Beaver Creek, Canada, to Lethbridge, Canada...a distance of some 2,086 miles. The temperature - down to 62 degrees below zero. The altitude - an average of 2,500 feet above terrain. The flight was over a 10 day period with days 2 and 3 being flown non-stop...some 6 hours a day without refueling. Fuel stops after the third day were attributed to a fuel tank problem and human fatigue.

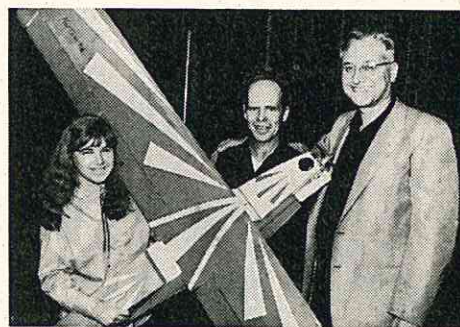
FOX 74 R/C



Bore1.000
Stroke937
Disp.74
Wt.19 oz.

\$49.95

DATE	MILES FLOWN	STOPS FUEL	TEMP.	HRS.	MIN.
1/11	87	1	-54	2	10
1/12	311	0	-45	6	17
1/13	284	0	-37	6	0
1/14	203	4	-62	5	20
1/15	322	6	-48	7	55
1/16	80	4	-42	4	22
1/17	207	8	-14	5	30
1/18	200	7	-6	7	40
1/19	205	7	+18	7	25
1/20	187	4	+36	5	22
TOTALS					
10 DAYS	2,086 MILES	41 STOPS	58 HRS.	1 MIN.	

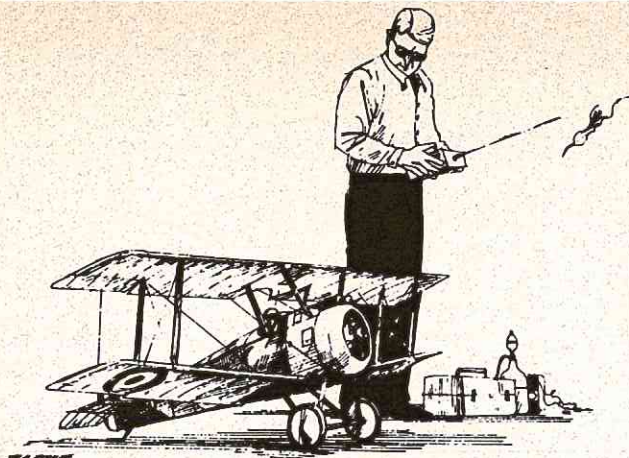


Duke Fox congratulates Grover and his daughter, Regina, on their trip.

Grover says,..."I have never found a carburetor with the reliability at both low and high speeds, and one you could fly anywhere close to the amount of time this one has flown, without adjustments. Idle is excellent. Transition on this 74 from low to high speed, in my estimation, is as near perfect as you can get. One flip starts were the rule on our trip. No adjustment of needle valve was required, and not once did we have to change our Fox Glo-plugs."



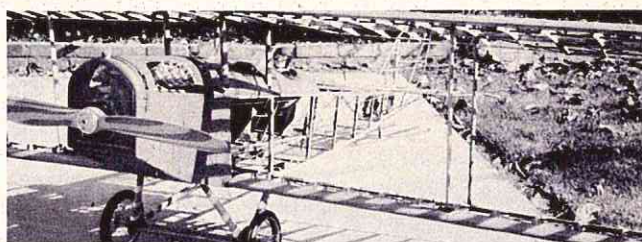
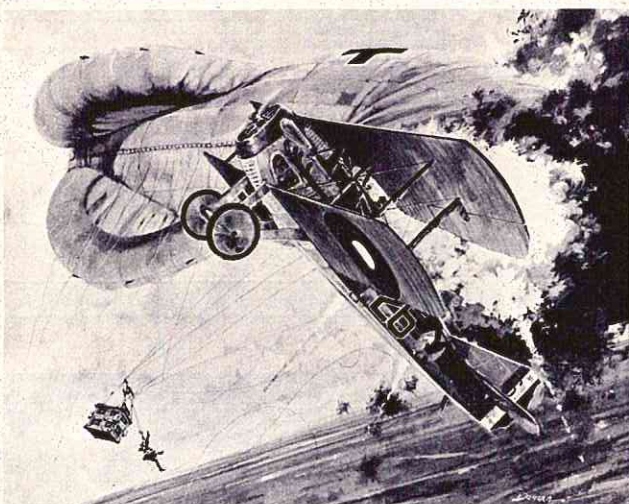
MFG. CO.
5305 TOWSON AVENUE
FORT SMITH, ARK. 72901



by DAVE PLATT

(Designer — Top Flite Models)

SCALE IN HAND...



Our leader photo this month really has ACTION in bucketfuls. Though reproduced here in black and white, the original has COLOR too — and at 20" x 16" (measure that out with your hands!) it, and its five companion paintings made sock-em-in-the-eye decoration for any scale fan's workshop.

Obtainable singly at \$2.00, or all six for \$8.95, the series depicts the Spad XIII above, Fokker D VII, Albatros DV, Sopwith Camel, Sopwith Triplane and Nieuport 27 as main subjects, with, in many cases, other aircraft "mixing it" with them. Fred Angel of Angel Mini-Flite Co., 340 Broad St., Box 437, Fitchburg, Massachusetts 01420, is the man to contact if your dealer doesn't have them. How about a WWII series, Fred?

Our regular reader(s) of this column will recall a photo published here several months ago, showing Dario Brisighella's DeHavilland *Sea Hornet* in early construction.

At Dario's suggestion, Scale in Hand took a drive to Milwaukee recently to view the model in almost-finished state and pass on a little "inside information" on weathering.

Wow!, is that thing gorgeous! We

always have had wet knickers for this ship anyway, and the sight of this big and beautifully-made twin, fairly takes your breath away.

If Dario's model is anything to go by, Scale RC quality is on the upswing here in U.S. There's other evidence too — we happen to know of — several more Scale RC ships, intended for the Nats, which are detailed down to the maker's name on true scale types, full cockpit detail, realism-finishing, etc. We'd better stop — can't give too much away to our English rivals in the World Champs!

Recent criticism of the FAI Scale RC Rules appearing in European model magazines have made it seem that all is not well with the rules. Our comrade RC Scale columnist Dennis Thumpston, a good friend and one time RC Scale entrant, says, "there is widespread dissatisfaction... with the current set-up... aggravated by the Scale Factor, an American proposition... criticized for its over-emphasis on Scale accuracy and due to the fact that, once a model has been given its Scale Factor, interest in the flying section is lost since a model with only an average factor will find it impossible to tote up enough marks for

a chance of placing."

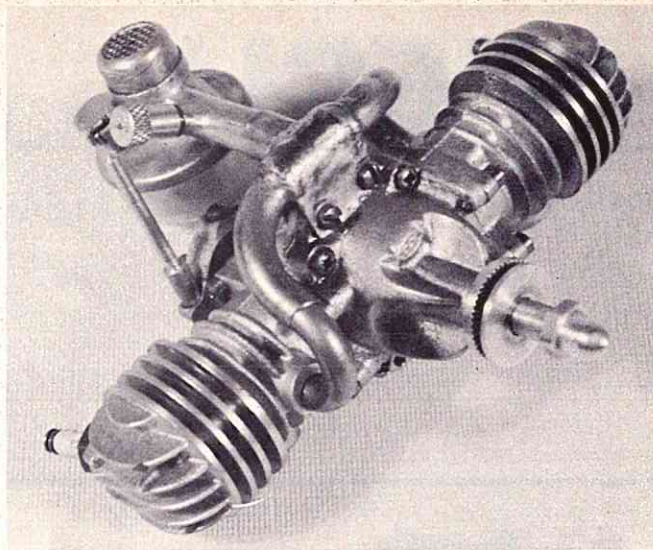
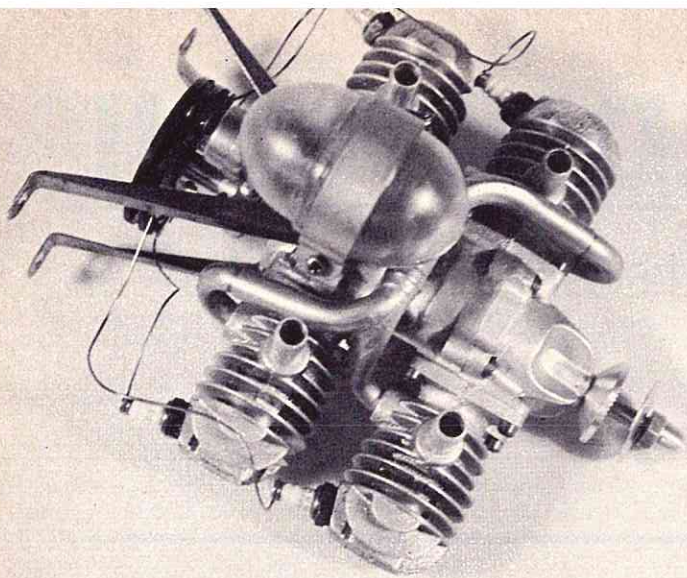
We sure hate to cross swords with Dennis on this one, for the aforementioned reason of friendship and also because he was no slouch at making a good RC Scale model, being personally responsible for much of the present state of the art in RC Scale in England.

But somehow, it doesn't all ring true. Basically, the idea behind the Scale Factor is to give the accurate model more of a chance against the altered one, which obviously will fly better.

Obviously? Sure! What other reason can be advanced for changing the shape around? It sure can't be to make it look better. So, the idea that a model with an "average" Scale Factor doesn't have a chance is baloney — it is expected to get the extra flying points over the true Scale job to start with. If it couldn't do so, the changes were pointless.

Then again, everyone knows that on the contest field ANYTHING can happen, and frequently does. Interest in the flying section lost? This has got to be a gag. What about the "over emphasis on scale accuracy"? Isn't this the name of the game? The FAI Pattern Aerobatics schedule over-emphasizes maneuverability, by this line of thinking. If

(continued on page 60)



ENGINE CLINIC

BY CLARENCE LEE

Over the years there is one question that I have probably had thrown at me more than any other. "When is somebody going to come out with a good twin?" Anytime that bunch of fellows get together for a bull session, this question always comes up. So, for our technical bit this month we will tell you of some of the problems involved and why, to the date of this writing, there are no successful twins on the market.

Most of the newcomers to R/C are not even aware of the fact that there have been many twins on the market

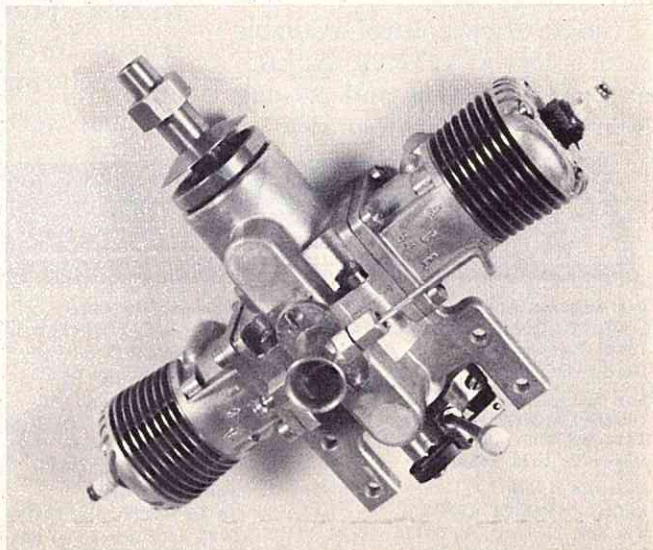
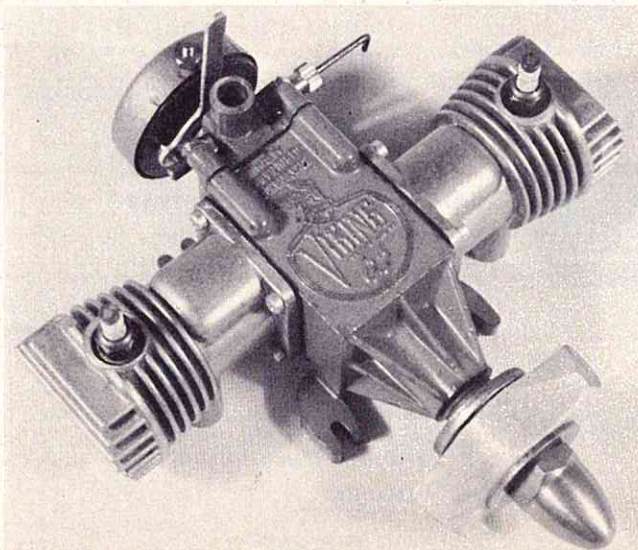
over the years. During the post war years of 1946-50 the market was loaded with twin cylinder engines; The Wasp, Ace, OK, Viking, and Vivel just to name a few. Prior to WWII there were several twin and multi-cylinder engines available. Elf made a twin, four, and SIX cylinder engine, and continued production on these for a short time after the war.

As many of you who were modeling during the post war years know, the market was loaded with some pretty poor excuses for engines, both single and twins. Of all of the twins made, the Ace was, in my opinion, the most successful. Few people have even seen one of these, as they were made here on the West Coast, and only a limited number were produced. The Ace, along with all of the others, went out of business when the glow plug came along. In fact, the glow plug is the reason you do not see any successful twins on the market today.

The major problem encountered with all twin, or multi-cylinder, engines is equal fuel distribution to the cylinders. In the case of a twin, one cylinder will always run leaner than the other. This tendency was not as bad, or as critical, with ignition systems, but when the glow plug came along, everything became a bag of worms. I have worked off and on with twins since 1946, so will try to fill you in on a few of the problems encountered.

First of all, for a given displacement, a twin will not have the same power as a single cylinder engine because of the extra drag. A tiny bit of drag can be a real "power grabber" in these small two cycle engines. Also, if one cylinder is running correctly, and the other slightly rich or lean, then the incorrectly set cylinder becomes a drag and is holding back the cylinder that is set correctly. Although twins will not wind up like their single cylinder brothers, they will

(continued on page 64)



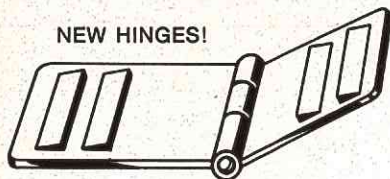
NEW KAVAN



CONTROL SURFACE FAIRING

- 1/4" - 32" Long, Pair 59 c
- 5/16" - 32" Long, Pair 79 c
- 13/32" - 32" Long, Pair 99 c

NEW HINGES!



- 6 pcs. per bag 59 c
- 15 pcs. per bag \$ 1.25



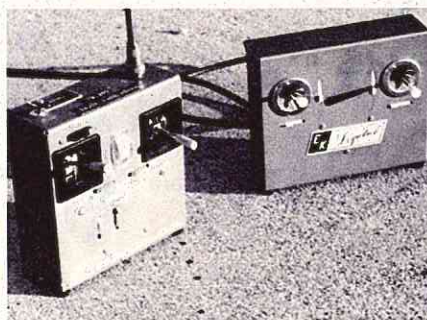
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CUNNINGHAM ON R/C



The "Buddy Box" is perhaps the most overlooked accessory that can be obtained for the enjoyment of this sport of R/C flying. For a long time most of the radio manufacturers did not supply "Buddy Boxes" to be used with their systems. Now, however, this stand has been reversed, and the "Buddy Box" can be had from almost all of the radio suppliers.

Just what the heck is a "Buddy Box", and why should you have one? Simply, it is a slave transmitter. It is attached to your master transmitter by a long umbilical cord, or cable. The slave transmitter has two control sticks, trim levers, a case like the master transmitter, perhaps a printed circuit board inside the case, and nothing else. No antenna, no batteries, nothing. A switch is located on top of the master transmitter. This switch can be simply a toggle switch, a spring loaded switch, a push button, or almost any gismo. When the "Buddy Box" is hooked up to the master transmitter, control of the aircraft can be passed from the master to the slave by throwing the switch. When the aircraft control is desired back at the master, the switch is returned to the normal position. OK, that's what it is, now why is it something for the modeler to consider buying?

Don't buy one if you change radio gear with the stages of the moon. Don't buy one if you are a dedicated contest flier, or racer, and you fly only for yourself and your own enjoyment. Don't buy one if you are a beginner to this sport, and are just now able to take

off and land in one piece.

But, if you like to stick with one set of radio gear, or wish to keep one set whenever you acquire a new set, or if you are a dedicated family man and would like to teach your small fry, or your wife to fly along with you, or if you are an expert flier and really get your kicks from helping newcomers learn the fabulous art of R/C flying, or if you're a hobby shop owner and give flying lessons with new rig sales, or, if you simply would just like to have one, then the "Buddy Box" is a darn good idea for you.

I flew one of the first Buddy Box systems about three years ago on one of my all too infrequent trips to sunny California. Don, Dick Sonheim, several girls from Deweys Harem (he calls 'em "staff", I call them "Harem!") and I all journeyed up to the now defunct "hill" to test out the brand new Deans rig and Buddy Box. We had a ball. I stayed on the master transmitter while first Don, then the girls took turns flying the slave. Whenever the girls got into a rough

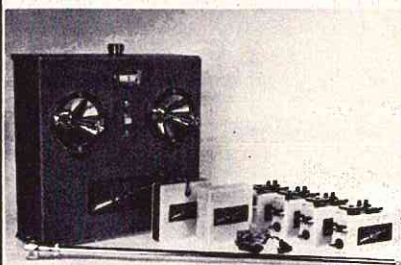


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...of course the old way had its advantages, too!

position I would ease up the switch lever, right the aircraft, and transfer the control back to them. Many times they never even knew that I had taken the control away from them for a brief moment. When Sonheim got on the slave the fun really began. Every time Dick would start a pattern maneuver, and got about half way through it, I would trip the lever kick the airplane into a weird position, then slip the control back to him. It made for a lot of laughs. Weird flying, but a lot of laughs. Landings were left untouched. Landing on that hill is a story all to itself!

When I came back from that trip I was sold on the merits of the "Buddy Box" type of system. I called my good friend, and fellow Thunderbird member, Bob Elliott of EK products and asked him about a system like this for my radio. Finally, about two and a half years later, old Bob agreed with me and said that he had been designing a system, and that he would fix one up for me. This system is now tagged into my three year old Log III transmitter. The slave sports EK's new control sticks and case shape but, in all other ways, is fully compatible with my older system. If you are flying a Log II, III, or one of the newer sets, write to EK and check into the cost of adding a box to your system. If you are going to buy a new radio, check with them on the cost of a new radio complete with Buddy Box. I believe that Kraft will be offering a similar system for their radios, although I haven't talked to Cliff about it for quite a long time.

My prime reasons for wanting the "Buddy Box" were both to teach my young son to fly, and, hopefully, my older daughters and my wife as well.

Also, I wanted to have a system available to instruct friends in the marvel of R/C flying. Like most of us, I'm always talking up this sport just about everywhere I go, and it is sure hard to get a friend out to the field and turn over a good flying new airplane to inexperienced hands for just a "feel" of the control sticks. I've mounted my system into my four year old Professor (RCM plan) and will use it for most training flights. The test flights on the system were made in the Miss Bikini (RCM plan) and young Chuck got his hands on the slave with the grand idea that he was a WW II fighter pilot. Thank heavens for the little switch on top of the master!

Probably the best way to start out teaching someone to fly by use of the "Buddy Box" is to start the same way that you do when trying to teach with just one transmitter. Give them a good ground school. Let them feel the sticks. Make them understand what the sticks actually do to the aircraft. Let them move the sticks and see the controls work on the airplane. Most beginners have the same fault — when they want the aircraft to go up, they push on the stick. I don't know if this is a reaction from pushing on the accelerator in an automobile, or pushing a basketball up for a shot, or what, but this is the natural instinct. Teach them to move the stick back for up, please! Next, teach them to move the stick only a small amount. Get through to the trainee that you don't have to haul the stick into its farthest travel to get the aircraft to move. A good ground school is worth many, many nervous moments in the air! After the student has become thoroughly acquainted with the controls, and control systems, give him a short lesson on what to expect of the aircraft in the air. How to make it bank and turn. How to make it climb and dive. How to learn to "see" the aircraft when it is in the sky. How to control the aircraft when it is coming toward him. After all of this, you're ready to take to the air.

It is a big help, at first, if you can secure the services of another flier to help your student over his first few rough places. Let the other pilot guide the students thumbs on the sticks for the first time or two that control is passed to the student. This will give him a chance to use his eyes in finding the ship, and to see just what a small amount of movement will do to the aircraft.

If you're a serious teacher, you will set up the control movements on your

(continued on page 63)

BRISTOL

By VERNON ZUNDEL and AL SIGNORINO

The Bristol Brownie was destined to become one of those obscure aircraft that was deleted from the vintage aircraft files. I became aware of its short lived history when I was going through a file of 3 view drawings that I had purchased from W.C. Hannan Graphics in California, under the company name of "Plans & Things" (a very good source of information by the way!) It was the first vintage airplane that I know of that used the adjustable dihedral feature, although not incorporated in this model. The Bristol Brownie, unlike the Blackburn or Demoiselle, is ultra simple for anyone who has ever used an X-acto knife.

First I will present a short and concise history of the Brownie (knick-named) "Jack" by those who flew it.

It was first brought to the concept stage as a racing type aircraft. It was built in England in 1924 and only 3 were completed by the Bristol Company. The model presented (G-EBJK) was the first of the three completed in 1924. The SN's were 6526-6527-6528; the names given to these aircraft by their pilots were "Jack", "Jill" and "Jim". The dimensions of the Brownie were: Span 36'7", Height 6'6", Tare Weight 500 lbs., Max Speed 70 mph, Length 26'3", Wing Area 204 sq. ft., All Up Weight 870 lbs., Range 100 miles.

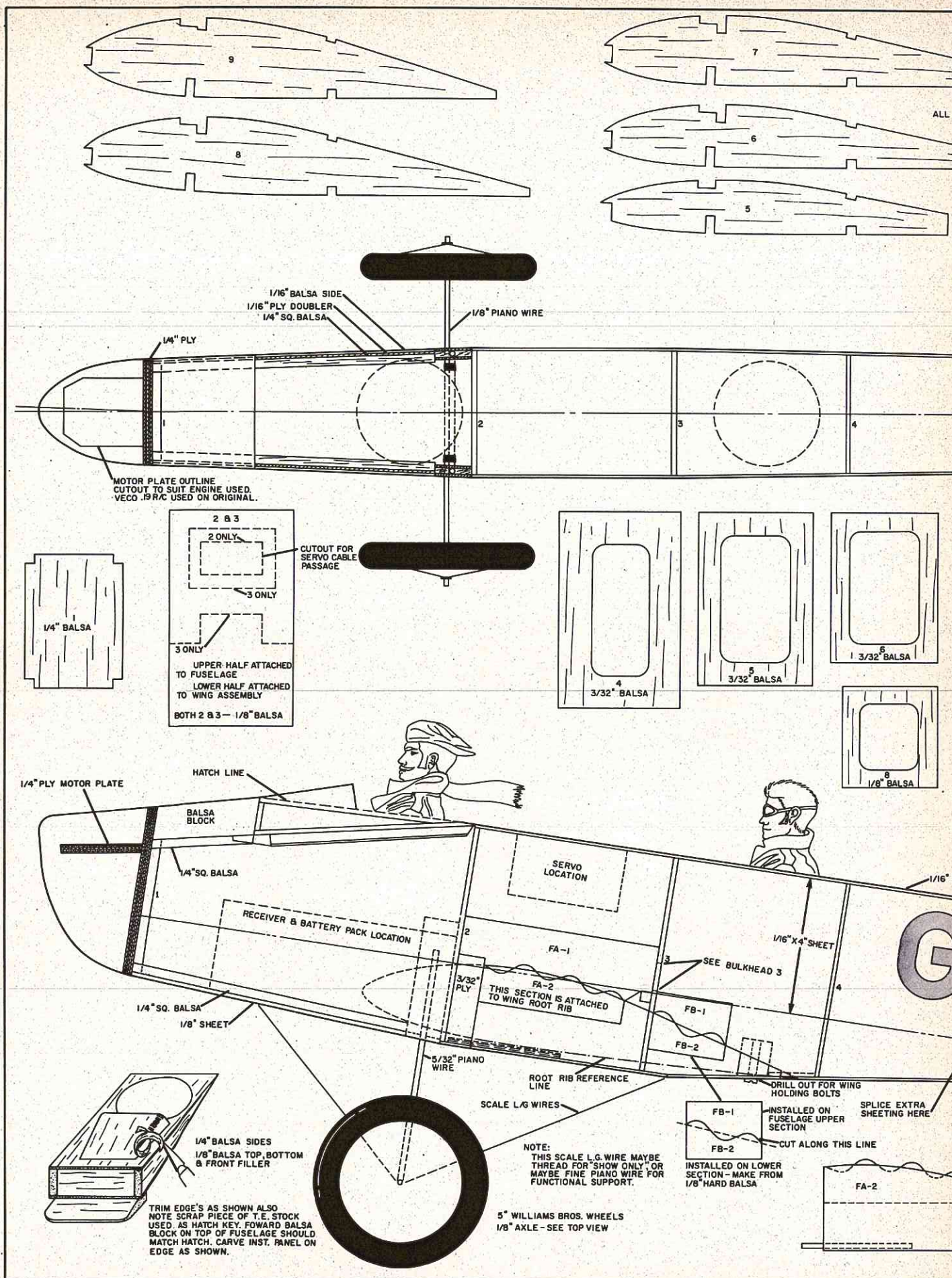
By this one can see it was a fast little plane in it's day with a minimum of weight. The first flight was made by G-EBJK on the 6th day of August 1924 by Cyril Uwins, then soloed by Barnwell and later flown by both of them together. Barnwell was credited with both the Biconvex wing and the Segmental Ailerons of the Bullfinch type. The original Ailerons were actuated by a single cable against rubber cords but later adapted to a return cable. Two types of wings were used on these aircraft; one wood, the other metal in hopes of higher speed. The first mishap was to G-EBJK on Sept. 5, when T.W. Campbell had the misfortune to foul some telephone wires and made a crash landing on the airfield at Filton where the damage was repaired in time for the air trials at Lympne. Uwins flew G-EBJK and designated it No. 1. G-EBJL was flown by Campbell and designated No. 2, making its first flight on 27 September that year. G-EBJM was also flown by Campbell and designated as No. 3. No. 3 was entered as a single seater with a long range tank and entered the Grosvenor Cup Race. In the main trials Uwins took second place of 500 pounds for the best take off and landings, this being the Duke of Sutherland Prize. Campbell won 3rd with an average speed of 70 mph. In late December of 1925, G-EBJK was considerably modified giving the aircraft a higher speed. The top longerons were altered to a slope, giving the pilot a better view. A larger engine and strut braced landing gear, still with a flexible axle as the only means of springing, were installed and the plane was redesignated Model 91A.

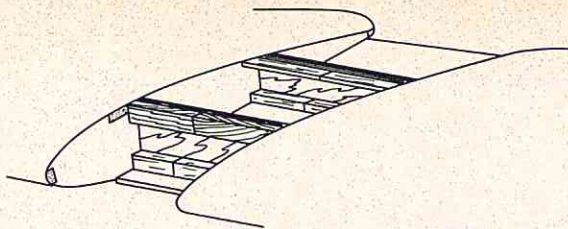
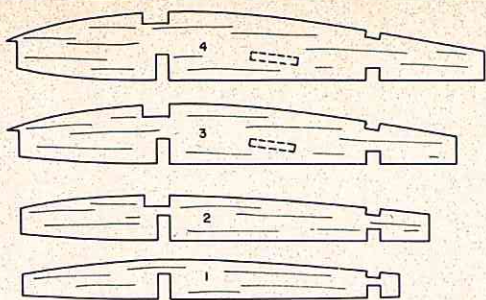
The Brownie went through a series of changes in the remaining years; metal prop, modified landing gear, shock absorbers, enlarged horn balanced rudder, and redesigned cowling, etc., but the Brownie held it's basic shape. In September of 1926 model 91B was entered in the Daily Mail Contest. Uwins won third prize of 500 pounds and won second in the S.M.M.T. Handicap on September 18. G-EBJM was hired by the London Aeroplane Club in 1927 and entered in many races in its remaining years; it was scrapped in 1930. G-EBJL was similar and was used by Bristol and Wessex Aeroplane Club until they moved in 1930. G-EBJK was less fortunate in that it was allotted to Capt. Barnwell for his personal use and on March 21, 1928 came to it's end on an attempted flight against a strong wind. It was in view for nearly an hour as he battled high winds. When he took off he encountered severe downwash over trees and in spite of full power, crashed on a road. He was unhurt but G-EBJK was a write-off. Although excellently built and engineered, efficient in performance and economical to use, it was expensive to build and not rugged enough to stand up to normal club use. Nor was it cheap to repair and, with the coming of the DeHavilland Moth, the Bristol Brownie was forgotten.

The 2 inch scale Bristol Brownie presented here is another model in my collection of those "magnificent machines" of an era past. At first you would say, "How can it fly with such an unbalanced ratio of horizontal stabilizer to wing area?" At this point, even I cannot explain this! But there will always be some questions unanswered about this type of aircraft in the beginning years of aviation. Probably the long tail moment and forward CG compensated for the small stab. Here again we...by we, I mean Al Signorino of the McDonnell RC Club, and myself, decided on a more closed fuselage type construction than we have been building in the past. This gives the builder less construction time and more flying time, while retaining that touch of nostalgia. ("So off we went to the Balsa Store".) It didn't take but a short time to rough a set of drawings with the help of the three view drawing from W.C. Hannan. Our first attempt at the finished drawings showed we

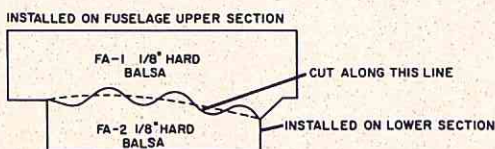
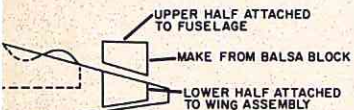
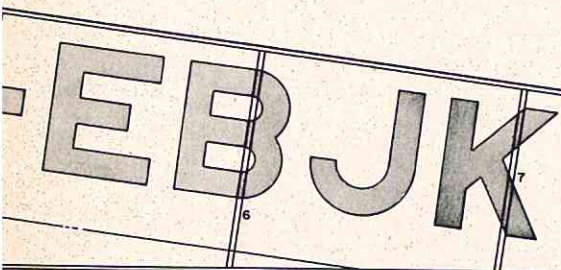
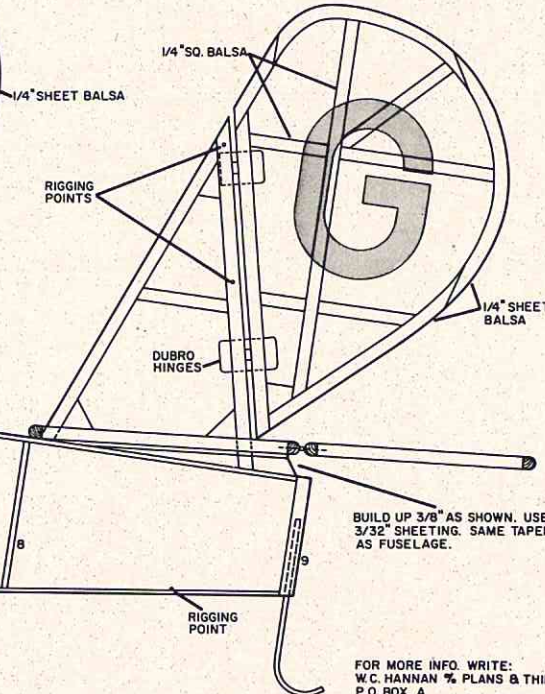
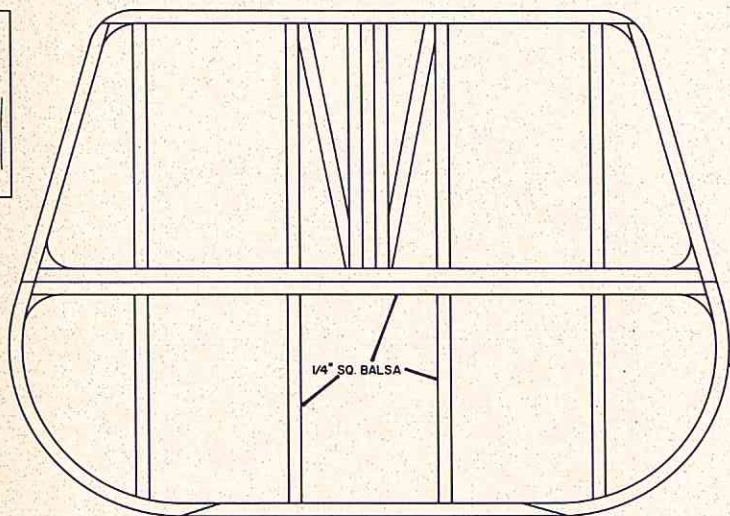
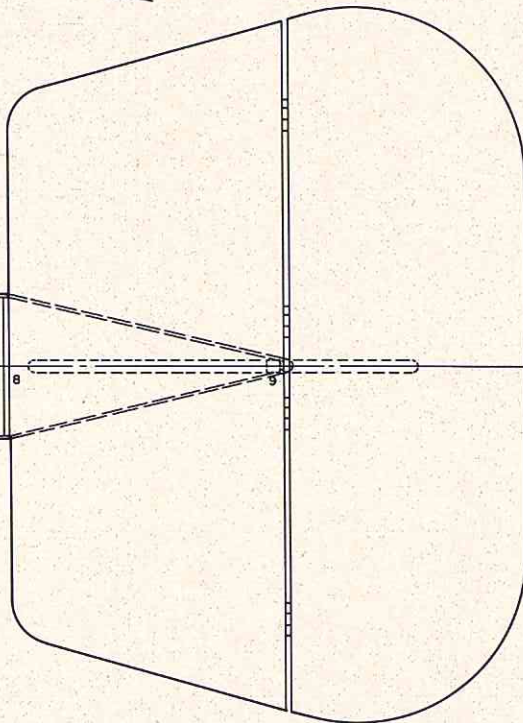
BROWNIE







SP-2 1/4" X 1/2" SPRUCE 2 REQ'D



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PLATE 1 OF 2



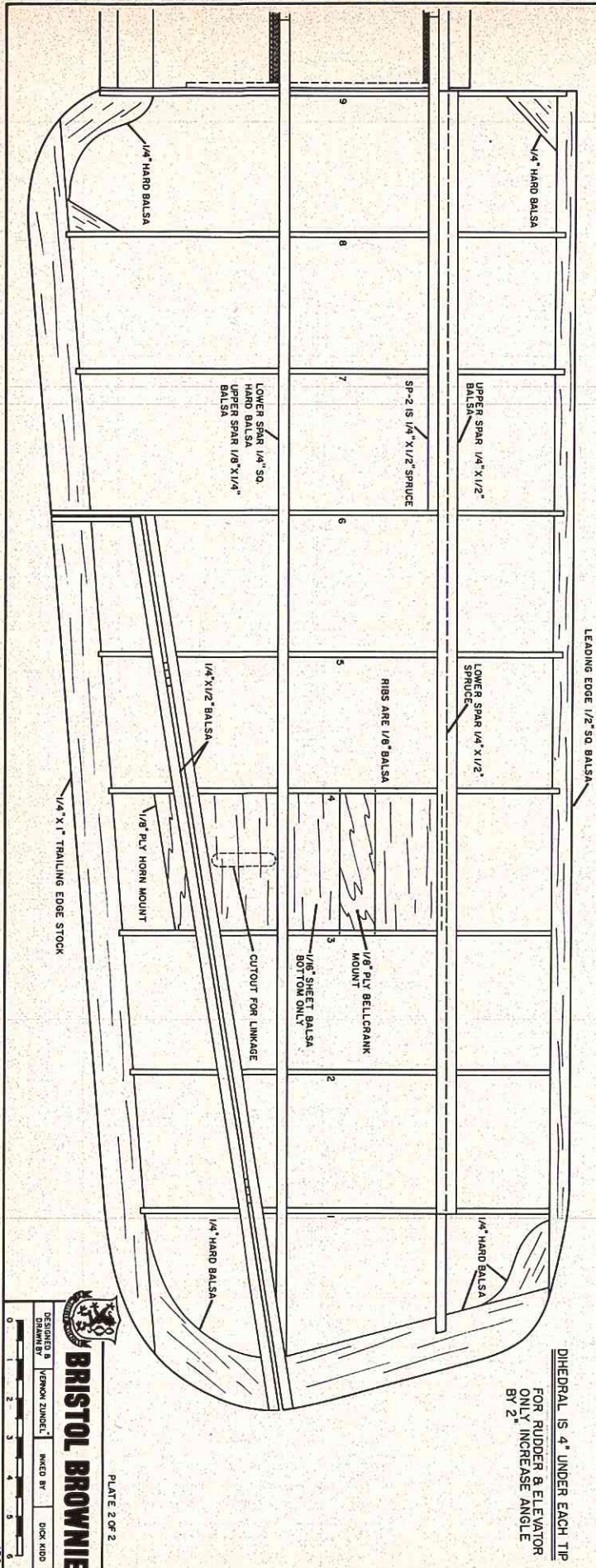
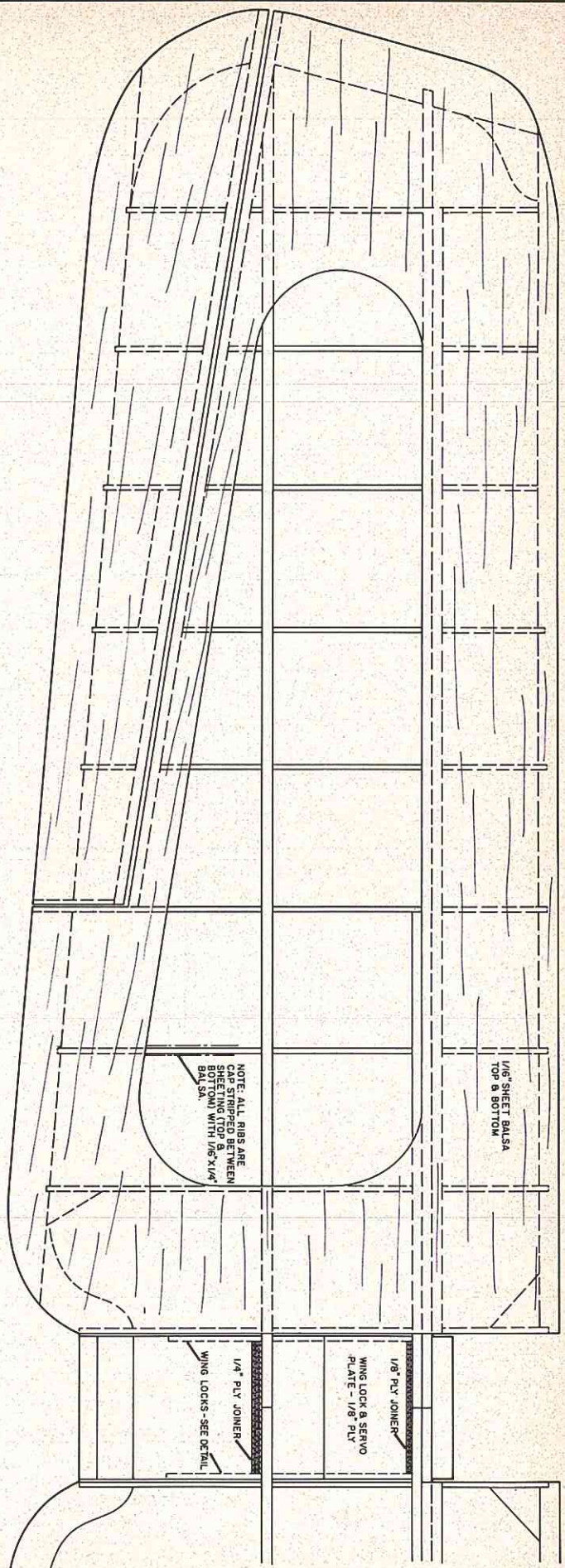
BRISTOL BROWNIE

DESIGNED & DRAWN BY VERNON ZUNDEL INKED BY DICK KIDD



430

FULL SIZE PLANS AVAILABLE - SEE PAGE 71



FULL SIZE PLANS AVAILABLE – SEE PAGE 71

The Bristol 'Brownie' is an excellent "First Scale" subject. It is easy to build and even more docile to fly with its light wing loading.



am, and the perpendicular landings I make, I decided on providing the model with certain provisions for "turf plowing". Now this may seem to be the wrong approach to some, but it proved to be most advantageous later on in our test flights, as you will see. I built up the nose of the plane with the idea of competing with, would you believe, the Wabash Cannon Ball? Prior to our sixth flight I had been cleaning around the engine compartment and had changed the needle valve setting slightly. Soon after take off the engine died on a crosswind leg. About this time Al Signorino (our test pilot), knowing he could not make a full pattern into the field, decided to try for the edge of our field. Giving a fair warning to all, he made his attempt; "up came the gale" and into a half roll, vertical half gainer, and vertical landing approach (I could do that good)(Is that hard to learn, Al?). Well anyway, it hit like the proverbial brick! I think six or seven times to be exact! Would you believe that it didn't even scratch the MonoKote? As a matter of fact, we were airborne as soon as we could start the engine and reset the needle valve.

As you will notice we tried to save the builder (and myself) the awesome work in building spoked wheels. The landing gear is composed entirely of 1/8" or 5/32" piano wire and Williams Bros. wheels. The method of attachment may be undesirable to some, but we found it to be most adequate, and easy to build. Instead of the usual rub-

(Continued on page 55)

needed to beef up the entire structure for R/C type flying. This aircraft, using an almost full symmetrical wing, could be further strengthened for contest type flying. Take note at this point that ailerons should be used. Just a straight wing would mean that a considerable amount more dihedral would have to be used, as we found out in our first test flight without ailerons. In comparing our finished drawings to the original sketch we had outlined, the only goof we hadn't made, was which end to put the engine on! The engine was a .19 on all our test flights, and we installed Al Signorino's Controilaire, thinking we would not have enough space for any other type. But at the time of instal-

lation we found we had enough room to install twice as many S4A servos as needed, giving the indication of being a versatile machine. We haven't found any reason to date why we should go to a larger engine unless the builder wishes to stunt this plane. But doing this would take away from its original scale type flying. It's my belief that this model could make a very good low wing multi-trainer. It's slow, and turns and banks are flat with no serious wing dipping. Without ailerons it was slow in coming around into the wind. To those modelers who wish to build this model I would like to recommend building it with ailerons.

Being the type of throttle bender I



SCOTCH LASS

**AN EASY-TO-BUILD, RUN-OF-THE-MILL
SHOULDER WING—UNTIL YOU GO TO
FLY IT! THREE VERTICAL SNAP ROLLS
FROM LEVEL FLIGHT WITH A .15 . . .**

In the April issue of RCM, I mentioned in my regular column that I would be presenting a small aircraft in this issue called "The Brat." When the El Cid of the modeling world, and editor of this publication, was proofing my column and read that remark, he yelled so loud we could hear it all the way down in Texas! It seems that Uncle Don and Dick Kidd, his Technical Art Editor, don't take too kindly to having an aircraft design suddenly thrust upon them for immediate publication when they have their designs scheduled three months in advance! When our Fearless Leader momentarily stopped screaming, I told him I'd send him a set of plans and all he'd have to do is build it, photograph it, and write the construction article prior to the next issue. What ensued, following that simple request, could not be printed in this, or any other publication! I really don't understand the problem, since he had almost two weeks in order to complete this project before the next deadline. As it ended up, he agreed, although somewhat incoherently, with certain specific conditions. It seems our editor feels that every aircraft has to have a reason for its existence, and assigned me the task of writing the so called "design philosophy" behind this model. The second condition was that the name be changed from "The Brat" to something with a little more class. The latter part was easy, since I vividly recalled what he had told me, earlier, to do with my latest design. Condensing it down, the name was changed from "The Brat" to the "Scotch Lass".

With regard to the "design philosophy", the basic reasoning behind this little shoulder wing model was three-fold: First, it was to be a model that could be flown in closely confined areas such as school grounds, parking lots, etc. Second, it had to be easy to fly so that it could be used to introduce my young son to RC (and in so doing, to prove out the worth of the EK "Buddy Box" system). Third, it had to be economical, easy, and fast to build.

If you go to an aircraft too small in size it becomes difficult to mount the standard miniaturized equipment in its interior. Additionally, if you get it too small the weight-to-power-to-wing-area factor goes way up, making for a hard-to-fly aircraft. The Scotch Lass is a compromise on these points. It is small enough to fly nicely with an OS Max .10 yet will take an EK Log III radio mounted on its standard servo/receiver board with room to spare. A Max .15 will yank this little bird about with lots of zip if



The 'Scotch Lass' with O.S. Max .15, E.K. Logictrol radio, and Super MonoKote covering. Wipe MonoKote with acetone before applying Finishing Touch decals.

you just simply have to have lots of power. The shoulder wing set-up was chosen because it allows for a more forgiving aircraft, and is also less prone to get torn up on a hard landing. With this little ship you can buzz around your school ground, get in and out of tight corners, and generally live it up close to home. Please, don't do this if you are a beginning pilot! Get out in the country, or at your club field, where you can have lots of room to allow for your natural mistakes without endangering others.

Country flying was another reason for selecting the shoulder wing configuration for the Scotch Lass. With a shoulder wing, you can hand launch your aircraft from any type of field. There is no need for a paved runway, or even a smooth grass runway. Of course, your landings might become a bit hairy if the grass is over your head, but it sure saves on props!

If you are a beginning pilot, or you are using the Scotch Lass to teach someone else to fly, shim the leading edge of the wing for one degree positive incidence and set the control movements on all surfaces to about 1/8" full-up and

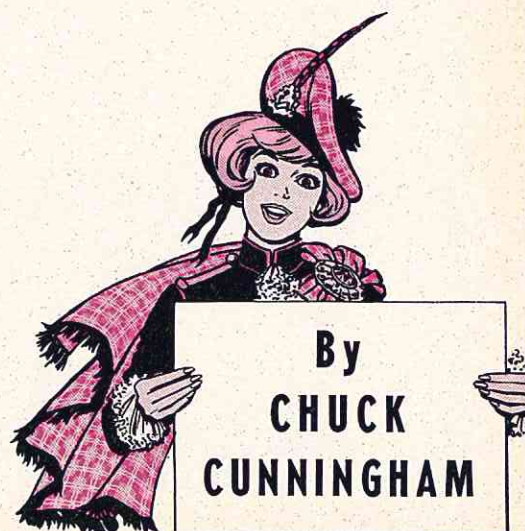
down elevator; 3/16" up and down on ailerons; and 1/2" to 3/4" right and left on rudder. This way you can gently fly about the sky without over-controlling. Be sure to use the smaller size engine. If you choose to eliminate the ailerons and fly with rudder, then the amount of movement given will be enough for this mode of flying.

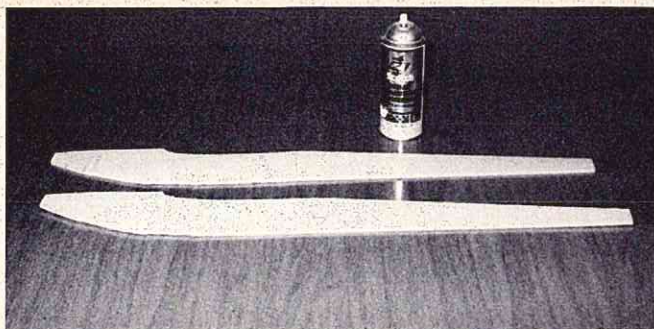
If you can't build the Scotch Lass in just a couple of evenings for a total outlay of less than \$10.00, cash-type money, then perhaps you'd better take up tiddley winks because you're in the wrong field! The fuselage goes together in nothing flat, and you can build the wing almost as fast. If you favor foam wings, as I do, then you can chop out a wing, skin it with dime store cardboard, glue together with Devcon 5-Minute Epoxy, and be ready to paint in just a couple of hours. The Scotch Lass should really live up to her name — Scotch to build, yet a fine young lady to own and to fly.

From this point I'll turn it over to our Editor for his building notes and flight reports.

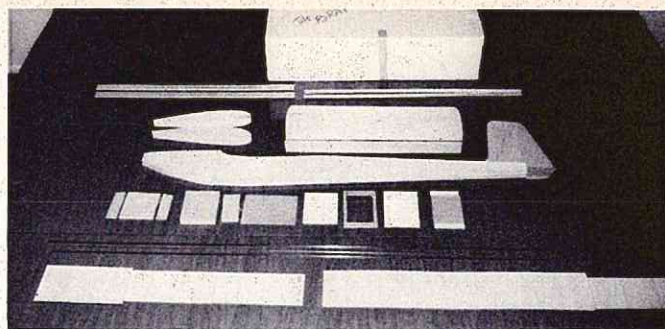
DON DEWEY: Before we begin the

actual construction of the Scotch Lass, I'd like to pass on a few general notes about the aircraft, itself. To begin with, our amiable, anplitudinous, Texan threw us a curve by mentioning in his last column that he would present a new design in this issue. He compounded the felony by sending us a set of plans with a cursory note to the effect that I'd better build the airplane in a hurry since it was raining throughout Texas! The





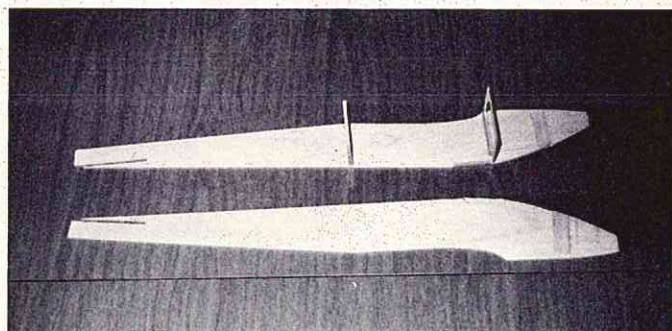
For accurate cutting, cement plans to wood.



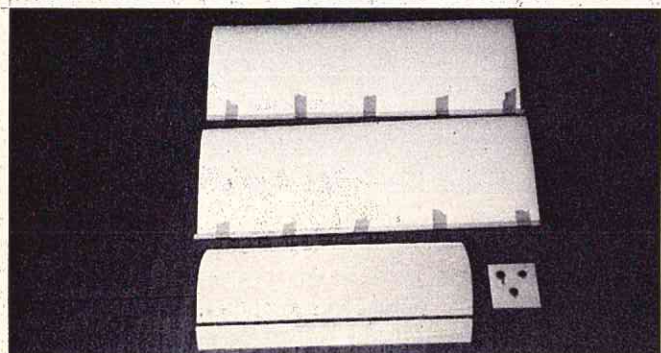
All parts cut out, ready for assembly.



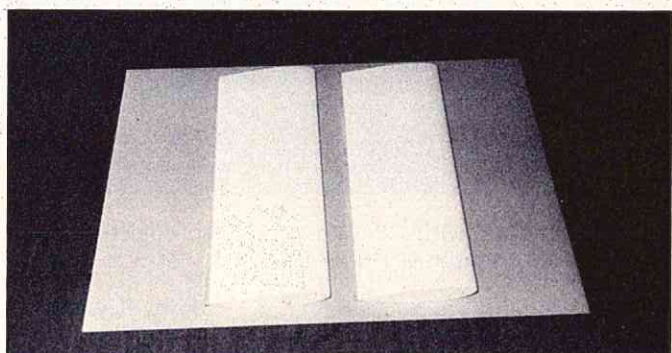
Join top & bottom cross-grain planking.



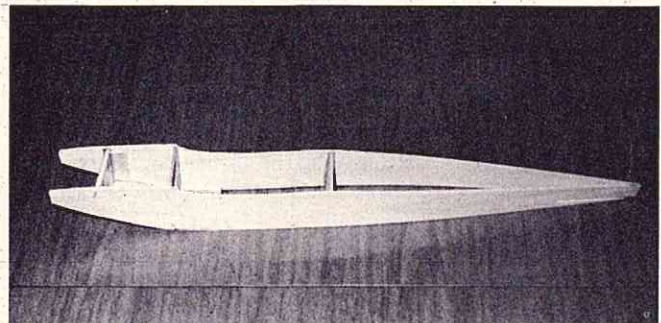
Glue main bulkheads in place with epoxy.



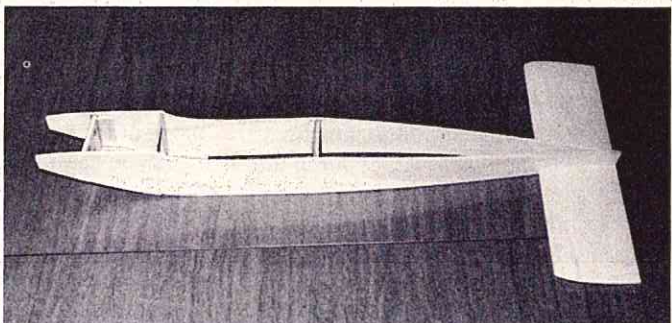
T.E. glued on wing cores; stab assembly.



Sanded from wing cores and cardboard for skins.



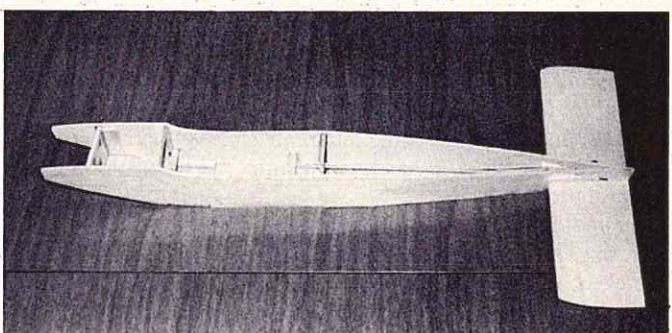
Fuselage basic assembly.



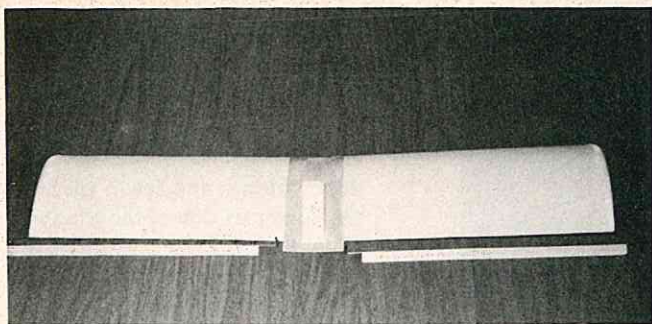
Stabilizer added to basic fuselage.



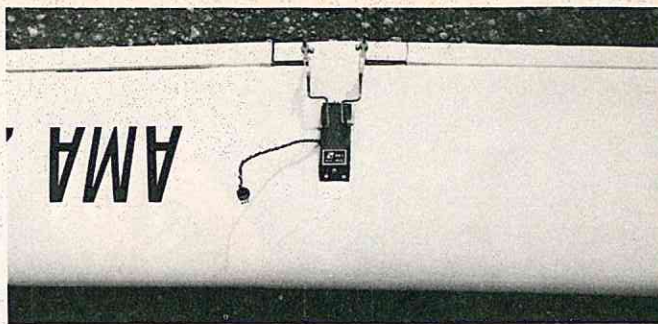
Bottom sheeting glued in place.



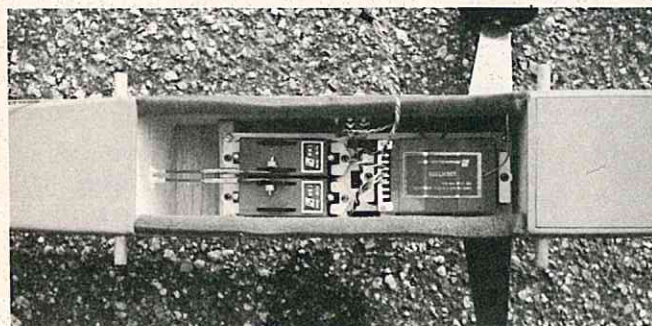
NyRods installed before top planking.



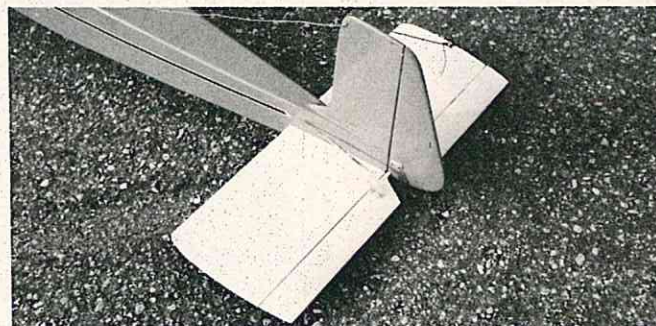
Assembled foam wing with Celastic reinforcing.



Finished wing with E.K. servo in place.



E.K. installation. Throttle servo under receiver.



Close-up of empennage linkages.

total building time for the Scotch Lass, including taking the step-by-step photographs on my dining room table, and dictating the construction notes as I went along, took a total of 11 hours. The finish is Super MonoKote and required an additional three hours. I used a foam wing with cardboard covering from the local Sears stationery department. Construction began on Saturday morning and the aircraft was ready to fly by Sunday evening. I would like to set the record straight as to the type of flying of which this little aircraft is capable. Its appearance is quite deceiving, since it looks like a small Digester, or a "trainer-type" shoulder wing design. The model shown in the photographs, set up with the zero-zero incidence, and with the OS Max .15 engine in the nose, is one hot little number! It retains its initial deception through its slow and easy lift off and gradual climb out. But here the deception ends! From this point on it gains speed rapidly and has a rolling rate that has to be seen to be believed! As a matter of fact, this plane will do three consecutive vertical snap-rolls from straight and level flight almost before you can blink your eyes. Its roll rate is almost too fast to count, and this is with the ailerons set $\frac{1}{4}$ " from the bottom of the standard DuBro Strip Aileron Linkage. The outside maneuvers, with the elevator set in the second hole from the outside of a long Carl Goldberg horn, are approximately 20 feet in

diameter. Our first attempt to do an outside loop was so tight, and resulted in such a high G-loading on the aircraft, that the hatch was thrown clear of the airplane and fell to the ground. It performs virtually all maneuvers with complete ease, but again, its landing speed is not the slowest in the world, even though the Scotch Lass only weighs two pounds 14 oz. ready-to-fly.

As we mentioned, this airplane is quite deceptive in its appearance. For the more experienced sport flyer, it is a lot of fun to fly, and one that could be flown economically and in small, confined areas. I would recommend this as an advanced transitional trainer, although it would definitely not be satisfactory for the beginning sport flyer as set-up on the plans. Adding a $\frac{1}{16}$ " balsa shim under the leading edge to effect positive incidence in the wing, and dropping the engine size to a Max .10 would definitely tame the model down and it then could be used as a trainer and easy-to-fly sport ship for the less experienced flyer.

The prototype shown in the photos used a single stick EK Log 5 radio system, mounted on the EK servo tray that mounts the receiver with rudder and elevator servos behind it, and the throttle servo underneath the receiver. The aileron servo was mounted in a cut-out in the foam wing and the protruding base of the servo covered by the hollow head rest.

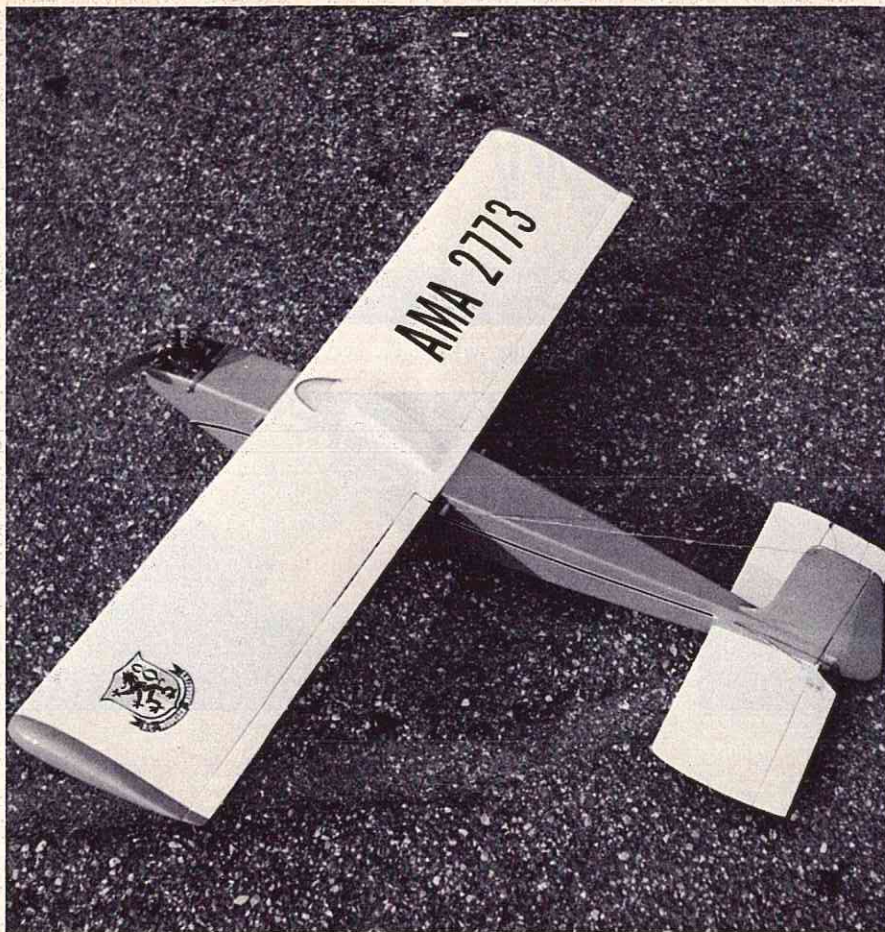
All parts were cut out prior to

assembly, forming a "kit". Devcon 5-Minute Epoxy was used throughout the construction in order to keep the building time to an absolute minimum. As previously mentioned, Super MonoKote was used for the finish. Other specific items used included Carl Goldberg Long Control Horns; Top Flite 8-4 Power Prop; MK small dural landing gear; DuBro 2" Low-Bounce wheels; foam wing core from International Models; thin sheet of cardboard (available from any stationery store (or Sears for less than 50 cents); 3M77 Contact Cement (for the foam wing skins); Goldenrod cable type pushrods; DuBro Strip Aileron Linkages; a 4" wide band of Sig thin Celastic for the center section of the cardboard covered foam wings; a Sullivan 3 ounce tank; and a Tatone short .15 mount.

CONSTRUCTION

The construction of the Scotch Lass is extremely simple, and is presented here in step-by-step format:

- 1) Cut out all parts as shown on the plans including cross grained top and bottom sheet planking.
- 2) Glue the top and bottom planking sections together using Scotch tape and Devcon 5-Minute Epoxy.
- 3) Lay out bulkhead marks on fuselage sides using a draftsman's triangle and ball point pen.
- 4) Set the Tatone mount slightly off center on the firewall. Drill for,



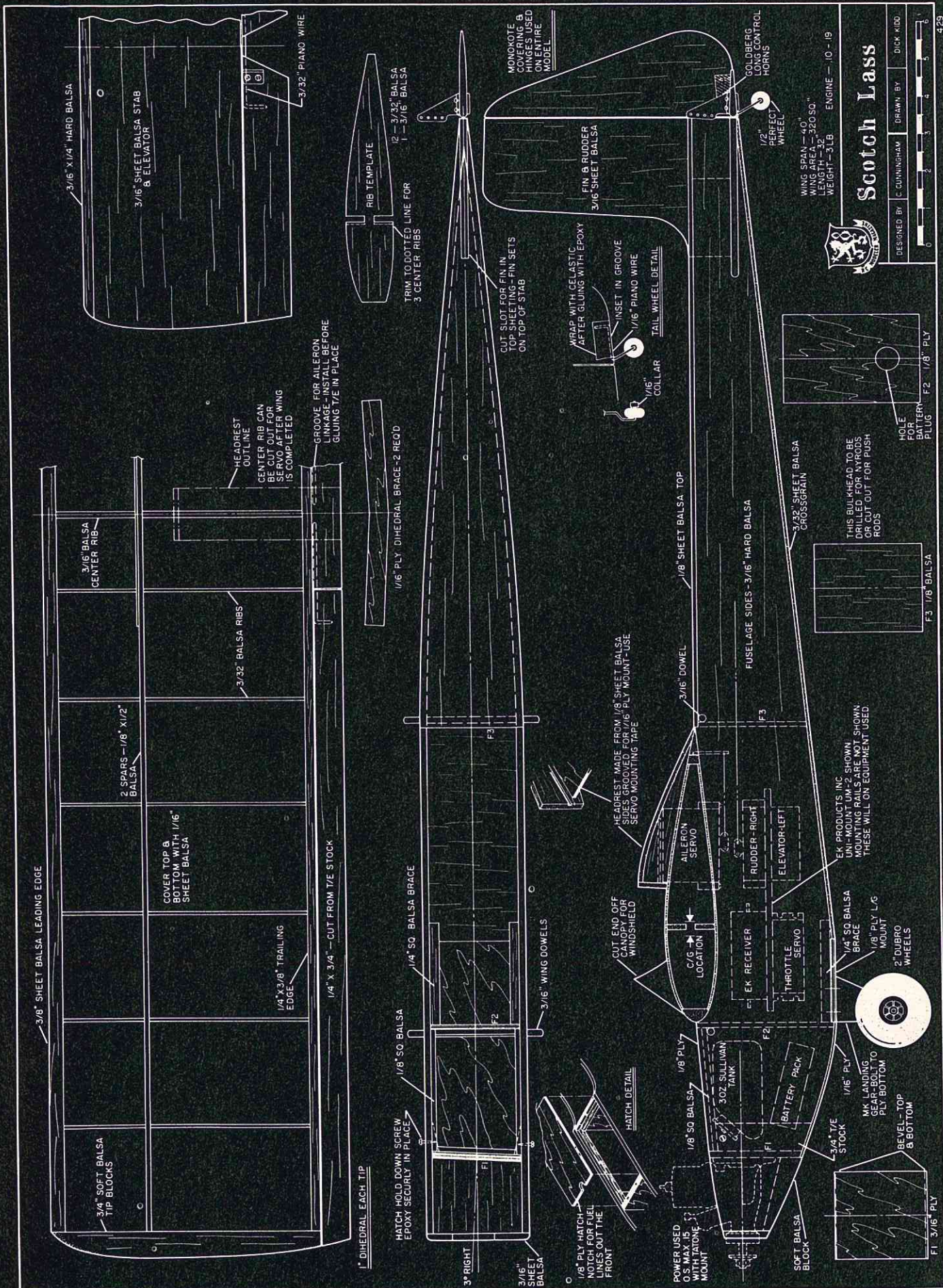
- and install, DuBro or Perfect 4-40 blind mounting nuts in firewall.
- 5) Glue the stabilizer and elevator parts together.
- 6) Glue balsa trailing edge strips in place on the foam wing cores.
- 7) Cut stabilizer slot in fuselage sides, making sure the slot is identical on both sides and set up parallel to the center line of the fuselage.
- 8) Glue the landing gear braces and firewall braces in place on both fuselage sides. When dry, glue bulkheads No. 2 and No. 3 to both fuselage sides making sure that they are properly aligned and at right angles to the fuselage sides.
- 9) Glue the firewall and plywood landing gear mount in place.
- 10) Glue the 1/16" plywood nose sheeting in place from the firewall to bulkhead No. 2.
- 11) Bevel the sides of the tail with your sanding block and glue the tail together, making sure that you have proper alignment and that there is no twist or warp in the fuselage. Check against top view on plans.
- 12) While the fuselage assembly is drying, sand the stabilizer, then

- glue in place in the fuselage with epoxy making sure that it is properly aligned.
- 13) Rough trim the bottom fuselage planking and glue in place.
- 14) Lightly sand the foam wing cores while the fuselage is drying using No. 360 wet-or-dry paper, using dry of course. Vacuum the foam wing cores thoroughly.
- 15) Lightly sand one side of the cardboard covering and vacuum it thoroughly.
- 16) Cover the foam cores with your cardboard wing skins and 3M77 Contact Cement.
- 17) Trim the excess cardboard from the wings and install the balsa tips.
- 18) When the fuselage is dry, temporarily install your radio equipment. At the same time install the pushrods you intend to use.
- 19) Remove the radio and install the top sheeting.
- 20) Install the vertical fin.
- 21) Prop your wing panels up and sand the proper dihedral in the root end of each wing panel.
- 22) Glue the wing panels together.
- 23) Cut holes in your firewall for passage of your fuel lines (use Veco black fuel line).

- 24) Glue the nose block in place.
- 25) Install the hatch bearers and the hatch.
- 26) Add the center trailing edge section of your wing.
- 27) Dip a 4" wide strip of Celastic in dope thinner and set in place in the center section of the wing and allow to dry.
- 28) Sand the tips, being careful not to sand into the cardboard.
- 29) Build your ailerons and install the DuBro Strip Aileron Linkages.
- 30) Cut a hole in the center of your wing, completely through the foam cores and cardboard skins, and temporarily install your aileron servo.
- 31) Build up a 1/8" sheet turtleback to cover the protruding base section of your aileron servo.
- 32) Sand the entire aircraft.
- 33) Add the tail wheel to the rudder using epoxy and a small strip of Celastic to secure in place.
- 34) Finish sanding the entire aircraft.
- 35) Using your choice of colors, completely MonoKote the entire model.
- 36) Add the dural landing gear and wheels.
- 37) Install the engine of your choice on the Tatone mount and connect the throttle linkage.
- 38) Install the Sullivan 3 ounce tank and connect the fuel lines.
- 39) Cut away a small piece of the Super MonoKote in the area where your windshield is to be installed, then install the windshield using a Wen Hot Glue gun.
- 40) Install all control surfaces using Super MonoKote hinges. Coat the edges of all hinges with a thin coat of epoxy resin, epoxy glue, or clear polyurethane.
- 41) Make sure your model balances on the CG exactly as shown, and that all control surfaces are in neutral.

Before flying your Scotch Lass, make sure your engine is thoroughly broken in, then make a few taxi tests to determine the ground handling characteristics of your particular model. Don't let anyone tell you that conventional geared airplanes are difficult to handle on the ground — as a matter of fact, if the landing gear is properly placed, they are far easier to handle on the ground than a trike-gear aircraft.

Good luck with your Scotch Lass — you will have a lot of fun with her!



FULL SIZE PLANS AVAILABLE – SEE PAGE 71



Airman Willie L. Hill, Jr. poses with his Super Sonic Soarer. Ektachrome transparency by A1C Charles A. Chisley.

SUPER SONIC SOARER

A LARGE, LIGHTWEIGHT THERMAL-SNIFFING GLIDER
FOR SINGLE OR MULTI-CHANNEL.

By WILLIE L. HILL

The Super Sonic Soarer has been designed to satisfy the need of the newcomer to radio control glider flying who wishes to start with a large enough model to handle the present day radio gear and launching methods. This ship will accept engines in the smaller power size for docile power launches or a slightly larger motor to really put it up where the eagles dare to fly. It is docile at almost any height. The original Super Sonic Soarer was flown single channel only, however, other versions of the model have been flown with rudder and elevator controls. Needless to say, it retains much of its same flying characteristics with either type control. Although designed specifically for teaching the beginner the finer points of glider flying, this model is no pushover and could stand up equally well against the latest thermal glider design. The particular model presented in this article is a result of several years of experimentation and modification.

CONSTRUCTION:

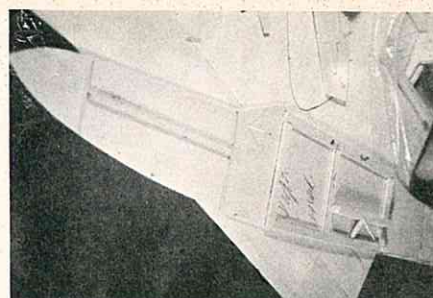
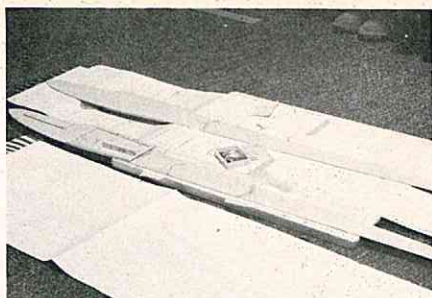
Holding true to its purpose, all construction is down to a minimum of difficulty and could be handled by the rawest of beginners. First of all, I will have to say that handpicking the wood is essential in constructing your model. If you have not done this before it is quite an experience and could determine the final results of a strong and rugged aircraft that will be around for more and more of your accidental crashes. Start constructing the fuselage by splicing two 3/32" sheets together to cover the entire length of the fuselage side. Follow the same procedure for the other side, then cut out identical forms. At this time, the reinforcing braces R1 through R5 can be glued to the sides of the fuselage. Simply take a strip of 1/8" x 3/8" balsa and cut the required lengths of strip. Before applying the rails for the servo, take the servo and place it in position on the plans to see exactly where the rails for your particular unit will be positioned, then glue them into place.

Next, cut out each former to the outline on the plans. If you desire to beef up the fuselage construction, then substitute 1/8" sheeting formers for 1/16" sheeting, cut formers No. 1 and No. 3 from 3/32" plywood sheeting, and add a former down strip R2. Since F3 and F4 are of equal width, glue these two formers to one side of the fuselage sheeting and let dry. Once dried, join the fuselage sides by pinning the tail together, then glue the formers to the other side. Make sure that your fuselage

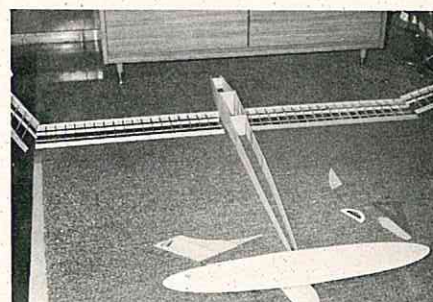
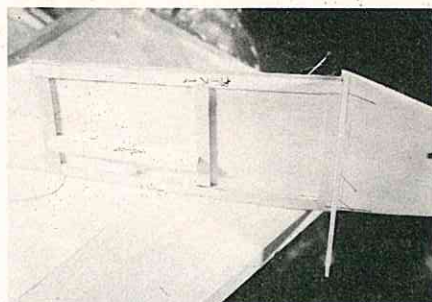
sides are carefully aligned. After this simple task, the remaining formers can be added. In the meantime, a pushrod for the control linkage can be made out of a $\frac{1}{4}$ " diameter dowel and $\frac{1}{16}$ " diameter wire. When you have the control rod shaped and you have estimated the position at which it will be aligned, start planking the bottom of the fuselage with $\frac{3}{32}$ " sheeting. Do this crosswise instead of lengthwise to assure a stronger body. Now, before planking the top of the fuselage, glue in position the $\frac{3}{16}$ " diameter dowels for the wing; the $\frac{1}{16}$ " diameter dowels for the stabilizer; and the plywood stab mounts. After this has been taken care of, start the planking of the top, omitting the section over the ballast area which can be done after balancing the plane to the correct center of gravity.

The wing is very easy to construct, and if you follow the directions closely you will have a very durable structure. With the one main panel given on the plans, you can build both a right and left panel. Now, I think the most tedious job of any model construction is cutting out the ribs for the wing. And, needless to say, I get my X-Acto knife, sandpaper, and Excedrin tablets together, oh, and don't forget the oil vassel, because it's gonna be a long, painful night! (Yes, I do hate to cut ribs!) Cut out all of the wing ribs from $\frac{1}{16}$ " sheeting after making a plywood template of the master rib shown on the plans. Trace this template's outline with a fine point ball point pen on the sheet of balsa, then cut these ribs out with your knife. After all of the standard size ribs are cut out, stack them together, block them up at their leading and trailing edges and pin all of the ribs into one bundle. Sand this bundle to the exact outline of the master rib with medium fine sandpaper. This will assure that all of the ribs are the correct airfoil shape and size. For the tapered tip panel of the wing, individual templates are not necessary unless you intend to build at least two of the models, therefore, draw the outline of the rib on the wood, cut out the rib, then retrace it on the wood again. Do this for all of the tapered ribs and you will spend less time on this section of the wing.

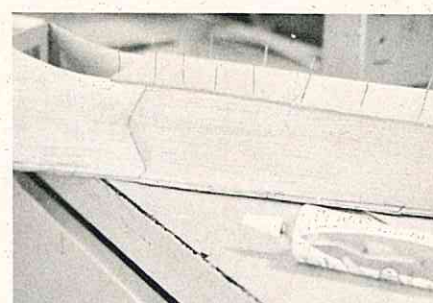
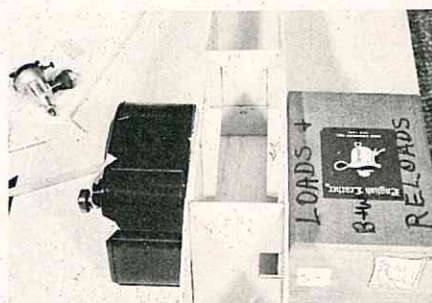
Next, pin down the tapered $\frac{1}{4}$ " x 1" trailing edge in place over the plans. Before placing the trailing edge down, slot the strip to accept the ribs. Cut a $1\frac{1}{2}$ " wide strip of planking from $\frac{1}{16}$ " sheeting for the leading edge. From a stock strip of $\frac{5}{16}$ " square balsa, cut it to the length of the leading edge. Glue



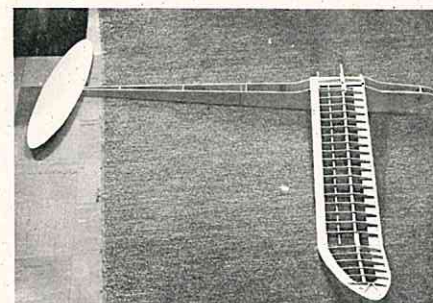
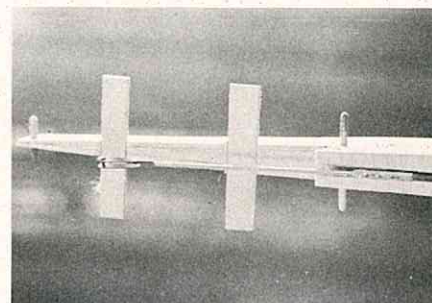
Left: The fuselage receiving its splicing cuts. Right: In the foreground is the R/C gear floor support rails and, in the background, the reinforcement frame with its built-in servo mount rail.



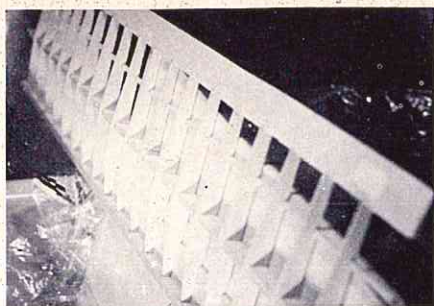
Left: This is a better view of the servo mount rail which will support the servo floor. Right: My roommate said, "Hill, there's only room for two of us. Either you or that thing has got to go." I wonder why he said that?



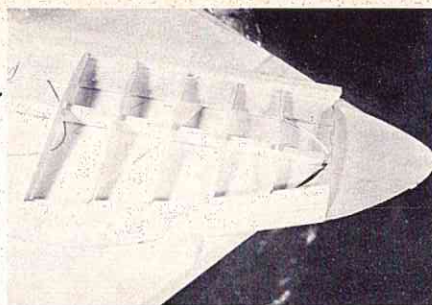
Left: The fuselage of the "Super Sonic Soarer" is getting the vise treatment as it is braced on both sides by a bulk film loader and a cologne box during drying. Right: Shown is top planking for fuselage.



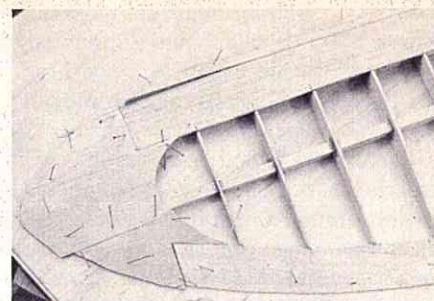
Left: Detail of stabilizer mounts. Right: If there is a biologist in the house, I guess you'd call this bisecting, um—m, Doc???



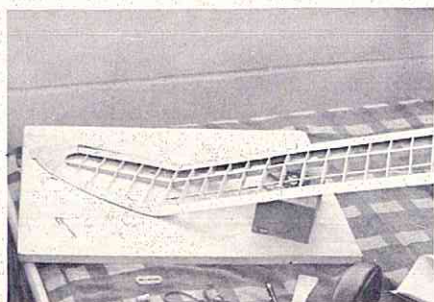
A perspective view of the wing's main panel.



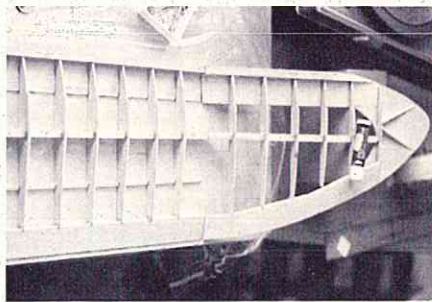
The right wing tip in its early construction stages. Notice the tapered spar.



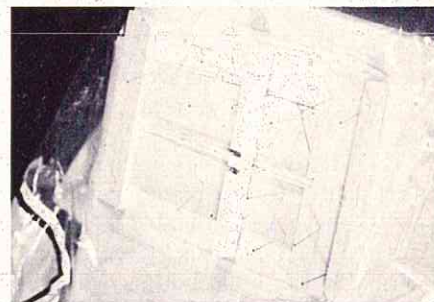
Sheet planking of tip is shown.



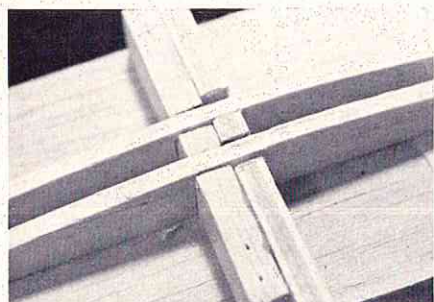
The tip panel dihedral is being applied.



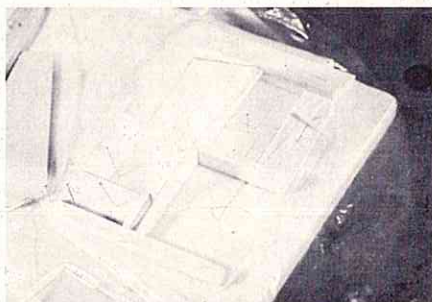
Braced up to its 4 1/2" polyhedral, the right tip panel is shown cemented to the wing's main panel.



The basic foundation of the center panel is shown being cemented down. The cuts to receive the ribs bracing the pylon can be seen.



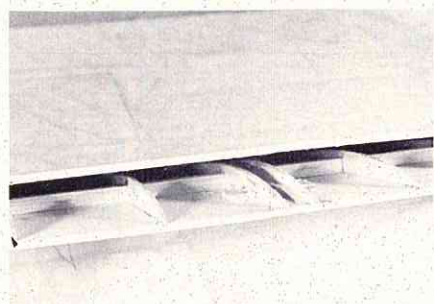
This extreme close-up of the center panel section reveals the complex specialties of the dihedral brace, power pod bracing ribs, and odd cuts in the plywood brace.



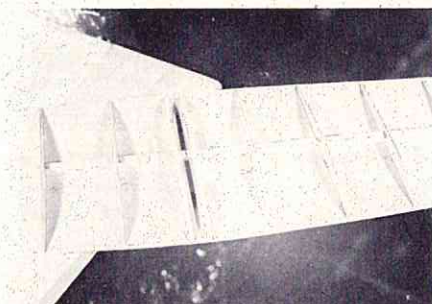
Position of the pylon mount in the center panel is featured in this shot.



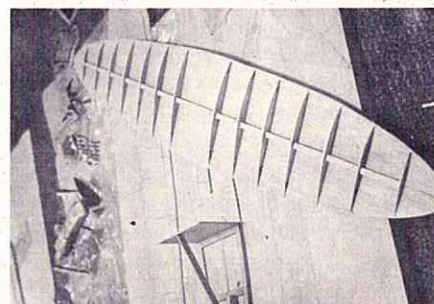
One type author fighting the balsa bugs. Compare the drawing board to the wing which overlaps even the desk.



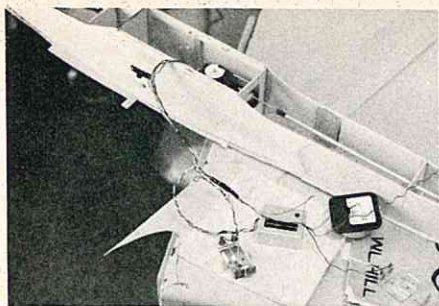
The stabilizer is truly sheet constructed as we see the top sheeting being glued down. However, at the moment it looks like a balsa clam!



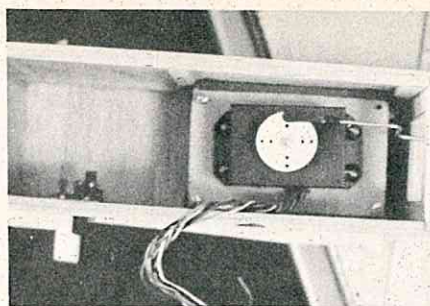
Before the top sheeting is applied this shot of the stabilizer is shown along with the plywood squares which will receive the stabilizer mounting screws.



As with the wings, a multiplicity of ribs is provided to assure a strong structure and anti-warp resistant panel.



The radio gear innards of the ship is seen before it is installed in proper compartments.



A Royal rudder servo is the mechanical device used in the ship.



Detail of the complete tail section.

the strip on top of the planking at the place shown on the plans. Pin the $\frac{1}{4}$ " x $\frac{1}{2}$ " and $\frac{1}{8}$ " square spars in place and fit the ribs into place, one by one, to see if they fit properly. For the tapered section of the wing, make the required taper in the main spar. The best glue to use in the construction of the wing is a good grade of white glue or Titebond glue. Now all of the ribs can be glued down, except the end ribs where braces and additional ribs will be added. When you build the main panels, let them dry for at least twenty-four hours before removing them from the pinned position. With the tip panels, each one will have to be built separately, first building the one shown on the plans, then turning the plans over to construct the opposite panel. Particular interest should be taken in the trailing edge of the tips since it is a built-up strip of balsa from the $\frac{1}{4}$ " x 1" tapered strip. As with the main spar, the trailing edge has to be tapered slightly more than normal to correspond with the smaller ribs at the tip. To do this, finish the entire panel, then sand off the excess wood, but for now let it remain so that the top planking of the panel can be accomplished. It should be noted that at the very tip of the panel the $\frac{1}{16}$ " sheeting is spliced together to cover the areas on the top and bottom.

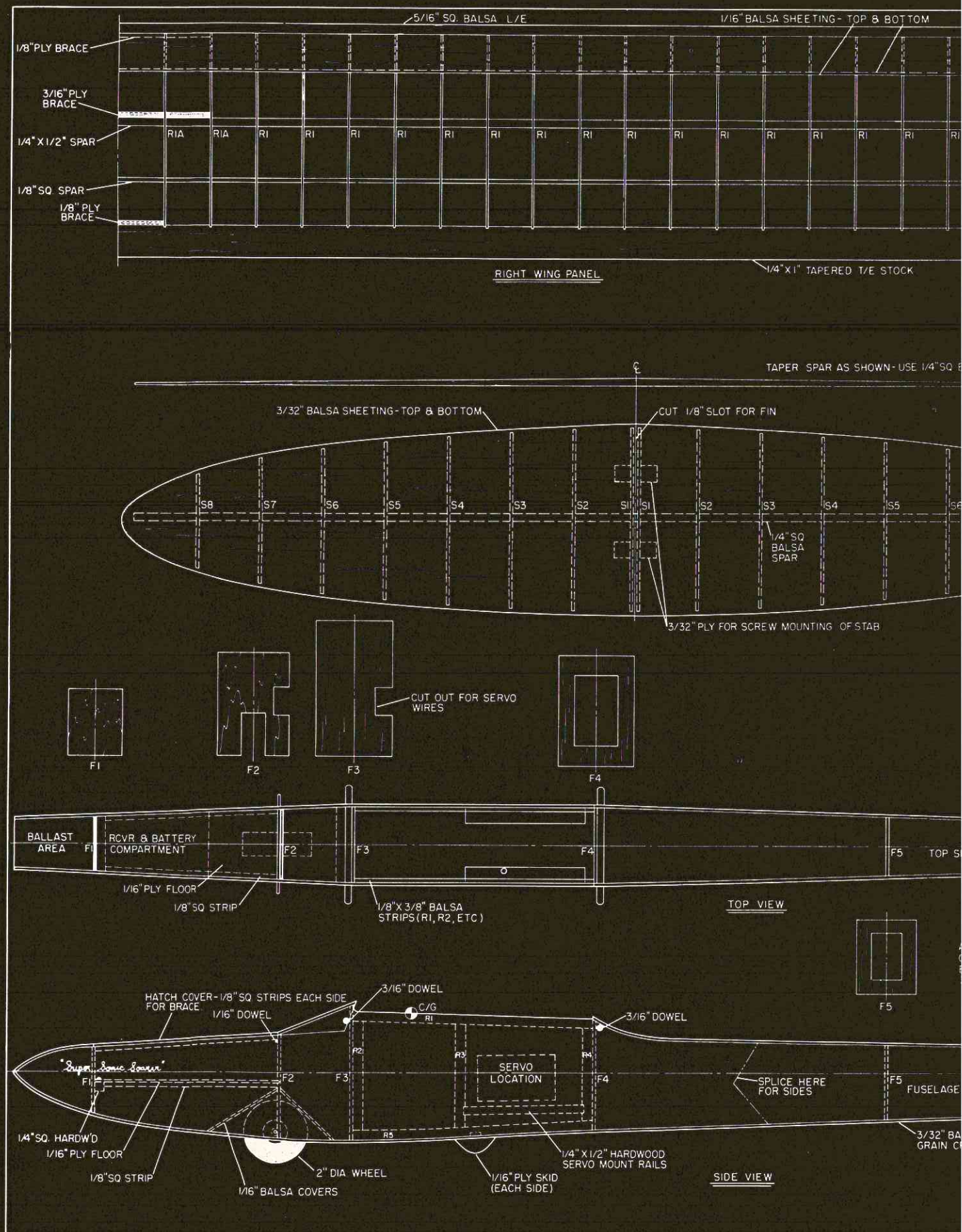
The center panel of the wing must be strong and rugged since it will receive the motor pod. As with the other sections of the wing, start construction by pinning down the $\frac{1}{4}$ " x 1" trailing edge. Next, lay down the $\frac{1}{16}$ " sheeting at the leading edge, then glue down the $\frac{5}{16}$ " square strip. While drying, take some $\frac{1}{16}$ " sheeting and cut it to fit the sheeting that are shown on both sides of the power pod slot. If cut correctly, the sheeting will leave a $\frac{3}{16}$ " wide slot for the plywood pod. At this time, you can glue down the main spar which is slotted with two grooves in order to receive the bracing ribs. Once pinned to the construction,

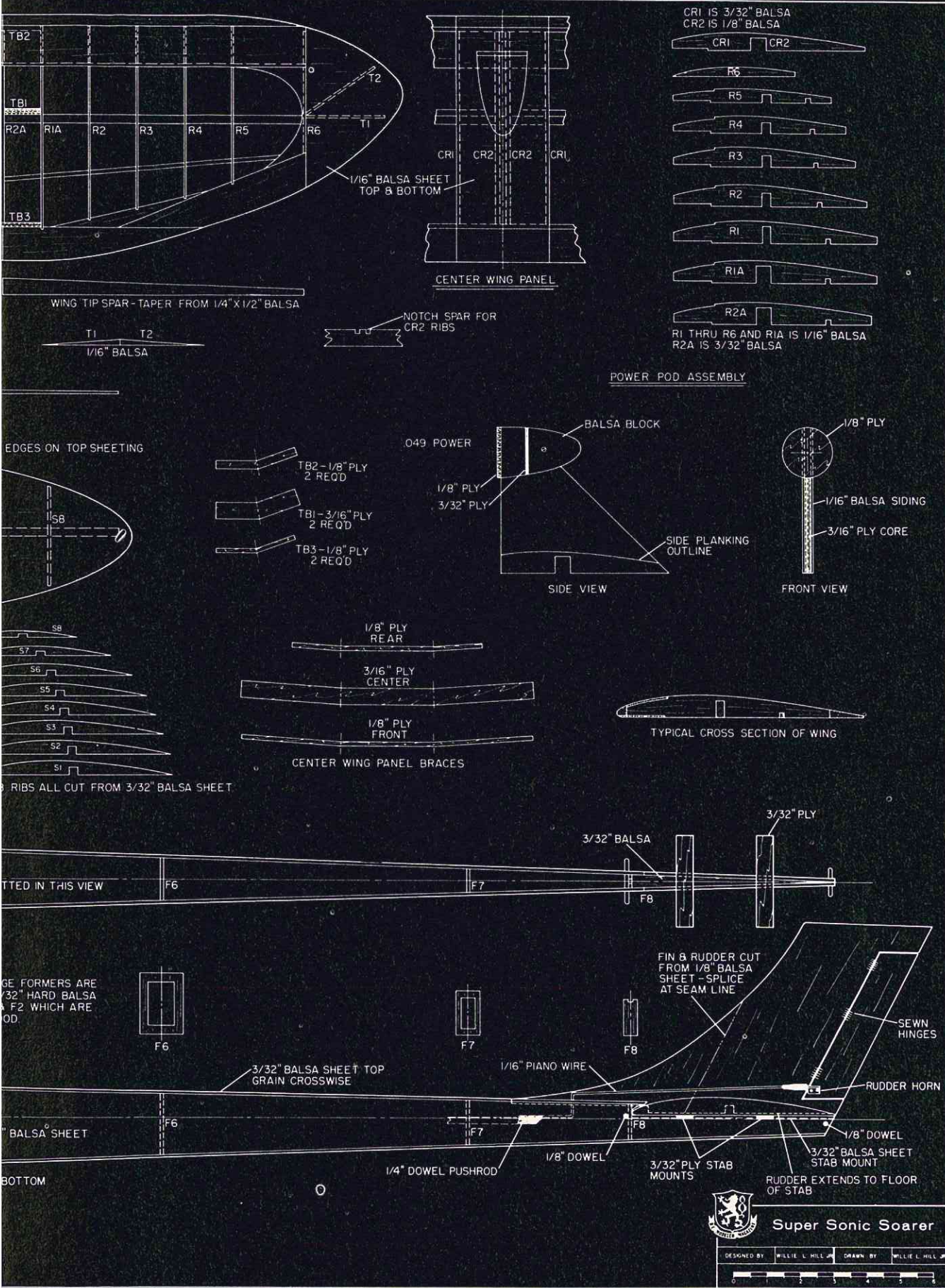
the $\frac{3}{16}$ " x $\frac{1}{2}$ " plywood brace should be glued to the front of the main spar, carefully aligning the grooves. Similarly, the $\frac{1}{8}$ " sheet plywood braces at the front of the trailing edge and back of the leading edge should be glued into place. For the joints in this section, do not be afraid to be a little liberal with the glue. After the braces have partially dried for several minutes, fit the $\frac{3}{32}$ " sheet brace ribs next to the pod and glue them down. Slip the plywood pod in its slot for proper alignment when you are gluing the ribs. The ribs at the end of the center panel will have to be added only after the wing sections are joined together. While the center panel is drying, you can join the left or right main panel to one side of the section. Begin by cutting the first two ribs in the main panel where they join the spar so that they can accept the $\frac{3}{16}$ " wide plywood dihedral brace. Put a liberal amount of glue on the braces and pin the wing half to the braces after blocking up the tip to the required dihedral as shown on the plans. The entire construction should be allowed to dry overnight. An overnight drying of all the panels is also recommended when joining them to the braces. The final task on the wing, after you have joined the panels, is to insert the plywood pod in its slot with a more-than-generous amount of glue and to add the top planking to the leading edge and tips.

Constructed of sheet, the stabilizer is quite an easy job to accomplish. Select two $\frac{3}{32}$ " x 6" sheets; one medium hard and the other one very soft. Take a straight edge and mark a long, straight line down the center of the sheeting, lengthwise and chord-wise. Using the outline on the plans, trace the form of the stab on the medium hard sheeting. Pin this bottom sheeting down to your building board, making sure that you understand in which direction is the front of the stab. Taper a $\frac{1}{4}$ " square strip to the outline of the stab spar shown on the plans. Apply some glue to

this spar and lay it directly on the line drawn on the wood. Now, trace all the outlines of the stab ribs on to a $\frac{3}{32}$ " balsa sheet and proceed to cut them out. You will have to sand the two identical ribs individually to assure that they are the same as the original. Glue down all of the ribs to the spar and make sure that they are properly aligned. In your spare time, take three sheets of $\frac{1}{8}$ " sheeting and glue them together to make a rough form of the rudder. Let both the stab and rudder dry overnight. Then trace the outline of the rudder on the sheeting and cut it out to shape. It will have to be sanded and covered with Japanese tissue before gluing it to the stab. Better still, if you can completely paint it, this will reduce the chance of warping when painted later on. In any case, install the rudder on the center line of the stabilizer and block it up with $\frac{1}{8}$ " square balsa strips to strengthen its drying position. Add the plywood squares to the position shown on the plans; they should be predrilled with a tiny hole. After several hours of drying, the entire stab can be planked on top. Do bevel the ends all around the sheeting to insure a perfect fit of the top and bottom planking. It is very important that the stab be thoroughly pinned down and allowed to dry overnight.

Covering and finishing is a personal taste, therefore, it's "your own thing". However, do strive for a lighter aft section because of the long tail moment. Install your favorite radio gear and make sure that your pushrod is not binding. Check the balance point of the model and see that it is the same as on the plans. When flying the Super Sonic Soarer, you will find that not too much rudder control is needed during the power portion of the flight, but will be necessary for the glide portion. If you have taken care in your construction, you will have a tremendous soaring glider that will teach you what glider flying is all about. ●





ADDING LIFE TO YOUR Almost-Ready-To-Fly-Aircraft

By FRANK MOROSKY

Although the most salient feature of the almost ready-to-fly (ARF) model is the reduced building time, the side benefit of quick repair also plays an important role in closing the sale. Damage to a balsa model that could take a week to repair can be remedied in one evening on an ARF. Where the ARF falls short in comparison to a balsa model is in its ability to withstand minor altercations over a period of time. This is not the fault of the ARF manufacturers but of the fliers. It is assumed that since the plane is made of plastic and is flexible, hot and hard landings, or dumping it into the tall grass after a bad approach, should not cause any damage. Right? Not now, but watch those fatigue cracks and loosened control surfaces begin to appear in a short while because of this type of flying.

It's been said that I build my planes to "survive a crash." True, my planes are less wrinkled than most after a run through the corn, but they are built to take a beginner's type of abuse and last. And, that's what this article is about.

Let's start up front. Some ARF's come without, or with only, a semi-firewall. Add one made of 1/8" or 3/16" plywood using epoxy cement. (See photo No. 1). The necessity for adding a firewall is fourfold: for additional strength above the thrust line; added support for the upper cowl or fuel hatch; to prevent exhaust goop from running into the battery and receiver compartments, and the fourth reason will be covered in the "repairs after a crash" section of the article.

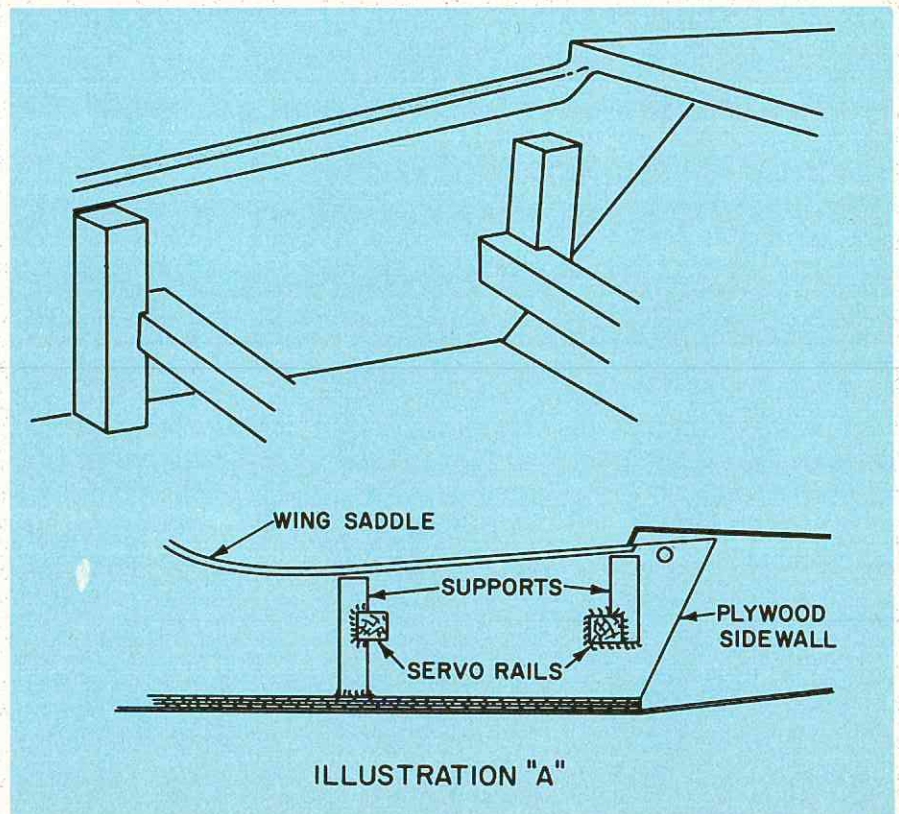
Stronger nose wheel mounting. This is specifically directed to beginners and novices. Several ARF models mount the nose gear directly through plywood blocks with the use of grommets. With this type of mounting, it takes only a half dozen or so hard landings to turn the nose wheel into a pendulum! Substitute a good firewall (Photo No. 11) or floor mount gear to help prevent this from happening. When using a floor mounted gear, reinforce the floor by

epoxing in an additional 1/8" plywood plate in the gear mounting area. (See photo No. 2). Also, mount the steering arm externally. Having to re-center an internally mounted steering arm at a flying field is near the top of the list of the "world's greatest frustrations".

Rupture proof tank installation. A number of models on the market have beveled rails that extend into the fuel tank compartment. It doesn't take more than 3 or 4 abrupt stops in tall grass or corn to rupture a tank against these rails. Take a saw and cut off these rail extensions aft of the nose wheel block. Epoxy a strip of fibreglass to each side wall where these rails were removed to add strength, then install a tank seat. (See photo No. 3). With this change, you can easily fit a 12 oz. square tank with room left over for foam rubber padding. (See photo No. 4).

Servo rails with fuselage support. One of the first places on the fuselage that begins to fail on a mistreated ARF is just aft of the servos or trailing edge of the wing. To provide internal support to the plywood sidewalls, add vertical 3/8" square hardwood supports as shown in illustration "A". The rear supports add strength to the trailing edge wing hold-down lugs and the forward supports make handy pushrod supports.

Tail cones. For those kits that come with formed stiffener rails, here's an easy way to provide additional support to the tail cone. Locate the aft end of the plywood sidewalls. On the outside of the fuselage, mark a spot on both sides 2 to 3 inches forward of this area. The marks should be placed where the top and bottom halves of the fuselage are joined. Clean the fuselage and stiffeners with alcohol and dry with a clean



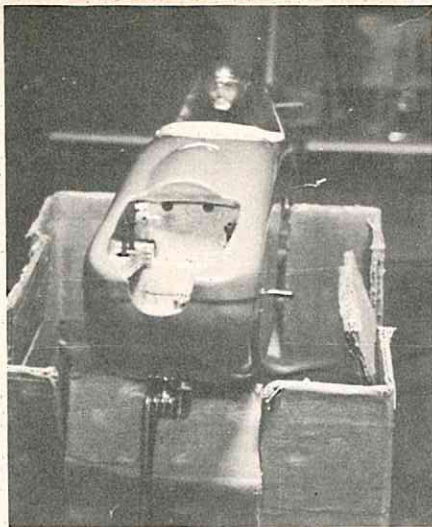


Photo 1: Coat face of firewall and seal all edges with epoxy.

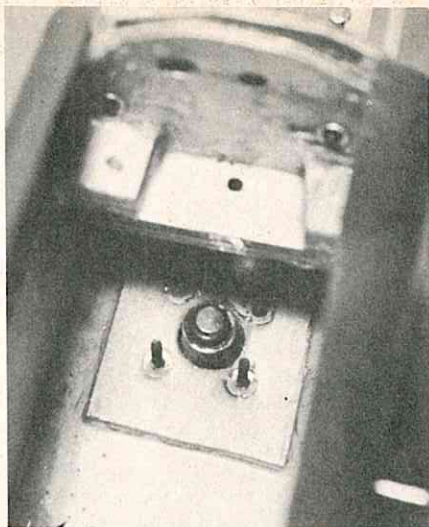


Photo 2: Floor mounted nose gear and 1/8" plywood reinforcing plate.

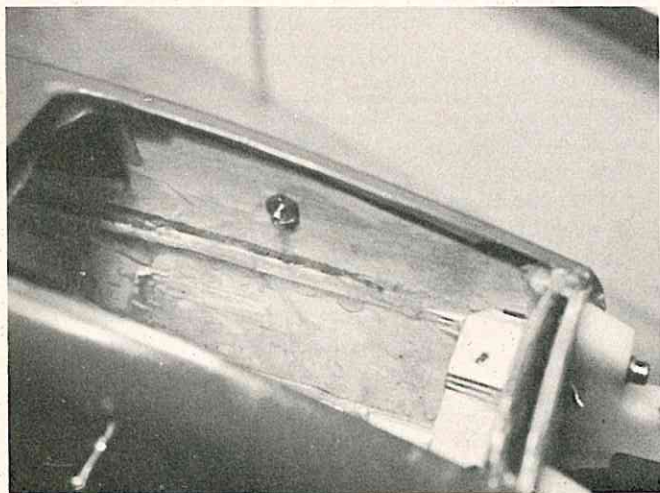


Photo 3: Engine rail extensions removed and area covered with fiberglass.



Photo 4: Enough room for 12 oz. RST Tank and foam padding.

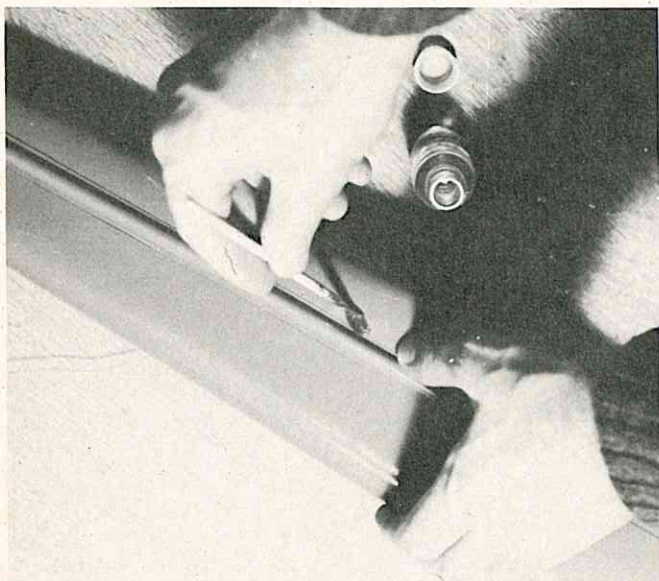


Photo 5: After top edge of stiffener rail has been bonded to the fuselage, apply solvent to lower edge by depressing fuselage skin.

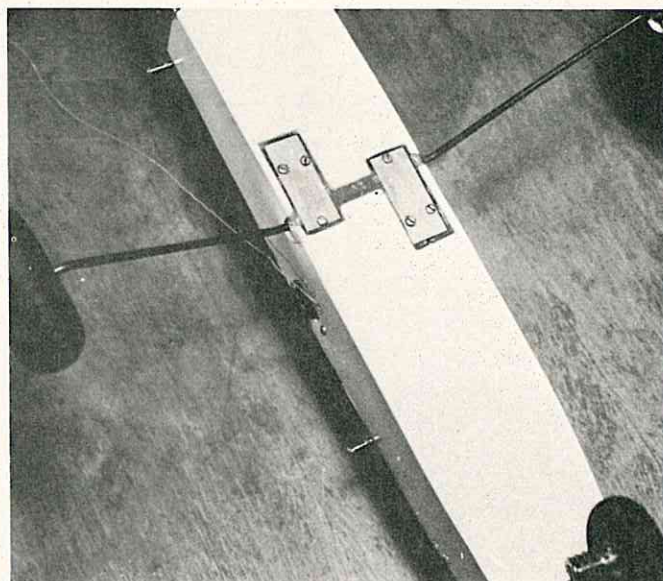


Photo 6: Gear cavity filled with "Twin Weld" forms a solid unit capable of withstanding many hard landings.

cloth. Take a stiffener, wet the inside front edge with the solvent provided in the kit, and quickly place it below the fuselage seam at the mark. Hold fast until the two pieces are joined. Now, starting on the top edge of the stiffener, apply solvent under the stiffener in 2 inch segments each time holding it fast to the fuselage until they are joined. Do not attempt to do both the top and bottom of the stiffener simultaneously. The result could be a poor bond. After completing the top edge of the stiffener, the bottom edge can easily be bonded by depressing the fuselage skin slightly, brushing on solvent and releasing the skin to make contact with the stiffener. (See photo No. 5). Now do the other side. For additional strength, add a stiffener to the bottom of the fuselage in the same method. I've applied these stiffeners with epoxy and with silicone adhesive both inside and outside the fuselage. None has provided as near as successful a bond or as much strength as the above method.

Extra rugged main landing gear. On shoulder and highwing models with externally mounted landing gear, try this — after the fitting and drilling of holes has been completed, and you're ready to mount the gear, partially fill the gear cavity with "Twin Weld", then press in the gear and cover with more "Twin Weld". Now, install the hold down plates, tighten the fasteners and

wipe off the excess "Twin Weld". By filling the cavity, a solid unit is formed preventing damage that can occur by the gear shifting on a hard landing. (See photo No. 6). For models that have internally mounted landing gear, there are two roads you can go. The first is securing the hold down blocks with 6 ounces of epoxy. If this doesn't appeal to you, try mounting the gear externally. Shown in photos 7 and 8 is an experimental method that has proven itself quite sturdy. So far, this gear has harvested 2 bushels of corn, six bushels of soya beans, and mowed half an acre of tall grass without any signs of fatigue! Besides strength, the external mounting of the gear allows the servos to be placed lower in the fuselage.

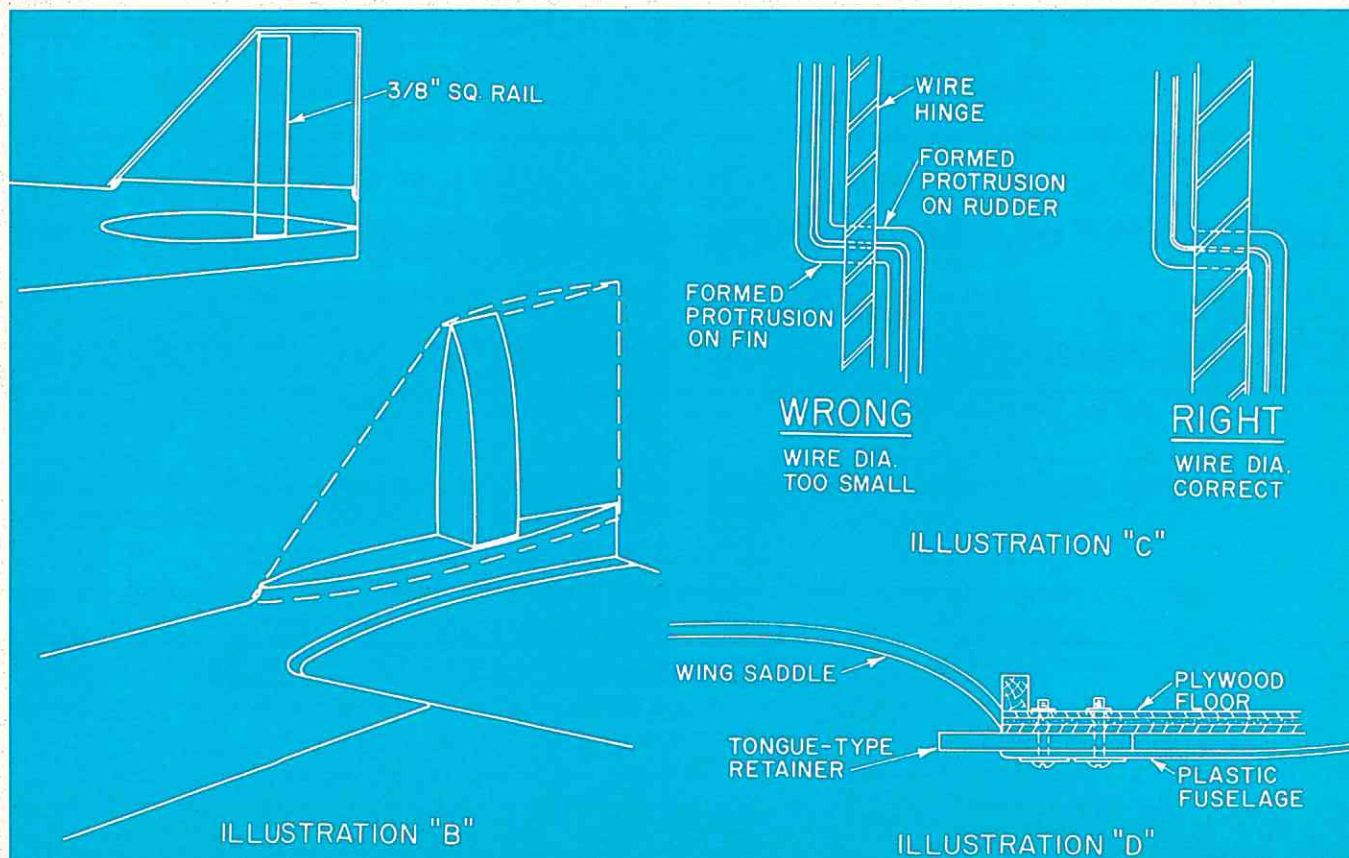
Vertical Fins. Some ARF'S have vertical fins which are merely two pieces of formed plastic without any fill material. This type of fin is generally attached to a preformed guide on the fuselage. It doesn't take too many tumbles in the grass to work the fin loose. This can be prevented in the building stage. Cut a piece of 3/8 inch square hardwood rail to fit from the bottom side of the horizontal stabilizer to the top of the fin. (See illustration "B") Shape the top half of the rail to conform to the shape of the fin. Next, locate the position of the rail in the fin and mark the preformed guide. Cut the hole in the guide for the rail, slip in the

horizontal stabilizer, insert the rail and mark the stab. Remove the stab and cut the square hole. Now apply epoxy to the sides of the hole in the stab and replace in the fuselage. Push the rail through the hole in the fuselage into the hole in the stab. Secure the rail at the fuselage guide with a bead of epoxy. After the epoxy has set, make a final check of the fit of the fin to the rail. Remove the fin and cover the sides of the rail with a coat of silicone adhesive and put on the fin. Do not seal the bottom edge of the fin to the guide until the silicone has dried.

Hinges. This type of fin usually has formed protrusions to act as guides for a wire hinge. If a thick enough wire isn't used, the rudder will become loose at the hinge points. Illustration "C" shows the right and wrong ways of making this hinge.

Wings. The plastic leading edge cap for the wing provided in many kits is seldom an exact fit. I've seen many attempts by other modelers to make it fit by brute force, but it never lasts. So, try this — on the portion that will be inside the fuselage, cut a slit from front to back in the dihedral groove. Glue the outside portion of the cap to the wing first and let it dry. Holding the split ends in place, mark the overlap, trim to butt fit and glue. Connect the split ends with a scrap piece of plastic as shown in

(continued on page 60)



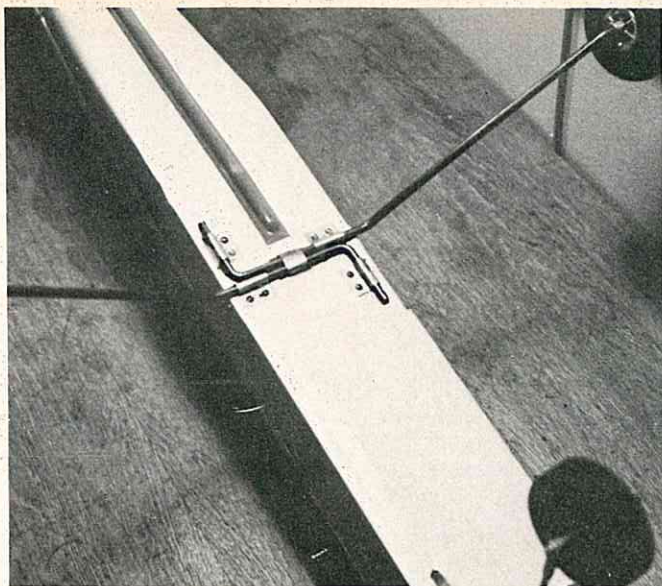


Photo 7: Experimental external mounting of main gear has proven itself sturdy.

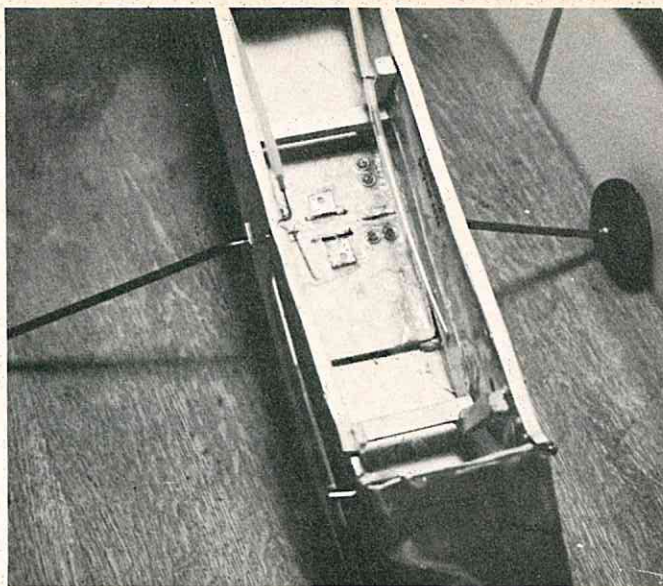


Photo 8: Elimination of gear blocks allows installing servos lower in fuselage and the use of a tray.

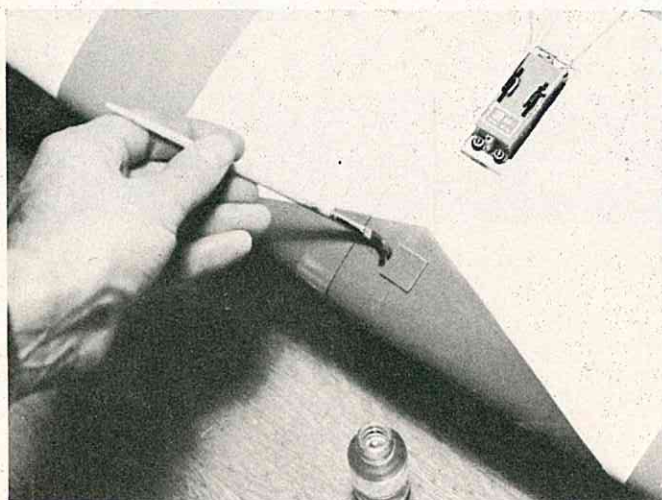


Photo 9: After sealing leading edge cap to fuselage, connect split ends with a small piece of plastic.

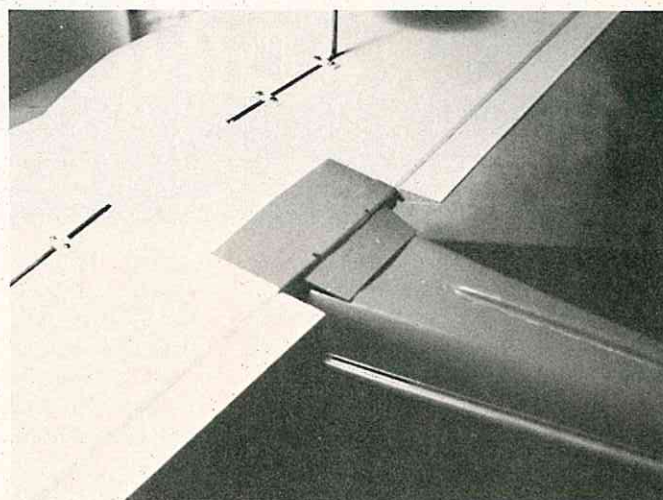


Photo 10: Exhaust goop can be kept from entering the fuselage aft of the wing with the use of this scrap plastic flap.

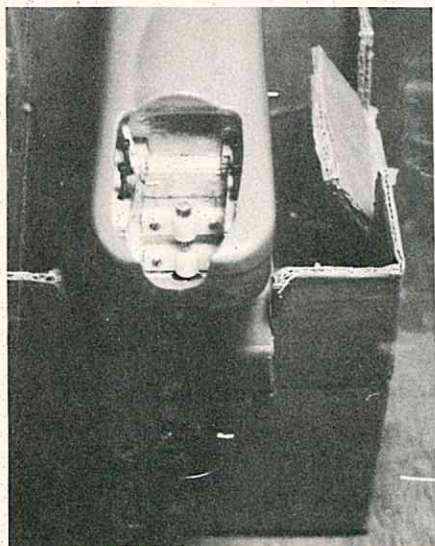


Photo 11: Method of installing firewall mounted nose gear. Nylon mounting blocks take beginner's bounces better than original plywood.

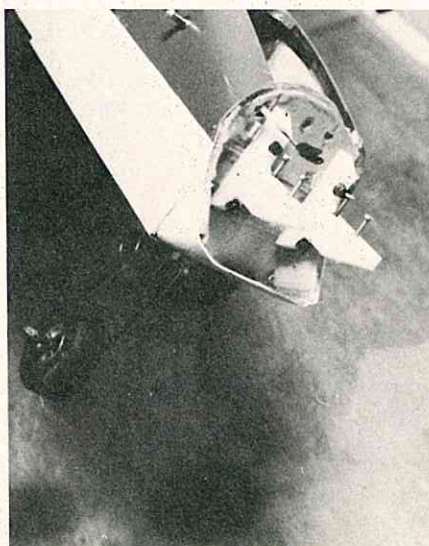
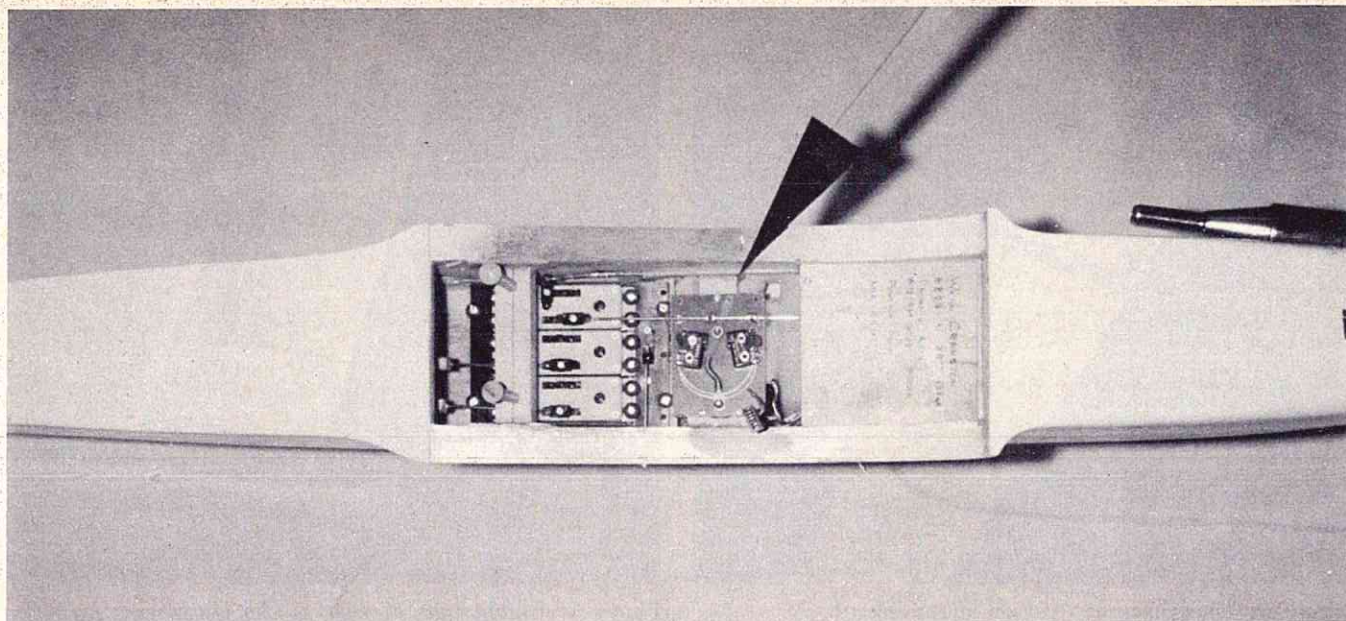


Photo 12: One nose first landing too many. Note use of double firewall because of extent of crash. Plastic from another crash used to patch side of fuselage.



This photo illustrates the author's installation in a Kwik-Fli III. Arrow points to switch mounting board.

UP-GRADING THE POSITRACTS

By BILL CRANSTON

Wing Mfg's retractable landing gear, Posi-Tract model 'B' is basically a good, reliable unit. However, as with any system, it's only as good as its weakest link. In the case of the Model 'B' Posi-Tract system, the method of controlling or switching was the hang-up.

Sold as an accessory with the Posi-Tract units is the "Novel" actuator switch. This switch, being a eight contact affair, means that to extend or retract the landing gear, a set of contacts (four to be exact with a trike gear aircraft) must **reliably** make and break. Obviously, keeping these contacts in adjustment is a real pain in the . . . er back pocket. Having to make a (sob!) "wheels up" landing in the boon docks is bad news at best. Gear failure in all cases was traced to the actuator switch contacts failing.

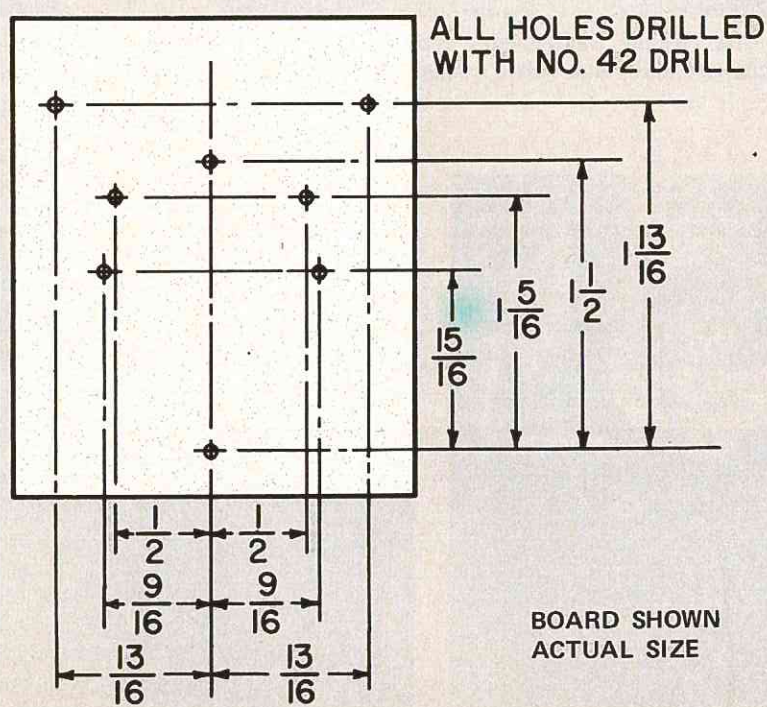
Having started out to build a reliable method to control gear, I came up with a system that has far exceeded my expectations. Namely:

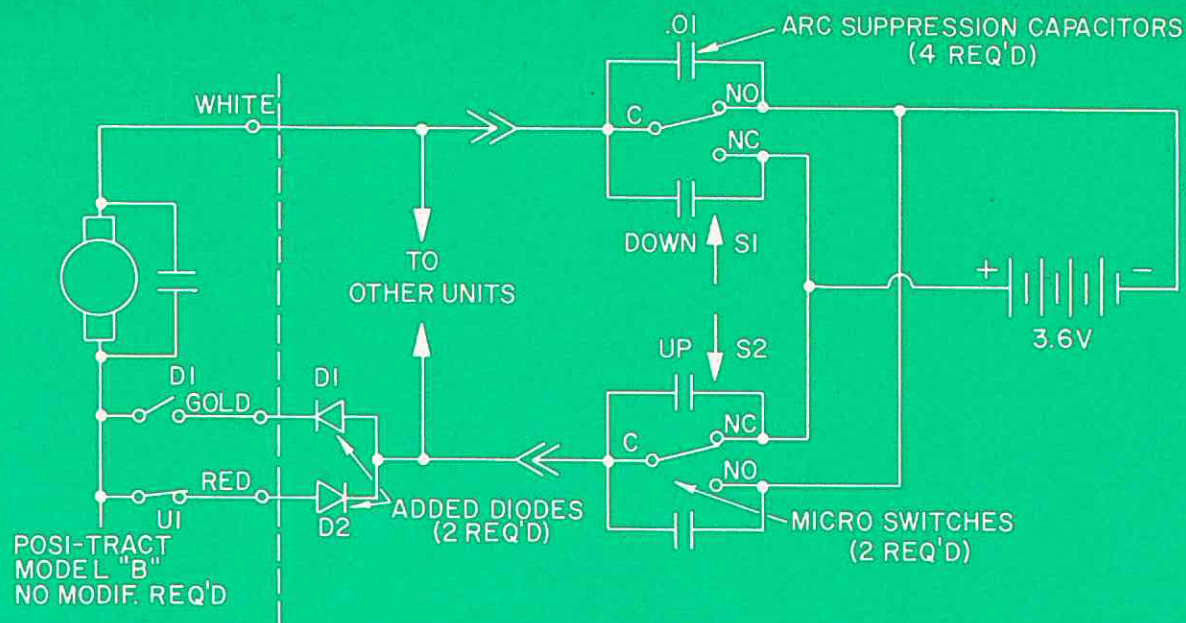
1. A two wire system.
 2. A weight saving by eliminating one battery.
 3. A method of switching that once is set-up properly, does not require periodic adjustments.
 5. A completely noise-free system.
- Presently, I'm using a four channel

system, (Kraft Gold Medal Series) which, of course, means I have to use the throttle for control of the landing gear. However, as it has turned out, this is not a dis-advantage as gear actuation is controlled essentially by the throttle trim lever. But even if I had an auxillary

channel not in use, I'd still modify the Posi-Tract system to its present configuration.

The secret of this system is in the use of "over-center" snap action to positively actuate switches. These switches are miniature SPDT micro-switches,





one being used for up and one for down. The switches, themselves, have a rating of greater than a million operations. (Let's see, 20 flights per Sunday, gear actuation at least 4 times, 52 Sundays per year, etc., etc. . .). Required operating force is about 5 ozs., but using the "over-center" action over twice this force is applied, thus ensuring positive switch action.

Note, in the schematic, the use of diodes, D1 and D2, in conjunction with the travel limit switches in the Posi-Tracts themselves. This means a two wire system can be used.

For all you local Einsteins, electrical operation is as follows:

When gear is down, "down" micro switch S1 is actuated with its N.O. contacts made. The "up" micro switch

S2, is not actuated and the N.C. contacts are made. The down limit switch (on the Posi-Tract unit itself) is open and diode D2 in the up limit circuit is back biased preventing the motor from running. As long as "up" micro-switch S2 is not actuated, the motor will not run, regardless of the position of micro-switch S1.

To retract the gear, "down" micro-switch S1 is de-activated, (possibly from some intermediate throttle setting) "up" micro-switch S2 is actuated by the "over-center" snap-action. This reverses polarity, diode D2 now conducts, allowing the motor to run. This action continues until the upper limit switch is opened. Micro-switch S2 has done its job, and similar to the down condition, S2 can

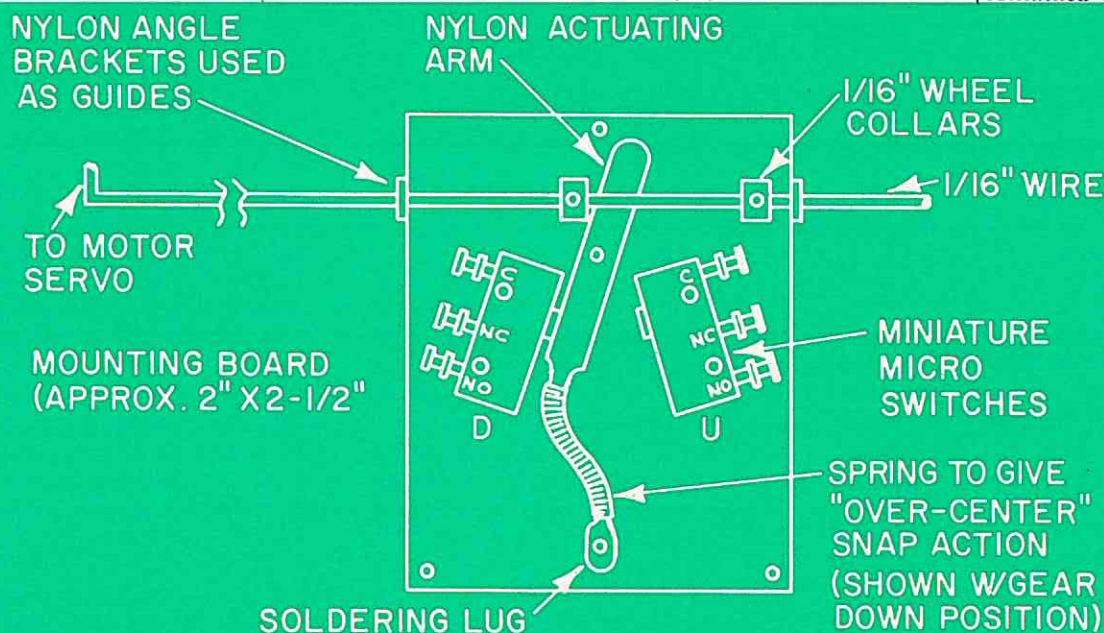
be in any position as long as S1 is not actuated. Hence, full throttle control can be used. (Without moving throttle trim lever, of course.)

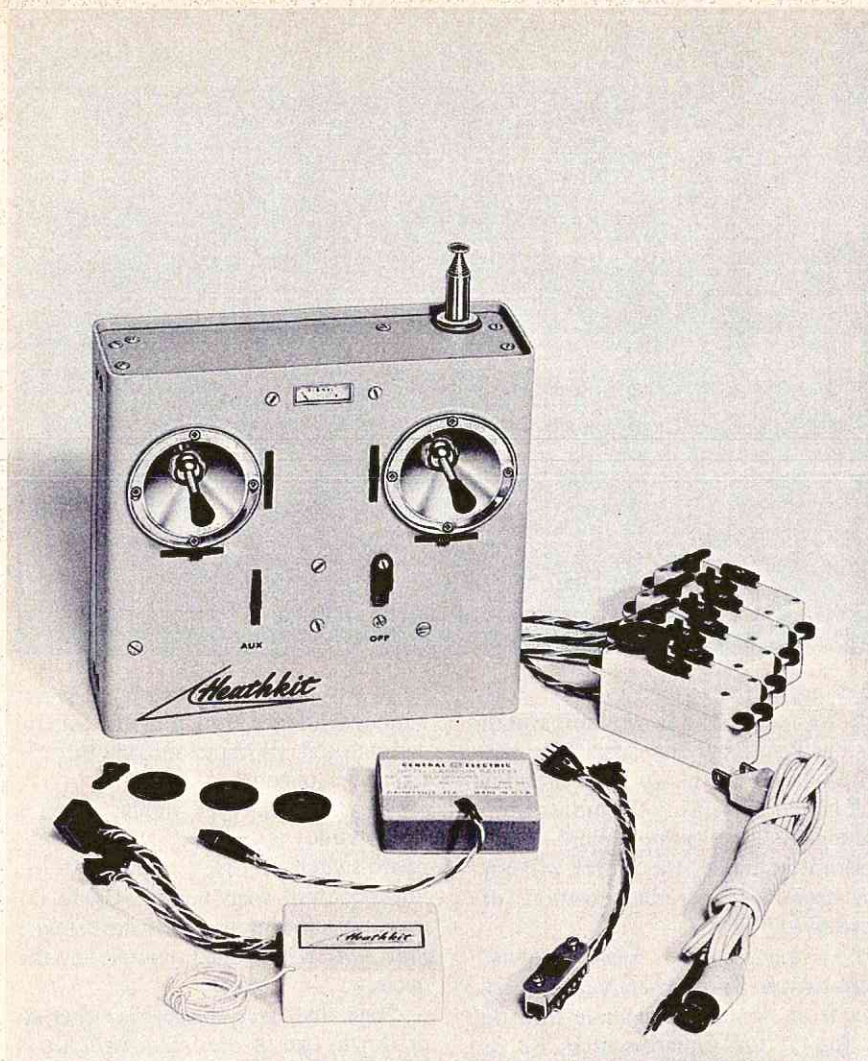
To extend the gear, similar action is involved. However, this time, micro-switch S1 is actuated by the "over-center" snap action. Diode D1 conducts, the motor runs until lower limit switch is opened, completing the cycle.

Note that once the gear is either up or down, one of the micro-switches is effectively out of the circuit and any intermediate throttle setting may be used. The trim lever is the guy that really does the job for us.

Now a word or three about the parts required to modify the Posi-Tract

(continued on page 59)





R/C KIT BUILDING

EVEN IF YOU DON'T KNOW A RESISTOR
FROM A DIODE, YOU CAN BUILD YOUR
OWN R/C SYSTEM FROM A KIT

By DAVE RYAN

This article is being written as the result of your editor, Don Dewey, graciously allowing me to give my viewpoint on the feasibility of the average modeler to build his own digital radio equipment from a kit. This is in response to an article written by Jim Simpson and Jim Bonar in the January issue of R/C Modeler with the title of GEMS. It seemed to deal with advice and other interesting information for the newcomers to this sport and hobby

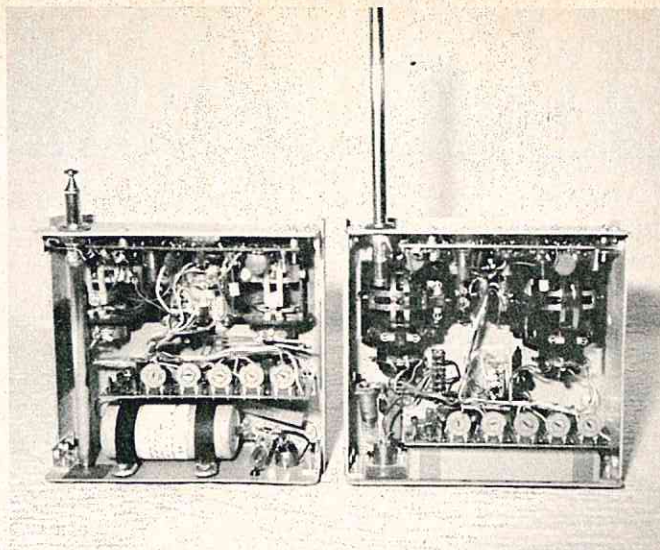
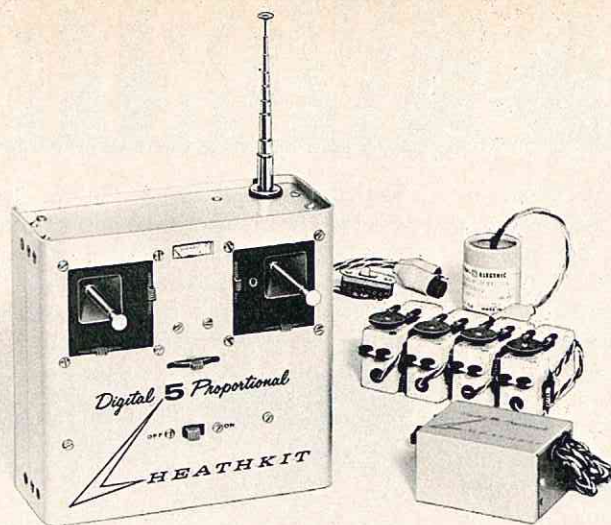
of model plane flying. I enjoyed the article except for the last paragraph, which ran contrary to my own experience on this subject. This concerned the topic of building R/C equipment from a kit, to which they limited their encouragement to those with special skills or experience in electronics. The only exception was the compulsive gambler!

I have no special skills in electronics, and yet I have had the satisfaction of

successfully building three digital radio sets. The first one was a GD-47 from the Heath company, followed by the Heathkit GD-19 and just recently another GD-47 when they were on clearance sale at a discount. As you probably well know, the GD-47 was phased out last year in favor of the newer Heath GD-19. At any rate, they were all built easily and it was an enjoyable and exciting experience. The only difficulty I had during construction of these was the first set. A transistor in the transmitter was found to be defective during the testing. This may very well have been caused by being overheated from a 30 watt pencil soldering iron in the hands of an overzealous amateur. Heath probably had to deal with more than one case of this type, so they now furnish, free with each GD-19 kit, a 15 watt pencil soldering iron that is just perfect for the job. It furnished just the right heat, and has a tip that never pits, corrodes or burns.

The other two sets were breezed through without any difficulty whatsoever, and all perform well, especially the GD-19 with the new receiver. After completing the GD-19, I ran a ground range check on it with the antenna collapsed, and found it to be an amazing 270 feet. This was prior to installation and situated on a cardboard box with the airborne equipment and antenna about a foot above the ground. Even when later installed in a Skylane 62, with the plane sitting on the ground and ready for flight, the range test was still an excellent 225 feet. If any of you have a factory-built rig, and the ground range check is better, you might check to see if the antenna when retracted for this test isn't still sticking out from the transmitter about a foot. In the case of the Heathkit models, it is only about one and one-fourth inches!

This GD-19 cannot only be built for about half the price of comparable factory assembled sets, but is the only one with a case with rounded corners for comfortable handling and a smooth, flush-fitting construction seam for truly professional appearance. I have found it to be a crackerjack in performance and reliability, too. It has been flown in season and out of season, whether the weather was hot or cold, wet or dry, and at low altitude at extreme ranges with electrical power lines between the transmitter and flying plane, and never a hint of glitch or trouble. At times I've been so engrossed in the flying, I didn't realize I'd already been flying with the set turned on for four or five hours of continuous operation, and still no



One of the major R/C radio kit manufacturers is the famous Heath Company. Even the newcomer to electronics can achieve success with their easy-to-follow, step-by-step instructions.

trouble with range and the meter on the transmitter still showing a very high output reading. So this may be a case of the tail wagging the dog. An observer might think that with your GD-19 you had a factory built radio and those factory built sets might look like they were built from a kit!

Now I think that perhaps more than one company puts out these kits for home construction in which the non-skilled person can participate. These could range from a kit in the full sense of the term to a semi-kit in which much of the electronic assembly is done by the manufacturer. If you are seriously contemplating building one of these kits, why not write to the company of your choice and ask for the manual to see just what you are getting into. Then you could determine if this kit is for you or not. Maybe you would decide you would be better off with a ready-assembled factory set. In the case of the Heath company, they offer this large and comprehensive manual for a price of \$2.00 which is refunded if you later decide to purchase their GD-19. So for the price of a show, you can get a lot of entertainment and information and be able to make a better decision. I've always had the feeling that they put a rope around your neck and lead you every step of the way, short of doing the actual construction for you. Heath has obviously spent a lot of effort and forethought in preparing it's manuals so that the average person can read a step explained in simple language, study the accompanying pictorial for a moment, perform the step, and mark it off and continue on to the next one. When you complete all the steps, you have been taken through a course of complex

electronic construction by the experts in such a simple and easy manner that you are amazed, and if you have done your work well and in a serious manner, it will work perfectly when done. Not only will you often save a great deal by building it yourself, but even more important is the fact that your natural creative talent has been given a chance.

There are well informed people in the mainstream of this hobby who apparently have access to the fact that an uncomfortable number of people have been unable to complete kits in one form or another in a successful manner, and at times it was costly to get repaired and in working condition. If this is so, the reasons for it could be many. If the instructions contained in the kit were only of a general nature and intended only for those highly skilled in electronics who can read schematics, etc., then it would be a mistake for a novice to make any attempt to try and construct one of these. And if a really good kit with sufficient instructions was built in a rough and slipshod manner, sloppy in workmanship and careless in attention to details, then the builder would have no one to blame but himself. There might be some instances in which a few components that go into the circuitry would be faulty, but I think the chances for this happening are rather remote.

I learned to fly R/C airplanes first with Testor's Skyhawk and their single channel pulse-proportional radio system. This seems like an excellent way to learn for the beginner, especially one who has to go it alone. But after building the first Heathkit GD-47 and finding it relatively easy, I decided it would be nice to change the Testor plane and radio over to galloping ghost

operation with the addition of elevator and motor control to the rudder control which was the only way to control it previously. I bought a conversion kit from another company offering it, and thought it would be a snap to do. My enthusiasm was short-lived, however, as the instructions were vague and incomplete, the few pictorials were, at times, contradictory with the hardware at hand, and the photos so hazy and obscure that they were of little or no value. I had to rely on guessing for much of the construction of it, and needless to say, the ghosts didn't gallop too well when I was done. There was some erratic movement available, but nothing close to what was expected of it. A kit of this type, no doubt, would be for those electronic engineers, to which they could put their talent to good use.

Who else might not be a good prospect for R/C kit building? Well, perhaps one who is hopelessly impatient or impulsive, or one whose moods range from up on 'cloud nine' to the depths of the dumps. The steady, quiet and matter-of-fact type of individual with reasonable intelligence and a will to listen and learn is a natural for a project of this type. After all, it's no snap to build one of these highly complicated 'toy' airplanes, especially one that is constructed accurately and flies well. So if you have the patience and tenacity to surmount all the problems encountered, then you should have the necessary mental attitude and training to build the radio system that goes into it. This pertains, of course, to those kits having an adequate instruction manual for even those non-skilled in electronics. In human nature there seems to

(continued on page 78)

FOR WHAT IT'S WORTH

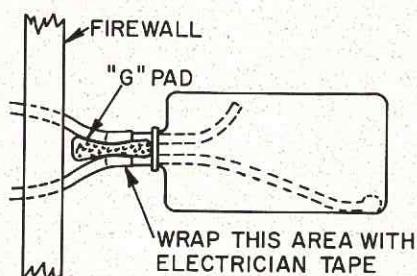
Salo Feiner, one of Mexico's best flyers, has been using Super MonoKote ever since it came out and thinks that it is great. When you can cover a Sun Fli in less than two hours, its advantages are somewhat obvious! Salo uses only the small Sealectric iron to apply MonoKote. There are, however, many small corners where it is extremely difficult to use the sealing iron. For this, he uses an ordinary pencil tip soldering iron which does a beautiful job. Naturally, the soldering iron is much hotter than the sealing iron and will dissolve the MonoKote if in contact too long. But when you pass the soldering iron over the material very quickly it sticks to the wood extremely well and doesn't burn. The same method works well for "burning away" the MonoKote from holes or cavities purposely left in the construction of the model. Examples of the latter are dowel holes, throttle arm extensions, switch holes, etc. Salo suggests trying this method on a piece of scratch MonoKote before you burn away on a finished project!

While on the subject of covering materials, John Whitney of Reno, Nevada finds that contact shelf paper cannot be sealed with an iron as the melting point is too low. The best solution is the hot air provided from a hand held hair dryer. After heating the plastic, smooth it over the balsa with your hand. Heat applied in this manner will also sufficiently shrink the plastic covering over open framework. On planking, such as fuselage sides, the plastic will actually fuse itself into the grain of the wood. John has used this method on an all-foam ARF plane with excellent results.

If you have ever masked off over a fresh painted model only to have the tape destroy your paint job when removed, you will appreciate this suggestion from Tom Mitchell of So. Charleston, W. Virginia. Tom uses Johnson & Johnson Dermicel Tape. This holds tightly to any clean surface but will not damage the finish when it is removed. This is also an excellent material for holding parts together for glueing or repairing.

Monty Davis of Redstone Arsenal, Alabama, experienced recurring dif-

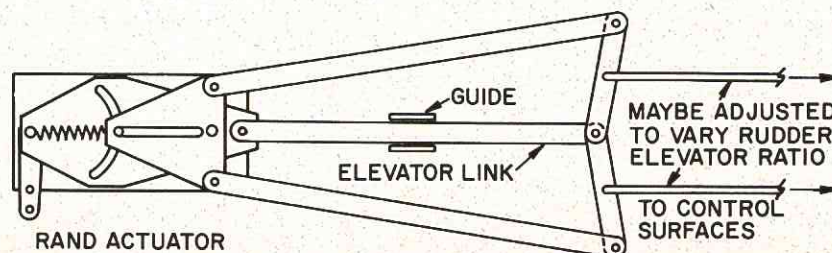
ficulty with his fuel tanks sliding forward in the nose of his plane, resulting more often than not, in the fuel line being cut by the brass tubes extending from the fuel tanks when they struck the firewall. He found that by placing a piece of G-Pad between the two brass tubes which extend from the tank with the fuel line already attached, and wrapping the brass tubes and the G-Pad with black plastic electrical tape, it provided a good buffer for the tank. Now, on those rough landings, the fuel lines are protected from being cut or pinched against the firewall.



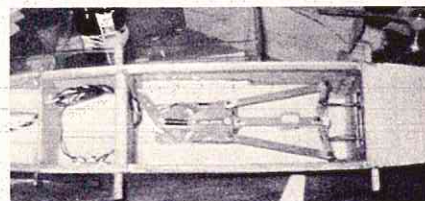
Bill de Vries of Laguna Hills, Calif., has found a way to get more "mileage" from your Super MonoKote. You can use Scotch Tape on the removed plastic backing to form custom made wing and stabilizer bags to keep them clean while being stored or transported. Tape all the seams to form a bag, then paper clip the ends together and hang on a nail for storage.



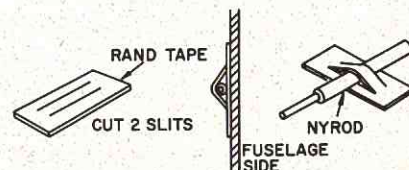
Richard Hautzenroeder of Framingham, Mass., submitted this idea for a simple linkage to enable Galloping Ghost V-tail, or Delta control, without moving the actuator for elevator control, thereby reducing battery drain.



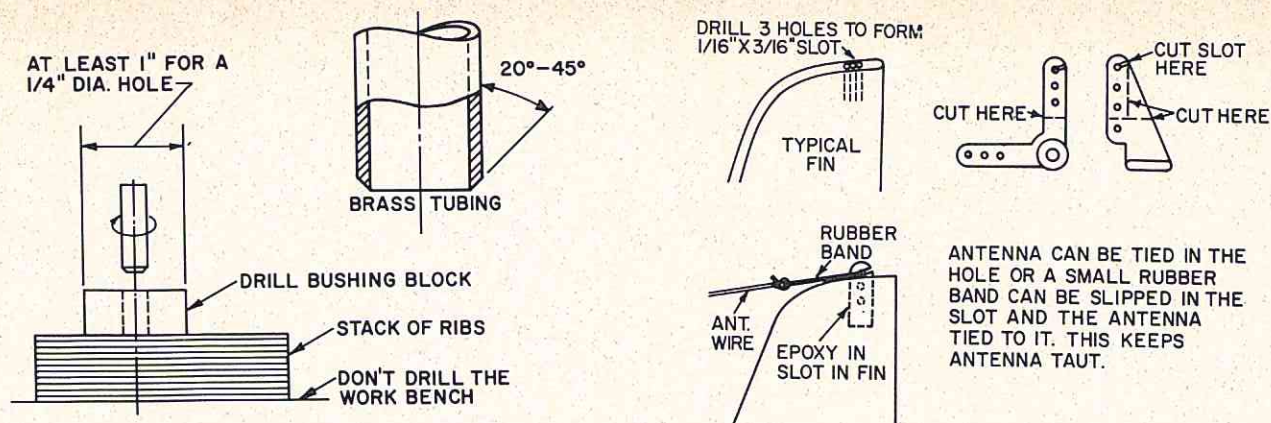
The cross linkage must be long enough to allow the actuator to go-around. The elevator link must be braced to prevent it from swinging sideways. This linkage has been installed in the RCM Little V glider and operates quite satisfactorily.



Bill Freiwald of Downers Grove, Ill., suggests using a length of Rand Servo Mounting Tape to secure Ny-Rods, push rods, etc. The accompanying sketch is self-explanatory.



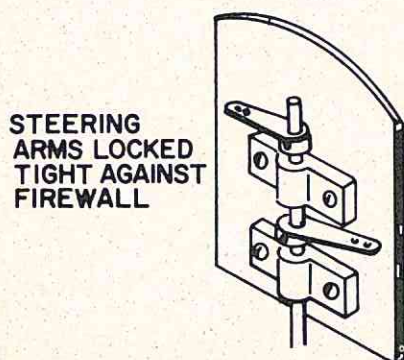
Ernest L. DeBardeleben, a pharmacist in Orlando, Florida, suggests a source for 1 to 12 oz. gas tanks that will cost you absolutely nothing. As a pharmacist, Ernie throws away between 15 and 20 plastic bottles a day . . . these bottles being the containers from which pills and tablets are dispensed by the pharmacist. The RC flier can go down to his friendly neighborhood pharmacist and tell him what he wants the bottles for and get him to save the various sizes for him. In about a week he would have enough different size bottles to make gas tanks to last for a lifetime. All that is necessary to do is to solder the gas overflow tube and pickup tubes into the metal cap on these plastic bottles. Or, if you prefer, a Tatone Stick-A-Tube set can be used.



As many modelers have found out, brass tubing makes an excellent drill for rib alignment or control holes. The end should be sharpened as shown in the sketch from Thomas Markland of Cincinnati, Ohio. This is easily accomplished with only a sanding block. The drill can be quickly made extra sharp with a few passes of a hone. The major advantage of this type of drill is that there is no tearing of the balsa wood. The hole that results is beautiful and true. For alignment of jig holes it is best to make a "drill bushing block" to square up the drill. Although the latter can be hard balsa it will not last as long, or be as accurate, as one made from harder wood and drilled with a conventional drill. These "tubing drills" can be soldered inside, or outside, of other sizes of brass tubing in telescope style to accommodate drill chuck sizes.

From the Middle Tennessee Radio Control Society of Nashville, Tenn., comes an excellent method for hooking your radio antenna up to your vertical fin. If you have an antenna "dangiliosis", you will appreciate this method which is completely self explanatory from the accompanying sketch.

If your kit provides a steerable nose gear, and you wish to make it a fixed type of gear, John Steinkamp of Rensselaer, Indiana, suggests this



method. By the use of two nose gear tiller arms, the wheel can be adjusted without making it permanent. The horns are opposite each other with the arms up against the firewall.

Jack Blanner of Pittsburgh, Pa., has solved the problem of trying to feed the fuel line through the same size holes in the firewall. Simply use a piece of the braided shield, or coaxial microphone cable used in electronics work. Just expand the braid to accept the tubing and then pull it through the hole with little or no effort.

Using the new fast-cure epoxies can be simplified by mixing on a small memo or scratch pad, using a toothpick

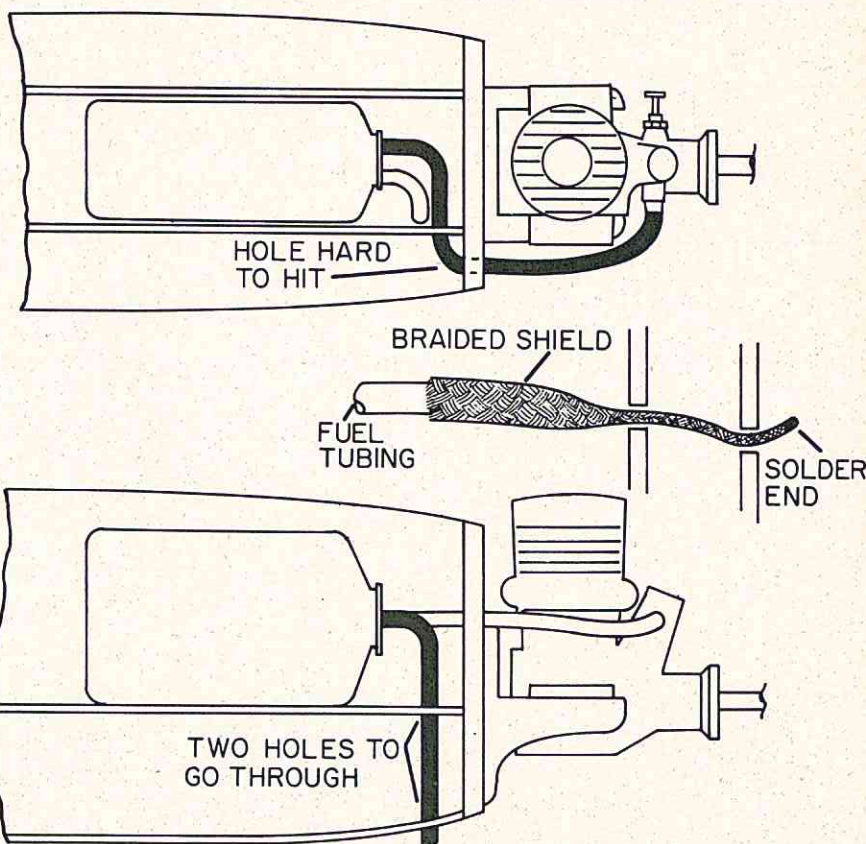
for stirring and application Gordon Gould of Breckenridge, Michigan, found that many small batches can be mixed before a 10c pad and a box of toothpicks are depleted.

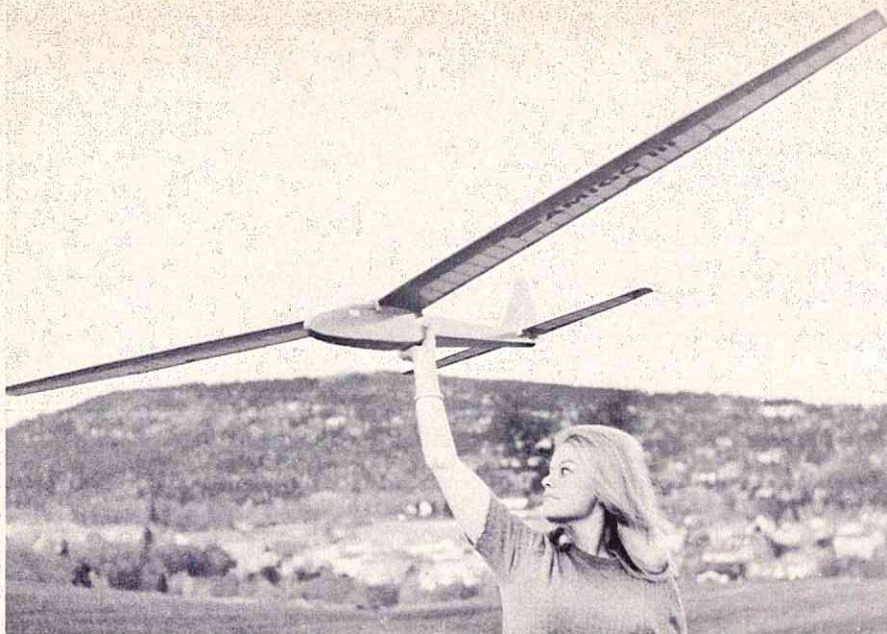
Clyde Harris of Pittsburg, California, suggests the use of No. 14 - No. 16 copper wire, bent to any shape necessary, and inserted in the end of a Weller Soldering Gun for making perfect cutouts in foam wing cores or for general carving in foam.

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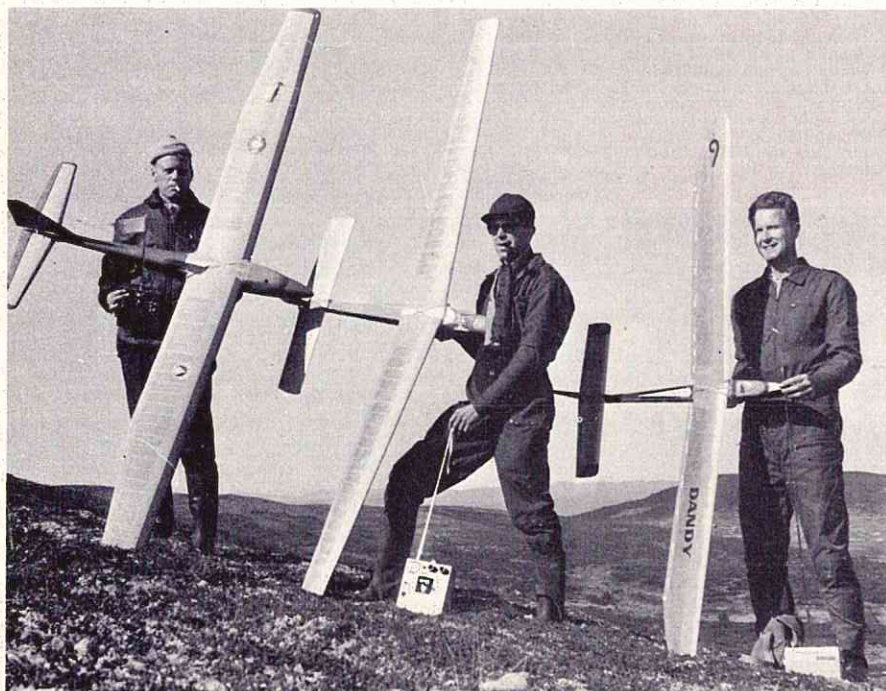


An Amigo III which is becoming quite popular for RC IV-A programs.

TRENDS & DEVELOPMENTS IN R/C SOARING

By OTTO STENSBOL

On top of the slope at Neverfjell near Lillehammer. L to R: Aasbo with 'Uranus'; Blaker with 'Rebus II'; and author Stensbol with modified 'Dandy'.



Soaring progress continued during 1969 and its present status gives a promising out-look for the future. The number of soaring pilots have steadily increased in both single and multi, and the standard European precision pattern, the RC IV-program, has been generally accepted as the best platform for good competition and equal judgement. This program may sound very easy and boring to you but once you've tried the game there are certain factors you would have to consider:

(A) An RC IV-type of competition model must be a highly developed, sensitive soarer with fairly light wing loading if weather is fine and you are using standard high-start with 300 ft. line (Nordic-type running start, good for your health!)

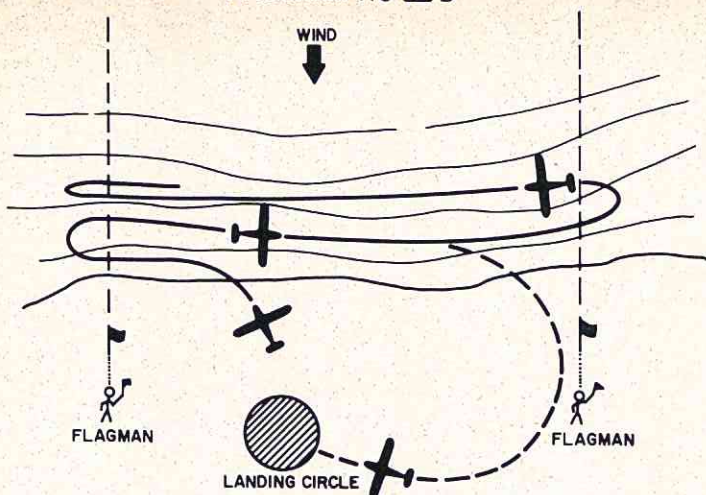
(B) An RC IV-soaring plane for competition work should fill the requirements for optimized aerodynamical design. Streamlined, functional with proven design-factors taken into account.

(C) The RC IV-type of competition favours the experienced flier with the best combination model/control gear, thus clearly indicating the need for hard training. This competition does NOT favour the chap who had the most dough to put in for a highly sophisticated RC-gear in the 500 buck class!

(D) And, finally, this competition can NOT be influenced by some good or bad judges who favours Mr. A and puts him away ahead of Mr. B although he may be the better flier! The RC IV-competition completely eliminates this problem as a stop-watch and a tape measure are the only governing factors.

You will find details on the competition in this article. It should be noted that these are a straight translation/adoption of the German RC-soaring formulas. As they are the definite leaders in this field their experience should be used. Here in Europe quite a few countries also follow their programs, some, however, with minor changes. All sizes and types of control systems are used in a mixed competition. There is, however, now a trend towards one open class and one standard size (probably Nordic-size A2 area, 32-34 dm²) to be used for individual choice of control-functions. You may then use 2 servos for RE and have a heavier model, or stick to one servo for R-only to keep wing loading down. Obviously then, a RE-model should easily obtain max landing points but may have trouble to stay aloft the necessary 200 seconds! The R-only model, however, would normally fly

PROGRAM RC IV B



the 200 seconds with ease while the landing inside the 150 ft. in diameter circle could be more problematic! Thus the RE- and R-only model should be on fairly even conditions in an RC IV-competition.

The RC IV-program has produced a lot of very good thermal-soarers and highly developed minimum-sink type of models. A variety of wing-sections have been tested, most in use now are the EPLER - series, especially E 385. Of great interest is the present trend towards trimmable trailing edges. This will obviously lead us into a completely new direction where weather-conditions, thermal-streams and other factors will have decisive influence on the pilots setting of his trailing edge. Laminar wing sections will obviously come into use and fully planked wings of extreme lightness will be developed.

A 3-channel digital set will be the natural choice for the soaring fan as the ideal in order to control R + E + trimmable trailing edge. The latter will probably be a combined brake/lifting device, up for braking action and, gradually, down for extra lift in circular flight where some down-trim elevator then must be put in to keep the nose down on normal flight-level. This development is just around the corner, I personally do work with such installations in my GHOST 7. This trend will no doubt also have great influence on types of competition, probably in the direction of full-size soaring plane rules. I think this is a natural result of present day efforts to find the optimized soaring plane and the most suitable competition.

You may wonder whether we do aerobatics or not. Well, naturally we here in Europe do aerobatics as well! There are two main programs we follow. The most widely used being the German RC II stunt-program and, to

some extent, the almost similar F.A.I.-program. These programs are both flown with models other than the RC IV-type as the manoeuvres requires aileron-effect to cater to the roll-moment. A variety of special models have been developed and, in my mind, the West-Germans are absolutely top designers. Competitions are often flown from a suitable slope and, from a public point of view, these competitions are very popular.

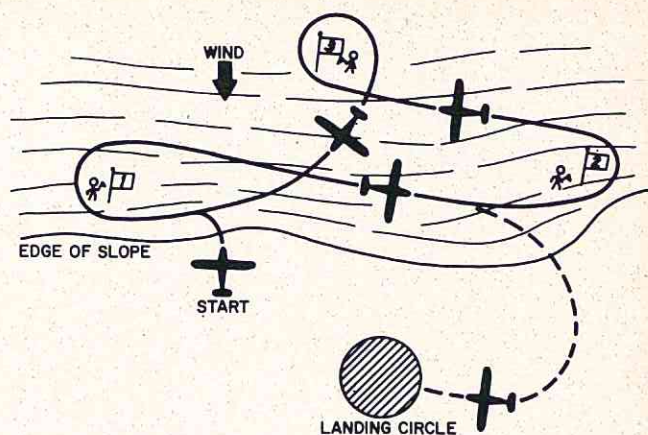
Very often we can also see splendid scale-models like the FOKA, LO-100, LIBELLE etc., in these competitions. With quite fast wing-sections such as the E 374 or some NACA laminar-section, they are quite impressive as they sweep along on top of the lifting zone and carry out the spectacular manoeuvres. A very graceful sight indeed!

The number of international competitions are now steadily increasing. The trend is definitely for a European Championship this year, and possibly a World Championship as well.

Programs Flown in RC-Soaring Competition.

RC-soaring in Europe has been strongly influenced by Germany whose programs and mode of competitions are generally accepted and widely used for national competitions. I think this is fair and logical, and it certainly is a very good basis for any further international co-operation within RC-soaring fraternities. Generally speaking, all models can be flown in the same competition, regardless of the number of controls/servos used, etc. Further, there has up 'till now, been no restrictions regarding wing areas, weight etc. The models should only be within the definition of "a model aeroplane"! There are now, however, quite strong moves towards a standard class plus one open

PROGRAM RC IV C



class.

Program RC IV A

- A. Start, 300 ft. line or handlaunch from a slope.
- B. Individual flying (no pattern) exactly 200 sec's
..... P = 200 pts.
Every second more/less than the required 200 sec's gives.
..... P = -1 pts.
- C. Landing, earliest 60 sec's from start, in the center of a landing circle of Diameter = 150 ft.
..... P = 50 pts.
Every three ft. away from center.
..... P = -2 pts.
Landing outside the circle.
..... P = 0 pts.

This program is often called the "standard RC-soaring program". The RC IV-class also has two other programs:

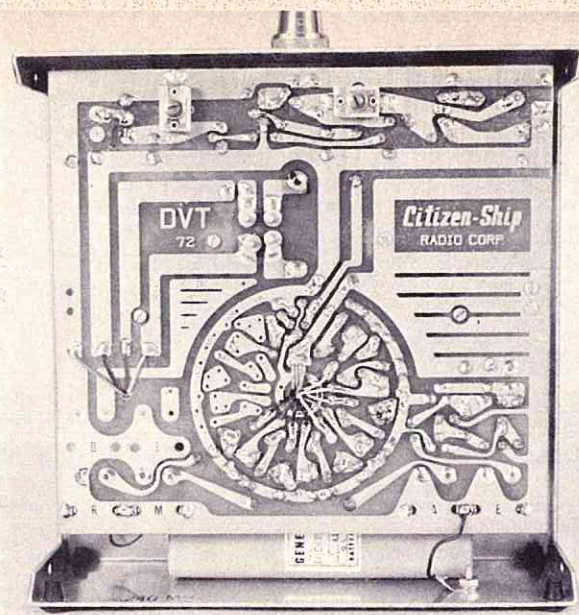
Program RC IV B

- A. Start, 300 ft. line or handlaunch from a suitable slope.
- B. 5 crossings over 2 marking lines where the distance between is approx. 450 ft. (One flagman on each line to flag off each crossing).
..... P = 200 pts.
- C. Landing, earliest after one completed round, within a circle of Diameter = 150 ft. in the center.
..... P = 50 pts.

Remarks

- 1) Each round NOT completed.
..... P = -40 pts.
- 2) Every 3 ft. away from center of the landing circle.
..... P = -2 pts.
- 3) Landing outside the circle.
..... P = 0 pts.
- 4) Program to be flown within 5 min's. from start

(continued on page 58)



RCM PRODUCT REPORT:

Citizen-ship DV-4 Digital System

By DON DEWEY & BILL O'BRIEN

During the past month we have been in the process of flight testing the Citizen-Ship DV-4 Digital Proportional System. This unit is manufactured by Citizen-Ship Radio, Division of Curtis Dyno-Products, Box 297, Westfield, Ind. 46074. It is available as a 4 or 6 channel unit on either 27MHz or 72MHz and six meter. The price for the 4 channel 27MHz is \$374.95 while the six channel version on the same frequency is \$399.95. On 72MHz and six meters, the four channel version is \$399.95 while the six channel configuration is \$424.95.

The DV-4 system we obtained from the manufacturer was provided to us on a frequency of 72.240 MhZ. This is a digital proportional system that provides four completely independent, fully proportional and simultaneous channels. The transmitter is of the standard American configuration and measures 6-7/8" wide x 7" high and 2-5/16" deep. The transmitter is clad in red vinyl over the metal case with white plastic trim levers. A recessed switch that is flush with the surface of the transmitter face, and completely enclosed gold anodized sticks. The antenna is of the conventional screw in, telescoping type. The charging jack is

located slightly off center on the rear of the transmitter. Four sheet metal screws hold the two transmitter case sections together.

Electronically, the DVT-472 transmitter consists of an RF power amplifier modulated by a digital type encoder signal which is varied by control sticks extending through the front of the case. The motor control stick has detents to keep the motor speed in the position desired. All controls have trim levers for trim changes while the plane is in flight. The nickel cadmium transmitter battery is installed in the transmitter along with a built-in charger as is conventional with most proportional systems. A zero center meter is located in the upper left hand corner of the transmitter which indicates battery current to the right of center and also the charging current which reads to the left of center.

The DPR-472 receiver is of the single conversion superheterodyne type and includes a decoder which sorts out the information received and sends it to the proper servo. The receiver-decoder measures 2 1/2" long x 1-7/8" wide x 1" high. Encased in a two section metal case which is held together by two sheet metal screws, the receiver utilizes some

integrated circuits. The weight of the receiver-decoder, along with the switch harness, is 3.75 ozs.

The Model DMS Servo from Citizen-Ship is a feedback proportional actuator of digital type which weighs 2.3 ounces each and measures 2 1/4" long x 1" wide (exclusive of servo mounting lugs) and with a height of 1 1/2" (exclusive of servo arms). Overall dimensions including mounting lugs and servo arms are as follows: 2-13/16" long x 1" wide x 1-3/4" high. The DMS Servo utilizes a combination of linear and rotary outputs. The output arms provided with the servos gives 6 possible individual connections. All servos are interchangeable and utilize standard end mounting lugs.

The wiring harness provided with the system does not utilize a switch, as found in most proportional systems, but rather a small (1 1/2" long x 1/2" wide) piece of PC board with a shorting plug and two sheet metal screws for mounting in the side of the aircraft. In order to place the airborne system into operation the shorting plug must be externally plugged into its female counterpart.

The airborne nickel cadmium battery supply is of General Electric

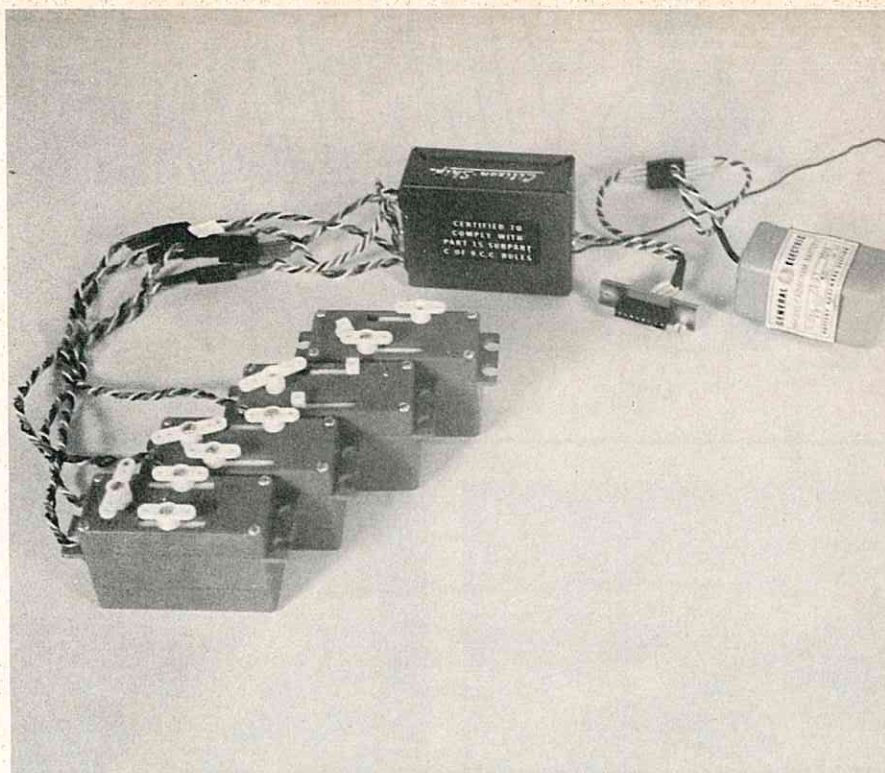
Manufacture and weighs 4.0 ozs. The battery pack measures 1-1/16" long x 1-3/16" wide x 1-3/16" high. The total airborne weight of the Citizen-Ship DV-4 system is 17 ounces.

The manufacturer, in their instruction manual suggests that a vertical antenna be used with the system since the transmitter antenna radiates vertically polarized signals with respect to the transmitter. During our entire test program consisting of numerous flights, we used the standard antenna stretching from the receiver compartment of the aircraft to the top of the fin of the model. No range problems of any type were experienced during these flights.

The DV-4 system is warranted by the manufacturer to be free from defects in material and workmanship. According to the manufacturers instruction manual, "any unit failing to operate within 30 days after date of purchase will be repaired or replaced free of charge upon being returned directly to the factory by the owner. This warranty does not apply to failure of operation due to exhausted or improper batteries, or (if in the manufacturers judgement) the equipment has been retuned, tampered with, or received abusive treatment beyond that encountered in normal usage. Warranty does not cover crash damage"

FINDINGS

During the entire period of flight testing by RCM, we found the Citizen-Ship DV-4 Digital Proportional System to equal or exceed the manufacturers specifications and advertising claims for the system. No failures or malfunctions of any kind were experienced. We do feel, however, that the transmitter sticks could stand improvement inasmuch as any movement of the electronic trim levers causes the main control sticks to move, a feature which is not desirable. This is, apparently, due to the basic construction of the sticks. Another feature which we, personally, do not care for is the use of a shorting plug in lieu of a switch. Should you lose this plug, you would not be able to fly the system, although the manufacturer suggests in the instruction manual that the "plug may be secured to the model with a short length of nylon line to prevent loss." We do feel that this shorting plug system is a poor substitute for a high quality slide switch in the airborne system. The overall design in construction of the system is excellent, with the previously noted exceptions, and, electronically, the DV-4 performs flaw-



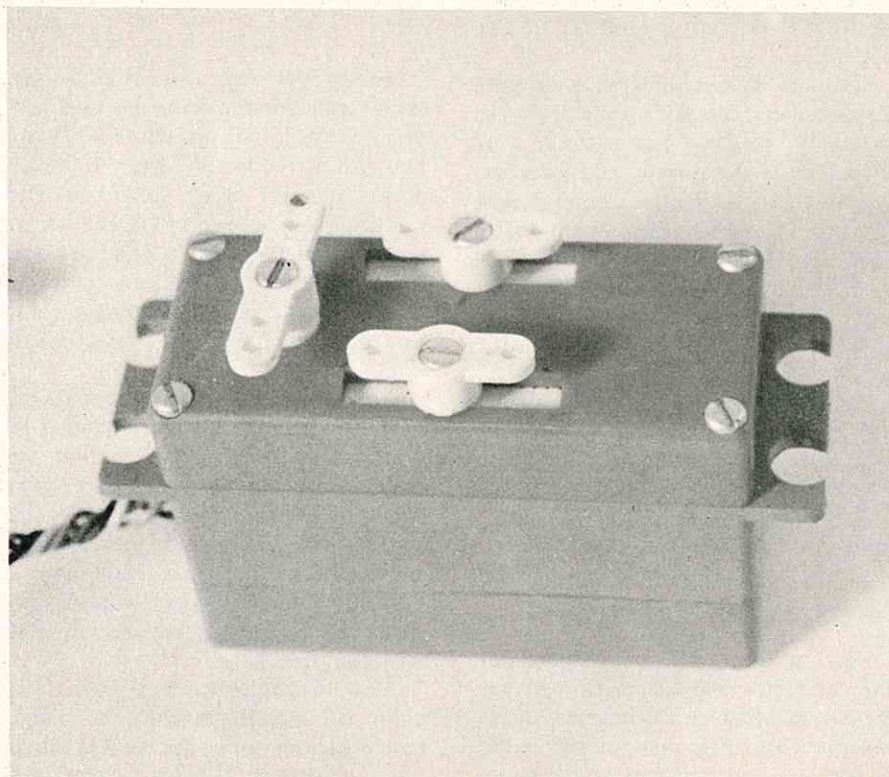
The complete Citizen-Ship DV-4 airborne system.

lessly. We particularly liked the small meter on the transmitter which indicates both battery power and charging condition when the system is being charged. Another excellent feature is the flush mounted transmitter switch

which prevents the flier from turning the transmitter on or off accidentally.

R/C Modeler Magazine has tested, approves, and recommends the Citizen-Ship DV-4 Proportional System to your consideration. ●

Close-up of the Citizen-Ship DMS servo with three output arms.



SUNDAY FLIER

KEN WILLARD



Rita with the Cliffmaster.

Two years ago I went to Mexico City for the Mexican National R/C championships, and really had a ball. If you happened to read the August 1968 issue of RCM, you saw my report of the activity.

One of the pictures showed Salo Feiner, one of Mexico's top R/C flyers, intently guiding his pattern ship through the maneuvers, and standing just behind him, and just as intent, was his little daughter Rita—who loved airplanes then, and still does now. Witness this letter I just received from her:

Dear Mr. Ken Willard:

My name is Rita Feiner. I live in Mexico City. I love airplanes and I built your glider (Cliffmaster) with the wings as they were on the plans.

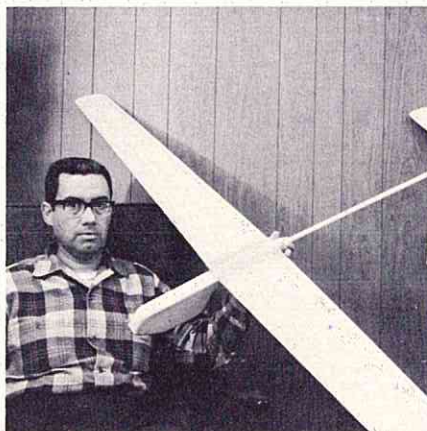
We went to the field, and we flew the plane. We put an engine on, but it wasn't enough for the plane. Also, we took the plane to Acapulco, and then the plane went high.

We decided to make another wing and we made it, and now it flies very fine.

Your friend,
Rita Feiner

P.S. Write soon.

So I wrote to Rita and thanked her for the letter and the picture of her proudly holding her Cliffmaster. Makes me proud, too, Rita, that you picked the Cliffmaster and it is now flying down



M.E. Valdez with modified Cliffmaster.

Mexico way. Sure would like to get down there again and see it go—especially along some of those cliffs at Acapulco!

* * * * *

From Iowa City, Mr. M.E. Valdez writes a nice letter about his Cliffmasters—he built two, one with a 72" wing and another with a 96" wing. He made some changes—using spruce for the spar because he uses an electric winch and figured the wing would take the launching stresses better, and building up the pod a bit. Also, he used a 1/2" dowel rod for the boom. Then he asks a question.

"I am very curious about one point. In the pictures that you included in your article it is very clear that the hinges you use go from one side to the other of the rudder as shown in the sketch, but in the text you mention that the hinges are MonoKote. How can you do it? The sticking surface of the MonoKote will be outside on one side if it sticks on the other."

Well, here's the way you do it. Cut a strip of MonoKote for the hinge (usually about 1/2 inch wide and one inch long) and then cut the strip in two. Turn

one side over, so the sticky sides face each other. Then overlap the two halves at the center line about 3/16" and seal them together with the iron. When you seal MonoKote to itself this way, it won't come apart at the seal. Then, attach one half to the fin, run the sealed center of the hinge through the hinge line so the hinge comes out on the other side, and then seal that to the rudder. Alternate the hinges so the hinge line stays centered.

* * * * *

Lots of interest in gliders this time around. Here's a letter from Marshall S. Watson, of Orrville, Alabama regarding power assist.

Dear Mr. Willard,

I've been R/Cing for 8 years; mostly single channel and some propo. Being an aerospace engineering student and confined to a wheelchair with periodic illnesses, I haven't advanced as far as I should have in the propo flying. I need more practice on my Sr. Falcon before going back to my Stinger.

Getting to my purpose for writing. For a year I've been having a ball with a galloping ghost in a Midwest Little T. Because I'm not experienced with towing and my closest flying site really too small for handling large hi-starts needed to get up to the good thermals, I used a power pod to get the altitude. However, the Lil' T isn't a thermal ship; I want to advance to a more sophisticated ship.

Now my problem I'd like your advice on is what glider do I go up to? I guess my Orbit 4-8 would be necessary for such a glider. It's one of the first 4-8 digitals to come out, so it has the big rx and servos (I hope to up-date it to the I-C equipment). I'd also like to get it up under power, but I guess I could hi-start or winch it up but lack of space and experience are against me.

Would a power pod ruin the efficiency of one of the excellent soarers like the Kurwi, etc? I wish I could slope soar but this part of Alabama is flat as a pancake.

If its not too much trouble may I have some advice from your vast knowledge of the powerless aeroplanes? Please answer by column or letter.

Yours truly,
Marshall S. Watson.

I gave his problem some thought, and replied:

Dear Marshall:

Thanks for your letter, and my apologies for the delayed reply. Christmas, New Year's, Thanksgiving, two columns, and a special report on the MATS trade show seemed to get me all hung up for a while.

Anyway, since you've asked for some advice, based on, as you put it, my "vast knowledge of the powerless aeroplanes," I'll do the best I can. I'm afraid my knowledge may only be about half as great as you think, though.

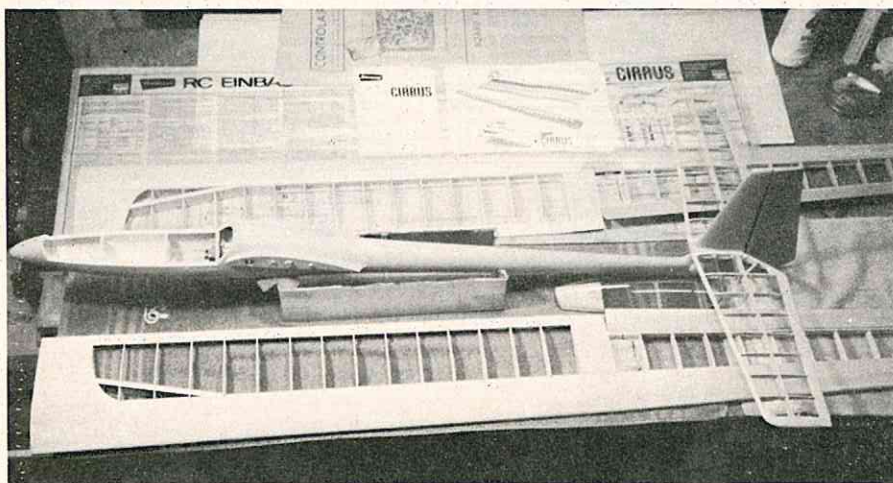
So here is my "half vast" advice.

No. A power pod will not "ruin" the efficiency of a sailplane. It will degrade

(continued on page 57)

KITS & PIECES

DICK SONHEIM



Layout of semi-completed Graupner 'Cirrus'. Bill Davidson reports in this issue.

Every year we see new designs and innovations by the top pattern contest fliers to improve the performance of their planes. Several years ago the big trend was to use larger rudders to improve the snap maneuvers as well as the knife edge flight. This year you will see more of the top pattern fliers using retract gear. Retractable landing gear will not only increase the performance of any model by reducing a large amount of drag but, even more important to the contest flier, will be the appearance to the contest judges. Until now most fliers have been using the servo operated type of retractable gear. With the small size of today's servos one servo is used to operate the main gear, and a second servo in the fuselage is used to operate and retract the nose gear.

Orbit Electronics, 11601 Anabel Ave., Garden Grove, Calif., 92640 expects to have ready by the end of March, 180 degree PS4 servos and special wiring harnesses so that two servos may be operated from a single channel. This leads us to think about some of the other possible uses where it would be desirable to operate two servos from a single channel. The first one that comes to mind are those scale biplanes with ailerons in both wings. Or, how about the larger gliders with plug-in wings now using mechanical linkages to connect the ailerons. It

would seem to me to be easier to put a servo in each wing and just connect an electric plug when the wings are attached. Well that is the extent of my imagination for the moment, however I'm sure there are many clever modelers who will find other uses for a feature such as this.

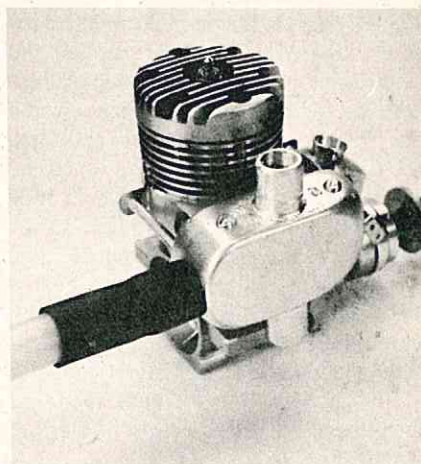
AR Flight, 23326 Ladrillo St., Woodland Hills, Ca., 91364, is producing foam core wings covered with 'Glaskin', an epoxy fiberglass and foam combination. The wings come complete with the gear mounts, and a cut-out for servo mounting is provided. The only thing necessary for the builder to do is to join the wings with fiberglass cloth. There is no other finishing or work involved other than painting these wings. In this writer's opinion this is a tremendous advance in the complete ready-built wing field. The surface of the wings are "smooth as glass" and extremely strong. Most popular strip aileron types are available at \$20.00 per kit.

Bob Palmer, 9161 Morehart Ave., Arleta, Calif. 91331, is now in production with a Flea Fly + 10 epoxy fiberglass fuselage that fits the Midwest Flea Fly + 10 kit. The kit features a removable cowl, fillets on the wing and elevators, and weighs only 10 ounces. The price will be \$21.00 with the firewall in place. Bob also produces a Minnow fuselage complete with all fillets and removable cowl and firewall

for \$28.50.

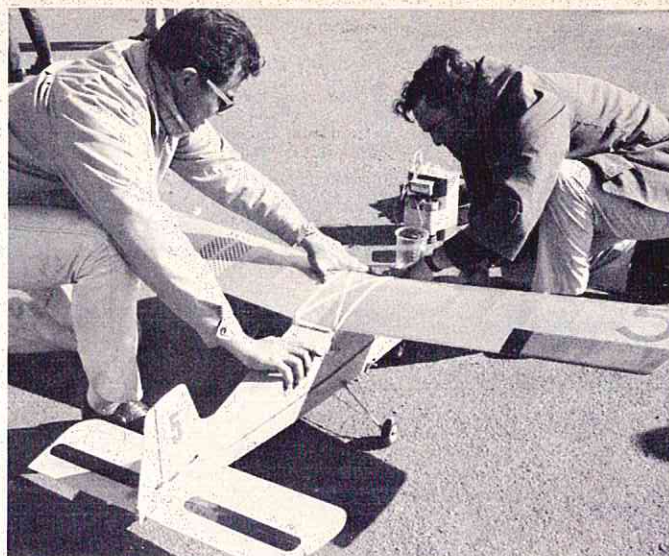
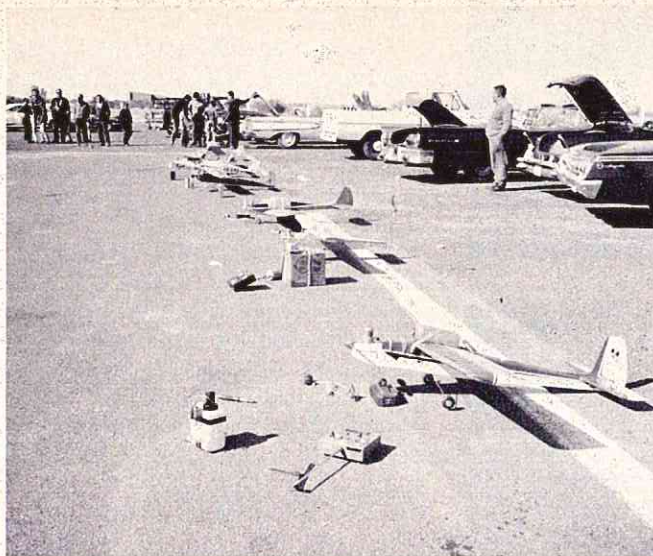
Jac-Mac Models, P.O. Box 3196, Ventura, Calif. 93003, is kitting the Sun-Fli-Too, a 52" version of Joe Bridi's Sun-Fli 4. The kit features all machine sanded parts, plywood fuselage doublers, shaped hatch, and hardware. The kit sells for \$38.95.

Tatone Products, 4719 Mission St., San Francisco, Calif. 94112, has developed a series of exhaust manifolds that will enable the modeler to lead the exhaust away from his model. The Tatone Exhaust Manifolds are cast in aluminum and made in three sizes: .09 to .19, .29 to .35, and .45 to .65. A heavy duty clamp and two screws securely mount them to the engine. Three tail tube pipes are cast in the manifold... one for upright engine position, one for inverted engines, and one tail end pipe. The modeler selects the tail tube necessary for his use, unblocks this tail pipe and can cut off the other two if they are in the way. A length of extension tubing is furnished along with a neoprene connector. This is connected to the tail pipe to lead the exhaust away from the model. An exhaust primer fitting is included and may be installed at the discretion of the modeler. While not intended to be a muffler, these Exhaust Manifolds can be used as a noise limiting device. Prices Are: .09 to .19, \$3.95; .29 to .35, \$4.50; .45 to .65, \$4.95 each.



Tab Books, Blue Ridge Summit, Pa., 17214, has just revised and expanded their Third Edition of the well known circuits classic their 'Electronic Circuit Design Handbook'. This carefully planned reference source of over 600 different tried and tested circuits is a detailed compilation of practical design data. The Electronic Circuit Design Handbook is an 8-1/2" x 11" hardbound volume of 384 pages. The price is

(continued on page 56)



Left: Early morning line-up. Planes, pilots and cars ready for 1969 RC XC epic . . . RIGHT: Jesus Gomez and Abel Guzman with Villegas entry. LW Cruiser was practical for XC race. Enya 45 & Orbit with 60 oz. fuel in brass shim stock tank.

RCM VISITS THE

2nd ANNUAL MEXICAN MARATHON

AN R/C CROSS-COUNTRY RACING EPIC

By JERRY KLEINBURG

What's better than a 75 mile cross-country RC race? How about one that covers 115 miles? This was the way the RC clubs of Mexico City and Guadalajara figured it as they planned the 1969 version of their annual endurance test. In 1968 a successful race covered the 75 miles between Puebla and Mexico City; this time the course was to be from Queretaro to Leon over a mile high trail that threaded through a scenic section of rural and industrial Mexico. Symbolically, it couldn't have been a better choice. Queretaro is quaint with an Emperor Maximillian historic heritage while Leon is an industrial center with modern bustle and technical awareness. RC fitted neatly into either backdrop . . .

The starting point was the Queretaro airport, a windswept expanse located on a plateau about 700 feet above the town and connected to it by a winding road notched into the steep slope of the flattop hill. Seven teams gathered in the chill of the morning to assemble and check out their equipment and entries. Planes and equipment had changed little from the 1968 Marathon that was detailed in these pages. (RCM-March, 1969) The team of Gallegos-Prat-Esteves had their ST .56 powered Nava-

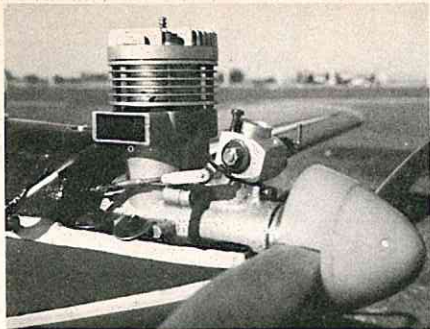
jo — last year's winner — that was favored to repeat in the 1969 contest. Other teams were Villegas-Guzman-Gomez and an Enya .45 powered Live Wire Cruiser; Feiner-R. Guzman-Sadurni flying a Qualifier with one of the first front rotor HP-61's; Covarrubias-Martinez-Calderon with a Super Tiger .40 White Cloud; Betancourt-Elizondo-Velasco flying a ST .60 scale version of the Mexico-manufactured Tauro crop duster (the prototype was actually patterned AFTER the RC model); Lozano-Perez-Vyzueth and a ST .60 Sr. Falcon; and finally the Sanchez-Brunner-Sossa Entry of a Sr. Falcon with integral wing tanks and a Max .80 engine that had a controllable carburetor mixture adjustment. This last entry was the most 'sophisticated' with regard to being made specially to meet the needs of distance flying. Other entries simply strapped an extra large fuel bottle onto the fuselage or wing — or stuffed it into the fuselage — and went merrily on their way . . .

The race itself was a compound of excitement, high drama, comedy, and perhaps tears that would have been a delight to the legendary Greek gods of old as they once watched from

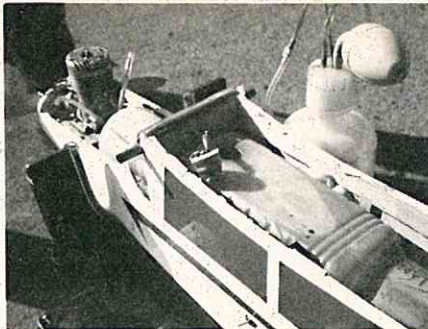
Olympian heights and manipulated the mortals who acted below. As the Mexican version of the model aviation gods would have it, it was Mario Sanchez's specially made model that finally crossed the finish line after a hectic start and an anxiety-filled flight of 108 minutes to win the 1969 RC XC classic! How he got to the Sport Stadium finish line in Leon is a story worthy of a Hollywood comedy production, and we were fortunate to be on the scene for a first hand account:

It started with a binding wheel during the take-off scramble that resulted in two propellers splintering on the first two aborted efforts. Removal of the wheel pants and putting on two other wheels remedied the problem and the plane lifted off easily on the third attempt. Meanwhile, all the other entries had gone. All went well for Mario and his team for 20 miles when the convertible suddenly broke down and Mario found himself afoot for a few moments until a friend came by to offer a ride on his motorcycle! Working out the problem of holding onto the driver and operating his Kraft transmitter at the same time was solved by placing the transmitter in front of the driver while clamping the driver's waist between his

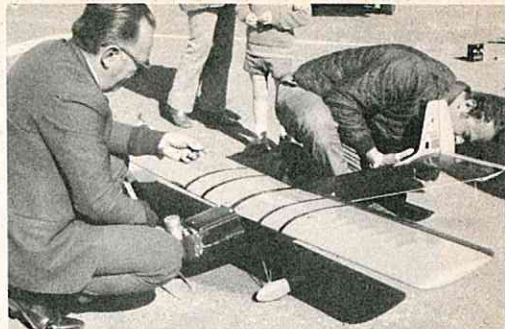
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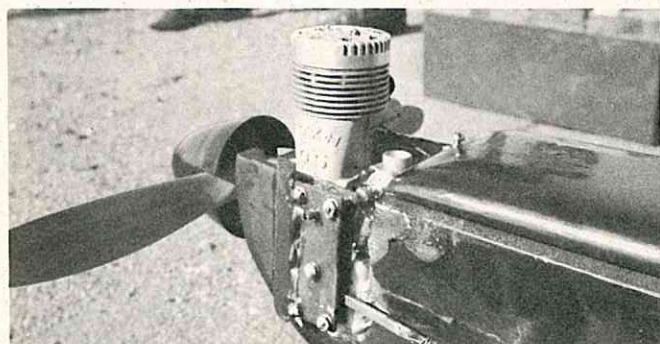
Front rotor HP-61 was a brute . . . New Austrian version powered 7 lb. Qualifier by Salo Feiner, easily hoisted ½-liter fuel load. Fastest plane, averaged 75 mph.



Fuel tanks of Navajo entry by Paco Gallegos, about 58 oz. ST 56, Orbit. Fuel system is simple 2-tank gravity arrangement.



Mario Sanchez adjusts elevator on Max 80 powered Sr. Falcon. Integral fuel tanks in wing. Wheel pants too snug, caused two take-off aborts.



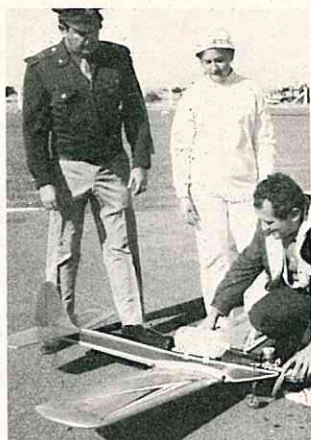
Max 80 powered winner in 1969 Mexican Marathon. Note remote mixture device. Old typewriters rich source of gadget parts . . .



Paco Gallegos, Vincent Perez, Emilio Lozano set hard hat styles in RC XC race. Visors also practical in open breezes and cool air. Tony Vyseth adjusts prop.



ST 40 powered White Cloud was Covarrubias/Martinez/Calderon entry. Carried 60 oz. of fuel, Orbit radio. Finished 4th.



Salo Feiner readies Qualifier. Patrolman Henry Harara watches process with Rita Feiner. Road escort essential to assure plane and road safety.



Vincent Perez, Tony Vyseth and Emilio Lozano ready ST 60RR Sr. Falcon. Placed 2nd non-stop in 115 mile course. Wing folded in exhibition after race. Kraft.



First off — Feiner/Guzman/Sadurni Qualifier led pack. Plane never headed, averaged 75 mph with HP-61, 62 oz. fuel load.



LeMans start for Mexican Marathon. Take-offs one-at-a-time with engine start determining sequence. Exciting way to begin . . .



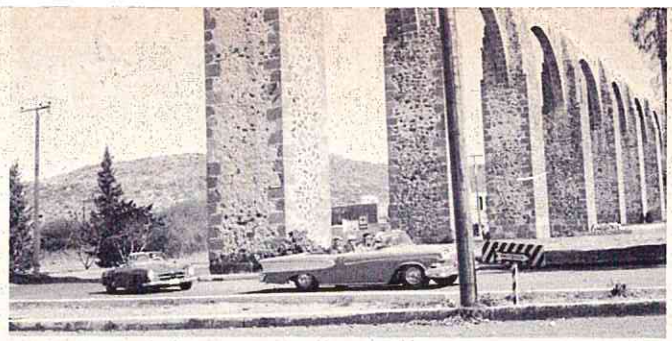
ST 56 powered Navajo entry starts roll. Jose Leon Guzman on left was Inspector from Civil Aero Bureau as Official observer. Highway escort assured safe operation.



Alex Elizondo releases scale Tauro, prototype of full-size crop duster. Model finished 3rd, with ST 60, Orbit and 64 oz. of fuel. Excellent flyer, Max Betancourt pilot.



Typical team setup. Truck new idea. Pilot is Paco Gallegos with Feliciano Prat as backup. Beto Esteves drives with Beto Jr. as helper.



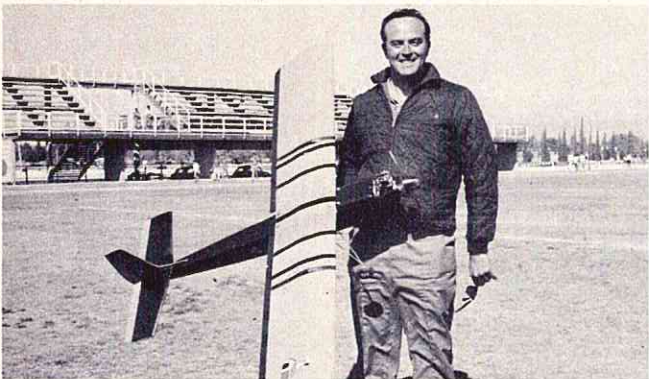
18th Century aquaduct was Queretaro 'obstacle', easily cleared here by Villegas/Guzman/Gomez entry. Mexican scenery and sights a bonus . . .



At 75 mph. . . Dune Buggy of Covarrubias/Martinez/Calderon was rode car. George Vergara at the wheel here. Good drivers essential on XC stints.



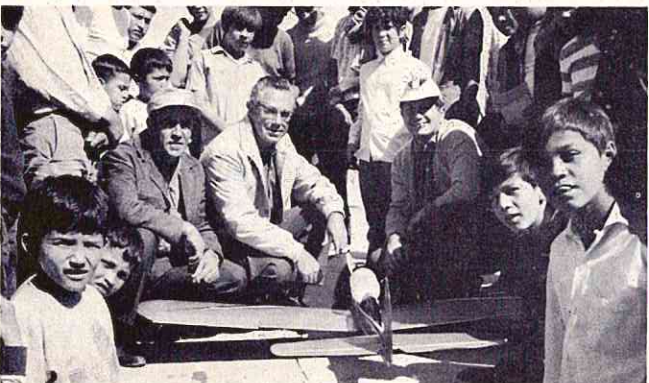
And at the finish line . . . Bob Guzman waves the winner across. Mario Sanchez hitched rides in 3 vehicles to make it, averaged 64 mph.



The winner's smile . . . Queretaro-Leon course non-stop in 108 minutes! Mario Sanchez with Max 80 powered Sr. Falcon. Wheel pants were left at the starting line . . .



Scale Tauro at the finish . . . Short by 100 yards, finished 3rd. Teamed by Enrique Velasco, Max Betancourt and Dr. Alex Elizondo, promoter of full-scale Tauro production.



Fastest, but disqualified . . . Chatto Sadurni, Bob Guzman and Salo Feiner breezed to finish easily. Flight disallowed due to technicality. Note external tank.



RCers and officials of 1969 Mexican Marathon. 5 of 7 planes completed 115 mile distance of Queretaro-Leon course. More XC coming in 1970. . .

(continued from page 21)

ber-band shock mounts, or bungy cord method most widely used on models today, and the originals of old, we decided on a torsion effect eliminating all the extra work involved.

The only disadvantage in scale landing gear felt on this particular model is that it has a close wheelbase in relation to wing span and, if flown off of a very rough field (like gopher mounds and mole hills) can give you an awful feeling in your stomach, as the plane starts to rock back and forth trying to dig up the grass. The take offs on rough fields must be similar to what must have happened to the originals on take offs!

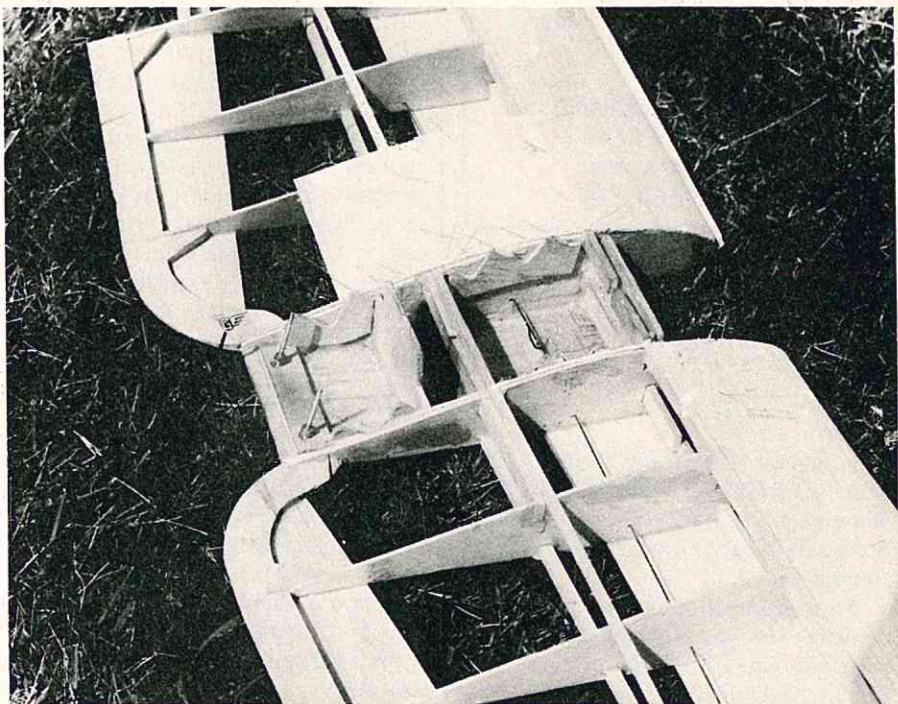
The pilot used was a modified GI-Joe doll and the hat (on backwards) was formed on his head out of Hobbypoxy "Stuff". It's quite simple to use. Just mask off his head, cover with a liberal amount of stuff and let dry, carve and sand to shape (you may have to add a second application to cover any goofs the first time, also to build up the bill of his hat), paint an appropriate color, add side burns, moustach, goatee, and a scarf and you're ready for installation.

The wing area of this 2" scale model is approximately 6 sq. ft. The prototype weighed $5\frac{1}{4}$ pounds ready to fly giving it a wing loading of approximately 14 oz. per sq. ft. This accounts for the ability of this model to fly well with a .19 and make scale like fly-bys and slow flat landing approaches.

Detailed construction information is not given because the design is straight forward, can be built from the plans, and is not recommended as a beginners first model.

Credit must be given to the members and staff of the McDonnell R/C Club and to W.C. Hannan Graphics for their assistance in detail construction methods and information on this aircraft, which proved most helpful in preparing this construction article.

In a final note I felt it was to aviation's disadvantage that the Bristol Company did not produce more than three Brownies. Had machines like these been more plentiful in the early days of flight no telling where our designs would be today. So, once again, I felt this would be a good selection to present to the modeling fraternity as it never really gained its rightful place in the pioneering days of aviation. Unlike so many others, it's easy to build and fly so don't hesitate. Order a set of plans and have yourself a ball. Once you see it taking off of your favorite grassy field I think you will feel it was all worth while. ●



Close-up of wing center-section.

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KITS & PIECES

(continued from page 51)

\$17.95.

Lafayette Radio Electronics, 111 Jericho Turnpike, Syosset, N.Y. 11791, announces its new 116 page 1970 Spring Catalog 703, which is available free upon request.

From time to time we ask other modelers for their comments on a particular kit. Bill Davidson, who is a top notch craftsman, has written the following comments on the Graupner Cirrus Glider Kit:

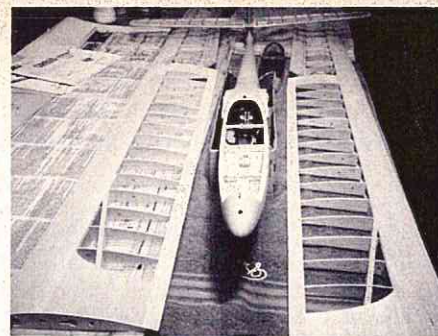


A funny thing happened to me at a San Gabriel Valley R/C League meeting. One of Fearless Leaders Contributing Editors - Bill O'Brien sat down beside me and made a simple statement - "Got somthin' in the car to show you". Out we went in the dark of nite, under the dim street lights to look at "somthin" - it was the best looking kit box I have ever gazed at, a beautiful shade of red, smooth glossy finished cardboard, with a picture of a Cirrus glider in vivid white, plus insets of various sections and information on it. Without thinking I said, "Boy would I like to build that", and before I could close my big mouth, O'Brien said, "Why not!"

So, tenderly I locked it in my car and returned to the meeting, but I nearly went mad waiting for the meeting to adjourn so I could get home and look through a real live Graupner Cirrus kit. What pleasant thoughts of soaring raced through my mind as I pawed my way thru the beautifully done plans for construction and various radio installations. There are two instruction books, one in German and one with several languages including english translation. I was very impressed with the quality of the wood and die cut parts, all of which were excellent. The three piece molded fuselage and hardware were equal to any I've seen or built. A special tube of adhesive was furnished to cement plastic to plastic, and plastic to wood.

Several days later Bill called to ask how I was doing. "Oh!", he said, "By the way, even though the kit version you have doesn't provide for ailerons, how about adding them?" I didn't think it was a big deal (as the fuselage and tail assembly went together so easily), so I said "why not!"

Almost a week went by before Bill



called again and ask the obvious "How are you doing?" So I told him; "it took 3 days to splice the wing plans - my servos will never fit the space allotted for ailerons - it has sixty wing ribs - it is a builders dream but I am a shoemaker and it will take forever to build the wings with ailerons, plus I have no way to hook up the ailerons - I can't read German - my wife says the lawn needs work - the weather is bad".

Bill finally cut in and said calmly, I have the aileron problem solved. A keen little device manufactured by Rowan just for gliders with wings which contain ailerons, which detach, and I'll see you tomorrow!"

Which all came true, a keen gadget for aileron hook up in detachable wings - whew! The kit, as it comes, is very good. I think it would be stronger if the ribs were capstripped at least on the top, as the rib to trailing edge is fragile. Also, the aileron servo space is very limited and there is a front spreader dowel which had to be removed to hook up the aileron servo. The plastic fuselage parts, three pieces, consisting of a tail boom and two front halves, assemble very neatly. The material wet sands and accepts paint very well. If you follow the instruction book and carefully study the exploded views, it is an easy thing to build, but does take time as there is a lot of detail construction in the wings. The one major change I made was to add vertical grained webbing between the wing spars. They show the wood with the grain parallel to the spars.

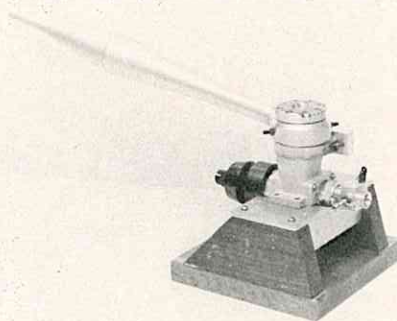
Franz Kavan, one of the world's largest manufacturers of model airplane parts, introduces their new Control Surface Fairings. These are designed to close up the control surfaces, increasing efficiency of each control surface by eliminating the airflow between the surface and its adjoining aerodynamic member.

Product 60 Hobbies crash resistant R/C Models announces the Mooney Mite. The manufacturer says this plane has fantastic appeal, superb handling

characteristics, and the same high quality materials as their Skyland and Comanche. The Mooney Mite is a full house performer for sub-miniature digital equipment. The fuselage is photographically scaled to avoid errors. The rudder and stabilizer are scale but the operating surfaces are 20% larger to insure high speed response. The fuselage is 28½" long and uses a modified Midwest wing. The wing is sparred with ¼" x ½" balsa and is covered with an .010 high impact translucent styrene. Any experienced modeler would ask why such a high stress wing on such a small model? This little beast will actually fly with an .09 engine, although a .15 is ideal, and a .19 is hot! The reason for the high stress wing is to permit a feasibility study in mini-miniature pylon racing. The Product 60 wing is stressed equivalent to, or actually stronger, than most wings used on pylon racers. The Mooney Mite retails for \$39.95. They are offering 100 planes to those who will actually fly ½ pylon courses with .19 engines for \$29.95 each plus \$3.00 postage and insurance. This offer will require a single order of four planes from one city and be limited to 8 planes from one city. It will require the individual buyers to complete a questionnaire and submit race results. (We hope to publish the results of this study.) If the results are conclusive, Product 60 will introduce a series of pylon racers scaled for ½ size courses with .19 engines. Product 60 feels the efforts of the pylon flyers are worth \$10.00 a plane to them and they are sure the results will help influence the industry. Product 60's experience indicates this size plane on a ½ size course produces more fun, greater flying challenge, and a much safer pylon race than the big hot .40's. The custom hand work in this model makes it impossible to offer it through dealers without a much higher retail price. These planes will therefore be sold by direct mail only. Manufactured by Product 60, P.O. Box 19133, Salt Lake City, Utah 84119.



Steve Muck's R/C Model Boat Supplies, 3422 Greenwood Ave., Los Angeles, Calif. 90066, is now delivering the new J.G. Model boat propellers. These propellers are made of beryllium copper from precision machined masters. The propellers are currently available for .19 and .40 mono hull boats, with the .60 size available soon. The .19 size is offered in 1.250 and 1.375 diameter by 1.750 inch pitch at \$3.50 each. The .40 size is available in 1.500, 1.562 and 1.625 diameter by 2.00 inch pitch at \$3.75 each. These propellers are ideal for today's mono hulls currently on the market.



Also from Steve Muck is the addition of three new configurations of the Rossi .60 engines, the first being a new full R/C airplane version 60-ABC. The engine incorporates the use of an aluminum piston with a brass liner, chrome plated. With the increasing interest in Open Pylon, this should be a leader at \$66.00. The second engine is a tuned pipe RC Marine 60. Like the unpiped engine, it comes with a Water Jacket and Rossi flywheel. The engine has a new liner timed for the tuned pipe. The pipe, in turn, is connected to a manifold that has a 13 degree angle so as to let the pipe extend out of the boat. Also available is a megaphone exhaust system that equals the power of the tuned pipe. The R/C tuned pipe engine goes for \$90.50 while the Megaphone model sells for \$88.00. A separate manifold sells for \$5.00 with the megaphone only for \$6.00 and the tuned pipe for \$11.50. An American made universal setup goes for \$3.50. ●

SUNDAY FLIER

(continued from page 50)

it, true — but not to the extent that you shouldn't use a power pod, if that is the only means available to get up where the thermals begin. And from what I can recall about Alabama, they get some pretty powerful thermals down

there when the tropical gulf air mass moves north over the state.

If I were forced to use power assist with a sailplane, I'd use an engine mounting in the nose, rather than a pod over the wing, and compensate for the added nose weight by relocating the radio equipment as necessary. Sure, the drag of the prop and engine will reduce the L/D ratio of the sailplane, but I don't think it drops as much as if you use the wing mounted pod. The big advantage of the latter is the "strap-on" capability without changing anything else. Another advantage is that some of the kits, notably the German ones, make provision for the strap-on pod. If I were doing it, though, I'd rig up a detachable nose so an engine could be put up front, and then move the batteries or servos back a bit to compensate.

There are so many sailplane kits available that it is hard to say which one would work best with the power assist. The Kurwi is a good one. So is the Cirrus, the Foka, and to a lesser degree, some of the sport types like the Malibu, the Windward, and Dumas' new "Fly-Anyway." These are just a few.

No matter which one you pick, you'll have to figure out the power assist modification — so pick the one that appeals to you the most, and go from there.

And how about letting me know how you make out. Send along a photo that I can show to the other guys.

Regards,
Ken Willard

Maybe some of you glider experts disagree. Oh, well.

* * * * *

That's enough on gliders for this time around. Let's look at some power plane activities.

Received a letter from James S. Miura, Secretary of the Kapiolain R/C club in Honolulu, Hawaii, with some beautiful pictures. Too bad there isn't room enough for them all, so I picked one that I think you all will like. It shows Jim's son, Keith Miura, with a grin as big as all outdoors, proudly posing with his dad's "Trainermaster." I'll bet it won't be long before Keith will be building them himself — just like Rita Feiner in Mexico. I certainly love to see the younger generation taking up the sport.

Jim also sent along a picture of a "Headmaster" which he modified to use the RCM Basic Trainer wing. A very

interesting combination — probably better for beginners than the Headmaster with the semisymmetrical wing. Although I would think that O.S. .35 up front really makes it move.



Here's a letter from Melvin Lee, in Tyrone, New Mexico.

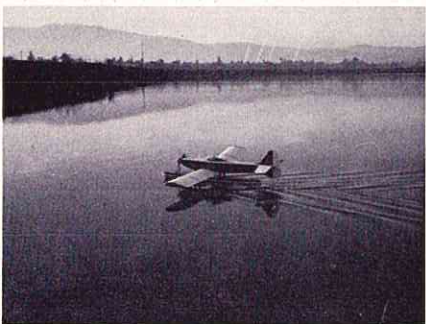
Dear Sir:

Enclosed are photos of my Stearman PT-17 that I have just completed. Photos taken with Polaroid camera.

It is a Sterling kit with a 64" wing span; powered with a Enya "60" engine. The radio is Heath Model GD-47. The scale engine cylinders are Williams Bros., with G.I. Joe standing by.

I am sending these photos as you asked in the December issue of R/C Modeler Magazine, on page 52. I subscribed to your magazine a short time ago and have not received any copies yet, so if these pictures are used I would like the issue they will appear in.

I've only been in Tyrone six months and we don't have very much interest in models yet, but hope to improve on this. Tyrone is a new town owned by Phelps Dodge Corp. and



is only about three years old, so it will take a little while to build interest. A small mention would help?

Am looking forward to future issues of your magazine.

Sincerely,
Melvin Lee
Box 137
314-Chalcocite
Tyrone, New Mexico 88065

Look at that Stearman! If he hadn't told me it was a model, I would have sworn they must have an old primary training strip there in Tyrone where he took the pictures of a real job! Since they are just getting started there in Tyrone, maybe some of you might drop Mel a note of encouragement.



Now for a bit on seaplanes. Somehow, I've always had better luck with flying boats that with twin float seaplanes, although with the advent of proportional gear the problems with twin float takeoffs certainly have been minimized.

Anyway, for some time I've been thinking about a single float seaplane — you know, the shipboard fighter type that they used to catapult from battleships. It seemed that it should have pretty much the same take-off characteristics of a flying boat, since there's only one main float, and the tip floats are free of the water as soon as you get up on the step.

About the same time my flying buddy Jim Sunday had the same idea and built a float for his Slickfli — which has a fiberglass fuselage, foam wing, and total weight of about 8½ pounds, with a .60 up front.

I built up a low wing design around the 48" wing that I had built for the



Seafoam flying boat, and used the same basic hull line on the single float that was so successful on Seafoam. It worked great. The pictures show Bud Freeman taxiing past and then taking off, with the third picture showing the angle at which it sits in the water as it taxis back after a flight. We'll publish this design, called the "Islander" later on this year.

Meanwhile, Jim was having trouble — his ship wouldn't take off. It would get up on the step, but it couldn't rotate enough to get the lift under the wing. So, Jim sawed the float in two at the step, glued it back together with some upsweep aft of the step — and away she went, broken back float and all! So, if you're designing yourself some floats, be sure to allow room for rotation on takeoff, or you can do an awful lot of skittering around on the water. And that's frustrating.

In the February issue of RCM I ran a questionnaire for beginners. The response has been excellent, and it is becoming increasingly clear just what the beginner is looking for — at least those beginners who read my column. It may surprise you.

Lots of the fellows not only sent in their answers, but also wrote long letters. Unfortunately, there are so many of them that I can't undertake to answer all of them separately, so thanks to all of you for sending them, and I will answer those that included a stamped and self addressed envelope. Just be a bit patient.

And for those of you who haven't written in, please do. Just send a postcard with your answers coded — you know — like 1b, 2d, 3a, etc. I'll add them to the analysis, and then I'll design a job that represents the cross-section of the beginners' ideas on what they want.

It won't be a look-a-like, either. ●

TRENDS IN SOARING

(continued from page 47)

Program RC IV C

- A. As in RC IV B.
- B. 4 complete rounds on a triangular course where each side is approx. 300 ft. (One flagman in each corner)
 - P = 200 pts.
- C. Landing, earliest after one completed round (as for RC IV B)
 - P = 50 pts.
- Remarks:
 - 1) Each round not completed
 - P = -50 pts.

- 2) As in RC IV B.
- 3) As in RC IV B.
- 4) As in RC IV B.

These programs can easily be flown as a normal pylon-race with several soarers being flown simultaneously. Quite often as many as 6-7 models are started at approximately 30 seconds interval, each pilot has his own flag-man and good colour! Theoretically we can fly as many as 12 planes simultaneously on the 27 MC-band and 2-3 in the 40 MC-band! As you may know, the German RC-equipment is very narrow-banded and a total of 12 spot-frequencies are open to us in the normal 27 MC-band where, in the U.S., you have only 6 spot-frequencies.

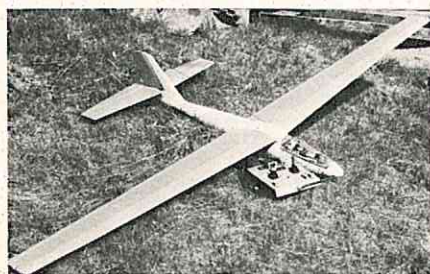
Remarks:

1. Maximum score per round is made up of "flying points" plus "landing points".
2. "Landing point" is where the model comes to a stand-still.
3. Distances are measured from the center to the nose of the landed model.
4. A landing must always be carried out according to a standard landing procedure with base leg, final approach and gentle touch-down.

A rough landing, for instance a wing-tip first landing, is NOT approved and gives zero landing points.

5. An RC-soaring contest according to the above stated rules, is always a 3-round game, all rounds to count for the final score.
6. A bad start, or other unfavourable conditions, giving the competitor a bad starting point, can be compensated for by a re-start if the model is landed within 60 seconds after release. Only one re-start per round.
7. Only one reserve-model per competition allowed.
8. Builder-of-the-model rule is followed.

Foka built by Rigstad from a Graupner kit. A very efficient slope soarer capable of high speeds and aerobatics. Tailplane must be enlarged with 4" in span to obtain enough area.



UPGRADING THE POSI-TRACTS

(continued from page 39)

system. I purchased the diodes thru one of the Radio Shack franchises. They sell for forty-nine cents a pair. The miniature micro-switches were found in a electronic surplus store for four bits. Even if one has to buy the components brand new, the cost is still less than the original "Novel" switch and the four batteries required.

One note of precaution... make sure all the Posi-Tracts are wired the same. (Diodes connected the same, common white to common white, etc.). Also a connector is required at the wing. I used one connector for the wing units by paralleling the connections in the wing.

Incidentally, the "over-center" snap action using micro-switches has many other applications in RC. Its fool-proof and reliable.

So there you are sports fans, move up to retract landing gear, modify the Model 'B' Posi-Tracts and you too might be Mr. BonettiKraftLeonard.

GENERAL NOTES

Wiring Instructions:

1. Diodes must be connected as shown. A convenient location close to Posi-Tracts is recommended. All arc suppression capacitors should be mounted on Micro switches with short leads.
2. Each Posi-Tract unit required 2 diodes per unit.
3. Ni-Cad batteries should be at least 500ma cells. (3-500ma, 1.2v. cells connected in series).

Required components:

1. 2. Micro switches, miniature "Micro" 11SM5-1T2 or equiv.
2. 4 (per unit) diodes, (Silicon diodes, 1 amp 50v, International Rectifier Corp. 1N4816 or equiv.). Note: any miniature silicon "economy" replacement diode may be used, such as diodes sold for replacement use. However, diodes must be at least 1 amp. 50v rating.

Some convenient means should be provided to charge nickel-cadmium cells, such as a connector between nickel-cadmiums and micro switch assembly.

A quick way to check to see if noise suppression is adequate is to actuate gear either up or down and turn off transmitter during time units are running.

There should be no movement of any servos either with units running or with micro switches being actuated.

Set up procedure

1. Set transmitter to give low engine, with trim at low position. Position collar to about .010" from actuating arm with arm in "down" position.
2. Move transmitter to high engine, leaving trim at low. Actuating arm should not go to the "over-center" position.
3. Move trim to high engine. This should cause actuating arm to go "over-center", snapping arm to "gear up" position.
4. Leaving transmitter stick and trim in this position, set remaining collar about .101 from actuating arm. (do not move collar that was positioned in step No. 1).
5. Move transmitter stick to low engine, leaving trim at high. Actuating arm should not go to the "over-center" position.
6. Move trim to low engine. This should cause actuating arm to go to "over-center", snapping arm to "gear down" position.

Notes:

1. Actuating arm made from Williams Bros. "throw reducer".
2. Spring should be tight on both actuating arm and soldering lug.
3. Spring length should be such that at the center position, spring should be almost fully compressed. Correct length is about 1" free-standing.
4. Component mounting hardware all 2-56 except soldering lug and angle brackets which is 4-40.
5. Board is made from fiber-glass, plastic wood, etc.
6. Elongate micro-switch mounting holes if necessary.

Operation

Always make sure engine trim is in low while aircraft is on ground. Make a normal take-off using engine stick as required for power. Actuate "gear up" by moving trim to high position. Once gear is up, full stick throw may be used, without causing gear to actuate. To lower gear, first move trim to low position then momentarily move stick to low engine, returning stick to about one-half or three-quarter throttle. Gear will be down in about 5-8 seconds and again full stick throw may be used. Remember during gear transit time, appropriate micro switches must be actuated for the time required for the gear to fully extend or retract.

(continued from page 37)

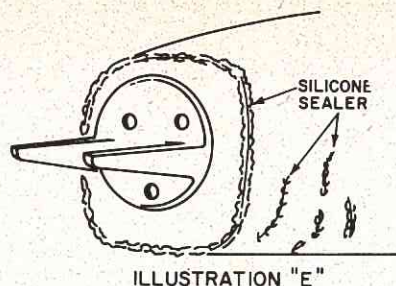
photo 9. Some of the new low wing ARF's use a tongue-type plywood retainer for the leading edge of the wing. It is recommended by the manufacturer to epoxy this in place. One bad landing can break this tongue. Then, a real excavation job is necessary to remove the glued portion. Try this method for mounting the tongue — lightly spot glue the tongue in place, drill two holes for 12-20 bolts all the way through the assembly. Inside the fuselage, set two blind nuts in the holes. Remove the tongue, trace a pattern including hole locations for future use. Replace the tongue and secure with 12-20 bolts from outside the fuselage skin. (See illustration "D"). Be sure to use large washers under the bolt heads.

Wing seating. To effectively keep the exhaust goop from entering through the wing saddle, apply strips of 1/8 inch thick foam tape to the saddles. Then, from a piece of scrap plastic, add a flap, as shown in photo 10, to the trailing edge support on the wing.

AFTER A CRASH

Most low level misjudgements should result in damages to the fuselage in only three places, that is, if you've had the plane beefed up as outlined earlier... The engine mounts, wing trailing edge hold down area and empennage.

Broken engine mounts. On the larger planes replacement of the plywood mounts is too complicated to be worthwhile. Instead, remove any remaining sections up to the firewall. (This is the fourth reason for putting in a firewall as discussed earlier.) If the side panels are also damaged, cut them away flush with the firewall. Cover the entire firewall with fibreglass. After it has dried, install any one of the ready-made type engine mounts. Be sure you've included the required side or down thrust. Where the plastic has failed, seal the areas with silicone adhesive. (See illustration "E"). (Photo No. 12).



Fuselage. Where the fuselage has failed aft of the wing trailing edge, you can straighten the plastic by carefully using a small torch. Patch any cracks on the inside with scraps of plastic and solvent. Then apply a section of stiffener to provide additional strength.

Empennage. In the empennage section, join the broken sections on the outside with patches of plastic and solvent. If you use pushrods, remove them and fit O.D. sections of NyRod from the pushrod exits to the servos. Pour in enough plastic foam solution to expand approximately 3 inches beyond the broken or cracked areas. After the foam has expanded, remove the O.D. sections of NyRod and install the pushrods in the resulting holes.

Wing. Repair the wing as outlined in the kit manufacturer's instructions.

To accomplish this beefing-up will add 2 to 3 hours to the building time of the kit. You'll get back 20 times that in airplane life, barring any major crash. If one should occur, do not dump the plane in the trash barrel until you've completely cannibalized it. Wing tips, wing sections, ailerons, uncrumpled pieces of fuselage plastic, etc., will provide repair materials for your next plane.

SCALE IN HAND

(continued from page 8)

we get right down to it, to eliminate the Scale Factor after so short a time would be akin to taking out the difficult manoeuvres from the Pattern schedule on the grounds that "not every model can do them."

As a matter of fact, the opposite reasoning can prevail. We could say, "Models which are altered are not scale and so are not qualified to enter the contest, on the grounds that it is not fair to the accurate models to endeavour to

reach the same flying points potential". There needs to be some way to "lead" the modeller, so to speak, toward ever more accurate models. This is the only direction scale can go and still be moving forward.

We seriously doubt that the modelers want the Scale Factor eliminated. On the contrary, it has been the only fresh idea in years. So what if it is an American idea? Is this so bad? International rules, let us remind ourselves, are supposed to be formulated Internationally. No one country should be allowed to throw out every idea that doesn't personally suit them or give them the advantage.

In any case, we feel that once the general level of the models improves, the Scale Factor will have less sting. At present it seems like a fierce weapon only because we have so many absolute horrors turning up at the contests — even the World Championships.

It's a shame to pick on poor Dennis without giving the rest of his thoughts, many of which we wholeheartedly endorse. But for reasons of space, we'll leave these to those interested — see Jan. 1970 "Radio Models".

Scale Contests

Denver area scale fans have an "Eyeball Scale" (stand-off) event on August 23. For all details contact the C.D., Don Johnson, 12604 W. Virginia Ave., Denver, Colorado 80228.

* * * * *

Cocoa, Florida will be the scene of a 2 day World War II Scale contest on April 25th & 26th. This is more of an F.A.I. — style deal, for accurate models. The man to write for information is Bob Wilson, P.O. Box 987, Cocoa, Florida.

* * * * *

Dear Dave,

Enjoying your column very much. Particularly the scale techniques that are described.

You have mentioned, and Mr. Don Dewey also, the attention to detail and realism of the English scale models. It seems, however, that no one ever bothers to mention sources of data used by the craftsman. Are these the result of individual research and study or are there general publications, photos, drawings, factory plans, manuals, etc., available? If so, from where?

As an example: I have written dozens of letters to museums, manufacturers, historical foundations, private individuals, publishers, and various firms for data pertaining to the Stearman Pt-17. Much data has been obtained at some expense of time and money, but considerable details are still missing. e.g. the method of interplane strut mounting. To obtain data on Fokker DV11 and DR1 I have joined "Cross & Cockade", studied micro-films of original issues of "Flight and the

THE LEARJET

The Ultimate In Sport Scale

Ken Willard — "The Learjet is a show stopper — fast, exciting and realistic; yet surprisingly easy for the experienced modeler to fly."

Bill O'Brien, RCM Special Projects Editor — "An exciting scale model; yet very easy to fly and maintain."

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Aircraft Engineer". WWI period issues are very good. Also, I obtained drawings by Nieto from the Smithsonian, close-ups from Bob Holman, and so on ad infinitum.

I mention the above mainly to see if I am on the right track. Is this the normal approach or are there easier methods or better sources of information? What I am doing is very time consuming and can rapidly become expensive without any real results.

In your R/C column, November issue, you mentioned a company would soon produce scale pilots. I recently purchased the Top Flite S.E. 5a kit and your instruction booklet mentions using a Top Flite Scale pilot (Special Note, paragraph 5, page 3). I have not seen this pilot advertised anywhere. Are these the same?

Charles V. Keller
El Paso, Texas

Like the rest of us, you have learned that to get all the information needed for a really super model is a painstaking business. Your approach I cannot fault.

About the only thing you don't mention, but which is one of the first things I do, is look for a real plane. For example, while making my SBD and 190 I visited examples of these aircraft for first-hand examination. The first involved a 1500-mile trip and the second a 700-mile one. If you can learn where there is an example of what you want, you can save much time, frustration and money.

The pilots are going to be produced by TF from my moulds, but no date or price has been determined at this time.

Dear Dave,

I've been going to drop you a line for a long time to tell how much I think of your "Scale in Hand" series. It's great. Any one that does not get turned on by a good scale or even a semi-scale model just does not have a love for aviation. I won't consider building a model unless it represents a full-size plane in some way. Two exceptions were the

"Mirage" (X-103) and the "Vertigo" which were built for a purpose other than scale or semi-scale.

Any help I can be to you in promoting semi-scale in your column, just holler. I am working on a ¾" B-25 that looks real good. Although it may be a little small for some, about 435 sq. in. I added some chord to the wing to get it that much area. It will have flaps. 2 Webra 20's will power it. If I can keep it around 5 lbs. it should be ok. It's about 75% complete. I plan on submitting it to RCM for a change. I'll drop you a photo when its a little farther along.

I'm also just completing a semi-scale "Taube".

One thing that puzzles me about the "Stand-Off" Scale event is where regular scale ends off and "Stand-Off" begins. If it is flown as a single event, Joe Blow still flies against Dave and Maxey with their super scale jobs. As an event to be run along with a scale event what is to keep the advanced builders from competing with above average models and flying ability? Where is the line drawn or isn't it? Other than this it sounds like a great idea.

By the way, I'm glad to see you always supporting the B.O.M. Rule and knocking those that disregard it.

Any way you are right about the "Bearcat". There were some good military color schemes. The one you depict is one of the best though. I appreciate you taking the time to bring it to my attention.

Best,
Nick Zirolli
(Major Models)

The intent behind the "Stand-Off" rules we presented was to nullify the advantage of a F.A.I. — type model. However, your point is valid. Ideally, a club running a scale contest should have the two classes — and anyone trying to enter an F.A.I. Scale job in the Stand-Off Class should be politely reminded that this class is intended for the less-experienced modelers, and that fair play indicates a switch to F.A.I. on his part.

It's impossible, really, to legislate against a superior model having a su-

perior chance. We'll just have to see if good sportsmanship makes this problem a theoretical one.

As for the B.O.M. bit, this again is a matter of sportsmanship. This column only knocks when someone breaks a rule which nobody else has the "advantage" of breaking. The Californians run a class they call "Dirty AMA Scale" with no B.O.M. rule, and EVERYONE has the same option. We see nothing wrong with this as an extra event — gives everyone some fun, build-er or not.

Dear Dave,

I was reading your column in the February issue of RCM when I came across your idea of "Class '2' Scale". It is a good idea, but I will take issue with you on one point. MAN-EUVERS NEED NOT BE TYPICAL OF AIRCRAFT TYPE, Hogwash. This item was point four in your rules. Now lets look at rule No. 5. "Judges shall mark flying maneuvers remembering that REALISM is more important than precision". How do you evaluate the two statements? I can't. Seeing a .29 Bird Biplane doing vertical rolls is not realism. Nor is the statement in another trade journal about Walt Moucha's Jenny. IT JUST FLEW AROUND. A scale model must fly like its big brother. If a fighter then it must do such flying. But for a Pietenpol or a Buttercup to fly like a fighter is out of the question.

But in all seriousness, I would like to see in your column a list of people or places where one may obtain scale information. A continuation of this months column would be good. Keep up the good work and give us the guts to build the best scale.

Henry M. Heard
Fremont, California

I guess you are right about the contradictory requirement for realism in flight yet not limit the model to full-size manoeuvres.

Some way out of this needs to be found. Because nobody wants this thing to get so "technical" that you have to



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prove manoeuvres were typical. Let the guy do what he wants - adds to the interest, makes each flight different, and after all, this is supposed to be the FLYER'S scale class.

On the other hand we wouldn't want utter perfection of performance to help win, else it will just be another contest for the pattern experts to clean up.

Seems to me all this is a matter of interpretation by the judges at the time. If a loop had to be preceded by a dive for speed, let them NOT downpoint the loop. If a roll is a bit barrelly or loses height a shade that's ok too, because this is how real planes fly.

So how are we going to say when a manoeuvre is or is not well done?

Ah! There's the rub! Any ideas?

Dear Dave,

I read your December 69 RCM article about frequency distribution with considerable interest. The idea is a novel one and should be considered.

I wonder about your reason for more time tho - I really don't think that scale people should be tempermental.

I was contest director at the Masters Tournament this year and we used a system which insured maximum use of the air time available and it worked. Using this system with 2 flight lines as we did, you could log 120 six minute flights in 6 hours.

I am enclosing a copy of our schedule sheet and other information we used.

I'd also suggest making scale flights short - perhaps 4 minutes which is enough to

demonstrate what the model will do. Using 3 flight lines and 4 minutes, you could log 270 flights in 6 hours which should be just enough.

If you'd like I'd be glad to run the flight line & help get the flying done efficiently this next year at Glenview.

Very truly yours,
Len Purdy AMA 129
(Lanier Industries)

I've read your letter and the enclosure and whilst acknowledging that the system is good so long as all R C classes are to be lumped together organisationally, I cannot see that it will solve our problems for once and all.

What my Frequency Allocation suggestion seeks to do is separate the R C classes into individual events which can be run all at one time. Can you imagine the chaos at the Nats if every event, C'L, F'F, and R C had to be run consecutive instead of concurrently? Glory be!

It may be that there is a case to be made for Frequency Allocation in all R C Classes and that each would benefit as a result. This I do believe. However, it is not for me to horn in on Pattern or Goodyear so I confine myself to trying to get it in Scale which is my own territory.

Projecting ahead, I believe that Frequency Allocation is inevitable so long as the R'C hobby continues to grow as

at present. Nor do I see how F.A. is so bad. What's so terrible with it?

Another point. There are rumblings from within that R C fans would like a Stand-Off Scale class at the Nats. Further, the non-builder scale guys (so-called "Dirty AMA Scale") want an event of their own. These people cannot be mixed into Nats Scale as it presently is and their need should be considered. Now, if we had F.A., these 2 or 3 scale classes could all use the same frequencies and these events be run consecutively - with, say, FAI (or "expert") scale last, to end the week with a bang.

Len, you will notice that my ideas are perhaps futuristic. Okay. But I only used them to demonstrate that F.A. is the only FINAL solution.

Finally this month, two shots of a superb Curtiss "Jenny". The work of Brad Allen of Sacramento, California, this magnificently detailed model is Super-Tigre .71 powered and weighs 11 3/4 lbs. Brad didn't mention the size but anyone can see it's BIG.

Just to rub it in, Brad says, "when California warms up we'll try to fly it". Saucy devil! It's -8° here today in Chicago! Seriously though, best of luck, Brad - let's see some flying shots.



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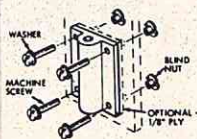


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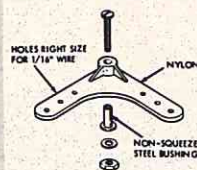
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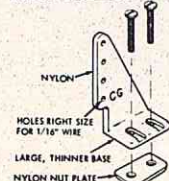
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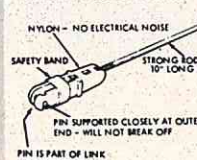
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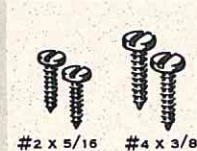
Extremely tough. When applied with heavy coats of cement, it approaches fiberglass. Excellent hinge material. 3/4" wide x 5 ft. 25¢

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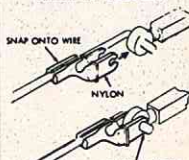
Ajusto-Link is used for adjusting linkage to control surfaces, throttle, steerable nose gear, etc. Nylon-tough and no electrical noise. Takes heavy load. 29¢

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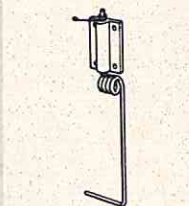
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CUNNINGHAM ON R/C

(continued from page 14)

model to allow for gentle flying. There is no reason to have the ship act like it was going all out to win a fun-fly contest with maximum throw on each surface if you're going to use it as a trainer. Give the student a real break, set the throttle on your bird at about half speed. It is a big help to him not to have the model ripping around the sky a

jillion miles an hour.

The Professor, the Instructor, Ugly Stick, or Falcon, all make excellent airplanes for this type of flying. I really believe that with this type of system you will have a lot of fun in bringing your small fry into the sport when they are ready. And, who know, perhaps your wife might really get interested in the sport if you let her get in some stick time. She might even turn out to be a better pilot than you!

* * * * *

Interest is really beginning to build up in the National Fun Fly Championships sponsored by R/C MODELER Magazine and the Fort Worth Thunderbirds, June 20 and 21. We are getting applications from all over the country, and if you are planning to enter this first national sporting event, write now for your entry blank and full set of rules. Write to me, Chuck Cunningham, 5333 Wooten Dr., Fort Worth, Texas 76133. Remember, you must have a valid AMA license to fly in this contest.

There is one very important rules change from the basic rules published in February. This was a typographical error on my part, for which several modelers wrote asking about it. The landing

approach will be as follows. You must make a high speed pass over the transmitter going DOWNWIND. As you pass by the transmitter you chop your throttle, then you make a 180 degree turn back into the wind and land on the grid system. After you have chopped throttle, you can neither advance it nor retard it again. It is dead as a control from that moment on. No landing points will be given if the throttle is moved. Of course, to save your ship you can move the throttle, but the landing points will be zilch.

The entire object of this meet is to get in a lot of flying by a large number of contestants. We will be moving the flight lines very rapidly, and no slowness will be allowed. If the contestants want to fly, the opportunity will be there. At the present time we plan to use two flying fields, one paved, and one close mowed grass, with two flight lines at each field. This will allow four flight lines to be used. Each flight will be for a maximum duration of five minutes, which means that the optimum would be 48 flights per hour. Speaking realistically, 40 flights per hour would be great. Over the 16 hours of contest time this will give us 640 official flights, which is a bunch. It's up to the contestants to make this work,



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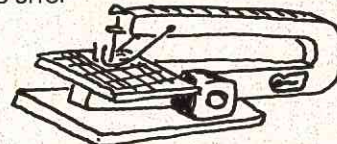
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by being ready when their name is called. Another rule that will be strictly enforced is that there will be absolutely no flying allowed over the spectator area. If an aircraft strays over this area the pilot will be allowed 10 seconds to get it away. If he does not, that entire flight will be scored a zero. These rules are not stuck in to see how "chicken" we can be, they are provided to insure that a maximum of safety is observed, and that a maximum of flying time is allowed for all pilots. Both the staff of RCM and members of the Thunderbirds think that YOU will have a good time at Fort Worth in June.

A lot of thought and ideas have been tossed around by club members, as well as those planning to come fly in this event as to what is the best type of aircraft to fly. Well, it has to be one that has lots of power, is light, can climb fast, roll fast, yet slow down for a landing, with lots of slow speed control. It may be an Ugly Stick, or some such aircraft that will be the winner, but, more likely, it will be a Little Stick or something similar. But, if you are designing your own special aircraft, and I hope that you are, then here's some ideas for you. Keep the power high, but weight down. This can be accomplished by using a smaller engine than a .60, or

by using a smaller aircraft with a .60 in the nose. A 550 sq. inch shoulder wing with a .60 would make a very potent machine, especially if the weight is around five pounds. A good, semi-symmetrical airfoil, with a thick section for lots of lift would be better than a symmetrical section, at least for this type of meet. The old standby NACA

(continued on page 75)

ENGINE CLINIC

(continued from page 10)

usually swing a fairly large size prop and are very smooth.

As mentioned earlier, the big problem is equal fuel distribution to both cylinders. It is general practice to offset the cylinder center lines so that the two connecting rods will miss each other as they rotate. With the cylinders offset this way, and the carburetor setting either up front or in the rear (see Viking photo), you can be relatively sure that the engine is going to have problems. One cylinder will always be farther away from the carburetor than the other. This is even a problem in automobile engines. The obvious solution would be to place the carburetor on top

of the engine between the two cylinders. If you will look at the picture of the Ace, you will see that it was this way, and was one of the reasons that the engine was more successful than many of the others. An alternate solution would be to offset the connecting rods, themselves, on the wrist pin so that the cylinders would be on the same center line and equa-distant from the carburetor. However, this presents problems due to the unequal loading on the wrist pin and piston. Then, when the glow plug came along, things became more critical even with the carburetor equal distant from the cylinders.

Engines have to be manufactured to production tolerances. In other words, each part has to have a slight variance. .250" plus or minus .001", etc. One rod can be a hair longer than the other. The distance from the wrist pin hole in the piston to the top of the piston can vary slightly. The distance from the center line of the crankshaft to the top of the crankcase, again, can vary a thousandth or so. When all of these tolerance variations are added up with the engine assembled, it is called "ganging of tolerances". If you were to check the distance from the top of the cylinder sleeve to the top of the piston, which in an automobile engine is called 'deck

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height', you would be surprised to find out how much this can vary due to the mentioned ganging of tolerances. This, in turn, affects the compression ratio, port timing, etc. This was not nearly as critical with ignition engines as it is with glow plug operation. Your glow plug engine is a compression ignition engine. This means the fuel charge fires when the combustion pressure and temperature is right for the plug and fuel you are using. If one cylinder has a slightly different compression ratio than the other, then it will fire differently than the other cylinder. To complicate the situation, if one piston has a better seal that results in higher combustion pressure than the other cylinder, then uneven firing will also result.

Being aware of all of this, I experimented with a twin many years ago in which I had set the deck height identical in both cylinders. I ran the engine on a lathe with pressure gauges on the cylinders to balance the combustion chamber pressures. This helped a great deal, but one cylinder still ran leaner and hotter than the other. The only deduction I could make from this was that the bypass chambers for both cylinders were on the top of the engine, and the exhausts out the bottom. Rotation of the crankshaft was helping fuel flow up one bypass and not the other. I also discovered that I could richen up the lean cylinder by lowering the compression or using a colder glow plug. However this was only a temporary remedy, because if the weather or temperature changed, this cylinder would then become the rich cylinder.

The next obvious solution was separate carburetors for both cylinders. This worked very well and solved the major problems . . . except for one: The human factor. A good portion of you guys out there have difficulty setting one needle valve correctly, let alone trying to synchronize two! However this does seem to be the only way to go at the present time.

Possibly the answer might lay in a transistorized ignition system. Several people have been working on these and maybe, one of these days, we will have a complete ignition system that will fit in the opening of your back cover. By being able to control the firing of the plugs, as in the old ignition days, the deck height, compression ratio, etc. would not be near as critical. The thought of this would most likely shake up the radio manufacturers. Think what havoc an ignition system might do to some of your digital systems. However,

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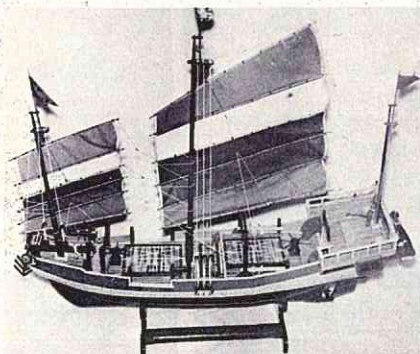
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Maynard Hill used an ignition system on his endurance record holding airplane, so the problem can be met.

An ignition system would also help one of the other problems facing a twin: Idle. If one cylinder loads up and the glow plug goes out, it will not light again without a battery, so a reliable idle with a twin will always be a problem.

That about sums it up. Two manufacturers have twins under development. Ben Shereshaw with the Bantam twin, and Lou Ross with the Ross twin. I certainly wish these two gentlemen all of the luck in the world and hope that they can come up with a solution to the problems that have been keeping twin cylinder engines off of the market all these years. The R/C market is waiting for a good twin.

* * * * *

Whenever I get a letter like the following it causes me some concern. Not from what the writer has done, but because of what he did not do.

Dear Clarence,

I have a very early production model Veco 61 which has only recently been pressed into service. The engine is an absolute joy to start and usually fires right up at the first flip of the prop. The joy ends right there! This beast runs so hot that I couldn't run it in on the bench at all. I was forced to fly it very rich in a Senior Falcon to give it additional cooling.

The first attempt to run the engine was on a test stand with a Top Flite 11/8 and K&B 100. It ran so hot that it crackled when shut off after three minutes running time. The next attempt was made with an 11/6 and the same K&B but with two ounces of castor instead of the initial 1 ounce per quart. The same results were noted. The fuel finally evolved into a mix of added castor in a ratio of six ounces per gallon of fuel. The engine would run on this mix if run VERY rich but still got excessively hot.

The next attempt was to break it in in my Sr. Falcon. The plane is very light and it did manage to struggle around the field with the engine set very rich. The added cooling did allow the engine to run longer before overheating and stopping. Now after three and one half gallons of this sloppy mix the engine will finally run out a tank of fuel. At this point I went back to straight K&B 100 plus one ounce of Lubricin. The results are about the same except that oil isn't dripping all over the place. But the engine still can not be run wide open and will not accept a cautious attempt at idling. Both of these things will overheat the miserable thing and it will quit cold.

Investigation does not reveal excessive varnish or carbon. The only unusual thing that I have noted is that the crankshaft/con rod journal seems to be rubbing on the back cover plate, almost as if the back cover plate went in too far or perhaps the journal is too long.

In twenty eight years I have never had an engine like this one and it really has me stumped. If length of break in is any criteria as to engine life this beast should last forever. I have the engine to the point of running out a tank when set at the very start of a two cycle, and it tolerates the slight leaning tendency noted when airborne.

Two questions: 1. Do you have any other things that I could try? (or am I just rushing things?) 2. Will the new manufacturer honor

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the "lifetime" warranty? If so, who should be contacted?

Regards,
Dick Hill
Laurel Springs, N.J.

Any time a ringed engine takes more than a gallon of fuel to break in, there is definitely something wrong. Providing of course you are using a fuel that contains proper lubrication. If you suspect that the crankshaft is running on the backcover, the engine should have been returned to the manufacturer a long time ago, Dick. The manufacturers stand behind their guarantee. The engine was sold with a 'lifetime' warranty against defective workmanship and material. K & B is now producing the Veco engines and will stand behind the guarantee. If the problem is the result of defective parts or workmanship, the engine will be repaired at no charge. However if examination shows the problem to be from improper running or abuse on your part, you will be charged. You mention the engine is an early model just recently put into service. Did you by any chance

purchase it used? Engines come in all the time that have been bounced off of the concrete by the original owner and then unloaded on to another owner. This may not be so in your case. Unfortunately some of the earlier Veco's did go out with pistons and lower ends a little tighter than might be desirable. They did take longer to come in than they should have, but did end up being good running engines. In your case there is obviously something wrong, so stop fighting it and send the engine into K & B for a check over.

Dear Mr. Lee,

I am sure this is the first letter you've received from Greece. During my nine modeling years, I met some problems that (in my opinion), are internationally bothering all modelers.

I will mention two of them. The first one is about the distance of engine mounting holes. Well, what do you feel when you want to compare two different engines on the same model but you can't use the new one simply because it won't fit in the predrilled holes? This problem might be partially solved with the use of TATONE engine mounts, but will be completely eliminated if the engines come with the same mounting template.

The second one is about glow plugs. In your country you have "LR" and "SR" in

cold, medium and hot variety, with or without idle bar. Besides American plugs I have used the Super Tigre and the O.S. type. These two are neither long nor short, but something in between. What effect do they have if used with another type of engine than the one recommended for? How do the S.T. and O.S. engines perform if another plug is fitted to them? What plugs do you recommend for these engines?

Yours sincerely
John Constantacatos
Athens, Greece

You are right Mr. Constantacatos, I get letters from all over the world, but yours is the first from Greece.

A universal mounting bolt pattern would be a great thing from the modelers point of view, but I can assure you that the manufacturer of a particular make of engine is not too concerned if the competitions make will fit his bolt pattern or not. It would be okay with me if the other makes decided to adopt the Veco .61 bolt pattern, but I'll be darned if I would change it or design an engine to fit theirs.

Each engine designer has his own idea on how something should be done. In the case of the Veco .61 I wanted the

P.M.W.

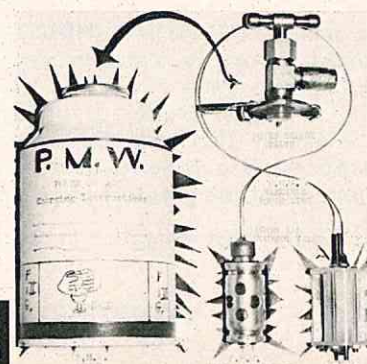
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balance and to strengthen the front of the case. Fox also does this. Other designers prefer the removable front plate type of case where the mounting lug cannot be brought forward. I am afraid that as long as engine designers have different ideas, there will also be different bolt patterns.

I have been receiving quite a few letters regarding glow plugs and will be doing a technical bit in the near future that will cover your questions.

Dear Mr. Lee,

I work in a hobby shop in Zurich Switzerland where, aside from other chores, I receive all kinds of model engines for repair and maintenance (from the small diesel to the large 60). Could you please tell me how to remove the carbon deposit and shellac from the piston of an RC engine? Is it proper to remove the piston rings and then to replace the same ones, or should one use new ones? Up to now I have carefully shaved off the shellac with a sharp unused razor blade. I'm sure this must be the wrong method. I have not been able to remove these deposits with thinner, nor have I dared to use very fine steel wool, hence the razor blade.

Could you also tell us something about the

wear out? Would it not be well for a manufacturer to supply their engine with the proper plug? How about a whole article on glow plugs, their history, development, and improvement?

Thank you for your help.
Hanno Pfeiffer
Thalwil, Switzerland

Hanno, you are sure going about removing the varnish the hard way. In this country we have SOS pads that are soap impregnated steel wool intended for cleaning pots and pans. If something of this nature is not available in Switzerland, use fine steel wool and kerosene or light oil. Do not remove the rings from the piston as they can be easily distorted. Just be very careful not to hook the ends of the rings with the steel wool during the cleaning. It is not necessary to replace the rings unless they are badly worn and the engine is in need of an overhaul.

As mentioned in the answer to the previous letter, I will be doing an article on glow plugs in the near future. Probably next month if I can figure out what to say and how to say it.

Dear Mr. Lee:

I have a FOX .59 R/C engine mounted in a low wing, tail dragging, WWII, scale P51 and wish to mount a muffler onto the engine. I would like to use either the KO or the SILENCE-AIRE muffler but am unable to trial fit one at a local hobby shop. Which one will fit with no modifications to the engine or the muffler?

Also is it possible to use a scale 4-bladed prop on the engine? Would the added blades add to the pulling power of the engine; I have access to lathe equipment and could make a 4-bladed adjustable prop similar to the auto-pitch prop marketed several years ago. Is this type of prop advantageous to flying?

Sincerely,
Robert P. Sonier
WO 1 USN

The Silence Aire for the Veco .61 can be made to fit with a little work. It is not quite high enough and a little longer than the Fox stack. With a pair of duck nose pliers you can reshape the manifold enough so that it will fit nicely. Neither Silence-Aire or KO make a muffler expressly for the Fox as far as I know. You might write Norm Rosenstock who makes the B & N muffler. He could most likely provide you with a muffler that would fit right on. B & N runs an ad in R/C Modeler from time to time.

If you go to a four bladed prop you are going to have to increase the power of the engine considerably to swing it. Because you cannot do this, the alternative is to decrease the diameter. Because of the small diameter you will be losing a lot of prop efficiency. There would be no advantage to using a four bladed prop as far as flying is

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concerned. Appearance-wise it would sure look great.

Dear Sir:

I have a Super Tigre .56 with the double hose carburetor, (idle and high speed hoses) that is almost impossible to start in the forward direction at times. I am using it without a muffler but with the original baffle.

Several weeks back on a very hot day, using Dukes Fuel, I would get six to ten backward starts for every correct start. Last week (the first time used since the other occasion), on a much cooler day, (which probably has nothing to do with it,) the ratio was much better, being about two or three to one, rather than ten to one.

If you should have space in your column in the future, please give a systematic adjustment procedure for both the two hose ST carburetor and the newer G (cam) carburetor. I find the Super Tigre instructions leave much to be desired.

Thanks very much,
Bert Kuschner

All engines will fire up backwards once in a while, but your Super Tigre .56 seems to take the prize for consistency. I think your starting technique may be partly to blame. You are probably loading the engine without realizing it. This would account for the problem you are having being better in cooler weather when more choke is necessary. Duke does use an igniter in his fuel for easier starting. This on a hot day, with a slightly flooded condition, will cause a lot of kicking back. You might try flipping the engine smartly backwards when starting. This will usually clear a flooded condition quicker and result in forward starts. If all else fails, try installing an extra head gasket to lower the compression slightly. This will definitely help the situation.

There is no systematic procedure that I can give you for adjusting either of the carburetors that would give completely satisfactory results. You would still have some problems. The new cam type carburetor is a lot more reliable than the old two hose model, but still has its problems.

If you are having any idle trouble, I would suggest you replace the carburetors with either Perry or Kavan. You will be surprised at the increase in performance, especially through the intermediate range. Incidentally, World Engines makes the Super Tigres available with the Perry carburetor.

Dear Sir:

As a newcomer to RC I have learned a great deal from your "Engine Clinic".

I share a similar problem with Sgt. Norman Lindermann but I have not bought my engine for my hydroplane yet. The old-timers around here claim I can slow my engine down with a baffle enough to make my turns. Which would be the best performer, the G65ABC with a baffle, or the fuel regulator, or the G60R/C RV with maybe two throttles. Also how much difference in performance is

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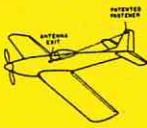
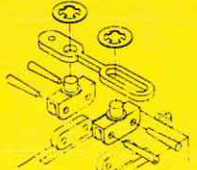
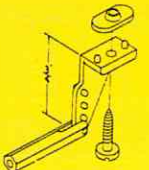






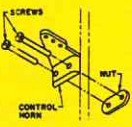
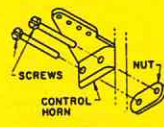
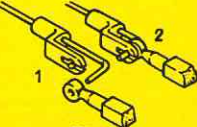






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there in the hand lapped speed pistons and the one ring RV and the 2 ring FV.

Any help would be greatly appreciated.

Sincerely,
Roger Luebke
Concord, Tennessee

If it is all-out speed that you are interested in and only want to throttle the engine down enough for the turns, then the G 65 ABC would be the best bet. This engine is intended for high nitro fuels and all-out racing. If you want to sacrifice a little top speed for a more reliable idle and better throttling, then the G 60 R/C RV would be the better engine. The two ring front rotor engine would rate number three in the power category. This would be a fine engine for a cabin cruiser, but as you are running a hydroplane, you are undoubtedly interested in the speed end.

There would not be too much difference in performance between the ABC lapped piston and the single ring piston used in the G 60 if you were only interested in burning mild to fairly hot fuels. The big advantage of the ABC lapped set-up comes through its ability to tolerate large percentages of nitro with a minimum of break-in time. This type of set-up is not affected nearly as much by a lean run and overheating as a conventional piston and ring assembly would be. Also remember your ABC .65

is of larger displacement than the .60 which is good for a slight bit of power in itself. The front rotor .60 was never intended for racing and is not even in the same class as your other two engines.

THE MODEL WIFE

(continued from page 6)

paper and anything else you might have around the house that would further the building of models. Save all jars with good tops for paint and all large plastic jugs for fuel. Don't throw away your old stockings; They make great strainers for lumpy paint. Keep your soft rags for wiping off airplanes after flight.

If your husband invites you, go out to the flying field with him to watch and lend a helping hand. If you have young children, comfort them when the engine is started and, in a very short time, they will be used to the scream of the engine and the smell of the exhaust. After a while, go get some iced drinks or a few cans of cold beer. In the winter time, make that a thermos of hot coffee.

Keep a cheery smile on your face when a new kit arrives in the mail or

your hubby comes in with a new engine. Don't complain of the odor in the house on the night he starts doping. Gasp, if you can't help it, but don't complain!

For the wives of winners of trophies; display them in a prominent place. When company comes, if they don't notice the trophy, point it out with pride in your eyes. Show it off from every angle, give a synopsis on where and when it was won and for which class. If the model is still intact, show it to your guest, also. If it is demolished, tell how it crashed. Be sure to explain that the crash was not caused by pilot error, but by interference, low batteries or whatever catastrophe it happened to be in that instance.

Most modelers take pictures of their airplanes from time to time. These should be near at hand, ever ready to be pulled out at a moments notice. Like when your husband says, "Honey, where is that picture of the Stinson, you know when we were at the contest and Mike took that good color shot?" It matters not at all that this photograph is twenty years old and by all rights, should be buried in a box somewhere in the hall closet. Take my advice, file all model pictures in alphabetical order where you can lay your hands on them in an instant.



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On quiet nights, when there are no model friends in the shop with your husband, don't go in to visit with him if you are tired or not feeling good. Before you can settle yourself on the only stool, he will have you holding this for him to solder, pressing that together until it dries or some other little tasks that will keep you standing on your feet until you are ready to drop. If you make this mistake, suddenly remember something that you had to do and escape to a comfortable chair with a good book or the television set for company.

One more thing, when Christmas and his birthday roll around, don't give him clothes. Give him things like model tools, engines, tachometers, model magazine subscriptions or a new radio set. He will love you for it.

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fall in love with models and model people. You'll have many good friends from all walks of life. We have met scores of modelers, all of them interesting, all wonderful people, all different and not a lemon in the bunch! ●

VIEWPOINT

(continued from page 5)

trolled full wave output. In an attractively styled steel housing, it comes equipped with an on-off switch and built-in pilot light, 3-wire grounding cord and overload protector with manual reset button. The unit can be used with all universal (brush type) motors and fixed load shaded pole motors.

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trol of electric drills, hand saws, sanders, polishers, and soldering irons. The harder the material, the slower the speed should be for drills. When drills are used as electric screwdrivers, the danger of damaging the work or screw heads is easily lessened. The speed control makes any hand saw a perfect cutoff tool for plastic. Saber saws can be slowed down when cutting thin hard metals, plastic, tiles, wire mesh, or making intricate shapes. When properly set, the unit prevents ruining projects through over sanding by stopping the worker from going too deep. The MSC can double as a temperature control on soldering irons or guns to provide for just the right heat. It enables home appliances or tools with heating elements to perform with precision, and it is also an effective light dimmer. The Dremel Solid State Motor Speed Control is available at most hardware, hobby, and industrial shops.

Lafayette Radio Electronics, 111 Jericho Turnpike, Syosset, L.I., New York 11791, has introduced a new 20,000 ohms-per-volt VOM, priced at \$29.95. This is a portable, precision VOM with 1% multiplier resistors and built-in overload protective circuitry to protect meter movement from overloads. It also features an expanded, easy-to-read 6 inch mirror scale. A sensitive 50 ua meter provides 20,000 ohms per volt DC and 5,000 per volt AC sensitivity. Accuracy is + or - 3%DC; and + or - 4% AC; and + or - 3% resistance. The unit operates on self contained batteries, and is housed in a rugged steel case with high-impact plastic panel. It is complete with test leads, batteries and carrying handle.

In closing, this month, I would like to remind all RCM readers of the RC Modeler Magazine and Fort Worth Thunderbirds National Fun-Fly Championships to be held June 20 and June 21 at the Thunderbird field on the West Shore of Benbrook Lake, Southwest of Ft. Worth, Texas.

This first national contest for sport fliers, under AMA Sanction No. 63 is designed to provide competition on a national scale for pilots who are not interested in pattern or racing competition. Trophies will be awarded from 1st through 10th place in Open and 1st through 5th place in Junior-Senior combined. Merchandise awards will be given all during the flying days. There is a \$3.00 pre-registration fee or a \$5.00 on-sight registration for those who do not pre-register. This will be an ideal weekend of fun for the Sunday Flier as

well as for his entire family. Since the site is located on the shores of beautiful Lake Benbrook, there is ample camping sites all around the lake, lots of boat ramps, and fish in the lake. There is also water skiing for those who care to participate. There are many motels within 15 minutes drive, including a Holiday Inn. The average high temperature on these dates is 91 degrees with an average humidity of 50%. The average low temperature is 71 degrees with a water temperature of 81 degrees at the lake. The average wind is 12 miles per hour.

The rules of the Fun Fly are listed in an advertisement in this issue of RCM. As a note of interest there will be custom fitted black arm bands awarded to everyone who crashes during the two day affair!

I would like to urge each and everyone of you, particularly those of you who have never before entered any type of contest, to attend, along with the entire family, the RCM-Thunderbirds National Fun Fly... you'll not only enjoy it, but it is a competition designed exclusively for the sport and Sunday flier.

CUNNINGHAM ON R/C

(continued from page 64)

2415 is hard to beat. Perhaps the 2418 might be a better choice. Either would be superior to a symmetrical airfoil. Landings need to be precise, and the best way to do this with the landing system devised, is to have an aircraft with a good amount of drag. The squared off nose of an Ugly Stick is the best source for this type of drag. If you streamline the heck out of the nose, you just might dash on by when making your landing approach. Look at the Formula I racers: Getting them back on the ground is a real art, since they just keep boring through the sky. Lots of frontal drag will solve this problem.

Well, that's about it for this month, if you're interested in a Buddy Box system write to the manufacturer of your radio equipment. I know that you will enjoy this system. If you are interested in the National Fun Fly Championships, then get busy and get that aircraft built, and practice. See you in Fort Worth in June. Old Dewey may even brave the roads of West Texas for a trip here again, who knows...

Come to think of it... who cares? He only ends up busting up my airplanes!

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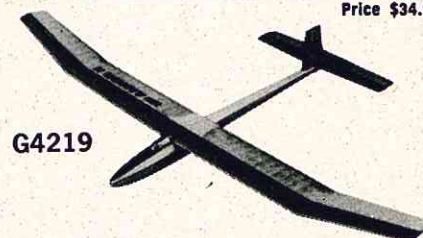
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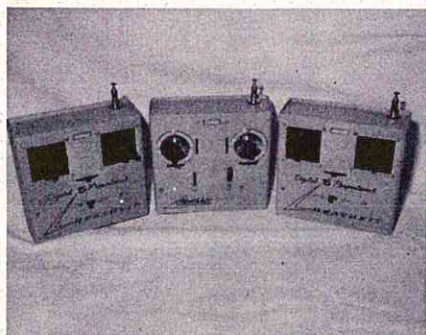
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KIT BUILDING

(continued from page 41)

be both the feeling of inferiority and also of superiority in our complex. If the feeling of inferiority seems to dominate, take note of your worth, for you may be a better and brighter person than you think. Then too, if you suffer acutely from a spirit of superiority, why here's an excellent chance to see if it can be justified.

To be objective, I will have to relate my experiences of success to one company, Heath, which is located at Benton Harbor, Michigan. Although the Heath digital radios come shipped in a

fairly large box or carton, they still can be sent via the mails. When it does arrive, it is one of the lighter moments of your life. It is difficult to conceal your enthusiasm, and get underway with the opening of the merchandise to see just what it's all going to be like in building one of these for the first time. The first thing you will encounter is the 133 page manual, and after scanning through it in a general way at first, and in a more detailed manner later, you will find that it's not so bad after all. I think at first I thought that I had bitten off more than I could chew, but after the first moment of panic subsides, you will find it is indeed written in non-technical language. Also, the instructions which are listed in a step-by-step manner, are simple and concise and the pictorials and photographs are easy to understand and read. All through the construction part of the manual, there are trouble-shooting charts in case you have trouble either in building the set or, later on, should some malfunction arise. Also, I might add that you can get technical assists from the company by either correspondence through the mail, or if you live reasonably close enough to keep your phone bill down, you can phone right in and talk to one

of their competent and courteous engineers. It's wise to have the pertinent details of your difficulty clearly in mind and held to a minimum for two good reasons. First, to keep your phone bill low, secondly to not use up too much of the engineer's valuable time. But if need be, they can usually put you right back on the track in short order. And if worst comes to worst, you can always send the set in for a check-up and get the difficulty cleared up. In any case, you won't be left an orphan.

I might add that, with the first set I built, that several months after completion, a difficulty showed up in that all of the servos gradually got so that they were sluggish in one direction of travel, although they would work perfectly in the other direction. I checked with the company and was informed that it would be repaired for \$10.00 if a part was defective and it would cost \$25.00 if there was a construction error on my part. A diode in the transmitter was found to be shorted or burned out, and the set returned with a half dozen papers showing that it had been completely checked out and were stamped with the letters NC (no charge)! In fact a couple of capacitors were also changed to bring it up to date with a slight change in circuitry then in production. So I've always been thoroughly satisfied with them.

After looking through the manual, the next thing to read is a rather small color booklet called the Kit Builders Guide. This is a must, particularly if you are a beginner, as the correct techniques and much helpful information and hints are enclosed. This includes a chart describing how to learn to read the value of a resistor in ohms. This is by the three color bands. When called for in a step, a resistor is listed not only in ohms but also by their three colored bands, so no major problem is involved here. This booklet lists the small tools that you

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will need as well, and they are needle nose pliers, a small wire cutter, a couple of rather small assorted screwdrivers and, if available, a wire stripper. I've always used a small pocketknife to remove the insulation from the ends of the wires when called for. With a little practice you can learn how to cut the insulation enough for removal with a slight tug, and still not weaken the wire by the blade nicking it. You don't want to damage the wire at it's most vulnerable point, next to the solder connection where fatigue could eventually get to it.

Another instrument that comes in handy for close-up checking of your work is an inexpensive magnifying glass of about three or four inches diameter. Some of the components that go into these circuit boards are rather small, and look alike but, nevertheless, are of a different value. These should be sorted out and kept separate when a package is first opened up and the parts accounted for. The magnifying glass can really zero in on these very small numbers printed on the sides of the rims of some of them. Remember that there can be no misplacement of parts in the circuits. This isn't asking for the impossible; it is asking you to be particular. Trust com-

pletely in the manual and follow it exactly. If you've ever heard the story that the Lord's Prayer was once printed on the head of an ordinary common pin, you tend to be a believer after trying to read these small printed numbers on some of the parts! Also, the magnifying glass is great for checking over solder connections for a possible cold joint or even one you might have missed and not soldered at all. The receiver and servo circuit boards are very small with narrow clearances between soldered lands, and you want to be sure of no excess solder causing a bridge or short in the circuitry. A good bright light of the swivel type is a great help in working on these kits. If you want to get X-ray type checks of the completed circuit boards, hold them up to the bright light and, with the aid of the magnifying glass, you can get a transparent view of them.

When a package is opened, empty all the contents out into the bigger box as explained in the Kit Builders Guide. Arrange the electronic parts in the corrugated edges of it for easy access during assembly, and also to group them in categories for proper and easy identification. Be sure none slip down into the corrugated holes in the edges

and are lost. Put masking tape on the edge of the box where this might occur, and punch small holes in the tape so things like resistors can be temporarily stored. This can be done with the sharp point of a pencil. Be sure to go through the parts check list and account for all the contents, not so much that they didn't send all the parts (they always do) but instead to be sure you emptied out completely all the small sealed envelopes and also that you didn't drop or mislay something.

If a part is unfamiliar, look at the number in parenthesis in the parts list and pull out the parts pictorial on the following page and look for the corresponding number and a drawing of the part as shown. Also, use the magnifying glass to be sure you don't get the colored bands in the small resistors confused. Sometimes one of the orange bands can be mistaken for a yellow or for a red or brown band. Or a green or blue could be mixed up if care is not exercised.

There is one situation where you may have to double check, and that is in the servo circuit board where two cylindrical transistors with a painted dot on each is used for a reference point for aligning with the board. Be sure to

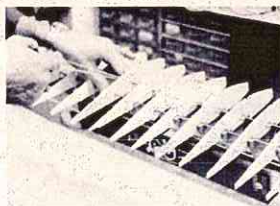
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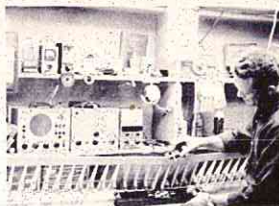
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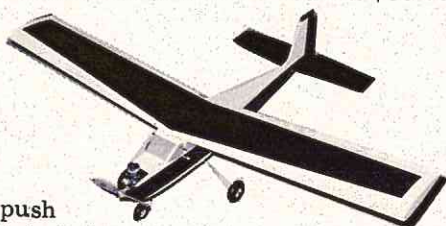
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double check with the pictorial to be sure of the proper positioning of these items, otherwise the leads will not be soldered to the proper lands on the foil side of the board. Also, in the receiver board, most of the transistors shaped like a top-hat have the center (collector) lead bent backwards slightly away from the flat side, and the remaining two bent forward toward the flat side. However, there is one such transistor in which this procedure is reversed for installation in the board. So take nothing for granted, relax in your work but if you really want to be sure, read each step twice and then you will not be overlooking some variations in these directions. Heath advertises that their kit can be built in about 25 hours construction time. Half the fun of a trip is in getting there and so I like to enjoy the scenery along the way. I've always spent about 50 hours time on each kit, and check all components before soldering them in. After all, when I get done my kits always work, and really that's the name of the game!

Other things worth mentioning are soldering techniques. This can be easily mastered if you will remember that you are joining two items together, not only structurally but more important for a good electrical connection. Consequently, put a slight pressure from the tip of the soldering iron on both parts simultaneously. If the iron is at the proper temperature, it will only take a second or two to heat both parts and then the tip of the solder wire can be touched to the tip of the iron and almost immediately the solder should flow and make a smooth and bright connection. Immediately withdraw the solder roll followed by removal of the iron tip in an easy and graceful gesture. Do not move any of the affected parts for a second or two until they have cooled and become rigid. Also wipe the tip of the iron after every couple of connections on a damp sponge to keep it clean and bright, so that you will be getting fresh solder on each new joint.

Heath starts you out by having you construct the circuit board of the transmitter first, where things are nice and roomy to perfect your soldering and it is a real confidence builder. Then you assemble the entire transmitter, except for the output meter which is reserved for the last, as it is used for testing of the entire system later on. Then the airborne battery pack and charging cables are assembled and you reach the first place in which some of your work is finally tested. The transmitter battery and receiver battery are charged sim-

ultaneously by having the transmitter plugged into an ordinary household electrical outlet. There is a red jewel located in the bottom of the light blue transmitter case, and when it lights up it never fails to give one a good feeling. So far, so good! A very rewarding and pretty sight.

Now the two circuit boards of the receiver are constructed. You will find things a bit more crowded here, but by now you should be feeling equal to the challenge. Then when you finally get to the circuit board of each of the four servos (five if you order an extra), you will find that the components are standing on end and rubbing shoulders. Your accumulated skills will now be put to the test, as things are pretty exacting. But it is all worth it, and when you get them done you should be feeling proud of yourself. Just be extra neat and precise in your soldering to avoid shorts caused by bridges, and check it out carefully with the magnifying glass.

After assembly of all the units, you will then begin a full scale testing of the system to see if everything checks out alright. Heath has found a way to do this with the output meter, and before you are through you will think that it is worth it's weight in gold. If you have done your homework well, the little red needle will move on the white face of the dial as indicated in the tests of the manual. The RF section which the company has preassembled, is first on the list for a check, then the five channels of the transmitter circuit board are checked out along with the battery. This is followed by the receiver, where the meter is used to peak it out for maximum sensitivity by adjusting two transformers. Then each of it's five channels is checked out. Finally, you learn how to adjust and center all of the servos and then, at last, the meter is installed in the front of the transmitter case where it measures relative signal output. This helps you to know when to recharge the batteries.

So now you have a rig that is second to none in value, appearance and performance. And you've saved quite a bit of money in initial cost, although the saving doesn't stop there. You are now ready to install the system in your favorite plane. If some adjustments are needed, you are completely familiar with the set and can make them. If one of the servo's travel must be reversed, you can look on page 88 of the manual and find how to unsolder two wires on the particular stick control pot involved, and merely switch them. Just recenter the servo again, and you are on

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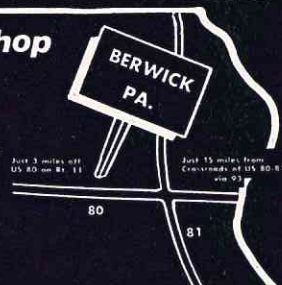
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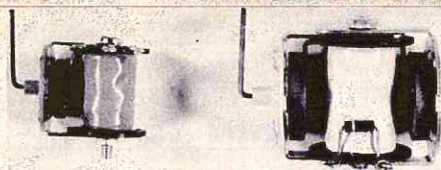
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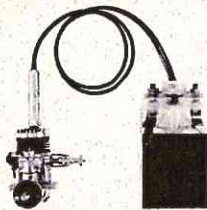
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your way. This can be necessary as in the case of a plane with strip ailerons. Or if the throttle control needs a precise setting so it doesn't bind at either end of travel, you can adjust the range of travel with the range control in the transmitter, and again recenter the servo with the stick pot adjustment lever. I use the rotary arm of the servo for throttle hook-up, and remove the linear arms and racks entirely so they can't hit the end of the slots and stall. Then I tape over the slots so oil and dirt can't get in.

I suspect most of us experience an unwelcome crash now and then. The little monsters seem particularly ground hungry when we are trying to struggle through those first few solo hours. And even after we have gained enough experience to get these guided missiles up in the air and down again in one piece with some degree of predictability, we press our luck at times. Maybe we enjoy that one last flight as evening approaches. And in a moment of inattention it somehow eludes our vision, and the bird just flies off into the dusk and develops a flight plan of its own. You might find it the next morning a half mile away as the rays of the sun glisten on the structure that still remains above ground level. But the point is that if you built the kit, you can usually repair it yourself. Your down time can vary from a few hours to a few days, depending on if you have some of the more vulnerable items ordered ahead of time and on hand. These are usually the rotary arms of the servos, possibly the post and gear to which the arms are attached to, or even the entire case. Or maybe the pin plugs are a little worse for the wear. Just get out that parts list for the proper number and price of the parts and order them. If you live reasonably close, just phone in and you'll get the parts in two days. So if you have a spare plane sitting around, you are soon flying.

So for those modelers with a limited budget who are flying something less than modern digital equipment and have the urge to move up, a kit could be the way to do it. If you have been looking for a way to kick the cigarette habit, why not anchor your willpower to a kit, and the money going up in smoke could just about keep up the monthly payments on the painless payment plan.

Nothing worthwhile was ever accomplished without taking on a few calculated risks, as reiterated in the old admonition, "Faint heart ne'er won fair lady!"

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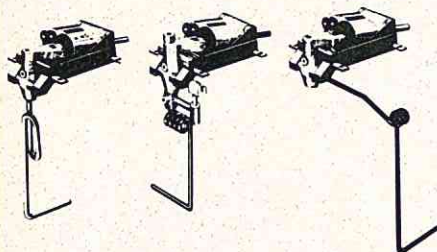
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MEXICAN MARATHON

(continued from page 52)

forearms. After all, a good flyer doesn't need to look at the transmitter while flying, Mario must have reasoned... This arrangement was good until the fiesta filled town of Silao was entered. Here the mirth of the gods must have again erupted as the motorcycle coughed out of fuel! The fiesta crowd barely noticed our RCing hero's concern as he circled the Sr. Falcon high above cathedral steeples and bunting covered narrow streets attempting to keep it in sight. While the driver scurried to find gasoline, Mario was left holding the transmitter on the street corner and wondering, what next? But at this moment the gods relented in the form of a race spectator in a convertible who spotted Mario and wondered if he'd care for a lift. And this kindly driver did get Mario all the way to the finish line after only getting lost one time!

Despite all, the winning plane averaged 64 mph for the 115 mile course. But this wasn't the fastest time of the planes that arrived at the stadium crowded with spectators to witness the race's finish. Ahead of everyone else was the HP-61 powered Qualifier and its flying team of Salo Feiner and Bob Guzman who had negotiated the distance in only 92 minutes, aided in good measure by the driving skill of Chatto Sadurni, an important element in cross-country marathoning. However, victory wasn't to be theirs because of a procedural boo-boo made during an otherwise allowable mid-course landing when the HP turned off for no apparent reason. The same perversity of the South-of-the-Border gods plagued the Elizondo-Betancourt-Velasco entry as they neared the finish line at the 100 minute mark only to run out of fuel and have to land short by only 100 yards! A quick refueling brought the scale Tauro over the finish at 115 minutes right behind Emilio Lozano's Sr. Falcon that had covered the course non-stop in 111 minutes.

Fourth place went to the Super Tiger .40 powered White Cloud entry of Tony Covarrubias, Dan Martinez and Pepe Calderon. Two ships of the seven starters did not fly the distance; Paco Gallegos picked up the pieces of the Navajo from the steep hillside airport road after the engine quit in the most inopportune place, while loss of radio brought the Villegas-Guzman-Gomez Live Wire Cruiser to a sudden end at



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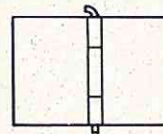
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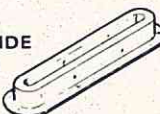
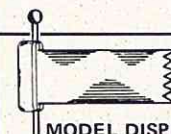
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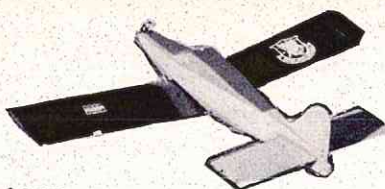
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about the 70 mile mark.

Weather for the race was ideal; cool with light tail winds that helped reduce fuel consumption rates. Despite the mile-high altitude, none of the models had difficulty in lifting the extra weight of the ½-liter fuel loads. The high altitude course further aided distance efforts due to lower drag factors, a bonus to those who carried the extra fuel externally. At the speeds flown and the time element involved, the altitude factor was a significant element. Most fuel supply arrangements were simple gravity feed two-bottle systems using a vacuum vent line to connect the two tanks and to release fuel from the larger ½-liter tank. Keeping the vent line clear has been found to be vital and is achieved by having a funnel-shaped end in the small engine feed tank. This funnel acts as a form of air pump which keeps bubbles from riding in the vent line and causing a leaning condition. It's all simple but effective.

And RC XC continues to grow elsewhere. As this account goes to press, Isthmian RC Club members are preparing for an ocean-to-ocean dash. Its about 90 miles from the Atlantic Ocean in the South and straight North to the Pacific shores in the Canal Zone with good roads for following. Incidentally, an RC boat attempt is also being discussed by the Isthmian group. This effort will use the historic canal and locks just as the big ones do... Another XC plane race is also being planned in Utah where a 30-mile jaunt to the Golden Spike Monument was made last year.

As for future Mexican Marathon races, success of the Queretaro-Leon venture (plus other races that have amounted to 346 miles total) encouraged planning for a mass assault on the world RC distance mark for the next affair. The 75 mph speed of the planes in the 1969 race (cars did 95 and better at times...) showed the need to de-emphasize the time factor to avoid hazards to contestants as well as observers. Fuel limits and mid-course landing penalties will be imposed to contain the 'race' aspect to reasonable limits.

In 1969 RCM was again pleased to be part of the historic Mexican Marathon. Our sincerest congratulations go to all the participants and organizers who were a part in this latest energetic enterprise. And we look forward to being on the scene again at the next endurance test. As a spectator was heard to remark, "Mexico may have the reputation for being easy-going in many things, but not in RC!" Our sentiments exactly...

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