MODEL BUILDER

MAY 1976

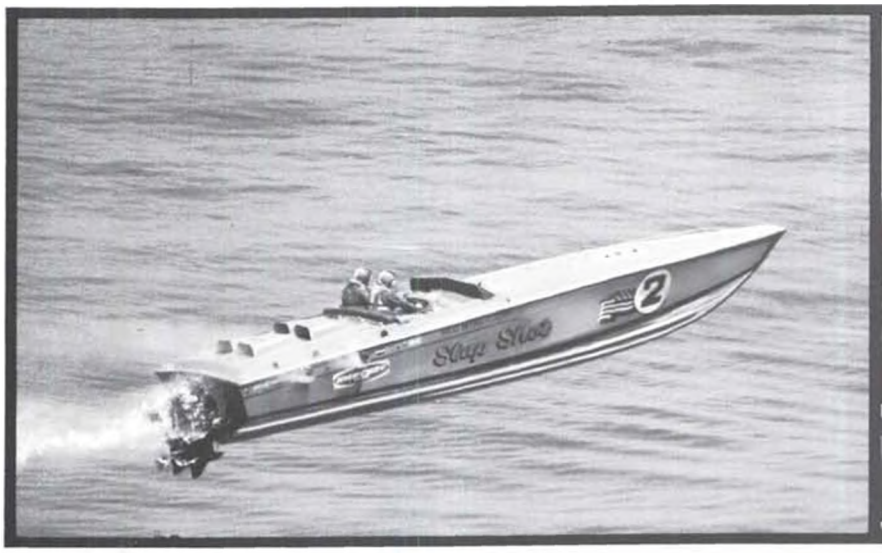
volume 6, number 53

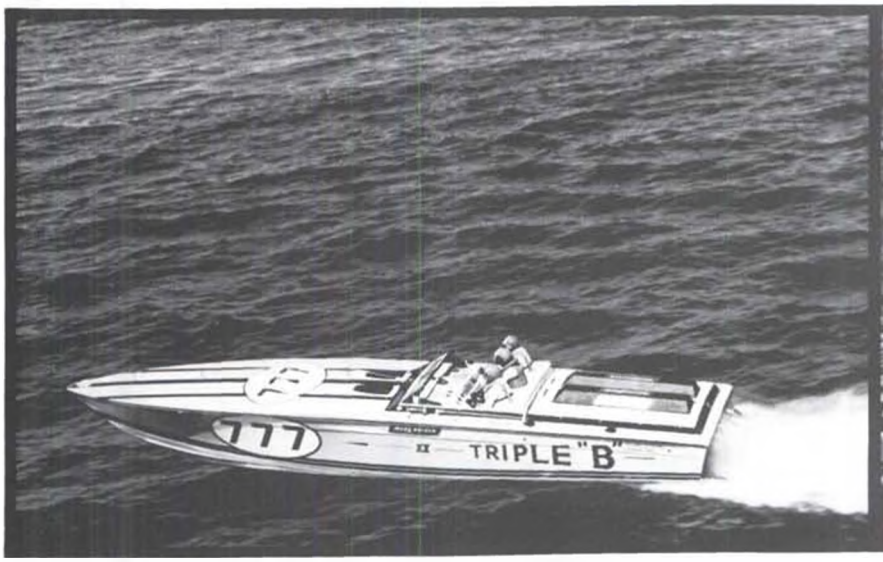
$1.50

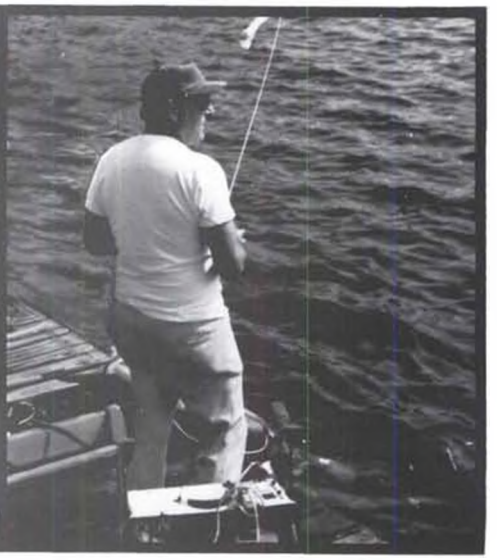
RACE THE MODEL BOATS THE "BIG BOYS" DRIVE

Art "Snapper" Norris, Vice President, Detroit Red Wing Hockey Team, and 1974 offshore racing champion, puts his full-scale Slap Shot through her paces. In his "spare time"...

...Snapper is an avid model boat fan, too. Here he prepares his Dumas Deep Vee 60 CF for a trial run around the course.



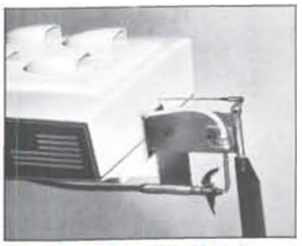




C. Stephen Babin, President of Marwood, Inc. and 1974 Overall Third Place winner in open offshore racing, drives his full-scale Triple "B" down the course. Steve also campaigns...

...his Dumas Deep Vee 40-CF with equal enthusiasm and promises to give current model offshore champions stiff competition this year.

DEEP VEE 40 CF 40" (for .40 engine)



Outdrive for Deep Vee 40 and 60 boats (hardware kit H-22)

If you'd like to join the "big boys" in competitive model boat offshore racing, Dumas has a full line of Deep Vee 10's, 20's, 40's, & 60's plus a new competition series with fiberglass hulls.

And if you're a sailing buff, you'll want to check out our new competition sailboat models.

See your hobby dealer or send 50¢ for complete catalog.

dumas boats

Dumas Products, Inc.,
790 South Park Avenue,
Tucson, Arizona 85719

KP-3C

The left-hand stick may be mounted vertically or horizontally, and may be either self-neutralizing or positionable with brake. For glider enthusiasts, this permits rudder on the left stick, with aileron and elevator on the right stick.

The transmitter has plug-in R. F. modules accessible by removing transmitter back.

This new 3 channel system offers greater utility than previous models because of the new control stick configuration. For gliders, boats, or small powered aircraft, it is unquestionably the world's finest 3 channel radio control system.

Super precision open gimbal stick. Vertical axis may be either self-neutralizing or positionable by a fine tooth ratchet.

Stick configuration can be easily changed by owner.

Internal reversing plug in the receiver matches channel output to desired control stick configuration.

Integrated circuit decoder and servo amplifiers are now standard in the receiver package.

Despite price advantages, troublesome and unreliable dry batteries have been eliminated and all systems now include rechargeable transmitter and receiver nickel-cadmium packs with charger. Cells are heavy-duty with vibration resistant construction and with fast charge capability.

Pictured is the standard 550 MAH KB-4E battery pack. Two configurations of compact lightweight 450 MAH battery packs are optionally available.

All new mechanics are smaller, stronger, and feature the rugged KPS-14II gear train. Two servo outputs are integral; the third servo is optional and not included. When used, it plugs into the pigtail provided.

KRAFT SYSTEMS, INC.

WRITE FOR FREE CATALOG

Worlds Largest Manufacturer of Proportional R/C Equipment

450 WEST CALIFORNIA AVENUE, P.O. BOX 1268, VISTA, CALIFORNIA 92083

MODEL AIRCRAFT OPERATING STANDARDS

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

1. PURPOSE

This advisory circular outlines safety standards for operators of model aircraft, and encourages voluntary compliance with these standards.

2. BACKGROUND

Attention has been drawn to the increase in model aircraft operations, and the need for added caution in the case of free-flight and radio-controlled types to avoid creating a noise nuisance or a potential hazard to full-scale aircraft and persons and property on the surface.

3. OPERATING STANDARDS

Modelers, generally, are concerned about safety and do exercise good judgment when flying model aircraft. However, in the interest of avoiding undue criticism from affected communities and airspace users, compliance with the following standards is encouraged by operators of radio-controlled and free-flight models.

a. Exercise vigilance for full-scale aircraft (get other people to help if possible) so as not to create a collision hazard.

b. Select an operating site at a sufficient distance from populated areas to avoid creating a noise problem or a potential hazard.

c. Do not fly higher than 400 feet above the surface.

d. Do not operate closer than three miles from the boundary of an airport unless permitted to do so by the appropriate air traffic control facility in the case of an airport for which a control zone has been designated, or by the airport manager in the case of other airports.

e. Do not hesitate to ask for assistance in complying with these guidelines at the airport traffic control tower, or air route traffic control center nearest the site of the proposed operations.

William M. Flener

William M. Flener
Director, Air Traffic Service

A MATCHED PAIR FOR THE SPORT MODELER
THE PERFECT COMBINATION FOR THE NOVICE
READY NOW AT YOUR HOBBY SHOP

FOR THE 1/2A SPORT FLIER WHO NEEDS QUIET POWER

COX QRC .049

MAXIMUM POWER WITH MINIMUM NOISE FOR SCHOOLYARD FLYING

$12.95
Cat. #450-1

- ★ Factory installed muffler.
- ★ Oversize tank for longer flights.
- ★ Built-in spring starter.
- ★ Highest power reed-valve engine with specially ported cylinder for maximum power even when fully muffled.

FROM THE LEADER IN 1/2A ENGINES AND ACCESSORIES

AIRTRONICS

Q-TEE Kit

$17.76

36 inch span, 252 square inches
16-20 ounce flying weight

- ★ For the novice who has never built or flown an R/C model.
- ★ Precision machined parts and all hardware included.
- ★ Perfect for schoolyard flying with the new Cox QRC Engine.

FOR ADDITIONAL INFO WRITE OR CALL:

COX HOBBIES

Phone: (714) 540-8200
1525 East Warner Avenue
Santa Ana, Calif. 92702
a subsidiary of Leisure Dynamics Inc.

In Canada Contact:
Leisure Dynamics of Canada
1315 Lawrence Ave. East
Don Mills, Ontario, Canada

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THE SAN VALEERS 27TH

FREE FLIGHT ANNUAL

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7 BB POLK

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TAFT

JUNE

26 27 1976

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1976 HONDA TRAIL "90"

GRAND SWEEPS

PLUS

COMPLETE DREMEL HOME WORKSHOP

AWARDED FOR

JR. HIGH TIME

FOR MORE INFORMATION, WRITE OR CALL

SEE ATTACHED PRE-ENTRY FORM →

PRE-ENTRIES MUST BE POSTMARKED BY MIDNIGHT JUNE 19, 1976 (PROCESSING)

Pre-Entry Fees JR $.50 SR $2.00
" " OPEN $2.50

-HONDA SWEEPSTAKES $5.00 (JSO)
G. S. MEMORIAL/GOLD COAST (JSO) $5.00
Total # Reg. Entries ___ Total Fees $___
G. S. MEMORIAL ___ Total Fee $___
Check or M.O. Enclosed full total fee $___

**= Junior SEPARATE
*= NOT SWEEPS OR TEAM EVENT

Contestant Signature _____

NOTE: SAVINGS FOR PRE-ENTRY - your cards will be ready to be picked up at the PRE-ENTRY registration table.
ENTRY BLANKS, AMA MEMBERSHIP AT REGISTRATION TABLE.

SATURDAY (X) EVENTS ENTERED SUNDAY

( ) A ( ) BAKEFIELD ** ( ) ( ) GOLD COAST G. S. MEMORIAL
( ) C ( ) A/1 NORDIC ** ( ) ( ) ½A
( ) H.L.G. ( ) NITE FLYING ** ( ) ( ) ½A JR. NOVICE
( ) .020 REPLICA ** ( ) H.L.G. ( ) A/2 NORDIC
( ) .020 ANTIQUE ** ( ) B ( ) F.A.I. POWER
( ) B (OT) PYLON ** ( ) D ( ) UNLIMITED RUBBER
( ) 30 sec. ANTIQUE ( ) A (OT) PYLON ( ) (OT) A-B CABIN
( ) 60 GRAM COUPE ( ) C (OT) PYLON ( ) (OT) GAS SCALE
( ) (OT) C CABIN ( ) OLD TIME RUBBER ( ) (OT)

NAME _____ (please Print)
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ARLETA, CALIFORNIA 91331
PHONE 1-(213) 899-2301

COMPLETE CONTEST INFORMATION WILL BE SENT TO YOU ON RECEIPT OF YOUR

PRE-ENTRIES MUST BE POSTMARKED BY
MIDNIGHT JUNE 19, 1976 (PROCESSING)

MODEL BUILDER

MAY

1976

volume 6, number 53

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CONTENTS

FEATURES

SCALE VIEWS

CONSTRUCTION

Cover: Jeff Breece's Albatros Sportflugzeug in relaxed, unhurried flight through blue Auburn, Washington skies. The 74 inch span sport scale model of a post-war German ultra lightplane is powered by an intake and exhaust restricted Fox 36 engine, turning a 12 x 6 propeller at a lazy 5,000 rpm. A one ounce fuel tank provides 6 minutes of powered flight, after which the Albatros does its own thing on rudder and elevator control. Picture is an 18 times enlargement from a half-size 35 mm transparency by Rick Koehnen.

The MODEL BUILDER gang at Toledo . . . (l to r): the editor "hisself," the General Manager, Anita Northrop, and West Coast Ad Rep, Bob Upton. As part of a new subscriber campaign, someone will win a free lifetime subscription during the Anaheim, California MAC Show. If you can't sell 'em, give 'em away, right?

from Bill Northrop's workbench . . .

• To help commemorate 50 years of official model aircraft competition, and to add spice to the oldest and original competition category, free flight, MODEL BUILDER Magazine is inviting the reigning World Champion in each of the three basic classes; glider (A/2 Nordic), Rubber (Wakefield), and gas (Power), to come to the United States and compete in our 1976 AMA Nationals.

This year, the official FAI competition calender includes the three FAI free flight events being contested at our Nationals in Dayton, Ohio, during the first week of August. This means that these events have international status, and may be entered by anyone, from any country.

The idea of inviting the current world champions to our Nationals, and offering them financial assistance if needed, was brought to us by Hardy Broderson, Executive Director of the National Free Flight Society. During an informal talk at the Toledo trade show, we agreed that MODEL BUILDER would spearhead the effort to bring these modelers to the AMA Nationals.

The three current World Champions, to whom invitations are being submitted through their national aero clubs are; B.A. Tchop, Russia (F1A Glider), Paik Chang Sun, North Korea (F1B Wakefield), and Lars Olofsson, Sweden (F1C Power).

Letters are being sent to free flight oriented members of the model industry, seeking sponsorship assistance, which, by the way, was kicked off by a $100 check from "Hardly Brokenspar Hisself." By way of this notice, free flight clubs, organizations, and individuals are invited to contribute.

U.S. free flight modelers should get quite a kick out of watching and/or competing against these world champions. Y'all come!

Incidentally, Nationals free flight will have several other new features this year. The SCAT Club (Southern California Aero Team) is putting up 3 trophies for the high point Junior in each of the FAI F/F events, and the Sky Scrapers of Brooklyn, Inc., is doing the same for high point Seniors. And there'll be a new unofficial event which was originated in Canada. It's called Unlimited Unlimited Rubber, and means just about that . . . any size model, any amount of rubber, and wildest of all . . . the timer follows the model, as in the old Texaco Event. That ought to stir up some wild designs!

WHIRLY CHAMPS

The 1976 AMA Helicopter Nationals will be held on July 30 and 31, and August 1, in Dayton, Ohio, at the Dayton R/C Field. Competition will be in accordance with the proposed AMA rules, and will be divided into Novice, Intermediate, Expert, and Scale, with trophies through 5 places in each, plus an award for the most outstanding helicopter in each category.

Friday, July 30 will be set aside for Judge's training, and practice. Competition will start on Saturday, July 31, immediately following an 8 A.M. pilot's briefing. For further information, contact Contest Director Walt Schoonard, 2080 Sharon Rd., Winter Park, Florida 32789, phone (305) 647-1335.

JUST IN TIME

This contest note came in as we were writing this column. The Omahawk R/C Club of "guess where", Nebraska, is holding an "Oldtimer R/C Free Flight Meet and Chautauqua" (?) on June 13, 1976. We bet there'll be some biplane old timers entered, because in addition to Contest Director Chuck Leitch, there will also be "Ancient Advisor" Olie Olson in charge of affairs. Contact them for further information at (402) 391-8760 and (402) 551-4662 respectively.

MORE THINGS TO DO

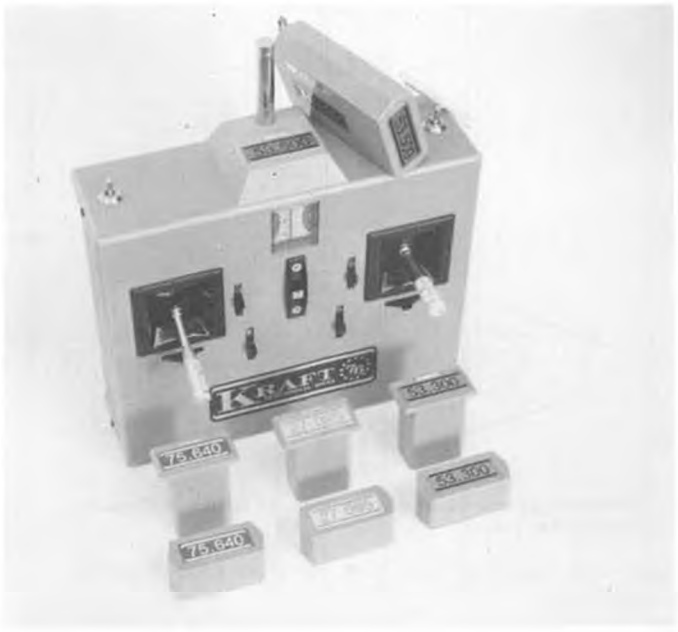
The Western Canadian R/C Model Aerobatic Championships will take place on June 5, and 6, 1976, sponsored by the YORKS (Yorkton's Outstanding Radio Kontrol Society), Garry Reusch, C.D., 221 Roslyn Ave., Yorkton, Sask., Canada S3N 1P3.

The Sky Rovers Flying Club is hold-

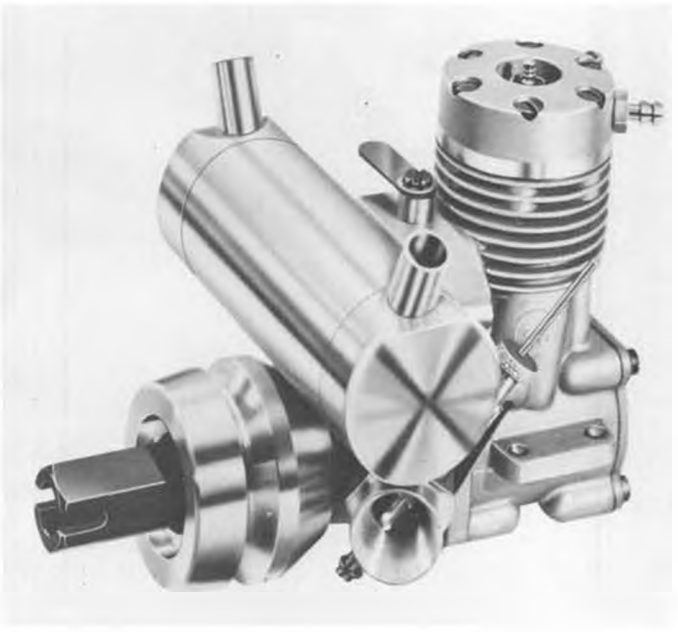
Continued on page 91

The original pylon "call girl", Kathy Root, is handling MB's phone calls when she's not out yelling "TURN" or racing Half-A's.

OVER THE COUNTER



The new Kraft KP-7C, with plug-in transmitter and receiver RF modules. Like the high-class barber shop . . . no waiting!



K & B's 3.5cc (.21 cu. in.) marine engine.

● Kraft Systems, Inc. has announced its 1976 line of R/C systems. In the spirit of the year, it is designated as the "Bicentennial Series" and the well known Kraft logo has been slightly modified to include a star-encircled "76".

The new three channel series is designated KP-3C. The transmitter includes a number of features found in the big brother systems later described. An important physical difference between this and the other systems is the receiver/servo "brick" package configuration.

The 'Sport Series' designation of years past has been discontinued. In that class, Kraft is now offering its KP-5C series. Claimed to offer contest performance and reliability at a modest price, it appears to be a worthy successor. This system offers open gimbal sticks, internal plug-in transmitter RF modules, and a newly designed receiver that does not require tuning to its companion transmitter. This allows the purchase of an additional off-the-shelf receiver on the same frequency, or receiver plus transmitter RF module to change band or frequency, or to equip another airborne system.

The Deluxe 7 Channel system, designated as the KP-7C series has so many interesting features that it is difficult to describe in the space available. As in the case of the KP-5C, complete freedom from transmitter to receiver matching has been reached. External plug-in modules provide instant change between any of the 17 standard frequencies.

The transmitter meter is a triple threat job that reads relative RF output, and transmitter as well as receiver battery voltage (through a jumper cable) on an expanded scale voltmeter.

The two-stick version features adjustable stick lengths, and a single-stick version is available at no extra cost. On special order, you may have spin and roll buttons, either at the time of initial purchase, or as a later addition.

The all ready known Signature Series is also available, with its many unique features. Offered is your choice of four receiver battery packs and six different servos, ranging from miniature to 180 degree high-power types for gear or flap operation.

With all the available options, it would seem that we can now sit home, design a system to match our exact requirements, and have it manufactured for us. The many options naturally mean varying prices. Therefore, we recommend a check at your favorite dealer for further feature and price information, or request it directly from Kraft Systems, Inc., P.O. Box 1268, Vista, CA 926083.

* * *

Attention 1/2A'ers. Ace R/C, Inc., which calls itself 1/2A Headquarters has recently introduced a number of items of particular interest to you little bird flyers. It seems Paul Runge of that firm is a believer in the adage that it is what's up front that counts, as up front is where all these new goodies go.

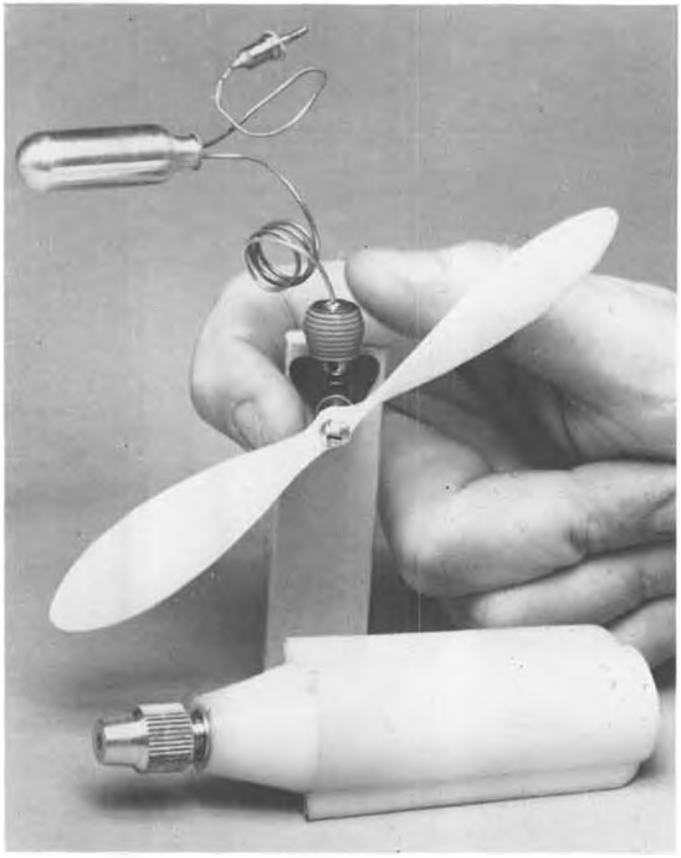
The new 1/2A motor mount is claimed to be almost indestructible. So much so that Ace offers to replace it free of charge if you manage to break one for any reason, including crash. It is made for the Cox .049 and .051 TD's, and includes mounting ears for a nose gear.

Ace also offers a new 6 x 3 fiberglas prop, claimed to give you top performance for your 1/2A airplanes. Breakage is reported to be greatly reduced, resulting in a substantial reduction in prop costs.

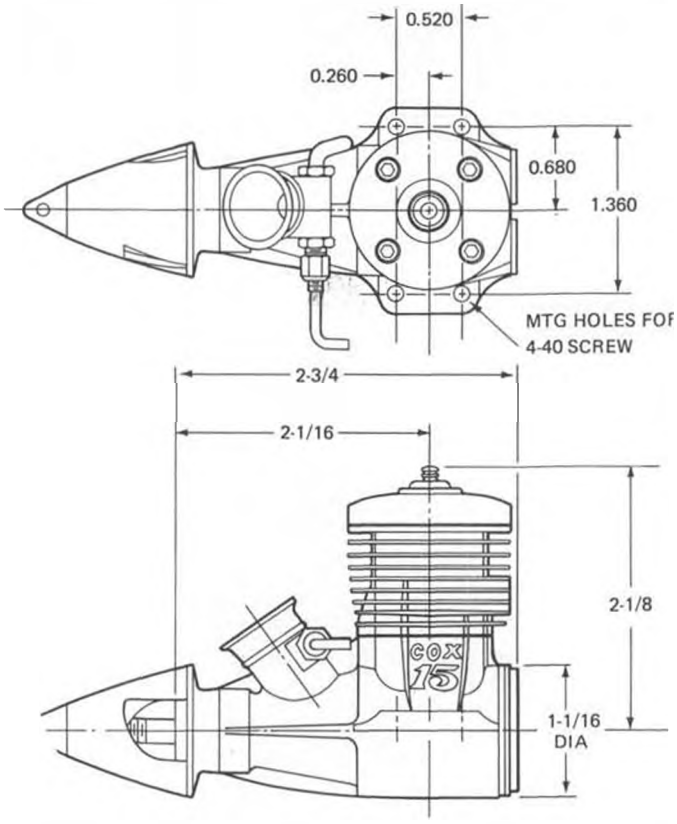
The mounts are $1.19, props are $1.98. Ace R/C is at Box 511D, Higginsville, MO 64037.

* * *

Shamrock Competition Imports, P.O.



The Shark CO_2 engine from Polk's Hobbies.



Dimensional drawing of the new Cox .15 engine. R/C version features Perry carb.

Box 26247, New Orleans, LA 70186, announces availability of the new ABC, Schneurle-ported OPS-60 boat engine.

Changes from previous models include a larger intake, re-designed backplate and rotary valve assembly, and improved timing. The results are a claimed power increase to 3.2 BPH, at 23,000 RPM, with the tuned pipe furnished and burning FAI fuel.

The pipe is a muffled version which holds the noise level down to a reported 92 db at 20,000 RPM. Additional muffling down to 90 db is available upon installation of an accessory muffler also available from OPS and Shamrock.

* * *

There is another engine, different type, different use, which has been designed specifically for our boating friends. K&B Manufacturing, 12152 Woodruff Ave., Downey, CA 90241, has announced its new 3.5cc RC marine inboard engine.

Already broken in when you receive it, this engine features all the improvements found in the best racing engines; ball bearings, ABC piston and liner, and advanced by-pass porting. Other features are those required of a good quality boat engine: rotatable case that permits changing the exhaust from front to rear, rear exhaust butterfly throttle, under 90 db muffler, and water-cooled head. The precision machined U-joint furnished should fit most existing ball-drives.

Check with your dealer, or call Bobby Tom at K&B, 213-923-5493, and tell him where you read about it.

* * *

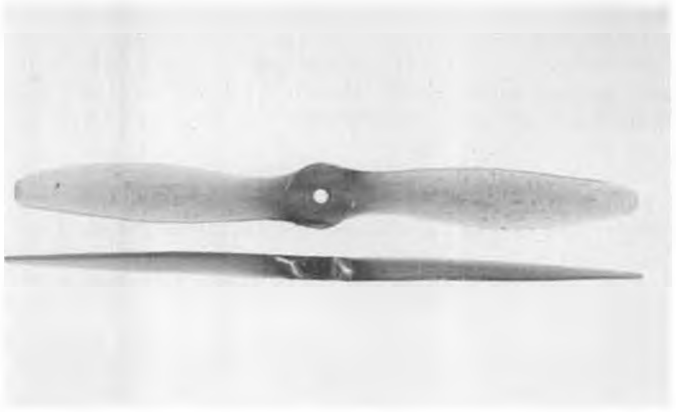
According to the latest word, shipments of the long awaited Cox 15 engines should have started by the time you read this. Apparently, the free flight version will go out first, with the R/C's to follow soon after.

Those of you who can't wait 'till you get yours to start building, should find the dimension drawings interesting and helpful. The R/C version will have the Perry carb hanging on the front, but will otherwise be externally identical.

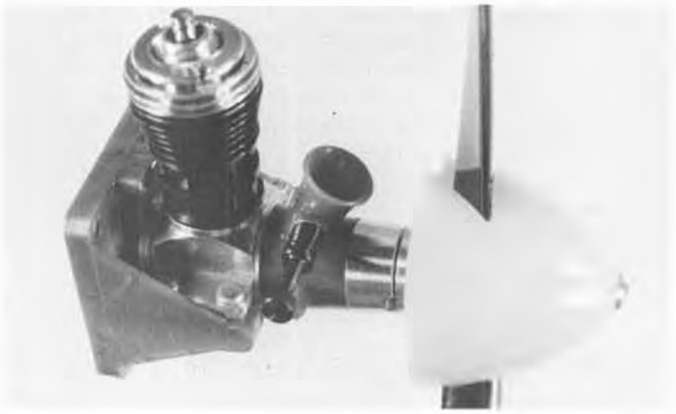
Cox Hobbies, 1505 E. Warner Ave., Santa Ana, CA 92702.

* * *

Polk's Hobbies has announced near completion of the development of a new CO_2 engine, now going into pro-



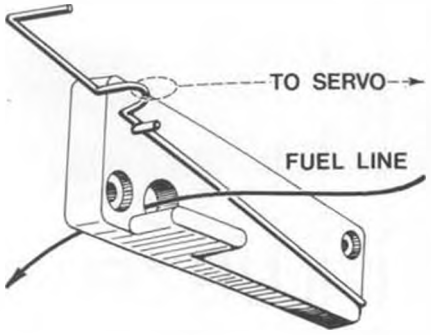
Fiberglass 6 x 3 prop from Ace Radio Control.



Guaranteed indestructible .049/.051 motor mount from Ace.

Glow plug and battery condition indicator from Aristo-Craft.

Sport scale Travelair 2000 by Concept Models, for R/C and 40 power.



Fuel shut-off for 1/2A pylon racers by Fourmost. Has other possibilities.

Allied Hobbies' 1/2A "Streaker."

duction for August 1976 deliveries.

The Shark CO_2 engine should provide enough power for Peanuts, and for models of up to 24 inch wingspan. The crankcase, cylinder, and piston are made of nylon, and the motor comes complete with fuel tank, prop, and charging gun.

Carbon Dioxide (CO_2), in convenient cartridges, is readily and inexpensively available. A cartridge will charge the airborne tank from 6 to 10 times, which runs the engine from 5 to 45 seconds, depending on the power desired.

Complete, at $19.95, from Polk's Hobbies, 314 Fifth Ave., NY 10001.

* * *

Do you fly 1/2A racers? Is your group plagued by the guy who seems to show up at every contest and has to fly for five minutes after every heat 'till he runs out of gas? If so, take up a $3.50 collection and buy him a Fourmost Shutoff, from Fourmost Racing Products, 4040-24th Ave., Forest Grove, Oregon 97116.

This dandy little device provides positive airborne fuel shutoff upon momentary application of down elevator. Constructed of nylon and spring steel, it weighs only .1 ounce, and comes complete with mounting screws.

* * *

A new go/no-go type of glow plug and battery condition indicator is being offered by Aristo-Craft, 314 5th Ave., New York, NY 10001.

This device installs on the battery cord in a matter of minutes and indicates normal or abnormal conditions at a glance.

It is priced at $4.95, and should be available at most hobby shops.

* * *

From Allied Hobbies, of Inglewood, California, comes the Streaker, in 1/2A size. No, it isn't Dick Russ in his birthday suit, it is a new plastic, foam, and balsa kit designed specifically for racing, but claimed to also be a great sport and fun flyer.

The canopy and turtleback are molded from styrene plastic, the wing is constant-chord foam, and the fuselage and tail surfaces are of machined balsa.

The kit also includes formed landing gear, detailed full-size plans, and an extensively illustrated manual. Further specs are: wingspan 34.875 inches; area 200.999 (Oh, come on!) squares, weight 21 ounces.

Try your local hobby shop first, or

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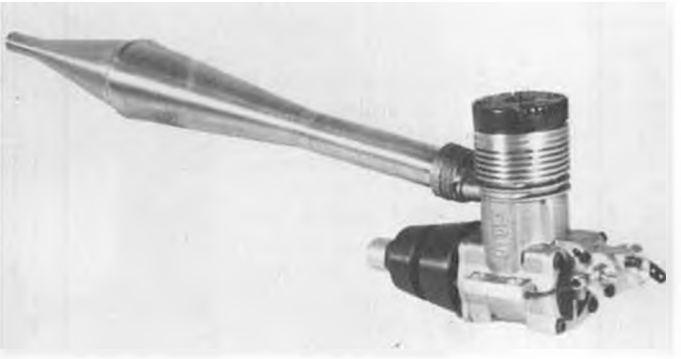
Brand new O.S. ignition conversions by Otto Bernhardt, of 77 Products.



ABC, Schneurle-ported OPS 60 boat engine, from Shamrock.

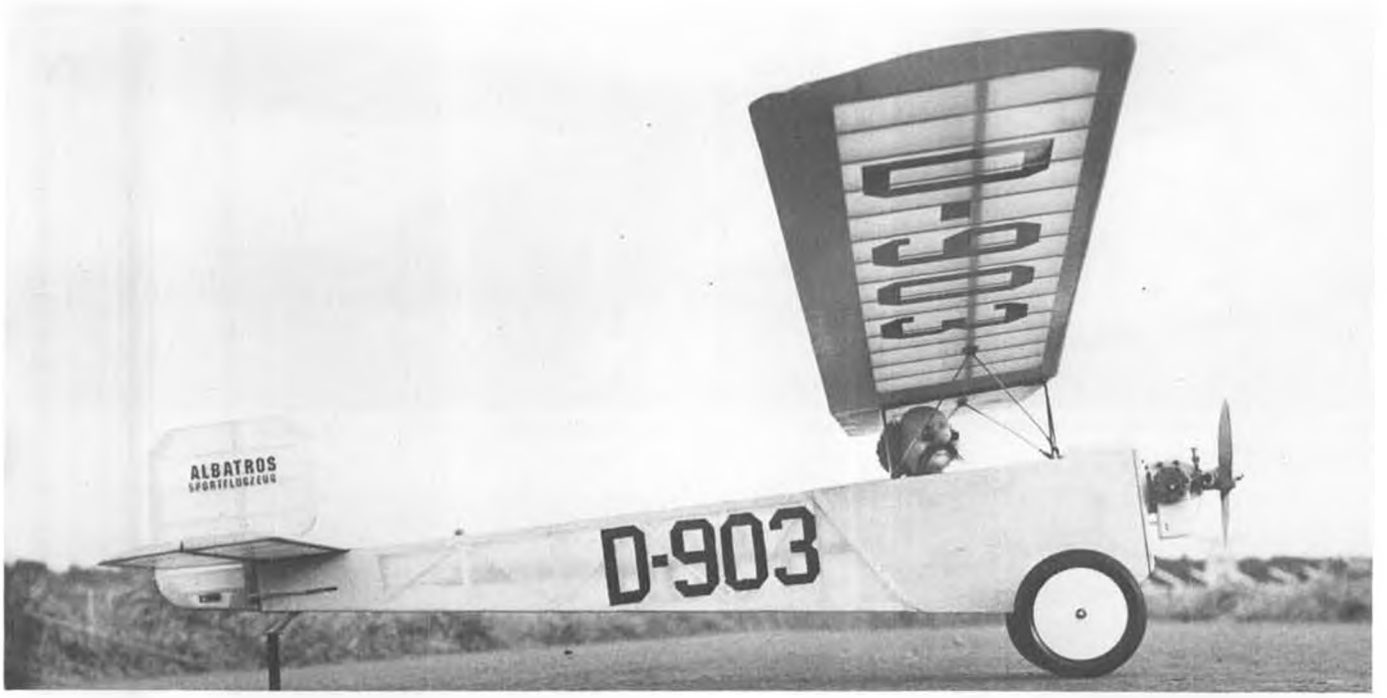


PHOTO BY RICK BRINGOLF

THE ALBATROS SPORTFLUGZEUG

By JEFF BREECE . . . Though of conventional construction, this model still manages to be just a little different in many subtle ways, not the least of which is the clever engine set-up . . economical and quiet.

• Albatros Sportflugzeug (Sport-flookzoing) means "Albatros Sport airplane." Powered by an uncowled 30-40 hp. Bristol Cherub engine, the Albatros was designed to get a piece of the ultra-light airplane market which was expected to open up after the Great War. The model presented here is essentially a blow-up of a 1953 Cal Smith design which appeared in Air Trails. My machine was designed to fly for fun, with the minimum of controls, to serve as a trainer, and to fly at air shows. The Albatros has all the atributes I was looking for . . . authentic lines; eye appeal; slow quiet, realistic flight; low power; fuel economy; easy and traditional construction; simple R/C installation; and more. The project has been successful beyond my fondest dream.

The Albatros' first flight started with a beautiful tail-up R.O.G.. A shallow climb off the grass and it's flight was light and smooth, the model flying in a slightly tail high attitude. When the engine quit, the model just flew on until it settled in for a tail-up landing with a nice rollout. Every flight since has been a carbon copy of the first, unhurried and smooth. Instead of jangling the nerves, it's highly muffled engine and smooth flight give confidence to even the greenest pilot. One guy, who happened by the field last summer, happily flew out three full tanks with only verbal assistance from me, his first R/C flights ever.

At the 1975 Boeing Management Association contest at Kent, Washington, I took 1st in Open Standoff Scale. Nine flights were flown that afternoon; eight perfect demonstration flights and one official flight on which I blew the landing . . . naturally! I always choke when it counts. On one flight, before the eyes of 600 or so blinking citizens, I turned in a 25 minute plus thermal flight. Never over 3-400 feet, lift was everywhere, and I only landed because I became sheepish about hogging the channel.

The real reason for the existence of the Albatros Sportflugzueg is the annual Northwest Kidney Center Benefit Air

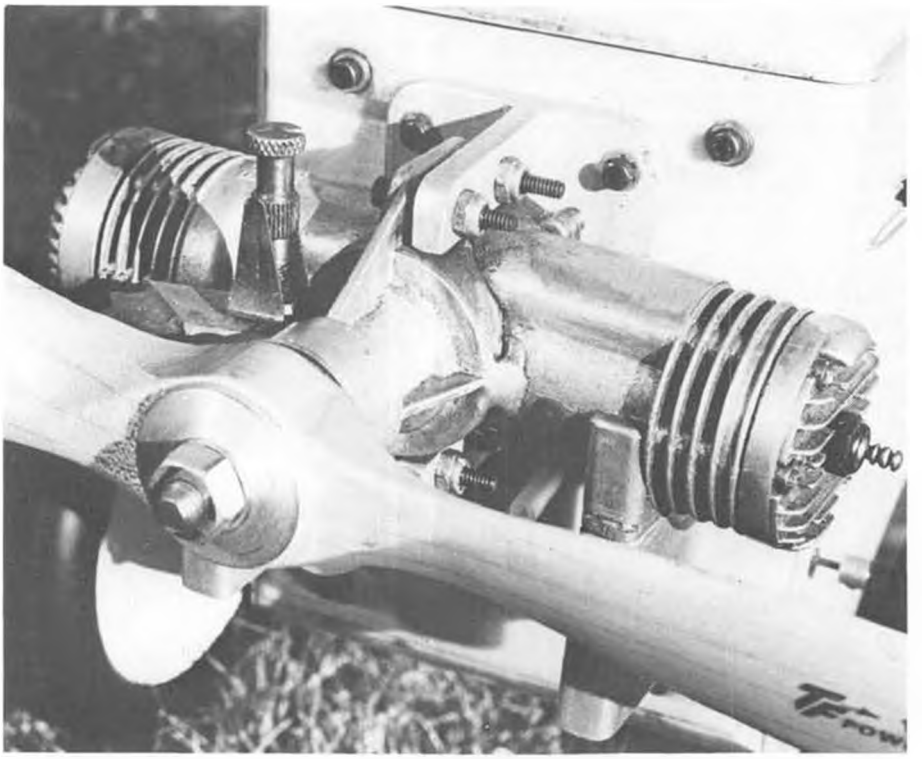


PHOTO BY EMIL NEELY

Fox .71? Nope. It's a .36 with a dummy .35 spot welded in place! "T" stock tapped mount is home made. A real head-scratcher. Intake and exhaust restricters hold RPM's to 5K.

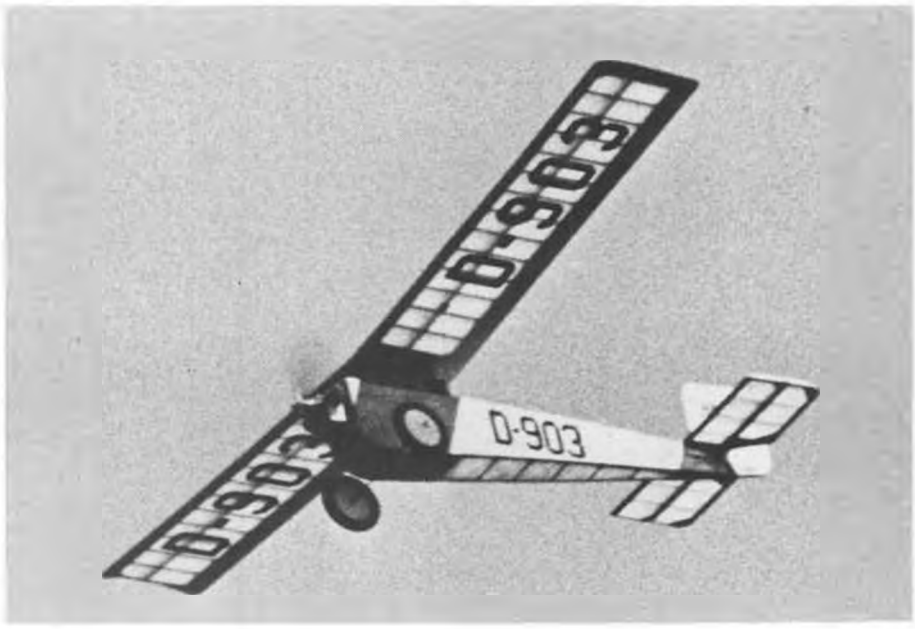
Show put on by the Radio Aero-Modelers of Seattle. The R.A.M.S. have been sponsoring this benefit for several years now, and last year presented over $2,500 to the Kidney Center. Thousands have thrilled to the sights and sounds of Pattern, combat, WW I and WW II scale, and R/C planes of all kinds. A divorce and work have kept me from participating the last two shows, but on the 5th and 6th of June, 1976, I hope to debut my Albatros in the event for which it was designed and built during a three week period in 1974. Finally I'll be able to share a little piece of myself and assist in a worthy work. If you're in the area drop by the fun and say "Hi."

Model specifications are: span 74 inches, length 39-1/2 inches, and wing area 703 sq. in. At a weight of 4-1/4 lbs, the model is powered by a muffled Fox .36 turning 5,000 rpm on a 12 x 6 maple prop. Engine speed is controlled by prop size and exhaust restriction. Fuel economy is unbelievable . . . over six minutes on one ounce of fuel! Noise reduction is dramatic too.

Among special features are: the simple, straight 3/16 music wire landing gear with snapring wheel keepers; bike spoke wing hold-downs and pop-out wing strut mounts; removeable firewall (mounting engine and tank) for radio access; and full-flying rudder. Most notable too, is the two-cylinder engine, which is really a Fox .36 with a dummy cylinder welded to the crank case. No throttle is fitted, and all landings are dead stick. Radio installation is designed for inexpensive 2-channel bricks mounted transversely behind the firewall, with batteries underneath. The prototype presently sports a Hobby Lobby 3, with the servos mounted on a 1/8 plywood plate.

Construction is conventional and, for the most part, no comment is necessary, as the plans have been carefully prepared to illustrate difficult areas of construction. The airplane was designed as a complete system, and every element was tailored to fit the special requirements of the machine. For example, the engine/firewall/tank assembly weighs 21 ounces, and produces the power of a .15. The use of a smaller engine will make balancing difficult and performance will suffer.

The fuselage must be built first, as the size of the cabane assembly determines the location of the brass tubes in the wing center section. Select four very hard pieces of material for the longerons. Careful fitting of the fuselage parts adds considerable strength and makes a most attractive structure. Use Wilhold or similar white glue for all construction except for installation of F-4, F-5, F-6, F-7, the cabane assembly, and the landing gear mount, where Hobbypoxy Formula II is used.



You gotta be an iron man to resist this little tub! Well . . . not so little. With a 74 inch span, it's a proven thermal hitch-hiker. Dare we say, "A great trainer?" Photo by Dave Katagiri.

Bend up the cabane struts and install the .025 brass wing strut mounting tabs. Don't bind and solder the cabane assembly at the top until it is securely fastened into the fuselage and the fuselage is complete. When installing the cabane, check and re-check to insure that the front of the cabane assembly is a 1/4 in. higher than the back, as this establishes the longitudinal dihedral of the ship. Use HobbyPoxy II for this.

Omit the 1/16 sheeting at the rear of the fuselage until the elevator is finished so the elevator hold-down blocks can be accurately drilled and the blind nuts installed.

Cut two bike spokes 3 inches long and bend one at 1/8 below the threads and the other at the base of the threads. When the fuselage is completely sheeted, bring the cabane struts together and bind with fine copper wire. Insert the bent spokes into the inverted "V" formed by the cabane. The spoke with the bend 1/8 from the threads goes in front. Bind together with fine wire and solder well, using a torch, paste, and acid core solder. The spokes should be tight into the "V" front and rear.

The wing is conventional spar-and-shear-web construction. DON'T OMIT THE SHEAR WEBS UNDER ANY CIRCUMSTANCES OR THE WING WILL FAIL! Note that W-2 is 1/32 ply, contact cemented to W-1 before assembly. The leading edge is hard balsa, the spars are spruce. The wing strut bracket screws to a 1/16 ply plate epoxied to the span outboard of the 3rd rib.

The wing strut bracket is fabricated from .025 brass sheet and 3/16 O.D.

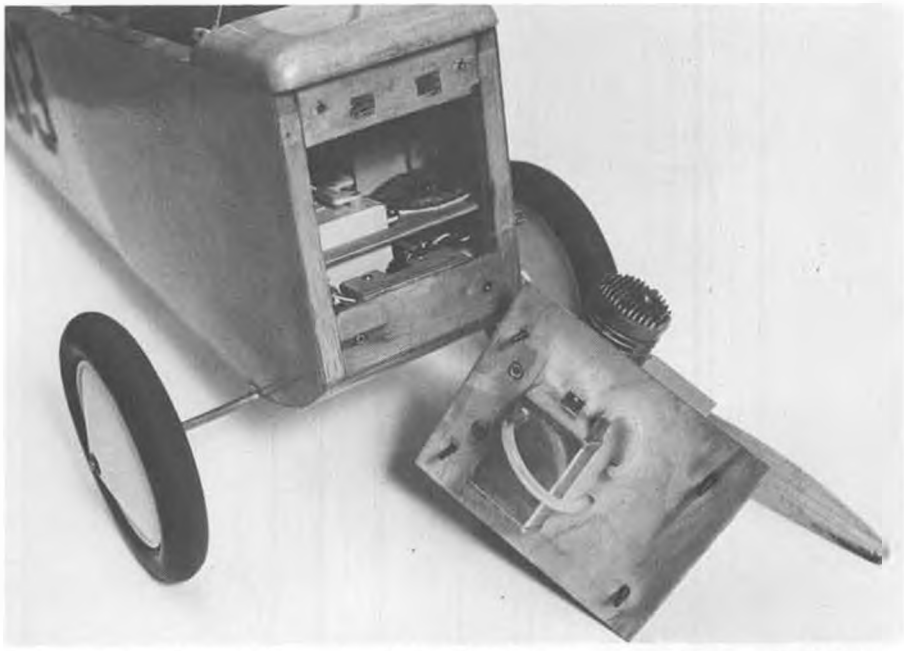
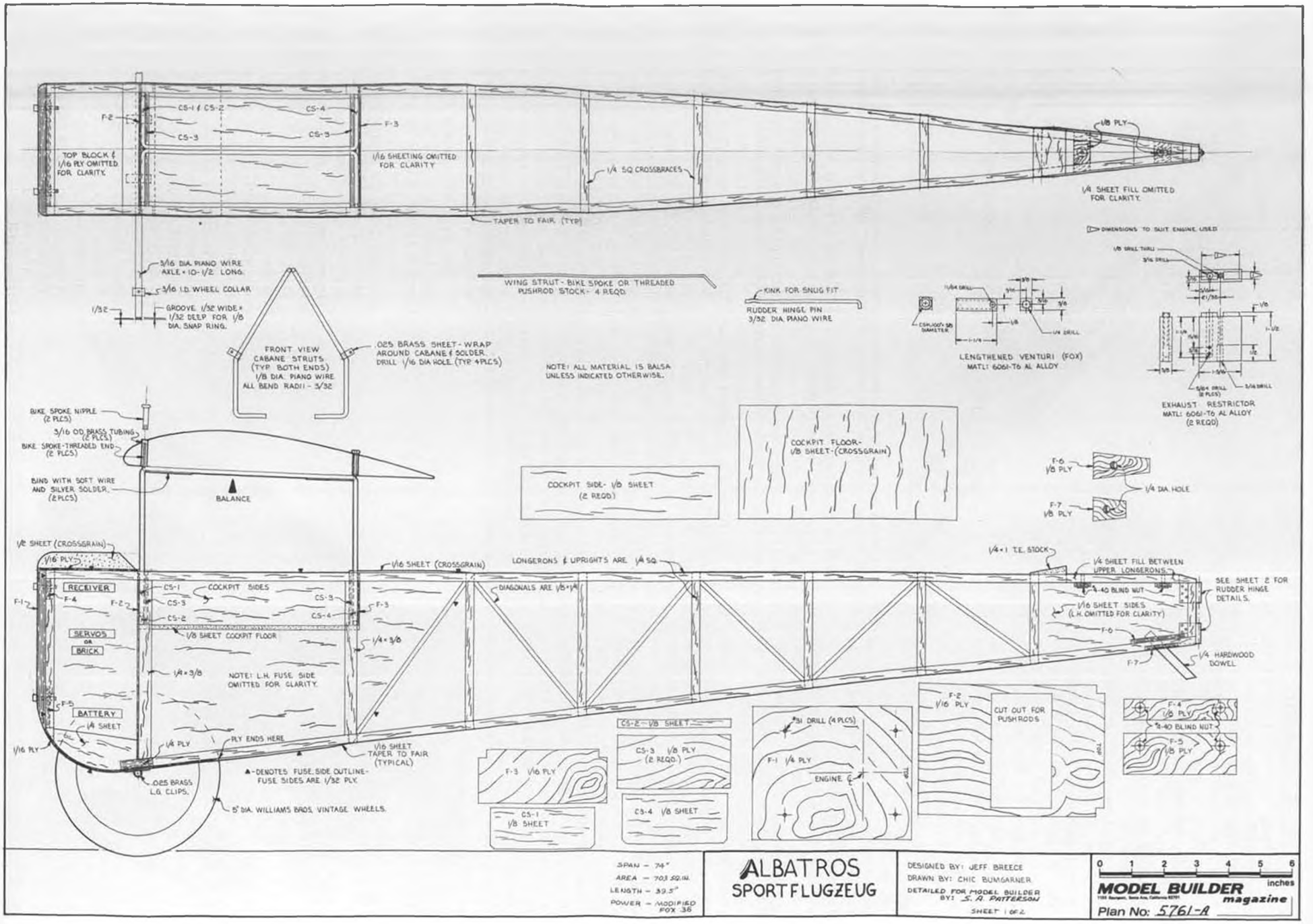


PHOTO BY EMIL NEELY

Super-sanitary tank and equipment installation. Note ballast servo-taped to mounting board. Externally operated switch in front. One ounce tank gives 6 minutes. No throttle used.



SPAN – 74"
AREA – 703 SQ.IN.
LENGTH – 39.5"
POWER – MODIFIED FOX .36

ALBATROS
SPORT FLUGZEUG

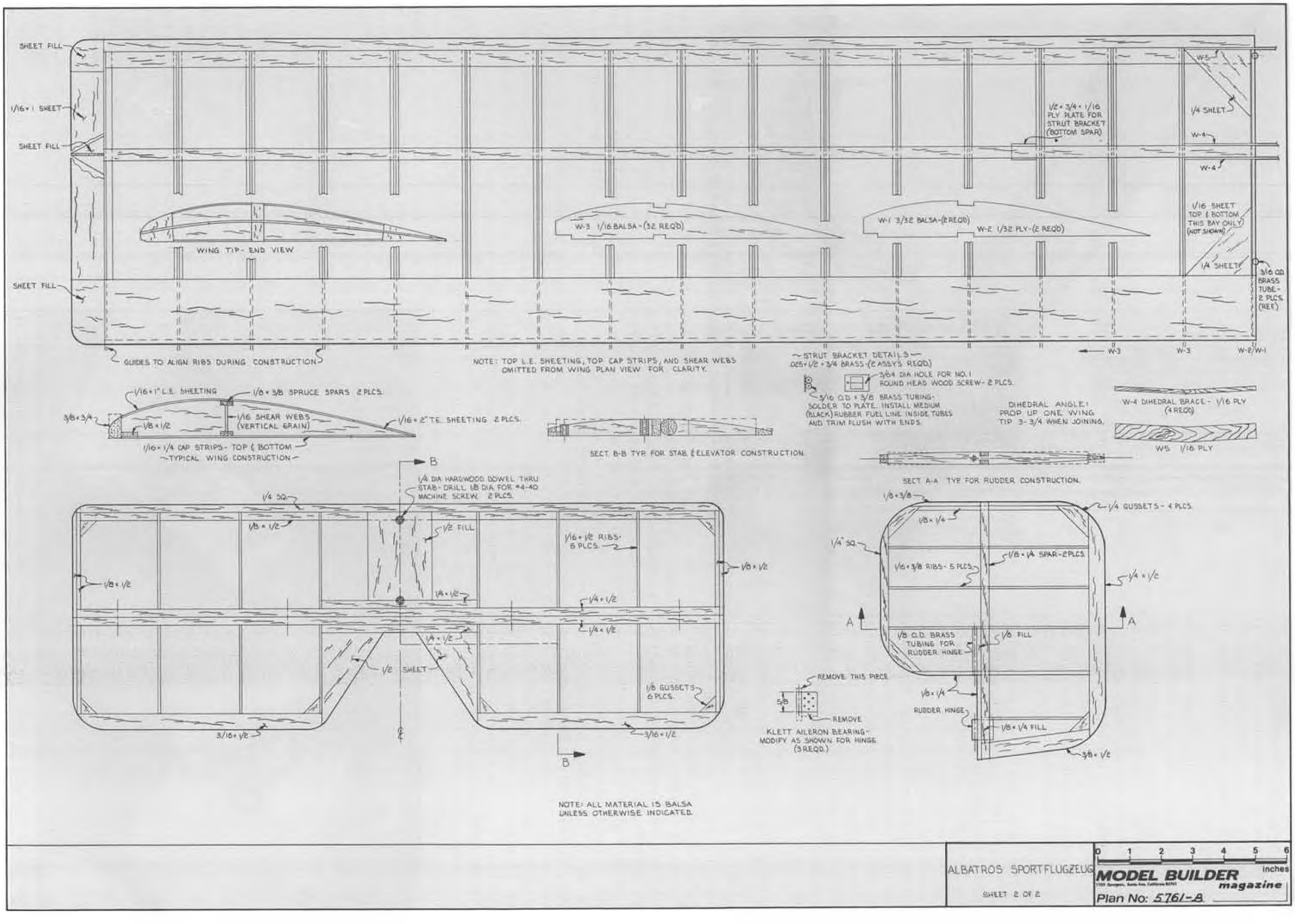
DESIGNED BY: JEFF BREECE
DRAWN BY: CHIC BUMGARNER
DETAILED FOR MODEL BUILDER BY: S. A. PATTERSON
SHEET 1 OF 2

0 1 2 3 4 5 6 inches

MODEL BUILDER magazine

Plan No: 5761-A

FULL SIZE PLANS AVAILABLE — SEE PAGE 94



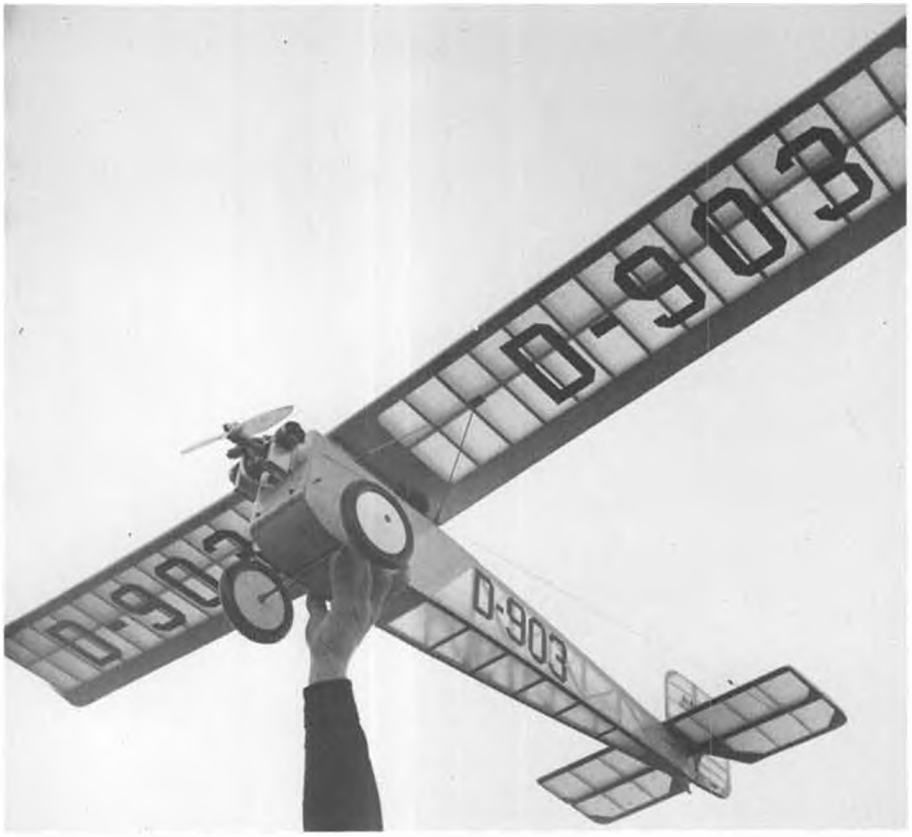
brass tubing. Use soldering paste and acid core solder. Mount with No. 1 x 1/4 screws. Insert medium sized black fuel tubing into the tubing and press the wing struts into the tubing. The fit should be quite tight.

The 3/16 O.D. brass tubes to receive the bike spoke nuts can be installed after the wing halves are joined and before the top sheeting is installed. The front one is a 1/2 inch back from the leading edge, and the rear one is positioned by taking the dimension from the finished cabane assembly. I cut the holes with the sharpened end of a 3/16 brass tube.

The tail surfaces are built of light balsa, except for the leading edge and spars, which are hard. Both are built flat and sanded to airfoil shape later. Note that the leading and trailing edge of the rudder must be blocked up during assembly to be on the center line. Note also the filler between the rudder spars to receive the hinge. Modify three Klett aileron linkage bearings as per the plans, and install them in the rudder and the fuselage. Install the rudder with a 3/32 music wire hinge pin.

The Engine is a modified Fox .36 X. Look at the photos of the engine carefully and you can see how crudely I modified it. The dummy cylinder is from a Fox .35, as I couldn't find a worn out .36. In spite of the mismatch of the two cylinders, some people never catch on, and most have to be told that it's a phoney.

Aside from the false cylinder, the engine is only slightly modified. Engine speed is controlled by exhaust restriction. Drill and tap the exhaust port web of the .36 to receive the 4-40 mounting screw. Make two restrictors as per the plans and install. Slip a piece of aluminum into the bore of the dummy cylinder and drill and tap it for the mounting screw when the dummy is finally welded on.



Simple wing mounting employs bicycle spokes. German civil markings are black sticky Monokote. Williams Bros. 5 inch diameter wheels on straight 3/16 axle. Photo by Rick Bringolf.

To increase fuel draw at the low speeds the engine will turn, you'll need to lengthen the venturi. Remove the needle valve and stock venturi. The Fox .36 X has a square venturi, so we're in business. Make a lengthened venturi as per the plans. Insert the new venturi and reinstall the needle valve, making sure the hole points down. Seal around the venturi with silicone where it meets the crank case, to insure good draw.

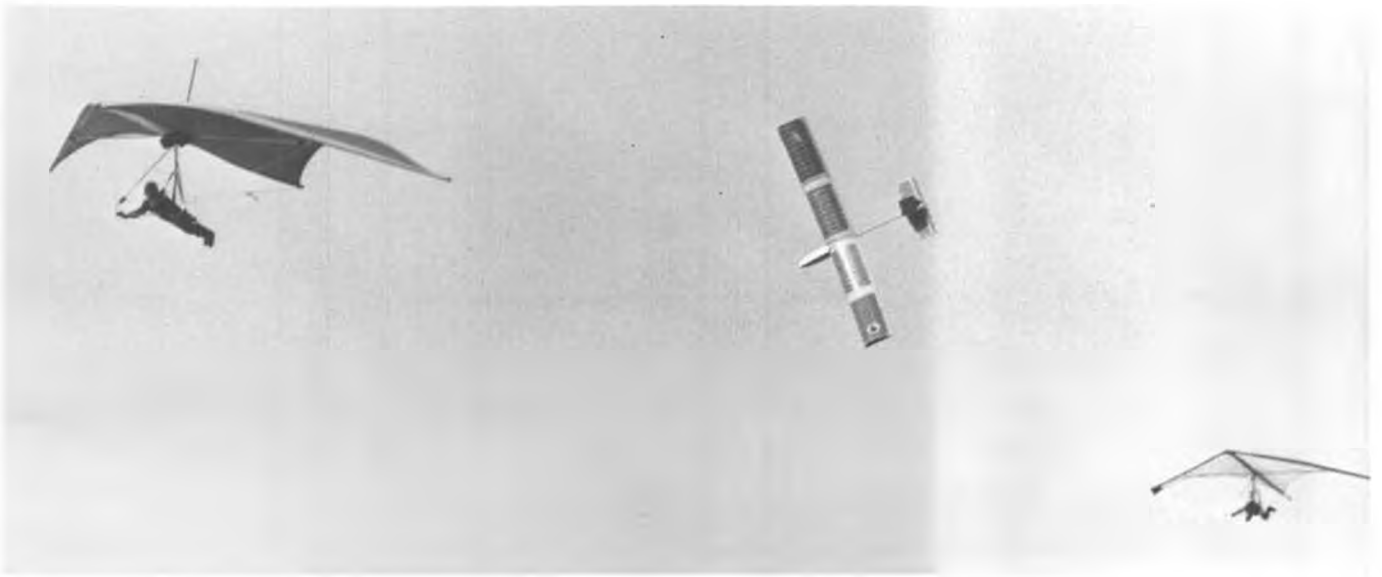
Remove the sleeve, piston and crank from the donor engine. Cut the cylinder away from the crankcase along the join line with a hacksaw. Leave a little extra material. With a Dremel sanding drum or a sharp knife, cut away the cylinder until it fits tightly to the crank case of the good engine. When the fit is good, find someone who can Heliarc, and have the dummy SPOT welded on. In most metropoliton areas there are aircraft welding places which can do this. The welding was the only thing I couldn't do on my own. Install the restrictor with a screw into the bored and tapped bar in the dummy bore.

Fasten the engine to a radial mount (I made my own from "T" stock) and install a 12 x 6 Power Prop. Use a standard long-reach plug, open the needle valve about three turns, and prime by flipping 10-15 times with your thumb over the venturi. The engine is impossible to prime by any other method. Ten percent sport fuel seems to work just fine with the plug mentioned. This arrangement should give a reliable engine run at about 5,000 rpm. I realize that the engine was not designed to operate in this manner, but two years and 200 or so flights haven't seemed to have hurt mine. I've been using Cox Glow Power fuel lately with good results. A couple of times I've used Cox Red Can, but I've got a hunch the milder fuels are better, as lubrication is minimal at best with the hotter fuel. Over six minutes per oz. of fuel is my usual run.

When the engine is adjusted, mount the firewall and install the fuel tank. Modify a 1 oz. rectangular U-control

Continued on page 62

Proof positive! Lengthened venturi and exhaust restricted to those two small holes, gives 5K on 10% nitro fuel and 12 x 6 Top Flite Power Prop. Also very quiet. Photo by Emil Neely.



Larry Fogel's JASCO "Scout" mixes it up with a couple of hang gliders off the cliffs of Torrey Pines, California. Not as close as it may appear, the Scout's wingspan is only 76 inches.

R/C SOARING

By LARRY FOGEL . . . This month's guest editor takes us on a tour of soaring patents, and also reviews Frank Zaic's latest glider, the "Scout."

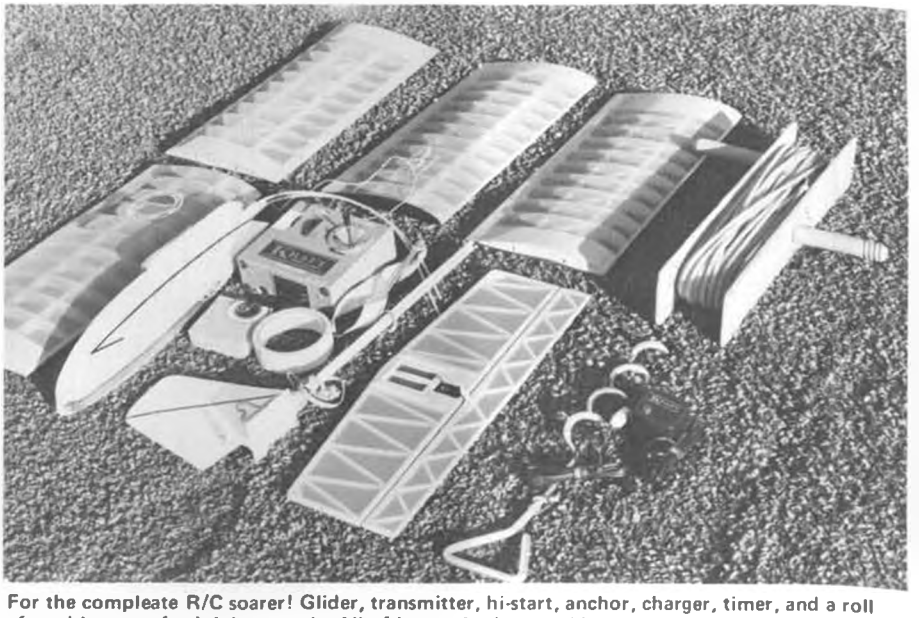
• In this bicentennial year it's interesting to look back into the history of soaring, so I performed a mini-patent search.

Otto Lilienthal (of Berlin, Germany) patented an unpowered flying machine on August 20, 1895 (U.S. Patent 544,816). "While during the flight (the pilot) can balance and steer the machine in which he is suspended (by a suitable movement of his body) so as to displace its center of gravity. In this manner he can imitate the so-called 'soaring' of birds, in which the movement takes place merely by a change in the position of the wings with regard to the direction of the wind, there being no rudder movement proper of the wings. As under these circumstances the legs are always freely suspended downward, the landing can safely be effected by putting the feet on the ground."

In 1897, Mouillard (of Cairo, Egypt) invented a "means of aerial flight", (U.S. Patent 582,757). "My invention relates to a machine for navigating the air by the force of the wind and has for its object the imitation of the soaring of large birds . . . I know from abundant personal observation that such birds can, without a single flap of their wings, float up into the air on a sufficient wind, sail about at pleasure, circle, and rise to great altitudes, glide down in any

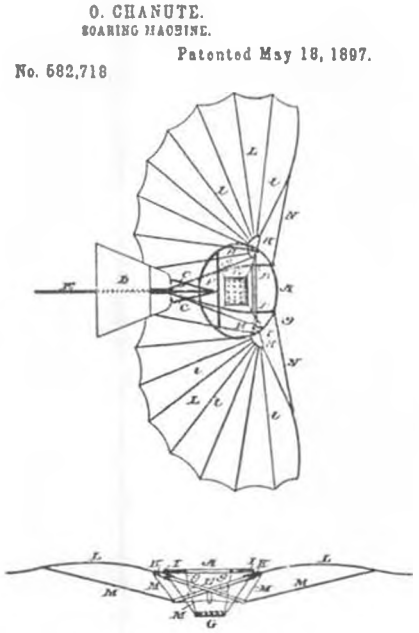
This month's guest editor with his Scout, all boxed up and ready to travel.

The Scout's kit box, fancied up with wood-grain contact paper. Everything in its place.



For the compleate R/C soarer! Glider, transmitter, hi-start, anchor, charger, timer, and a roll of masking tape for joining panels. All of it goes in the travel box.

Walt Hoffman and his "Mini-Gryphon," made the hard way. See text.



Octave Chanute's hang glider.

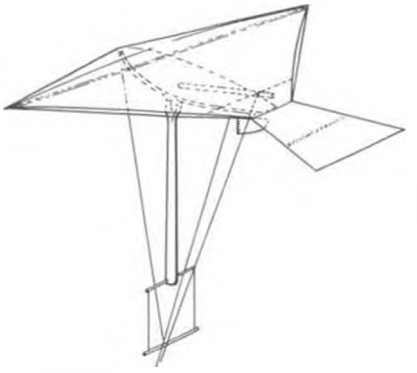
Gary Fogel, age 7, and his zero-channel glider. No radio failures to date!

It appears that Larry has his son well trained in proper launching technique.

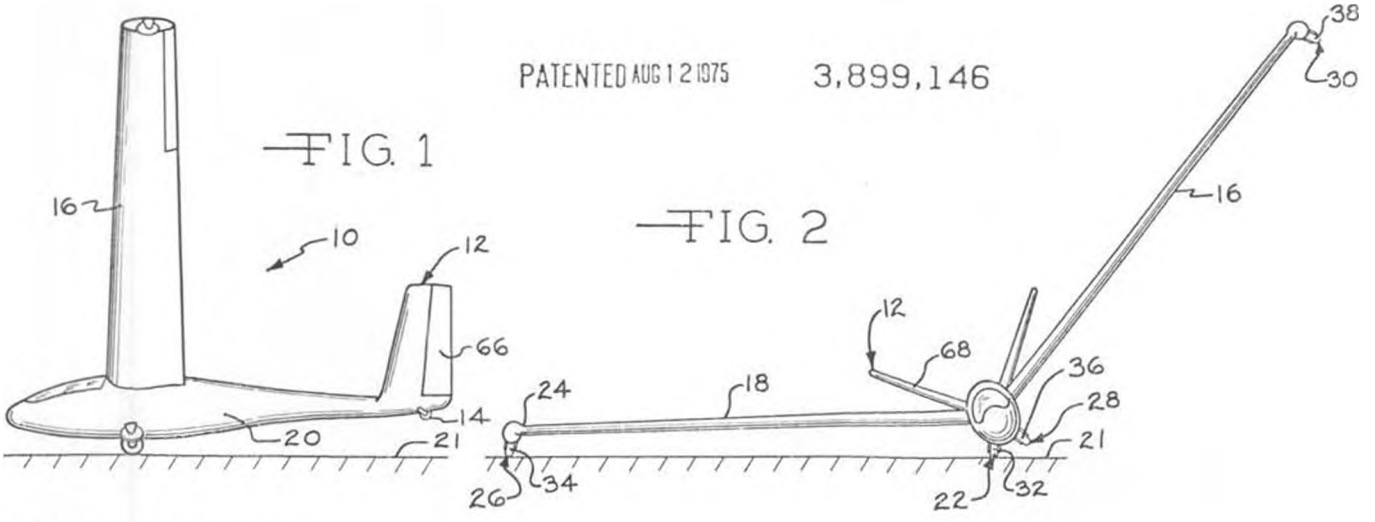
direction, and come back to their original starting point upon fixed rigid wings, solely by the skillful use of the power of the wind." He goes on to state that, "I rely entirely upon wind pressure to sustain my apparatus". He describes launch from a sufficient height or flight "by a skillful utilization of the force of the wind, which must blow at least 10 mph to enable the airplane to operate. This wind pressure and the force of gravity provide for translation in any direction and this constitutes the great economy of soaring flight."

In 1888, William Beeson (of Beaverhead, Montana) invented a flying machine (U.S. Patent 376,937) consisting of two sails, "It will be noticed that the least deviation of the main sail A from its normal plane will, through either compound lever MN be instantly felt and responded to by the back sail or tail B, which thus will correct tendencies to wild flight of the machine by automatically holding the main sail to its proper plane, and the machine will be self-supporting in a light wind, say of 10 miles or more per hour, and when once raised by a kite or otherwise and cut loose, the machine will of itself perform the evolutions of a soaring bird and rise to any altitude". The inventor appears highly optimistic.

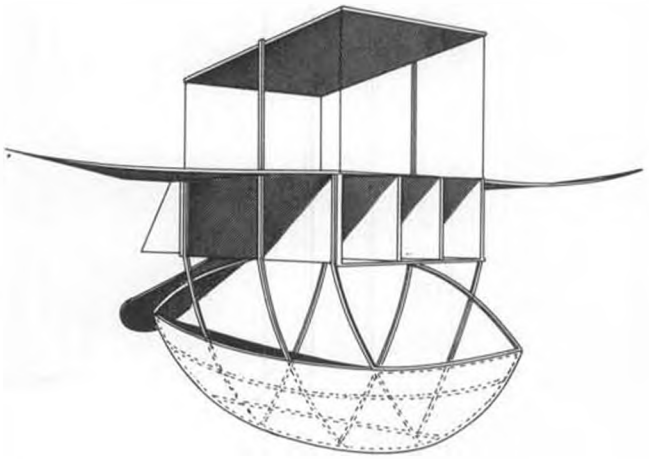
In 1897, Octave Chanute (of Chicago, Illinois) patented a "soaring machine" (U.S. Patent 582,718), his intent being to imitate the soaring of birds, which is accomplished while the wings are held rigidly still. He references the work of Lilienthal and Mouillard, but states that in addition it is necessary "to provide for a fore and aft movement of the wings in order to preserve the equilibrium. I provide a stationary seat and pivot each wing . . . so that it can be moved bodily forward and backward, as may be required to preserve the balance



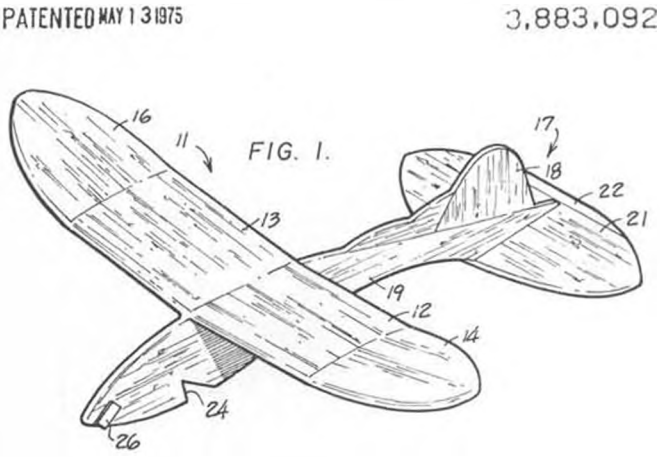
William Beeson's "Flying Machine."



Jim Amick's V-winged sailplane.



William Butusov's "Soaring Machine."

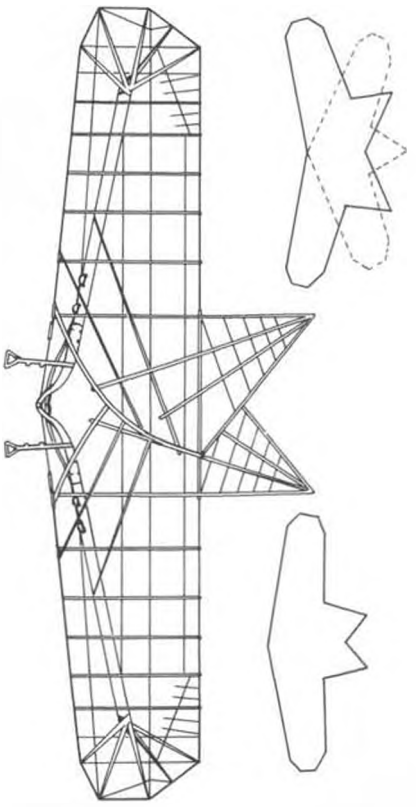


Yes, Virginia, Ralph Ditto got a patent for this very unusual "flying machine" in 1975!

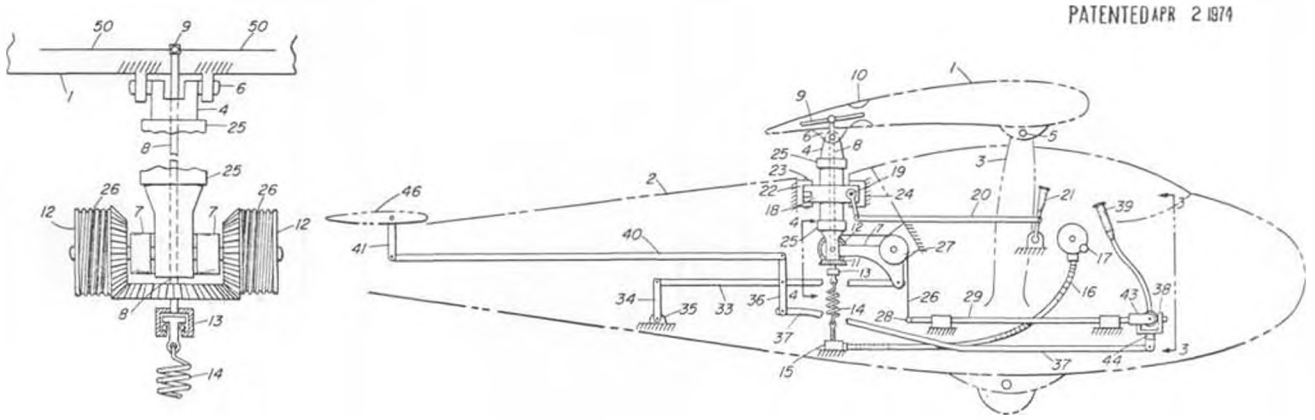
of the machine and the aviator. In operation, the springs are arranged to yield sufficiently to allow the machine to be properly balanced when soaring in a wind of 10 or 12 mph. If the wind strengthens, the wings are forced rather backward."

In 1898, William Butusov (of Chicago, Illinois) patented another soaring machine (U.S. Patent 606,187), which is intended "for sailing or soaring in the air". "The rider is enabled to keep the machine at all times under perfect balance and control by simple movements of his body on the platform, which he soon learns to do almost by instinct, as a child learns to cycle and a person learns to ride a bicycle or to swim, his hands as well as his attention or mind are left substantially free or unengaged and may, therefore, be devoted almost entirely to the single purpose of guiding the direction of the machine up or down or in respect to the points of the compass . . . (this) is effected by simply moving the rudder to one side or the other. The steering or guiding of the machine up or down or so as to cause it to ascend or descend, as may be required from time to time, is effected by the operator moving or leaning his body forward or back, so as to change the angle of incidence of the kite or plane to the wind and that of the wings to the wind. The angle of the kite or plane may be changed from time to time, according to the force of the wind." He goes on to point out that should there be difficulties in flying over water, a water-type covering over the hull allows the soaring machine to become a sailboat. He recommends that the kite or plane be "8 feet wide by 9 feet long and the spread of the wings 38 feet". "When in the air, the machine operates simply as a soaring or sailing device and may cause it to imitate the motions of ordinary soaring birds, such as circling round and round, rising against the wind and sailing with it, or at an angle to it to distant points." Now get this, "to rise from a given height to a greater height, the operator turns the machine with the wind and tilts it downward at a slight angle, keeping it in this position until the machine by its continued descent acquires a great velocity, and then the operator, by turning the machine around against the wind and simultaneously titling it upward as it moves against the wind rises to a still greater height by the combined force of the wind and the force represented by the velocity required by a previous descending movement with the wind". Other inventors conceived and demon-

Continued on page 65



In 1897, L. P. Mouillard invented this "means for aerial flight."



Ed Jones patented this "integral control system" for sailplanes.

Looks can be deceiving. If it wasn't for those Cox .020 Tee Dee engines, you might not realize that this B-17G has only a 39 inch wingspan. Built from a Sterling kit by Masayuki Suzuki, of Tokyo, Japan, it has a Futaba radio on rudder, elevator, and engine cut-off, using two channels.

'REMOTELY SPEAKING...'

R/C News, by BILL NORTHROP

TOLEDO

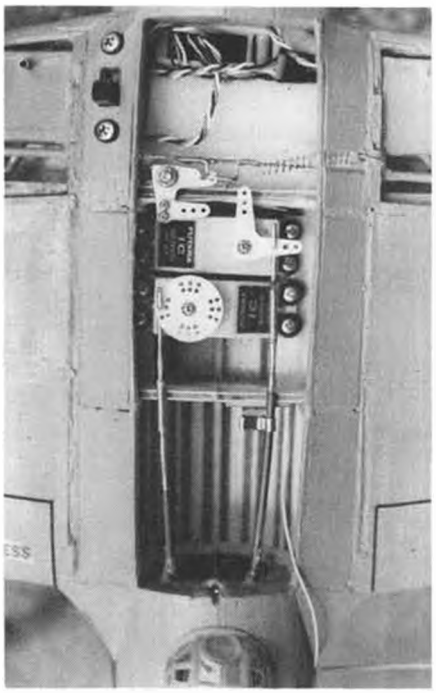
• We just returned from the "Greatest R/C Show on Earth" in time to get this issue to the printer. There isn't time to put a report together this month, but we will include a few photos, just to keep our competition on its toes!

This year, the Toledo Sports Arena was open to the public for three full days; there was no special time for dealers. Though tougher on the exhibitors, having the show open on Friday gave modelers a chance to take a day off from work and visit the booths without the typical Saturday crush. On the other hand, the hall closed promptly at 6 PM each day, giving everyone a chance to catch their breath and apply soothing "lotion" to overworked vocal cords.

Approximately 250 booths were occupied by about 170 some exhibitors. The majority were manufacturers, along with some national modeling organizations (AMA, SAM, NSRCA, IMAC, etc.) and a few distributors. Most everything was R/C oriented, though the MECA and NFFS booths enjoyed lots of attention. Vito Garafalo, of Tern Aero, kept things lively near MB's booth with dawn-to-dusk Aerobug flights. Another popular non-R/C demonstration was continuously put on by Eddy Manulkin, at the Sterling Models booth, flying Peanut Scale models from his latest kits.

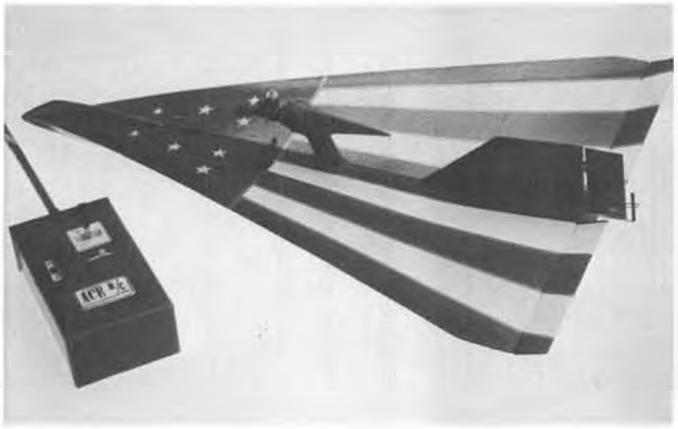
Everyone always asks, "What was new?" Perhaps after 14 years of uninterrupted attendance, we've acquired a "seen it all" attitude, toward the trade shows, but in our opinion, there was nothing really *new* at Toledo. There were many new variations on existing themes . . . new radios, new helicopters, new engines, new kits, etc., but there were no completely new tricks. The closest thing to it may be the Gell-Cells. Gell-Cells, basically, are sealed lead-acid

Just to verify the B-17's size, here's Masayuki holding the model. Flight shots were in color.



Radio installation in the B-17, showing the spring tripper for engine cut-off. Clever!

Astro Flight's Bob Boucher, with his twin Astro 15 powered flying wing. Kraft 3 ch.



John Walker, this month's Peanut scale contributor, built this red, white, and blue Bicentennial Cox .010 powered pulse rudder delta.

PHOTO BY NATE RAMBO

Camarillo 1/2A pylon winners, Mar. 21 (l to r): Dan Schaeffer, Ron Clem, Bob Nickle, George Kurreck, John Acord, and Gary Acord.

batteries, and though they've been around for many years, the manufacturers have only recently started to romance the hobby field. Next month, we hope to provide our readers with a clear description of Gell-Cells, their properties, care and feeding, and capabilities.

Next month, we'll get into some of the better mousetraps seen at Toledo, but right now, the biggest story out of last weekend was the announcement of the FCC's latest move . . . which follows.

BEWARE OF THE MONSTER!

Motivated by big money and politics, the Federal Communications Commission is about to deal R/C modeling its lowest blow. Unless something happens to prevent it, the six 27 mHz R/C channels will *legally* fall into the irrepressible clutches of the CB monster by the end of the year. FCC Docket 20120, released March 29, 1976, seeks relief for the overcrowded CB "Garbage Band." The following is a quote of AMA's news release dated April 3, 1976. Read it carefully.

"The FCC Proposal released March 29, 1976 seeks relief for the crowded CB channels by taking away the six 27

Ron Gilman, Tulare, California, current Form I record holder at a blistering 1:13. See text.

Winners of the 1976 Annual Sno-Fly, see text (l to r): Kevin Pearson, Jim Steel, J.D. Cochrane, Bud Pell, Bob Robinson, Dave Corven, Bob Hicks, and Dave Leach. Trophies are hand-made.

Ken Bates and his Hobie Hawk. Both are straining in the 20 mph plus wind. Sure looks cold too!

Warren Tiahrt, president of the Greater Detroit Soaring and Hiking Society, launches. Keith Finkenbiner, S.O.A.R. club on the watch.

Earl Denny, hard-working member of AMA's Headquarters.

Top Flite's Dan Santich (center) and Mike Schlesinger, surrounded by members of the famous Col. Betkey's R/C Show Team. Pictures on this and next page taken at Toledo Trade Show.

MHz RC channels from the hobbyists engaged in model planes, boats and cars. The FCC Docket (20120), if passed, will put these six frequencies in the hands of the CB'ers by the end of 1976, so the matter is urgent to present RC users.

"The FCC action is being protested by 70,000 organized RC users from the AMA, ROAR, IMPBA, AMYA; the National Associations of members involved. The AMA pioneered RC use of 27 MHz in 1952, and finds it disturbing that the FCC proposes to take away frequencies from the well-established and well-controlled RC hobby. This action would cut the number of RC frequencies from 13 to 7, drastically curtailing RC competition and sport usage. By contrast, Germany has just increased its RC channels from 13 to 89!

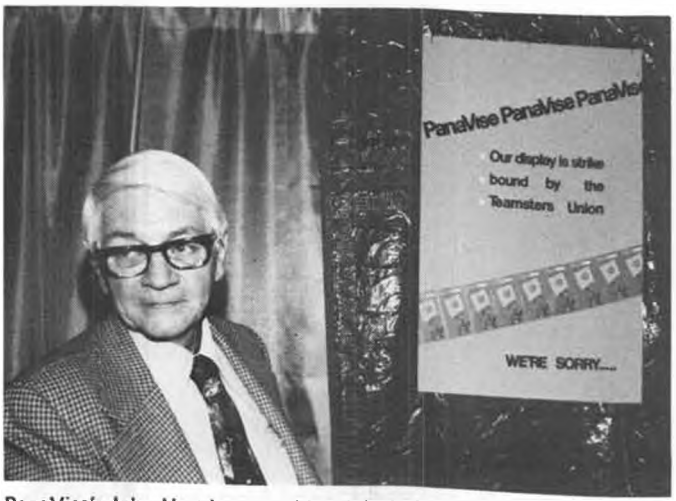
"An emergency meeting of the RC equipment manufacturers, a 25 million dollar industry, at the Toledo Trade Show stated that 20 million dollars worth of 27 MHz equipment (about 80,000 radio units) would become obsolete or require conversion to new frequencies. The industry members strongly object to relinquishing of the 27 MHz frequency, but support the acquisition of new frequencies to replace those which may be lost by the FCC Proposal. Although the FCC proposal allows shared used of the RC equipment with the CB'ers for a five year period, it is the technical judgement of the RC manufacturers that the danger of a CB unit causing loss of control to a model plane would cause many crashes, property damage and personal injuries. In fact, most industry members plan to halt productions of 27 MHZ RC units if the proposal is adopted, rather than aggravate the safety situation.

"The FCC further proposes that the Class C licenses (RC users) be grouped with the class D licenses (CB'ers) to simplify FCC paper work. The AMA notes that this action would lose identification of the distinct RC usage which is different in technical and operational ways. Specifically, Class D requires the licenses to be 18 yrs old or more, whereas the Class C permits from 12 yrs and up. This is significant when the recent RC USA National Champion, Rhett Miller, was 15 years old! He flew in a World Championship meet in Switzerland, representing the U.S.A., when 17 yrs old! Further, the AMA has almost 10,000 members under the age of 18.

"The AMA is sending official comments to the FCC on Docket 20120, with specific constructive proposals, to proceed with an orderly solution of CB problem and the impact on the RC Community. These AMA suggestions would allow time to consider the use of new RC frequencies to slowly phase out the 27 MHZ, if required, and permit RC manufacturers the necessary leadtime to gear up for new production. The AMA also proposes that, to increase safety from loss of control, the new frequencies should use modern modulation techniques, such as narrow band FM, to replace the more susceptible AM modulation now employed.

"Further suggestions are solicited from all of the RC community for incorporation into the AMA response to the FCC Docket 20120. Suggestions should be sent to the AMA Frequency Committee at AMA HQ. The AMA attorney, J. Courtney, will incorporate all useful ideas into the official response. This procedure is recommended to assure a unified voice on behalf of all RC users."

Once you've scraped yourself off the



PanaVise's John Hart borrowed local dealer's merchandise for display and made appropriate sign, on the spot. It tells the whole story.

Tony Dowdeswell (left), editor of England's RCM&E magazine, and MAP's Managing Editor, Ron Moulton. They had a busy booth.

Helene Tozier (left) and Lenore Levine, Mil-Comm Distributors, Inc., explain the advantages of Globe Gel/Cells.

Sterling Models' Ed Manulkin, recovering from hospital visit, had a ball flying his new Peanut scale models. Flash stopped prop.

ceiling, calmed down, and removed the straight pins from you FCC doll, you might discover that we could be looking at a blessing in disguise.

We previously mentioned that the 27 mHz R/C frequencies might *legally* become CB channels. The italics meant that we were facetously referring to the fact that "Garbage Banders" (also called "Shams") have been illegally helping themselves to our 27 mHz frequencies more and more in recent years . . . to the point that, except in areas of low population density, 27 is seldom used by R/Cers.

Because of the growing illegal CB use of our 27 mHz channels, the AMA/FCC frequency committee has been working toward possible switching to frequencies in the 30 to 40 mHz bands. Some foreign modelers are now legally operating on 40 mHz, in fact, it was in use by Holland and Switzerland at the last World Championships.

Narrow band FM is another way to go. FM R/C radios are now being made by Graupner in Germany and Digi-Tech in Japan, among others. FM allows narrower frequency spread, yet better signal separation. Of course, any mention of new and/or more sophisticated techniques immediately raises the question of increased cost. In this case, we don't have a comparison on the Graupner radio, but the Japanese Digi-Tech is priced, in Japan, at about what we pay for a good five-channel system. In this column next month, we will give you more information about FM, how it compares with AM, and its advantages and disadvantages.

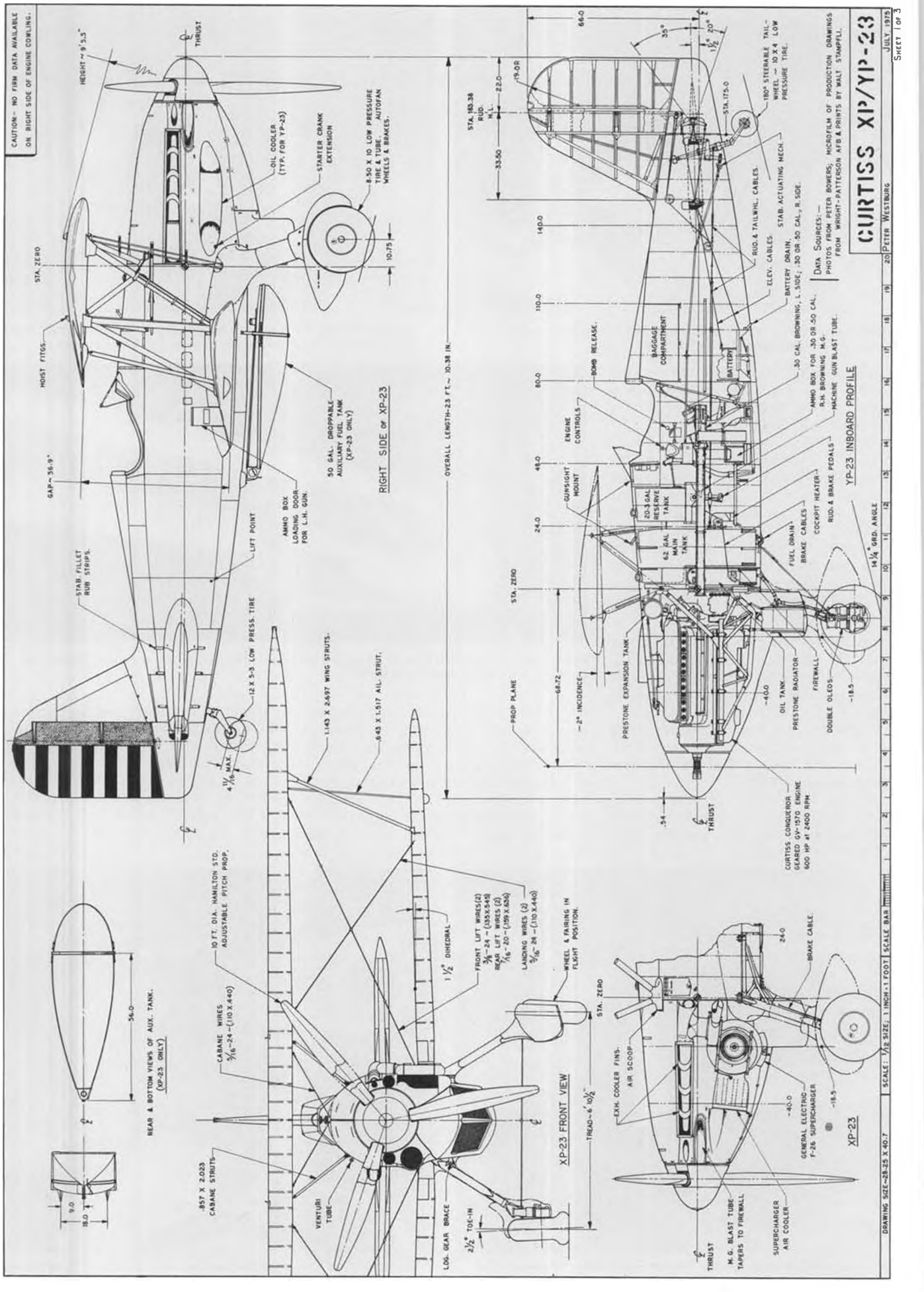
It is almost a certainty, no matter what the final solution, that 27 mHz, as an R/C band, is at an end. Philosophically, we repeat our earlier comment

Continued on page 83

Buford Gross, last year's Best of Show winner, donated his Wright Flyer to the AMA Model Museum. Wing warp is actuated by R/C.

Well-known engine man, George Aldrich, showed his "Magnum" line of glow plugs and fuel.

Du-Bro's Dave Gray explains the reason for using cookie-cutters on the Shark 60. Du-Bro also showed new air wheels up to 6 inch dia.


CURTISS XP/YP-23
JULY 1975
PETER WESTBURG
SHEET 1 OF 3
CAUTION- NO FIRM DATA AVAILABLE ON RIGHT SIDE OF ENGINE COWLING.
RIGHT SIDE OF XP-23
YP-23 INBOARD PROFILE
XP-23 FRONT VIEW
REAR & BOTTOM VIEWS OF AUX. TANK. (XP-23 ONLY)
XP-23
DATA SOURCES:—
PHOTOS FROM PETER BOWERS; MICROFILM OF PRODUCTION DRAWINGS FROM WRIGHT-PATTERSON AFB & PRINTS BY WALT STAMPFLI.
OVERALL LENGTH-23 FT.~ 10.38 IN.
HEIGHT ~ 9' 5.5"
GAP ~ 56.9"
TREAD ~ 6' 10½"
PROP PLANE
+2° INCIDENCE
14¼° GRD. ANGLE
CURTISS CONQUEROR GEARED GV-1570 ENGINE 600 HP at 2400 RPM
10 FT. DIA. HAMILTON STD. ADJUSTABLE PITCH PROP.
1½° DIHEDRAL
2½° TOE-IN
LOG. GEAR BRACE
.857 X 2.023 CABANE STRUTS
CABANE WIRES 5/16-24 ~ (.110 X .440)
FRONT LIFT WIRES (2) 3/8-24 ~ (.335 X .549)
REAR LIFT WIRES (2) 7/16-20 ~ (.399 X .634)
LANDING WIRES (2) 5/16-24 ~ (.110 X .440)
1.143 X 2.697 WING STRUTS.
.643 X 1.517 AIL. STRUT.
12 X 5-5 LOW PRESS. TIRE
8.50 X 10 LOW PRESSURE TIRE & TUBE AUTOFAN WHEELS & BRAKES.
180° STEERABLE TAIL-WHEEL ~ 10 X 4 LOW PRESSURE TIRE.
42 GAL. MAIN TANK
20.3 GAL. RESERVE TANK
50 GAL. DROPPABLE AUXILIARY FUEL TANK (XP-23 ONLY)
PRESTONE EXPANSION TANK
PRESTONE RADIATOR
OIL TANK
DOUBLE OLEOS
FIREWALL
COCKPIT HEATER
RUD. & BRAKE PEDALS
MACHINE GUN BLAST TUBE.
AMMO BOX FOR .30 OR .50 CAL. R.H. BROWNING M-6.
30 CAL. BROWNING, L. SIDE; .30 OR 50 CAL., R. SIDE.
BAGGAGE COMPARTMENT
BOMB RELEASE.
BATTERY
BATTERY DRAIN.
STAB. ACTUATING MECH.
RUD. & TAILWHL. CABLES
ELEV. CABLES
ENGINE CONTROLS
GUNSIGHT MOUNT
FUEL DRAIN.
BRAKE CABLES
BRAKE CABLE.
EXH. COOLER FINS-AIR SCOOP
GENERAL ELECTRIC F-26 SUPERCHARGER
SUPERCHARGER AIR COOLER
M.G. BLAST TUBE TAPERS TO FIREBALL
VENTURI TUBE
WHEEL & FAIRING IN FLIGHT POSITION.
STAB. FILLET RUB STRIPS.
LIFT POINT
AMMO BOX LOADING DOOR FOR L.H. GUN.
OIL COOLER (TYP. FOR YP-23)
STARTER CRANK EXTENSION
HOIST FITGS.
STA. ZERO
THRUST
DRAWING SIZE-28.25 X 40.7
SCALE: 1/2 SIZE; 1 INCH=1 FOOT
SCALE BAR

THE LAST OF THE TWO WINGED HAWKS

By PETER WESTBURG

Part I

The XP-23 was the last of the 46 famous P-6E's, though only the wings remained. The rest was all new. Note clockwise rotation of prop. (USAF Museum)

CURTISS XP/YP-23

The XP-23 in flight. Rare shot shows all wheels extended, with cuffs on main gear streamlines faired with gear legs. (USAF Museum)

Fuselage and tail surfaces were all-metal and completely new design. The tail was later used on the XP-31 Swift.

• In 1932, when monoplane combat aircraft were flying into the present, the Curtiss company made one last attempt to extend the life of the famous Hawk pursuits. For seven years, the good looking, sturdy, easy-to-fly Hawk had been the mainstay of the Army Air Corps pursuit squadrons, but its days were numbered by the oncoming low wing monoplane fighters on the drawing boards of every major nation's designers.

The XP-23 was almost a Hawk but not quite. The fuselage was all-metal monocoupe, the empennage was all-metal and brand new, and the landing gear, which appeared to be like that of the P-6E, was sprung in a much different manner. The powerplant was still a Conqueror, but it was an indirect drive one, and was fitted with a new General Electric F-26 supercharger.

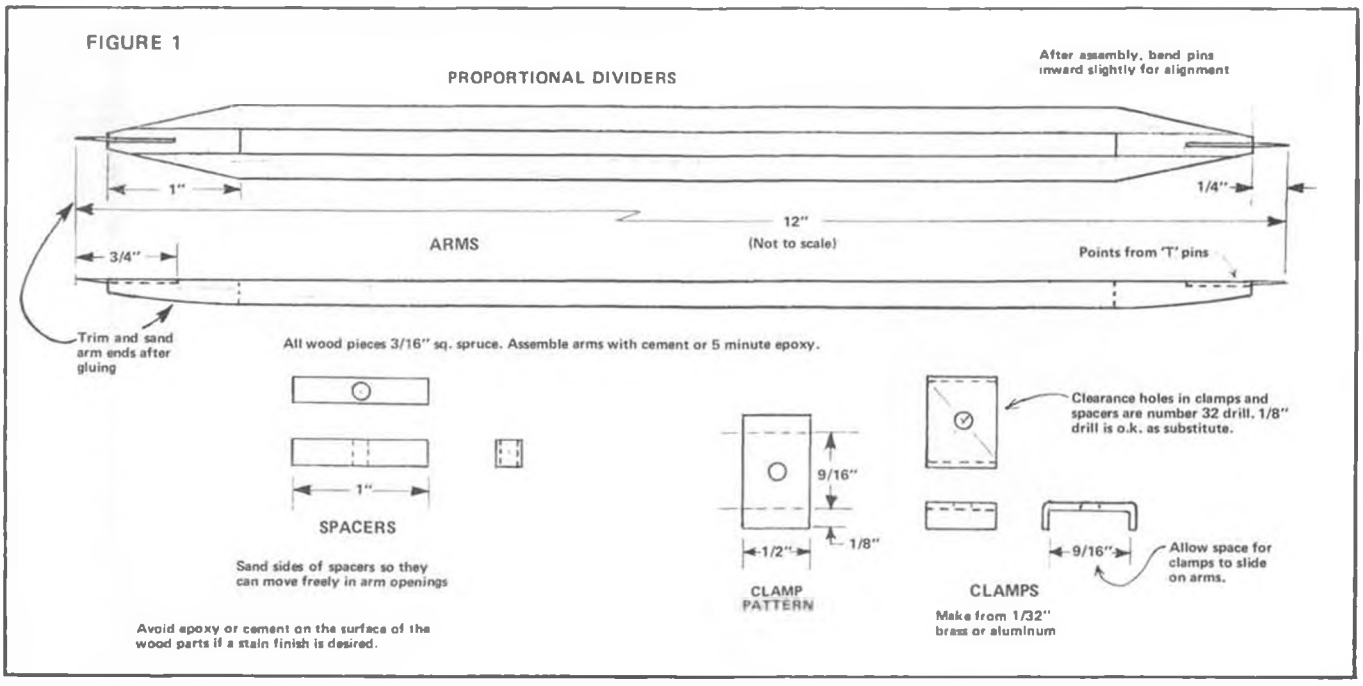
Only the familiar tapered wings were the same. But even they were changed; they were four inches farther apart and they had new constant-chord, all-metal ailerons.

Tested at Wright Field, the XP-23 gave a pretty good account of itself. Its ceiling was 33,000 feet, and in the first minute of climb, it reached 1370 feet. At 15,000 feet it had a maximum speed of 223. Though good, the performance could not match that of a new, lightweight low wing fighter that had already flown at Boeing, in Seattle. •

(To be concluded next month)

Close-up of GE F-26 supercharger, which gave XP-23 top speed of 223 mph at 15,000 feet.

FIGURE 1



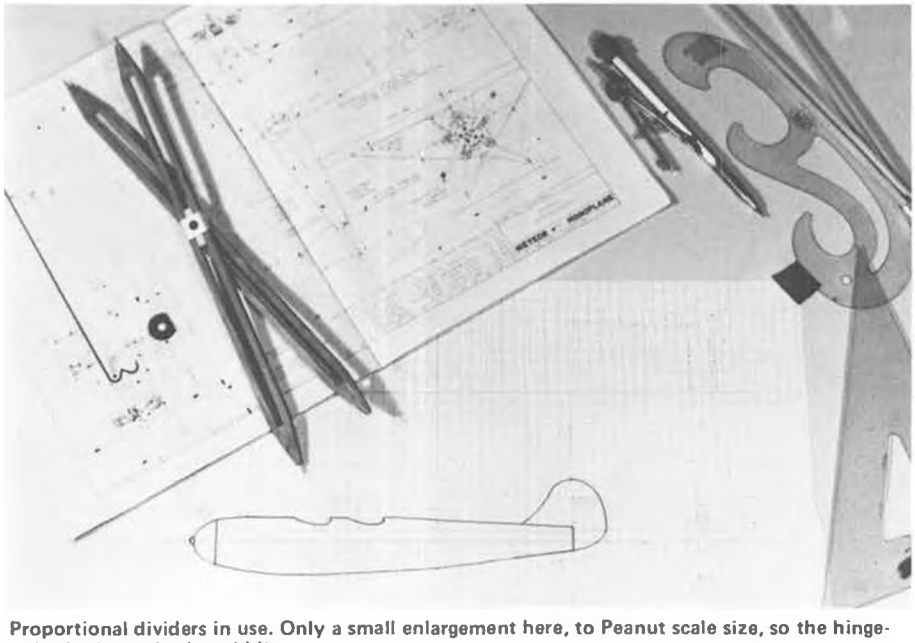
SIMPLIFIED **SCALE** DRAWINGS

By AL LIDBERG . . . An introduction to the use of a scale designer's most useful tool, proportional dividers. And in case you don't happen to own a pair . . . here's how to make an inexpensive set.

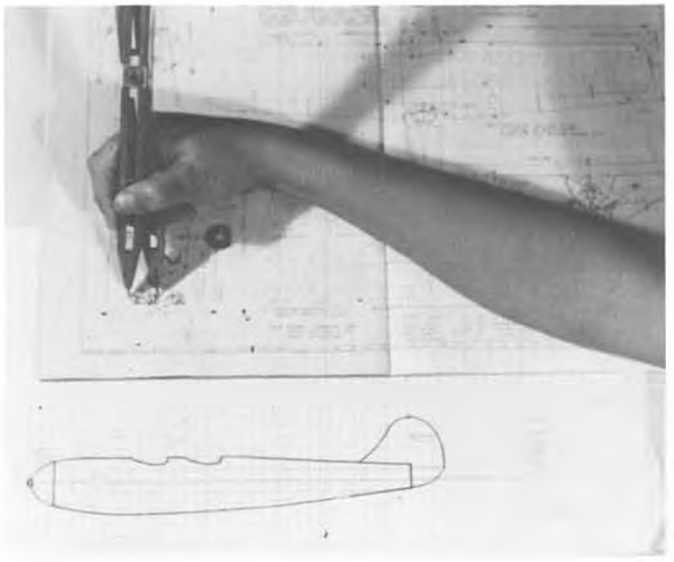
• Scaling up drawings for model projects, especially scale models, has traditionally been a task that many modelers avoid like the plague. There are some easy ways around the job, though, like starting with a kit or a full-sized magazine plan. You can also take a simplified approach to the problem by dealing in full multitudes of the original drawings; that is twice-size or four-times size. With this method, a dimension is struck off two or four times with dividers. This approach is not always satisfactory, however, when trying to fit a model to a particular size or class, such as Peanut or Jumbo scale. A similar problem occurs when trying to decorate a kit model to match the paint trim and markings of a particular plane, using 3-views or Profile drawings for reference.

I have tried various methods over the years to assist in scaling up model drawings. These have included scale rulers, proportionate triangles, and multiplying dimensions from a 3-view by the required enlarging ratio. These methods all work (and the presence of a scale ruler in the documentation package will help the judges check your model), but they all take more time than using proportional dividers. These dividers are an obscure item in the draftsman's tool kit, but a very useful one. They operate on the same basic theory as the proportionate triangles, but are made adjustable to provide a variety of ratios. Fig. 2 shows the theory in a simplified drawing.

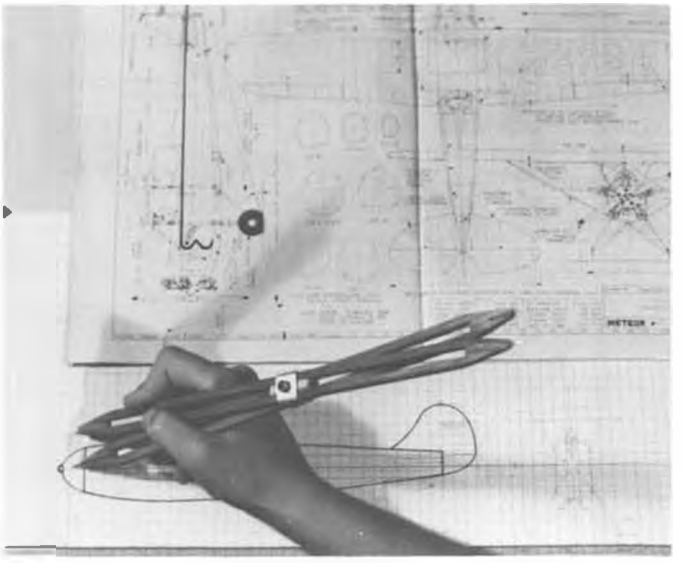
You may have a problem locating commercially made proportional dividers, and when available, the price is far from cheap. A few telephone calls here in the Phoenix area resulted in finding only one drafting supply store clerk who knew what the dividers were, and then only through a catalog listing! The price was about $30. Thus, a set of ready-made proportional dividers may be well beyond sensible cost limits for many modelers. The photographs, and Fig. 1 show a set of proportional dividers constructed from ordinary hobby shop spruce, "T" pins, 4-40 screw and self-locking nut, one washer, and some scrap aluminum; all at a cost of less then $1.00. The larger set of dividers shows was made from 3/16 sq. spruce to avoid the flexibility noted in the first set which was made from 1/8 sq.. The open center arrangement of each arm allows the easy adjustment of arm lengths for different ratios. Once the ratio is selec-



Proportional dividers in use. Only a small enlargement here, to Peanut scale size, so the hinge-point is almost in the middle.



In operation, when enlarging, a measurement is taken from the original drawing, using the smaller end of the proportional dividers.



The dimension is then transferred to the new and larger drawing by marking the space between the points on the longer arms.

ted, the screw, nut and clamps retain the length adjustment, while the washer allows the arms to pivot for use.

There's not much to be said about the construction of the dividers. Each arm consists of two 11-1/2 inch lengths of 3/16 sq. spruce, separated by two 1 inch lengths of 3/16 sq. at each end. Five minute epoxy works fine, and when set, the arms can be tapered at each end. The points on both ends of each arm are large "T" pins, cut to 3/4 of an inch and epoxied into 1/32 grooves. Each arm assembly should be 12 inches long, but more importantly, both the arms must be the same length, even if they come out slightly longer or shorter than 12 inches.

After this step, the arms should be sanded smooth and given a protective finish. The larger dividers in the photos were sanded with No. 400 paper and given a coat of liquid brown shoe polish. After the polish dries, it can be buffed with a piece of cloth and the arms are ready for use. Clamp pieces can be made from brass or aluminum and should be formed to slide on the arms. Drill the holes in each clamp after forming, as it is easier to get the hole centered in this manner.

One tip in using the dividers is to start work from a reference line. This can be the thrust line, the edge of the wing, or a line you have drawn for the purpose. Dimensions are then scaled along, and at right angles to that line, on both the original drawing and the enlarged drawing.

The dividers are set up for use by checking the ratio setting table in Fig. 3 for the desired ratio (or calculating for an intermediate ratio) and then setting the l_1 and l_2 dimensions by loosening the clamp screws and sliding the arms. Some minor adjustments may have to be made to l_1 and l_2 to arrive at the exact ratio, but I've heard that this is also a characteristic of the commercially made dividers. Once the desired ratio is reached and the clamp screw is tightened, the setting will stay until a change is required. For a typical scale-up pro-

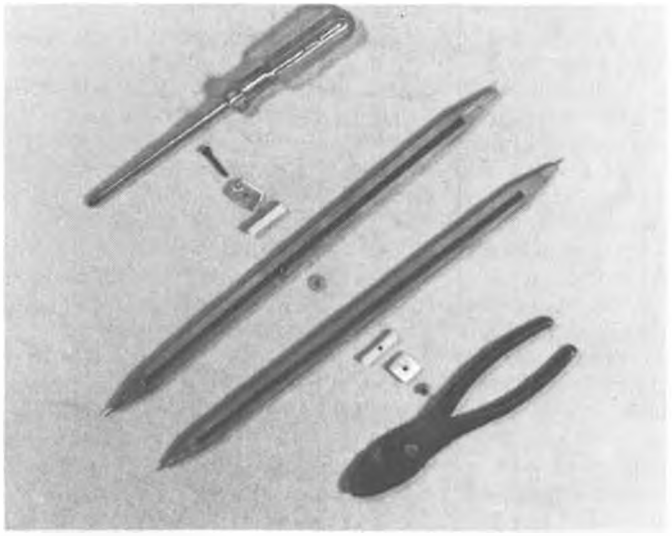
Continued on page 91

PROPORTIONAL DIVIDERS RATIO SETTING TABLE
($l_1 + l_2 = 12''$)

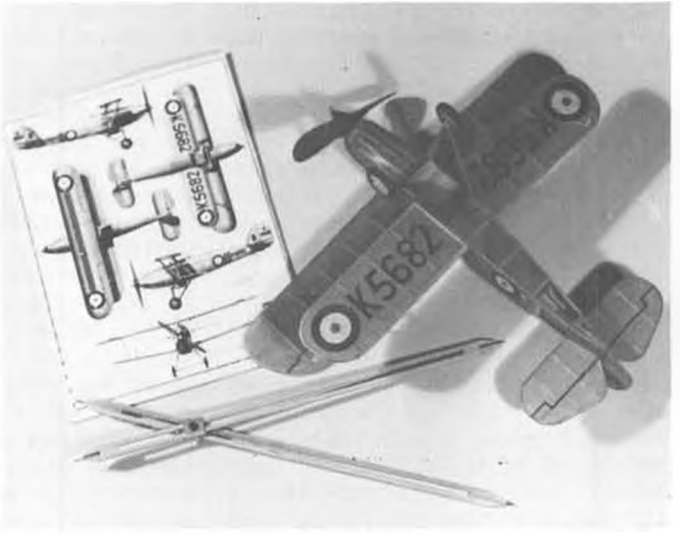
ENLARGE RATIO	l_1	l_2	REDUCE RATIO
1.0	6.00	6.00	1.0
1.2	5.45	6.55	.83
1.4	5.00	7.00	.71
1.6	4.62	7.38	.63
1.8	4.29	7.71	.56
2.0	4.00	8.00	.50
2.2	3.75	8.25	.45
2.4	3.53	8.47	.42
2.6	3.33	8.67	.38
2.8	3.16	8.84	.36
3.0	3.00	9.00	.33
3.5	2.67	9.33	.29
4.0	2.40	9.60	.25
4.5	2.18	9.82	.22
5.0	2.00	10.00	.20

For settings which are not listed on the table, calculate l_1 as follows:

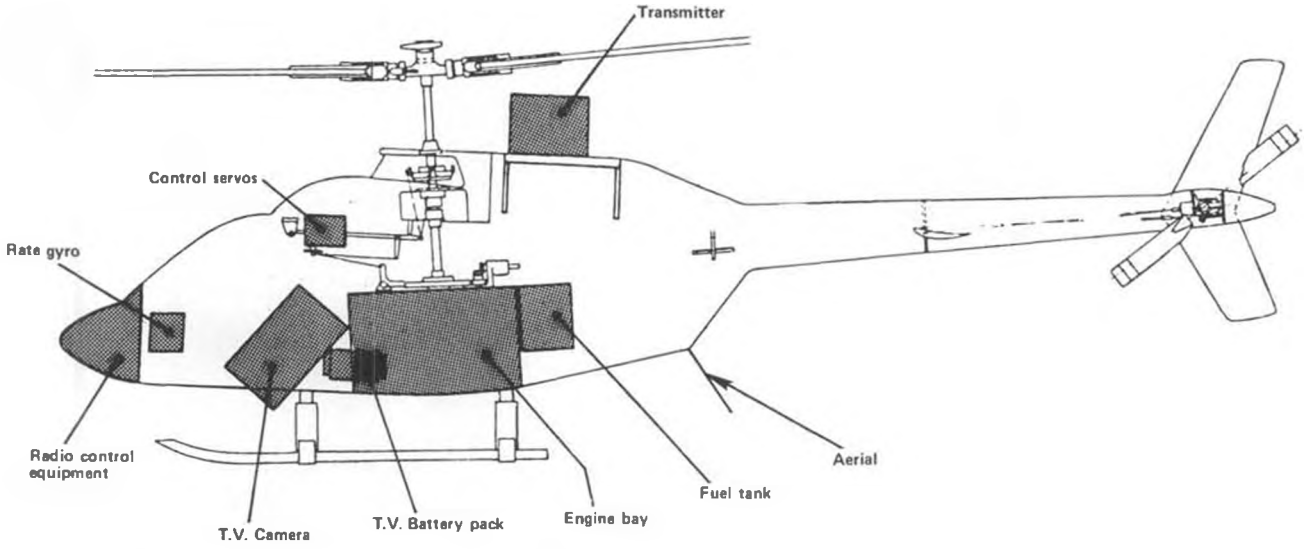
$$l_1 = \frac{12}{1 + \text{ratio}} \quad \text{and} \quad 12 - l_1 = l_2$$



Parts of proportional dividers, ready for assembly. Use of a knurled nut would allow more convenient hand-tightening.



Dividers are also handy for proportioning and properly locating insignia on military models. Approx. 3 to 1 enlargement used here.



Equipment set-up in a Kavan Jet Ranger being used by the British Aircraft Corporation in its rotary wing RPV research.

CHOPPER CHATTER

By JOHN TUCKER

• A quick look in my mailbox at the magazine office indicates that I am behind in my reporting, so will work in a couple of letters with this issue. I have also been fortunate enough to secure a copy of a paper presented to the Royal Aeronautical Society on the 27th of January, 1976, concerning British Aircraft Corporation's Guided Weapons Division Report on their experience with Rotary Wing R.P.V.'s. This report is quite flattering to the model helicopter industry and contains a lot of thought-provoking information which might be of interest to you experimenters.

ELECTRIC POWER

First, a quick look at Charlie Gilbert's electric helicopter, and how his experiences are providing data for future changes. As we reported last month, the little machine would only get "light" and skim around the workshop floor in its present configuration. In his continuing efforts to get more power into the main rotor blades, Charlie changed gear ratios and tried different motors with a slight increase in performance, but still not enough to get airborne. Then he discovered, by disconnecting the tail rotor drive, that there was more than adequate power to lift the chopper off the ground in the conventional manner. Now, all that remains is to find a method of controlling the rotational torque without robbing the main rotor of its potential lift capability. Charle calculates that the tail rotor absorbs about 60% of the total power output of the motor! So, it presents quite an obstacle to overcome. The next step is to fit a separate motor to drive the tail rotor independently of the main rotor. We all hope it works Charlie . . . keep up the good work and keep us posted on your experiments!

IDEAS

I received another fine letter from Larry ("Long Ranger") Bingham of Salt Lake City, and wish to pass on his comments about modifying the DuBro Tri-Star. He says, "There are a couple of things I am working on now that have kept me quite busy. One of these is making my DuBro Tri-Star rear rotor easier to handle. I have incorporated Mr. Kavan's mixing-lever (part No. 3508) to work on the Tri-Star. By taking the rear rotor servo and putting it upside down next to the throttle servo, and installing the mixing lever with a solid Nyrod to the rear rotor, it has taken out the radical torque problems. I don't have as much confidence in the spring return on the rear rotor as I do with the more positive push and pull of a stiffer rod from the servo to the tail rotor blades. I think that Kavan's mixing lever could be used on all makes of choppers as long as the throttle servo and rear rotor servo are as close together as the mixing lever is long. My second idea, I will keep to myself for now, until it has been completed and tested. I think it will add a great deal to the scale Jet Ranger builders, and a new aspect of flying." Well Larry, we will anxiously await your report of this latest project and hope it will turn out as well as your "Long Ranger" model.

Another idea comes to us from Mike Daily of Seattle, Washington, who writes, "I just finished a flying session with a new mod on my Heli-Baby. The mod is a spring on the tail rotor control linkage. This keeps the rotor blades from feeding-back and takes up the slop in the raceway (slot) on the control linkage, when control input is given to the tail rotor. This problem shows up with a hunting of the tail, or overshoot, and the need for constant corrections to the tail rotor. This problem was first noticed when control throw was increased to make left turns more responsive. The spring keeps the link on the right side of the raceway at all times. Needless to say I am very excited about the mod, since at hover, I can even take my hand off the tail rotor to trim it, etc. Give it a try on your Heli-Baby, you will not believe the difference in control. Also, everyone in the Seattle area is replacing the roller bearings with ball bearings on the tail rotor shaft." Mike attached a drawing to his letter showing the modification, and we will include it in this column for your information. Some years ago, I made a cylindrical raceway and spring-loaded the lever arm in much the same fashion, and must agree that taking out the slop in the tail rotor control provides a much smoother control in all respects, but I have to admit that Mike's spring is much simpler and will do just as good a job! If you're not very handy with bending springs, you might try adapting a small safety pin!

Mike also, in another letter, sent drawings and information concerning a low cost blinking light system that he

designed. Of primary importance to his needs was a unit that incorporated an adjustable time base, and was not temperature sensitive, so he came up with circuitry based upon the 74121 IC, which is a monostable multivibrator. Because of limited interest in this type of project, we will not print the details of construction, however, will be happy to mail you a copy of his schematic if you'll send a self addressed and stamped envelope to my attention. And many thanks for the input Mike . . . we need this kind of effort in promoting the state of the art.

ROTARY WING R.P.V.'s

Acknowledgement is given to R. Stephenson and the British Aircraft Corporation, Guided Weapons Division, for the excerpts given below on their rotary wing Remotely Piloted Vehicle research. In the past, their work has been concentrated on target applications, and it seemed clear that model aircraft technology could form the basis for such targets. Consequently, they set three objectives for a research program: (1) to produce a flight vehicle for general applications in anticipation of mini-RPV requirements, (2) to investigate the design, manufacture, and flying qualities of a low budget RPV, (3) to develop a vehicle that could be flown by inexperienced operators. In addition, it was decided to evaluate the capabilities of commercially available model helicopters for carrying experimental instrumentation packages and for the surveillance role.

"Research has been concentrated on the mini helicopter. It would have been unrealistic and uneconomic to develop a helicopter of our own. We, therefore, surveyed the model market.

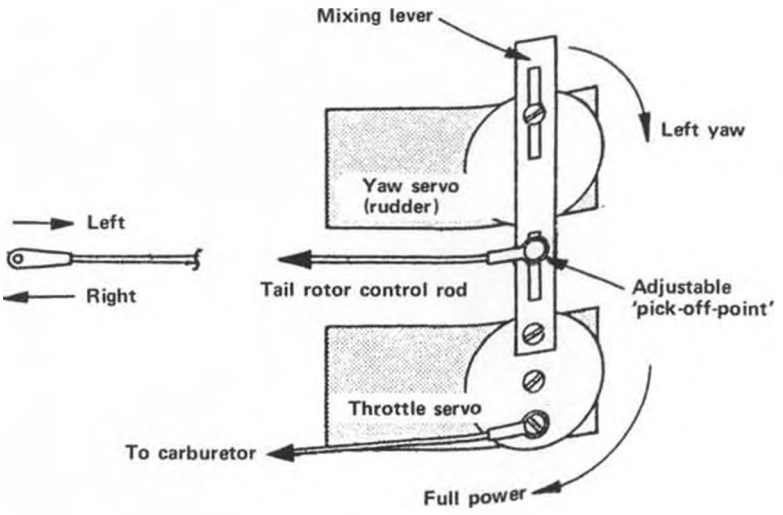
"We have no connection with any model maker but chose the model which appeared to have the most potential for meeting our requirements. This was the Kavan Jet Ranger which we modified to improve its payload capacity while retaining mechanical reliability.

"We selected the Kavan Jet Ranger model helicopter for investigation because:

(1) Its mechanism, by nature of its components, could be modified while still using Kavan production parts.

(2) The quality of the components is of high standard and the model is under continual development by Kavan.

(3) The Kavan Jet Ranger is well proven by its performance in the aeromodelling fraternity. Particularly, the capability of Kavan's rotor system to respond quickly to control enhances manoeuvrability and the ability to hover over a specified point. (The Kavan System produces cyclic pitch by directly controlling the incidence of the main teetering rotor blades with only limited authority stabilisation from a stabiliser rotor and also employs a collective pitch control. Most other models available at the time controlled lift from throttle setting only, and cyclic pitch remotely through the aerodynamic surfaces of the stabiliser rotor blade using the Hiller system which is a more sluggish system both in cyclic and collective pitch).



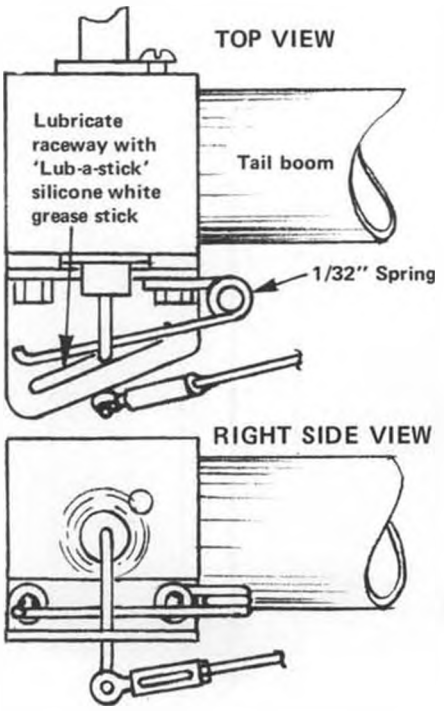
TYPICAL MIXING LEVER SET-UP

(4) Stability in hover is obtained from the Young stabilising bar principle originally developed by Bell Helicopters.

"Though a full theoretical analysis of the dynamics of Kavan's rotor control mechanism is not available, it can be seen to incorporate some of the properties of the both Hiller and Young systems and a complete analysis may show it to advantage over both.

"We are indebted to Kavan for a great deal of advice and assistance in using this model.

"Objectives: Our initial objective, studying the model practically, was to evaluate its capability of carrying experimental instrumentation payloads such as a vertical reference, a heading reference and autopilot instrumentation for evaluation.



"Later, the experiments were focused for a time on modifying the helicopter to carry a television camera and T.V. transmitter to evaluate its potential in a surveillance role. These experiments investigated:

(1) The feasibility of operating a T.V. Camera in the models vibration environment.

(2) The possibility of interference on the command receiver from T.V. transmissions.

(3) The possibility of distortion of data transmission by the main rotor.

(4) The ability of a ground operator to hover the model with sufficient accuracy for the camera to view desired ground objects.

"These experiments successfully demonstrated the operation of the T.V. camera and data link.

"They have confirmed our belief that:

(1) We should take advantage of the ingenuity and enthusiasm of aeromodel makers in accumulating 'Know How' and adapting modern technology to a relatively low cost product for the hobby market.

(2) Though it has been said that less than 40% of aero model kits sold reach complete construction and less than 20% fly, these figures reflect the competence and enthusiasm of the average buyer, not the average model engineer.

(3) The alleged lack of reliability and availability of models from "Sunday Fliers" is not inherent in kit designs and components but in maintenance discipline. Provided that a maintenance schedule, (Kavan has recommended a fairly comprehensive one for the Jet Ranger) is rigidly adhered to and a maintenance and flying log is kept, relia-

Continued on page 70

The good old summer time . . . it's coming! Somewhere in New England, Esio Grassi tunes the engine in his Miss America, as Stu Murray holds on. Say what you will, with all those trees around, you fly by radio assist, or don't fly at all.

PLUG SPARKS

By JOHN POND

• Got that aluminum beer can compressed air tank finished yet? If you haven't, maybe it's just as well, as Bert Pond, the windmill (compressed air power) expert himself, has come up with a few follow-on thoughts that should be of help if you have been having trouble with your creation. Incidentally, before we go any further . . . in response to inquiries, Bert Pond can be reached at 128 Warren Terrace, Longmeadow, Mass. 01106.

Bert observes that his tank peeled paint at 100 p.s.i. The epoxy on the joint "lifted" the paint. As we noted last month, all paint on the joints should be removed. When you get it cleaned up, you will find the aluminum is quite shiny. The surface should be roughened slightly without weakening the strength of the metal, to give the epoxy glue a better "bite." Sanding is the simplest method, but a mild etch will work well too. A joint of this type will tend to become round even if out-of-round. Alignment is of particular interest here as the joint could "work" and exert a shearing effect on the glue.

To obviate this problem, Bert recommends that the bottom be "fly cut" (If you don't know what that means, see your machinist), leaving a stiffening rim (See Figure 1.) This is a simple yet great idea! In addition to this, as mentioned last time, use the longer-curing epoxy cement. Five-minute epoxy is too brittle. (No flexibility).

One word of caution; not all beer cans are of the same aluminum wall thickness. Some are as low as .004 inch; very light, but the load factor would be lower. Most of the cans are .006 in. In any respect, after you get past 100 p.s.i., be careful. Bert sez he doesn't know what the bursting pressure is yet (or reasonable operating pressure).

The last point Bert makes is reserved for the finished end. Keep this piece as short as you can and yet maintain the radius, circularity, and rigidity. The accompanying sketch (Figure 2), should help clarify some of the points of the foregoing paragraphs. If still in the dark, write Bert.

ENGINE OF THE MONTH

This month's subject, the Bantam 19, needs no introduction to the old timer. As designed by Ben Shereshaw, this en-

Impressive line-up of entries in the SAM 21 Fuel Allotment contest held at Santa Teresa Park. Pond's Dallaire at far left, and Products In Use Playboy facing left.

The prototype Spielmaker 60. Production scheduled for spring '76. Now! Price, $75.

Mike Bonke at the 1975 KOI Meet. Thermal Thumber with Klondyke 19 (K & B ignition conversion).

Don Dodd, with his beautiful New Ruler, was a cool competitor in more ways than one at the CAMS Idaho O.T. meet.

gine was a must in anyone's stable for Class A competition for ten years.

Ben Shereshaw, who was responsible for many designs dotting the early magazines; i.e., Flying Aces, Air Trails, and Model Airplane News, got interested in building a small engine in 1938. Being a machinist by trade, it wasn't long before Ben had a Class A engine of .16 cu. in. displacement.

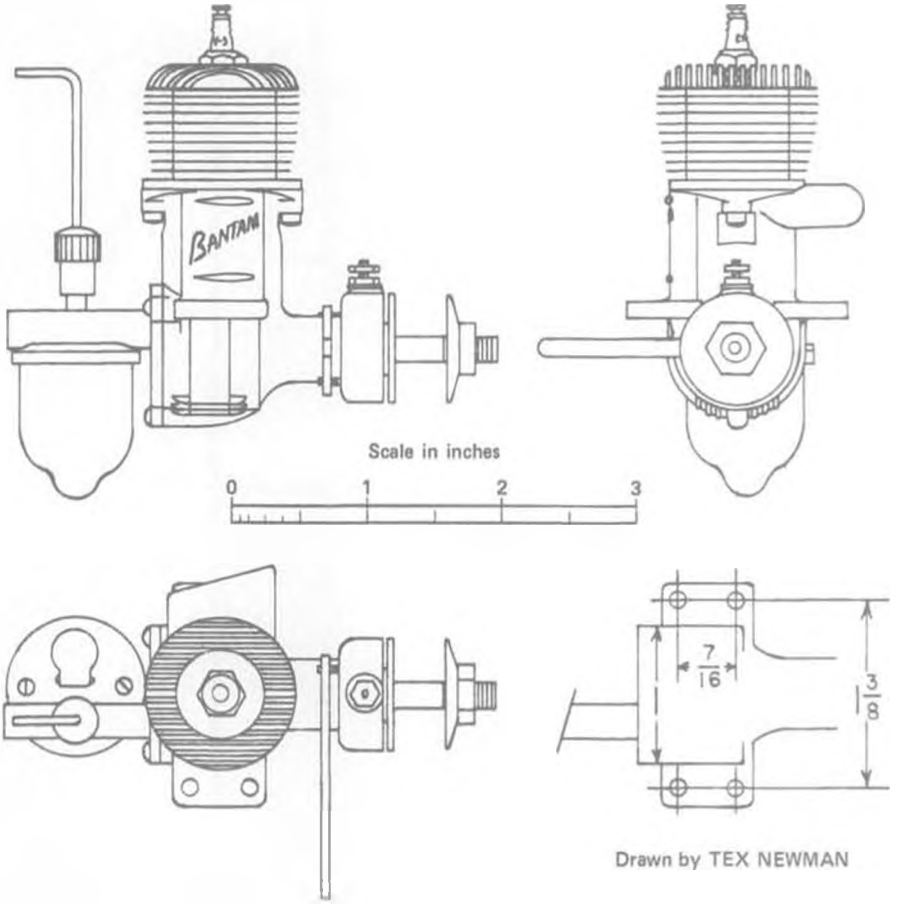
These early engines were highly prized and very much in demand. As Henry Struck noted, "It was a six months wait for my engine but boy, was it worth it!" The Bantam engines, made with excellent precision, ran every other Class A engine off the market. Even the Ohlsson .19, put out by O&R, suffered in sales to the point that Irwin Ohlsson had to admit his best small engine seller was always the .23. The .19 O&R engine sold poorly in comparison.

Around late 1939, Ben decided to increase the displacement of his Bantam to .19, as this was the upper limit of Class A. Why give the other fellow an advantage, reasoned Shereshaw. This was the real bread-and-butter engine that brought Shereshaw fame and (some) fortune. The Bantam won practically every event class in which it was entered. Actually, it was not until the advent of Ray Arden's 19 that the Bantam had any serious competition. Like all good things, the Bantam eventually passed from the motor market, as Ray Arden's engine proved to be too much for it.

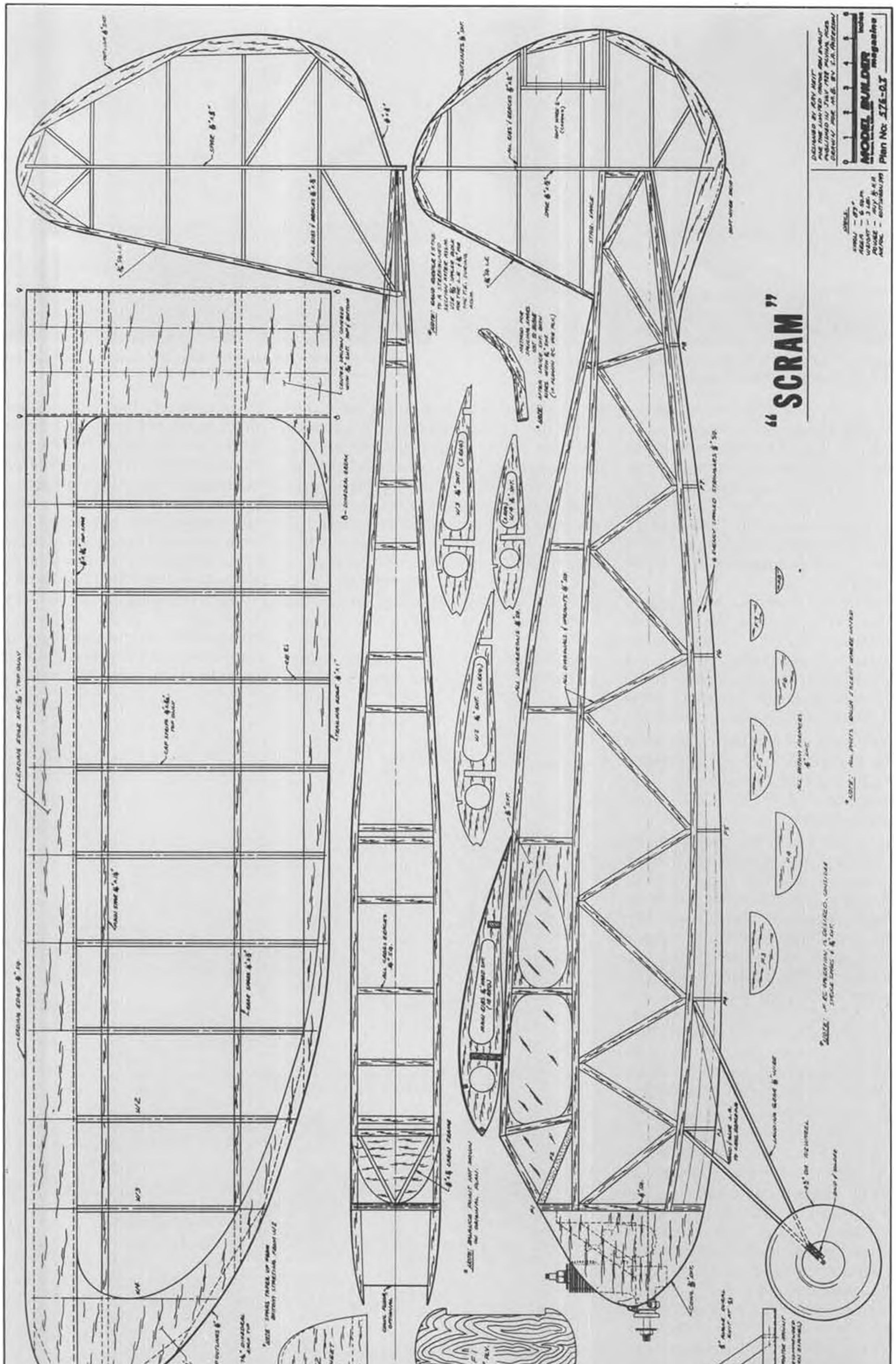
For those who collect engines, there are four distinct Bantam engines, the .16, the magnesium case .19, the chrome coated Bantam .19, and the OK version; the company that eventually bought up Shereshaw's business. The biggest advantage to Bantams was their lightness, weighing only 3-3/4 ounces.

Specifications of the post war model indicate a bore of .656 and a stroke of .590. The crankcase and lower portion of the cylinder were die-cast magnesium alloy with an integral exhaust stack. The cylinder barrel and head were made from one piece of high manganese steel with the cooling fins machined from cylinder stock. The inside, which was the secret of Ben's success in engines, was micro-bored to a very high-finish. The mating portion, the piston, was machined and ground to very close tolerances. The writer hadn't seen fits like this until Leroy Cox, in his mass production genius of temperature controlled centerless grinding, made the Cox engine an outstanding piece of precision fit.

For those who have Bantam engines and wish to use them (much to the Engine Collector's horror) in a suitable free flight, probably the best combination is with Carl Goldberg's Interceptor, either the 42 or 48 inch version. *(Last month's "Cabruler" by Hank Struck, was designed around the Bantam. wcn)* Bantam engines were not noted for turning large diameter propellers. The writer recommends nine inch dia. with four inch pitch to get the Bantam turning in the 10,000 rpm range. Using any other combination of larger diameter and/or higher pitch would drastically drop the rpm indicator by at least two thousand revs. In short, keep the motor turning



BANTAM 19


"SCRAM"

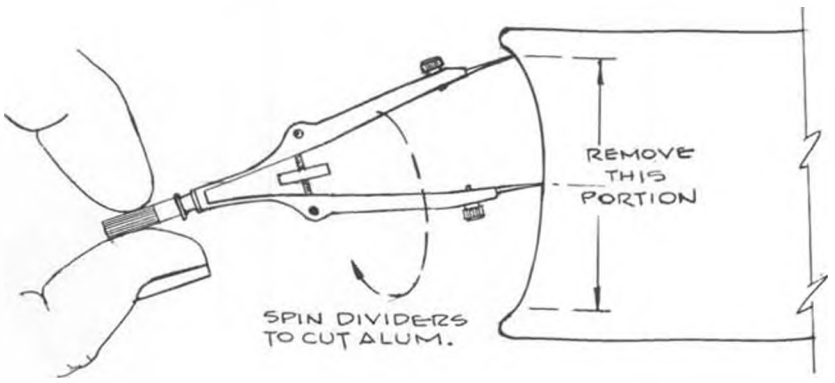


FIG. 1 REMOVING BEER CAN END

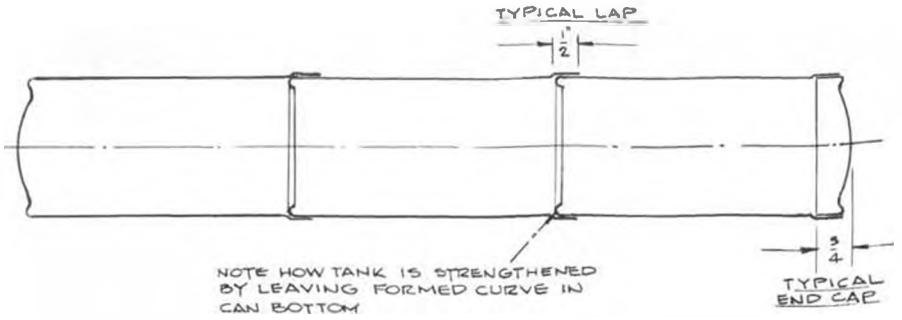


FIG. 2 TYPICAL TANK ASSEMBLY

More info on the beer can compressed air tank. See text.

up to develop maximum power.

BOWDEN CONTEST

We talked about the rules last month and how the Bowden Event works. The writer was fully aware that such a meet had been held at the Old Warden Aerodrome (home of the Shuttleworth Collection), but had not received a single word from his British correspondents.

Trust an American, Joe Carter, of Vienna, Virginia to be on hand, take pictures, and send in a report of what went on. Great stuff! Like this writer keeps saying, the columnist is only as good as the material he receives.

Joe first became aware of the Old Timer meet to be held at Old Warden while visiting the Aeromodeller offices in Hemel, Hempstead. Just in time! Carter was able to motor out to the Aerodrome on Sunday with plenty of time to spare as the event did not get underway officially until 11 a.m.

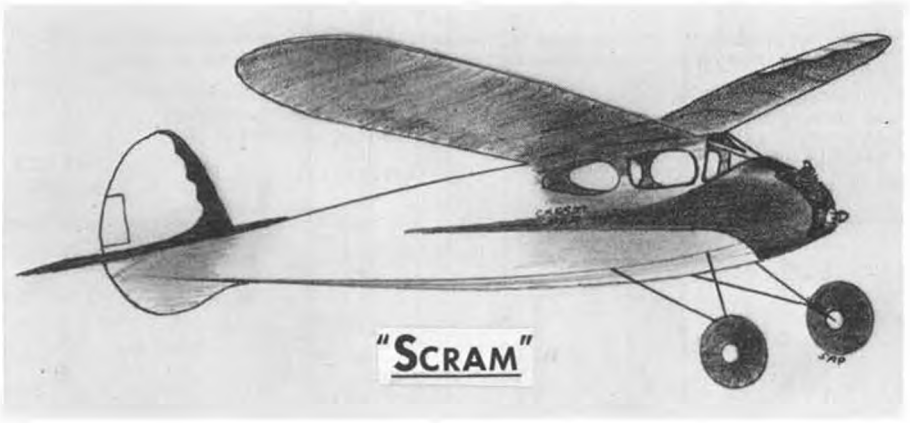
Carter was rather surprised at the variety of flying going on simultaneously. Seems all were invited and all showed up: CO_2 Free Flight, Rubber Free Flight, Free Flight gas and diesel, radio control, radio assist free flight, and controline!! How about that for action?

Of course, to Carter, the most interesting facet of flying was the Old Timers in the Bowden Event. Despite the number that showed, only about a half-dozen officially entered. These contestants were generally engulfed by the spectators despite the fences and restraining ropes posted.

The Bowden Event featured 4 to 5 judges on the filed who carefully ex-

Continued on page 78

SCRAM



OLD TIMER Model of the Month

Designed by: Ray Heit

Redrawn by: Al Patterson

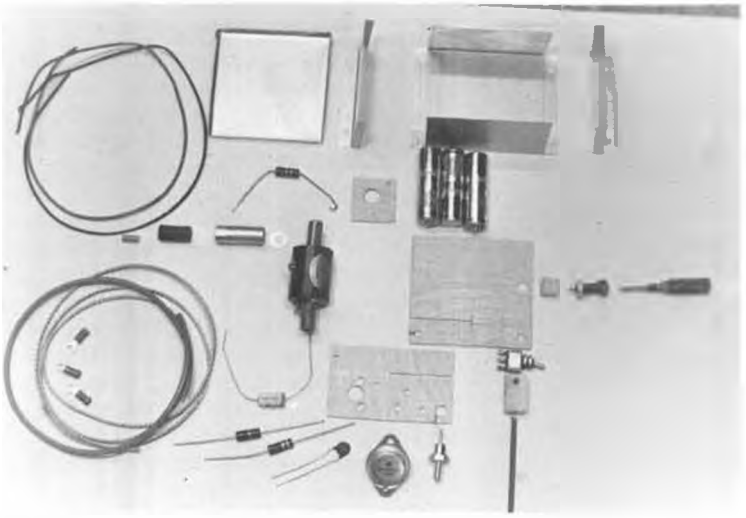
Text by: Bill Northrop

• If you should happen to leaf through our copy of July 1938 Flying Aces, there are two equally old pieces of paper that will fall out. One is a very crude attempt at plotting a full size airfoil, and the other is a list of materials with prices. Both items apply to the gas model construction article in that issue . . . Ray Heit's "Scram."

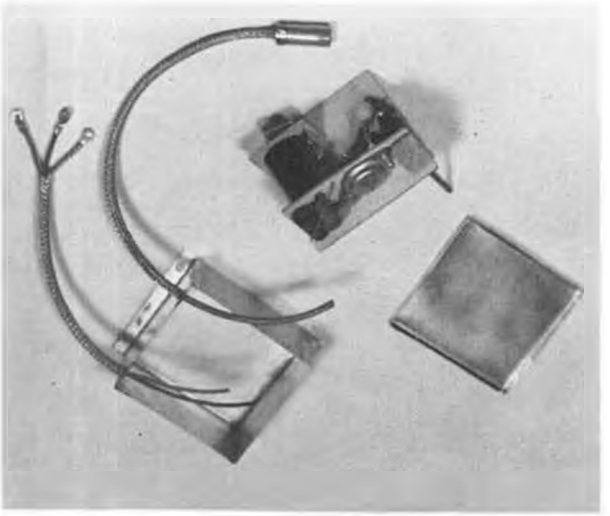
Al Patterson's sketch of the Scram, traced from one of the typically poorly reproduced Flying Aces photos, pretty well explains why we were so interested in the design. The 83 inch span cabin model weighed only 3 pounds, and placed 8th in the 1937 Nationals limited motor run event. Ray's Bay Ridge Mike and Ike became better known designs a few years later, but the similarity in design was very evident.

Free flight old timers will excuse us if we point out the excellent R/C assist possibilities of Scram. Hinged surfaces can be located along the existing spar lines, though the elevator could be limited in area by adding extra spans and a hinge line about 2-1/2 inches aft of the existing spar. Following the tradition of most early plans, incidence and balance point locations were not included. Start at 1/3 back from the leading edge, and bring lots of shim stock the first time out.

Incidentally, that old material list was interesting. Five foot lengths of 1/4 square balsa averaged around 3-1/2 to 4-1/2 cents each, a pair of 4-1/2 inch airwheels was $1.75, and a 9 by 12 inch piece of 1/4 inch plywood was 20 to 30 cents. The total tab was $6.18, about the cost of two Peanut kits! •



All of the parts required for Tom Bristol's transistorized ignition system. Old Timers may not be the only ones to go for this!



The completely assembled unit, ready to install in the metal box. Shut-off can be radio operated, to avoid battery run-down.

A RELIABLE ✳ TRANSISTORIZED IGNITION SYSTEM ✳

By TOM BRISTOL . . . This transistorized ignition system for gasoline engines is 100% R/C compatible. Sport R/C fliers, as well as OTers should think about it. A gallon of "ignition fuel" is less than a buck!

FORWARD (by John Pond)

Every so often, this hobby is blessed with a fellow who has the curiosity and courage to say, "I can build a better mousetrap." Such is the case with Tom Bristol, a comparative newcomer in the old timer F/F radio assist game and one of the best spark plugs any club ever had.

Through Tom's efforts, a transistorized ignition system has been developed, complete with all shielding required to work with any *radio set. This has been repeatedly proven with the writer's Long Cabin and an open-point Dennymite engine utilizing a sensitive Kraft set, probably the worst case possible. No "glitches" were noted at distances of a half mile and altitudes of better than 2,000 feet. To say the system works is a tremendous understatement.*

Probably the best feature of this transistorized system is the improved gas economy resulting from a very good spark. When the writer was bragging about getting nine-and-a-half minutes from 1-1/2 ounces of fuel, Tom turned around and was able to obtain 14 minutes from 1-3/4 ounces of fuel! This phenomenal time with a Merco .61 was due entirely to the new ignition system. In short, this system is reliable, more economical, and more powerful.

• The Old Timer R/C movement is growing rapidly throughout the United States, and many fliers wish to fly their O/T planes with the gasoline engines for which they were designed. However, most of the proportional radio systems available today are subject to anomalous behavior when placed close to an operating ignition engine. This article describes the construction of a simple shielded, transistorized ignition system which will provide "glitch-free" operation of your radio controlled airplane with your favorite Old Timer gasoline engine.

The author's interest in ignition systems began when he attended a Texa-

Both sizes of insulators are drilled 9/64" clear through.

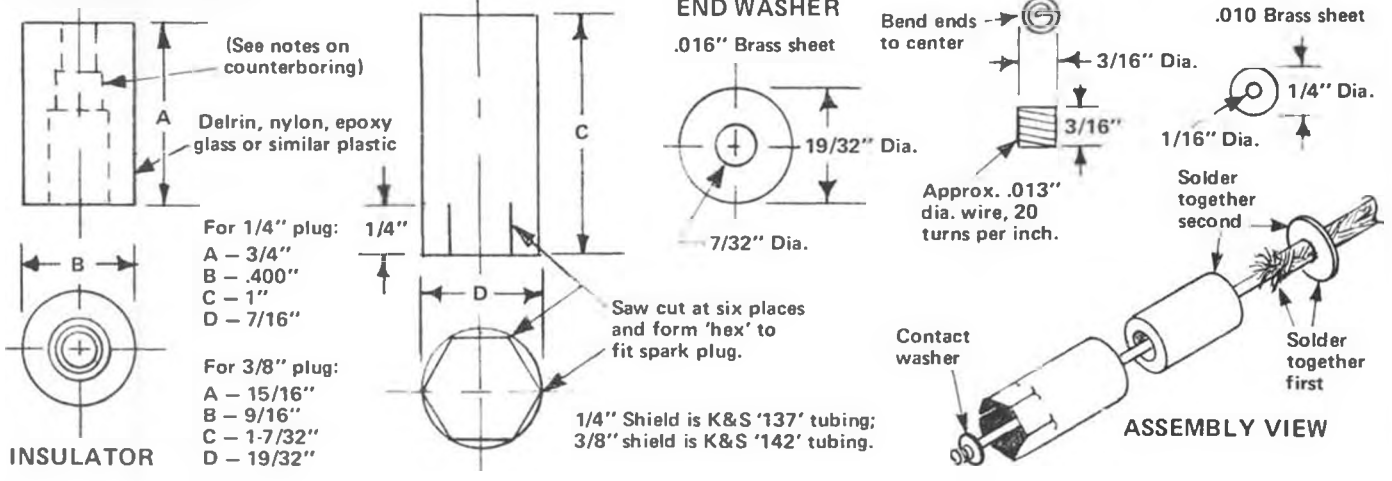
For the 1/4" plug size, the 1/4" counterbore is 1/2" deep and the 9/32" counterbore is 5/16" deep.

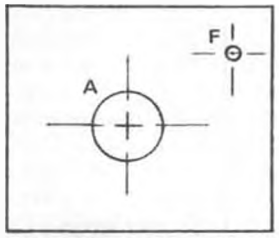
For the 3/8" plug size, the 1/4" counterbore is 11/16" deep and the 9/32" counterbore is 1/2" deep.

Note that dimensions are given for two sizes of spark plug connectors; 1/4" and 3/8". Be sure you follow instructions for the size that suits your particular needs.

The cylindrical shield varies in size, but the saw cuts are 1/4" deep on both sizes.

The end washer, spring contact and contact washer is the same size for either size (1/4" or 3/8") of plugs.

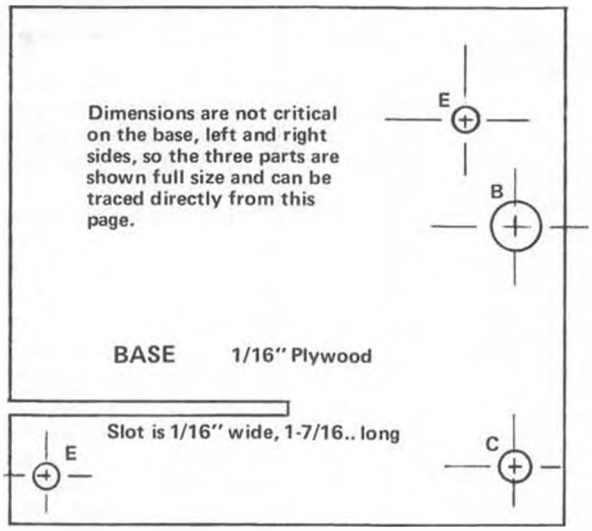


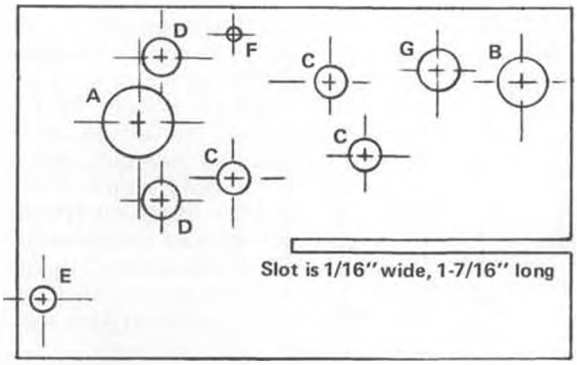


LEFT SIDE 1/16" Plywood

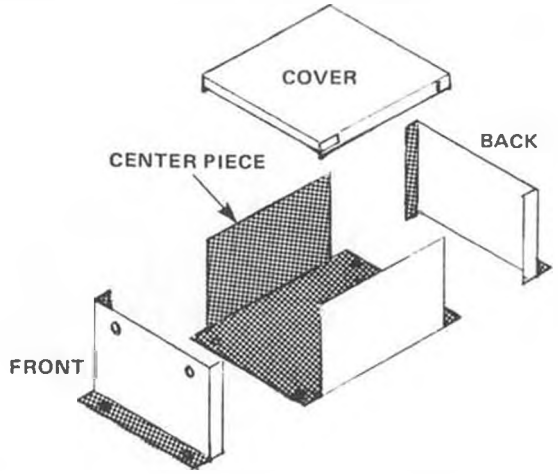
HOLE SIZES

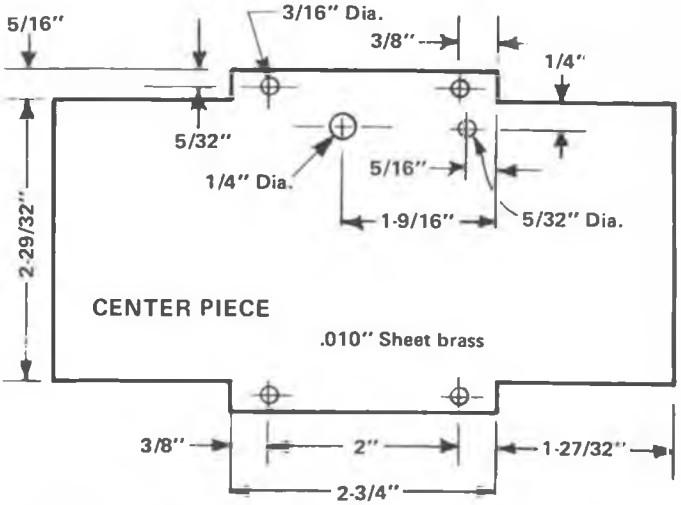
A – 23/64" Dia.
B – 1/4" "
C – 5/32" "
D – 3/16" "
E – 1/8" "
F – 1/16" "
G – 13/64" "



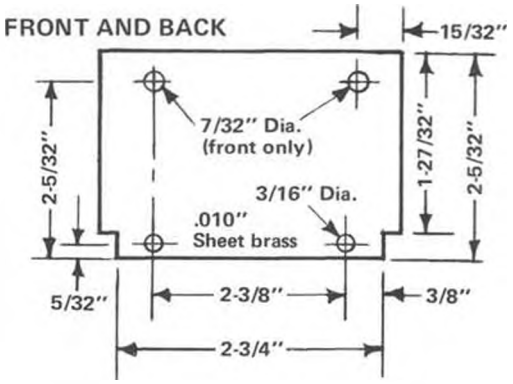


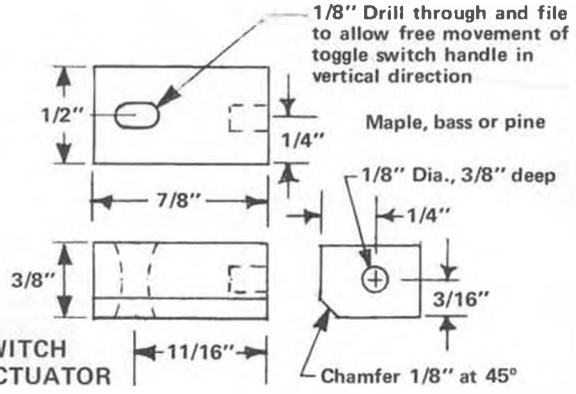
RIGHT SIDE 1/16" Plywood



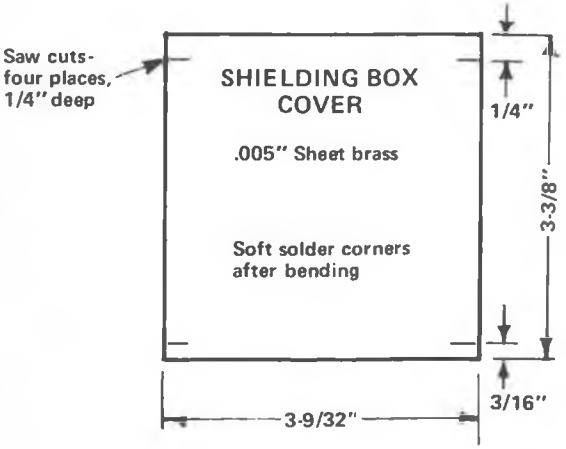


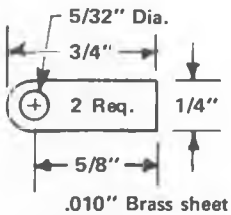
SWITCH HANDLE — Epoxy glass rod or wood dowel, 1/8" dia., 2-1/2" long



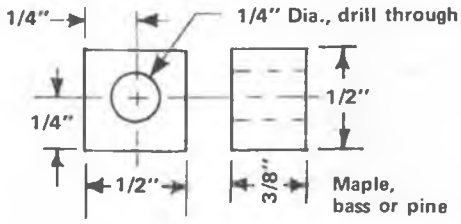


SWITCH ACTUATOR

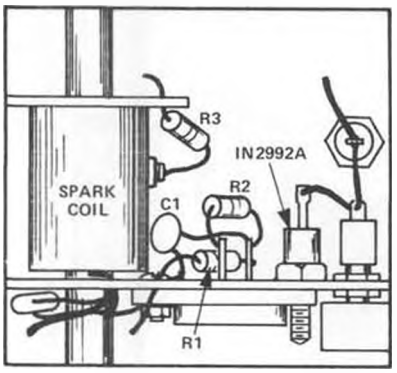


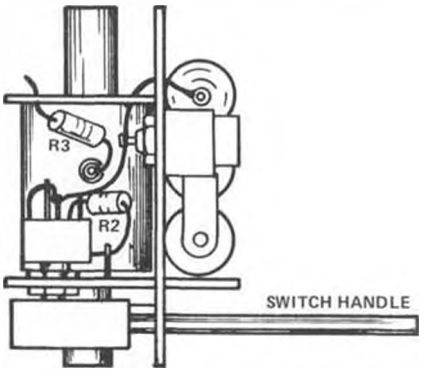


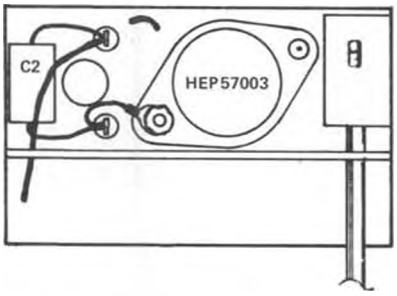
BATTERY STRAP



PIN JACK SPACER







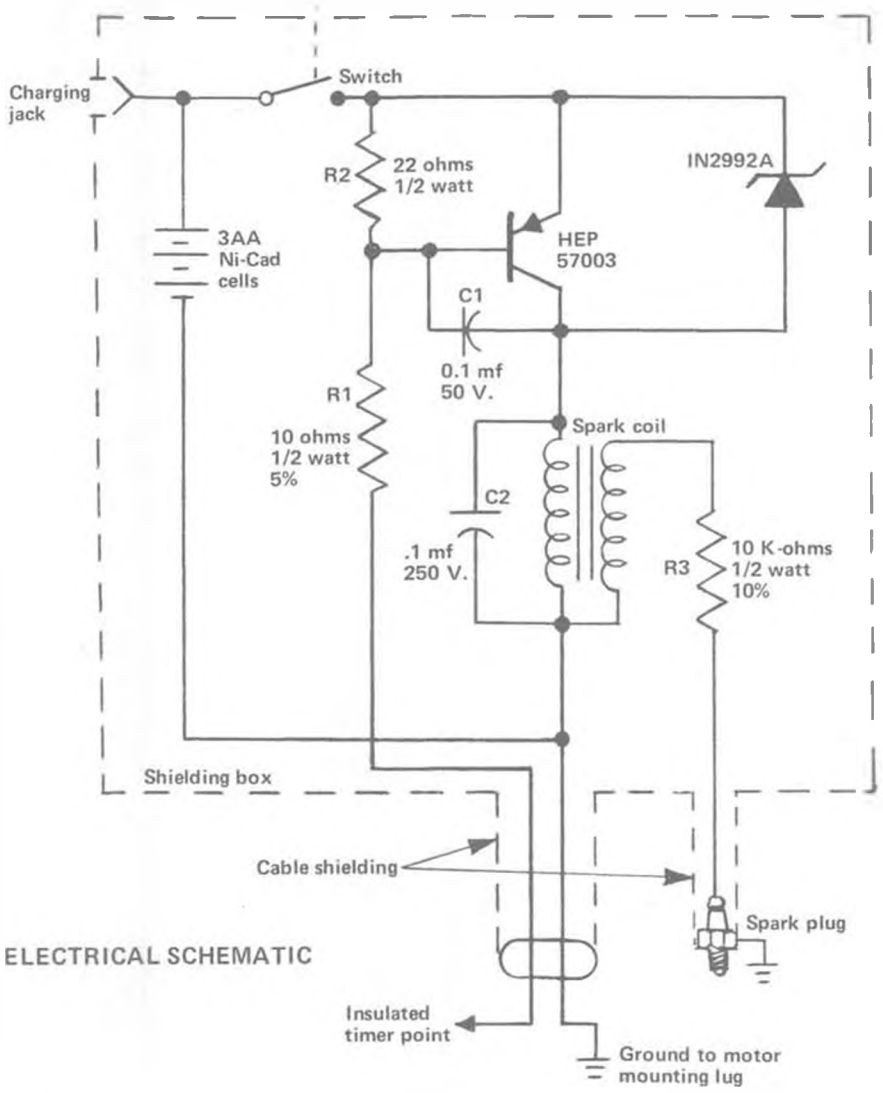
co contest and became aware of the difference in length of engine run one could realize using a gasoline engine instead of a glow engine (12 minutes versus 6 minutes on 1-1/2 oz. of fuel). In reviewing the literature, four articles (July '72, December '72, February '75 M.A.N., and March '74 Model Builder) pertaining to the subject were found. These indicated that proper shielding of the ignition system would permit operation of gasoline engines in radio controlled airplanes. Using the information presented in the articles as a starting point, the author proceeded to develop modifications for improving the system.

Since the timer points interrupt the full coil current (approx. 4 amps) when using three ni-cad cells) the arc which occurs during switching is a likely source of radiated electrical noise. It was felt that reduction of the current interrupted by the points would reduce the electrical noise output. Therefore, a switching transistor was incorporated in the circuit to carry the coil current, while the timer points were used to turn the transistor on and off. The current through the points was reduced considerably from approximately 4 amps to 0.10 amps. Although this reduced the radiated electrical noise significantly, it was felt that further reduction was required. Incidentally, using the transister causes the current through the coil to decay more rapidly than in the conventional system, which results in a higher output voltage from the coil and improved performance from the spark plug.

To further reduce the electrical noise radiated by the ignition system, shielding was extended to cover not only the high tension lead but also to cover the spark plug itself. Addition of this shielding resulted in an ignition system which is compatible with all of the radio systems that have been tried to date. The Kraft systems which the author uses will operate without "glitches" when placed next to the shielded box encasing the ignition system, even at ranges which challenge the eyesight to see the author's 7 feet span Powerhouse.

The ignition system described in this article weighs 8-1/4 ounces (including batteries) and is by no means to be considered the ultimate system. In fact, more improved systems are already being flight-tested and hopefully will be published in the near future. Rather than wait for these improved systems, however, it was decided to publish this "Brute force workable system" to satisfy the many requests for information on how to build an ignition system which can be used with R/C airplanes.

The author knows that many of the readers are very knowledgeable in solid state electronics and are capable of designing better systems than the one presented here. However, when the author attended college, the only solid state the professor lectured on was that which existed between the students' ears! So accept it as it is, the author's first attempt at solving the radiated electrical noise problem using solid state devices. It is recognized that many of the components used are far more overrated than they need be. However, if you want to fly ignition engines in your R/C planes, build this system and enjoy flying while awaiting the "ultimate" system.

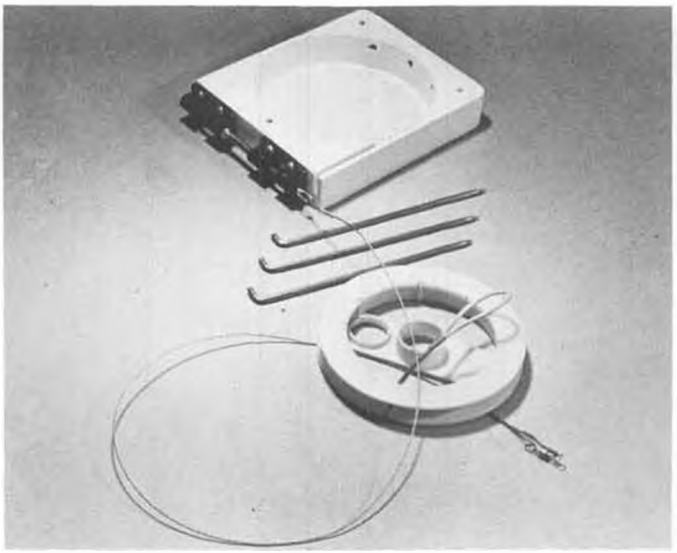


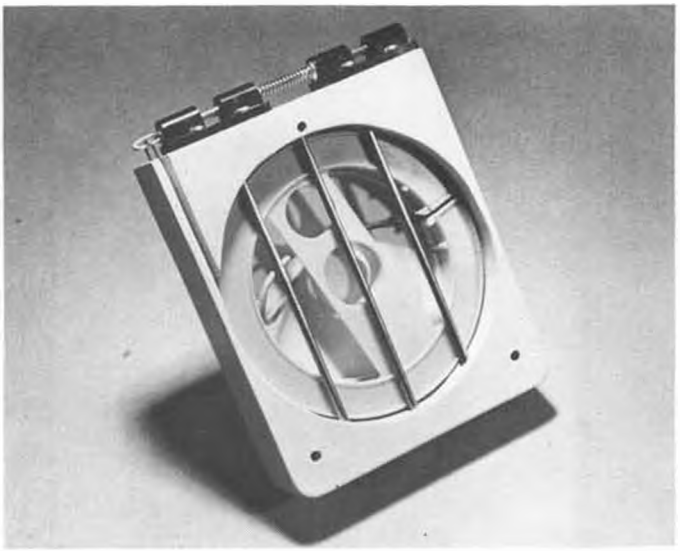
ELECTRICAL SCHEMATIC

CONSTRUCTION

The first step in construction is to cut out the Right Side, Left Side and Base pieces from 1/16 thick sheet plywood. Next drill the holes in these pieces as shown in the drawings. Then slip the Right Side piece into the slot of the Base piece. Align them and glue them together using your favorite adhesive (The author uses Hot Stuff to

Continued on page 71





Two photos of Arlie Preszler's "Super Stooge"; one disassembled and ready for use, the other as compactly assembled for transportation. Reel holds line for operating stooge, not the flying lines. Veddy neat!

Control line

By "DIRTY DAN" RUTHERFORD
PHOTOS BY THE AUTHOR

• Organization. I need some . . . badly! I've got a ton of material to lay on ya, but I'm having trouble getting it all organized.

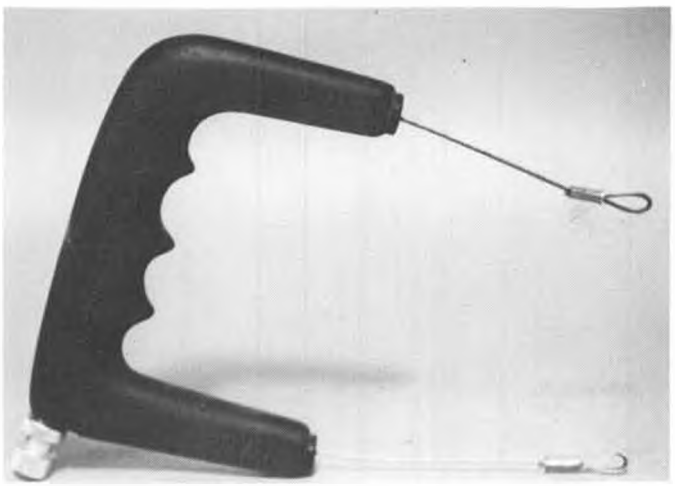
Last month I told you all about the super handle from C.S.C. and I forgot to drop in a picture of the handle. Told you I need some organization. Somewhere in this month's column is a picture of the handle, take a look at it and see if you don't agree that it's plenty trick. Again, the handles are available from: Control Specialities Company, 205 Wood Ave., Box 268, Middlesex, New Jersey 08846, for $9.95 plus 50c for postage.

Also pictured is Arlie Preszler's "superStooge", which is the best stooge I've ever seen. Here's Arlie to explain construction of the superStooge:

"I think these photos explain 'super-Stooge' good enough to make drawings unnecessary. The plastic guides are steerable nose wheel mounts as used by the R/C boys. The spikes and spring shaft are of 1/8 inch music wire. My high class coil spring cost 14c at the local hardware store, but one from a ball point pen will work as well. A soldered washer and attachment loop complete the release assembly. The main housing is from 3/4 inch plywood with a 1/16 plywood bottom glued on. I gave it a polyester resin and epoxy paint finish, with absolutely no concern for how much weight I was adding.

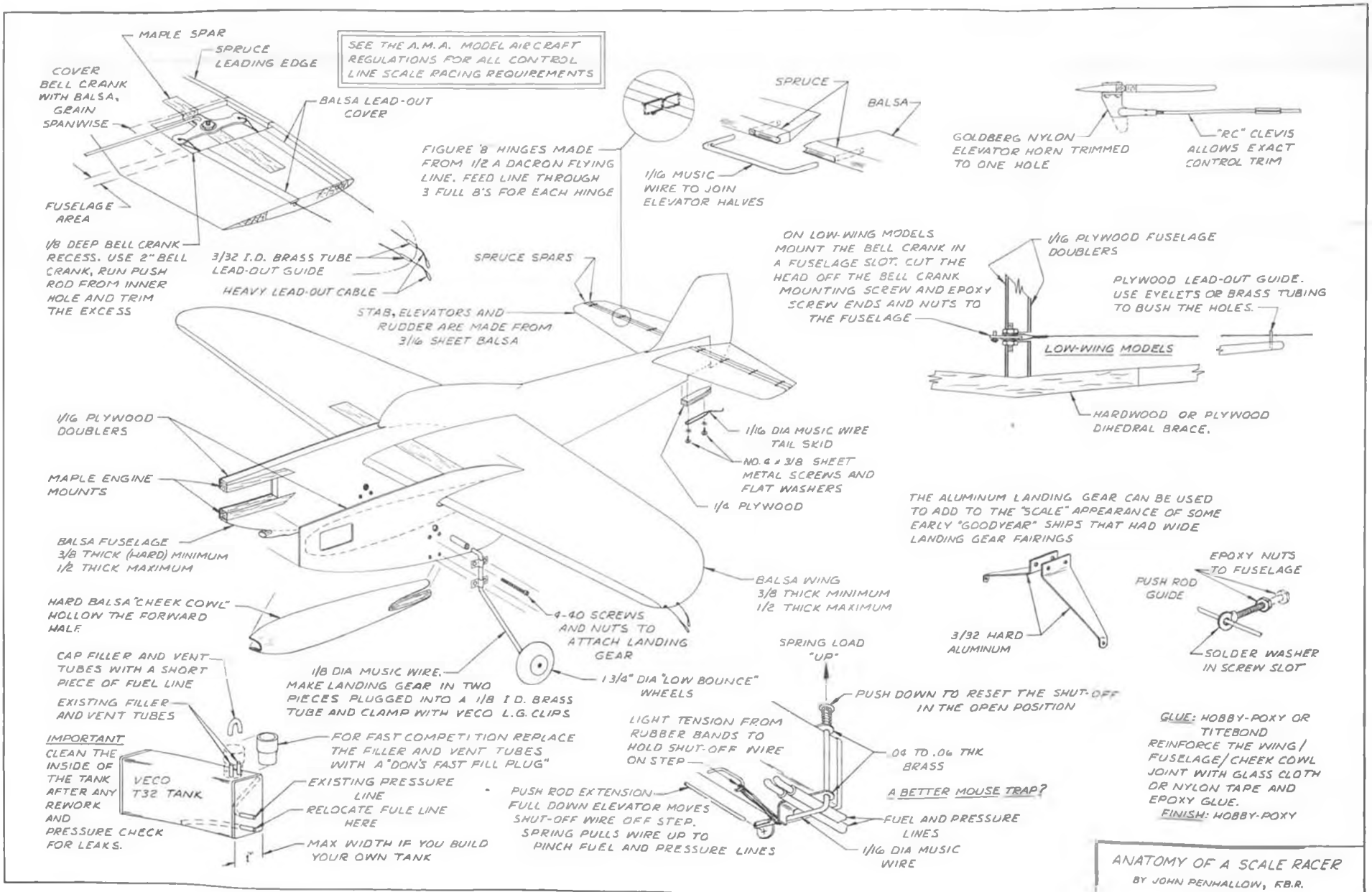
"This stooge replaces an old junker I had and meets the requirements that I want out of a release agent (I guess I could call it "Preparation P."). A stooge has to hold positively and release easily . . . I spend too much time on my Stunters to take any chances. Have you ever been half way out to your handle and noticed those lines between your fingers making a premature forward motion? Worse yet, is to have a stooge not release, and then let go while you are part of the way back to check it. A stooge should also be compact so that it can fit easily into the flight box and always be along when you arrive at the flying field and no helpers are in sight. Finally, a good stooge must be easy to clean . . . equipment lasts a lot longer when it is maintained, and I like to free my time for building airplanes."

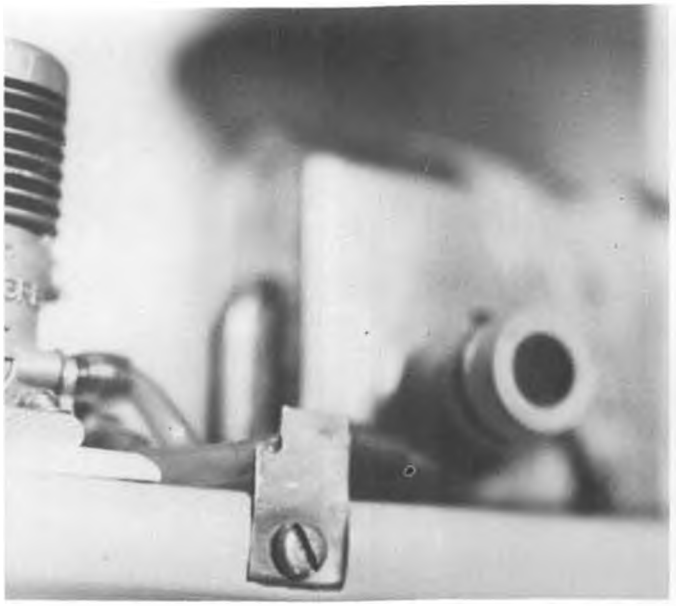
Although I very rarely go flying alone, I just had to build a superStooge. Never know when the locals might turn on me and refuse to launch my planes for me. The stooge works just great, why not build one and give it a try?



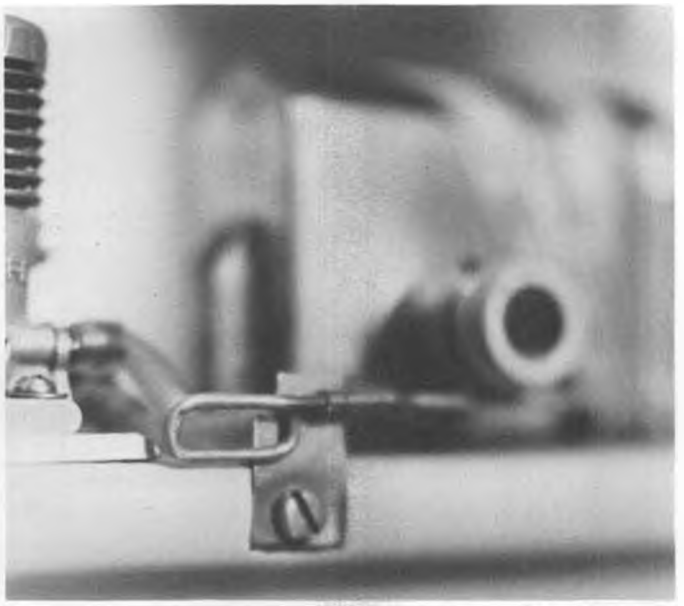
The Control Specialties Co. handle described by DD in last month's column. He'll get it all together one of these days!

Sterling Models PT-17 by Bill Rushbrook, Lisle, Illinois. ST .71RV with throttle, 14x6 prop, 8 1/2 lbs, flies on 70 foot lines.


MAPLE SPAR
SPRUCE LEADING EDGE
COVER BELL CRANK WITH BALSA, GRAIN SPANWISE
BALSA LEAD-OUT COVER
FUSELAGE AREA
1/8 DEEP BELL CRANK RECESS. USE 2" BELL CRANK, RUN PUSH ROD FROM INNER HOLE AND TRIM THE EXCESS
3/32 I.D. BRASS TUBE LEAD-OUT GUIDE
HEAVY LEAD-OUT CABLE
SEE THE A.M.A. MODEL AIRCRAFT REGULATIONS FOR ALL CONTROL LINE SCALE RACING REQUIREMENTS
FIGURE '8' HINGES MADE FROM 1/2 A DACRON FLYING LINE. FEED LINE THROUGH 3 FULL 8'S FOR EACH HINGE
SPRUCE
BALSA
1/16 MUSIC WIRE TO JOIN ELEVATOR HALVES
GOLDBERG NYLON ELEVATOR HORN TRIMMED TO ONE HOLE
"RC" CLEVIS ALLOWS EXACT CONTROL TRIM
SPRUCE SPARS
STAB, ELEVATORS AND RUDDER ARE MADE FROM 3/16 SHEET BALSA
ON LOW-WING MODELS MOUNT THE BELL CRANK IN A FUSELAGE SLOT. CUT THE HEAD OFF THE BELL CRANK MOUNTING SCREW AND EPOXY SCREW ENDS AND NUTS TO THE FUSELAGE
1/16 PLYWOOD FUSELAGE DOUBLERS
PLYWOOD LEAD-OUT GUIDE. USE EYELETS OR BRASS TUBING TO BUSH THE HOLES.
LOW-WING MODELS
HARDWOOD OR PLYWOOD DIHEDRAL BRACE.
1/16 PLYWOOD DOUBLERS
MAPLE ENGINE MOUNTS
BALSA FUSELAGE 3/8 THICK (HARD) MINIMUM 1/2 THICK MAXIMUM
HARD BALSA "CHEEK COWL" HOLLOW THE FORWARD HALF
1/16 DIA MUSIC WIRE TAIL SKID
NO. 6 x 3/8 SHEET METAL SCREWS AND FLAT WASHERS
1/4 PLYWOOD
BALSA WING 3/8 THICK MINIMUM 1/2 THICK MAXIMUM
4-40 SCREWS AND NUTS TO ATTACH LANDING GEAR
1/8 DIA MUSIC WIRE. MAKE LANDING GEAR IN TWO PIECES PLUGGED INTO A 1/8 I.D. BRASS TUBE AND CLAMP WITH VECO L.G. CLIPS
1 3/4" DIA "LOW BOUNCE" WHEELS
THE ALUMINUM LANDING GEAR CAN BE USED TO ADD TO THE "SCALE" APPEARANCE OF SOME EARLY "GOODYEAR" SHIPS THAT HAD WIDE LANDING GEAR FAIRINGS
3/32 HARD ALUMINUM
EPOXY NUTS TO FUSELAGE
PUSH ROD GUIDE
SOLDER WASHER IN SCREW SLOT
CAP FILLER AND VENT TUBES WITH A SHORT PIECE OF FUEL LINE
EXISTING FILLER AND VENT TUBES
IMPORTANT CLEAN THE INSIDE OF THE TANK AFTER ANY REWORK AND PRESSURE CHECK FOR LEAKS.
VECO T32 TANK
FOR FAST COMPETITION REPLACE THE FILLER AND VENT TUBES WITH A "DON'S FAST FILL PLUG"
EXISTING PRESSURE LINE
RELOCATE FULE LINE HERE
MAX WIDTH IF YOU BUILD YOUR OWN TANK
SPRING LOAD "UP"
PUSH DOWN TO RESET THE SHUT-OFF IN THE OPEN POSITION
LIGHT TENSION FROM RUBBER BANDS TO HOLD SHUT-OFF WIRE ON STEP
.04 TO .06 THK BRASS
A BETTER MOUSE TRAP?
PUSH ROD EXTENSION FULL DOWN ELEVATOR MOVES SHUT-OFF WIRE OFF STEP. SPRING PULLS WIRE UP TO PINCH FUEL AND PRESSURE LINES
FUEL AND PRESSURE LINES
1/16 DIA MUSIC WIRE
GLUE: HOBBY-POXY OR TITEBOND
REINFORCE THE WING / FUSELAGE / CHEEK COWL JOINT WITH GLASS CLOTH OR NYLON TAPE AND EPOXY GLUE.
FINISH: HOBBY-POXY
ANATOMY OF A SCALE RACER
BY JOHN PENHALLOW, F.B.R.



Stop plate for Badyear shut-off.



Forward end of the actuating rod, made from a Du-Bro 30 inch clevis rod.

The complete shut-off system, in the off position, installed on the airplane.

I believe Arlie used Rocket City nose gear brackets (stock no. 25) on his stooge for the guides. I used Goldberg items and they were a little two wide, but worked OK after I glued on an extra piece or two of 1/8 ply.

* * *

I guess it's time to get started with Project Goodyear. This is the first in a series of Project Planes, so I'm not sure of the best way to handle this. Hang on, be loose and maybe we'll all learn something.

It seems that a lot of people have trouble setting up reliable and simple shut-offs, so let's look at one I designed several years ago. It's not very exotic, but works reliably, plus being easy to make. Most Badyear Freaks in this area use this style of shut-off and very few have any problems with it.

The first pic shows the stop plate which is made from sheet brass. I cut mine out on my jig-saw, but K&S markets brass in a number of different thicknesses and shapes, so that is the easy way to go. A piece of .032 by 1/2 inch wide should work just fine. The retaining notch for the shut-off wire can be filed in by hand or cut out on your saw.

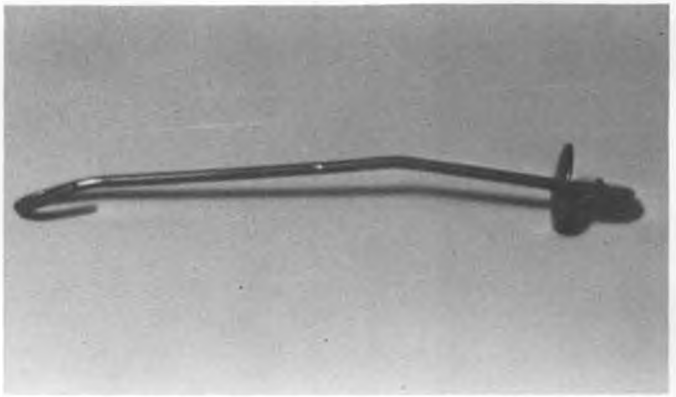
The stop-plate is held to the fuselage by a single No. 6 x 3/4 inch sheet metal screw. Notice that the fuse is notched to accept the stop-plate. This holds the plate and keeps it from moving forward or backward. Also, notching the fuse allowed me to attach the plate directly to the upper motor mount, which makes everything pretty solid.

Next pic shows the forward end of the actuating rod, which is made out of a DuBro 30 inch rod that is threaded on one end to accept a clevis. It is bent in a rectangular kinda loop that allows full and free movement of the elevator, yet a positive, solid "feel" to the shut-off.

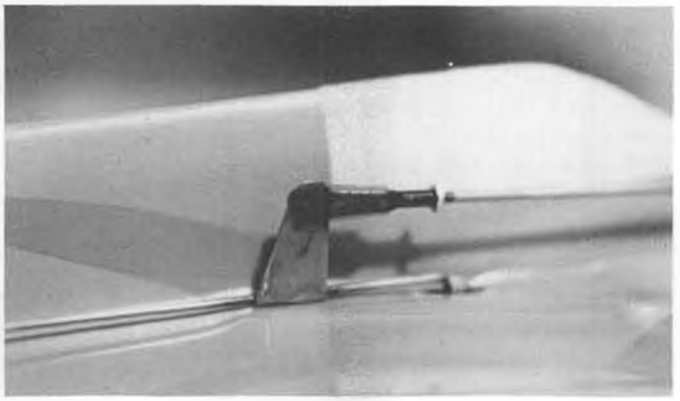
Next we see the aft end of the actuating rod. Note the adjustable clevis, it makes the shut-off easier to set where you want it. The clevis is attached to a piece of brass that is silver-soldered to the elevator push-rod.

The shut-off wire is the next thing to look at and it is made out of 1/16 piano wire. The lower end of the wire (as installed on the plane) is to the left and is simply bent in a "U" and bolted to the fuse with a 4-40 bolt. The bends in the wire look a little strange, I suppose. The lower one is to provide adequate pressure to pinch off both the feed and pressure lines. The upper bend insures that the wire will hit flat against both lines instead of pinching one off and leaving the other only partially pinched off.

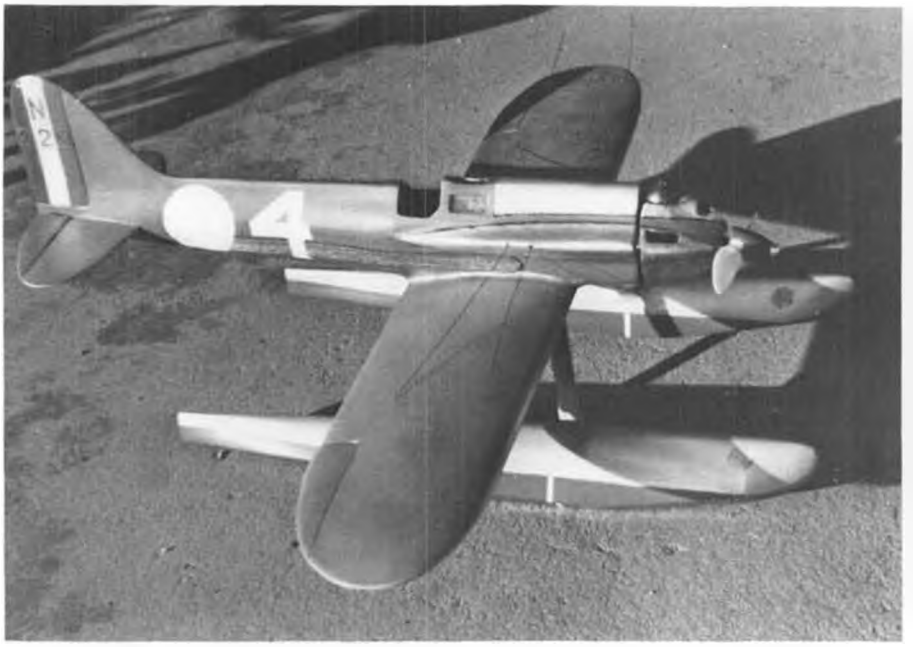
Continued on page 75



The shut-off wire, bent to shape and ready to install. It must be adjusted so it will pinch off both lines.



Aft end of the actuating rod. Adjusting clevis mounts on a piece of brass that is silver-soldered to the elevator push-rod.



One of the prettiest seaplanes of all time, the S-5 has been a popular modeling subject for many years.

"Look, Ma, I can float!"

THE SUPERMARINE S-5

By JACK BALE . . . Designed and built for the Flightmasters' annual R.O.W. meet at Lake Elsinore, this little C/L scale model of the famous 1927 Schneider Cup Race winner was first in scale points, 2nd overall.

• In 1927, R.J. Mitchell, chief designer of the Supermarine factory, arrived in Venice, Italy, for the tenth running of the famed Schneider Cup race, bringing with him two of three new racers designated Supermarine S-5. They were numbered 219 and 220. The third machine held in reserve was number 221.

The S-5's had evolved from hard lessons learned during the previous attempt of the S-4 in 1925. The winner in 1927 was number 220, flown by Ft. Lt. S.N. Webster, clocking in at 281.54 MPH. Second place went to number 219 at 273.01 MPH.

The model subject, number 220, is the second aircraft I've built for the control-line Schneider contest sponsored by the Flightmasters and held yearly at Lake Elsinore, California.

The contest rules state a maximum of .049 engine size and 35 foot steel lines (which are a real necessity for safety at the flying speeds of these little bombs). The models are flown and timed, with points given for speeds recorded plus points for landings, etc. Then comes the static judging (if everything is still in one piece after a few dunks in the drink). This is a very challenging and rewarding event, as even a smooth takeoff and landing leaves flier and spectator equally thrilled.

My first attempt at this type of flying was the year before. I built a Macchi MC72, which was too large (one inch scale), and too slow. Plus an unexpected [illegible] feet of water didn't help matters any. So later, the smaller, lighter S-5 was begun for the 1975 contest.

Scaled to 3/4 inches=1 foot, this is a small ship, but large enough for engine cowling and streamlining. It was judged first in scale points, and was second overall after the flight times were calculated.

CONSTRUCTION

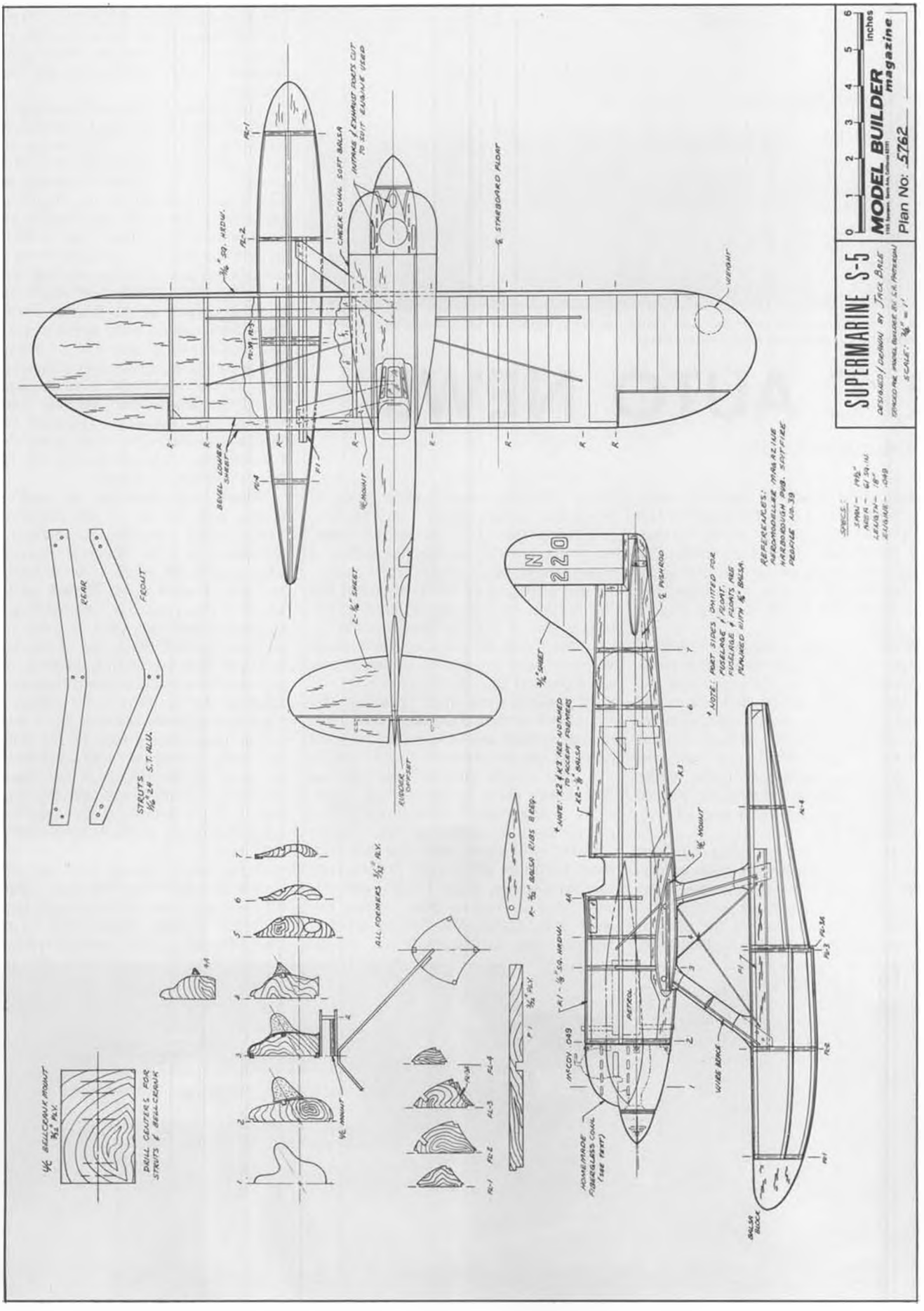
Pin down lower and rear keel parts and epoxy. I use 5-minute type a lot, as it is fast and strong. When dry, remove from plan and install all formers, starting at the rear. Add top keels.

Install motor nuts on firewall, blind-type being the best in this case. Cement in gas tank, along with over-flow tubing.

Add side keels.

Continued on page 87

Hand discloses the compact size of this .049 powered model. Author uses an McCoy Red Head diesel to power the model shown.



FULL SIZE PLANS AVAILABLE — SEE PAGE 94

Track at the Thorp Raceway, in Pomona, California. It has super traction and lots of corners, a driver's track. It's behind John Thorp's shop.

R/C AUTO NEWS

By CHUCK HALLUM

• Boy, these deadlines come up awful fast. Seems like I just finished the last article, and it's time to submit this one. Last month we covered the radio and engine trouble-shooting and checkout, and had the car on the track, hopefully with those two things working reasonably well.

When a new car is put on the track, I always recommend running it box stock for awhile to get yourself used to the car. Many times, driver education is one of the hardest factors to cope with because we get into a rut. Before you put your car on the track, follow your normal buildup procedures or the manufacturer's recommendations. Be sure all bolts and screws are tight and all linkages free of binds.

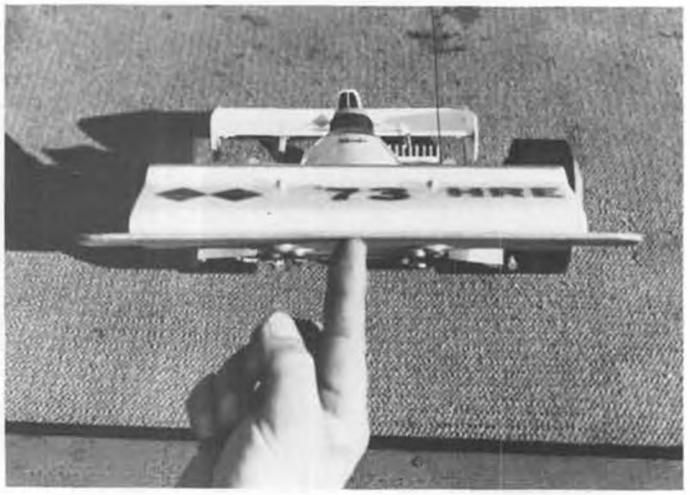
Next check to see that all four wheels contact the track surface evenly. I use two methods for checking even tire contact on the track surface. If a flat surface is available (not the ground) it is preferable to use the first method. Many top racers carry a plastic, glass, or wood flat surface about 1 x 2 feet for just this purpose *(See Hannan's column. wcn)*. Sit the car on this flat with the bumper and most of the front end of the car overhanging the front end of the flat. With a screwdriver centered on the chassis just in front of the front wheels, lift the front of the car. Both front wheels should lift off the surface at the same time. If the wheels do not lift off at the same time shim or adjust the front end so that they do. If you have no adjustment available, you can bend or twist the chassis plate to accomplish this, as a second choice. After twisting the chassis plate, shake the car vigorously, holding the front and rear of the car . . . because some of the chassis "tweak" will come out after bending. You should be able to get the tire contact even within about 1/64th inch this way. Always realize that uneven tire wear will change this setting so that front axle adjustments or chassis "tweak" may be required often. Personally, I rotate tires right to left when I'm practicing after about 20 or 30 minutes of track time. Once the race program starts, leave the tire alone, as they develop a wear pattern for maximum traction.

The second method of checking uniform tire contact is visual, and does not require a flat surface. Put the car on a table and position yourself in front of the car. Lift the front of the car with one finger centered on the chassis just forward of the front axle. Adjust your position and the amount you lift the car so that one eye is in the plane of the tire contact surface. Get far enough away from the car so that both front tires cover a portion of the view of the rear tires. Now adjust your eye and car so that both tires on one side are even, at the ground contact area, and then look over at the other side. You can easily tell if the front wheel on that side is high or low. Adjust as required. With this second method of leveling the tires, I would guess you can get the tire contacts to within 1/32 inch.

Where and when you do your car testing and set up is also important. Track surface conditions can make a big difference in what your car does and what you think needs to be done to it to make it work right. A track surface which is clean and has reasonably good traction is recommended, but this may be hard to find. At many of our local tracks here in Southern California, dust gets on the surface between races and it takes several hours of use to clean the track a reasonable amount. So, I would recommend running your car for at least one hour, maybe two hours, before you get down to the details of car changes required to really track-tune the car. If the car really handles badly, then some adjustments can be made before the 1-2 hour mark.

Now, after running your car for a couple of hours to get the track cleaned off, you are ready to start track tuning your car. I hope you've been rotating your tires right to left and vice versa and

Chuck Hallum displays the visual, or "eyeball" method of checking for uniform tire contact. Line up your eye with plane of tire contact.



View as seen from front of car for checking uniform tire contact. Car's left side is lined up, but the right front is a little high.

they're still legal size. Check your chassis alignment and tire contact uniformity. Put in a fresh receiver battery and go out and run for one or two tankfuls. Note in your mind what the car is doing. Does it have low speed oversteer or understeer? High speed understeer? What happens under power application at low speed and high speed? We may be able to do a lot of things to help what we consider problems . . . but some of them will end up requiring driver education.

What I mean when I say understeer is that the front wheels turn (right or left for cornering) but the car does not respond and continues in a rather straight line, or does not turn as rapidly as the front wheel deflection would indicate. In other words, the front wheels are slipping, or pushing. Oversteer on the other hand is when the car turns more rapidly than the amount the front wheel deflection would normally give. When the car is oversteering the rear tires are slipping. Sometimes oversteer occurs during power application only and this is termed power oversteer. If the brakes are applied too hard, or lock up, the rear tires slip and oversteer will also occur.

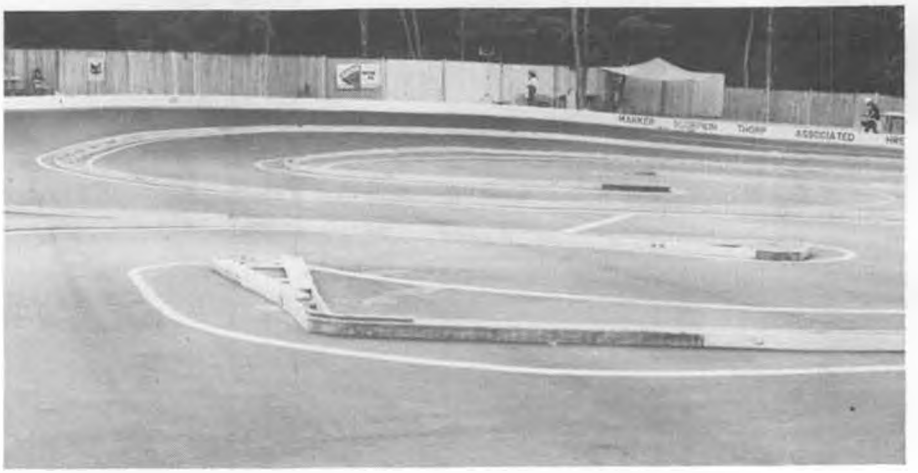
Here are the things which I normally use to track-tune a car:

- Wing angle
- Wing location
- Front tire hardness
- Front tire width
- Caster (camber)
- Toe-in (out)

and occasionally

- Clutch slip
- Body
- Weight
- Rear tires
- Rear c.g. height

What I'm going to do now is tell you what each of the above-listed things does for me and when I use them. In some cars, the effects may not be the same because the basic car design is different or you are using an entirely different car set up. For example, I do not believe in extreme front wheel toe-in, and if you do, some of my comments on caster will be incorrect. I use reasonable Ackerman action so that the inside wheel turns at least the appropriate amount, maybe a little more. If you don't have enough Ackerman action, again, some of my comments about caster may be incorrect. Also, the steering servo-saver should be stiff enough not to release, or override, or spring, during normal cornering. If it does, you may not be able to get more front cornering force and your steering characteristics may not be uniform or consistent. If you can't increase the steering servo-saver preload because you will strip gears, then you should make changes to the front end geometry to decrease the operating force level required, e.g. move the kingpin axis further in toward the center of the tire contact patch.



A portion of the track at Rattey's Raceway. This excellent layout is located in Attleboro, Massachusetts.

WING: Usually I start with a wing angle of about 20^{o}-25^{o}, with the wing positioned as high and as far to the rear as is legal. Changes to wing angle and location mostly affect high speed car characteristics, but begin providing noticeable forces in the 15-20 mph range. If your car has high speed oversteer, increasing the wing angle will help rear traction. For high speed understeer, decrease the wing angle or move the wing forward. I usually have a second wing available which is positioned about 1 inch further forward for this situation. I have even used one that is placed 3 inches forward and the improvement in high speed front end bite is very noticeable. Actually, if the wing was all the way to the rear, it really would be transfering the downforce from the front to the rear. So when moving the wing forward, we are only changing the amount of downforce transfer, which helps the front.

FRONT TIRES: Since rear traction is practically always the most important, use the rear tire compound that gives you the highest traction. Changing the front tire hardness (compound) and tire width will change both the low speed and high speed cornering force limits. Harder tires do not conform to the track surface or adhere as well . . . so hard tires decrease front traction

Continued on page 80

SUMMARY OF CHANGES AND EFFECTS

CHANGE	EFFECT
Greater Wing Angle	Strong High Speed Understeer
Forward Wing Location	Mild High Speed Oversteer
Harder Front Tires	Strong Low Speed Understeer; Strong High Speed Understeer
Wide Front Tires	Mild Low Speed Oversteer; Mild High Speed Oversteer
More Caster	Mild Low Speed Understeer; Mild High Speed Oversteer
More Toe-In	Mild Low Speed Understeer; Mild High Speed Oversteer
More Clutch Slip	Strong Low Speed Understeer
More Weight	Mild Low Speed Understeer
Harder Rear Tires	Mild Low Speed Oversteer; Mild High Speed Oversteer
Higher Rear C.G.	Mild Low Speed Understeer; Mild High Speed Oversteer

Peanut scale J.E.A.A. S-1, by Tom Houle, of Aero Era (See Classifieds).

FREE FLIGHT SCALE

By FERNANDO RAMOS

• I would like to talk about several items this month that hopefully will make your scale modeling a little easier and more enjoyable.

This past weekend I covered my Gene Thomas-designed Heath Baby Bullet for .020 F/F. If ever there was a model with compound curves, this is the one! The covering was made easy by using some of Peck-Polymer's white Japanese tissue, applied wet. I have yet to see a modeling tissue with as much wet strength as this particular tissue. Typically, most modeling tissue shreds rather badly when wet, if one isn't careful. Covering wet is ideal most anytime, but is truly suited when there are compound curves in the structure. Another step in making the covering as easy task, is to use thinned-out white glue. I've mentioned it beofe, so I won't go into a lot of detail, other than to say that the combination of white glue and wet tissue really makes an easy time of covering, with superior results. A couple of examples are the wings and fuselage of the Heath. The wing on this model has a tip with a sweeping radius, and only about two thirds the span of the wing can be covered dry without getting a wrinkle or two. However, by applying wet tissue, I was able to cover all but the last bay totally wrinkle-free. The fuselage sides were also done in one easy "wet" step.

The technique is quite simple. I apply thinned out white glue (40% water and 60% glue) to all of the outer edges of a panel to be covered. I spray the tissue on the dull side with a fine mist of water. Once the moistened tissue is applied to the surface, you can lightly pull it in all directions to get the surface tight and smooth. You will be amazed at how much pulling and stretching you can do without tearing this Peck tissue. Other tissue can be applied wet in the same manner, but with greater care. If you happen to have an abundant supply of another kind of tissue, and you want to try using it wet, here is a simple way to do it. Use an atomizer with a very fine mist of water. The spraying should be done on the back side (dull side) only. This way you have plenty of time to place the tissue in place, pull tight, etc., before the water soaks all the way through. Once the tissue is entirely soaked, it will shred something awful. A little practice is all it takes, but the results are definitely well worth it.

See the illustrations for a few additional hints on covering. In Figure 1, you can see what can happen when you cover a wing using an RAF 34 or similar airfoil. Naturally, I found out the hard way. A thin coat of white glue on the undercambered part of each rib will take care of the problem. Another point to consider is where to apply the glue when covering a wing. I have found that by applying the glue on the edge of the entire wing frame *only*, the appearance is far more realistic and cleaner. For instance, do not put glue on the entire surface of a wide trailing edge. . . just put it on the outside edge.

In Figure 2 you can see that it makes a model look very bad to have the tissue come in contact with the entire upper and lower longerons, particularly if they are 3/32 square or larger. There are two ways to remedy this problem. One is to chamfer. the corners of the longerons and glue on a half-rounded 1/16 or 1/32 square fake longeron of the appropriate size for the model your building. On the Heath, I used 1/32 square. Granted, 1/32 square isn't much surface for attaching your covering, but with the

Peanut Fairchild-Hiller Turbo Porter, based on Hannan plans, and modified to match windshield shape and markings from a 3-view. Built by Al "Proportional Divider" Lidberg. See page 24.

white glue, there is absolutely no problem at all. Most gas models have much larger longerons for strength reasons, so they should really be treated as mentioned above in order to end up with a much finer scale product. The other way to over come this problem is shown in Figure 3. This method I use quite often, particularly if I'm in a hurry, and who isn't? However, to use this technique, wet tissue should be used for the best results. Incidently, I find that it is easier to cover the two sides, followed by either the top or bottom.

One last comment regarding this Peck tissue. I find that it takes dope much better than others that I have used. That is, the pores seem to fill more quickly with less dope. I have not used any of the color tissue as yet, since most of my models are finished with Floquil, so I primarily use white tissue for my gas models.

Almost without exception, every F/F scale drawing shows the landing gear installation rigidly attached to the fuselage framework. This type of attachment brings disasterious results to the fuselage in a hard landing. (See Figure 4) For a gas model I simply lace the main strut of the landing gear onto a plywood bulkhead which is then epoxied to the fuselage. I solder the trailing arm or the gear to the main gear, and let this one flex inside of the fuselage. On a rubber model I essentially do the same thing, but instead of using plywood, I sandwich the gear in between two pieces of balsa (Note how they are attached to the fuselage.). Please note that on the [illegible] gusset that keeps it in the proper position. Plywood should be used (1/32 or 1/16 sheet is OK) so that it won't wear or crack as this portion of the gear flexes. This same principle can be used if the gear flexes from the front, on aircraft such as the Avro Avis, the Letov S-39, etc. The only difference is that the trailing arms are now on the front side of the main gear. The length of the trailing arm wire should be long enough that it does not pop out and tear the covering in a hard landing.

If the landing gear has a fairing, I don't bring the fairing all the way to the top of the wire strut, so it has some room to flex. With this arrangement, a model can land on the gear pretty hard without destroying the entire fuselage.

The following information is directed to individuals who build from plans rather than from kits. Many times I have seen a set of drawings of one of my favorite airplanes that I just had to build. Once started, I found that there were many errors in the drawings, requiring structural changes. This type of situation can really discourage one from building scale models. Rather than criticize the designers, I'd like to point out areas I look at first before doing any

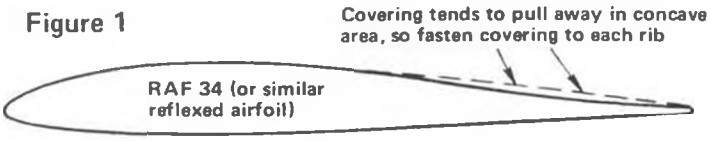


Figure 1

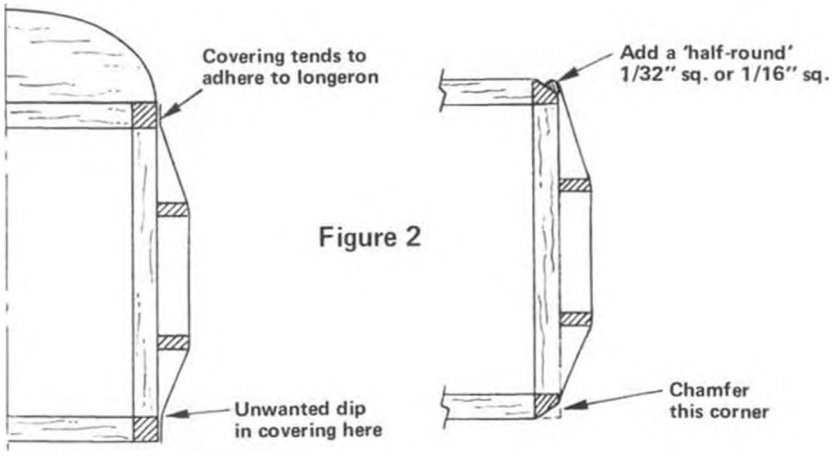


Figure 2

building. This way you have a chance to catch any errors before it's too late.

The first item I check is the stabilizer and fin. On many designs, the fin merely sits directly on top of the stabilizer. Often on a drawing, the base of the fin is not the same dimension as the portion of the stabilizer where the fin is to be mounted, or visa versa. Sometimes a similar problem exists with the fuselage and stabilizer. That is, on the fuselage profile, the stab is one dimension, but on the plan view of the stab, it is an- . . most annoying to say the least. Naturally, adjustment can easily be made *before* construction begins.

Sometimes after the entire fin and rudder are completed, for some mysterious reason, the rudder comes out to be too short where it comes in contact

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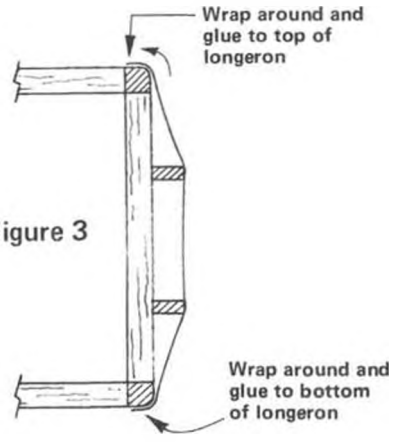


Figure 3

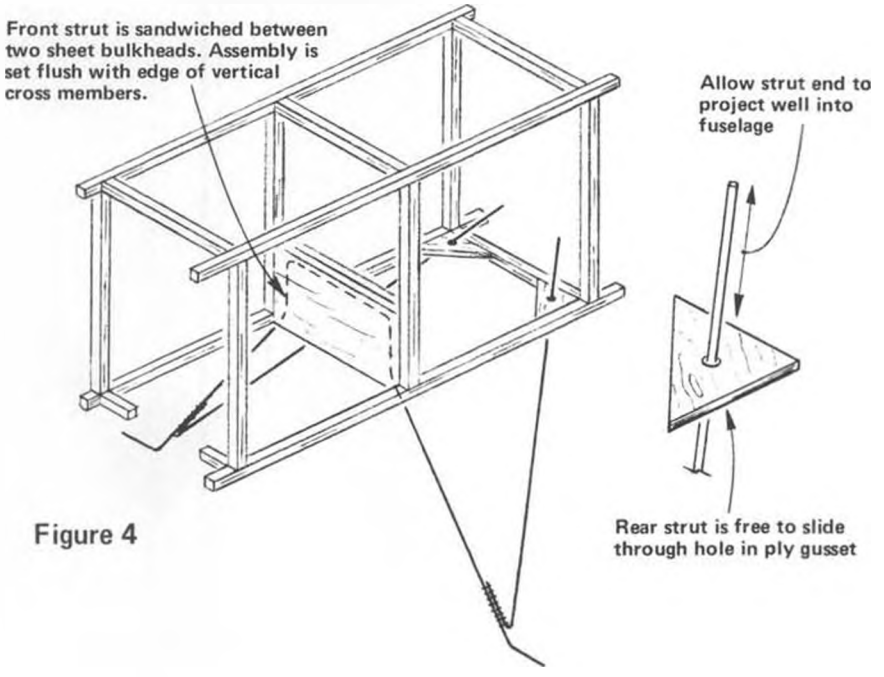
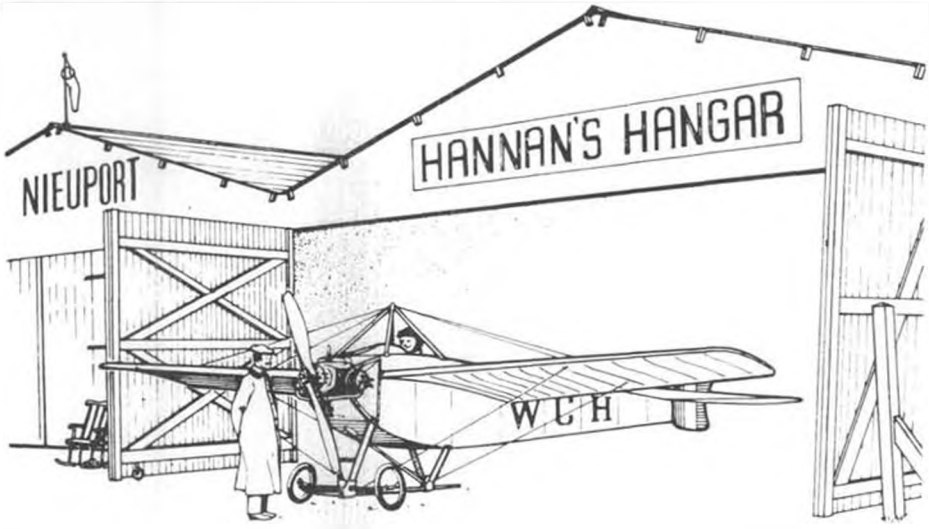


Figure 4



"To design a flying machine is nothing . . . to build a flying machine is not much . . . to test a flying machine is everything!"

• Our lead-in line this month is a quote by one of the *original* hang gliders, Otto Lilienthal.

FROM THE MAILBAG

A letter from Dave Gibson, of Cedarburg, Wisconsin, had this to say: "It was very pleasing to read about Walt and Carole Mooney's trip to Wisconsin in your recent column. The visit was more than we could have hoped for and was sincerely appreciated." Dave is a Peanut Scale fan, but also enjoys non-scale models, such as old-timers reduced to smaller sizes. Dave's wife plays the trumpet, and we have it on good authority that she sounds "Taps" over crashed model aeroplanes!

SCOTT'S HANDY HINTS

Ralph Scott offers the following suggestions: 1. A flat sheet of auto glass about a foot square can be used as a surface plate, and for cutting masking tape to special widths or curves. Try for a piece with at least one 90° corner, and sand the edges well for safety. It may lie unused for months, but will be just what's needed every now and then.

2. Use that left-over epoxy: Prepare several "knives" in advance, by cutting a slit in the end of a 1/4 inch strip of wood. Cut a double-edge razor blade in half lengthwise, and trim the halves to your liking. Spread the slot a little, and work epoxy into it. Coat one end of the razor blade, slide into the slot and clamp with a clothespin. Not a sturdy knife, but really handy for such purposes as trimming tissue paper from frameworks.

3. Press household aluminum foil into a bottle cap, for a throw-away liner. It saves time and thinner used to clean up after painting.

SO NOW WE KNOW!

Al Fissonette was quoted in The Satellite newsletter by Lyman Armstrong: Al defined free flight as 5% facts and 95% BS.

MORE ON THE HUGHES FLYING BOAT

Fifteen year old Jon Williams, of Santa Monica, California sent in the following poem:

The Spruce Goose

I long to see the Spruce Goose flying,
across the skies, I'll be standing there sighing.
With the greatest span there will ever will be, I
then just started to climb a tree
As I looked from the tree to see it soar, it flew
right by me with the greatest roar.
It's eight big engines, seventeen foot props,
make a Cessna One-Fifty pull over and stop.
We all wonder why you flew just but once, then
taxied right back to the dock.
And now you are guarded by lots of armed men;
not moving, not flying, in that great big den.
In the hangar you are, and maybe will stay, until
Howard Hughes comes out, from under the hay.
Since 1947 you sat there and slept, with hopes in
the future that you will be kept.
If you do come out, nobody will pout, but will look
on and say, from forty-seven, and all the years since,
I'm glad it's here today.

HYDRAVION

The spidery looking float-mounted aircraft in one of our photos was constructed by Dave Acker, of Scotia, New York. Spanning 46 inches, the model contains Vintage Aero bamboo, spruce, birch dowel, 1/64 plywood and balsa. The silkspan covering is varnished with polyurethane and the rigging is swaged monofilament, and functional. The Cox .020 on the rear swings a scale diameter (6 inch) propeller. Weighing a shade over 6 ounces, the model is as yet unflown. Dave wisely allowed extra firewall room for a larger engine, in the event more "push" is needed.

The model was based upon Bill Stroman's smaller model of the craft, which flew from the water of Lake Elsinore. Bill was rewarded with words of praise from Henri Fabre, who built and taught himself to fly the real machine, back in 1910.

ERIC COATES REPORTS

The editor of the flying scale model column in England's *Aeromodeller* magazine sent in the photo of his Curtiss Robin, powered by a Brown Junior C02 engine. Converted from a Tern Aero rubber-power kit, the model is a fine indoor flyer, with durations in the 90 second range.

SMAE, the British equivalent of the AMA, now has provisional flying scale rules promoting the use of C02 and electric power. Specified are maximum weight and wing loadings, as well as K factors for scoring realism of flight. In addition, a 100 point bonus is offered for each extra engine contributing to the model's thrust. In the static judging department, the rules are the same as those used for outdoor F/F, C/L, and Class 1 R/C. It is felt that models in this new category can be constructed to sim-

"Mr. and Mrs. Peanuts", Carole and Walt Mooney, during their visit in Wisconsin, winding a Fokker D-8. Photo from Tom Houle and Dave Gibson.

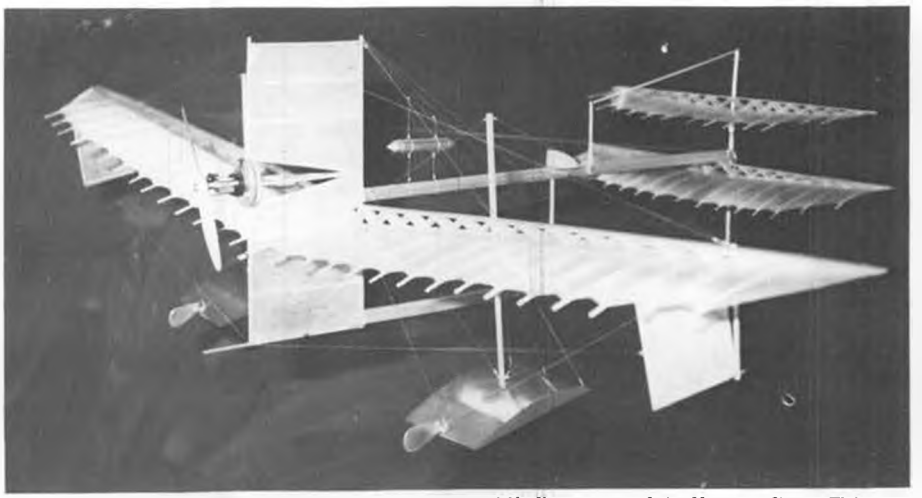
ilar high standards, and NO compromises for scale fidelity are to be tolerated without incurring loss of static marks.

PROLIFERATING PEANUTS

Little did Dave Stott and Robert Thompson, of Bridgeport, Connecticut, know what they were starting when they invented the Peanut Scale concept! Who would have thought that even one of the major manufacturers would have started producing kits for the tiny critters? Or that the idea would catch on in so many parts of the world? We have been told that counterfeiting of certain Peanut kits has become a serious problem in Europe! And MODEL BUILDER's centerfolds apparently are receiving recognition with similar enthusiasm by those of certain other X-rated publications. Truly, Peanuts are an idea whose time has come.

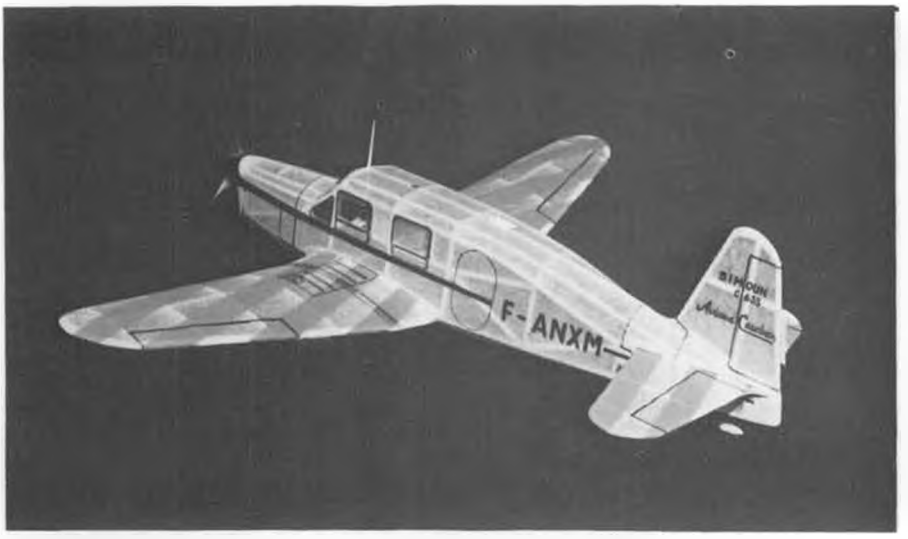
Latest designs to reach our attention are from sources widely differing in geographical location . . . as far apart as New York and France! From Gene Thomas, in New York, comes a series of four new Peanuts, following his previously introduced Heath "Baby Bullet", advertised in MB a while back. The latest releases include the 1911 Cessna, which resembles a Bleriot; the Heath Super Parasol (including information on a float-mounted version); the Alexander "Bullet", a radial-engined low-wing cabin type; and the Church Midwind open-cockpit rig. Our understanding is that the plans are presently available at $1.00 each (plus 10% postage), and that scale documentation and printwood for them will be available soon *(See advertisement in this issue. wcn)* Additionally, larger scale drawings and vacuum-formed accessories are scheduled to follow. Gene's drawings are beautiful examples of graphic art, even to the company logos and perspective sketches detailing portions of the models for clarity. Gene Thomas, Thomas Studio, Box 681, Melville, N.Y. 11746.

From France comes another half-dozen new Peanut plans, for an unusually charming group of rare aircraft, drawn by E. Fillon. Fillon is a model builder of many years experience, including the winning of the 1937 Wakefield Trophy. Featured in this fine series published by Mod'Air are: the 1932 Weyman Type 130 cabin biplane; the 1912 Caudron Type N midwing; the 1934 Courdou Leseurre GL B 6 et 7 parasol; the 1928 Mignet HM.8 parasol; the 1932 Caudron "Luciole" open cockpit biplane; and the Stark AS-90 midwing open cockpit lightplane. We were intrigued to note that these drawings feature some English translations, color information, and instrument panel drawings. They are being marketed in the United States by Peck-Polymers, and are priced at $1.25 each.



Cox .020 powered Hydro-Aeroplane Fabre, the world's first successful off-water flyer. This model was built by Dave Acker, Scotia, New York.

TernAero Curtiss Robin, converted to CO_2 power by Eric Coates, editor of the scale model column in England's Aeromodeller magazine.

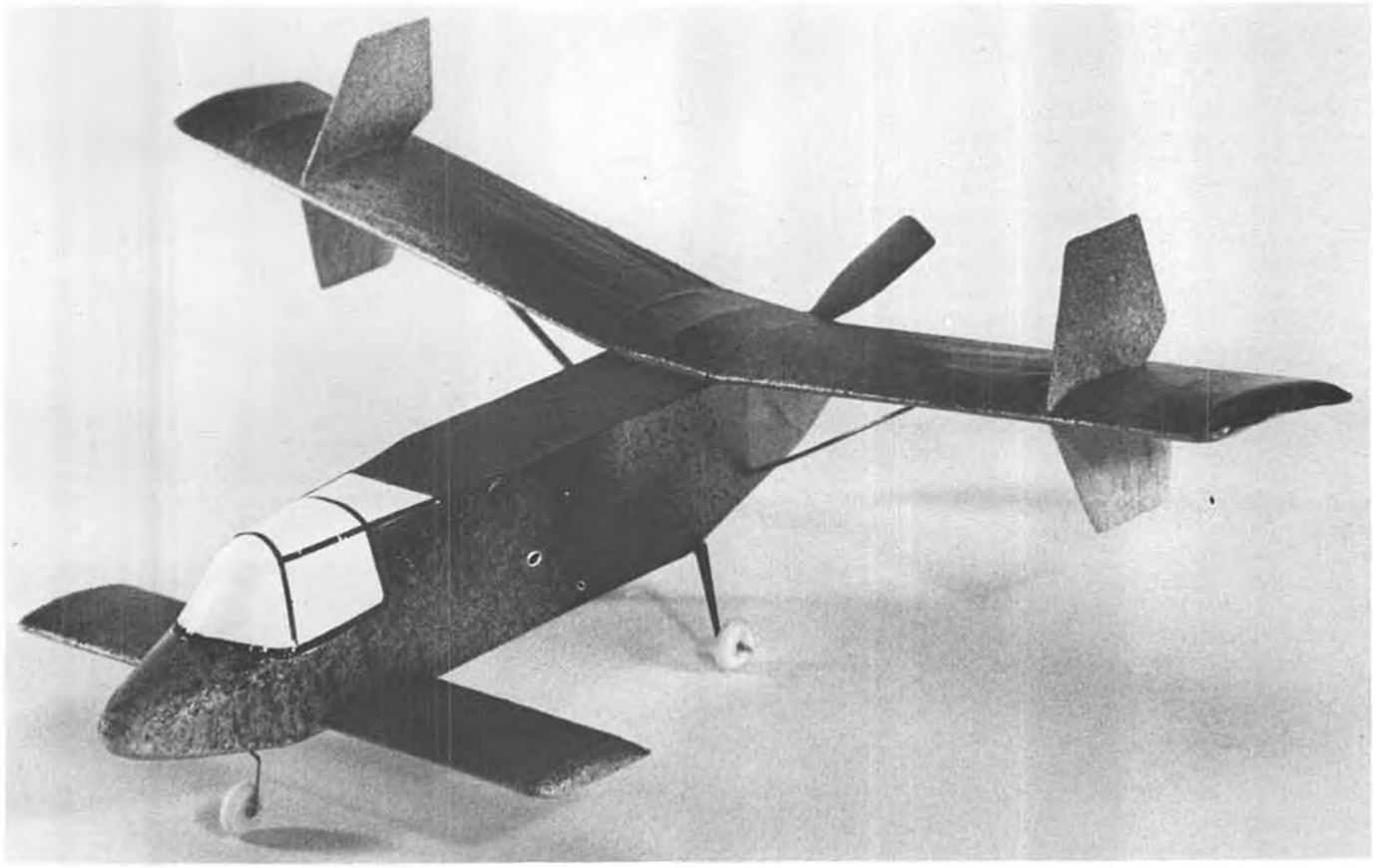


Peanut Scale Caudron "Simoun," constructed by Pres Bruning. Photo by Bob Mosher.

ANTIQUE PAPER AEROPLANES

Also from France, via Peck-Polymers, are some truly unique offerings. Though undated, it would appear that these paper aircraft were originally produced in the 1915-1919 era, or thereabouts. Three types are available: The Antoinette monoplane, the Bleriot monoplane, and the Hydravion biplane flying boat. Featuring several colors, the models would seen to be fairly easy to cut out and assemble, although the few instructions are in French. It should be mentioned that these are far from being exact scale, but rather charming abstract impressions of the real machines, with a pleasing "quaint" appearance. Supplies

Continued on page 90



Peanut *LOCKSPEISER* LDA-01

By JOHN WALKER . . . An "It went thataway instead of thisaway" flying machine, this month's Peanut is certainly quite a bit out of the rut. Originally designed for a Campus CO_2, it's easily adapted to rubber power.

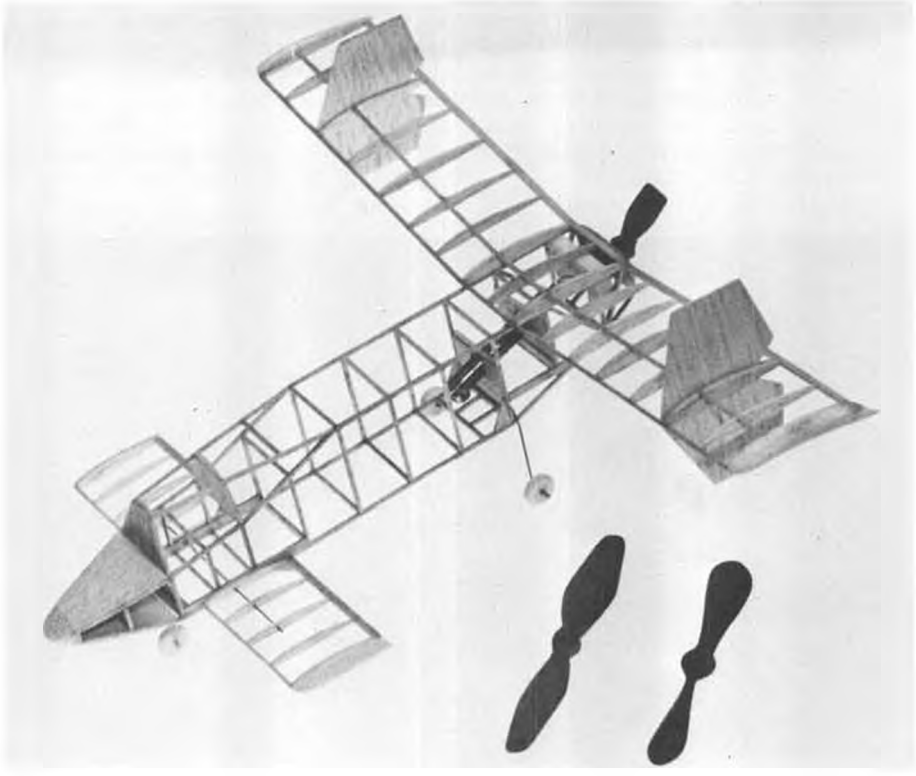
• The Lockspeiser is an unusual aircraft that has been under development in the United Kingdom for a number of years. The craft has a canard layout with the wing mounted high on the aft end of the box-like fuselage. The plane is a 7/10th scale version of the planned production version, making this model a scale model of a scale model.

The Land Development Aircraft (LDA) has been described as an "aerial Land Rover" (flying Jeep for you who do not know a spanner from a wrench or bonnet for a hood).

Since making its first flight in August, 1971, the LDA has undergone many changes. It was originally fitted with three wire-braced rudders and a four-wheel undercarriage. The 85hp Continental has been replaced by a 160hp Lycoming engine. Hoerner tips have replaced the square tipped wing and canard.

The production "flying utility truck" will have a span of 13.4m and be powered by a 360hp 0-540 engine.

The model is a copy of the aircraft seen at the 1975 Paris Airshow. One-half of the plane was camouflaged, with the other half in civvies. The model shown is fully camouflaged.

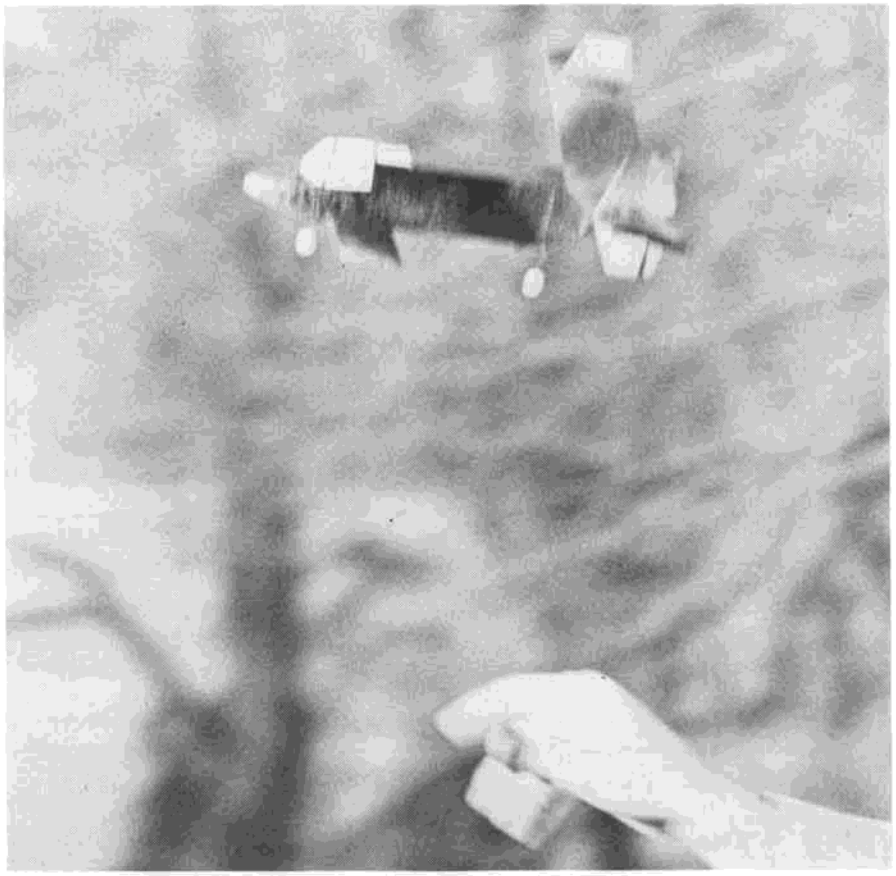


Bones of the Lockspeiser reveal traditional structure in spite of the unusual configuration. The author's model is powered by an old Campus CO_2 engine.

For some time now, we have been trying to come up with an unusual model for an old Campus A-100 compressed air engine. The Lockspeiser seemed to fill the bill. The engine operates equally as well in either direction, and, being mounted in the rear, there was little chance of damaging the engine.

Construction is straightforward and simple. If you don't just happen to have a Campus A-100 (a Bill Brown gem of more than 25 years ago) the fuselage size is ample for rubber power. The fuselage is framed of 1/16 sq. balsa. On the wing, two closely-spaced ribs on each wing half permit the rudders to be installed after the wing has been covered. We cut the rudder portion from the lower fin to make the installation of the rudder easy. Carefully replace the rudder with Hot Stuff, and you cannot tell that the piece was cut away.

The plans show only one-half of the canard (small forward wing). This should create no problem, because they do not become right or left canards until the tips are installed. One thing while mentioning the tips. They should be carved from very light balsa and the extreme rear portion of the tip strengthened after carving by applying a drop or two of Hot Stuff and allowing it to penetrate into the soft wood.



PHIZZZ! The little canard is off and running. Yes, Matilda, the little wing goes in front!

Since we could find very little information on balancing canards, we had to "guesstimate" the CG. But to hedge our bet on a properly trimmed model, a section of 1/8 OD (1/16 ID) soft aluminum tubing was fitted into the fuselage. A section of 1/16 OD tubing was fitted into each canard with approximately 1/2 in. projecting from the winglets. After the model was covered, the small diameter tubing was cemented into the tubing in the fuselage (no adhesive on the end rib, please). This permitted us to increase or decrease the canard angle of incidence until the model was properly trimmed for flying.

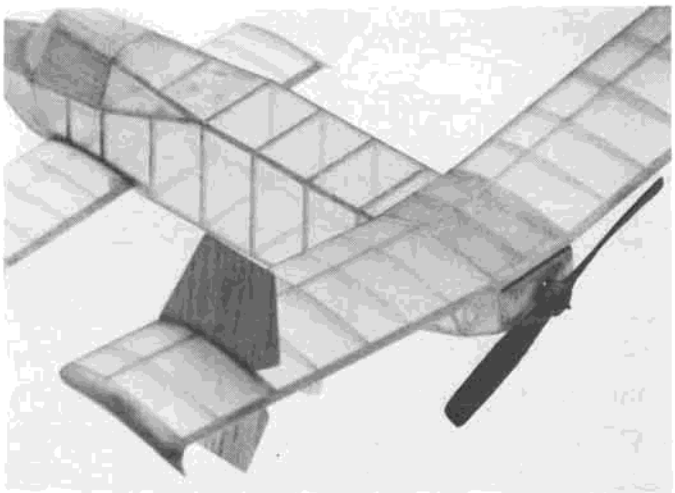
The model was covered with lightweight tissue and was given two thinned coats of plasticized clear dope after the tissue was tightened with rubbing alcohol. Color was applied in a mist coating, using spray enamel from the days when the younger son built model cars.

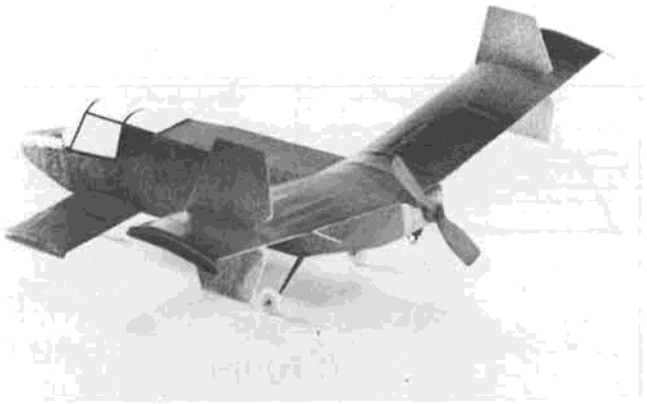
The wind screen can be fabricated from thin transparent plastic. If you plan to attach the plastic to the model with Hot Stuff, Zap, etc., try the adhesive on a small section of the plastic first. We found that some plastics disintegrated (not dissolved) when the adhesive was used.

By the way, if you coat your hands with DuPont's PROTEK (a product that might be described as an "invisible glove" when applied to your hands) there is little chance that you will glue yourself to the model when using Hot Stuff, Zap, etc.

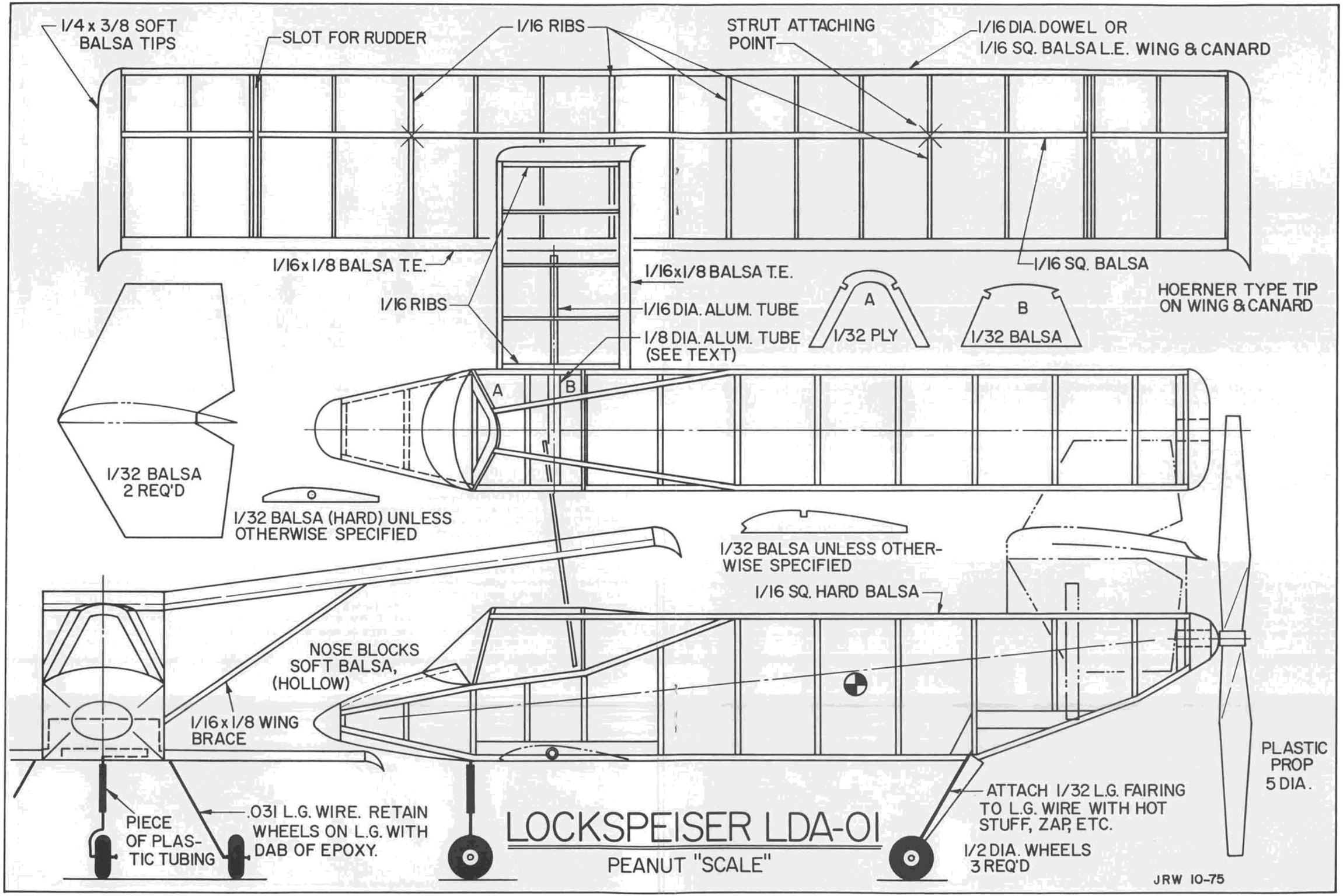
Flying results were quite satisfactory after the model was trimmed. We made the mistake of locating the air tank a bit too far to the rear of the model. Clay had to be added to the nose to correct this.

For rubber power, either carve a pusher prop or cut down a plastic prop. REMEMBER, the model flys TAIL FIRST. The amount of rubber needed will depend on the weight of your model. •





Rear three-quarter view of model in its natural covering and with the camouglaged finish. Conversion to rubber power is easy, and the long fuselage will allow a large loop of rubber for sustained power flight.


1/4 x 3/8 SOFT BALSA TIPS
SLOT FOR RUDDER
1/16 RIBS
STRUT ATTACHING POINT
1/16 DIA. DOWEL OR 1/16 SQ. BALSA L.E. WING & CANARD
1/16 x 1/8 BALSA T.E.
1/16 SQ. BALSA
HOERNER TYPE TIP ON WING & CANARD
1/16 x 1/8 BALSA T.E.
1/16 RIBS
1/16 DIA. ALUM. TUBE
1/8 DIA. ALUM. TUBE (SEE TEXT)
A
1/32 PLY
B
1/32 BALSA
1/32 BALSA 2 REQ'D
1/32 BALSA (HARD) UNLESS OTHERWISE SPECIFIED
1/32 BALSA UNLESS OTHERWISE SPECIFIED
1/16 SQ. HARD BALSA
NOSE BLOCKS SOFT BALSA, (HOLLOW)
1/16 x 1/8 WING BRACE
PLASTIC PROP 5 DIA.
PIECE OF PLASTIC TUBING
.031 L.G. WIRE. RETAIN WHEELS ON L.G. WITH DAB OF EPOXY.
ATTACH 1/32 L.G. FAIRING TO L.G. WIRE WITH HOT STUFF, ZAP, ETC.
1/2 DIA. WHEELS 3 REQ'D
LOCKSPEISER LDA-01
PEANUT "SCALE"
JRW 10-75

From England, Joe Barnes shows off his aluminum tube fuselage Wakefield. Very slick model. Photo by John O'Donnell.

Photo of John O'Donnell, by John O'Donnell. Those British F/Fers are pretty clever! Unlimited carries 4 oz. of rubber in 3 oz. airframe.

FREE FLIGHT

By BOB STALICK

• We've got a bunch of odds and ends to pick up in this month's column, the first of which is very important for all FAI F.F. types. So, without further ado, let's get on with it.

THE 1977 FAI PROGRAM FINALS

In the fall of 1974, the AMA, in cooperation with the NFFS, formed a representative committee to rework the entire program formats for indoor and outdoor FAI competition. In September, 1974, each group met in an in-person meeting in Detroit to formulate those plans. The format developed and approved by a vast majority of the FAI fliers was forwarded to all competitors. At this time, we are mid-way through this program. Recently, the model press has had its share of controversy over the program design . . . specifically, the number of rounds to be flown. A recent poll of the members of the committee reaffirmed the committee's intention to maintain its position. There will be 8 rounds, with flyoffs, in the finals to be held this coming Labor Day weekend. To stress the feelings of the committee to all interested parties, there was no single member of the committee who voted to change the format. As chairman of the committee, I am recommending to the AMA President that the format adopted by the committee and approved by a large majority of the FAI contestants be as stated at the in-person meeting in September, 1974.

All comments received from this point forward will be used by the members of the committee to assist in formulating the changes which would be proposed for the 1979 program.

Members of the committee, if you care to contact them in your district are:

District I: Vacant
District II: Bob Hatschek
District III: Rol Anderson
District IV: Bob Sifleet
District V: Tom McLaughlin
District VI: Dick Lyons
District VII: Paul Crowley
District VIII: Frank Parmenter
District IX: George Batiuk
District X: George Xenakis
District XI: Bob Stalick

By the way, the AMA survey of the FAI participants was conducted in January, and two of the questions were answered by 212 people as follows:

1. Is the proposed budget for utilizing the FAI Free Flight Program Funds acceptable?
Yes, 184
No, 27

2. The team selection finals should be held on:
Labor Day Weekend: 113
The three days preceeding the Nationals: 60
Either: 35

Many, about 40, did sent along suggestions, recommendations and criticisms of the various items in the FAI Program Format. These will be considered as part of the 1979 program, as mentioned earlier.

Finally, the committee is undertaking the task of constructing an operations handbook, which would be used to assist future program administrators, Semi-Finals, Finals, and International Team Managers, as well as Team Mem-

Unidentified Cargo ship at the Nats, waiting for an official flight. Note 4-wheeled undercarriage.

Marty Thompson launches his Cargo ship at a recent B.M.A. Scholarship Contest. Another 4-wheeler.

bers. Anyone who has suggestions, hints, or even the beginnings of such a handbook, is requested to forward this material to the FAI F.F. Program Committee Chairman, Bob Stalick, at 1120 Shady Lane, Albany, Oregon 97321. There is no need to repeat past errors, and there is a definite need to capitalize on past successes. Such a manual will take a great step toward providing us and our teams with this kind of help.

MYSTERY MODEL FOR MAY

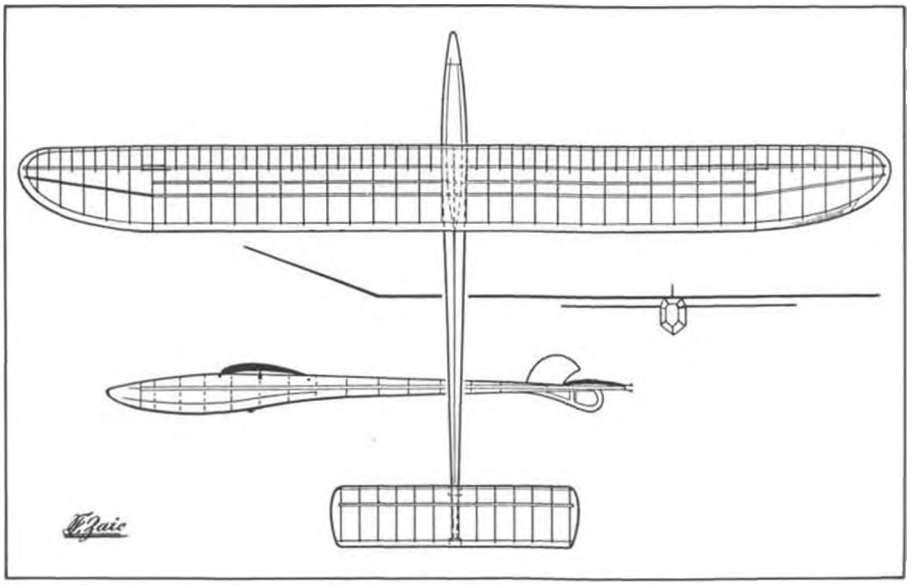
This model enjoyed considerable international success in its day, when there were 100 meters of towline allowed. Kitted and available in the USA for awhile, it was built by a good number of Americans who were looking at towling glider as a new and challenging event. If you know what it is, drop Uncle Bill a line.

(Our readers really "did it to us" on the February Mystery Model. No less than three ended in a tie by first identifying Woody Blanchard's "Gawn" . . . Brooks Goodnow, Auburn, New York; Steve Mounsey, Phoenix, Ariz.; and some fella by the name of Bill Gieskieng, from Denver, Colorado.

Al Wargo, Dearborn, Mich., was the first (alone, thank Heavens!) to correctly identify Ray Schofield's "Stormer," in the March issue, and amongst stiff competition, Jerry Barnette, Fredericksburg, Virginia, was first of many to correctly identify George Reich's 1961 FAI World Championship Wakefield winner, "Max Maker." wcn)

DARNED GOOD AIRFOILS–
Goldberg G-9071

Stop laughing out there. You're right, though, this is the foil which Carl used in his 1/2A model, The Viking. Local modellers have had excellent success with this section in 1/2A models by simply making it into a flat bottomed airfoil. It is very fast and has a surprisingly good glide for such a thin section. It should be given consideration for other classes as well. I have never used it for Wakefield, but it might do the trick with a low aspect-ratio job intended as a windy weather model. I tried it on FAI Power, using conventional built-up structure, and found that even with geodetics and multispars, it was too thin for a 10:1 aspect ratio. With a sheeted structure, it should be stiff enough to do the trick, though. Worth a try!



MYSTERY MODEL FOR MAY

TUBA TUGGER–CARGO

Cargo is a really fascinating event. The challenge is to lift as much weight as you can and keep it aloft for at least 40 seconds. Joe Norcross designed the Tuba Tugger for just this purpose. He just recently lifted 21.5 ounces and barely missed 23.5 ounces because of a downdraft which forced him to the ground 1/10 of a second short of the necessary 40 seconds.

Joe strongly urges the 4 wheel gear, as ground looping is a problem with standard two-wheel gear.

I have seen all kinds of cargo ships in local meets and at the Nats, and it's my impression that the most straightforward designs tend to be the most successful (that's usually the case, or so it seems), and Joe's is a good example of this school of thought. Build one and hang a good T.D. .020 on the front. This should give you a good shot at the next cargo meet in your area . . . and you won't need 1,000 acres to fly the darned thing on, either. *(You do if the engine timer sticks . . . Right Joe? wcn)*

1976 U.S.F.F. CHAMPIONSHIPS

About the time you read this, you should be gearing up to head to Taft, CA. to put your ships into a trash-mover. This year, the contest management has pulled down an AMA AAAA sanction! Added events spice things up even more. New events are: Outdoor Peanut Scale, Cabin Old Timer and a split between A, B and C Old Timers divided into Cabin and Pylon.

PHOTO BY JERRY KOLB

George Reich, with April's Mystery Model, after '61 Wake win. TM Herb Kothe at left.

The dates are May 29, 30 and 31, 1976, and the events by day are:

SATURDAY

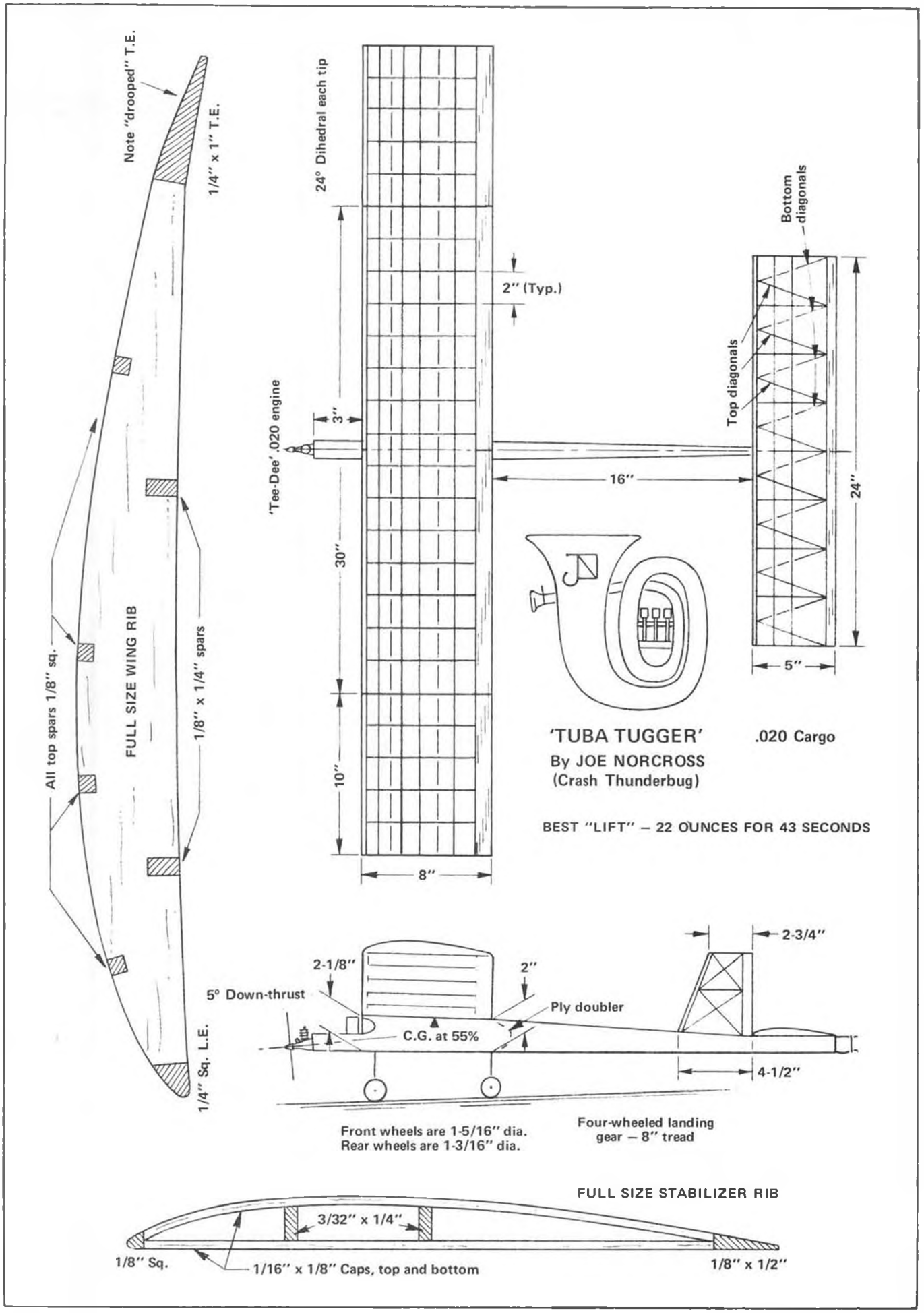
A Gas, C Gas, A/2, Coupe, .02 Replica, 30 Second Antique, A/B Cabin Old Timer.

SATURDAY NIGHT

Indoor: Penny Plane, Peanut, Hand Launch Glider, Easy B.

DARNED GOOD AIRFOIL – GOLDBERG G-9071

STATION	0	1.25	2.5	5	7.5	10	15	20	25	30	40	50	60	70	80	90	95	100
UPPER	0.66	1.73	2.26	3.18	3.98	4.65	5.71	6.31	6.84	7.04	7.04	6.57	5.71	4.58	3.32	1.73	1.00	0.13
LOWER	0.66	0	0	0	0.13	0.26	0.40	0.60	0.73	0.93	0.93	0.86	0.66	0.46	0.26	0	0	0


Note "drooped" T.E.
1/4" x 1" T.E.
24° Dihedral each tip
2" (Typ.)
Bottom diagonals
Top diagonals
'Tee-Dee' .020 engine
3"
16"
24"
30"
10"
5"
8"
All top spars 1/8" sq.
FULL SIZE WING RIB
1/8" x 1/4" spars
1/4" Sq. L.E.
'TUBA TUGGER'
.020 Cargo
By JOE NORCROSS
(Crash Thunderbug)
BEST "LIFT" – 22 OUNCES FOR 43 SECONDS
2-1/8"
2"
2-3/4"
5° Down-thrust
Ply doubler
C.G. at 55%
4-1/2"
Front wheels are 1-5/16" dia.
Rear wheels are 1-3/16" dia.
Four-wheeled landing gear – 8" tread
FULL SIZE STABILIZER RIB
3/32" x 1/4"
1/8" Sq.
1/16" x 1/8" Caps, top and bottom
1/8" x 1/2"

SUNDAY

1/2A Gas, FAI Power, HL Glider, Unlimited Rubber, A/B Pylon Old Timer, C Cabin Old Timer, C Pylon Old Timer, O.T. Rubber, Gas Scale, Rubber Scale, Peanut Scale, Night AMA Gas.

MONDAY

B Gas, Jr. B/C Gas, A/1, Wakefield, Rocket, Payload, D. Gas.

NEW PRODUCTS AND PLACES THAT SELL GOOD STUFF

Ultimate Dragmaster Kit: Tom (Round Man) Hutchinson, 10726 Arrowood, Temple City, CA 91780, is now in production as R.M. Enterprises, and the first kit is the highly successful Unlimited Dragmaster. Two versions are available. One is the short kit containing all strip wood and the plans in addition. Costs: $12.50 postpaid for the short kit and $22.50 for the complete version. Available by the time you read this.

First ALLSA and now Tuff-Foam. Recent ads from the trade have touted two new products both of which are intended to replace balsa wood. As yet, this writer has not seen either of these products, but he is looking forward to giving both a try. If the promotional material is accurate, though, it would appear that our reliance on that old stand-by, balsa wood, is ending. We shall see. More information on both of these products can be obtained from: The Envoy Corporation (ALLSA), P.O. Box 15917, Phoenix, AZ. 85060; Aero-Foam Crafters (Tuff-Foam), Rt. 2, Box 43, Valmeyer, Ill. 62295.

Blue Ridge Models, P.O. Box 9188, Asheville, N.C. 28805, is marketing a number of hard-to-get items. Included in its offerings are: A fine Coupe/Unlimited Rubber Model, "The Coupe De Ville;" molded propeller blades for rubber models, aluminum motor tubes for Coupe, and other things. What struck me, however, was the quality of the Japanese tissue they are selling. It is the best looking tissue I have seen in years. Good grain, good finish . . . complete with a shiny and a dull side, and light weight. Only 3 colors available, though: white, yellow, and orange. 20c per sheet. Drop them a line.

Colony Enterprises, 2337 Ewing St., Los Angeles, CA 90039, has a number of goodies primarily intended for the FAI competitor, including Wakefield prop hubs, aluminum tubes with a lip on the edge for flex joints on Nordic, Power and Wakefield fuselages. In addition, Colony imports Jim Baguley's A/1 glider kit, The Satellite, and the A/2 Asteroid. FAI engine pans, Czech towhooks, and a variety of FAI engines, round out more of the offerings. Drop them a line.

HINTS AND TIPS

If you don't have MODEL BUILDER's fabulous Uber Skiver knife set and are still using X-Acto knives, you are probably wondering what to do with these 889 used Number 11 blades. I must have a shoebox full of them. If you don't throw them away . . . seems wasteful to me, why not recycle them? How, you ask? Here's a tip from Competition Canada: "A bird carver has revealed the way to do it. Hone the blade on a 1/2 or 3/4 inch thick cloth polishing wheel. Put jeweller's rouge or steel polishing compound on the wheel and you can re-edge your blades, knives, or chisels."

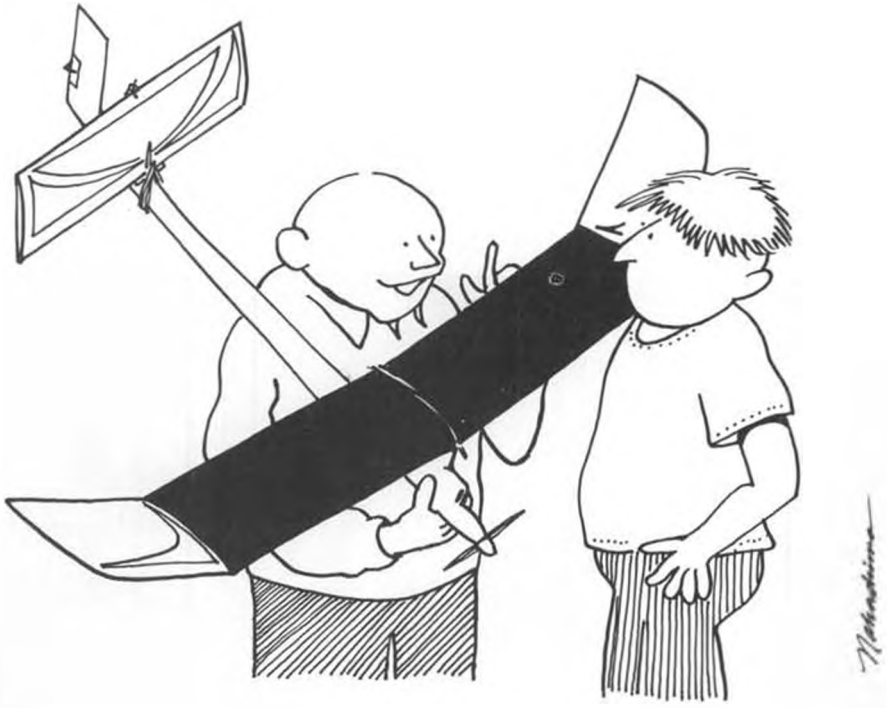
Now, you know. Aren't you glad you asked?

CLOSING NOTE

All together now, in the key of D: "Serious competition brings out the best in equipment and the worst in people."

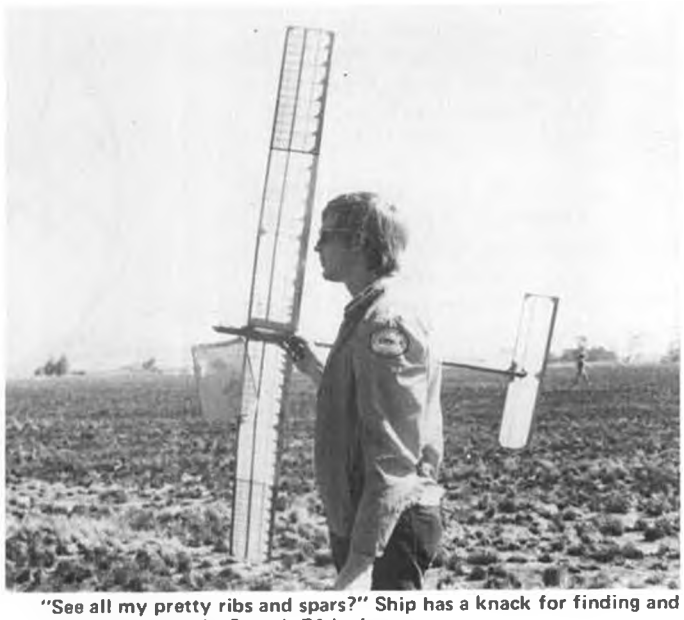
See you all here, in your favorite magazine, next month. Thermals. ●

"I don't believe I've ever seen a Class D Sweepette before."



"I'm going to the Free Flight Championships to see if I'm the 'fastest gun' in the east and the west."

The "Simplex" on its way up for another max, being towed by young Tom Stalick, its builder, Pappa Bob launching.



"See all my pretty ribs and spars?" Ship has a knack for finding and staying in thermals. Span is 71 inches.

THE SIMPLEX A/2

By BOB STALICK . . . Get into the intrigue of A/2 Nordic flying with a model that is highly competitive, yet easy to build and trim.

• The Simplex was designed to do two things: 1, build and trim quickly and easily, using minimum amounts of materials; and 2, to be competitive in A/2 Glider competition.

It is both.

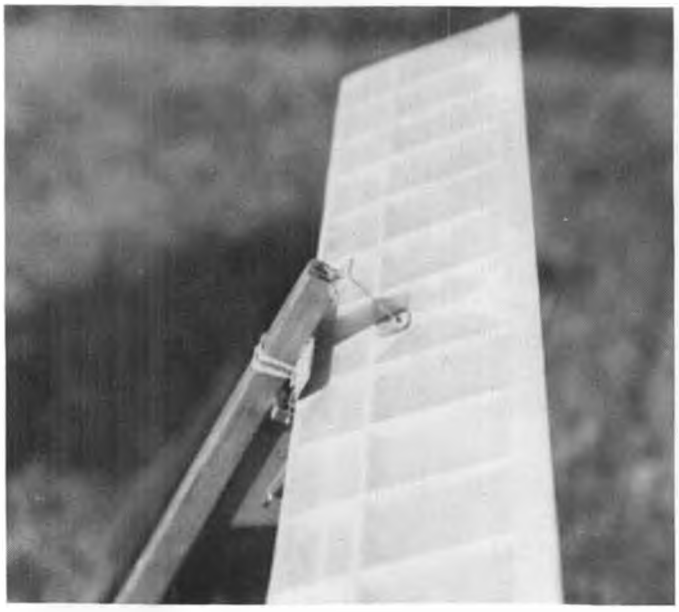
The original glider was built in 1974 to replace my aging and worn A/2's. At it's initial contest, it was trimmed and proceeded to fly [illegible] ficial flights. On the [illegible] itself worked into a good sized thermal and took off across the wilds of the Hillsboro flying site . . . never to be found again.

The second glider was built by my younger son, Tom, who had had it with the A/1 gliders he had been flying, and was ready to move up to something a bit larger and easier to fly. This model is featured in the accompanying pictures. Tom qualified in A/2 at the 1975 Semi-Finals, held this year in Tacoma, with his model of the Simplex.

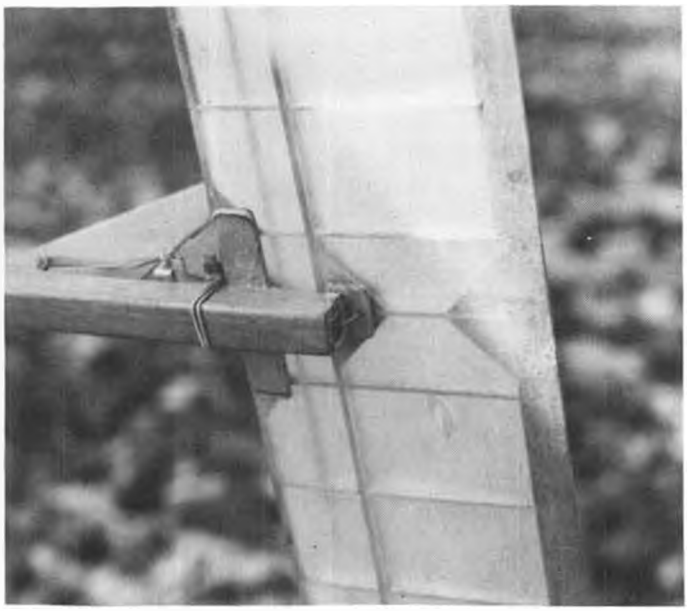
The [illegible] ground . . . [illegible], and has bumped into lift and worked its way up into the air again to max. In fact, with

Continued on page 88

Proud owner and builder of the Simplex shown on this page, Tom Stalick.

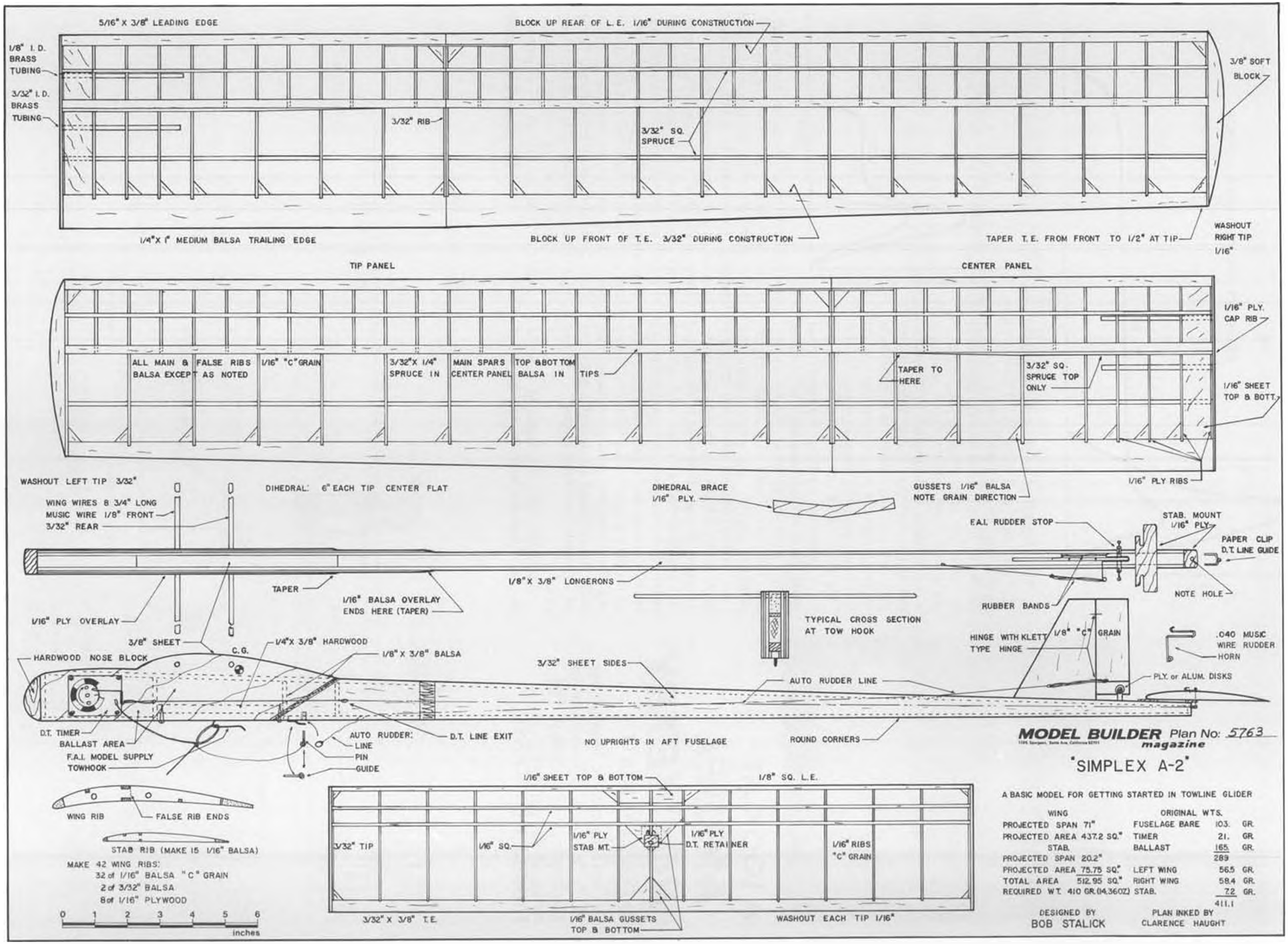


Stab in d.t. position. Note plywood glued to underside of stab where it meets the platform. Correct d.t. angle shown.



In glide position. Note the wire "saddle" which keeps the d.t. line from chewing away at rear of fuselage. Also note stab overhang.

FULL SIZE PLANS AVAILABLE – SEE PAGE 94



MODEL BUILDER magazine Plan No: 5763

"SIMPLEX A-2"

A BASIC MODEL FOR GETTING STARTED IN TOWLINE GLIDER

WING		ORIGINAL WTS.	
PROJECTED SPAN 71"		FUSELAGE BARE	103. GR.
PROJECTED AREA 437.2 SQ."		TIMER	21. GR.
STAB.		BALLAST	165 GR.
PROJECTED SPAN 20.2"			289
PROJECTED AREA 75.75 SQ."		LEFT WING	56.5 GR.
TOTAL AREA 512.95 SQ."		RIGHT WING	58.4 GR.
REQUIRED WT. 410 GR. (14.36 OZ)		STAB.	7.2 GR.
			411.1

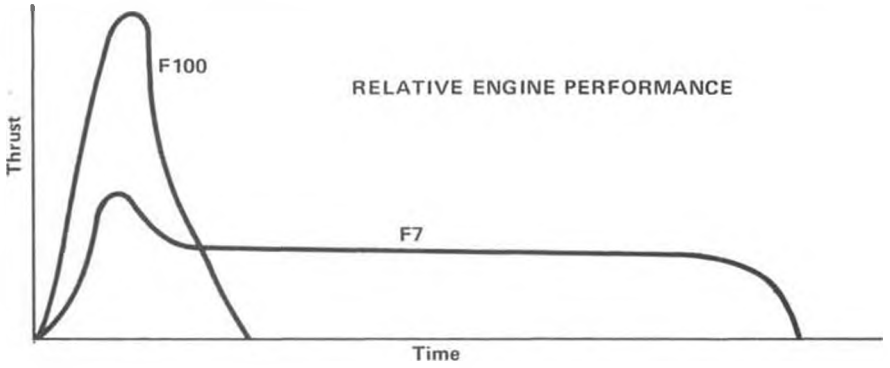
DESIGNED BY BOB STALICK

PLAN INKED BY CLARENCE HAUGHT

A LOOK AT *MODEL ROCKETRY*

By DOUGLAS PRATT . . .

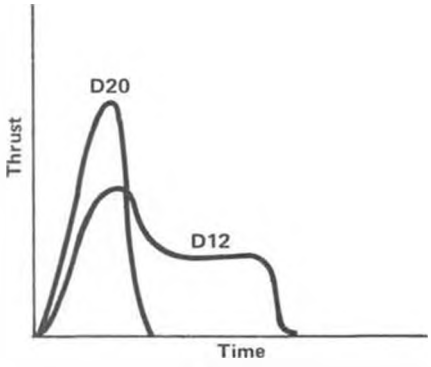
An introduction to high power "D", "E", and "F" engines for the beginner in rocketry. The name of the game is . . . HANDLE WITH CARE!!



The Model Rocket alphabet definitely doesn't end with "C." There is an awful lot to be done with A8-3's, B4-5m's, C4-6's, and so on; almost all competition and most sport flying is done with these engines. But if you have a really heavy scale model, or an instrumented rocket that really should go up thousands of feet, or if you simply want to get a flight that will bung the spectators' eyes out, then you're ready for the "big stuff:" D, E, and F engines.

A word of warning, however. You must be a serious modeler with some good, solid experience. Model rockets are not toys, and the large engine-powered models are emphatically not toys. Many dealers who sell large engines won't sell them to hobbyists under 16 years of age. This is as it should be; not just with rocketry but with any activity that has even the possibility of hurting someone. I recommend a year of modeling experience before attempting these engines; and of course, you must be prepared to accept a price tag of as much as $9 per engine . . . in one case.

To begin with, the National Association of Rocketry and the Hobby Industry Association of America have established a safety code. These rules conform to the government regulations, and as long as you stick to them, you don't require any kind of license or clearance. They state that no model rocket may weigh more than 500 grams (round it off to just over a pound) *fully loaded.* That means, including the weight of the engine, recovery system, and payload if any. Also, no rocket may carry more than four ounces of propellant. These rules eliminate the staging and clustering of certain of the big engines. For example, a 2-cluster of FSI F7 engines is



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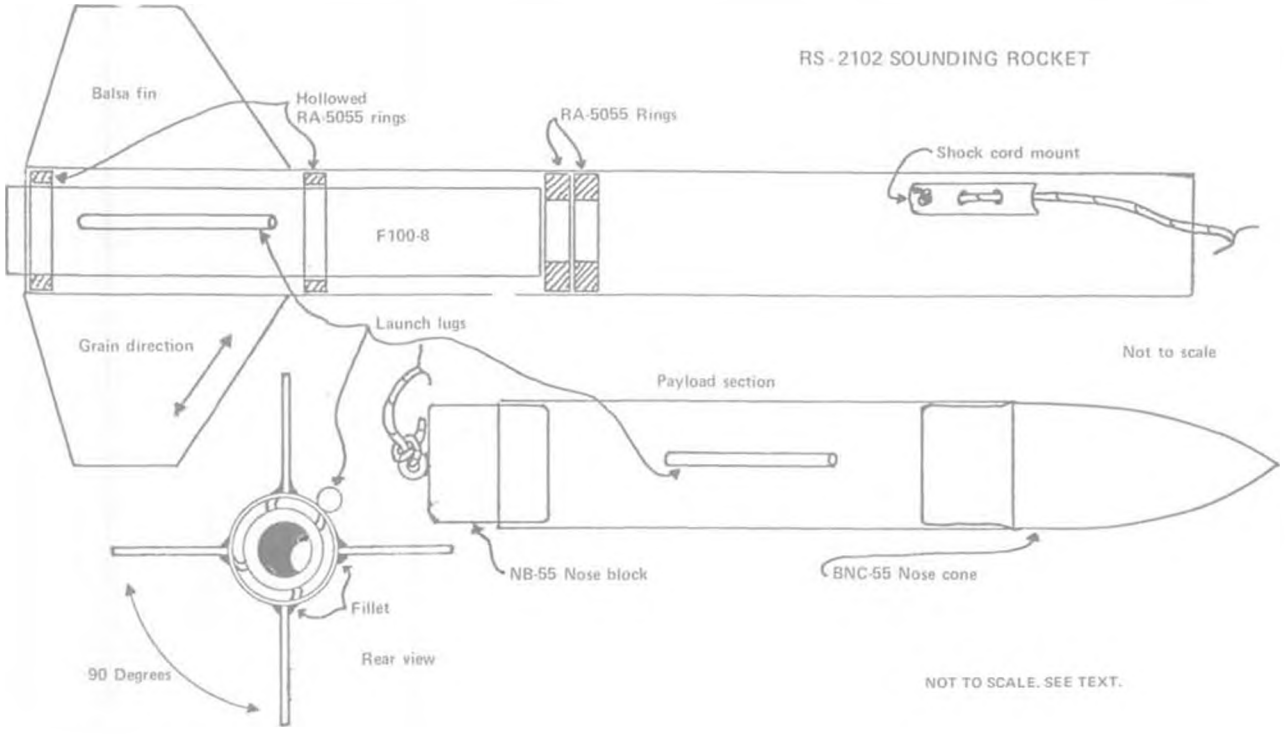
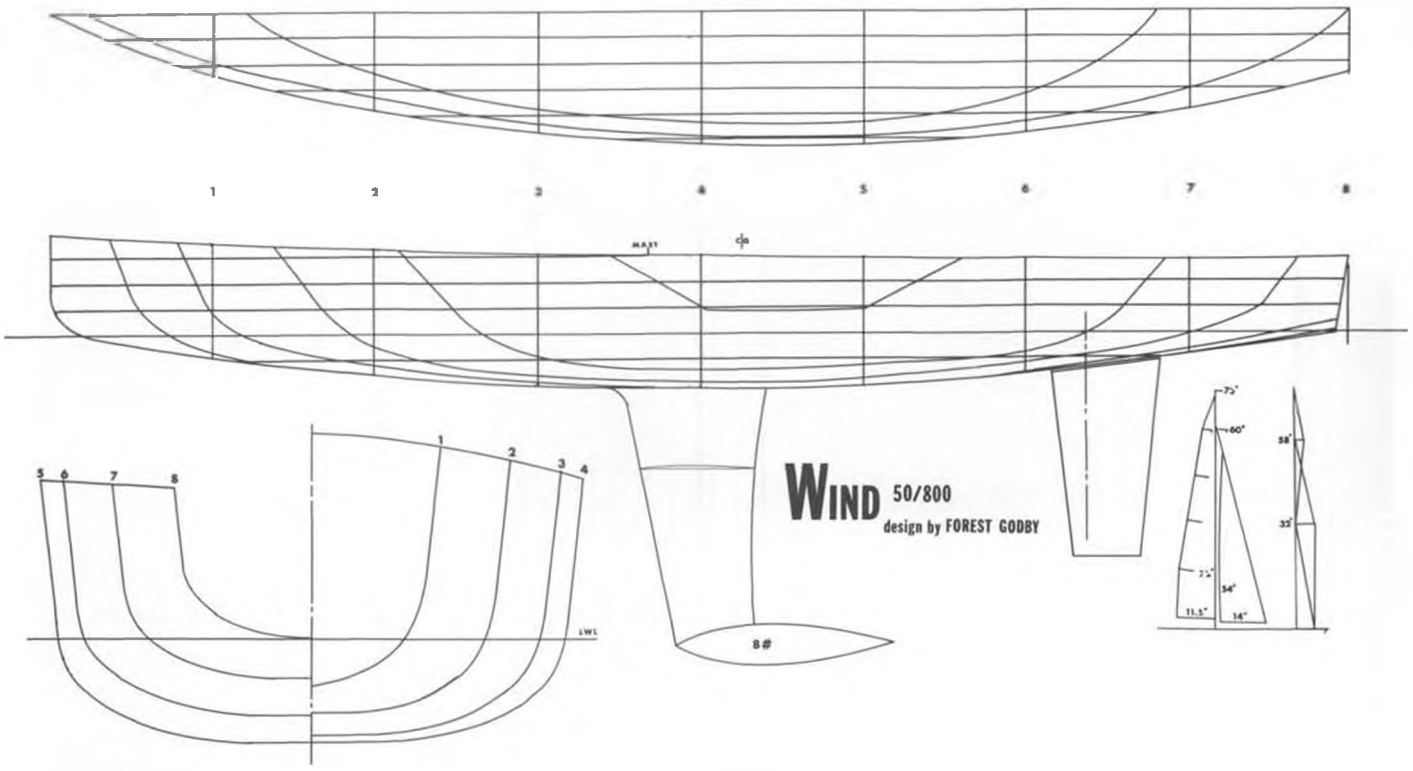




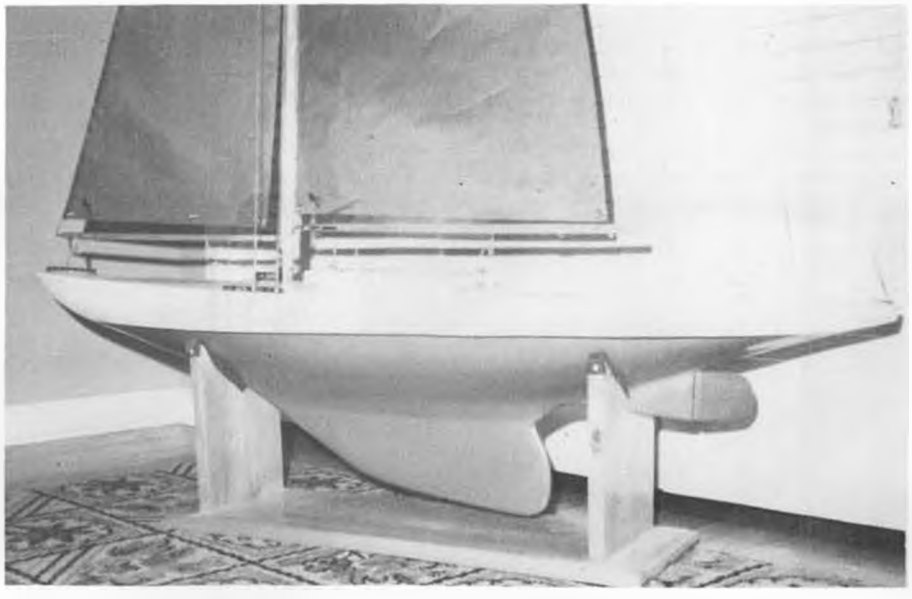
STRICTLY SAIL

By ROD CARR

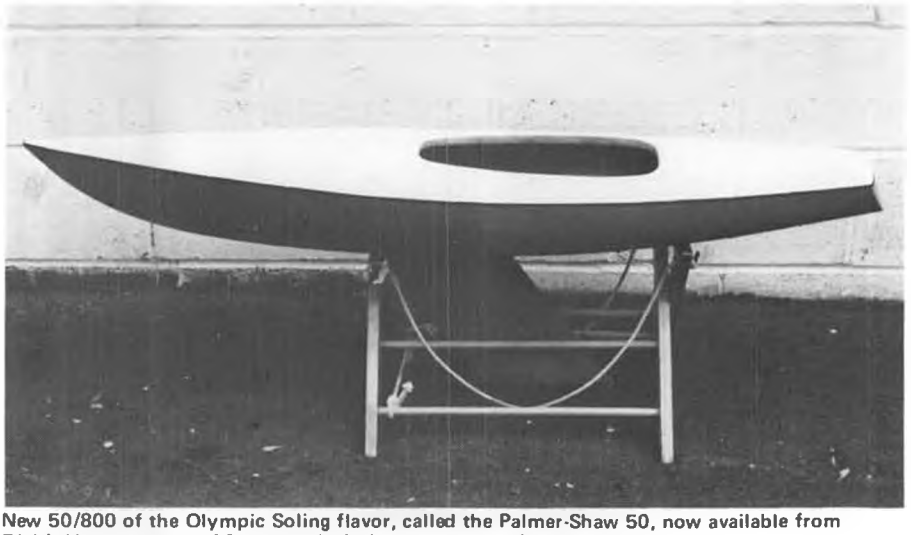
• When the 50/800 class was started by Roy Clough in 1930, early designs were by-and-large full keel boats. We see examples of this in the Cheerio design still marketed by A.J. Fisher, and more recently have learned of a 1935 vintage design which has been refurbished by Clyde Ellis, for sailing under R/C. With long forward and after overhangs, LWL measurements of only 30 to 35 inches were not uncommon. The recent trend in the class has been to stretch out the waterline to the maximum allowed by the rule, and to reduce the keel as much as practicable to eliminate wetted surface, since skin friction is the major cause of hull drag at low speeds. We now are accustomed to the fin keel, or bulb-and-fin configuration. The bulb is put low, at maximum weight, to increase stability, and only enough fin is used to prevent leeway when sailing to weather. The hull has evolved into a "canoe body"... so called because many designs are almost double ended, and with the keel removed, do indeed resemble a canoe.

A discussion of the various types of canoe bodies available today is in order. We can rank them in various ways, and in so doing, make some generalizations concerning suitability of each hull for certain kinds of water and wind. The first consideration is the mid-body station. This is the shape and form of the hull if cut in half 25 inches from the bow. The mid-body is often called the "master section", since it has such a

A 1934 vintage photo of Clyde Ellis' 50/800 when it was a free sailer.



Clyde's same boat, 42 years later, ready to sail again, with R/C equipment on board. There must be many more like this, waiting to be rejuvenated.



New 50/800 of the Olympic Soling flavor, called the Palmer-Shaw 50, now available from Rich's Hobbytowne, of Pine Brook, N.J., in all stages of completion.

controlling hold on form stability, on dynamic stability, displacement, and wetted surface. It also is responsible for setting the standard underwater volume against which the prismatic coefficient is calculated, ie., the ratio of the hull's actual underwater volume to the volume of a prism with the mid-body cross section and an LWL length.

Figure 1 shows the mid-bodies of some popular hulls which now exist. The hulls show a definite progression from displacement types (Warrior, Soling) to planing hulls (Yankee, Flying Dutchman). In general, most hulls will fall somewhere within these extremes. Though I have heard of extreme designs with only 5 inch beam, and so on, few have ever gained popularity for a wide range of conditions.

If we compare the perimeters of each hull section from waterline under the hull to the other side, we can see that there is a general increase from the displacement hulls to the planing form. When we take the length of the hull into account, what we really are observing is a progression from displacement hulls of low wetted surface to planing hulls of high wetted surface. As said before, at low hull speeds, it is this wetted surface which is the major contributor to hull resistance.

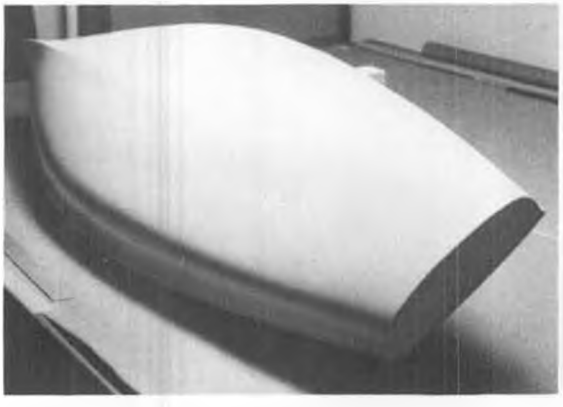
Not obvious from the master section, but worthy of mention, is longitudinal stability. In a regular balanced hull like the Warrior, as the hull heels, as much bow in-wedge as stern in-wedge is immersed. The effect is that the center of buoyancy does not shift fore-and-aft and upset the longitudinal trim of the hull. On the planing hull, especially one like the Yankee which has a skinny bow and a fat, flat stern, heeling puts more of the after hull in the water and less of the bow in the water. If allowed to remain on an even keel, the center of buoyancy would shift aft to coincide with the extra stern volume which is immersed. In reality, the center of buoyancy must line up with the center of gravity of the boat. The center of gravity does not change, so the center of buoyancy moves forward by the simple process of dropping the bow farther in the water and lifting the stern out. This is the reason you will often see your rudder sticking out of the water in heavy air. The hull is so heeled, that if it is asymmetrical in the fore and aft direction, the boat will usually nose down when pressed, lifting the rudder out of the water. On a displacement hull of the Warrior variety, you are much less prone to see the rudder, since the balanced hull does not nose down when heeled.

Consideration of the master section will give us some idea of the kind of stability that the heeled hull will have. In Figure 2, we see the Warrior section heeled to an angle of 25°. The in-wedge and out-wedge are marked. Notice that the center of buoyancy has not moved very far from its original non-heeled position. This is due to the rather regular distribution of hull form around the center of buoyancy. As a result, resistance to heeling must come from a heavy keel weight, or bulb, rather than from the form of the hull. As heeling tries to lift the bulb, gravity tries to pull the bulb back down. Resistance to heel increases continuously as heel angle increases. We can see that the shift of the Center of Buoyancy for the Warrior hull is on the order of an inch or so to the leeward side.

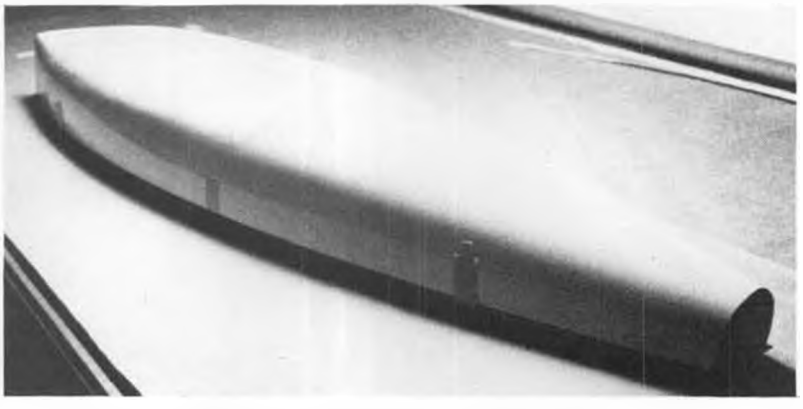
In the planing hull of Figure 3 however, there is a dramatic shift in the center of buoyancy with a change of heel. In this case, the hull itself immediately resists the heel as the sail plan tries to submerge the leeward side of the hull. The FD manages to shift it almost five inches, a tremendous increase in the righting lever arm that can act to prevent the hull from heeling further.

Only at greater angles of heel would a keel weight be much help to stiffness, and as a result, planing hulls usually keep keel weights to a minimum, and standard practice is to sail the boat as upright as possible in order to give it the maximum chance to plane. A planing hull is said to have form stability, which comes from the form of its hull shape, while a displacement hull obtains its stiffness from the sheer mass of its keel weight slung below the hull.

It is worth noting that there is a dramatic reduction of wetted surface when the Flying Dutchman hull heels to 25°. It is for this reason that some small amount of heel is a benefit when working this type of boat in light air. On a model, this can be accomplished by very slightly over sheeting the sails to induce a little extra heel. This must be done very carefully, as we already know how much we will be reducing drive by such a procedure. I might comment that a hull form very similar to the FD was sailed during the 1974-75 season by Bill Huson of our local club. The Beltway Bandit seemed happier the harder it blew, and was fastest off the wind



Flying Dutchman 50/800, a typical planing hull form.



The Warrior II 50/800, a typical full-displacement hull form.

where it could take advantage of its flat bottom to plane away from the competition.

As we go from displacement to planing hull, there is a general increase in beam, and a decrease in depth of hull. Remember that the Soling does not have a full 50 inch LWL, and is attempting to cram 18 pounds of displacement into a shorter waterline length. This is why the hull depth and beam are both larger than the Warrior, but note that her shape below the waterline is flatter for a longer distance than is the Warrior, ranking the Soling as nearer to planing than the Warrior. We seem to be saying that at low hull speeds we want a displacement hull, fairly heavy to coast well, and of minimum wetted surface, probably with a high aspect sail plan to catch zephyrs higher off the water. As the wind speed picks up, we will opt for a combination form with which planing will have some chance to occur, slightly more wetted surface, and lighter weight for better acceleration. Finally arriving at the strong wind area, a full planing hull will be at its best, with somewhat lower aspect rig to reduce heel as well as improve planing performance on the reaches and runs. Of course, we generally try to combine all these desirable features into one boat which will be a compromise in all wind strengths. It is the tradeoff between wetted surface and planing ability, between heavy displacement and acceleration, which has seen so many new 50/800 designs come out in recent years. Each in an attempt to provide all around performance.

The Wind design shows a definite compromise between the two extremes. It has a fairly deep hull (15.5 lb displacement), and yet at the same time is quite flat to help promote planing on the reaches and runs where the boat is not heeled. Her turn of the bilge is a good ways from the centerline, so that she will take advantage of form stability while going to weather. This is a design that has tried to incorporate the strengths of both the planing and displacement hull form, and in so doing is expected to be a better all-round performer in all wind strengths and sea states.

Wind is described by the designer, Forest Godby. This boat came in 5th in the 1975 ACCR, a generally light air event. Forest has donated this design to us via plans available from MODEL BUILDER, and I hope will be the first of a series from his board, as well as setting an example for other designers who would like to see their work published. The following discussion is by Wind designer, Forest Godby.

"Wind a 50/800 Marblehead yacht, was designed during the fall of 1974. Construction was begun in January 1975 and completed in March. The model placed 5th in the N.Y.C. Central Park 59th Anniversary Race on May 3, 1975, 1st in the Hartford race on June 9th, 5th at the 50/800 ACCR in August, and first in several local races.

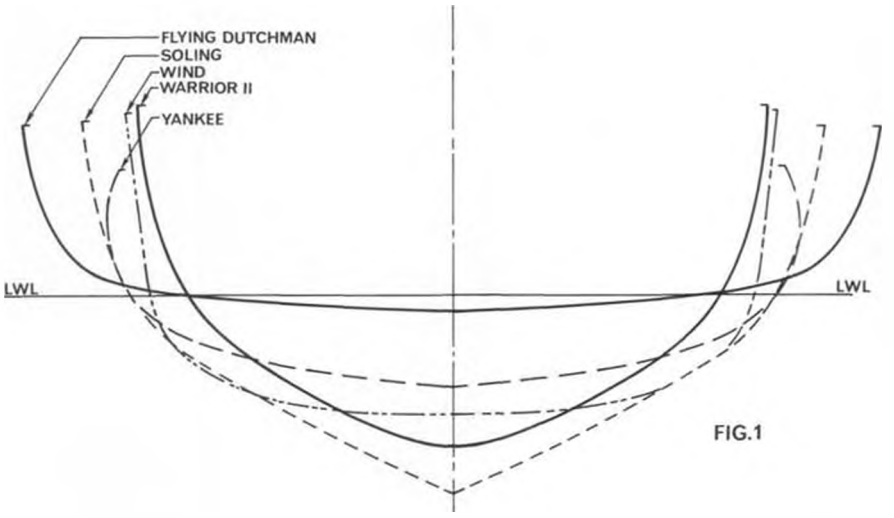


FIG.1

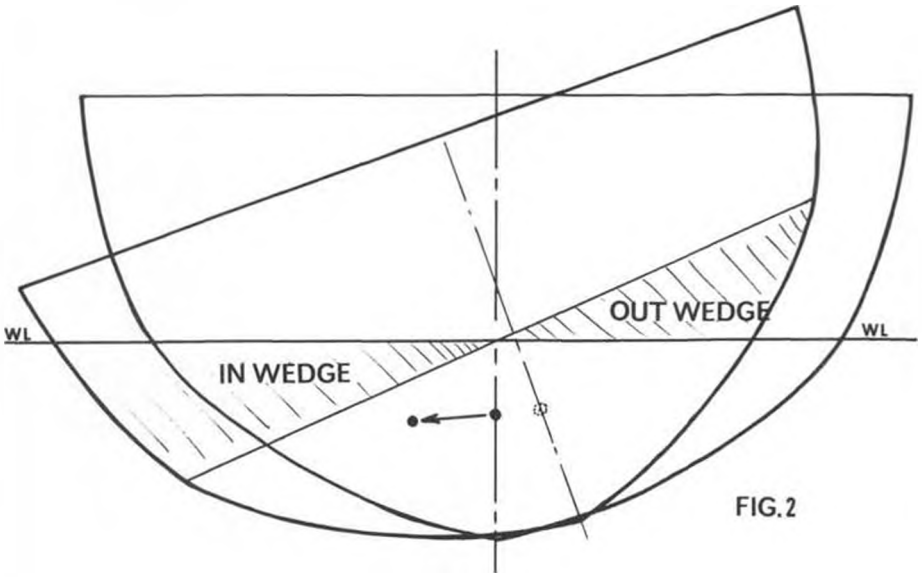


FIG.2

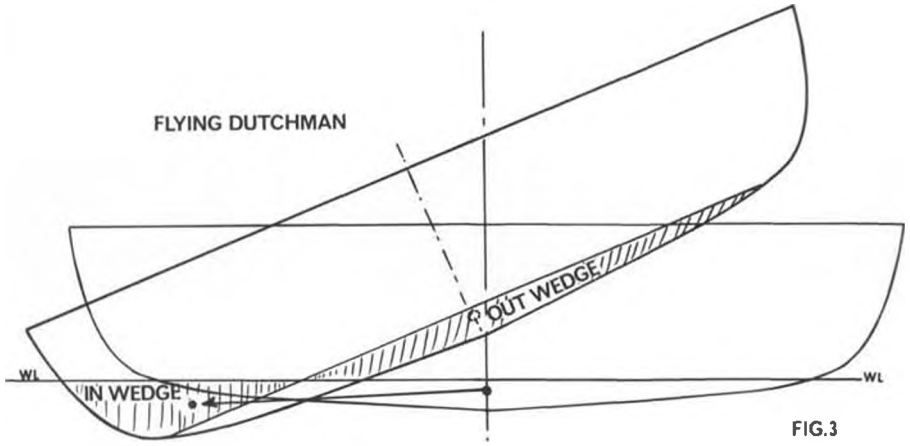


FIG.3

"I was quite pleased with Wind's performance, since this was my first season of racing model yachts and my first serious attempt to design for performance. I have built model sailing craft for many years, concentrating on RC square riggers and appearance which were mostly scratch built and sailed for personal enjoyment. Model yacht racing has opened up a new facet of the hobby for me.

"This article is not intended to be a detailed construction project. It is intended to put forward some of the thinking that went into the design of Wind and to outline the general construction process showing methodology rather than the 'Glue part A to part B and let dry' type of article.

"Model yacht construction can be quite complex. For those who are interested I would refer them to two ex-

cellent publications. MODEL SAILING YACHTS by W.J. Daniels and H.B. Tucker, and PLANK ON FRAME MODELS by Harold A. Underhill. Both books treat the subject exhaustively, with perhaps Daniels and Tucker's book being better suited for our purposes. Mr. Underhill's book deals mostly with scale construction. I believe it is possible to obtain these books through Model Shipways.

"Design Considerations: My desire was to create a yacht that would have a low wetted area and would part the water with a minimum of disturbance. If you visualize a drop of water located at the bow and its movement as the hull passes, the objective would be to displace the drop slowly and as small a distance as possible as it moves from the bow, around the hull, and back to its original position as the stern passes. Obviously this calls for a long waterline hull (slow drop acceleration), and either a thin deep hull or a shallow hull (Minimum drop movement in a horizontal or vertical direction). A hull designed to accomplish this should not be a wave making machine. Some hulls I have seen actually throw curlers from their flared bows. This is very pretty to look at, but I feel it absorbs energy that should be used in propelling the hull at a higher speed. The ideal yacht should leave no wake at all.

"Life being a series of compromises, I chose a hull with a 'U' section, with a fairly flat floor and a gentle rocker from bow to stern. To avoid any tendency for bow submerging in heavy weather, I gave the bow 4 inches of free board and avoided a flare at the bow to minimize the bow wave.

"You will note that sections 4 and 5 are identical in shape. This keeps the CB (center of buoyancy) and CG (center of gravity) well aft and should allow the hull to surf or plane easily.

"The correct amount of ballast was found by sailing the boat with different keels in various wind conditions. The 8 pound keel appeared to be the best from an over-all performance standpoint. It will allow the boat to sail reasonably erect in a 20 knot breeze, and the boat is still controllable when the wind is at 30 knots if the sails are handled properly. In higher winds the water is not safe for any model. You risk flogging the shape out of your sails.

"SAILS: Moderately high aspect ratio sails were chosen since it was felt that the free area gained in the roach of the main and jib coupled with clean air higher off the water would be a definite advantage. Therefore a luff of 72 inches was chosen for the mainsail.

"A balanced jib and main configuration was used to keep jib efficiency high and to allow the boat to wing-to-wing without having to apply rudder correction. For example, my EC 12M requires constant rudder trim to keep it on course while sailing wing-and-wing. In heavy airs, the EC 12M is more prone to broach due to this imbalance. Wind will sail from mark to mark without rudder correction most of the time.

"The sails were sewn on my wife's sewing machine from two ounce dacron sailcloth procured from a sailmakers loft. The luff of the main was cut dead straight. Some sailmakers prefer to cut a slight reverse 'S' in the main luff to provide a slight pocket in the lower 1/3 and to tighten the leech in the upper 1/3 of the sail. I prefer to shape the sail by adjusting the rigging (mast bending), to suit different wind conditions starting from a straight mast and luff condition.

"Construction: Wind was built upside-down on a building board. The ribs were covered with cellophane tape to prevent the planks from adhering to them during the planking process. The planks are glued to each other and to the stem and transom only. Planking was done using 3/32 x 3/8 white pine strips and epoxy. The procedure is to add a plank to the starboard side at the deck line, then port side; then starboard side of the center line of hull, then port side. There is no keel member as such. Four planks can be added at each sitting, using straight pins to hold them in place until the epoxy has set up. This procedure was continued until the closing plank was added at the turn of the bilge.

"The hull was carefully sanded and

covered with one layer of fiberglass cloth and polyester resin. The hull was then removed from the building board. The result of this process yields a light shell of wood that compares favorably with the weight of an all-fiberglass hull. Strips of 1/4 x 1/2 wood were glued to the sides of the hull, at the sheer, to act as support for the deck and deck beams. This also provides the necessary strength to the hull to survive ramming which occasionally happens. Wind was rammed by a Warrior at the ACCR, when I inadvertably violated the Warrior's starboard tack rights (with no visible damage).

"A slot for the fin was cut through the bottom and the fin was set into place using short rib sections butt glued to the fin to distribute the strain across the bottom of the shell. A mixture of resin and fine sawdust was formed into a fillet between the fin and hull junction for additional strength. A block of wood was drilled and epoxied into place as a rudder post support. I must emphasize that great care must be taken to insure that the fin is perpendicular to the deck and parallel to the hull's centerline, otherwise the model will sail better on one tack than the other. Also make sure the rudder is in proper alignment with the fin.

"Next, the deck beams and hatch framing were installed. I also added a kingplank on the centerline which was recessed into the deck beams, bow and transom. This adds support for the maststep, the jib and stern fittings, and to the sheet guides. The portion of the king plank that crosses the hatch opening is removed after the decking is installed.

"The RC gear and winch was installed at this time so that the interior of the hull would be completely accessable for work. The RC gear and winch was then removed for later reinstallation when the hull was completed.

"The deck beams must be fair to each other, the kingplank, and to the sides of the boat, or a wavey deck will result. The deck was made of 1/16 birch plywood which was cut to shape and epoxied to the hull. A rub rail was added, outboard of the deck edge, to complete this portion of construction.

"The fin used in Wind was made up from a 1/8 plywood center core to which soft pine strips were glued and faired to a streamlined section. The thickness is about 1/2 inch at 1/3 chord tapering to 3/8 inch at the bottom.

"The lead ballast consisted of two 4-pound teardrop sections obtained from a plaster mould. The two halves were then epoxied to the wood fin and the whole thing fiberglassed.

"Wind was finished using high gloss white Rustoleum enamel. The rub rail was painted black, and a strip of black trim tape was used to indicate the waterline."

* * *

New AMYA Clubs continue to sprout in the winter sun. Latest to join the long list are: No. 53: SALISBURY MYC, Fred Frey, 21 Deer Lane, Hicksville, New York 11801; No. 54: DEUPAGE MYC, Robert V. Borla, 10 West Burlington Ave., Westmont, Ill 60599.

I get a gripe every now and then about the amount of stuff I print concerning the formula classes. "Why don't you ever print one-design articles!"

Well, 'tis really quite simple. Unless I get some input from you one-design skippers, I will continue to serve you helpings of racing rules and tactics as your fair share of these pages. If you want to see your particular boat or class, get together with your class secretary and make a pitch to me. From what I read in the class columns in the AMYA Quarterly, you are not exactly flooding your class secretary with cards and letters either. Communication is the name of the game. New formula class designs are easy to track down. One-designs have to be presented in a carefully contrived format which will take into account the philosophy behind them. The structure of the class specifications and the kind of job it is to maintain a class where sailing, not construction, is the raison d'etre.

I will field questions directly if accompanied with a stamped, self-addressed envelope or via MODEL BUILDER. Rod Carr, 7608 Gresham St., Springfield, Va. 22151. •

Albatros . . . . . *Continued from page 14*

tank by removing one of the overflow tubes and soldering a small brass plate over the hole. Solder two little tabs to the tank and mount it to the firewall with No. 1 x 1/4 screws. Check the photos for this detail.

To cut the slots for the 1/8 inch E-rings in the landing gear wire, mount your Dremel tool in the router attachment and clamp the router attachment vertically in your vise. The shaft will be horizontal, with the chuck to the left. This will give you a conventional cut . . . a climbing cut will be fatal. Install a No. 409 cutting disc and move the fence up to a within a couple of thousandths of the disc, and lock tightly. Lay the 3/16 music wire on the fence and make a few practice cuts. You will find that, with care, a fine, square slot can be made by rotating the wire against the disc with a light pressure. Check with your E-ring such that the slot doesn't get too deep. The disc will cut rather quickly. As the wheel wears, move the fence up to maintain the distance from the disc. I use this method to cut off the ends of large gauge wire. The cut end looks as if it has been machined. Solder the .025 brass landing gear mounting tabs to the axle and mount with No. 2 sheet metal screws. Regular 3/16 set collars position the wheels on the inside.

The prototype is finished naturally, just like they used to be. The fuselage is covered with silk and received 20 coats of Aerogloss clear. The wing is covered with heavy Silkspan and received about 12 coats of Testor's clear. The rudder and elevator are covered with medium Silkspan, and doped with 20 coats of Aerogloss clear. No kidding about the dope, it just wouldn't fill. Heat-shrink film cannot duplicate this finish, but it's a heck of a lot cheaper. The letters on the tail are Chartpak Velvet Touch Lettering rub-on letters applied over the dope. "Machine" style is used in 60 point and 24 point. The letters on the wing and fuselage are cut from Monokote trim sheet, 5 inch letters on the wing, and 3 inch letters on the fuselage.

The pilot is a 7440 farmer doll head I got from the hobby store. This head was pushed onto an Ivory Liquid dish washing detergent bottle, and then the bottle was cut to fit in the cockpit with scissors. An old Argyle sock was cut to form a turtle-neck sweater. Craft fake fur makes the hair and mustache. Glue in the pilot with silicone sealer.

When the model is done and the radio is installed, it should balance at or slightly ahead of the spot indicated on the plans. Put a Goldberg short horn on the rudder and a long horn on the elevator. The rudder should have about 1 to 1-1/4 inch of throw each way at the trailing edge, and the elevator 3/4 to 1 inch each way at the trailing edge. The engine is offset about 3 degrees to the right.

Start the engine and check the controls. The radio is pretty close to the engine in this installation and may show symptoms of vibration sickness. I put 80 to 100 flights on my Kraft brick in this plane and never experienced even the slightest twitch. The Hobby Lobby 3 has worked flawlessly also. If it tachs 5,000, and the radio is working, let her go. A little up trim and a squeeze of right rudder will hold her straight. The tail comes up in couple of feet and the rudder is very effective. Be gentle on the rudder corrections on takeoff. Let her roll until she gets light and starts to bounce on the gear. Now, SQUEEZE the elevator and climb out at about 15 to 20 degrees, no more. All climbouts should be shallow. Turns should not be banked beyond 30 degrees until you become accustomed to the craft.

I like to make low passes 3 to 4 feet off the deck and then climb to 10 feet or so and make 180 degree turns and come back on the deck. A loop can be done. Start at about 50 to 75 feet of altitude, hold a shallow dive, pull back at about 20 feet and hold. You should come out at about 20 feet. If you plan to do loops, inspect the rubber tubing in the wing strut brackets to insure that the struts aren't pulling. I found that mine were hard and not holding tightly after about a year or so, replace them every season just on general principles.

After 4 or so minute flying time, go for altitude and get set up for landing when the engine quits. I use the same trim for a gentle climb and for glide, which keeps the fuselage about level with the horizon and will maintain a good rate of sink. I always make a conventional approach with a down-wind, cross-wind, and a final leg. I personally would rather land a little short than overshoot, so I make my approaches low, under 60 to 70 feet, on the down wind leg. A proper approach will have the model touch on the mains with the tail high. Roll-out will be about 30 feet. If too hot or over-flared, the Albatros will bounce, but heck, she screams across the fence at a blazing 15 m.p.h. and you'll catch on fast. In a breeze, zero-roll landings are no trick, in fact, I land across the strip in a severe cross wind, no sweat! Cross wind takeoffs are surprizingly easy, both on grass and pavement.

The Albatros is about the most rewarding experience I've had lately. It's characteristics are thoroughly pleasant, and on the ground it never fails to draw attention. You won't be popular with the hobby dealer, with all those bike spokes and the homemade engine and 16 oz. fuel to last you a whole day, but the crowd will love you. You can only be rewarded by building this little gem.

If you're in the area, drop by the

CARL GOLDBERG

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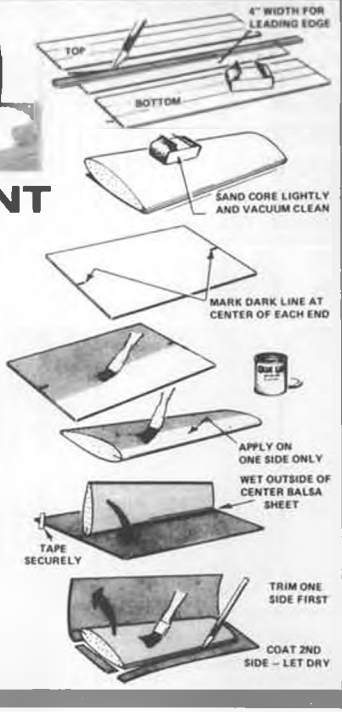
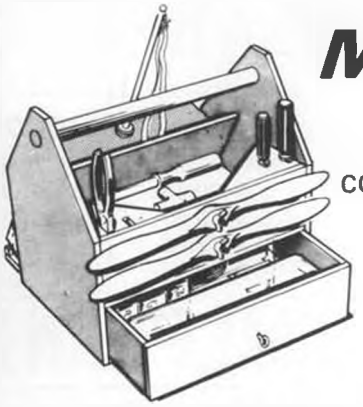


MINI-TOTE



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Stake, line, reel, parachute, all hardware included. Std. Hi-start, 100 ft. Surgical Tubing — **$29.95.** Astro Start — for big planes — 100 ft. Bungee — **$34.95**

Boeing Aero Space Center in Kent, Washington, on 5 and 6 June, 1976, and take in the annual R.A.M.S. Northwest Kidney Fund Benefit Airshow. Say "Hi Jeff" and I'll give you some stick time. In any event, if you build an Albatros, drop me a line and a photo. I'd love to see your's and meet another afficionado of the R/C Sport. •

Soaring . . . . . *Continued from page 17*

strated gliding flight in the gay '90's. In 1906, John J. Montgomery (of Santa Clara, California) was granted (U.S. Patent 831,173). Here a more conventional configuration is described.

Few other patents are worthy of note before getting to modern times. In 1947, O.A. Buetner invented a composite glider which parted in flight into separate flying machines (U.S. Patent 2,421,742). In 1948, B. Mitchell invented an airplane train (U.S. Patent 2,457,391), wherein a string of gliders are joined, towed aloft, then separated.

At this point, it is interesting to skip many of the intervening years and note only a few recent patents.

Ed Jones (of Perryman, Maryland) received (U.S. Patent 3,801,045 dated April 2, 1974) relating to "integral control system" for sailplanes. Here the intent is to achieve dynamic soaring, that is, capture energy from the wind turbulence in order to assist supporting the sailplane against the force of gravity. Jones references a pilot patent pertinent to dynamic soaring (Patent 3,477,664 dated November 11, 1969), which requires the wing to change pitch in order to obtain energy from turbulence of gusts of wind. He goes on to suggest a control system which offers coordinated movements between any two of the wing, elevator, and control stick, independent of the third. For example, "any change of pitch of the wing is countered by a change of pitch of the elevator without changing the position of the control stick. If the wing is held fixed, for example, in landing, the stick will move the elevator. If the elevator is held fixed, or becomes jammed, the control can be used to change the pitch of the wing to maintain control".

On August 12, 1975 (U.S. Patent 3,899,146) was granted to Jim Amick (of Ann Arbor, Michigan). Here a sailplane is described "with wings mounted to its fuselage in a vertical V or butterfly configuration, and having steerable running gear means, so that it is able to sail on a flat surface with one wing approximately horizontal, and in this attitude the other wing extends upward at some fixed angle to the horizontal, in the range of 30^{o} to 90^{o}. A steering system enables the pilot to adjust the yaw angle of the vehicle to obtain a desirable angle of attack of the raised wing with respect to the wind, while the craft is traveling approximately perpendicular to the wind direction. Under favorable conditions of the wind, aerodynamic forces on the raised wing accelerate the vehicle from rest, producing speeds in excess of the required take-off speed".

Lastly, may I reference U.S. Patent 3,883,092 granted on May 13, 1975 to Ralph Ditto (of Santa Cruz, California). Here he describes a glider generally of the kind we have all enjoyed. According to the inventor, "the double dihedral is found to give greater lift as well as to improve anti-roll stability". He suggests the use of balsawood or similar material and perhaps catapulting the glider through the use of a suitable elastic material.

What else is there to say? *(Shucks, I should'a gotten a patent on my last R/C scale ship! wcn)*

MISCELLANEOUS BUMPS

Have you seen the traveling man's airplane? Frank Zaic has come through with another clever design. Here, the entire model and launching requirements fit within the kit box, which measures 8 x 8 x 22 inches . . . a neat case for carrying, even on board your airliner. I can't think of a better way to build some pleasure into business trips.

The box, as shown, was covered with contact paper, and velco makes a convenient handle. Believe it or not, it contains the pod (built of plywood sides and formers), four wing panels (stretching 76 inches once assembled), a boom and rudder (three arrow shafts epoxied

together), the elevator, transmitter, and charger, a Hi-Start on-reel, ground stake and even auxiliary equipment such as a stopwatch. There is no room for a rattle.

The pod allows just enough room for a two-channel brick, thus making this polyhedral aircraft highly maneuverable and lots of fun for sport flying. It turns out you can't get transparent green Monokote. So I covered the top of the flying surface with transparent yellow and the underside with transparent blue. That makes it transparent green as it flied overhead. (Not too psychadelic.)

I have now flown this plane in Kansas, Florida, Virginia and California, all with good results. I have towed into a 28 knot crosswind and landed almost going backward. The plane is responsive, yet predictable. Evidently it is sturdy. Mine weights out at 29 ounces . . . that is 7.6 ounces per square foot. Yet it is surprisingly fast and penetrates well.

For those who enjoy building, here is an unusual project. At times I felt I was assembling a carefully designed jigsaw puzzle. For those who simply want to fly at the least provocation, here's one to keep in your car.

* * *

I have just had my first chance to handle the Citizen-Ship transmitter (their Velvet Touch II). The curved sides make it fit your hand, helping it become a part of you. The antenna can tilt so that you maintain maximum range, even if you use "body English" to bring your plane about in that distant thermal.

* * *

On another matter, you know it's hard to stay aloft for, say, an hour at a time. First there's the problem of finding a sizeable thermal. But even when you find one and you're up, up and away, there's the problem of not getting too high (or too far and too high). It's nerve-wracking to follow that tiny dot in the sky, knowing that each time you circle it will disappear for a while. You want to maintain altitude as insurance against a quick return to the ground, and you know that the higher you are, the easier it is to stay up. But there comes a time when you chicken-out and decide to drop to a more comfortable height (preferably upwind). Unfortunately, this often leaves you right back on the ground near your launching point.

Worrying about this, I looked into wearing low-powered (2.8x) binoculars, the kind you wear like glasses. These ("Binolux" is the trade name) cost about $20 (if you can find them). They provide greater range, but you quickly face a new problem. If your head isn't absolutely steady, the image of the plane hops about like a Mexican jumping bean. To make matters worse, you fear losing the bird for even an instant. With such a narrow field of view, you'll never find it again.

Say, how about using a monocular . . . removing one of the lenses of the binocular or attaching a monocular lens to your eyeglasses, if you wear them? Well, I tried that too. Can you imagine how it feels to see twin sailplanes, both at the same altitude, but one much larger than the other and the larger one keeps jumping around the smaller one in an erratic fashion? I never realized how much I move my head without meaning to. Chalk it up as another bad idea.

Well, what *can* you do? You can ask some friends to stretch out on the ground, prop his head on a hard pillow, and track your flight through binoculars. Whenever you lose sight, you shout and he calms you down, saying, "OK, I've got it, a little left stick, down trim . . . " Hopefully, you will find it again soon. This can easily cost you some friends, but that's cheaper than covering the wings with tin foil and buying a surplus radar together with a portable engine/generator power supply, etc. Walt Good suggests that you keep track of where the thermal was and try to fly in and out of the same thermal, thus adjusting your height with some security.

There I was, circling just below a cloud. I couldn't even tell if I was doing up or down. Don Edberg commented, "If you wear a visor and hold your head still, you can tell by watching the plane relative to the edge of the visor." "Thanks," I muttered. It sounds simple, and is a step in the right direction. Try it, you'll like it. *(Sorry Larry and Don, but if the glider flies toward or away from you, at the same altitude, it* appears *to be changing altitude. wcn)*

* * *

The other day I saw my first Mini-Gryphon. It's about one-half the kit bird yet flies even better, albeit rolling somewhat faster. If you think the original Gryphon was exciting to fly, you should see this one. I asked its pilot, Walt Hoffman, why the small size. He pointed out that this was the composite of two Gryphons that had ended in separate disasters, the outer wing panels of one and the fuselage of the other. From my point of view it's a fine original design.

WACO S.R.E.

RADIO CONTROL MODEL

SPAN: 56½" LENGTH: 45 3/32" ENGINE: 40 to 60 SCALE: 1 5/8" = 1 FT

Its hard to find words to describe the breath-taking beauty and great flight performance of this graceful and beautiful cabin bi-plane of the "Golden Thirties". If you're an R/C flyer, whether Sport or Scale, then you are bound to fall in love with this magnificient aircraft. Beautifully engineered for ease of assembly and long-lasting ruggedness; the Waco S.R.E. has loads of room for R/C equipment and scale detail, (it can also be built for control line). It's truly a joy to fly and likewise just to look at, whether on the ground or in the air. The kit's a real dandy too . . . top grade-density selected balsa, sanded to micrometer tolerance. Die cut & numbered parts make assembly swift and sure as you follow the detailed step-by-step plans and instructions that cover every phase of construction. Formed Landing Gear, Alum. Engine Mounts, Giant Scale Decals, Linkage Hardware includes Pushrods, Aileron & Elevator Horns, Bellcranks, Clevis, Connectors, etc. . . also Plastic Cowl with molded-in-place dummy engine cylinder, Wheel Pants, and much more . . .

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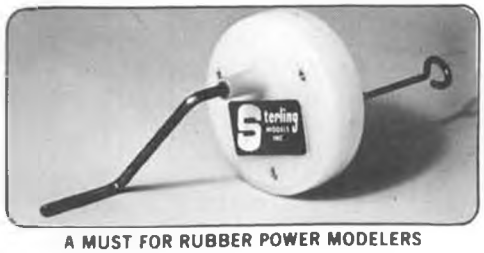
Parts printed on fine quality balsa wood, density selected and sanded to micrometer tolerance-Strip Balsa, Colored Tissue, Scale Decals, Wheels, Propellers, Fittings, Contest grade Rubber Loops, Light-Strong Detailed Scale Plastic Parts-Clear-easy to follow step-by-step drawings and instructions-both models are fine flyers if built according to plan.

Peanut Scale models are rubber powered flying models scaled from real aircraft. Span is strictly limited to 13" and they may be flown indoors or outdoors. Sterling "Peanuts" are fun to build and fun to fly. Designed by experts, they are remarkably realistic in appearance and are great flyers. All material required is in the kit for both models except glue & dope (paint). In addition you need pliers, straight pins, hammer, tweezers, single edge razor blade, flat building board, Saran Wrap (or similar).

RUBBER MOTOR WINDER



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Some believe in starting them early, so on the insistence of my son Gary (age 7), I slapped together a Jedelsky Wing, zero-channel glider, which gives the feel of what he will fly in a few years. You can see that he has gotten the launch technique down perfect. •

Rockets . . . . . *Continued from page 56*

over the propellant weight limit; while an F100-0 staged to an E60-6 is perfectly legal. All manufacturers include the total weight of the propellant in their catalogs; in planning out your rocket design, check these carefully.

At present, three of the four US model rocket manufacturers offer rocket engines. Centuri Engineering of Phoenix, Arizona, has a line of 1/4A through C engines, notable for its mini-engines. Estes Industries, of Penrose, Colorado, also offers 1/4A through C, with one big engine, the D12. Flight Systems, Inc., of Raytown, Missouri, offers A through C, and a large array of big engines: D4, D6, D18, D20, E5, E60, F7, F100, and the "Thunderbolt" F32. The fourth company, Competition Model Rockets, of Alexandria, Virginia, has kits for all of the aforementioned engines, designed for competition flying. Of the two Canadian manufacturers, CANAROC and Shand Industries, only Shand makes an engine, a B2; but it is rumored to be planning additions to its line.

The Estes D12 is a good engine for heavy payload and scale models, because of a relatively high liftoff acceleration. It fits the BT-50 tube, and can be easily mounted in most designs using Estes tubes. The company offers some very good kits for the D engine. A D12 will power the Estes Saturn V kit, which is good news for people who have trouble getting clustered engines ignited properly. It also gives the Estes Cineroc movie camera an excellent ride when staged in the "Omega" kit. You can get full information at most hobby shops, or by writing to Estes Industries, Penrose, Colorado 81240.

FSI's D engines are different. Like most of FSI's engines, they are designed to give a relatively low liftoff impulse; but they have a very long thrust duration. This makes them generally unsuitable for heavy models, except when clustered. D4 and D6 engines are the best for competitions such as altitude and duration events, when a light model has the chance to build up momentum under that long thrust; they are also the best for boost/gliders, where too much thrust can exceed the "speed of balsa" and fill the sky with confetti! The D18 engines have a slightly higher liftoff impulse, but still aren't designed for heavy models; they are competition engines, incorporating a very long sustaining thrust after that initial "spike." Even though their code number indicates a higher average thrust than the D12, examining the time-thrust curve shows that a heavy model could fall out of the sky during the last part of the burn. D18 is an engine for light altitude birds, where the long sustainer is an asset.

The "Loadlifter" series from FSI hit the other end of the power spectrum. The D20, E60 and F100 engines are all high-thrust engines with short thrust durations. They give you 10, 24, and 35 pounds of liftoff thrust respectively. They also offer two "long-burners" in the E and F range: the E5 and the F7. The F7 boasts the longest thrust duration in the model rocket industry: nine seconds. In a demo bird, these engines ("steam machines," as they are called by hardened astromodelers) turn in the most spectacular flights imaginable.

The F32 "Thunderbird" is very different. It uses a composite propellant, instead of the standard gunpowder-like mixture. This stuff gives it an incredibly high acceleration. A model with a Thunderbolt engine and a three-ounce payload was tracked by radar to 4000 feet in less than 7 seconds. These engines are the most powerful available to the hobby today. They are also the most difficult to use; they are for serious modelers only. At the time of this writing they are not widely available because of high shipping costs. FSI also requires a written statement from the user before shipment. Write to Flight Systems, Inc., 9300 East 68th St., Raytown, MO 64133, for full information.

This is a good time to re-emphasize the safety precautions that should always be followed with model rockets. When you receive model rocket engines, inspect them. If there is a deep wrinkle, dent or swelling in the paper casing, *don't fly that engine.* Rocket engines use a propellant that is compressed to form a solid grain. If the grain is cracked, the increased surface area will cause a violent increase in thrust shortly after ignition. Result: catastrophic self-disassembly! Another rule is to always handle these engines with care; if one gets dropped on a concrete floor; you may get the same effect.

If you should have a "catastrophic failure," as the NAR calls it, notify the manufacturer right away. Send full details, and if possible, the engine casing. All of the manufacturers are very good about replacing bad engines; it doesn't happen too often. They need feedback from their customers to help correct minor production problems. Estes is having trouble with its D engine; it occasionally shows tendencies to blow the nozzles. The modeler's best assurance of quality is the NAR's Standards and Testing Committee, which issues the safety certification on each engine. NAR also conducts the Malfunctioning Engine Statistical Survey, known, of course, as MESS. You can write to NAR Headquarters, P.O. Box 725, New Providence, NJ 07974, for MESS report forms and information. Better yet, join

up . . . their monthly magazine carries regular reports on engine testing.

Your first big engines should be flown in kits designed for them. But, of course, the real fun comes with designing your own vehicle. To begin with, keep on mind the general principle of making everything twice as strong; the fins, the engine mount, the recovery system, and the safety precautions. Sheet plywood in just about any thickness is perfectly good. Remember to keep the grain parallel to the leading edge; the fin needs to be strong. As for recovery systems, another rule; forget the old rubber shock cords. A good, cloth-covered elastic cord, like Centuri's, is a must. You can get narrow elastic at a sewing goods store. FSI shock cord is covered with a special flameproof cloth. A standard plastic parachute is fine for most models, but build it very carefully, since the model will be traveling at a much greater velocity when the chute opens. Both Centuri and FSI sell stitched silk hemispherical chutes; you can't go wrong with one of these. For high-altitude models (especially the ones with plywood fins) a streamer is best. Not only does the model come down nearer the launch site, but it's easier to see during descent. Use crepe paper or cloth, about two inches wide and good and strong; at least five feet if you can fit it into the model. One good way of attaching a crepe streamer to a model is by sticking a self-adhesive piece of paper or plastic to one end, punching a small hole in the middle of it, and trying a cord through the hole. The cord is then tied to the screw eye in the nose cone. The adhesive paper serves to prevent, or at least slow down, the tearing of the crepe paper. The engine mount for a big engine is pretty normal, but extra strong; the FSI models use plywood rings for centering and for thrust bulkheads, while the Estes models use thick rings of spiral-wound cardboard. Both should be firmly filleted with a good absorbent glue.

Once you have a large model built, always test it for stability. This applies whether it is a proven kit or a product of your diseased imagination. A rocket's stability in flight depends on how its weight is distributed, and with big engines you have to cope with an increase in weight in the tail (wrong) end. A handy stability test is the "string test;" you tie a string around the model at its center of gravity, so that it balances when supported by the string, and secure it with a small piece of masking tape. Be sure that the model is in flight trim, with the engine, recovery system, and payload, if any, in place. Swing the model around your head (carefully!), nose forward. If it doesn't keep going straight, add weight to the nose and try again. This is as easy with models with a payload section, but in other models it may be necessary to fit trim weights around the screw eye or in a hollowed-out nose cone.

A special note of caution about the FSI F7 engines: Because these engines carry more propellant, they are heavier than average. They also take a lot longer to build up speed. Test an F7 model carefully, and if you find yourself adding much weight to the nose, take off the fins and put on larger ones. Since the F7 delivers less sudden force, the fins don't have to be reinforced as much. F7's can loft payloads; in fact I've flown transmitters and eggs with them. But the bird must be very light, and must be flown on *dead calm* days, or the model will veer off course during that long thrust duration and be over the horizon before the engine even burns out.

The rocket pictured is designed for FSI F7 and F100 engines. RS-2102 is a heavy-duty payloader with a large cargo capacity. It's made from Estes parts, since they are more readily available in hobby stores, but FSI parts can easily be substituted; check the catalogs. The drawing is not to scale, but it shows all the parts. The outer airframe is BT-55. The main body is 18 inches long and the payload section is 5 inches long. Any BT-55 size balsa nose cone can be used; blunt shapes are more efficient. The fins are made from 1/8 inch thick balsa. The exact shape of the fins is not critical, as long as the root edge is at least three inches long and the leading edge at least two inches long. They are glued down with either Wilhold or Titebond, both of which soak into the materials and give an excellent bond. Once the first layer is dry on all fins, run a line of glue along the joint between the fin and the body and smooth it with your finger. Fillet all of the fins this way on both sides. Once this is dry, you can reinforce the fins by gluing down fiberglass or silk cloth along the body/fin joints. Cover this with sanding sealer and sand when you seal the fins before painting. An al-

ternate method is to fillet the fins with epoxy or body putty, but the cloth provides the strongest bond.

The payload section is joined to the main section by an NB-55 nose block, with a large screw eye glued in. Glue the nose block about halfway into the payload section. Use elastic shock cord; a piece about four feet long is sufficient. Cut a piece of card stock, like a filing card, to a rectangle of 1 by 2 inches, and punch three holes in it just larger than the shock cord diameter. Knot one end of the shock cord and thread it through the card as shown in the drawing. This mount is glued into the body with the knotted side up. Glue it far enough down inside the tube so that it doesn't interfere with the nose block when the payload section is attached to the rocket.

The engine mount is made from four RB-5055 centering rings. Glue two of these rings together to form the thrust bulkhead (engine block). These are glued into the body so that the engine will stick out about 1/4 inch from the body. Spread a line of glue around the inside rear of the body, and use an engine casing to push the ring in to the proper distance. If you plan to fly the RS-2102 with E60 engines only, use one of the these engines to push the rings into position. The E60 is the same diameter as the F7 and F100, but shorter, so the engine mount can be easily set up for them.

The other two rings must be hollowed out until they slip over the F engine casing. Cut a small amount of paper from the inside of a ring, and peel it off in a layer. It won't take much, so do it a little at a time, checking the fit as you go. The ring should slide easily over the engine casing, but should not fit too loosely. These two rings are glued into the body behind the engine block, one about halfway down from the block and the other about 1/8 inch from the end of the body tube.

To mount the engine in the rocket before launching, wrap masking tape around the center and the end of the casing. Get a fairly tight fit in the center ring, and concentrate on getting a tight fit in the rear ring.

Remember to stability test the RS-2102 before flying it. When flying, use plenty of recovery wadding. The model can be flown with a parachute for delicate payloads, but a good long streamer of the type described earlier will insure a good change of recovery. Always install the igniter in accordance with the manufacturer's instructions. Standard launchers with an 1/8 inch diameter rod can be used, but it's a good idea to get your hands on a heavy-duty launcher with a 3/16 or 1/4 inch diameter rod. Select launch lugs according to the size rod you intend to use, and glue them in place as shown in the drawing. Any standard electrical system which allows the operator to be at least fifteen feet away from the launcher can be used.

Always be sure to check for any low-flying aircraft before launching any large model rocket. Make sure everyone in the area is paying attention, so that nobody gets surprised; the large engines can be a bit hair-raising until you get used to them.

D, E, and F engines are one of the advanced aspects of model rocketry. They open up new ranges of power and performance, and they can provide some of the most exciting moments in any flying hobby. •

Choppers . . . . . *Continued from page 27*

bility can be high.

(4) To enable model aircraft and helicopter components to be accepted in military and civilian roles, replacement life must be evaluated and operational environmental specifications must be established.

(5) There may be scope for improvement of performance by applying optimisation techniques for specific roles which have not been, so far, considered by aeromodellers and for which the present available market may not provide an adequate return to companies oriented to meet the demands of the hobby fliers.

"The experiments have also confirmed our view of the need to develop low cost instrumentation for augmented stabilisation and navigation aids to enable a mini rotary R.P.V. based on model helicopter technology to be operated at greater ranges and out of sight of the ground based controller. We believe that such a system, with adequate payload and flight duration, would satisfy a potentially large demand which we expect to develop over the next ten years.

"By careful construction, Kavan had made one copy of their kit to demonstrate that a bare weight of down to 4.5 kg could be achieved. This could permit an overall payload (fuel and equipment) of over 2.7kg, with some of the 10cc commercially available model aircraft engines.

"However, the advertised specification for the model quotes:

Rotor	1.6m
Fuselage length:	1.45m
Engine:	10cc
Flight Weight:	4.5 to 5kg (9.9 to 11 lbs)
Payload:	50% flight weight
Control:	4 channel proportional

"Performance and training: Handling the model in forward flight is simple, though requiring more concentration than a normal fixed wing model. Landing and, to a lesser extent, takeoff require more training and acquired skill.

Kavan acknowledges this by producing a rate gyro to monitor yaw rate and feed demands to the yaw control to automatically counter excessive yaw rates which could occur with an untrimmed model in the hands of an unskilled operator.

"They also offer a wider pair of training undercarriage skids to avoid damage in clumsy landings by unskilled operators. We found that inflated float bags attached to the skids were an additional help but, of course this reduces the useful payload.

"To fly the helicopter with maximum payload requires considerable skill and an operator with quick responses. This fact was emphasised when carrying experimental payloads which altered the models CG height and body moments of inertia. Since the ground operator uses model attitude for his control cues, the control 'feel' had to be relearnt as the helicopter body response time constant was changed by adding the payloads. Such factors increased the learning task but did not invalidate the logical training programme recommended by Kavan.

"The greatest skill was required to hover the helicopter over a specific object, particularly at long range. This limits the range of operation unless the operator's visual cues are supplemented by instrumentation.

"Development: We constructed the Kavan kit to check the lifting capability which our construction would achieve. We also studied component strengths, engine and rotor performance with the objective of increasing the payload capability with minimum modification to the kit design and, where possible, using additional Kavan components.

"The increased payload capability was achieved by maximising engine power output, increasing the diameter of the main and tail rotor and changing the rotor blade sections. The effect of these modifications was confirmed on a ground test rig and shown to increase hovering lift by up to 27.7kg., (5.9 lbs).

"To retain mechanical integrity with increased power, various components have been strengthened. These include using a double belt drive in the transmission system, centrifugal clutch modifications, material change for the main rotor drive gear, and modifications to the tail rotor gear box and axle assembly. The tail boom was also extended to maintain clearance between the main and tail rotors.

"For a recent real time surveillance demonstration, a Philips T.V. camera was mounted in the helicopter and was adjustable from vertical to 40° forward looking. The ground equipment include a Sony monitor and a silicon storage unit for instant picture freeze.

"Possible improvements to the system include greater payload capability to cater for instrumentation and navigation equipments, gyro-stabilised optics, and an articulated camera with a motorised zoom lens—and improved autostabilisation."

FINAL APPROACH

Well! That was quite a report wasn't it? B.A.C. says that although the helicopter was chosen at the start as suitable for preliminary research only, it has proved so versatile that they plan to continue experiments for at least an additional two years. I personally forecast that we will have complete autostabilization systems, in addition to altitude-hold capabilities, within those next two years. In the meantime, lets keep on moving ahead with our experiments . . . BCNU next month. ●

Trans. Ign. . . . . *Continued from page 34* join the pieces and then adds Aliphatic resin to bridge the gaps.). While this is drying, thread the mounting hole in the case of the transistor (which is closest to the Base (B) and Emitter (E) leads) using a 10-32 thd tap. Threading this hole allows the Zener Diode (IN2992A) to be used as one mounting bolt for the transistor, while simultaneously making its connection to the collector of the transistor. When the glue joint is dry, attach the transistor to the Right Side piece as shown, using one 6-32 x 3/8 screw and nut on one end and the IN2992A Zener Diode on the other end. For use in wiring later, mark the inside

of the Right Side 'E' and 'B', to conform to the marking on the transistor. A solder type lug should be placed under the head of the screw and the nut. These lugs are used to connect the coil to the collector on the nut side and to the 0.1 mfd 50 volt capacitor on the screw head side. Mount the switch so that its handle moves vertically to actuate the switch.

Cut the Pin Jack Spacer from a piece of hardwood and glue it in place below the Base plate. The pin jack itself can be used to locate and clamp the spacer in place. Next cut the Battery Straps from .010 sheet brass. Tin one side of each strap before assembling to the size AA GE Perma-Cell Rechargeable Nickel Cadium cells. The author found that sanding the electrodes of the cells with 600 grit emery paper before applying soldering paste makes it easy to solder the connections to the cells. The author uses NOKORODE soldering paste to make these joints, but undoubtedly there are others that will work equally well. After cleaning the electrodes, apply solder paste to the surface and pre-tin all connection points. Then solder the two battery straps to the positive electrodes of two of the batteries, through the hole in the strap. *Be careful not to close the vent hole in the electrode.* Group the cells on a flat surface and orient them so that the positive and negative poles are adjacent to each other for soldering the loose end of the battery strap to the negative terminal of the adjacent cell. Sweat solder the straps to the negative terminals. Cut off two short pieces (approx. 3 inches long) of No. 18 insulated wire, one black and one red. Clean the insulation from the wire approximately 3/8 inch and pre-tin the conductor. Solder the black wire to the negative terminal of one end cell and the red wire to the positive terminal of the other end cell. With the cells grouped together on a flat surface, apply a bead of RTV between the sides of the cells to join them together. Set aside until the RTV has cured.

While the soldering iron is still hot, some of the components can be wired together. Solder the 0.1 mfd 50 volt (mud turtle) capacitor between the BASE TERMINAL (B) of the transistor and the solder lug on the screw head side of the Right Side piece. Bend one lead of the 10 ohm 1/2 watt resistor at a right angle close to the resistor body and thread it through the 1/16 diameter hole in the Right Side piece. Cut to length and solder the other lead to the Base Terminal (B) of the transistor. Bend and cut the leads of the 22 ohm 1/2 watt resistor to length and attach it between the Emitter Terminal (E) and Base Terminal (B) of the transistor. Connect a piece of No. 18 insulated red wire between the same terminal of the Zener Diode and the Emitter Terminal (E) of the transistor. Solder a short length (approx. 2 inches) of No. 18 black wire to the solder lug attached to the transistor collector by the nut.

Slide the coil into position through the Right Side piece, slide the Left Side piece over the other end of the coil and locate it such that it constrains the side wise motion of the coil. Clamp the Left Side piece in place and glue it to the Base piece. When this side is firmly attached, solder the 0.1 mfd 250 volt capacitor leads to the coil terminals which extend through the Right Side piece. Next solder the black wire attached to the solder lug (clamped under the nut) to the lower coil terminal.

When the RTV has cured on the battery pack it can be attached under the Base piece. As a precaution against possible arcing from the outer winding of the coil through the Base piece to the grounded battery cases, insert a .007 thick piece of mylar sheet film between the battery and the plywood Base piece. The black wire from the negative terminal of the battery is located through the 1/8 diameter hole in the Base and Right Side pieces. The red wire from the positive terminal of the battery is pushed through the 1/8 diameter hole in the Base piece next to the pin jack. Clamp the battery pack to the Base piece and secure in place, using RTV along the long sides of the cells.

Solder the black wire attached to the negative battery terminal to the upper coil terminal. Solder the red wire attached to the positive battery terminal to the pin jack terminal. Solder a piece of No. 18 insulated red wire from the pin jack to the center terminal of the switch.

Bend one lead of the 10 K ohm 1/2 watt resistor at a right angle to the body and insert it through the 1/16 diameter hole in the Left Side piece. Bend and cut to length the other lead and solder it to the high tension terminal of the coil.

Make the Switch Activator and Switch Handle as shown. Insert the handle into the actuator and secure,

using Hot Stuff. The actuator assembly can now be inserted through the Base piece and over the switch toggle.

Next, lay out the pieces on the brass sheet material to be used in constructing the shielding box. Cut them out and bend to shape as indicated in the drawings. Note that the Front and Back pieces overlap the Center piece at each end to form a double-thickness mounting flange. Apply solder paste to the surfaces to be joined. Clamp together (the author used spring type clothes pins) and apply heat and solder to form a joint. The author uses a 300 watt soldering iron, but a smaller one will also work well. The soldering paste causes the solder to be drawn into the overlapped joints to make a good seal. After the box has been assembled, cut 2 pieces of the 3/16 inch shielding braid to the proper length for your motor installation. Insert one end of each length into the 7/32 diameter holes in the front wall of the shield box. Flare the braid out to form a flange and using solder paste, solder the braid to the inside of the box. Cut out a piece of .007 mylar sheet film to fit inside the box. Cut out holes in the mylar to clear the pin jack hole and switch handle hole located in the bottom of the box. Insert the mylar film in the box and place the circuit assembly on top of it in the box. Check alignment of the pin jack and, freedom of the Switch Handle relative to the holes in the bottom of the box.

Insert two lengths of No. 18 insulated wire one red, one black in the shielding braid on the right side of the front piece. Solder the black wire to the top terminal of the coil (which extends through the Right Side piece and to which the negative lead from the battery is attached). This wire will be grounded at the motor mount, along with the shielding braid, and will be used as the negative terminal for charging the battery. Solder the red wire to the lead of the 10 ohm 1/2 watt resistor located near the upper terminal of the coil (it extends through the 1/16 diameter hole in the Right Side piece). Insulate this solder joint with shrink tubing or tape. This red wire will be connected to the insulated contact of the engine timer points. Approximately one inch from the far end of the shielding braid, part the weave and pull the wires through the opening. Twist the one inch length of the braid and solder it into a crimp type lug. Cut the black wire to the same length as the braid and solder into a crimp type lug. Allow additional length of the red wire so that it will reach the insulated timer point, cut and solder it to a crimp type lug.

Two designs of a Shielded Connector have been included to accommodate either the 3/8 or 1/4 spark plug your specific engine may use. Some modification may still be required since there are several different Hex bases used on the two sizes of spark plugs. Select the one suitable for your specific spark plug and construct the parts. Slide the End Washer over the shielding braid for the high tension lead. Flare the braid out to form a flange and using solder paste, solder the braid to the End Washer. Solder the Contact Washer and Spring Contact to the high tension wire and slide the Insulator over the wire. Slide the Cylindrical Shield over the Insulator and thread the high tension wire through the shielding braid to the inside of the shielding box Clamp the End Washer to the Cylindrical Shield and solder together.

Pull the high tension lead through the shielding braid so that the Contact Washer and Spring Contact seat in the well in the Insulator. Inside the box, solder the high tension lead to the free end of the 10 k ohm 1/2 watt resistor and insulate with the shrink tubing or tape.

Charge the batteries for 16 hours at 50 milliamps of current. The pin jack should be connected to the plus (+) and the black timer point wire to the minus (-). Push a spark plug into the Shielded Connector, connect the lugs of the black wire and shield braid together. Turn on the switch (pull it out). Quickly touch and separate the lugs attached to the black wire and red wires and observe the spark which should jump across the spark plug gap. If no spark occurs recheck the circuit connections.

Cut a piece of .007 mylar sheet to fit inside the top cover and insert it in the cover. Push the cover over the top of the box. The shorter wall of the cover is at the front of the box to allow clearance for the wires extending from the front. Using adhesive backed aluminum tape, seal the cover to the shielding box. Make sure there are no gaps in the shielding.

When the circuit operates correctly, install the unit in your airplane. Be sure that the black wire and shielding braid are both grounded to the motor mounting flange at the same point (the same screw). Try operating the motor with the radio system in operation. It is suggested that a range check be made with and without the engine running to determine whether or not the ignition noise is interfering with radio system operation at very low transmitter signal levels.

When starting your engine you must be certain that you do not leave the timer points closed for any length of time, otherwise you will run the battery down. The ignition coil typically draws between 3 and 6 amps, depending on the type of coil. Since the battery has a 550 Mah rating, it will run down in less than 10 minutes if the points are left closed. This will occur normally in flight but could occur during starting if one is not careful. As mentioned previously,

other improved systems are now being flight tested, one of the improvements eliminates this possibility. Should the points be closed after the motor stops while the plane is airborne, so that the batteries are discharged, it is possible to recharge them quickly at the field. The author has done this several times using a charging system normally used for electric airplanes. *(A shut-off switch could be operated by, say, full down elevator, once the engine stops, thus avoiding battery discharge during a long thermal flight. wcn)*

Several of these systems described in this article have been operated for approximately a year without observing any interference problems. If care is taken in the construction of the system, it should provide you with the thrill of flying your favorite Old Timer airplane/gasoline engine combination without having to chase it, a la free flight.

PARTS LIST

RAW MATERIALS

1 PC—1-13/16 x 2-7/8 x 1/16 Plywood Sheet-Right Side
1 PC—1-3/16 x 1-3/8 x 1/16 Plywood Sheet-Left Side
1 PC—2-11/16 x 2-7/8 x 1/16 Plywood Sheet-Base
1 PC—3/8 x 1/2 x 1/2 Hardwood (Basswood, Pine, Maple etc.) Pine Jack Spacer
2 Pcs.—1/4 x 3/4 x .010 Sheet Brass (K&S No. 251)-Battery Strap
1 PC—No. 18 Insulated Black Wire-2 feet long-Wiring
1 PC—No. 18 Insulated Red Wire-2 feet long-Wiring
1 Tube—Dow Corning Silastic RTV 732 or equivalent
1 PC—2 x 1-11/16 x .007 Mylar Sheet or similar Insulation-Battery Insulator
1 PC—3/8 x 1/2 x 7/8 Hardwood (Basswood, Pine, Maple etc.)-Switch Actuator
1 PC—1/8 Diameter Fiberglass Rod or Wooden Dowel-Switch Handle
2 Pcs.—3-1/8 x 2-5/32 x .010 Sheet Brass (K&S No. 251)-Front & Back, Shielding Box
1 PC—3-3/8 x 3-9/32 x .005 Sheet Brass (K&S No. 250) Cover, Shielding Box
1 PC—3-17/32 x 6-7/16 x .010 Sheet Brass (K&S No. 251) Center, Shielding Box
2 Pcs.—3/16 Braided Cable Shielding-1 foot long-High Tension & Point Wire Shielding
2 Pcs.—2-11/16 x 2-7/8 x .007 Mylar or similar Insulation-Insulators, Top & Bottom
1 PC—1/4 Dia. x .016 Sheet Brass (K&S No. 231)-Contact Washer
1 PC—3/16 Dia. x 3/16 Lg. Spring-Spring Contact, Spark Plug Connector
1 PC—20KV Insulated high tension wire, flexible-1 foot long-Columbia Electronic Cables No. 415 or equivalent-High Tension Lead
As Required—Adhesive backed aluminum tape-1 inch wide-Scotch brand tapes-3M Co.

FOR 1/4 SPARK PLUGS

1 PC—.016 x 7/16 Dia. Brass Washer (Make from K&S No. 231) End Washer, Spark Plug Connector
1 PC—.400 Dia. x 3/4 Plastic Rod (Delrin, Fiberglass, Nylon) Insulator, Spark Plug Connector
1 PC—7/16 O.D. x 1 Brass Tube (K&S No. 137)-Shielding, Spark Plug Connector

FOR 3/8 SPARK PLUGS

1 PC—.016 x 19/32 Dia. Brass Washer (Make from K&S No. 233) End Washer, Spark Plug Connector
1 PC—9/16 Dia. x 15/16 Plastic Red (Delrin, Fiberglass, Nylon) Insulator, Spark Plug Connector
1 PC—19/32 O.D. x 1-7/32 Brass Tube (K&S No. 142) Shielding Spark Plug Connector

COMPONENTS

1 PC—Transistor-Motorola HEP 57003
1 PC—Zener Diode-Motorola IN2992A
1 PC—Screw 6-32 x 3/8 Pan Head Machine Screw
1 PC—Hex Nut 6-32
2 Pcs.—Solder Lug to fit 6-32 Screw
1 PC—Switch C&K 7101 (SPDT)

1 PC—Pin Jack
3 Pcs.—G.E. Perma Cell Size AA Rechargeable Batteries (Ni-Cads)
1 PC—C1 Capacitor 0.1 mfd 50 Volt (Mud Turtle type)
1 PC—R1 Resistor fixed carbon-10 OHM 1/2 Watt (5% Preferred) 10% acceptable Radio Shack No. 271-001
1 PC—R2 Resistor fixed carbon-22 OHM 1/2 Watt 10% Radio Shack No. 271-005
1 PC—Ignition Coil-the Aero Spark Super Coil and Modelectric Coil will fit the dimensions given on the parts drawings (slight elongation of the 3/16 Diameter terminal clearance holes may be necessary with the Aero Spark Coil) Other coils may require considerable dimensional changes and may draw higher current resulting in shorter battery life.
1 PC—C2 Capacitor 0.1 mfd 250 Volt Radio Shack No. 272-1053
1 PC—R3 Resistor, fixed carbon-10 KOHM 1/2 Watt-10% Radio Shack
2 Pcs.—Crimp type insulated lug to fit engine mount screw
1 PC—Crimp type uninsulated lug to fit engine timing point stud •

C/L ..... *Continued from page 37*

This guarantees a clean shut-off and certainly cuts down on those zonkers lean runs that result when a shut-off doesn't pinch both lines tightly. Burndowns aren't fun! Always be sure your shut-off really does . . . shut-off.

The buttons on top of the shut-off wire are just the heads of thumb-tacks. One is drilled in the center with a 1/16 drill and soldered to the wire, rounded face down. This keeps the actuating rod from binding on the wire or slipping off of it. The tack on the top of the wire is nice, as I can push on a fairly large and smooth surface when resetting the shut-off.

Finally, we see the whole mess lashed to the plane. Note that shut-off is in the open position. When actuating rod is pushed forward, it shoves the wire off the brass plate, the wire pinches the fuel feed and pressure lines, and our screaming motor suddenly goes quiet.

As pictured, the position of the actuating rod corresponds to neutral elevator. Note that rod only has a short ways to go before actuating shut-off, and quite a bit of travel is available for up-elevator control.

While I am not claiming that this shut-off is the ultimate, it is very easy to whack out with ordinary hand tools, is easy to get set-up and, above all, is reliable as a stone. Ron Scoones flew the plane pictured for me for three years. We never had a failure of the shut-off and Ron never once hit the shut-off by mistake or got surprised when a quick shot of down-elevator failed to result in a gliding model. Of course, Ron is a pretty good Racing flier, but even good fliers need dead-reliable equipment.

Next item up is a look at John Penhallow's well-done "Anatomy of a Scale Racer" drawing. Although the drawing is a little out-of-date, by John's own admission, it is full of construction hints that should help you to build a decent Badyear.

There are, however, several items that need up-dating. As shown, the motor mounts are too short. I make mine about 6 inches long. Profile fuselages are notoriously weak, and we need all the rigidity in the nose area we can get, particularly with the high-revvin' engines currently in use.

The lash-up shown for the landing gear isn't adequate. I've tried putting my gear on that way and had nothing but problems. The 1/8 ID brass tube gives way and your wheels end up tracking really weird designs down the pits. The best gear I've seen is Glenn Lee's titanium items, but that is the subject of a future column. If you must use piano wire for the gear, attach it as shown in the Lil' Rebel Badyear article published in AAM about three years ago. Next month I'll try to have a pic of the gear on my old plane.

The method shown for construction of the stab is OK, but I prefer to use 1/8 basswood for the stab, elevator and rud-

der. This eliminates the need for attaching spruce spars to the stab and elevator and also gives you a much stronger rudder. The 1/16 ply doublers are OK, but I prefer to use 3/32 to give as much rigidity as possible (without excess weight) to the nose of the plane.

John's push-rod guide works good, I have used just such a set-up on my previous Badyears. Also, the shut-off looks pretty good.

Take a good look at the "Anatomy" drawings. All the basics are there to get you started in building a Badyear. Many thanks to John for letting us use his drawing.

My Falcon Spl. No. 10 is about ready for paint right now. Next month we'll look at this model in the construction photos I have taken.

Several months ago I read in Phill Bussell's Speed column that a Speed organization was being formed. I wrote to Phill asking for info and offering to help out by publicizing the new organization in this column. Never did get an answer. Strange, to say the least. If anybody out there knows anything about the Speed organization, how about writing to me letting me know what's going on and how I can help? A letter takes only a few minutes to write, after all, and I suppose that the Speed fliers would welcome the publicity as their event is hardly a "biggie" any more.

Since Phil Granderson quit writing R&R for MAN, little has been heard from him in the national magazines. I can guarantee that Phil is still up to his old tricks! The letter below was written to the leaders of MACA, and in it, Phil brings up some very good points.

"Congratulations, gentlemen, on a job well-done. In fact, when it comes to an overall contribution to the advancement of Combat, yours is as significant as the stabilator. You have successfully done what seemed to be an impossible task. As MACA leaders you are responsible for assimilating the needs and wants of competitive Combat fliers and translating them to political jargon and maneuvering that even the most moronic members of AMA's bureaucracy can understand! Everyone who has competed in Combat in recent years, whether they are MACA members or not, owes you gentlemen a debt of gratitude. Having been involved in the early development of MACA (to a much lesser degree than any of you) I realize the tremendous effort and dedication that is necessary to keep things moving forward. Thanks! and here's my five bucks for another year.

"In your September newsletter, Gary James posed the question 'Do we need Slow Combat?' I THINK WE DO!!! Back in '69 and '70, when Slow Combat was gaining momentum, those of us who flew Fast thought it was pretty silly. In fact, it *was* pretty silly! Due to all kinds of dumb and inconsistent rules, Slow Combat had a long way to go. Most of the entries were beginners who had seen Fast Combat and figured the easiest way to get started was with their Ringmasters, or Shoestrings, or whatevers. Since experienced Combat fliers shunned the event, aircraft design and development was greatly hindered. All these factors added up to the biggest comedy event at any contest.

"Well, it's 1976 and things have changed. Slow Combat has graduated from a struggling event to a promient figure at C/L contests. The event has several advantages, in fact I see it as the most important event at a contest when it comes to the growth of Combat in general!!!

"Contests serve two purposes: First they allow model builders to come together and gain knowledge and status from each other. I don't feel this is as important as the other, or second function of contests; to attract spectators, amongst which are the future Combat stars of the world.

"Suppose you've never seen Combat flown before. Suppose you've never seen a C/L model fly other than a plastic RTF. Many of these spectators haven't. Now, since our event is the most exciting, we usually draw the biggest crowds. Let's compare Fast and Slow Combat through the eyes of a guy who knows very little about either. He asks questions like, how much does it cost, how fast does it go, how long does it take to build, etc. He then takes a look at Fast Combat. There's a plane that looks easy to build; just a wing with a tail hanging on two sticks. He looks over in the corner and watches 'Show Biz Sam' put in a test flight. Man is he impressed!! It's the coolest thing he's ever seen. The only problem is he can't see the plane too well, but old 'Show Biz' is really living up to his name . . . reversed wing-overs a foot off the ground, squares, triangles, why he's even looking at the ground while he's doing all those neat tricks! Our spectator can't wait 'till the dog fights start (Combat to us). Fifteen minutes later he sees 'Show Biz' and another guy standing together in the center of the circle. A judge shouts 5-4-3-2-1-GO!! Two screaming 35's roar to life and our spectator is chewing on his elbows in anticipation of his first Combat orgasm!! They're off! For the next 20 seconds he catches glimpses of two streaks in the sky. He doesn't quite understand what's going on but it sure is exciting. Then he hears a loud but rather dull *thunk*, followed by a shower of balsa chips and plastic covering. He sees 'Show Biz' (his hero) turn to his opponent, shake hands and say, 'Great match!' Now, our spectator, being a basically ignorant creature, figures he must have missed something, so he hangs around for another couple of hours and witnesses the destruction of hundreds of dollars worth of airplanes and finally he just gives up and goes over to watch the beautiful Stunt fliers in their white suits with matching airplanes. You may think I'm exagerat-

ing, but how many times have you gone to a contest where half of the matches end in a line tangle, collision and/or crash? I've been flying Combat for eight years and this is true of almost every contest I've been to. It's neat to watch, but not too encouraging to a new guy.

"Now let's take a look at Slow Combat. He sees airplanes that he can identify with. He sees 'Show Biz' and his opponent put on a full five minutes show that is much easier to follow. He sees cuts being made, and best of all, he's excited. He sees things happen at a pace slow enough for him to understand, consequently his confidence is enhanced. He thinks he can do it, he wants to do it. BINGO!!! We've got us a new Combat flier.

"This is the main reason we need Slow Combat, but there's more. If you put a beginner with an expert in Slow, he will probably get his clock cleaned, but he'll at least have more of an opportunity to see why and thus become more proficient. You put two experts together and they usually put on one helluva show in addition to getting some very good practice. Another reason is . . . it's fun!! And even relaxing!

"We need Slow Combat at all contests because all contests have spectators and from these spectators come Combat fliers. That includes the NATS. Slow Combat is indeed a beginner's event. It is also (and I use the term loosely) an expert's event. You Fast guys who haven't tried it should give it an honest effort. Build a decent plane and try it. You'll find the climax may not be as intense but it sure lasts a lot longer."

In case you're not with it yet, the MACA organization Phil mentions is the Miniature Aircraft Combat Association. It is, as Phil says, one of the very best things to happen to Combat for some time. If you are interested in Combat, you should join MACA. For a year's memberhip, send five bucks to: Tom Southern, 2207 Paul, Longview, Texas 75601. And then stand back! You'll be receiving the MACA newsletter, now edited by Ben Sasnett and Patty Sak (of "Patty's Pinkie" fame).

Slow (?) Rat???? Just got a note from Kilsdonk and he says he is running flat 15's (about 120 mph) with his new Slow Rats! Motors being used are .40's reworked to .36 displacement. John says that he really isn't in favor of this kind of speed (and the effort required to make the motors), but that the rules allow for it and he is out to win. John expects a lot of negative reaction to 120 plus Slow Rats. That's OK with me (and John too, probably) as negative reaction is lots better than no reaction at all. Maybe when the air clears at the end of the upcoming racing season, the RAC and the CLCB will have received enough input from people like yourself to come up with whatever kind of slow, or sport racing event you want.

One of the very best contests in the N.W. (or anywhere, for that matter) is held every year in Eugene, Ore. This is the annual N.W. Regionals, a two day contest, and it is always held on Memorial Day weekend. The Eugene Prop Spinners put on this contest, but many of us help out by judging whenever possible, so we look at it as a group effort rather than just one club's contest, although the Eugene club does do most of the work. Anyway, all of us here in the N.W. are inviting those who can make it to come on up and join us in a contest that features good competition and good times.

Most AMA events are run at the Regionals; Speed, Racing, Combat, Carrier, Scale, and Stunt so there are events for everybody. The Regionals are held at the Prop Spinners flying site (one paved circle, one closely mowed grass Stunt circle, a circle with deck for Carrier, and two circles for Combat) which is on the site of the Eugene airport. So if you would like to fly in for the Regionals, you can get off the plane, walk about one-eighth of a mile and be right at the contest. Flying in complicates transporting the models, but we can take care of that, too. If you want, we can make arrangements to get your stuff to the field if you ship it up (by UPS, preferrably) to one of the guys in Eugene.

Lots going on at a N.W. Regionals. Here is how the weekend went for many of us last year. Pulled in on Friday, had camp set up by noon. Test-flying most of the afternoon, flew .049 Combat in the evening. Bench-racing until late Friday night. Saturday is mostly Racing, lots to do. Saturday evening more test-flying and some pretty serious .049 Combat flying to get warmed-up for Sunday. Listened to Rich "von" Lopez tell us about the "really good" California Combat fliers who were coming up. Told Rich to not be over-confident. More bench-racing Saturday night, plus a little tavern-hopping. Sunday, lots of Speed flights (just love those shaft-runs!), Scale and Stunt are flown but Combat dominates Sunday's events.

Pretty good matches in Slow Combat, one California flier is beating everybody. Drew Lance III, from 'frisco' is in the final match for first and second. Enough is enough and I figured second place was good enough for Lance. I beat him. Let's fly some AMA Combat. Drew got revenge, really put it to me in Fast, he's pretty good. Oh well, it's double elimination. Too bad that I lost my next match to Tom Tucker, an old rival. Put the planes away and helped pit. Gary Stevens is winning every match with a kill, he is really gettin' it on. In one match, Gary runs out of fuel with five cuts to zip, in Gary's favor. Goes right back up and comes through with another kill and against a pretty good Combat flier, Gordon Delaney, of Salt Lake City. Lots of really good, clean matches. Double-elimination, 32 entries in Fast and only a very few mid-airs. Finally down to the finals. All the guys from Cal are spectators as the best in the N.W. (all from Seattle) fight it out for first through fourth. Marty Phillips takes it all, Gary ends up second. Clapped our way through trophy presentation (Becky Snyder, Sam's little Speed-flying girl, gets cuter every year). Said goodbye to Rich, told him to be sure to practice more next year. Rich took it well and left . . . Humbly. More .049 Combat (but not much) Sunday evening, lots of well-phrased excuses

flowing Sunday night. Up early Monday morning for a little more flying, believe it or not! Break camp around noon and truck on home.

The Regionals is really great. See you there, I hope. Rich Lopez is coming back. Hope I don't have to fly him after what I just did to him!

Remember the N.W. Regionals is the end of this month. If you can, make it on up. For entry forms and full info on the Regionals, write to: Mike Hazel, 738 West "M" Street, Springfield, Ore. 97477.

The column is a little shorter than usual this month *(Oh? wcn)* so Unca' Bill can fit in all the pics and Penhallow's "Anatomy" drawing. See ya next month with more on Project Goodyear and other assorted trivia. •

Plug Sparks . . . *Continued from page 31*

amine and witness all flights. The models are judged for takeoff, general flight stability, glide, and finally, the landing. Before flying, all models are judged for craftsmanship and fidelity to the original. Almost like a flying scale event!

The winner of the event was adjudged to be Mike Beach, with his Baby Cyclone powered Bowden "Mouse." Carter states the ship flew nice and slow, was quite stable, and of outstanding craftsmanship. The latter was quite a far cry from the original Bowden models, as Col. C.E. Bowden's were regarded as "Chopped out with a hatchet." In defense, it must be stated that the Colonel transported his models halfway around the world from base to base. This, of course, required the models to be repaired numerous times.

Joe further sez it was simply a great day for England, with the temperatures in the nineties (Don't find them like that very often!). With everyone complaining about the heat, Mike Beach had the foresight to come dressed like Col. Bowden, in his tropical uniform. Got lucky that time!

For those modelers complaining about fields, Carter notes that the cost of entering the field was one pound ($2.20). In spite of this tariff, numerous spectators lined the fences. Just goes to prove in this model game, if you put on a good show with proper preparation, people are interested in model flying, come to see the show, and leave with a good impression.

COOL CATS

Received a nice note from Walter Johnson (no, not the Washington Senator pitcher!) giving the columnist the lowdown on the Strat-O-Bats Misery Meet, held February 1 on a foggy day with the high at 37 degrees. Noted was ice forming on the wings of some models! Whew! that is misery!

With the ceiling varying from 150 to 400 feet, flying was extremely restricted. Trust Don Dodd and Tom Cope to be out there, flying their New Rulers. However, Tom, who was anxious to show that his New Ruler flew so good as the one by Don Dodd, forgot to trip his shutoff timer. Wide open, the climb was great, but the motor run was 3 minutes, 23 seconds!

With horizontal visibility limited to 600-700 feet, the model simply disappeared visually and sonically. The next week, the gang hunted to no avail. Luckily, a man and his son stumbled onto it the following Sunday, 3-1/2 miles away in the opposite direction of ground drift! It pays to look both ways, men!

HENRY STRUCK EVENT

Well, it was only a matter of time until someone thought of a Henry Struck Event (Hank has published some 66 designs!), and you could trust the Connecticut boys to come up with this unusual event.

According to George Armstead, Henry Struck has been prevailed on to set optimum times for all of the published designs conforming to SAM rules. Hank will dope out the event score, based on the percentage of time attained. Right now the Connecticut boys have set a date of October 17 for the meet.

Best part of all is that anyone can participate, as the contest is open to mail entires. Just as soon as we get more specific information on this most interesting contest, we'll clue you in. Meanwhile, if you can't wait, write to George Armstead, Jr. at 89 Harvest Lane, Glastonbury, Connecticut, 06033. This may also help promote publicity to get Henry Struck in the Hall of Fame. Now there is a worthy cause!

O/T FLYING SCALE, RADIO ASSIST

As part of the SAM schedule of events at the National Championships, the free flight side features a flying scale event that is very similar to the Unlimited Event, except there is no limit on motor run. Before you, the reader, fall over in a dead faint, you must remember most flying scalers are poor performers, and a long motor run doesn't put them very high.

Rather quietly, of late, Hurst Bowers (who owns Flyline Models) has been running numerous fly-in and competition get-togethers in the Virginia-Maryland area. These meets are stricly for fun and have been well attended to the point that Bowers feels there is a definite place for this type of model in the Old Timer game.

At present, Bowers has no set rules, but all have been using the Flyline kits, or models of similar size. Powered with .049 Tee Dee engines, the various designs, such as Stearman C3, Bellanca, Curtiss Robin, et al, have proven to be

very smooth and relaxing flyers.

This columnist is quite enthused over the possibility of a flying scale R/C assist event, and has ordered up several of the Flyline models, i.e., the General Aristocrat and Velie Monocoupe (these look like the best competition flyers to the writer). Incidentally, if you haven't seen the ads in MODEL BUILDER, you can contact Flyline Models at 10643 Ashby Place, Fairfax, Va. 22030.

Although flying scales can end up as a real nit-picking event, the writer would like to suggest for starters the following rules (we are hopeful people will write so as to gain an idea of what is really wanted!)

(1) Maximum displacement shall be .049 cu. in.

(2) Models shal not exceed 48 inch wingspan.

(3) All models shall R.O.G., *no hand launching.*

(4) Fuel tanks shall be limited to one ounce.

(5) No limit on attempts (attempt defined as any flight under 30 seconds). Only two official flights are allowed. The one highest flight counts in scoring.

(6) All models shall land within 300 feet of the takeoff area.

(7) A flying scale shall be one that has been built from a published or kitted plan to exact size as shown. Original plans will be permitted only upon proof of scale. Any obvious disproportionate size of landing gear, tails, etc. in any of the above cases will be in the Contest Director's judgement, sufficient cause for disqualification.

Well, that last rule ought to stir up some controversy. Remember, flying scalers, this is supposed to be a fun *fly* (emphasis on fly!) event. The writer will go into a huddle with Hurst to see what changes should be made (if any) prior to submitting them to the SAM membership for approval. Let's hear from you!

CUNNINGHAM ON R/C

No, it's not RCM, but Chuck Cunningham did write to say he has just finished the Powerhouse and the O/T bug has bit him real good.

Along with Helmer Johnson, his old flying partner (or is it "podner" in Texas?), Chuck went the boys one better. Helmer took his tape recorders on the field with 1939 type jazz music taped on it. Talk about getting the right mood and background for flying old timers! Wow!

Cunningham ruefully remarks (after a real good time) that he wishes he could do something about that gray in the hair and that lead in you-know-where. Wouldn't that be something!

SPIELMAKER 60

A coupla columns ago, we mentioned that Karl Spielmaker was manufacturing (in limited quantities) the Golden Eagle engine, nominally a .60 displacement motor.

Spielmaker writes to say the Golden Eagle ain't so hot as it only won third in its event (Hm-m?). But . . . the Speilmaker 60 is going to be a goodie with a single-piece head. This system is similar to the Avion cylinder, where the cylinder head in machined on top of the cylinder. The motor features a front rotary intake and is estimated to turn a 13/6 prop at 8000 rpm (Not bad!)

The engine is completely made of sand cast parts, with a total all-up weight of 11 ounces. The motor will sell for 75 dollars (don't faint!), in the box, with a decal yet to be designed. If interested, write to Karl Spielmaker at 3153 Burlingame, S.W., Wyoming, Michigan 49509.

NATS COMPRESSED AIR EVENT

As announced by Tim Banaszak, SAM Secty-Treasurer, a compressed air event was staged last year at the Lake Charles Nationals. The disappointing turnout has failed to deter Tim's enthusiasm, and he has scheduled another event for the SAM Champs at the Nationals being held this year at Wright-Patterson, Dayton, Ohio.

To really stir up interest this time, Spielmaker Motors has offered the following prizes; 1st place, $25.00 2nd place, $15.00; and third place gets $10.00. That ought to scare a few compressed air models out of the woods.

AMPS BOWL

Sounds like a football game, huh? That's what the Antique Model Plane Society (AMPS) of Northern California called their most unusual O/T Contest. Staged on February 15 at the Montevideo Road Field in San Ramon Valley, it featured a contest where any old timer, rubber or gas, could be entered. The object of the event was to get as much time in the air as possible during the alloted half hour.

Flown in rounds, the start of flying was signaled by head-timer Everett Mason's car horn. With a brisk breeze blowing, the biggest problem was the retreival of the model, as more than one ship was lost during the round, and not found until time had run out.

Two rounds were flown, with Jim Perssons and Ken McBride winning their respective rounds. Rather than have a fly-off, Jim conceded to his younger opponent and the AMPS Perpetual Bowl (trophy?) was awarded to Ken McBride. Based on this successful meet, New Year's Day 1977 has been the scheduled date of next year's Bowl Meet.

W.A.F.F.C.

Not too many people know it, but WAM (Western Associated Modelers), a large association of controline models, does sponsor free flight events primarily, for the juniors. The Western Associated Free Flight Council (not to be confused with the NCFFC) staged contests in the following categories: Hand launched glider, Rubber Scale, Delta Dart, AMA Cub, and commerical rubber.

Best part about these meets is that you don't have to belong to WAM to participate. So if you want to introduce that young one of yours to the art of flying models, try these fun get-togethers.

For further information, the WAM office should be contacted: Myrtle Coad, Route A, Box 19, Lower Lake, Ca 95457. Or if you want to call "Mom", try (707) 994-6643 after seven p.m.

TREXLER AIR WHEELS,
40th YEAR ANNIVERSARY

After numerous inquiries from the readers, the writer finally took it upon himself to write the Trexler Balloon Wheel Co. to inquire on the availability of their wheels; in particular the No. 11-G wheels. These wheels are popularly used in the larger models such as PB-2, Lanzo, etc.

Back came the nicest letter from W.H. Trexler, Sr., who states that the wheels have always been in production. Accompanying the letter was one pair of 11-G wheels along with one air pump. Bet half of you guys didn't know Trexler made an air pump for their wheels!

To purchase wheels, they can be ordered directly from Trexler Balloon Wheels Co. at 1008 West Riddle Avenue, Ravenna, Ohio, 44266 or from their jobbers; Royal Products or Sig Manufacturing; so if your hobby dealer doesn't have the wheels, you can either tell him where to get them for you or you can write direct. To say the least, the writer is delighted to pass on this information to the readers and to say congratulations on Trexler's 40th year of production!

CONTEST ANNOUNCEMENTS

Fred Collins reports that SAM 19, "Old Time Model Wings" (the original 16MAA Unit No. 1) will stage their Third Annual Old Timer F/F Reunion on May 30 at the Keystone Clippers R/C Field. The "Gasoline Alley" gang invite one and all to come and have a good session of flying and gabbing.

* * *

The AMPS of Northern California are really coming to life this year after such a successful last year. Jim Persson advises the following remaining schedule for 1976 is in effect:

2 May	AMPS, Sacramento
6 June	WAFFC, San Ramon
13 June	AMPS, San Ramon
11 July	AMPS, San Ramon
18 July	WAFFC, San Ramon
8 Aug.	WAFFC, San Ramon
21-22 Aug.	NORTH-SOUTH, Taft
19 Sept.	WAFFC, San Ramon
24 Sept.	WAFFC, San Ramon

That ought to keep the boys busy!

SPOT SHOTS

That effervescent Randy Carmen is at it again! Just received the latest SPOT (Society for the Preservation of Old Timers) announcement in time to make this month's column. The New Jersey boys won't be able to complain about enough advance notice.

Based on its very successful first contest, the SPOT Club announces its second annual will be held on Sunday, August 15, 10 to 5 p.m. at the North Branch Park, Somerset County, New Jersey. Events will be Classes A, B, and C; Antique, and Special Fuel Allotment.

As per last year, the SPOT Club holds these meets in the town, therefore mufflers are required on glow engines larger than .10 cu. in. displacement. In addition, the ladies will again provide the food and entertainment. For further information on this meet, write Howard Carmen at 20 Maple Avenue, Hightstown, N.J. 08520, or James Clark, the Contest Director, 1127 Denmark Road, Plainsfield, New Jersey 07062. This is a goodie, don't miss it!

FREE FLIGHT FOREVER

There is always a friendly (?) rivalry between the free flight old timers and the relatively new-comers to the old timers game, the radio assist boys. This was graphically illustrated at a recent SCAMPS meeting where the Annual SCAMPS Texaco contest was being discussed.

Al Hellman suggested that some of the fellows should be allowed to fly their R/C models (not entered, of course) in this normally free flight event. Before Sal Taibi, the Contest Director of this event, could express an opinion, Gene Wallock jumped up and said, "That would be like asking Sal to salute the French flag!"

After a moment of silence while Sal mulled this over, he replied, "Ya know, I believe I would rather salute the French flag." Haw! Old Free Flighters never die, they just get carried away! •

R/C Auto . . . . *Continued from page 41*

and give more understeer. Softer rubber increases front traction but also has much higher tire wear. Traction also improves with tire width. More rubber on the track means a lighter unit load on the rubber, and usually, with the softer tires anyway, more front cornering force. My cars usually work well with 1 inch wide medium hard front tires. To get more front traction I have 1-1/2 inches wide medium hard front tires as well as 1-1/2 inch wide soft tires. To decrease traction I use 1 inch wide hard fronts or 1 inch wide rock-hards (old or aged and dried hard tires). Hard front tires are an effective way to control low speed power oversteer.

CASTER: Most R/C cars have some built-in geometric caster with the front axle centerline, to the rear of the king-pin location (giving some positive caster). But here I am talking about angular caster. Positive angular caster occurs

when the top of the kingpin is angled to the rear. Normally I run about 10° to 15° positive caster. Positive caster usually helps low speed straight line stability during acceleration and can be used to help power oversteer problems, but it is not as effective as low traction front tires. When the kingpin axis is on the inside 24%-30% of the tire contact patch, increasing angular caster will also increase front cornering force, which is most noticeable at high speed. However, besides improving front cornering force it also decreases the rear cornering force slightly . . . but since aerodynamic forces are high, the change in rear force may not be apparent. If the kingpin axis is pretty well centered on the tire contact patch, laterally, then negative camber will improve front cornering force. Negative kingpin camber occurs when the top part of the kingpin is closer to the car centerline than the lower part. Most of the cars that I have run have the kingpin axis at about the 20% point (inside edge of tire to the kingpin centerline), so I use caster to help high speed turning. Sometimes I have gone to as much as 20° caster, maybe a little more. The high positive angular caster, or geometric caster and negative camber, moves the front wheel on the inside of the turn downward. Therefore there is more force on the inside front wheel, balancing the forces more and improving overall front cornering force.

TOE-IN: To have the greatest front tire traction, toe-in should be held to about 2°-5°. With the proper amount of Ackerman action, the two front tires will work together and give maximum front cornering forces. Some toe-in is required because Ackerman action (inside wheel turning more than the outside), is not perfect for all turning radiuses, and the inside wheel turning progressively gets too great. Toe-in shifts the initial point a little so that the relative turning of the two wheels are correct to a smaller turn radius in each direction, hence the front tires work together over a greater range. Normally, the only time I use toe-in (toe-out) adjustment is: 1) to get a little better high speed-large radius turning, when I have high speed understeer, and 2) to promote inside tire wear to keep individual tire loads more uniform when tire wear can be a problem. In both cases, I decrease toe-in and sometimes go to a little toe-out to force the inside wheel to do more work. Excessive toe-in (10°-15°) gives some understeer and outside tire wear . . . because the outside wheel does *all* the work . . . and excessive toe-out gives some oversteer and promotes inside tire wear. Some people believe in using excessive toe-in to give car stability, or understeer, by forcing the tires to slip all the time and the outside tire to do all the turning. I believe in keeping good front traction for the highest cornering capability, and getting the car stability in other ways. The only exception to this might be on a very slippery, dusty, track where I might add toe-in to control severe power oversteer. As the track gets better it is pretty easy to remove the toe-in again.

There are a few other adjustments that I use to tune a car, however, I find I don't use these very often. But on initial car set-up, you may find that these variables are useful to get the car adjusted to your personal desires. I think it's also a good idea to make some of these adjustments at some time just to see what they can do.

CLUTCH SLIP: Clutch slip is a very effective way to control low speed power oversteer. The more the clutch slips, the more the low speed power oversteer is reduced. Clutch slip can be increased by reducing the clutch shoe weight, increasing the (holding or return) spring force, or reducing the shoe contact area. Materials of the shoe, clutch, or liner could be changed, but you should probably stick with what the car-maker recommends. Low speed power oversteer can also be corrected by a well-trained throttle finger . . . but I personally like to put most of the low speed power oversteer correction in the clutch. That way I can concentrate on the steering. On a race course with reasonably good traction, the clutch slip should be set so that you can punch full throttle coming out of most corners and not spin out.

BODY: The body shape can make considerable differences in the handling of a car at high speed. Some have considerably more front aerodynamic force than others. My personal preferences are the Porsche 917-10 and Porsche 917-30KL. The 917-10 seems to have a little more front downforce and the 917-30KL a little lower drag. To get more front downforce, I think you could try an Alfa, or for lower drag, a Lola. And there are also numerous others between these.

WEIGHT: Normally I try to run my cars as light as possible. Usually my formula cars come in at about 5 lb. 1 oz. to 5 lb. 2 oz., and the Sports cars around 5 lb. 4 oz., or a little heavier. When traction is good, the light car has the cornering force edge. But when the traction is down because the track is dusty or slimey, weight will get the tires over the dust to give better traction, and possibly promotes tire wear to keep them cleaner on a slimey track. You have to add at least 8 oz. or so of weight before you start to see any difference.

REAR TIRES: I practically always use the highest traction rear tires that I can. Occasionally, when track conditions give super traction, the rear tires just won't breach loose and the front tire traction is the problem. First, I usually cut down the rear wing angle, sometimes trim the rear body spoiler off, and some of the other neat things. But sometimes I have to change to a little harder to less adhesive tire compound to reduce rear traction a little in order to balance up the car handling characteristics.

REAR C.G. HEIGHT: Rear c.g. height (increase) can be used to control low speed power oversteer, but will give a slight amount of high speed oversteer. An increase in c.g. height causes a little more weight transfer to both rear wheels during heavy acceleration, and to the outside rear wheels during corner-

ing. Normally I only use rear c.g. height control, because there usually is high speed understeer. However, if there is a problem with high speed oversteer, the c.g. height of the whole car can be increased slightly. Usually the adjustments are less than ± 1/8 inch from some nominal. The car should theoretically work the best with the lowest c.g., so favor that side of the adjustment on this variable.

Now let's get back to the problem at hand, tuning the car. The best way to get the general idea is to go through a few examples. One of the most common problems is low speed power oversteer . . . the tail end getting out of shape very easily . . . and I'm assuming the track is in reasonable condition. Only two car adjustment variables primarily affect low speed power oversteer; clutch slip and weight (of course, you're using high traction rear tires). My choice here would definitely be clutch slip, up to a point, and then I'd juggle a couple of other variables before going to a weight increase. Increase weight only as a last resort when initially setting up the car, because it affects overall performance adversely. If high speed handling is about right, go to a little narrower front tire or a little harder compound and put in some positive caster (or negative camber). At low speed the harder/narrower front tires and caster will decrease oversteer, but at high speed they will about cancel out.

The next most common problem is high speed understeer. The first thing to try is to decrease the wing angle because it's simple. Next move the wing forward. However, rear side force capability will drop off some for both of these. Another option is to go to wider or softer front tires and put in a little easier. At high speed, both the tire change and the caster will help, but at low speed they can cancel one another.

If there is oversteer at both low speed and high speed, the best thing is to go to harder or narrower front tires. You could also add toe-in, or increase the wing angle and increase the clutch slip a little more.

There are combinations of the variables, shown in the summary table, that will take care of practically any combination of handling problems that you might have. But there are limits that you can go to and then things stop happening . . . or really start to happen . . . so you should only use the adjustments in moderation. The one thing we haven't talked about, really, is the driver. A little will-power on punching that throttle and really learning how to drive the car can do more than the adjustments covered here. But it's a good idea to put as much in the car as possible so the driver can make mistakes. I know I do frequently, but my car saves me most of the time.

So you now should have a bomb, ready for the next race. If you don't go back and practice some more, re-read the last two articles, and make a few more adjustments. As a last resort, you can write to me C/O MODEL BUILDER Magazine, or direct to P.O. Box 4658, Irvine, CA 92716. In my case, I've always had things that needed to be done to the car, they've never been just right.

F/F Scale . . . . . *Continued from page 43*

with the fuselage tail post. To eliminate this possibility, I place a wider strip of material at the base of the fin. If the rudder turns out to be too short, I can remedy the situation by cutting into this fin material, allowing the rudder to drop into position. I might add that this wide strip also serves to keep the covering from pulling the base of the fin upwards. This way the fin always has a flat surface to glue onto the stab or fuselage.

Another thing that is disturbing is to cut out dozens of wing ribs, only to find that the spar notches do not line up with the spars locations on the wing drawing. Too often, the wing rib pattern is too short for the drawn chord of the wing. Take a minute to measure and make certain that the pattern is correct before cutting out any ribs. You may think it doesn't matter that the spar notch is out of place, as long as it's consistent. Maybe so, but if you have already cut bunches of false ribs, they could be too short. Then what? It only takes a moment to see that this doesn't happen.

Have you ever built a fuselage completely, one that has a wing saddle (typical of crutch type construction), only to find that the finished wing does not fit into the saddle at all? Well, I have! The reason is usually that the wing saddle is too small. I had one model completely constructed before I found this most disconcerting error. There was no way to change or modify it easily, so the airplane is now merely collecting dust! To prevent this from happening, cut a pattern from the main wing rib (the one which would be sitting under the wing saddle of the fuselage), and use it to cut the wing saddle portion of the crutch. This way, the wing will sit in the saddle properly.

Probably one of the most annoying headaches about building from plans, or even kits for that matter, are ill-fitting bulkheads. How often have you cut all the bulkheads, had them glued in place, then tried to line up the stringers in the notches? More frequently than not, the stringers look like a cork-screw. I'm sure you have. This is a problem you cannot forsee prior to construction. However, my solution to this is to merely undercut each bulkhead instead of in a notch.

You can make each one as straight as a die. I don't think there is any strength penalty this way, since the usual procedure anyway, would be to radius the bulkheads between stringers before covering. This way the covering is only making contact on the stringers, making a much neater covering job.

One last item to look for is one that doesn't occur too often because it has to do with the design of the real aircraft. Take for example, a short-nosed aircraft like the Velie Monocoupe. It has a rather wide cabin area in relationship to the nose. What happens is that it tapers to the front sharply from the cabin. In a model, you would have the same thing. When the two sides are bent inward at the front bay of the fuselage, this sharp angle causes the overall length of the fuselage nose to be too short. With this kind of design, you cannot afford to have any less nose length than is called for. It would also be out-of-scale. To overcome this problem, the fuselage sides must be made extra long to compensate for the loss of length when bent inward. Usually, the top view of the plan shows the correct length. So cross-check with this view.

If you spend a little time checking over a few of these points prior to constructing a model, you will probably find the building easier and far more enjoyable.

A new outfit to me, called Aero Era, has quite a selection of peanut scale plans, as well as a few larger rubber powered models. This company has several models that have not been done before, such as the Super Aero Sport, Gere Sport, Fokker E-1, Bristol F 2b, etc., and a most unusual Japanese Experimental called the J.E.A.A. S-1. The cost is only a dollar per plan or all twelve for nine dollars. Aero Era also have a DH-4 with a 24 inch wing span that is very nice and would be particularly suited for the twin CO_2. There is a 16 inch span Pietenpol Air Camper that is exact scale. In the jumbo scale range there is a Pilatus Turbo Porter which has a 49 inch span, featuring plug-in wings for easy transportation, and a 36 inch Gere Sport, which could very easily be converted to gas.

Send a S.A.S.E. for the current catalog, to Aero Era, c/o Tom Houle, 11333 Lake Shore Drive, Mequon, Wi., 53902.

Fulton Hungerford now has stainless spoked wheels for sale. For some time, Fulton has had samples out in the field to get opinions on how they could be improved. In other words, he wants to make certain that everything is just so before selling them to the public. I want to say that they are just beautiful, and would enhance any model's appearance. They are not for too many rubber models, at least in my opinion, due to the increase in weight over the silk threaded type. However, for gas F/F or R/C, they would be nothing less than sensational! Write to Fulton for a copy of his latest wheel catalog. His address is . . . 1770 Lilac Circle, Titusville, Fla. 32780.

Just a reminder that the Flightmasters Scale R.O.W. contest is June 20, at Lake Elsinore, California. •

Remotely . . . . . *Continued from page 21*

. . . provided we get other frequencies in its place, we'll be better off than we are now.

RADIOS. . .WHO FIXES WHAT!

The recent changes of ownership of various radio companies have left many of us wondering: Where do I send my system for repairs? The following persons and firms are known to us as capable of servicing systems as stated.

RS SYSTEMS. Two persons have informed us of their capacity to service RS's: Mr. Chuck Moses, 6722 Park Ave., Garden Grove, CA (714-894-2092) and Mr. Robert Novak, 420F West Carriage Drive, Santa Ana, CA (714-549-3741). Both parties also have replacement servos, trays, batteries, etc. available. The latter also informs us that he is developing a new system, apparently high quality custom made, to be available some time in the future. We hope to have more information later.

ORBITS & POST-1970 MICRO AVIONICS. Millcott Corporation of Santa Ana, Ca (See their ad page 62) has acquired the inventory of the recently

sold Orbit Electronics Corporation and has available a number of technicians from that organization to service all digital Orbit systems, as well as all Orbit-manufactured (orange transmitter) Micros. They have on hand all replacement parts necessary for repairs and post-crash rebuilding.

PRE-1970 MICRO-AVIONICS, KRAFT, BONNER, ACE, and most BRAND X's. Andy's Electronic Repair, 2817 East Lincoln Ave. Anaheim CA 92806 (714-630-5061) has informed us they can service all of the above, plus most analogs, reeds, and single channel systems. Obviously, the proper repair of all systems is dependent in large on the availability of replacement parts, many of which are not available through normal electronic supply channels. Andy's will inform you of the present state of affairs re your particular older system.

We realize that there are others equally capable and equipped, and we hope to hear from them. The above are mentioned because we have knowledge of them and their service since they are in the local area.

THE HESITATION ROLL!

Jim Kirkland started the whole thing at the pilot's meeting prior to the 1972 Master's Tournament in Huntsville, Alabama. It has probably done more to preserve his memory than any of his far greater accomplishments in the modeling world.

Jim stood up and asked, "Where is the center of the Four Point Roll?"

Knowing him as we did, it's our opinion that he only half-way needed an answer to that question. What he really wanted . . . and got . . . was a riotous and very entertaining one-hour debate among the "flight line lawyers" in attendance. A satisfactory answer never did evolve, but Maynard Hill finally concluded the "discussion" with a statement that went something like "For the contest, the center of the Four Point Roll is assumed to be . . . " We don't recall what it was.

At numerous major competitions where this writer has been chief judge, this same question has been repeated, and we have ducked the issue by pointing out that with the judges properly spread apart and having different viewing angles, the center of a maneuver can be most anywhere within a hundred feet.

We have a pretty good reason for avoiding this question when it applies to the "point" rolls, because, in our opinion, none of them; the Four, the Eight, and now the Two, have *ever* been properly described . . . in AMA *or* FAI rules. *All of these rolls have one less "point" or "hesitation" than their name implies.*

Let's take the Four Point Roll, for instance.

As the pilot settles the plane into straight and level flight he calls the start of the maneuver, and after a pause to establish heading and altitude, rolls the model 90 degrees to knife edge flight and holds it there . . . the first "point" or "hesitation."

Next, he rolls the model 90 more degrees to inverted flight and holds . . . the second "point" or "hesitation."

Then he rolls the ship 90° further to the next knife-edge position and holds . . . the third "point" or "hesitation."

Finally, the roll is completed by rotating the last 90 degrees to straight,

level, and upright flight. This last 90 degree roll, according to the wording of the current rules, is the conclusion of the maneuver. The straight and level flight at the end is not a fourth "point" or "hesitation," it is merely the straight flight required at the end of every maneuver.

By the same reasoning, the Eight Point Roll has 7 hesitations, and the Two Point Roll has one.

There's one particularly nice side benefit from the above reasoning . . . the maneuver has symmetry. You put an odd number of *anything* in a row; fence posts, apple pies, etc., and there's always a middle one . . . not so with an even number. The middle hesitation in a . . . er, 3-point (call it 4) roll is the inverted hesitation. And the *middle* of the middle hesitation is the center of the maneuver. Same thing for a so-called Two Point, Eight Point, Sixteen Point . . . ad nauseum.

Let's celebrate the solving of that controversy with a poem . . .

ODE TO THE SNOWFLY 76

"The Sno-Fly is fun for most every one
Though it falls at a time of the year
When the weathers not right and it's always a fight
To get out and join in the cheer.

With temperatures low, the winds always blow
From the north 'till it cuts you right through;
The sailplane nut in a dull winter's rut
Will come to say that he flew.

This year was of change with mid-winter's rain
South winds that blew very strong,
And temperatures neat that put mud on your feet
What a day for things to go wrong.

They came in droves through weather they loathe
To launch into thermal-less light;
And the sailplanes came down with nary a sound
My God those are really short flights.

During Round Two the winds really blew,
Breaking up ships in the breeze;
And we can't overlook when released from the hook
Those who flew into the trees.

The ones that survived were glad they arrived
To Round Three with a shot at the gold:
For many gave in or crashed in a spin
With only a tale to be told.

The flying was keen, for the pilots were lean
And hungry for trophies to gain;
The scores were real tight throughout the last flight

The winners getting glory and fame

The trophies were passed to the winners at last
All with bright shining faces.
The photos were snapped and the cars were all packed
To head back to those wintery places.
Now maybe next year you'll come on up here
The Sno-Fly puts a smile on your face;
And maybe you to will fly like I flew
'Cause I ended up in first place!"

—Bud Pell

VITAL STATISTICS

No. of Contestants	61
Standard Class	39
Open Class	18
Junior Class	4

RESULTS

Standard Class

1. Bob Hicks	602
2. David Leach	439
3. J.D. Cochrane	425

Open Class

1. Bud Pell	512
2. Dave Corven	487
3. Bob Robinson	439

Junior Class

1. Kevin Pearson	320
2. Jim Steele	244

MYSTERY SOLVED

Now we know what "Gazariator," the name Sterling Models gave its .60 powered shoulder-wing sport R/C model, really stands for. It means "Model used for piggyback drop-tests of a 1/40 scale space shuttle orbiter."

According to the March 15, 1976 issue of "Aviation Week & Space Technology," John Kiker, chief of the Mechanical Systems Branch of the NASA Johnson Space Center's Spacecraft Design Division, is using the Gazariator to test planned separation maneuvers between the Orbiter and a Boeing 747 during approach and landing tests. The tests started strictly as John's hobby sideline, but are now NASA-sanctioned.

Next project for John is a 1/40 scale 747 (!) powered by propellers to provide even better simulation . . . Toys indeed!

MINI-FORTRESS

Another Sterling model has come to our attention, this one is in Japan, and again it's a bit unusual. Masayuki Suzuki, of Tokyo, has installed a Futaba radio in his 39 inch span Boeing B-17G Super-Fortress, controlling rudder and elevator, plus an engine cut-off for the two Cox Tee Dee .020 mounted in the inboard nacelles. The cut-off is operated by elevator down-trim. We can't reproduce the flight shots because they're color transparencies, but it *do* fly!

FORMULA ONE

It will come as a surprise to some that the racing season has just started, because for many, it never stopped. Quarter Midgets, Quickie 500's, and 1/2A's have been raced all through the winter. And not only by Californians and Floridians, as many of our more hardy northern friends will attest.

It is correct, however, to say that the Formula One racing season has just been flagged off. And we wonder what the year will bring. What new designs have been brewing all winter? What engines, flyers, etc. will pull ahead this season?

We hope to report the developments as they take place.

As they fly around the first pylon, we find Ron Gilman of Tulare, California in the lead. Ron holds the existing fast time record with a sizzling 1:13 time flown at Whittier Narrows last June 8th. He broke the then existing fast time of 1:14:2 held by Terry Prather. The equipment used was a Toni and Super Tigre X-40 by Prather Products, 9x7-1/2 (reworked) prop by Rev-Up, radio by Orbit, and last but very important, calling by Rusty Van Baren of Hanford, California. The latter is himself a Formula One flyer of considerable skill and one to watch this season.

What about 1976? Who would dare predict! Only low time (with no cuts) will tell. •

Supermarine . . *Continued from page 38*

Plank entire fuselage with 1/16 sheet and strips. Rough-sand and cut out cockpit and window holes. During planking, paint as much as possible with clear dope around gas tank and firewall areas.

Sand all surfaces smooth and paint on one coat of clear dope and let dry thoroughly. Sand with No. 360 wet-or-dry paper and apply another coat of clear. Sand, and then apply slightly dampened silkspan. Add two coats of clear, sanding between coats, then one coat of white. This shows up any irregularities and provides an excellent base for the final color.

ELEVATOR

Cut out two outlines of stabilizer and elevator from hard 1/16 sheet balsa. Cut apart at elevator separation. Install control horn and sandwich the two sheets of elevator together with hinge cloth. Leave about 3/8 inch of cloth protruding out to the front of the elevator to be sandwiched between the stab pieces. Finish same as fuselage.

WING

The wing is made ala Fireball. If you're too young to remember this airplane, it was a carved fuselage and sheet winged affair that flew like blue blazes with a .60 up front. Also, this was U-control No. 1 for me in the good old days.

Enough reminiscing. Lay out 1/16 sheet balsa and draw outline of wing. Cut out and draw another, using first one as a pattern, but make it at least 3/16 larger all around. Mark rib positions on lower sheet (smallest), and glue on ribs. Drill U/C and bellcrank holes on ply mount and install 4 blind nuts on top for gear bolts and one underneath for bellcrank bolt.

Inboard ribs have holes drilled for control lines. Glue on a penny for weight in outboard wing, up against inside of end rib. Glue on aileron spars.

Install bellcrank/gear mount on center line between the two ribs. Mount bellcrank, lead-out wires and push rod. Slide lead-outs through holes in ribs. Install eyelets or tubing at wing tip. Glue on wing top sheet. Add ailerons, outboard about 1/16 up and inboard the same amount in down position.

ASSEMBLY

Thread push-rod through fuselage, hold wing in place and check controls for free movement. Put 'S'-bend in push-rod at elevator, checking for neutral position of elevator and bellcrank. Bend lead-outs, keeping neutral.

Glue wing into place, along with completed stab assembly and fin/rudder assemblies.

FLOATS

Pin down top and bottom 1/8 square hardwood keels, adding small vertical piece at rear. Glue on all former halves. Add side stringers. When dry, remove, add opposite former halves, stringers, and plank, leaving open where ply F-1 gear mount will slide into place. Add nose block and sand smooth. Repeat for opposite float, making sure gear cut-out is facing inwards on both floats.

Form gear legs and drill all holes as indicated on plan. Mount gear to F-1's and slide into holes left unplanked. Epoxy well and plank over top after checking alignment. Finish overall same as fuselage and wing.

Add completed floats and leg assemblies to mount in wing. Plank over bolt heads and smooth into fuselage. Finish off the same as before, using silkspan on planking at gear legs.

Spray on color coats, using No. 600 in between coats. Add interior details and markings, etc.

COWL

Carve a styrofoam cowl mold which is 1/16 inch under-size all around. Sand smooth. Find a washer that fits exact outline of nose of cowl. Be sure that hole in washer is large enough for prop shaft of motor to pass through.

Mix up some Hobbypoxy No. 2. Spread coat over all except rear. Place washer on nose, making sure it is centered. Put on one layer of light glass cloth and pull around form. When smoothed out, coat again with epoxy.

Lay on another cloth, repeating smoothing process.

Coat once again with epoxy and set aside overnight to cure. When completely hard, sand and coat with clear dope. When dry, place a few drops of thinner onto the rear of cowl form. This will eat away all of the styrofoam and you will have a nice hollow cowl. Epoxy 'L'-shaped mounts inside cowl. Dope and finish as the rest of the plane.

Mount engine, hook up gas tubing. Install windows and rigging wires, etc.

FLYING

Lay out lines parallel to shoreline. Start motor and go to handle and check controls . . . 'up' is 'up', we hope. Wade out to center and have assistant take plane backwards into water about one-fourth of the circle diameter before launching. This prevents the in-coming waves from swamping or pushing the model in towards you. The waves moving towards the shore help keep the lines taunt when the model is launched "down wave," so to speak.

Before signalling assistant to release, hold full up on the control and be prepared to step backwards. Also, know where your feet are going before hand! It is a little different in one or two feet of water than on land, not knowing if you will step in a hole or on glass etc.. Wear old tennies if possible.

Another thing to be careful about is staying in one place too long. Constant turning around in the same spot can sink your feet into the mud and trip you up. I know, I've done it. Model and all were dunked!

If you're afraid to get your feet wet, stay on the shore and let the model take off away from the shore . . . and just hope it will become airborne before the half-circle of water becomes shore once again!

As soon as the model breaks water, give some fast down control to level off, as control is near impossible if the model gets overhead with slack lines.

Know beforehand when your motor will quit and try to grease it onto the water with power. If you have a flame-out, nose the ship down fast and haul full up just before touchdown, in order to get the tails of the floats hit first. The model will flatten out on the surface with enough speed to skim along to a stop. GOOD LUCK . . . ●

Simplex . . . . . *Continued from page 54*

the erratic towing that Tom sometimes manages, most of the credit for his placing in every contest entered must go to the glider. It is about as goof-proof a glider as I have ever experienced. A good part of the credit must go to the airfoil, which is pirated and changed from the Lively Lady, and more credit should be placed on the wing planform and layout, which is copied from Hugh Langevin's Osprey. Together, this is an excellent combination.

Convinced? Good. Try it for your first A/2. In fact, if time is a problem, you may want to try it for your next A/2. It builds fast.

Fuselage construction: The fuselage is built very similarly to the Starduster. Using light weight 3/32 sheet 36 inches long, cut both fuselage sides from it. Pin one side of the plan and using Wilhold, glue the 36 inch long 1/8 x 3/8 longerons in place. Notice that they are in a straight line . . . no bends needed or wanted. When dry, glue in the 1/8 x 3/8 uprights where shown. If you plan to use a circle tow device, make that decision now (I recommend the Max-Aid unit, sold by National Free Flight Society, 4200 Gregory St., Oakland, CA. 94619, for $8.50). If not, use a regular FAI Models Supply Hook Assembly as shown on the plan. With the standard hook, a 1/4 x 3/8 hardwood block must be glued in place as shown.

Glue other side of fuselage in place.

All of the above description assumes that you are using a very straight building board . . . because if you're not . . . you now have a bent fuselage.

Next, cut out 2 pieces of 1/16 plywood to the shape shown. Also cut 2 pieces of 1/16 balsa as shown. The balsa follows the outline of the plywood, except it is about 4 inches longer, extending onto the fuselage boom, as indicated. Glue the balsa sheet to either side of the fuselage as indicated. Glue the plywood sheet over the top. Fair both the balsa and the plywood into the fuselage (This can be done more easily prior to gluing to the fuselage).

Cap the nose with a piece of hardwood block (pine or bass), sand and shape the entire fuselage. Round the corners of the boom.

Fill in the area above the top longeron and between the plywood balsa overlay with scrap balsa. Sand to shape.

The wing is next: Cut out all wing ribs, using a plywood template. All ribs are identical. Cut out 1/16 or 1/32 plywood reinforcement ribs. Trim the stock trailing edge to shape. Notch the trailing edge to receive the ribs. Block up front of trailing edge 3/32. Pin leading edge in place. Put in necessary washout as indicated on plans. Glue ribs in place using Hot Stuff. Do not add plywood ribs at this time. Block up each tip 6 inches for dihedral, and glue wing panels together, using gussets as shown. Add all spars when dihedral joint is cured. Do not forget to add the tapered spar as shown . . . this adds tremendous strength and flexibility to the wing and is imperative if you plan to use a circle tow system. Add all triangular gussets to rib trailing edges, tips, etc. add and shape wing tip blocks.

Take the plywood ribs and very carefully drill them (using a drill press if

available) where shown on the plans. Drill the holes slightly oversize (3/16 front and 5/32 rear)

Next, slide a 12 inch length of brass tubing into the ribs front and rear and line all of them up on the tubing. Pin the wing panels in place so that they butt up against each other. Place the ribs in their respective places (they are still on the tubing, remember) and when they are all lined up, glue in place, using Wilhold or epoxy. Only when completely cured, unpin the wings and remove the brass tubing.

Next, cut the tubing to length as shown on the plans, and slide the tubing onto 1/8 diameter wire (front) and 3/32 diameter wire (rear). This wire is 8-3/4 inches long. Now, epoxy the tubing into the plywood ribs, using the wire to join the two wing halves together while the epoxy cures. Use plenty of epoxy.

When all is completed, sand the entire wing . . . remove any lumps and bumps. Glue in the 1/16 sheet center where indicated. Add plywood cap ribs at each root as shown. Sand again. Predope the entire wing structure, sand lightly, and dope again. Cover with Japanese tissue, using nitrate dope. The center section of the wing may be double-tissue covered for strength. Adhere the undercamber well, so it doesn't pull loose.

The stab is simply constructed and straightforward. The only unusual feature is the d.t. hold-down location, which is explained later in this article. Cover the stab with Japanese tissue, and give 3 coats of thin dope.

The fin and rudder are cut from 1/8 light-weight C-Grain balsa. The hinge is the plastic Klett-type hinge used by R/C types. Rudder stops are available from FAI Models Supply.

When the fin and rudder are complete, epoxy to the top of the fuselage. Cover the fuselage with Japanese tissue and give 4 coats of clear dope. Drill the wing wire holes as shown on the plan. Slide the previously cut music wire wing tongues in place . . . 1/8 in front and 3/32 in back. Epoxy wires in place in the fuselage. Before the epoxy cures, slide the wings into location . . . this will set the wires and wing location for all time . . . now is the time to line things up so that wings are at right angles to the fuselage in all directions. When the epoxy is 90% cured, removed the wings and set the fuselage aside. You may need to sand down the wing wires to remove any epoxy that might have adhered itself to them.

Cut the stab mounts from plywood as indicated. Glue in place.

Form all wire parts and glue in place, using epoxy or Hot Stuff.

Install the timer and the towhook. Using cotton fishing line for d.t. and Auto-Rudder . . . about 20 lb. test . . . drop them through the holes shown in the fuselage . . . you may need to "fish" them through the fuselage boom, using very fine music wire. Since there are no bulkheads in the fuselage behind the wire trailing edge, the boom is essentially a hollow tube and the lines should drop into place without meeting any obstructions. Notice that the rear stab platform hangs over the rear edge of the fuselage and that is has a hole drilled through it. The d.t. line passes through this hole . . . after it passes through a wire saddle in the open rear-end of the fuselage.

It's now time to rig the stab to accept the d.t. line. Place the stab on the stab mount. Mark where the rear stab platform touches the stab itself and cut a piece of 1/32 plywood to match. Using epoxy, glue this piece of 1/32 ply directly to the bottom of the stab where it contacts the stab mount. Glue a similar piece of plywood on the top of the stab directly over the piece you've glued on the underside. Drill (carefully) a hole through both pieces of plywood . . . and through the stab center rib. This hole must be large enough to allow the d.t. string and the retaining wire to pass through. Epoxy the wire stab hooks in place on the top center of the stab as shown.

Assemble the complete model. It must balance as shown. Add lead in the space behind the timer until the balance is obtained. Weigh the model . . . it must weigh not less than 410 grams. It won't. You will need to add ballast in the section of the fuselage under the center-of-gravity until it meets minimum weight. The original needed almost 5 ounces of ballast to bring it up to weight . . . this is in addition to the nose-weight added.

Flying: When the c.g. is in place, as described above, it's time for the first test flights. Set the rudder for a right hand turn. Start with about 1/4 to 3/8 offset. Hand-glide. It should show a slight right turn and no tendency to dive. If it dives, shim up the t.e. of the stab about 1/64. Continue shimming until it has a flat glide with slight right turn.

Now, set the auto-rudder so that it points straight ahead or very slightly to the right.

Set the tow hook so it is 1 inch in front of the center-of-gravity. Hook up the auto-rudder and d.t. system.

Tow the model into the wind . . . move rapidly for the first 20 feet or so and then slow down and watch over your shoulder to see what is happening. It should tow straight. Slight variations to the left or to the right may be corrected with rudder offset. If it cranks over to one side and will not right itself, move the towhook forward a bit. If it climbs shallowly and weaves about on the line, move the hook back. Experiment for the best setting and mark that location. There will need to be slight adjustments made for wind conditions, but most of your flying will be done within a 1/4 inch of the setting you have made during this testing time.

I have always used Tatone timers on my A/2 gliders and find them to reliable and easy to use . . . but they are susceptible to dirt. A cleaning now and then in alcohol does wonders. Slight oiling afterwards will keep it running for years. I recommend them highly. On this model, if you don't use a d.t. timer, you will lose it when the first thermal comes through.

You will find the Simplex to be a very competitive model, and it should win some hardware for you . . . beginner or expert.

If you have any questions about yours, drop me a line care of MODEL BUILDER . . . include a self addressed stamped envelope, and I'll be happy to answer.

Happy thermals. •

Hannan . . . . . *Continued from page 45*

are strictly limited. Postpaid prices for the Antoinette and Bleriot are $2.25, while the larger Hydravion is $2.75. Peck-Polymers, P.O. Box 2498, La Mesa, CA 92041.

NEW CATALOG OFFERED

A complete description and price list of the many fine Hungerford spoked wheels, including the new stainless steel types, is now available for a stamped, addressed envelope. Send to: FH Wheels, 1770 Lilac Circle, Titusville, Florida, 32780.

CHANGE OF ADDRESS

New home for the World War I Aeroplanes newsletter, edited by Leonard E. Opdycke, is 15 Crescent Rd., Poughkeepsie, N.Y. 12601. This month's edition is a beauty, and features the 1922 and 1924 Wissler biplanes, in cover drawings and detailed 3-views by R. Anderson. Future issues will be devoted to the Poll Giant, the Taubes, and Bristol Scouts. Why not send Leo $1.50 for a sample copy? You'll be glad you did.

A CONVERSATION WITH COURTNEY

We had the privelege recently, of visiting Frank T. Courtney, author of the remarkable book "The Eighth Sea." In company with Warren Shipp, several hours were pleasurably spent discussing the amazing career of this aviator whose experiences extended from 1913 Graham-White box kites, clear through the Atlas missles of the 1960's. It was difficult to decide which subjects to ask about when in the presence of one so knowledgeable on virtually ALL phases of aviation, but for a start we mentioned models. Sure enough, Mr. Courtney had constructed them as a youth, and maintains an interest even to this day.

In reflecting upon his past, Courtney, noted he had first become involved with aeroplanes at the age of 18, and sometimes wonders, "Why I didn't stay with railroads or ships or something!" Fortunately, he decided upon remaining in aviation, participated in World War I, served as a test pilot, an instructor, an aircraft designer, ferry pilot during World War II, and was in the engineering department of Convair while the Atlas missiles were being developed.

Along the way, he had the opportunity to fly almost every imaginable type of flying machine, including the original Cierva Autogiros, ultra-lights, lightplanes, fighters, transports, bombers, and flying boats.

As it happened, Warren Shipp had brought along his flying scale model of the Ireland "Privateer" flying boat, with which Courtney was very familiar: "It had fabric on the bottom of the hull, and was the noisiest aircraft I ever flew!". He made the following comments regarding seaplanes, which may be of interest to you rise-off-water flying scale model fans: "The best shock absorber is a flat-bottom hull, except on a glass-smooth sea. "V" bottoms waste power by throwing water outward, and are not only bad on water, but poor in the air."

Regarding new designs in general, Courtney said he felt that engineers generally made the same mistakes, regardless of geographical location. During the early days in England, he sometimes had a waiting list of new designs to test fly. He would phone manufacturers and say: "You have a week before I am available . . . use the time to put a bigger rudder on it." The reply would be something along the lines of: "But you haven't even *seen* the machine yet!". His reply: "No matter, it's bound to need it!" As an example, he described one Handasyde design which was so deficient in rudder area, that it took him nearly an hour to fly it around London . . . every time he attempted a turn, it would start to spin! The same problem was encountered with certain types of aircraft in this country.

When a casual mention of my current model research project, the Wilford Gyroplane was made, Courtney replied that he had not only seen the rare craft, but had actually flown it.

Now 81, Frank Courtney is remarkably fit, sharp of memory, and his sense of humor makes one want to write down almost everything he says. Shortly before we left, he offered this parting shot: "I was the only pilot in our WW I squadron not to crash a tri-motor Caudron. That's because I never flew a tri-motor Caudron!"

SO YOU THINK YOU'VE GOT PROBLEMS?

Couldn't resist quoting this para-

graph from a circular devoted to the "Ms" magazine, edited by femlibber Gloria Steinem: "P.S. It is possible this letter came addressed to you as 'Miss' or 'Mrs.' If so, it is because this is the way your name appeared on a mailing list compiled by us. If you prefer to be addressed as 'Ms.', or any other way when we send you magazines or renewal notices, please mark your correction on your reply card before you return it."

Dividers . . . . . . *Continued from page 25*

ject, adjust the spread of the shorter arms to match a dimension such as the wing chord on the 3-view, and then, without changing the arm spread, use the long arms to transfer the scaled-up dimension to the enlarged drawing. I think you'll find the use of these dividers to be an interesting experience and, once started, your drawing takes shape fairly rapidly.

(Suggestion: Having used propo dividers for many years, and often having to enlarge by some odd ratio, we simply devised a trial-and-error method of setting the dividers. Establish one average size dimension on both the original and final drawing and then adjust the dividers until the opposite ends match the original and final dimensions. Everything else will now fall into place accordingly. wcn)

Regarding the capacity of these dividers, two situations are involved; the ratio capability, and the dimensions of the 3-views and enlarged drawings. If your project requires a ratio in excess of the practical limits of the dividers (beyond about 5 to 1), just divide the ratio by a whole number to get back to less than 5 to 1. As an example, if you need to enlarge 12 times, just divide the 12 by 3 to get a ratio of 4. Set the l_1 and l_2 for a ratio of 4 and start scaling. The enlarged dimensions are then struck off 3 times the long-arm span to produce the desired 12 to 1 ratio.

The dividers are not limited by their size to Peanut scale subjects either. Consider that whatever size model you need to scale up can be divided into smaller parts. That is, a fuselage has a number of convenient reference points already established, such as the firewall, wing leading and trailing edges, cockpit location, stab leading edge, etc.. These proportional dividers can be used to enlarge a model to 5 or 6 foot span nearly as easily as a small model. Work from the natural reference points as far as you can, and if there remain some areas or spaces that exceed the divider arm span, just create some artifical reference points or lines on the 3-view. It's not very important where these points or lines are as long as you can locate them on both the original and enlarged drawing.

As mentioned earlier, proportional dividers are particularly useful in gauging the proper size and location of authentic markings for a model. The Hawker Fury in the photograph, for example, was constructed from a Flying Models plan and then marked to conform to a particular aircraft shown in a Profile publication. The Fairchild Turbo-Porter (p. 42) is based on Hannan's plan in Model Aviation, but has been modified to show the windshield and side window shapes and markings of a particular plane from a Model Airplane News 3-view. In working up the markings, it is not necessary to scale up the whole model, but just to scale up the marks and their locations from known points.

These dividers can also be used to reduce the size of drawings. The ratio setting table in Fig. 5 also lists reduction ratios. These ratios are the reciprocal of the enlargement ratio; that is 1/enlargement ratio.

Good luck on that scale project you have been putting off. With this easily made drafting tool, you'll have fewer excuses! ●

Workbench . . . *Continued from page 6*

ing the 5th Annual New York State R/C Fun-Fly Champs in Clifton Springs, N.Y. on July 10 and 11, 1976. Events include Sport Scale, Multi-wing, Fun-Fly, Saturday night Bar-B-Q, etc. Contact Harold Ford, 11 Stephans St., Clifton Spa, N.Y. 14424, (315) 462-2235.

MB PERSONALITIES

When you call this office, you may find yourself talking to our secretary, Kathy Root. When she's not here, chances are she's in the model workshop with husband, Bob, or buzzing the pylons in a Half A R/C pylon race. On March 21, 1976, she placed 7th out of 26 in a race at Camarillo, California.

One of the remarks overheard was "The whole world hates a wise-person!"

FLYING SCALE MODELS

MODEL BUILDER Magazine has purchased the remaining copies of the book which it edited and published for I.E. Coleman. The book contains full size plans for 12 World War II fighters, done in 1/2 inch scale, for rubber power. All models are accurately scaled, detailed, and finished by well-known experts Doug McHard, Bill Hannan, Bob Peck, Hal Cover, Clarence Mather, Harry Bagley, Frank Scott, and Ed Coleman. In addition, there are three well illustrated articles by Bill Hannan, Bill Warner, and Doug McHard on building and finishing, covering and trimming, and flight adjusting. Price of the book has been lowered by one dollar to $6.95. It may be purchased from your dealer who carries MODEL BUILDER, or ordered direct. See ad on page 86.

Further books of similar format are expected in the future, with subjects covering the Golden Era, WW I, Pioneer, etc.

WHERE ARE THE BIRDS?

Our continuing article, "Is Soaring for the Birds?" had to be bypassed this month because of crowded conditions. Art Gray's interesting series will appear again next month. •

Counter . . . . . *Continued from page 9*

order direct from Allied at 633 Isis Bldg, Inglewood, CA 90301.

* * *

Now you can buy brand new O.S. Max engines converted to spark ignition. These are just some of the many converted engines available from Otto Bernhardt. The entire line of OS's is available, plus most others on special order. Typical prices are $40 and $50 dollars respectivaly for the .15 and .35 shown. A conversion of your new or near-new engine will cost $30 to $40.

A complete line of ignition necessities is also offered: coils, condensors, timers, etc.

Send for free 1976 price list from 77 Products, 17119 So Harvard Blvd, Gardena, CA 90247.

* * *

Travelair 2000, by Concept Models, 2906 Grandview Blvd., Madison WI 53713. Not much information, but we couldn't resist the photo. R/C, for .40 engine, apparently four channel radio. It has a 52 inch wingspan, 790 square inches of area, and weighs 4.75 to 5.25 pounds. Construction is similar to the stand-off scale Fleet introduced last year. Write for more information, just be sure to say that you read about it in MB.

* * *

BOOKS, BOOKS, BOOKS

Polk's Hobbies has introduced two series of books of interest to the scale builder or student of World War Two military aircraft.

Designated 'Archive' and 'Warpaint'; the first is a series, each dedicated to one particular aircraft, which becomes part of a complete library. Each booklet will contain a minimum of 24 pages of text and illustrations, two of which will be in full color. A bound volume containing six issues will be published every six months. →

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IGNITION ENGINES: The entire O.S. Max line of fine engines is available converted to ignition engine operation. These engines are eligible for OLD TIMER competition and are the very finest obtainable anywhere. We also offer a complete line of ignition accessories, ie, coils, timers, condensers, etc. Send for free 1976 price list. 77 Products (Otto Bernhardt), 17119 So. Harvard Blvd., Gardena, California 90247.

FOR SALE: MODERNISTIC MODELS
New info. Market value $6,302. Over 300 steady customers. 4,729 plans, 4 storage cabinets. After complete inventory and re-evaluation, now priced at $2350. Call (213)-766-5868.

SCALE "CURTISS HAWK" PLANS: 2" R/C P6E, 2" R/C P1A, 2" R/C F/C-3 (Red Ripper) all 3 sheets, 30 by 72, blackline, $13.50 per set. Coming soon 2" R/C YP23. Smith Plans, Box 8, Snowmass, Colo. 81654.

HI-FLY ENTERPRISES. "Sparrowhawk." NEW, for unlimited rubber competition, flown by Bob DeShields, 1975 Calif. point champion, and Bob White, FAI champion. "CONDOR 800", B-C-D F/F, 3 HL gliders. Stamp for catalog. HOBBY FAIR, 7212 Vassar Ave., Canoga Park, Ca. 91303.

"PERRY DIRECTIONAL PORTING"
A patented modification for baffle-type engines. See Feb '76 RCM. Supertigre engines, $20.00 plus postage. Nightingale Mfg., 218 Via El Centro, Oceanside, Ca. 92054, phone (714) 433-2281.

FOR SALE - Full function hobby craft shop in God's country. Perfect retirement business. Also income properties with residence. Call (307) 332-2400 after 6 pm or write to: 800 Garfield, Lander, Wyoming 82520.

WANTED – Will buy multi-cylinder model airplane engines. In particular, the older spark ignition and certain glow ignition. All letters answered. Russel Sprague, 8800 Green Lane, Randallstown, Md. 21133.

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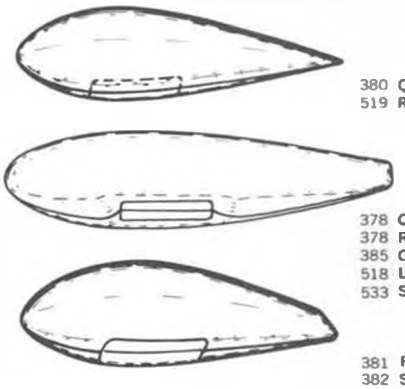

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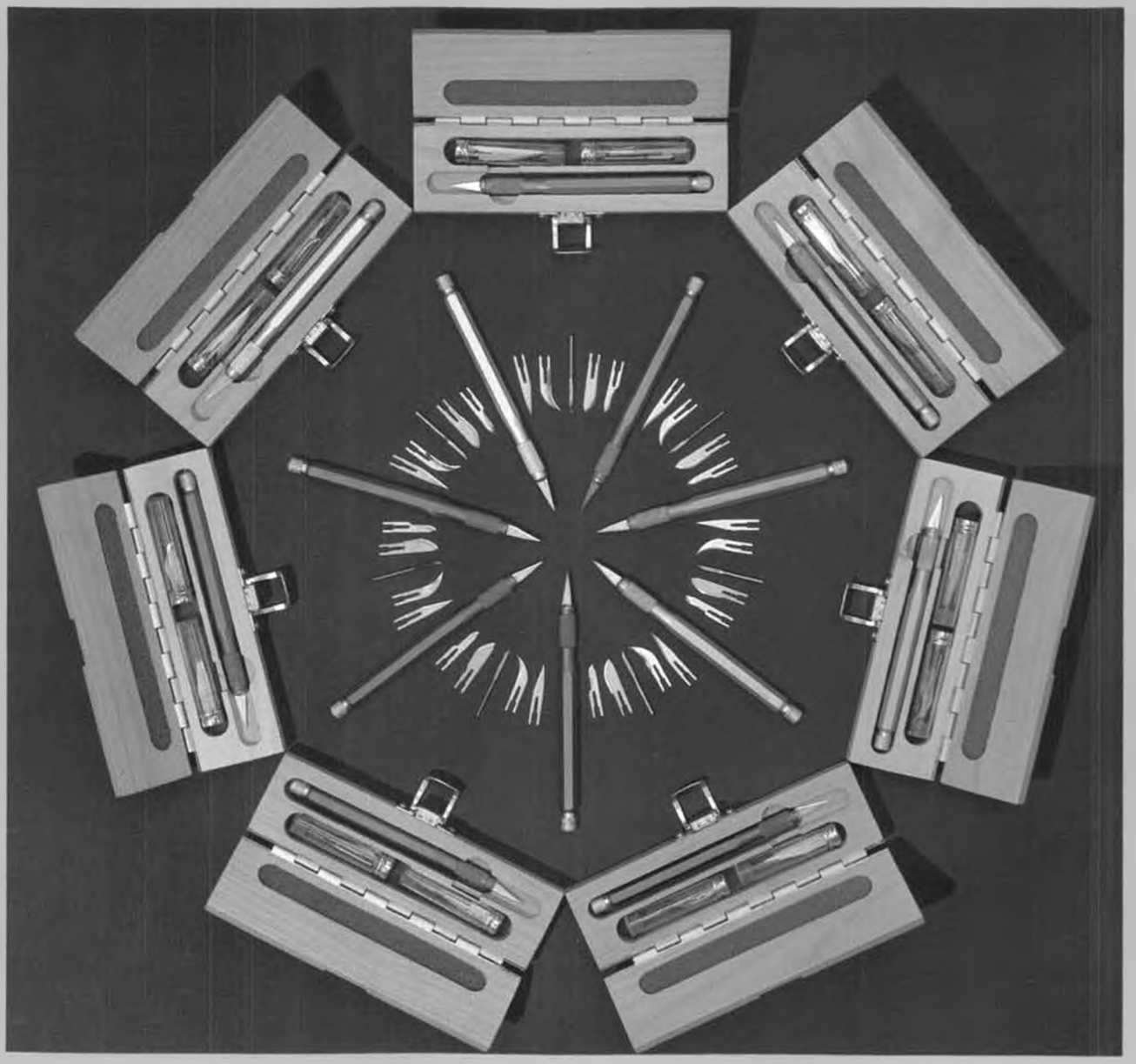

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