

JANUARY 1956 — 35 CENTS

MODEL AIRPLANE NEWS



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MODEL AIRPLANE NEWS

JAY P. CLEVELAND, President and Publisher

JANUARY 1956

Vol. LIV—No. 1

CONTENTS

CONSTRUCTION

Mooney Mite	9
Waco Cabin	14
The '55 Rambler	18
Three Aces	30

ARTICLES

Try Wet-Covering!	12
All Metal! (I)	20

FEATURES

MAN at Work	2
Radio Control News	16
Planes Worth Modeling	23
Douglas World Cruiser	24
Foreign Notes	32
Contest Calendar	36
Pen Pals	47
Quickie Wings	50
The Baby ROG	51

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551 Fifth Avenue, New York 17, N. Y.

Advertising Manager, N. E. Slane, 551 5th Ave.,
New York 17; West Coast Adv. Mgr., Justin
Hannon, 4068 Crenshaw Blvd.,
Los Angeles 43, Calif.

Editorial and Business offices: 551 Fifth Ave., New York
17, N. Y. Published monthly by Air Age, Inc., 1140 East
West Highway, Silver Spring, Maryland. Jay P. Cleveland,
President and Treasurer; Y. P. Johnson, Vice Pres.; G.
E. Johnson, Sec. Entered as second class matter Feb.
1951 at the post office at Silver Spring, Md., under the
act of March 3, 1879. Additional entry at New York, N. Y.

Price 35¢ per copy in U. S. Subscription Prices—U. S. and
possessions: 1 yr. \$3.50; 2 yrs. \$5.50; 3 yrs. \$7.50;
Canada: 1 yr. \$4.00; All other countries: 1 yr. \$5.00.
Payment from all countries except Canada must be in U. S.
funds. Change of Address—Send to MODEL AIRPLANE
NEWS, Subscription Department, 551 Fifth Avenue, New
York 17, New York, at least one month before the date of
the issue with which it is to take effect. Send old address
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copy. The Post Office will not forward copies unless you
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Printed in U.S.A.

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by
William
Winter

► After reminiscing with Nieto about stick and wire crates until the wee hours during a Dallas Nationals, had formed a partnership with Joe. Purpose: an ice-cold watermelon. For a big knife, took a Navy Chief as a third partner. Then behind the work hangar, where you always find sleepless hobbyists, sat in the warm night with a bunch of Texas modelers and, of course, the conversation soon touched on some issue that had been raised in MAN at Work. It struck us that night that a column is not something that belongs to the person who prepares it, or to the house that publishes it. Rather, it is the property of the people who read it: one merely conducts it and, principal among his duties, is the touchy responsibility of airing the issues which most concern us all.

For example, when it seemed that gas modelers would never get a break in International competition, we had, tongue in cheek, reasoned that gas engines should be put in Wakefield models. Now there is nothing more touchy than your real Wakefield fan, unless it is a wounded tiger. Although a few virtuosos of vocabulary favored tar

and feathers, the uproar that followed did influence an equality of events.

Response to these columns ranges from enthusiastic cheers to pointed suggestions, but never has response been as thoughtful as it was after the October issue wondered out loud about the belief widely held in the industry that modelers don't want to "make" models. One of the largest manufacturers phoned in a fit of gloom to say that, with the distributors and industry's emphasis on added hobbies and crafts, model departments may end up selling tropical fish. Another small accessory (airplane) manufacturer groaned that jobbers in his section would not even answer his letters. A club spokesman in Grant's Pass, Ore., said boys in his section are not afraid to "build" models but they won't build models that might come out all wrong. Now there is something to mull over! Old timer Charles Holz, Mountain View, Calif., who built his first model, an Ideal Cecil Peoli pusher in 1929, commented, "I really was disappointed when my son showed an interest in building models and we (Continued on page 6)

NEXT MONTH'S COVER

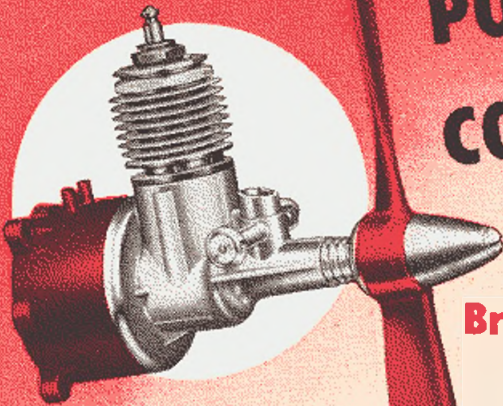
Radio Model

PLANE ON THE COVER

Although a good fighter once in general service, WWI German Pfalz D-12 was gradually pushed out of the picture by the Fokker D-7. A streamlined fuselage seemed offset by complicated wing rigging. Top speed was 125 mph with the 180 hp Mercedes engine. Span was 29 ft. 6 in. Armament was two synchronized Spandau machine guns.



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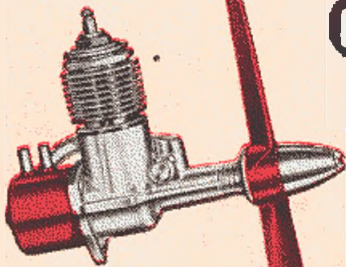
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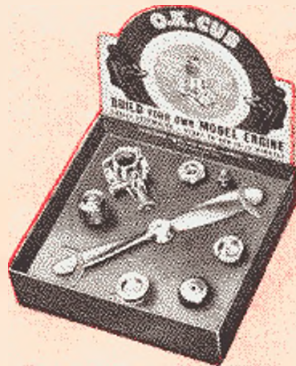
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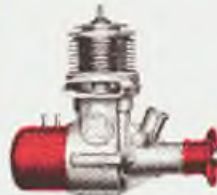
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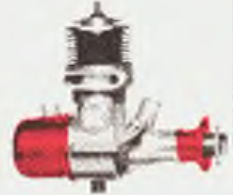
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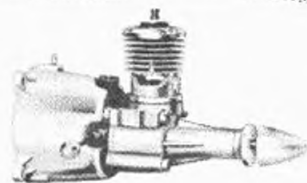
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TURN PAGE FOR CONVENIENT ORDER FORM



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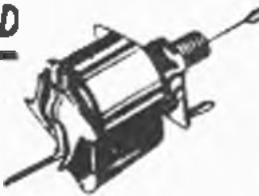
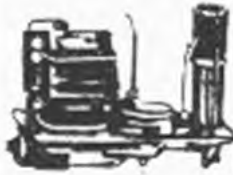
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0.50 MILLIAMETER For Transmitter	2.75

And . . . we carry everything advertised in R/C

SEE NEXT PAGE FOR MORE AHC BARGAINS & HANDY ORDER BLANK

MAN at Work

(Continued from page 2)

discovered that the most available kits were 'slap them together' sheet or plastic jobs. One dealer even confided to my wife, "They aren't making the old fashioned balsa wood and tissue kits any more." That's not quite true, but darned near it.

"Read your timely remarks in October MAN," says Larry Conover, who asks, "Who is to blame for the 'no work required' attitude of today's kit fans? Perhaps you have unmasked the villain. Or is it a problem of who influences whom?"

"There were pre-fabs back in the 'thirties," Larry recalls. "Selley with Selley-Tex. The all-aluminum Mickey Mouse Pursuit, that flew. Japanese wire and silk ROG models. Many more. These types launched many a lad into the exciting sport of model flying. The first one I saw was a ready-made all-balsa ROG with a red celluloid prop and fin. I watched a boy fly it on a corner lot, at least 20 ft. high. It was wonderful and I was a model enthusiast from that time on.

"I think there is a lot more to this situation than just pre-fabbing, don't you?" Larry cites the curious case of Sig Balsa, which tried Contest Balsa, lightweight, expensive wood, catering to the three to ten per cent of the expert model men, as listed in a MAN Model Builders Survey. One year later, that firm had to specify that their last ordered carload of wood be half the lighter, contest wood. Who buys it? Perhaps, Larry, this isn't so curious after all. More people are "building" models.

* * *

► George Moir's '55 Rambler team racer, page 18, reminds us that George has set up Model Motors Service, P.O. Box 515, Mantua, N.J., to produce custom-modified Fox engines tailored to the special requirements of different events. Ted Martin, after test-running an MS Special, says Moir's modifications are astonishingly thorough. George has modifications for team, stunt, another for radio. Our own custom RC MS Special emphasizes high torque to turn a real prop and to drag a hefty crate, without overheating fuss that plagues the RC fan. George puts two 1/4 in. holes straight into the nose (1/4 in. back) on his team racers. Opponents wonder if he is carrying machine guns! Really cools crankcase. Reminds us, too, of Ken Johnson, Galesburg, Ill., a team race-crazy spot if there ever was one, with late dope on the Sheik (MAN, 1/54). Fuselage shortened 2 in. from rear, wing same position, Torp .29 with reworked porting, with these results: on 9 x 8 Tornado prop, 25 laps, 99.41 mph; Thimble Drome, 64 laps, 93 mph; Powermist, 89.52 mph for 7 laps from take-off in qualifying; 93.76 mph. proto speed.

* * *

► Berkeley has new Jetex-type fuel, requiring no screen or scraping; cardboard filler tube allows clean, instant removal. Less duration but more thrust is claimed. Samples of Sterling's Super Ringmaster and Nieuport 28 look mighty nice to us. The profile Ringmaster must have set sales records a long time back. The Super R has a two-sided fuselage and added realism. The Nieuport, of course, continues a company tradition of sharp-looking scale jobs that do not sacrifice performance. Another real stunter, the 28 kit sports an impressive aluminum cowling . . . Boat fans would do well to invest a dime in the new catalogue by writing Department M, Dumas Products, 2114 S. Alvernon Way, P.O. Box 6096, Tucson, Ariz. Dumas has been in the boat kit business for longer than we care to remember. All their boats are tested in rough

and smooth water for balance and watertightness. With one exception, all their items are die-cut and have mahogany decking . . . To the many readers who asked for information about the Jensen four-cycle engine, no longer made, Octura Models, P.O. Box 536, Park Ridge, Ill., handles castings for building this engine, as well as for most of the steam and gas engine kits formerly handled by the late Wayne Miller. Catalogue is 10c . . . Bill Deans, Coast radio man, says 400 ft. color 16 mm film on RC event at Nats available to clubs. Requires single-sprocket projector such as Bell & Howell . . . Leo Holliday to Fort Smith, Ark., to manage Duke Fox's fuel business. Bringing out racing fuel, also bulk fuels, including 1, 5 and 55-gallon containers.

Bill Murray and Dale Kirn (Stanzel) again beating the bushes to demonstrate Mono-Line. Kirn is said to fly Half-A on a 60-ft. line—and ain't that sump'n! . . . Irv Megoff, Esco, "FCC now licensing communications on this channel (27.255—Editor). Demand for channels by other services is so great that FCC seems to feel that the small occupancy of our channel by model control enthusiasts does not warrant an exclusive channel. They use as their information the small amount of licenses issued to modelers. If each and every modeler had taken the little time and effort to apply for his license, the picture would be different and the FCC would hardly license other services to use our channel because of the interference that would be created to the modelers."

Now that 27.255 speedily is being messed up, entirely through our own fault, it becomes even more important to get in that registration for your transmitter. Hope for another frequency rests with you. Apparently, the RC breed of modeler is all talk. Back to U-control, boys?

* * *

► Having enjoyed a real reporting job of State activities in the CCAMA Connecticut News, which we find the best of the mimeographed papers seen each month, can't help but think of the decidedly unsubtle editorials in one ambitious group paper lambasting the AMA and poor Bill Fletcher. For shame!

* * *

► But enough of this serious stuff. The Baltimore Aero-Craftsmen speak of a nifty new field on Route 29, two miles northwest of Rockville on Route 28. Few trees or houses within 1/2 mile. But it's the man who lives next door who fascinates us. Does he complain, call the sheriff? Does he blow his stack? Nope. He gives the boys permission to use his outdoor fireplace. Mr. Weaver, you should get a trophy!

The Aero-Craftsmen, incidentally, just held their annual meet, using a novel scoring system. You got 100 points for high time, none for low and the rest in proportion. Bob Canady topped 'em all in gas and Wakefield.

* * *

► And at the CCAMA (what, again?) annual picnic, the annual baseball game, married men vs. single, ended when both bats were broken. The rope pull ended with two broken ropes. Says Mike Adajian, "This just goes to prove that model builders don't know their own strength."

* * *

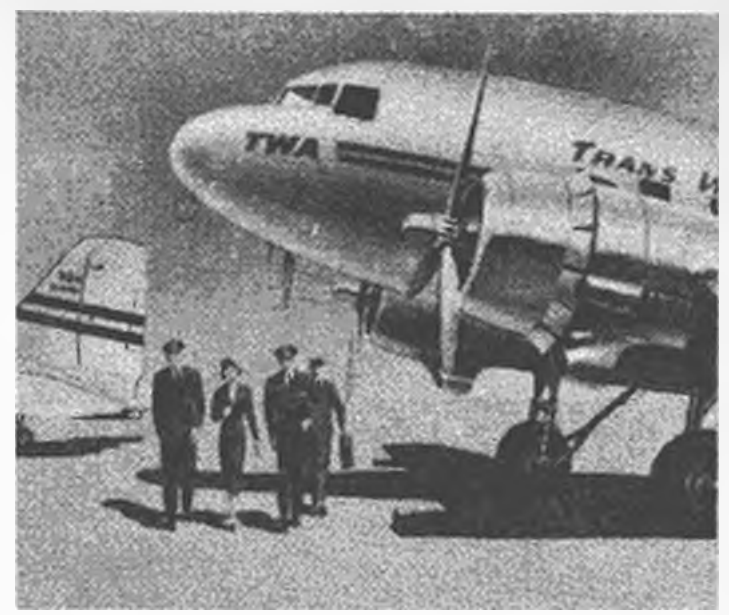
► For the past two years, the mail has been heavy with thanks for maintaining MAN as a model airplane magazine, undiluted with material aimed at other hobbies and groups. Because this has been done, MAN now is able, in its turn, to thank the plane builders for their support. How else is a circulation increase to be explained?



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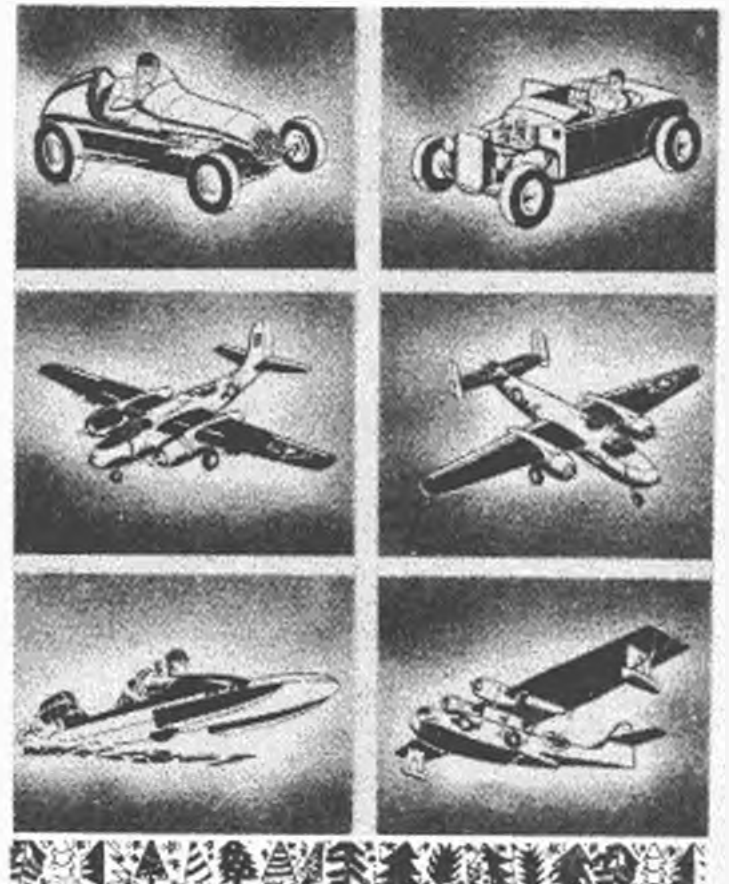
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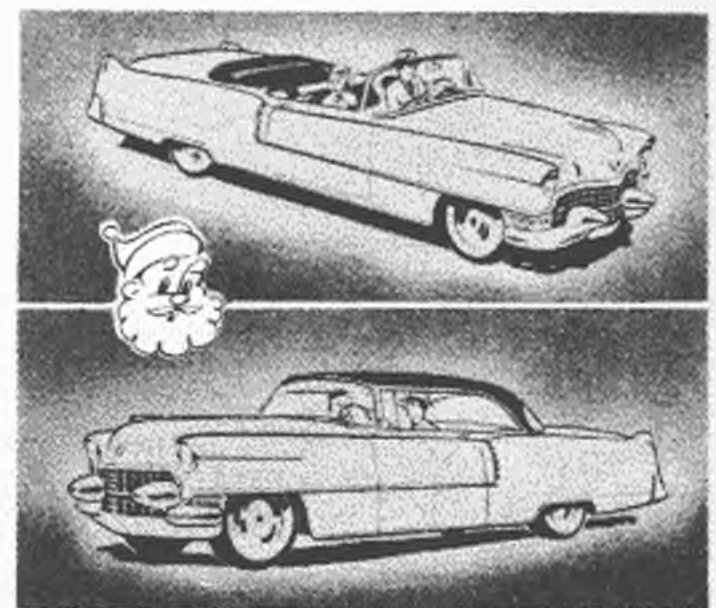
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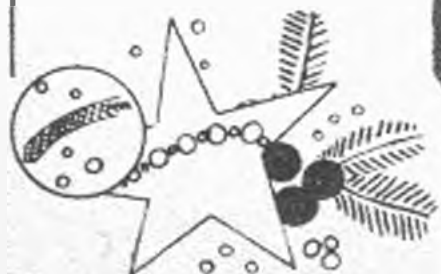
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MODEL AIRPLANE NEWS • January, 1956

MOONEY MITE

By W. E. MOONEY

Delightful Half-A-powered scale model holds its own and then some against those high wing cabin jobs. Free flight, PAA-Load, a dream.

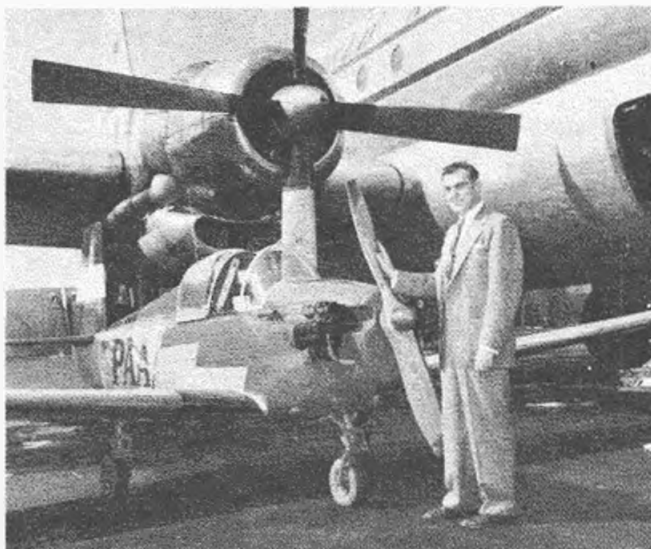
MODEL AIRPLANE NEWS • January, 1956



Twenty flights, including 14 at the Nationals, before this article was written, proved the airplane a successful, stable performer.



Despite sturdy construction, the little Mite weighs only 16 oz. for free flight or 21 oz. with payload. Trim, balance are same for both.



Father of the PAA-Load event, Dallas Sherman, had idea for the payload model of personal Mite. Walt Mooney also is a real Mite pilot.

► The Mooney Mite is a low wing single place light-plane powered by either a Lycoming or a Continental 65 hp engine. It has tricycle retractable landing gear and a sliding hatch which, coupled with its trim looks and modern design, make it resemble a little fighter. The airplane flies as well as it looks.

So when the author of this article found out that Dallas Sherman of PAA-Load fame had a Mooney Mite which he was using as a retriever at large contests, a PAA-Load free flight flying scale model was inspired. This inspiration, it must be admitted, was helped along by a letter from Mr. Sherman suggesting that The Mite be built.

The original has a very gaudy color scheme which makes the model even more fun on the field. The model looks like quite a challenge in view of the widespread prejudice against low wing models in general but with only two deviations from exact scale, it flew right off the board. The horizontal tail was increased slightly in size and the dihedral was raised to supply the added stability needed in the model. The model in the article has been flown 20 times, including 14 flights at the 1955 Nationals. It will fly with or without the payload without any trim changes. Weight, empty, is 16 oz. and, with the payload, 21 oz.

Construction on the model follows full size practice almost exactly, substituting silk for fabric and sheet balsa for plywood. The fuselage is planked where the real ship is planked and the rib-spacing is to scale. All surfaces were made separately and hinged with soft wire for adjustments which, as it turned out, were not needed. The flaps on the model were in the 10° down position to give the effect of an undercambered wing. Scale wing sections and scale washout (wing twist) were used to prevent tip stall which might otherwise be present in a tapered wing.

If the model looks overly complicated, it should be pointed out that making the surface integral with their forward counterparts will in no way hurt the model's flying ability and should result in a slight weight saving.

Simply use tapered trailing edge stock on the wing and run the ribs all the way back. Do likewise with the vertical and horizontal tail. Then the surfaces can be marked on in black paint. For scale contest flying, however, the separate surfaces are worth their production trouble in scale points at the judging.

The vertical and horizontal tails are pretty conventional and fairly simple, so build them first. The stabilizer (I fixed part of the horizontal tail) shows in the factory three-view to be flat on top in the front view with the bottom surface tapering up. Therefore, plank one side with the leading edge while it is still on the work board. Then the slide against the board becomes the top of the stabilizer, since it will be flat.

The wing should be made next because the cut-out in the fuselage planking will then be easier to fit. Cut all the ribs from medium to soft $\frac{1}{8}$ sheet balsa. Then cut the dihedral brace out of $\frac{1}{8}$ plywood, taking care to make this accurate. Cut the landing gear support from 1/16 plywood. Lay the bottom spar and the aft spar down on the plans for one wing. Cement the dihedral brace to the bottom spar and then assemble all the ribs from 2 to 12. Install the top spar and the LE from rib 2 to 12. While this is drying, bend the main landing gear from 1/16 dia music wire. Remember to slip the piece of aluminum tubing over the wire before bending it.

When the one wing is dry, block up the tip for the correct dihedral and, keeping the aft part of No. 2 rib on the board, install two No. 1 ribs and the other No. 2 rib. The No. 1 ribs are cemented together to make a single rib $\frac{1}{4}$ in. thick. Add the center section of the top spar and the leading and trailing edges. When the center of the wing is dry, raise the completed part of the wing still higher so that the spar for the opposite wing can be laid on the board and install ribs No. 3 through 12. When dry, the wing skeleton can be raised from the board, the LE trimmed and the LE sheeting added. Separate pieces must be used between the No. 2 ribs and between the No. 2 and 4 ribs because of the change of taper at these points.

Now add the second piece of the aft spar, which is triangular in cross-section. Build up the ailerons and carve the flaps from $\frac{3}{16}$ sheet balsa. Before sheeting the bottom of the wing LE, install the main landing gear. The free end of the wire is run through the hole in the plywood gear supports and then the tubing is wrapped and cemented to the dihedral brace. This gives a sort of torsion bar suspension which the author has used for some time and which has proved practically impossible to break. The bottom sheeting goes on the same way as the top. Make a $\frac{1}{8}$ sq. notch in it to clear the landing gear leg.

The fuselage should be started next. Cut all the formers out from $\frac{1}{8}$ medium soft sheet balsa. Cut the firewall from $\frac{1}{8}$ plywood and the engine mount gussets from 1/16 plywood. Start assembly by laying the top $\frac{1}{8}$ sq. longerons on the plans and mark the positions of all the formers. Cement the longerons together at the aft end and install the formers in their correct locations. Install the bottom longerons and insert the motor mount beams in the holes in the first two formers. Make up the aft keel from hard $\frac{1}{8}$ balsa. This makes up a bare framework which is quite flimsy. The longerons must be of the same density balsa so that they will bend uniformly. Check each former to see that it is in the right position and true and square with the fuselage as a whole.

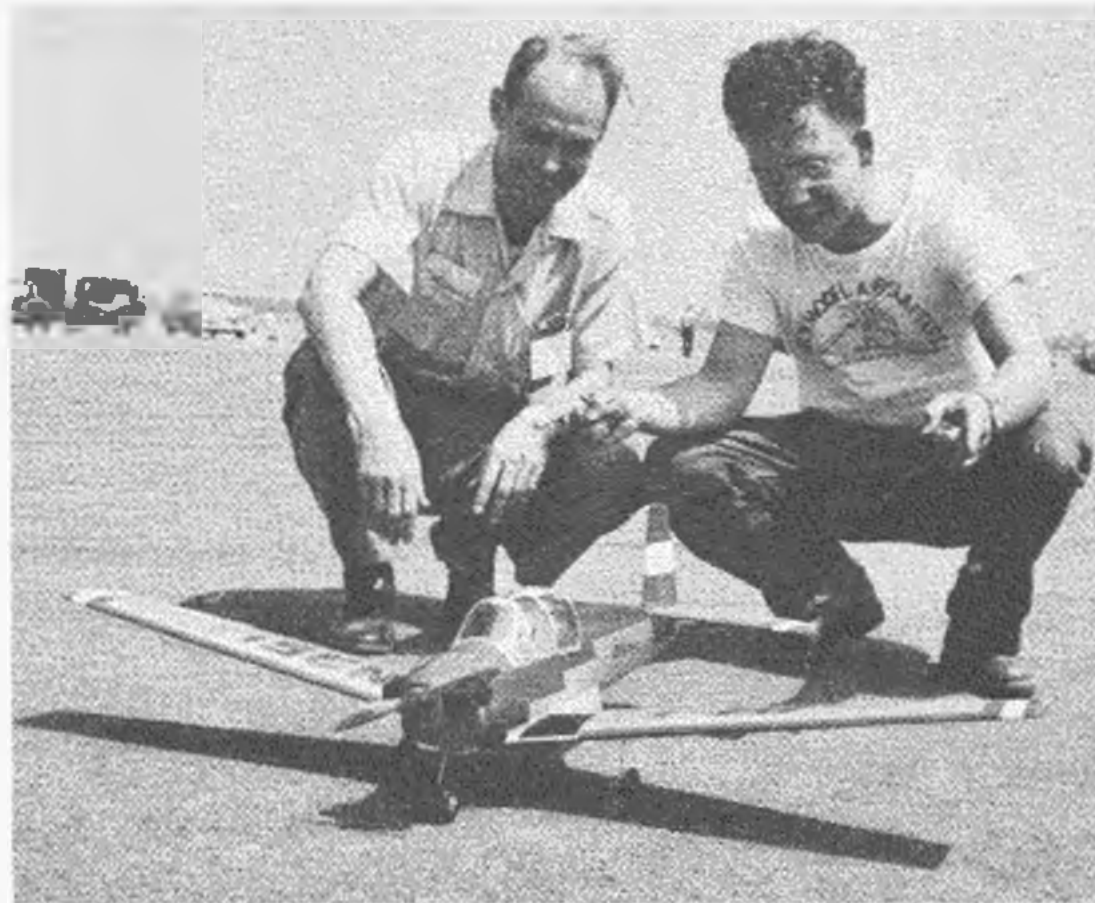
Now take two pieces of 1/16 sheet of the same density and put them on the sides of the fuselage. They should reach from the first former to somewhat aft of the last former and from top to bottom longeron.



Spectacular paint scheme tops off exciting model. Canopy works. Wood is substituted for all metal surfaces and silk for fabric ones.



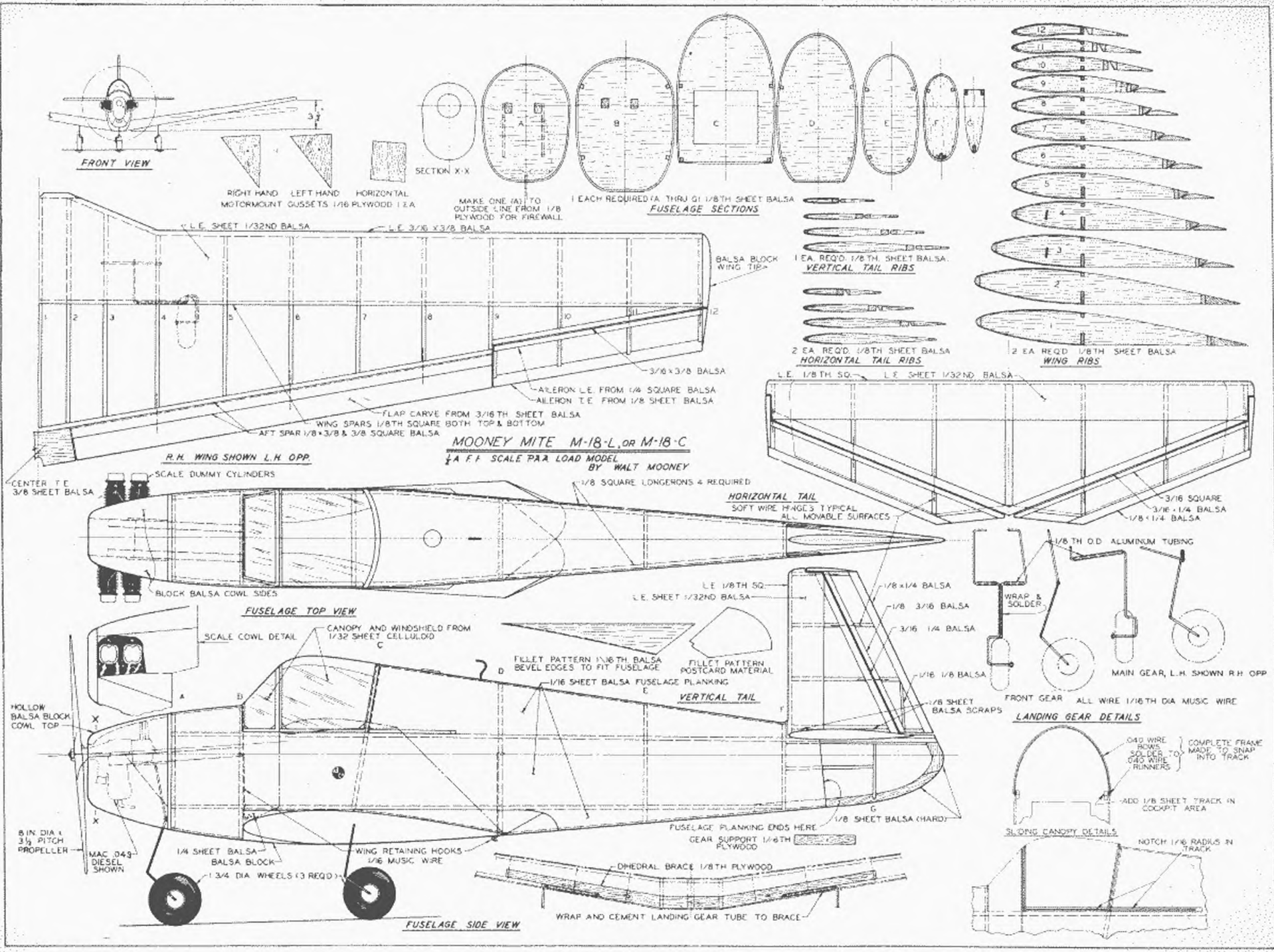
Only the usual increase in dihedral and stabilizer area departs from true scale. Tricycle gear makes take-offs thrill to watch. A prop saver.



Enjoying Walt's briefing on the novel model is Pan American's George Gardner, left. Ship has a simulated dummy engine, scale rib spacing.

Put them on at the same time, using Ambroid or some other slow-drying cement to give the time needed to make adjustments in position and to add the rubber bands necessary to hold the planking in place. There is some compound curvature in these first two panels, so if you find trouble in holding the panels down in front, have patience and resort to wetting them and using pins as well as rubber bands. This completes the most difficult part of the fuselage. The rest of the planking is done with narrow strips, tapering and fitting them as required.

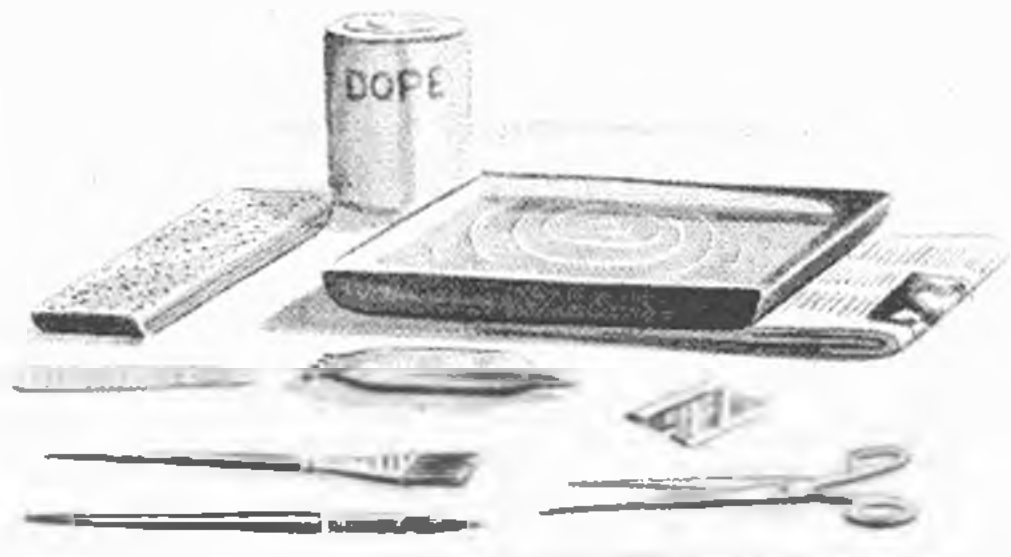
From former B to former C on the bottom, the fuselage is covered with a flat sheet of balsa with the grain cross-wise. This piece goes (Continued on page 42)



FULL SIZE PLANS AVAILABLE. SEE PAGE 52.

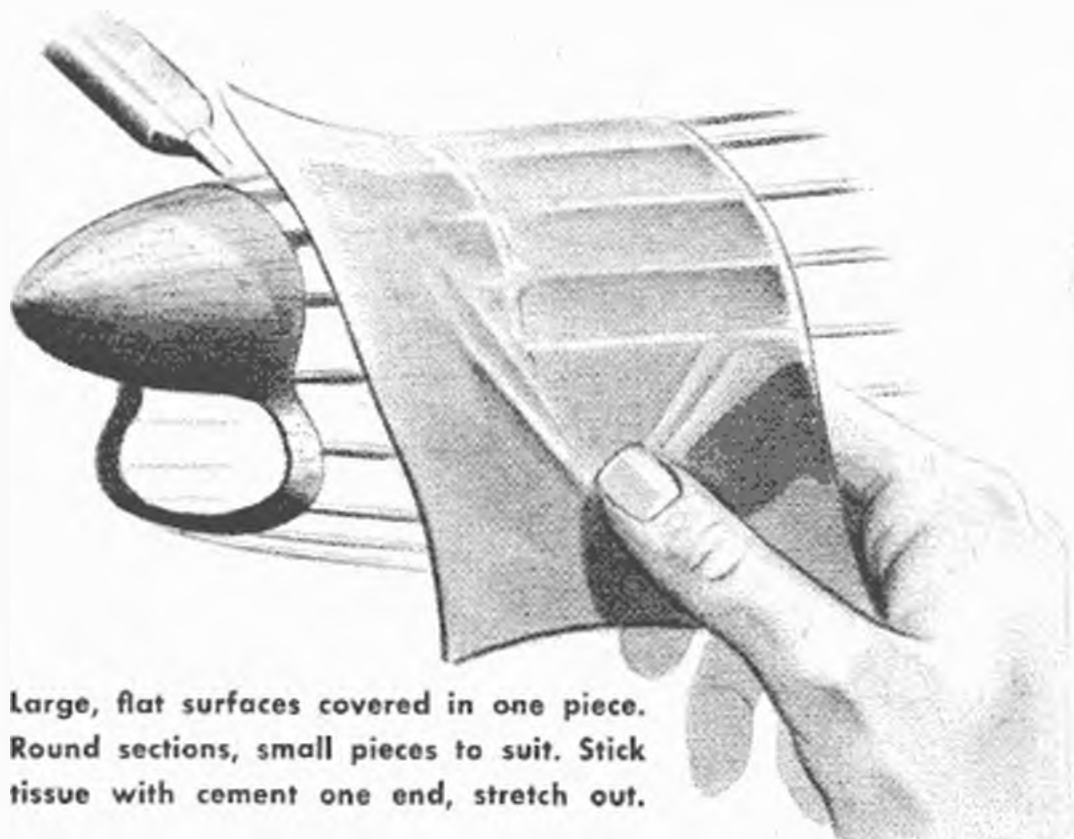
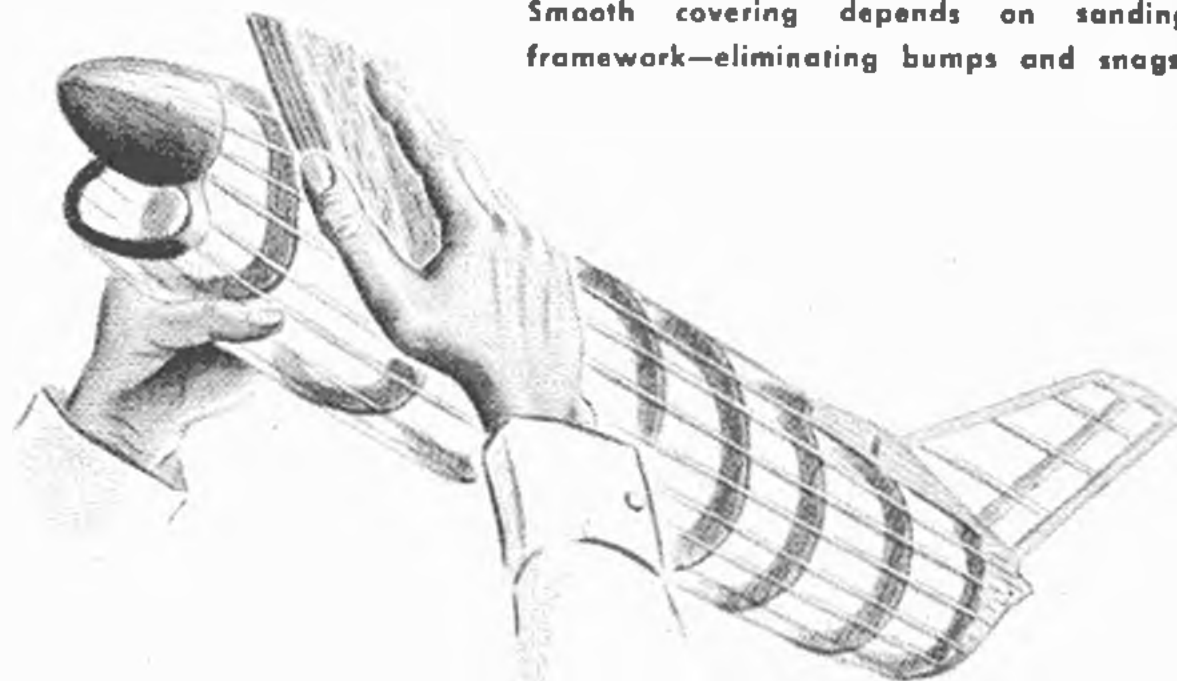
TRY WET-COVERING!

Once you've tried it, wet-covering is slick as a whistle for getting tight, smooth surfaces. Where double curvatures are involved, it can't be beat. Period.

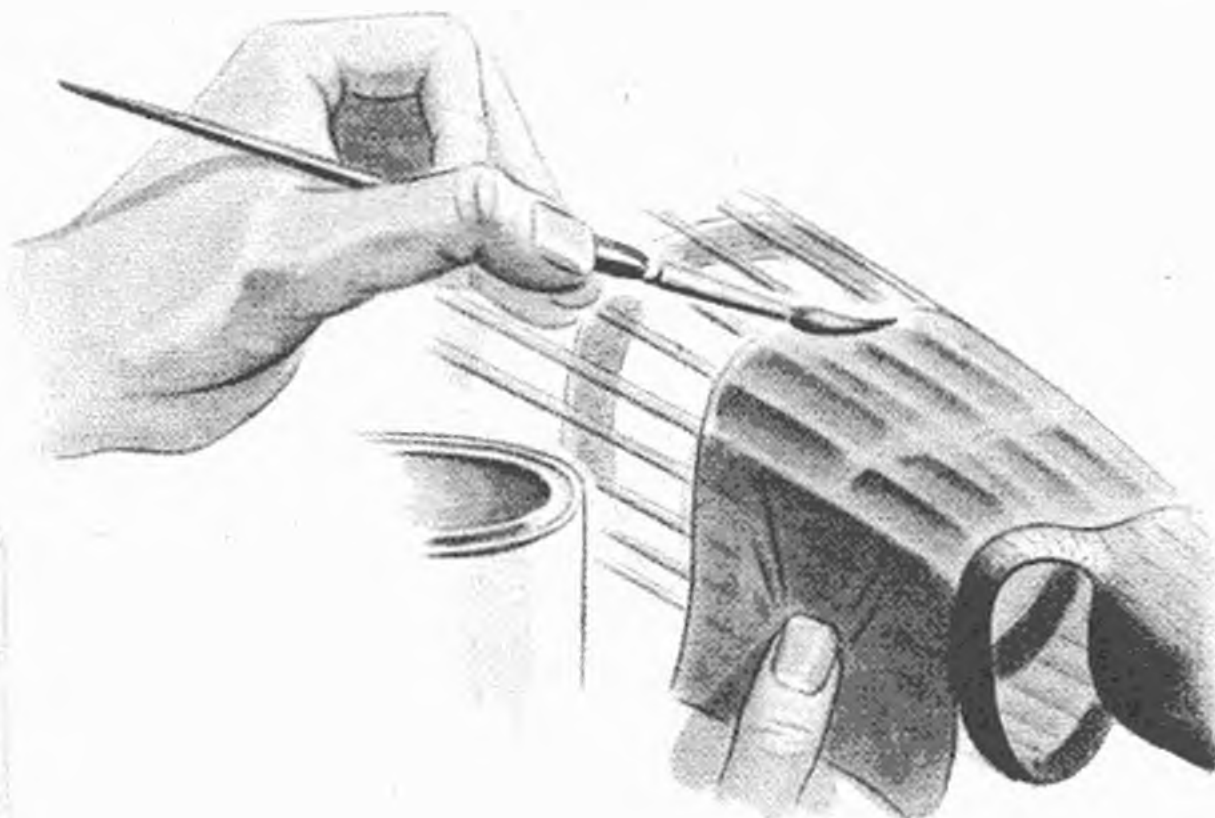


What it takes. The small emery board (try drug store) is useful for getting into those small, hard-to-reach corners.

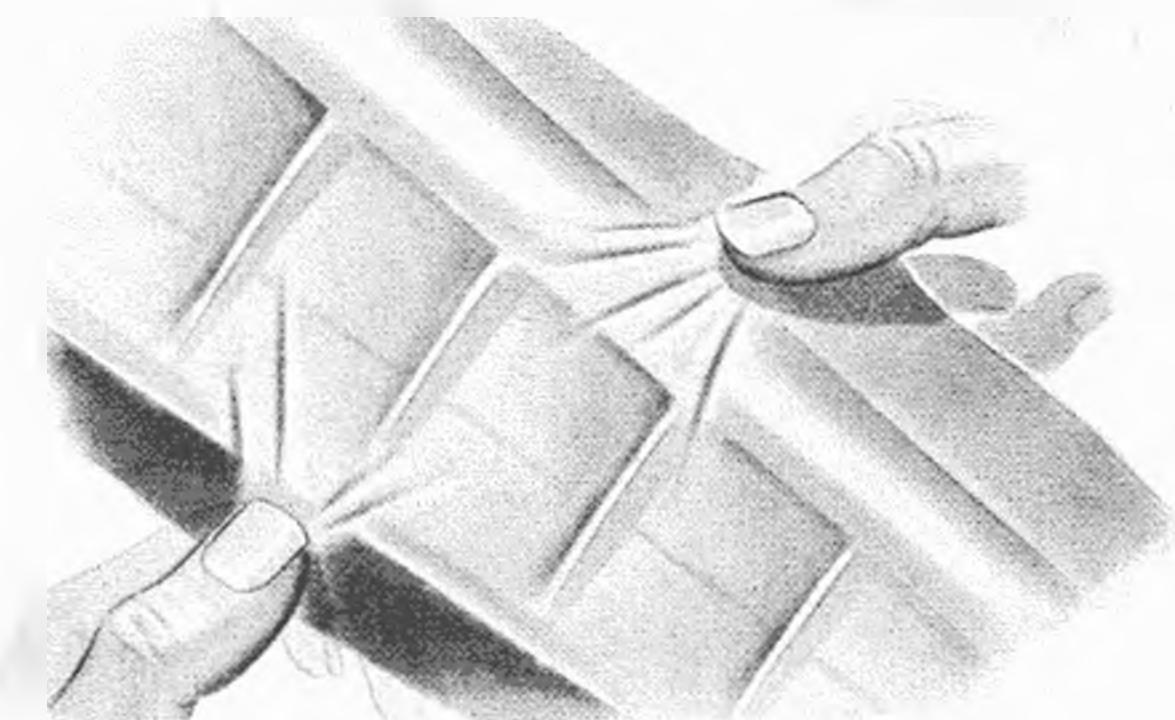
Smooth covering depends on sanding framework—eliminating bumps and snags.



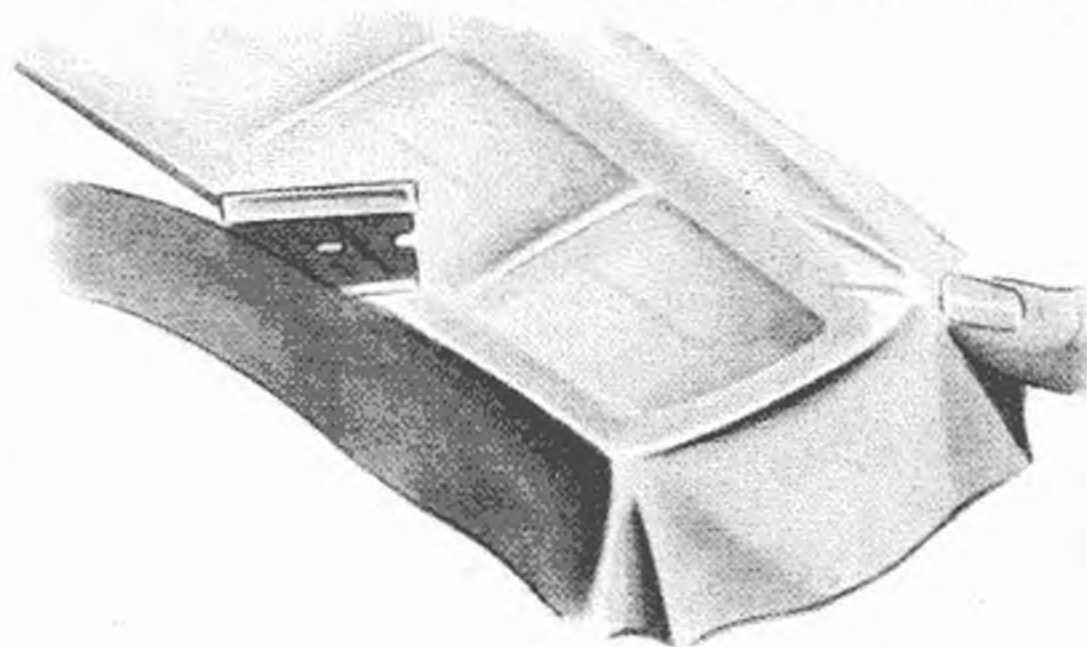
Large, flat surfaces covered in one piece. Round sections, small pieces to suit. Stick tissue with cement one end, stretch out.



Draw out edges of tissue to secure. Work tissue while still damp. If dope "blushes," turning white, add few drops castor oil.

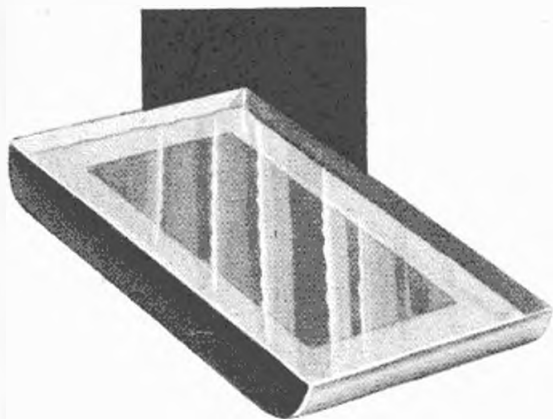


Some builders dope one end, then pull out and dope other end. Or work around all edges. Because paper wet, can move it easily.

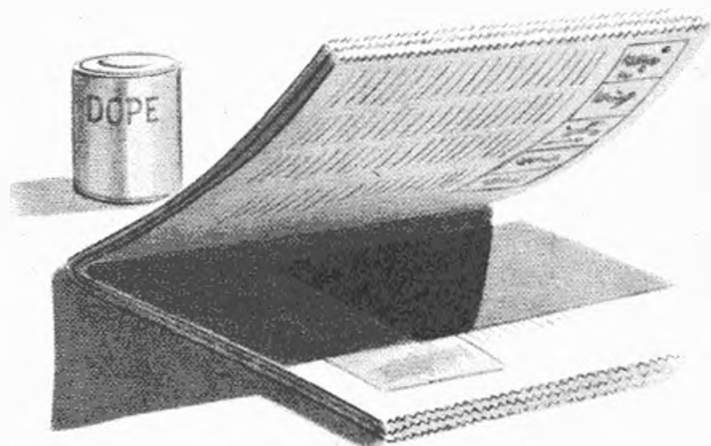


Allow edges to hold tightly before trimming. In case of silk or nylon, allow edges to dry completely or trimming will snag.

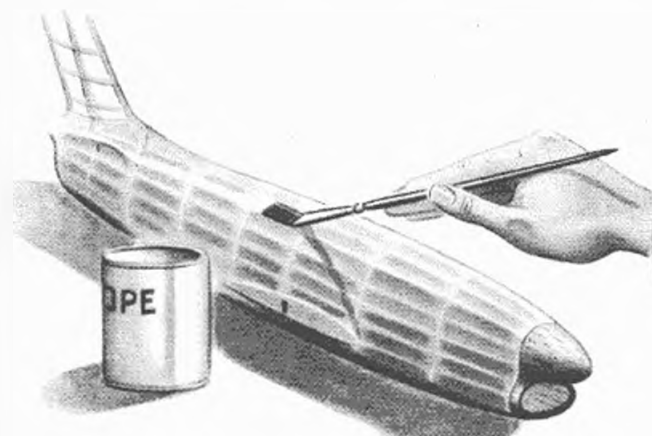
► All the common sense points you'd use in dry-covering apply when wet-covering as well. No covering job can be better than the initial preparation, sanding, etc., permit. The frame must be accurately and strongly built to resist any warps. When surface is dry and tight, you can dope and paint as you'd normally do. Water-wetted covering does not stick to wood when pinned down. Use only wet type covering materials like Silkspan and silk.



Material soaked in water for a few seconds. Fold the material in half as many times as necessary to fit in the pan.



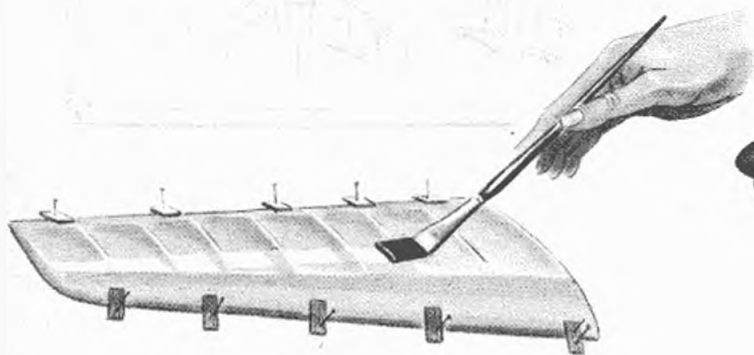
Excess water is blotted out of material by placing it between a fold of the newspaper. Dye sometimes stains a towel.



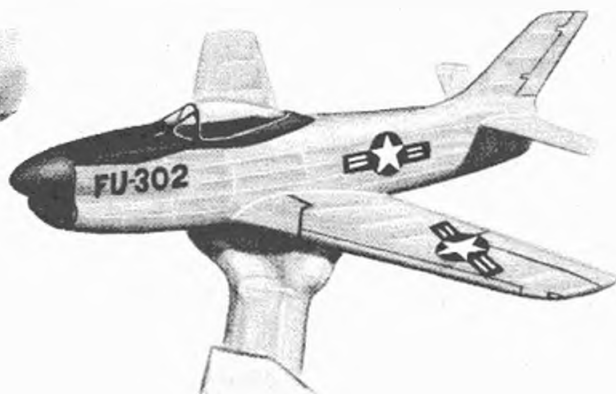
After covering is dry, check for "pulls." If any, rewet, allow to dry. Several coats clear dope draw tissue permanently.



Wing sections in one piece, grain spanwise. If dihedral, use piece each panel. Dope edges, pull out to eliminate wrinkles.

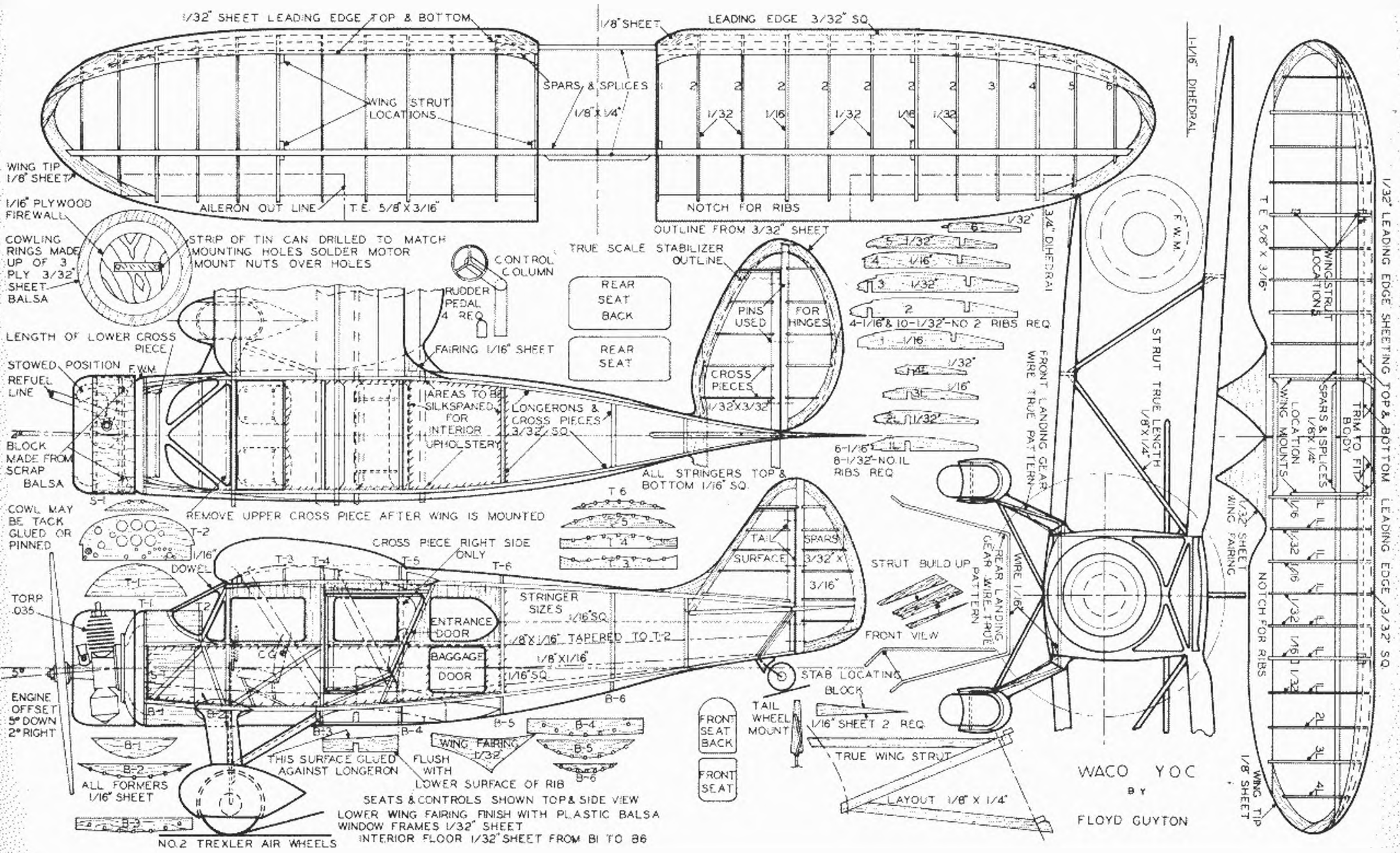


Once covered and dry, pin down panels as shown before dopping surface. No pins in framework. No warps! Put wax paper beneath?



Senores y senores! Drumtight finish on models of streamlined modern planes essential if the crate is to look like the real thing.

FULL SIZE PLANS AVAILABLE. SEE PAGE 52.





An almost indiscernible increase in dihedral and a slight addition to the stabilizer area are the only departures from scale. Note open cabin door.

WACO CABIN

From the Pacific Northwest comes this Half-A scale model, a grand flier, contest winner. Not exactly cinch to build, but worth it.

By **FLOYD GUYTON**

► The Waco Cabin, as it was commonly known, was built between 1931 and 1940. It boasted greater stamina, speed and desirable performance than any other airplane in its class. With its compact size, easy handling and pleasing appearance, it made an ideal luxury, family or businessman's air vehicle.

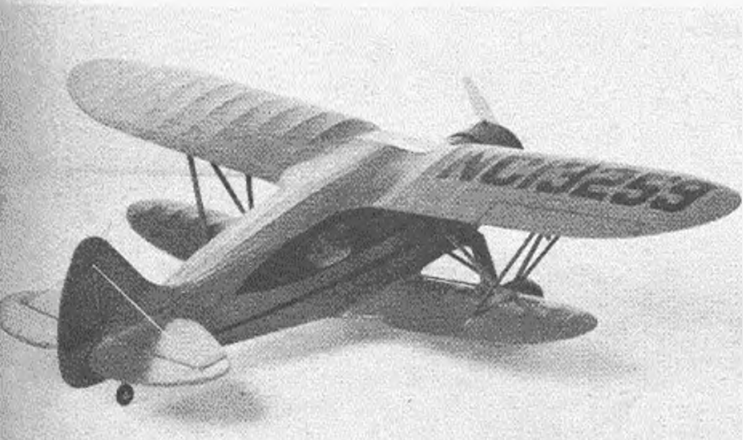
The model, winner of the '54 Jim Walker Northwest Championship, drawing top points for scale, reflects all the ruggedness and stability of the original. Appearance is enhanced by clean fairings and smooth lines. Very few changes were made from true scale. The dihedral was increased from $2\frac{1}{2}$ to 4" and the stabilizer area slightly increased. The widespread landing gear and large rudder facilitate unassisted take-off.

This model is not as difficult to build as it may appear. The sequence of construction is of prime importance. Tail surfaces are self-explanatory, except that the stabilizer spar and front outline will be duplicated by extending on through to make the other side. Wings are built up in the usual manner. Dihedral may be spliced into wings directly over wing views of drawing. Leading edge top sheeting should follow splicing. Then build up fuselage square in usual way, noting entrance door on left-hand side only; reserve the door construction for later. If you wish to upholster the interior, this is the time to do it.

Area from back of entrance door from B5 to T6 station between baggage compartment and rear window should be covered with Silkspan to separate baggage compartment from cabin. Interior was painted one coat of light gray dope, floor is 1/32 sheet balsa, baggage compartment floor was corrugated and may be simulated from corrugated paper found in packaged cookies and similar articles.

Build up seats and controls, paint gray and cement into positions. Add stringers only to sides of fuselage. Now build out frame around entrance door of 1/8 x 1/16 stick, inside opening, to make sure of exact fit. Entrance door is hinged with three layers of Silkspan.

Install formers T1 and T2; also, 1/32 sheet areas from T1 to T2 around sides to lower longeron as shown in shaded areas. Cut out window frames of 1/32 sheet, check for fit, treat both sides with Silkspan, paint gray on inside and black on outside, cement celluloid windows into place and install. Windows should be covered with masking tape as protection against dope and cement. Sides of fuselage, wings and tail surfaces may be covered at this time. *(Continued on page 48)*



Unassisted take-offs just come naturally for a real looker like this. That color scheme, incidentally, is Waco maroon with black trimming.



Unusual feature of Waco Cabin was the interplane strut system which, on model, adds crack-up resistant rigidity. Glow plug juts through cowl.



Dorothy Deffner holds hubby Bill's Piper J-3 Cub with Fox .25 engine. Radio a Babcock three-channel. Second in Lakeland, Wis., multi event.



Remember that pic of Marion Cain's (Lafayette, Ind.) Tri-Pacer framework? Here 'tis. You need the wide open spaces and tower's green light.

multi-channel by Frank Madl of Chicago. Glenn Lee, Evansville, Wis., took first in a new event known as Single-Channel Multi-Control. Interest was so great in this event that it has already been scheduled for next year. Are there any other clubs running such an event?

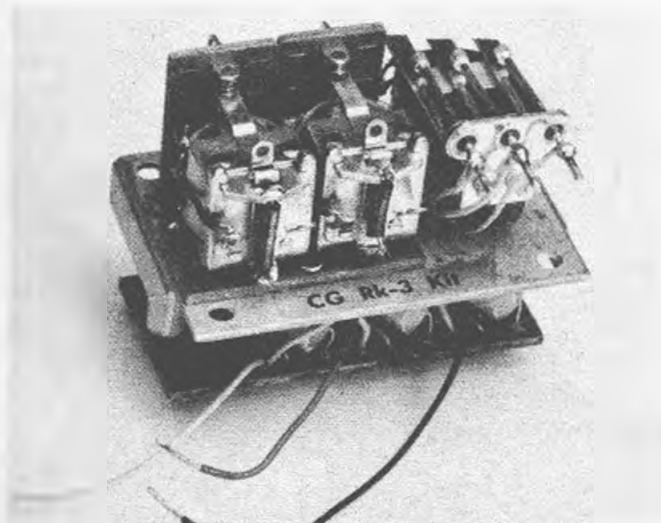
Richard Flinchbaugh of Poughkeepsie, N. Y. has been doing quite a bit of RC boat work and reports from last summer indicate that improved range is obtained by grounding the A+ and B- of the receiver to the water. This was done by soldering a wire from the battery connections on the receiver to the stuffing box. An increase in range of approximately 40 per cent was obtained.

The East Park, N. Y. Flying Maniacs, who turned to RC boats all summer, for lack of suitable flying sites, are now back in the air. This airfield business can be mighty serious at times and those of you who live near wide open spaces should be thankful. Reports from around the country show that the main reason

for being rejected from a flying site is non-compliance with local rules and regulations. All of which brings up another question of non-compliance with rules and regulations: Have you sent in your FCC registration yet?

Reviews of overseas RC boat events show that the first place winners are using reed equipment. RC plane builders on the Continent are rather conventional, with Germany turning out some nice looking ships, some scale jobs and the rest designed around our standards. Some of the Scandinavian countries go in for unusual designs, all of which are claimed to fly very well. English models are usually pretty much like our designs, although the trend is toward a "box" type of design.

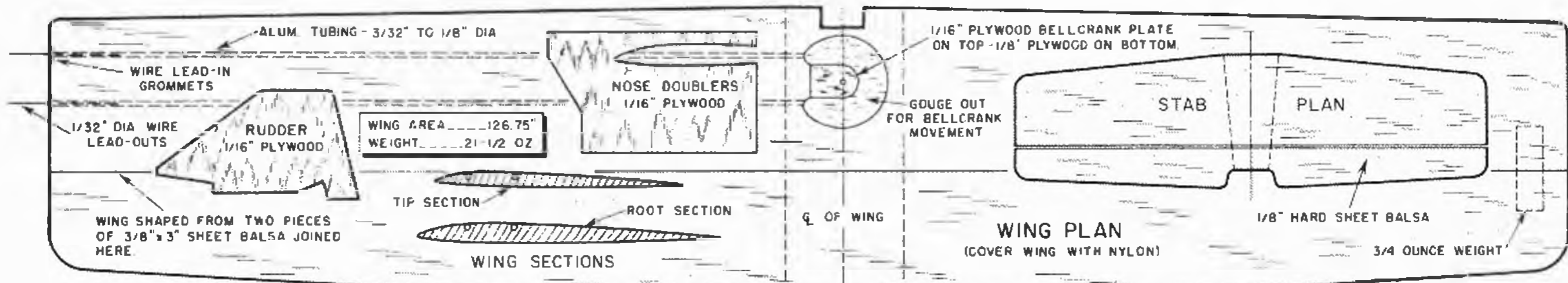
Jack Layne of 221 E. 28th St., Hamilton, Ont., Canada reports that our original two-tube receiver and MOPA transmitter have given him an entire season of reliable flying. A Sea Cat by Berkeley has been flown by most of the free flight (Continued on page 37)



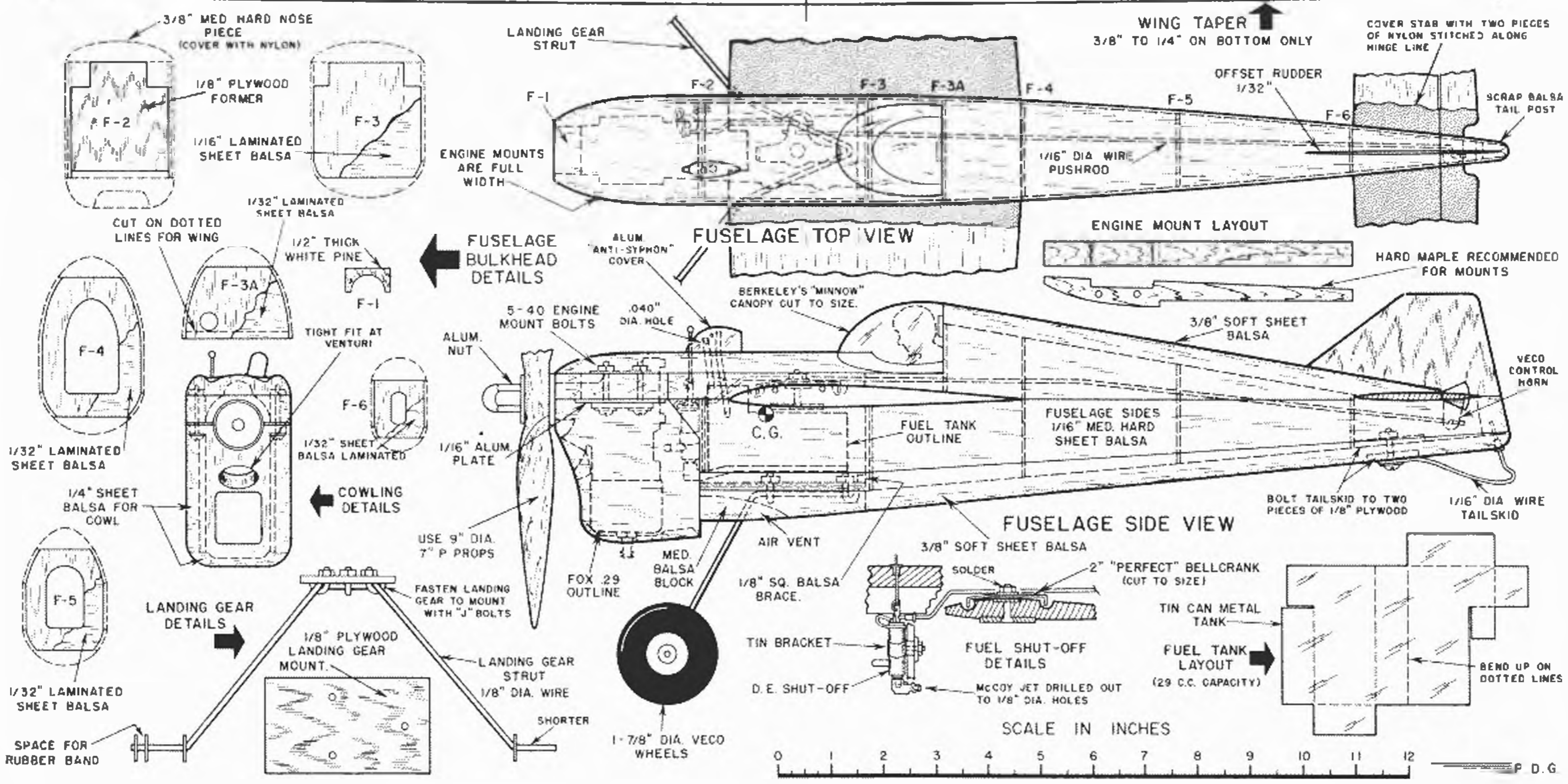
The CG kit referred to in the article. Manufacturer claims operation on one pencil and a 30 volt hearing aid. Multi-channel Half-A, maybe?



Flying his trusty deBolt Cruiser with Babcock radio, newcomer Eddie Friend beat out even the old hands in rudder-only at the '55 Nationals.



NOTE INSIDE WING PANEL IS 1/4" LONGER THAN OUTSIDE WING.



The '55 RAMBLER..



Third Annual U-Control Olympics Trophy earned by Number 9 Rambler was one of last season's wins. Not fancy but real flying machine.

By **GEORGE MOIR**

A "snow job" isn't necessary for this team racer. A word tells the story: performance. TR chariots in your blood? Do try this one.

► Team racing officials are becoming more conscious of the design and appearance of the models: beauty judging is becoming an important factor in the team race event, as the planes have been getting faster and faster, for it is in a close race that beauty points may mean the difference between being chosen for the feature race and being barred from it. So, with this in mind, I designed this new Rambler, which has a snappy appearance and is very easy to build and has proved to be a strongly constructed plane, as well as a very steady flier with plenty of zip.

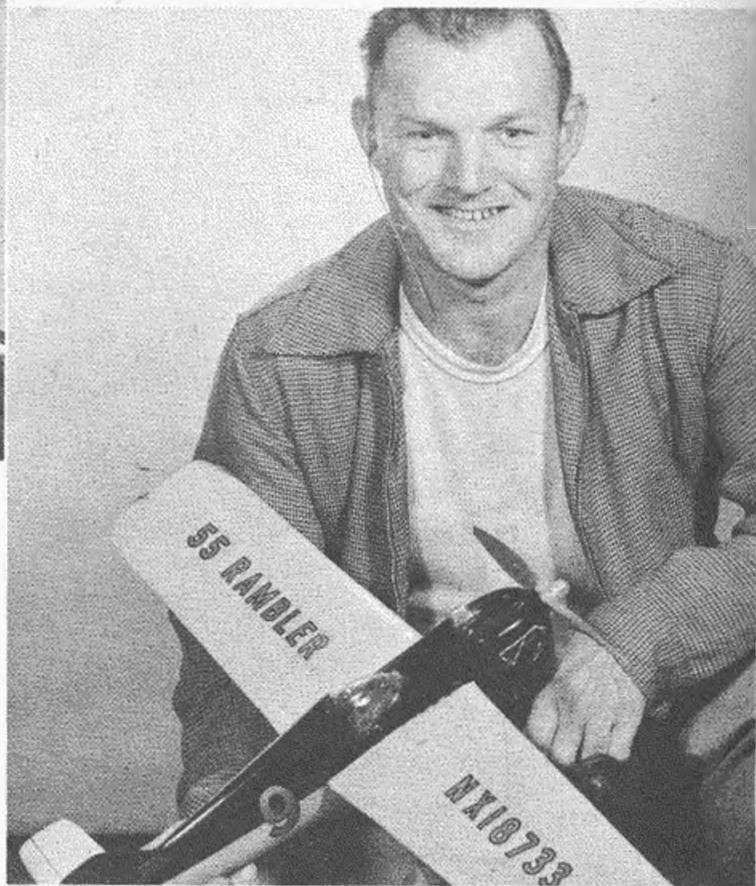
This model design has already twice broken the eight minute barrier: at Frederick, Md., 7:57; at Washington Contest in Rockville, Md., 7:59, both times taking off from rough grass. Speed averages about 5 mph better than the '54 Nats winner, delivering from 90 to 104 mph with an M.S. Fox .29 up front.

Acceleration averages 2:6 to 2:9. At Far Hills, we checked in at 2:2. 18:5 in the seven laps. A sister ship owned by Bob Hemingway also checked at 2:7 to 19:00 in the air. Bob is the fellow who twice did under eight minutes with his Rambler and M. S. Fox set-up. Bob is 15 years old, which proves you don't have to be an old pro to build this New Rambler.

As always, study drawings carefully; save many mistakes later.

Make up formers 2, 3, 3A, 4, 5, 6. Tail-wedge formers 4, 5, 6 are two pieces of laminated 1/32 hard balsa. Formers 3, 3A are laminated medium hard 1/16 balsa. No. 2 is 1/8 plywood.

Cut out 1/16 plywood doublers (two), mark off thrust-line (TL) on doublers and also all former positions. Mark the doublers where formers 2, 3 go. Cut motor mounts (MM) from maple or some other tough wood



Better than even his 1954 Nationals winner, the '55 design consistently has broken the "eight-minute barrier." George makes MS Special engine.

that won't splinter easily. Cement MM to doubler on TL's. Cement formers, 2, 3 in place. You now have a box-type section; keep this square while cement dries.

Cut out two side planks 1/16 x 17 medium hard balsa. Mark off on inside of planks the positions of all the formers; remember the top edge of this plank is your TL. Cement side plank to front section (doublers) lining up top edge of plank with bottom edge of MM. This is a very important step. Cement all formers in proper place, lining up TL with top of side plank, except 3A, which is installed after wing is in place.

Cut out wing from 3/8 x 28 medium hard balsa. Inside wing panel is 1/4 in. longer than outer wing. This is a feature that helps make this plane stay where pilot wants it, even in heavy winds. Gouge out two 3/8 slots for lead-in wires; also gouge out for bellcrank (BC) movements, BC to be installed later.

Lay 3/32 wire in wing slots, then cement 1/8 balsa strips in slots. Make sure you have movement on wires so they can be removed, leaving a hole for regular flexible lead wire to be installed later.

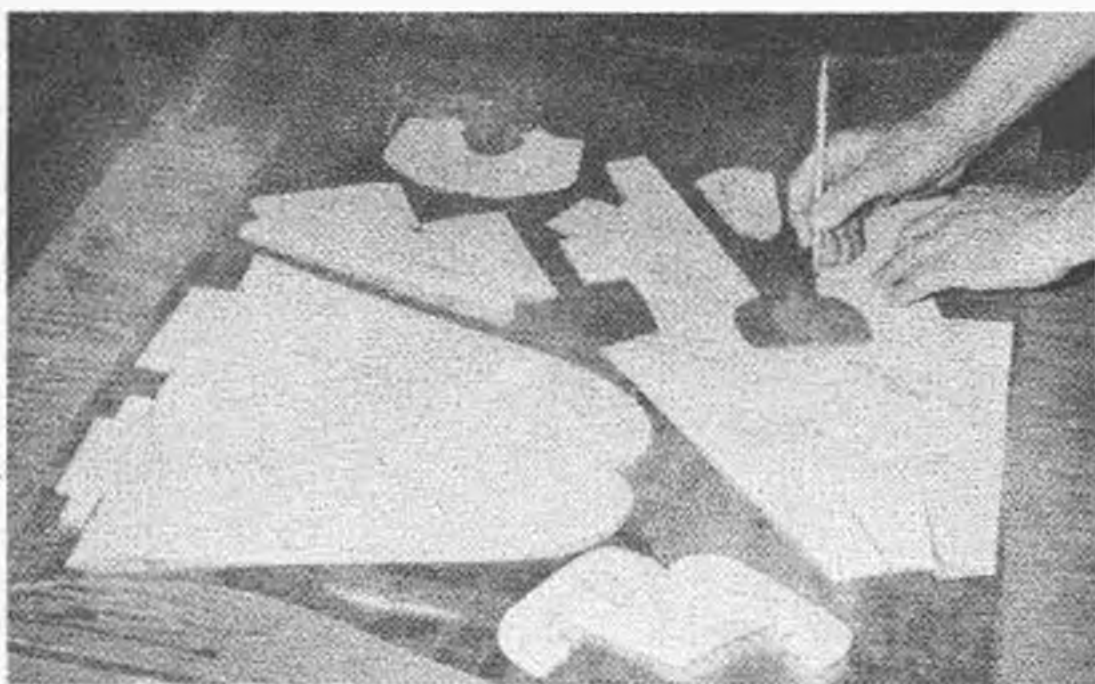
Cover wing with nylon for added strength. First cover the center area 5 in. in each side of center line of wing. Sand edges down, then cover wing all over with second piece of nylon. Install wing in proper position, exact right angles to fuselage center line. Double-cement (To be continued on page 49)



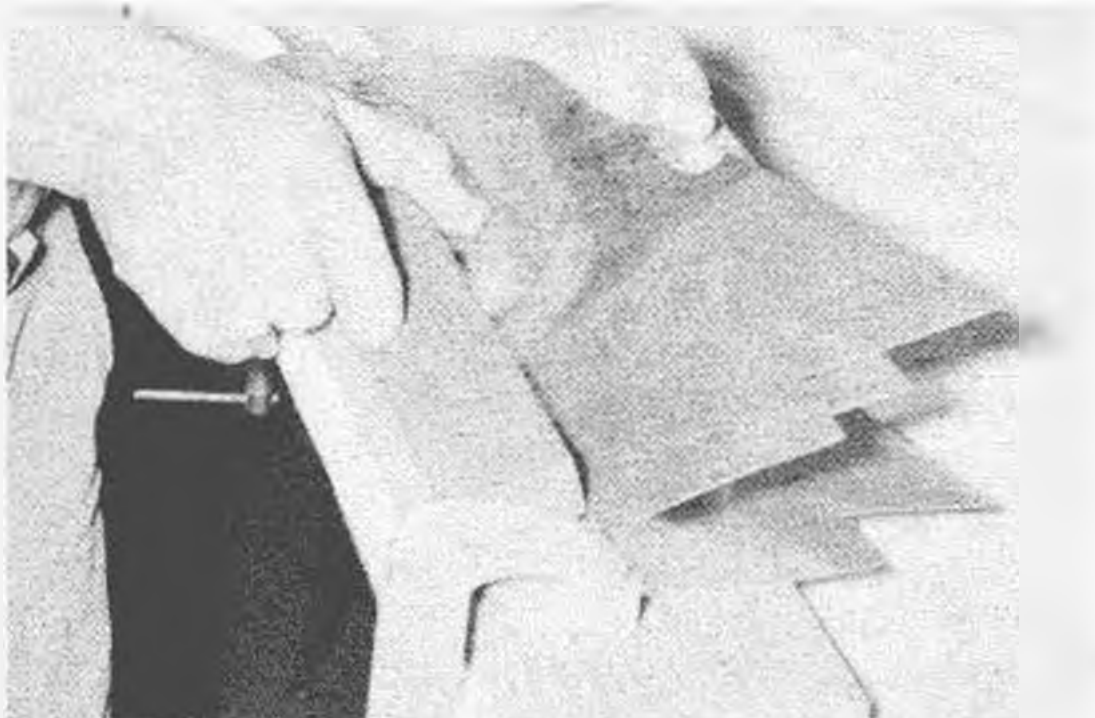
Sheet-metal team racer here displayed by author is his K & B Allyn .23-powered Skeeter, a faithful copy of the prototype. A Goodyear racer.

By **GRANGER WILLIAMS**

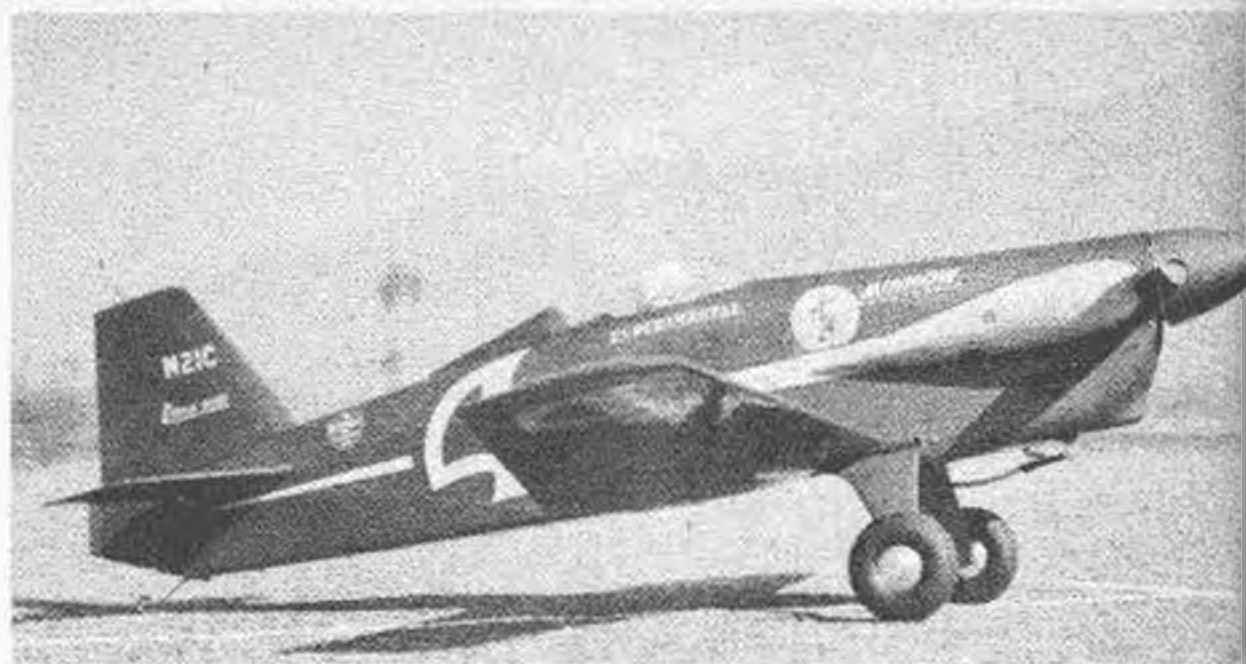
No wizard of the tin snips do you have to be to make models the way real airplanes are built. Build or not, a challenging article.



Tracing patterns on .010-.012 24ST aluminum sheet. Patterns arranged so bending minimized during cutting. Gloves protect hands when cutting.



Partially curved panel then worked further over a shaped block, here shown clamped to bench. Block in hand is used to work in a smooth curve.

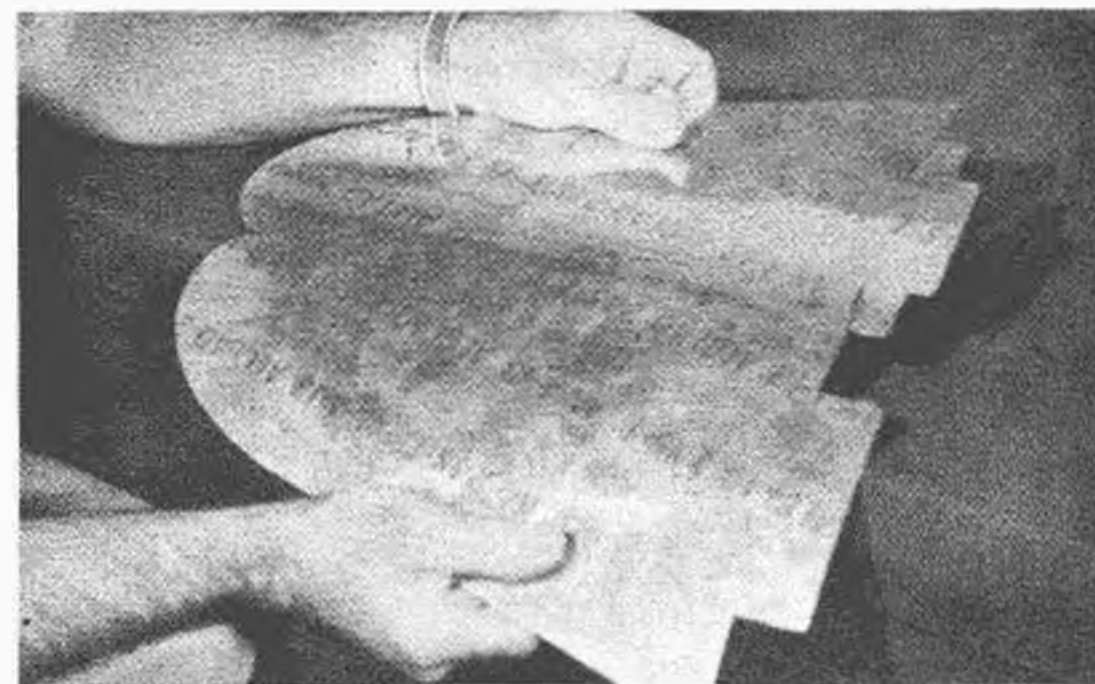


Probably the most famous of the Williams' metal jobs was his Cosmic Wind Minnow, which won the Nationals team racing event several years ago.

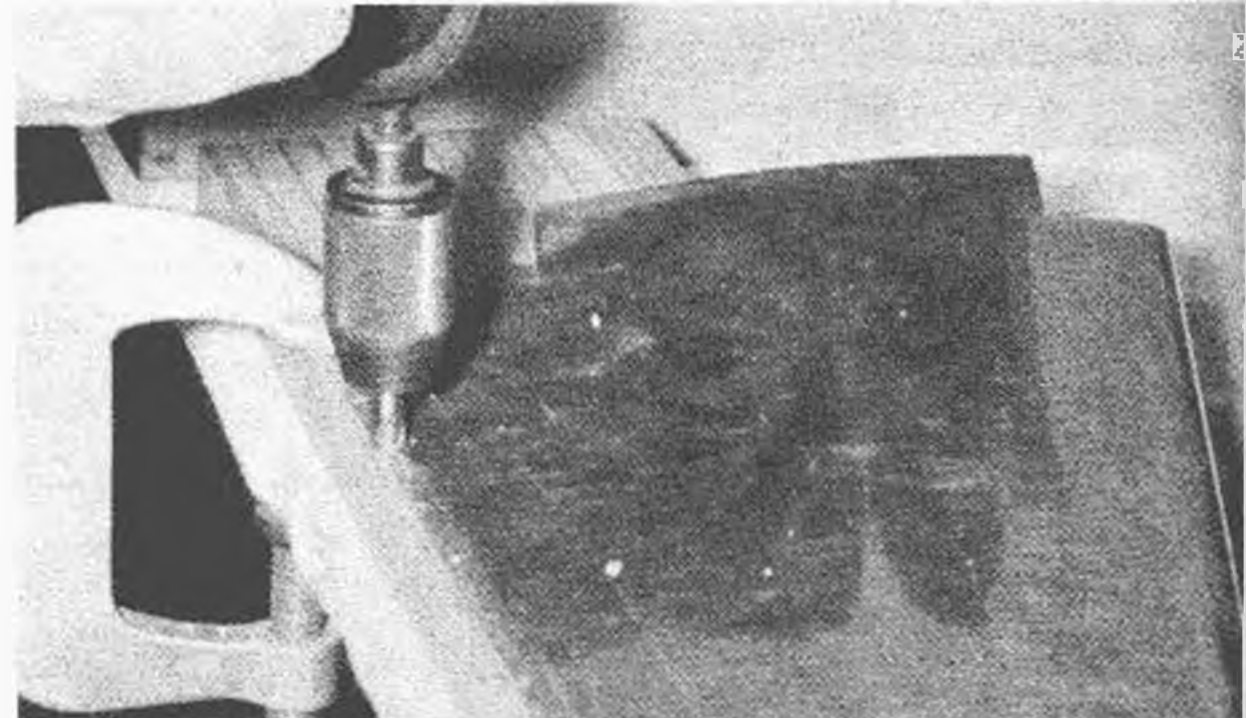
All Metal!

Part One

► If you have any mechanical ability at all, it is possible for you to build an all-metal scale or semi-scale model of your favorite airplane. It is not necessary that you be an experienced sheet metal man to do so. The only experience I had ever had with sheet metal



Partial leading edge curve worked into wing panel by rubbing metal over edge of bench. All edges are smoothed, burrs removed, with fine file.



Countersinking drilled holes in trailing edge. Flush-head rivets placed $\frac{3}{4}$ in. apart. Rivets placed close to edge. Clearly detailed in text.

construction was when I was making metal wings for speed models. I had never given a thought to building an all-metal model until I became interested in team racing. Then I decided to try and build such a scale model to fly in these races.

My first model of metal was the Cosmic Wind Balerina. It weighed in at 2½ lb., which is quite heavy for team racing. Although it was just as fast as the lighter models, it had a very slow take-off acceleration, which was a disadvantage. Consequently, as I built new models, I began to cut down on weight as much as possible without sacrificing much strength.

The Cosmic Wind Minnow was constructed at 2 lb. even, and my lightest model weighed just 26 oz. Weight, however, is not too big a disadvantage, as I have demonstrated many times against 18 and 20 oz. team racers. It does mean that you have to use a little more science and common sense in the construction and flying of your model. A scale model in metal, as well as in wood, is going to weigh more than a model that just fits the rules of an event. This generally results from the larger fuselage cross-section and details of a scale model, in comparison with the wing area.

It is not necessary to have fancy forms or bending equipment to construct a metal model. My equipment consists of the edge of a bench, several sizes of tube or dowel, a 2 ft. piece of 2 in. angle iron, a couple of tapered sticks, two or three C clamps and my hands.

Before you start to build a metal model, make a full size three-view drawing of the airplane you wish to construct from metal, picking one that has few compound curves—or that will look well without them. The type of airplane you build will determine whether

the seams should be on the top or bottom of the fuselage. On all the metal models that I have made, I have had the seams on the top of the fuselage forward of the cockpit and on the bottom aft of the engine cowling, landing gear or wing. The model we show has a minimum of curves and yet is a good looking airplane that is very stable in flight.

As shown in the drawing, the wing is very easy to lay out, being usually in two pieces, with separate right and left panels. The wing panels are laid out to bend around the LE and to be riveted at the TE. The method for doing this will be discussed later.

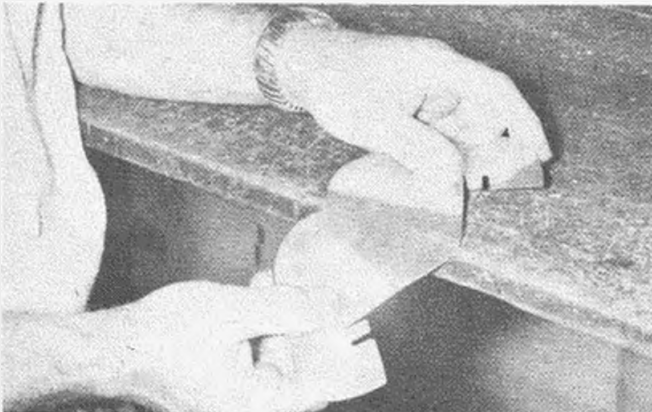
The stabilizer is laid out in one piece, as shown on the drawing, in the same manner as the wing. The elevators are folded at the hinge line and laid out separately, unless the model you build has a one-piece full span elevator. The rudder is folded in the same manner as the stabilizer and riveted at the TE. This takes for granted that the airplane has straight LE's on the wing or tail surfaces. If the LE's are curved, a few changes have to be made. The surfaces then must be made with separate top and bottom sheets with a thick LE piece sandwiched in between. A typical curved LE rudder is shown on the drawing in exploded view.

For my models I use .010 or .012 in. 24 ST aluminum sheet, with reinforcing strips of .030 in. aluminum sheet or aluminum angle of the right size and thickness. Rivets used are 1/16 in. flush-head and round-head. All this material was purchased at surplus stores. Lay out your patterns onto the sheet metal in a manner that will allow you to cut the pieces out without bending them, if possible. Remember to drill a small hole in the inside corners, at least 1/16 in. in diameter, as any inside corner not radiused in this way will crack and spoil the entire job. If there is a bend at an inside corner, a large hole is necessary to avoid cracking. It is a good idea to use a pair of gloves when cutting the pieces out for a cut from aluminum can be serious.

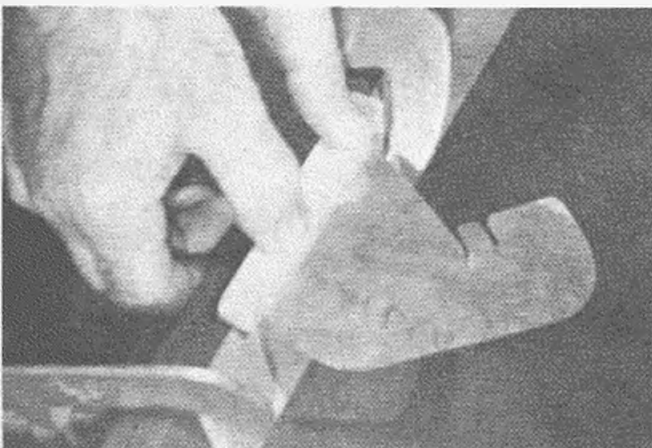
When you have the pieces cut out, take a fine file and round off all edges and remove all burrs. If there are spots where a sharp curve prevents your making a smooth cut, a half-round file will help greatly.

When you have the pieces ready to start forming, begin with the vertical fin or rudder (as the easiest piece to form), holding with both hands, and rub the inside surface over the edge of your bench until you have a slight curve in the entire piece. Then clamp a piece of wood about ½ in. thick and rounded on the edge to the inside of the piece of metal, with the radius at the place you wish to make the bend. With a block of balsa wood the length of (Continued on page 45)

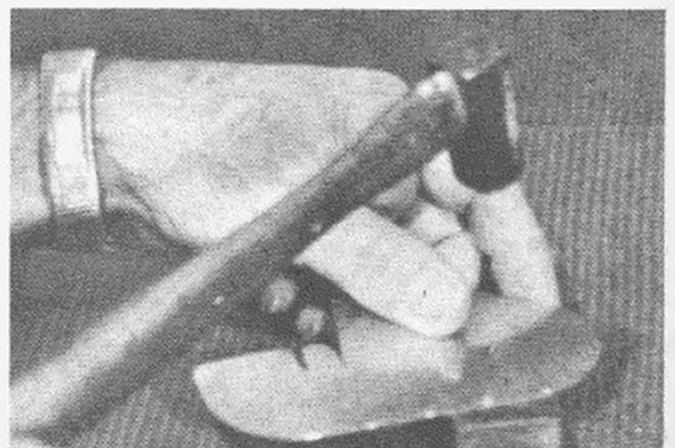
DRAWINGS AND PATTERNS ON NEXT PAGE



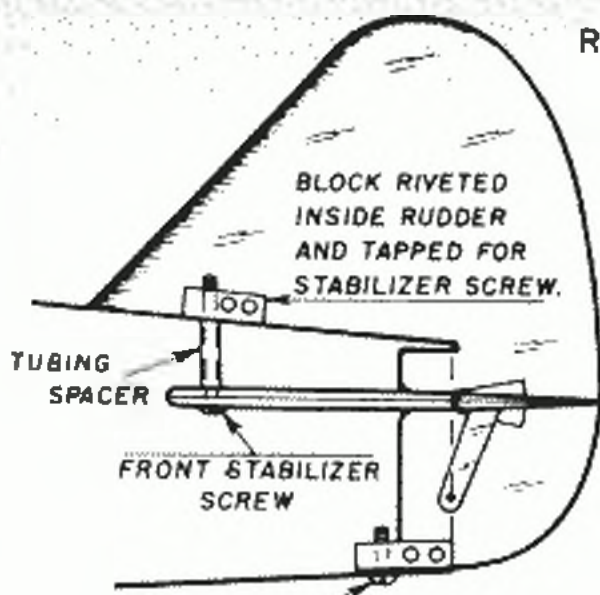
Fin-rudder (shown) and stabilizer formed from one sheet by same method as wing. Anvil and small hammer for riveting. But practice on scraps!



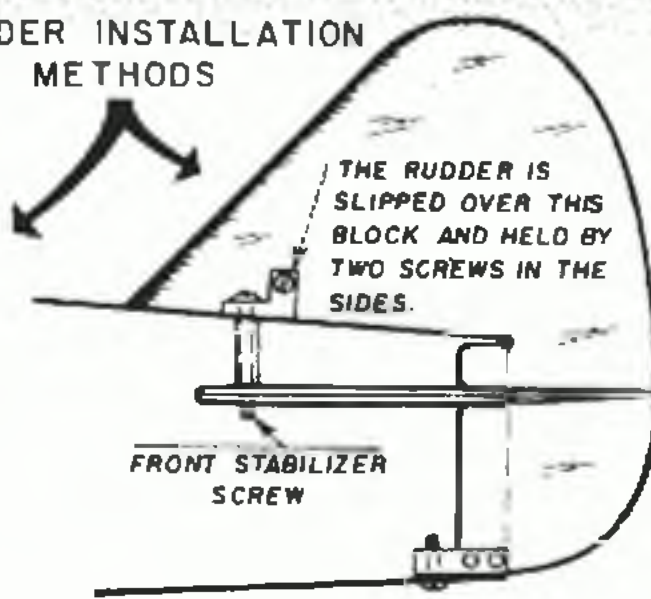
And here is the fin-rudder leading edge being fully bent with aid of C-clamps and wood block. If edges don't meet, bend is wrong; start over.



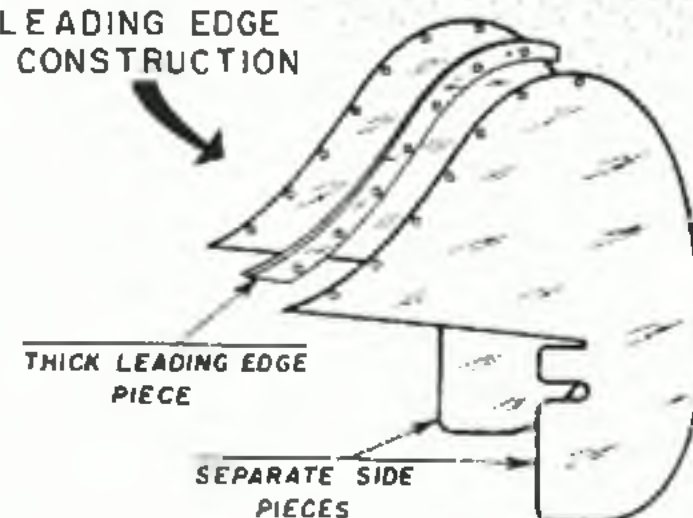
With side cutter or file rivets can be cut down to 3/64 in. above surface. Ends of rivets are hammered out until about 3/32 in. in diameter.



RUDDER INSTALLATION METHODS



CURVED RUDDER LEADING EDGE CONSTRUCTION

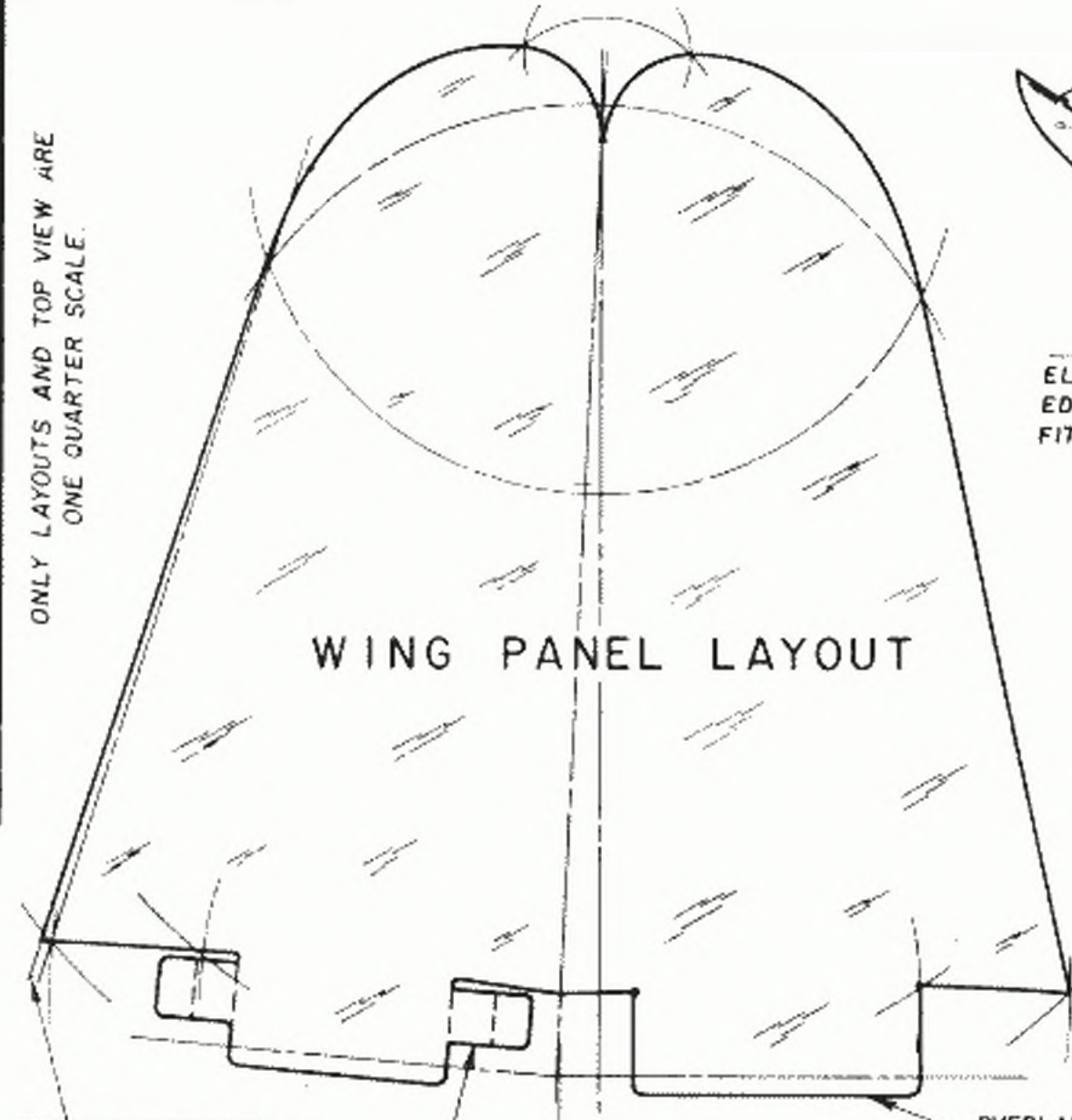


BLOCK RIVETED INSIDE BOTTOM OF RUDDER.

NOTES 010" OR 012" 24ST ALUM SHEET AND 030" ALUM REINFORCEMENT STRIPS USED UNLESS OTHERWISE SPECIFIED RIVETS USED ARE 1/16" FLUSH HEAD AND ROUND HEAD.

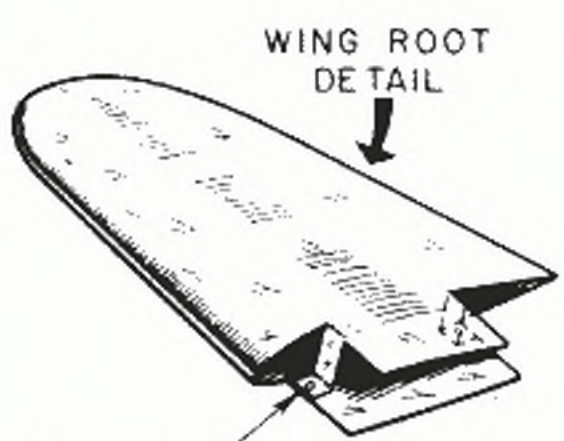
SCALE IN INCHES

ONLY LAYOUTS AND TOP VIEW ARE ONE QUARTER SCALE.

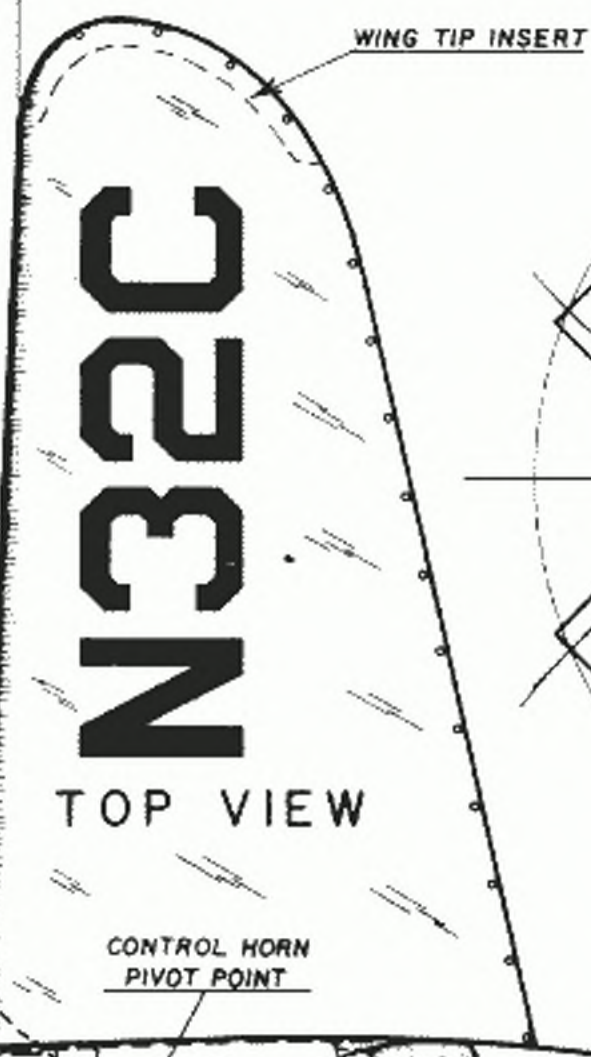


MATERIAL ADDED WHEN UPPER SURFACE OF WING HAS MORE CURVE THAN LOWER SURFACE.

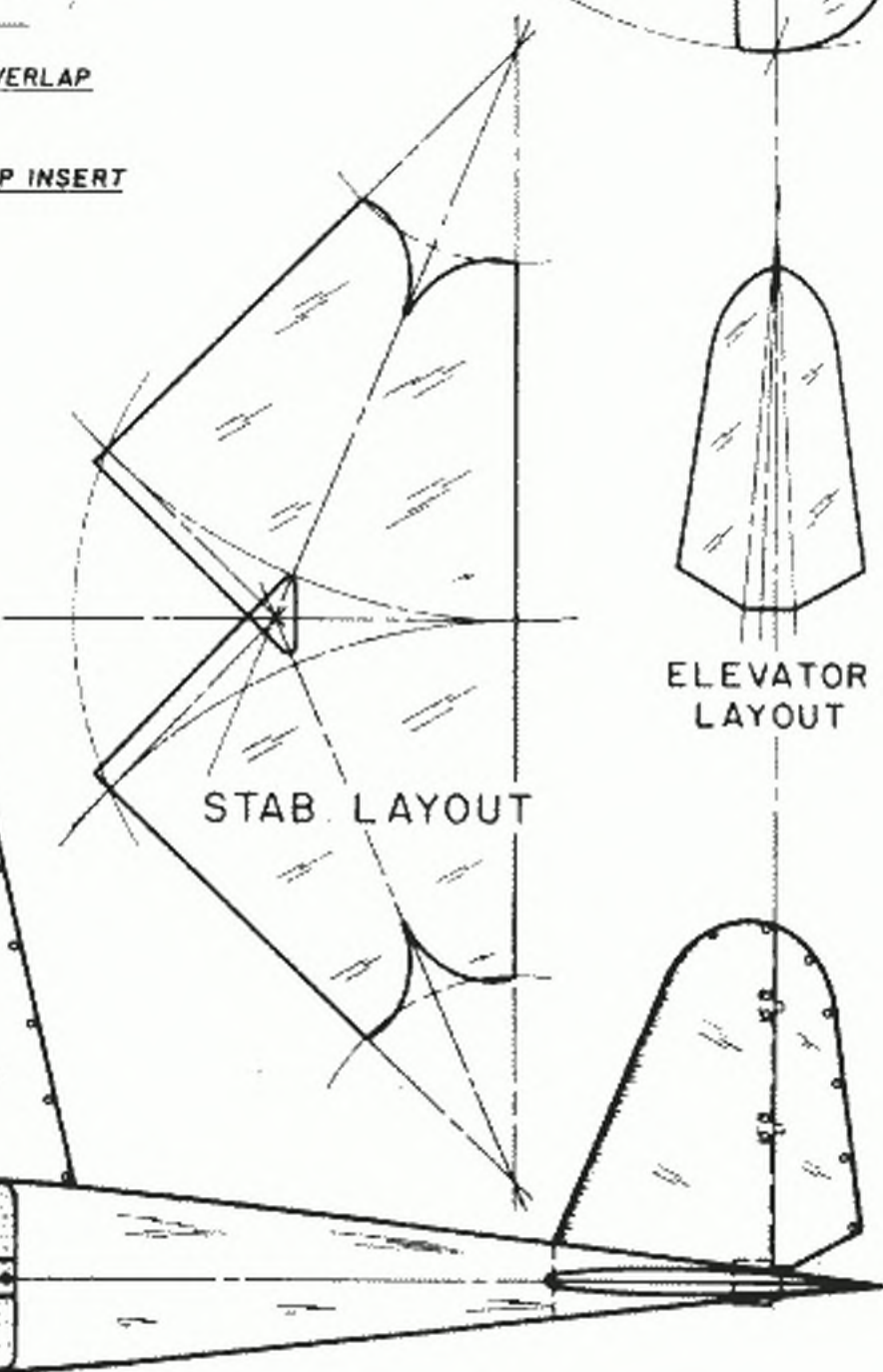
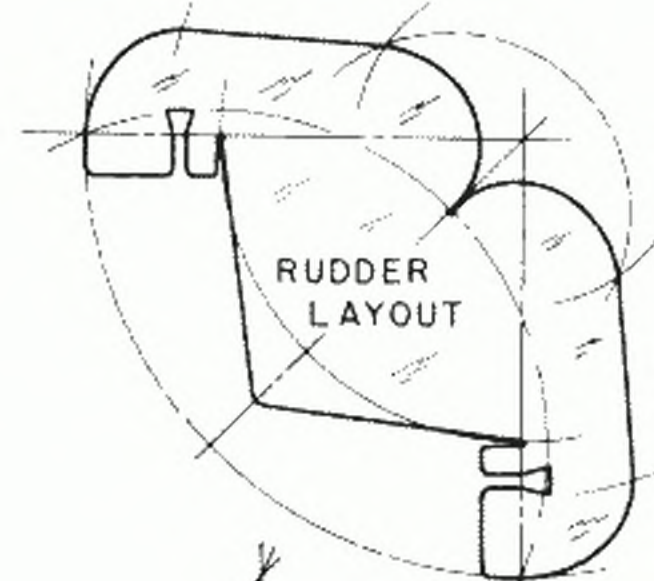
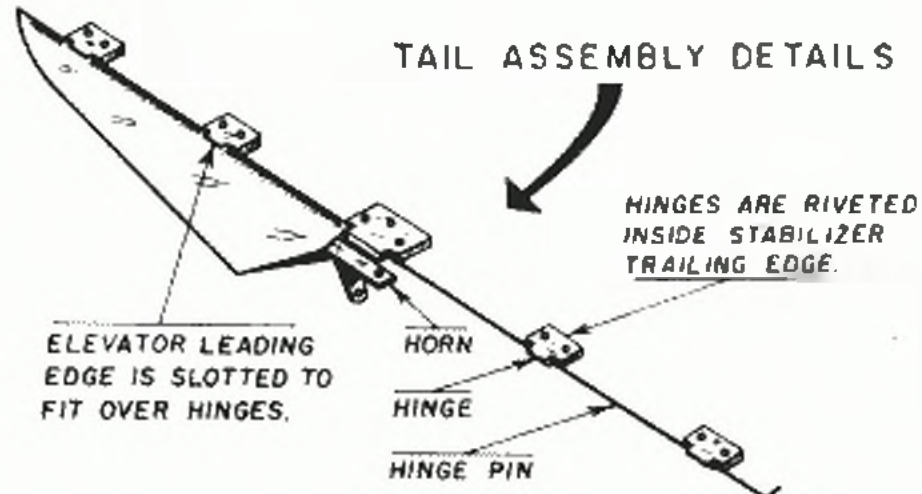
AIRFOIL BRACE TABS BENT ON DOTTED LINE ARE USED TO HOLD THE CORRECT THICKNESS IN THE AIRFOIL.



UPPER COWLING RIVET STRIP



TAIL ASSEMBLY DETAILS



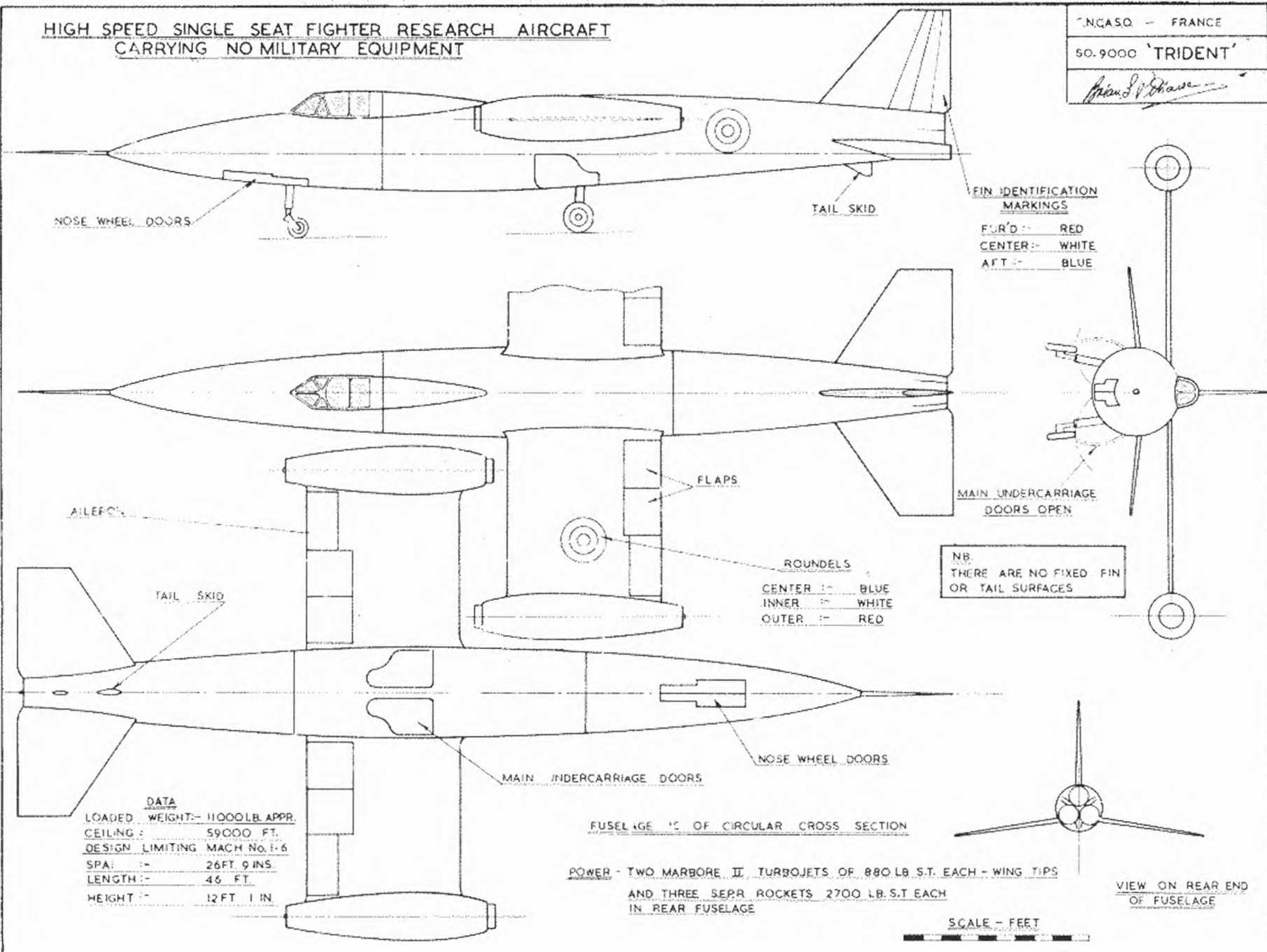
1-3/4" DIA. SPINNER

HIGH SPEED SINGLE SEAT FIGHTER RESEARCH AIRCRAFT
CARRYING NO MILITARY EQUIPMENT

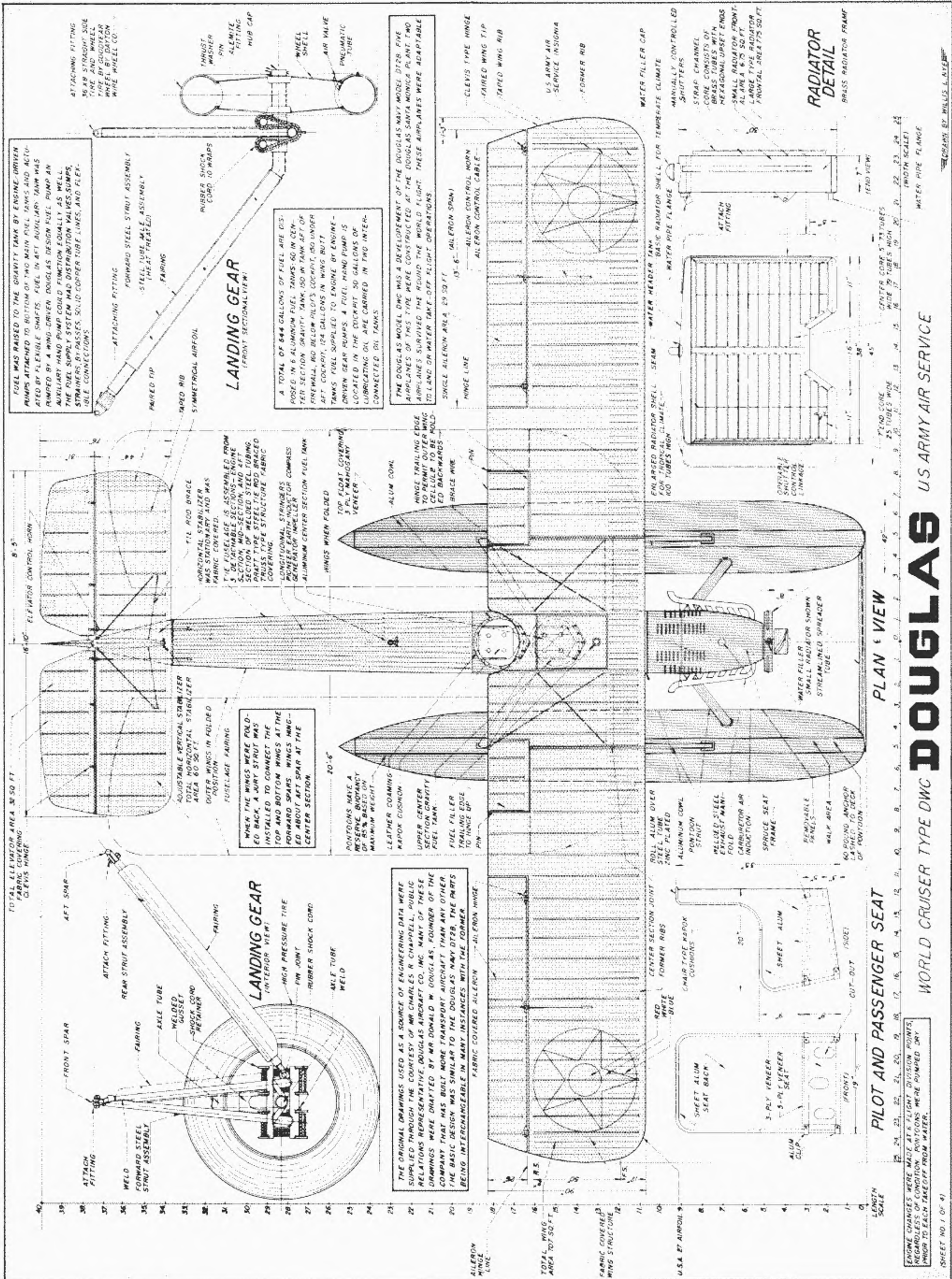
ONASO - FRANCE

50.9000 'TRIDENT'

André V. Dhase



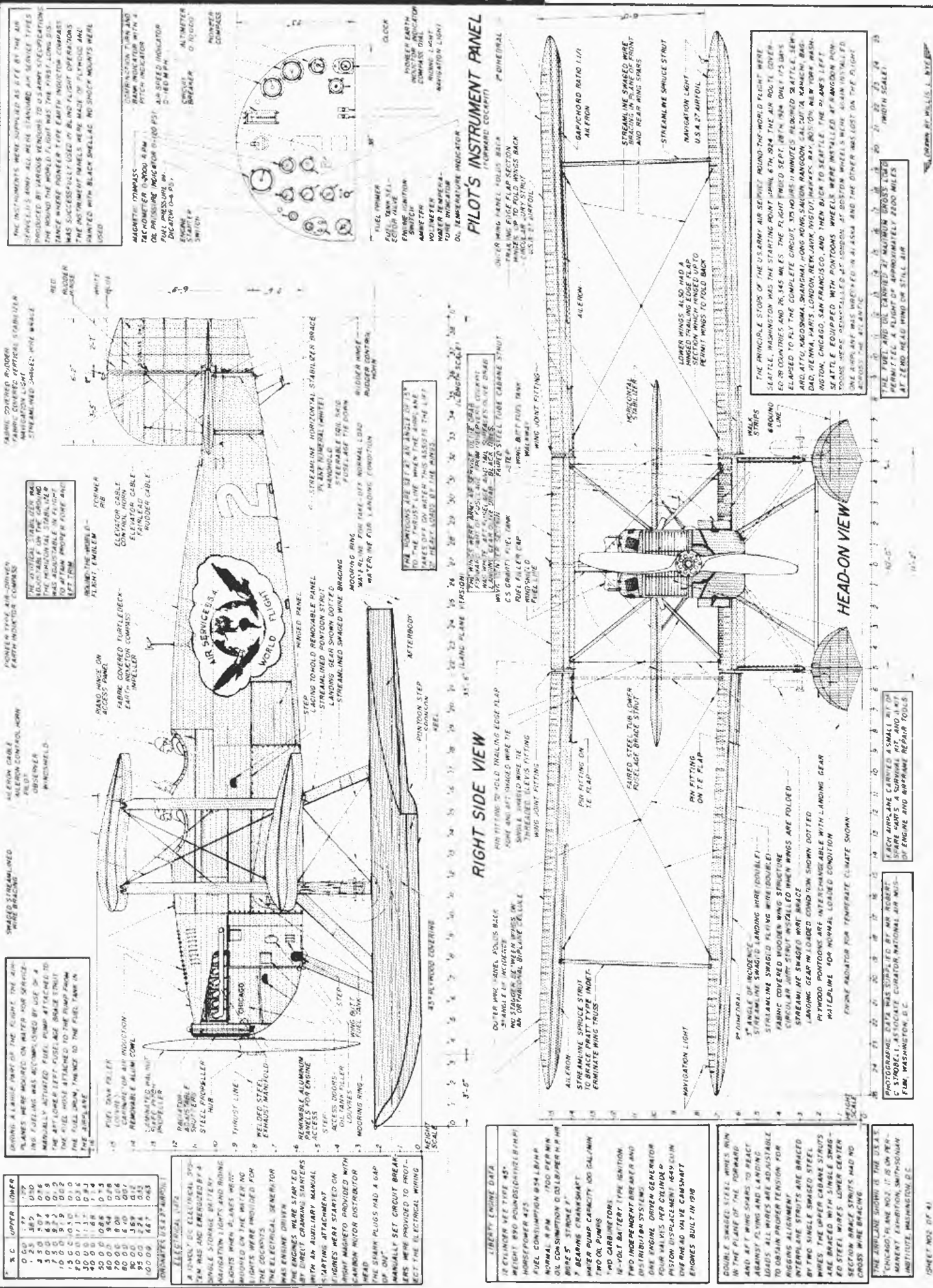
Planes Worth Modeling—TRIDENT



DOUGLAS WORLD CRUISER TYPE DMC US ARMY AIR SERVICE

DESIGNED BY WILLIS L. LAYNE

SHEET NO. 1 OF 4



R.C.	UPPER	LOWER
0.00	1.77	0.79
1.25	3.87	0.50
3.00	6.07	0.06
5.00	8.27	0.13
7.00	9.97	0.02
10.00	11.17	0.00
20.00	13.77	0.00
30.00	16.87	1.14
40.00	19.97	2.28
50.00	23.07	3.42
60.00	26.17	4.56
70.00	29.27	5.70
80.00	32.37	6.84
90.00	35.47	7.98
100.00	38.57	9.12

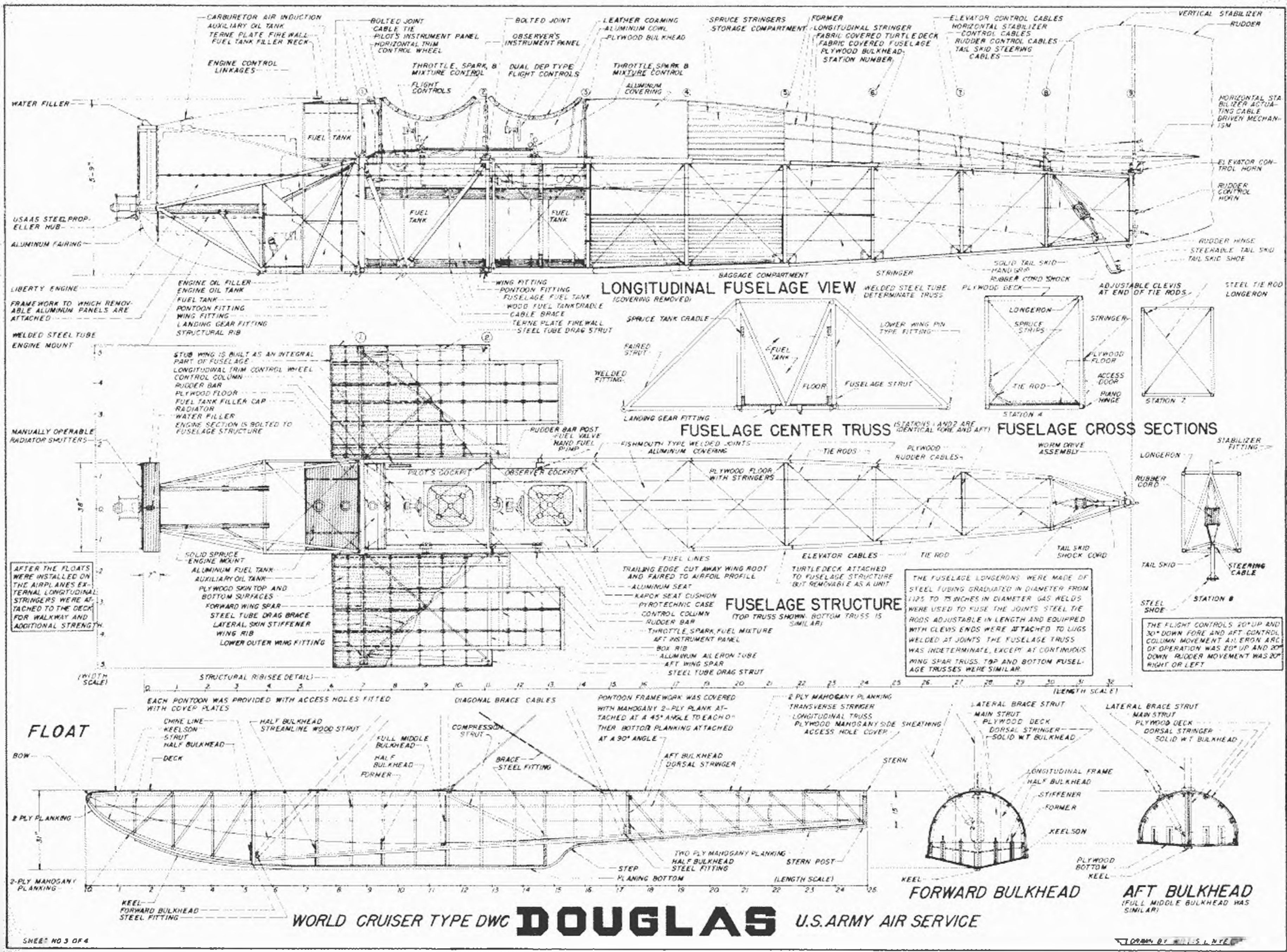
LIBERTY ENGINE DATA
 12 CYLINDER VEE TYPE 45"
 HEIGHT 89.00 INCHES (21.00 METERS)
 WEIGHT 425 LBS (193 KG)
 HORSEPOWER 425 @ 1800 RPM
 NORMAL R.P.M. 1700-2000
 OIL CONSUMPTION 0.04 GALLONS PER HOUR
 WATER PUMP CAPACITY 100 GALLONS PER HOUR
 TWO COIL PUMPS
 16-VOLT BATTERY TYPE IGNITION
 TWO INDEPENDENT BREAKERS AND CONTACTORS TO START GENERATOR
 CONTACTS WERE ON 100 P
 POSITION CONTACTS WERE ON 100 P
 ONE ENGINE VALVE CAMSHAFT
 ENGINES BUILT BY B&W

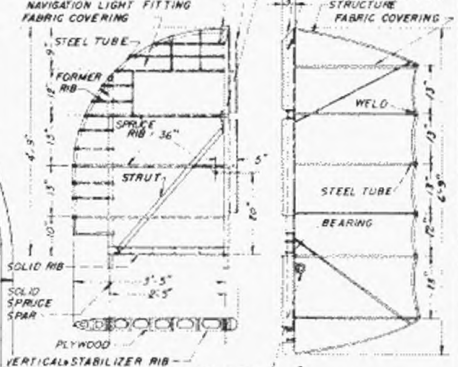
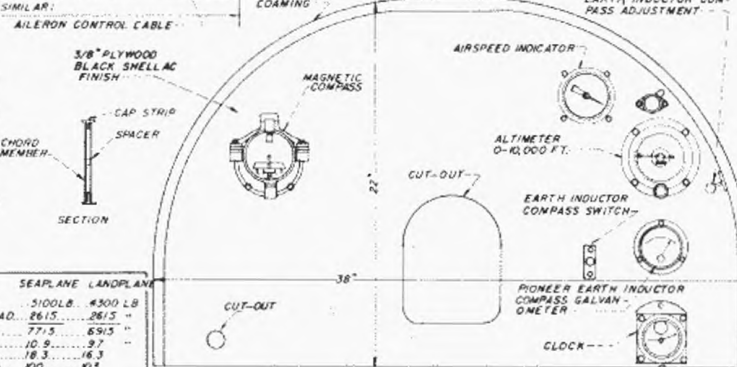
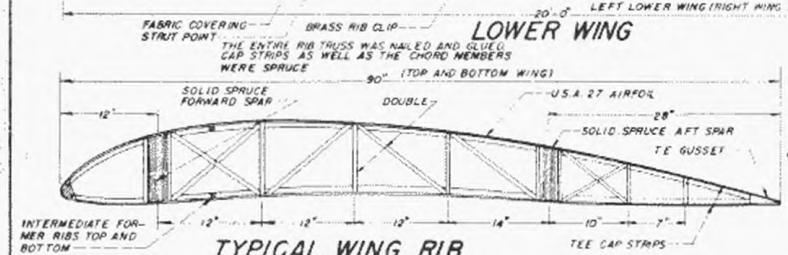
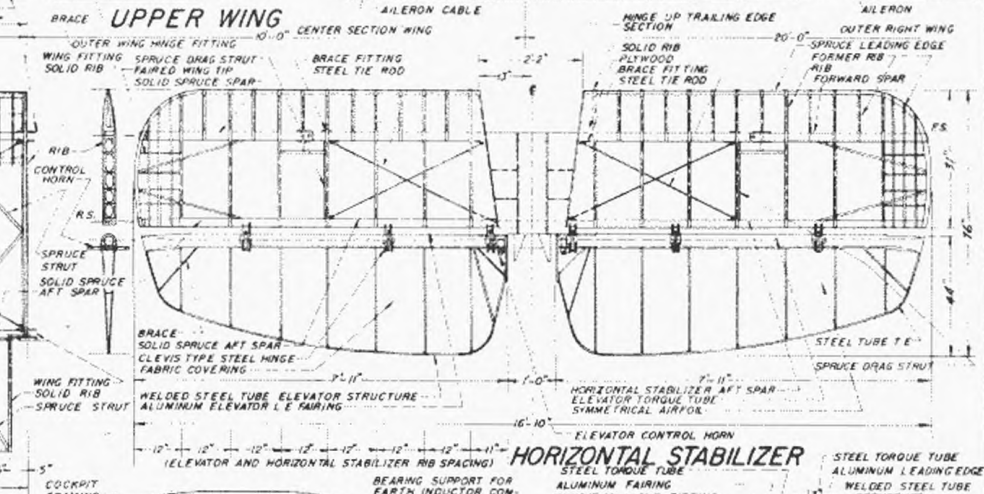
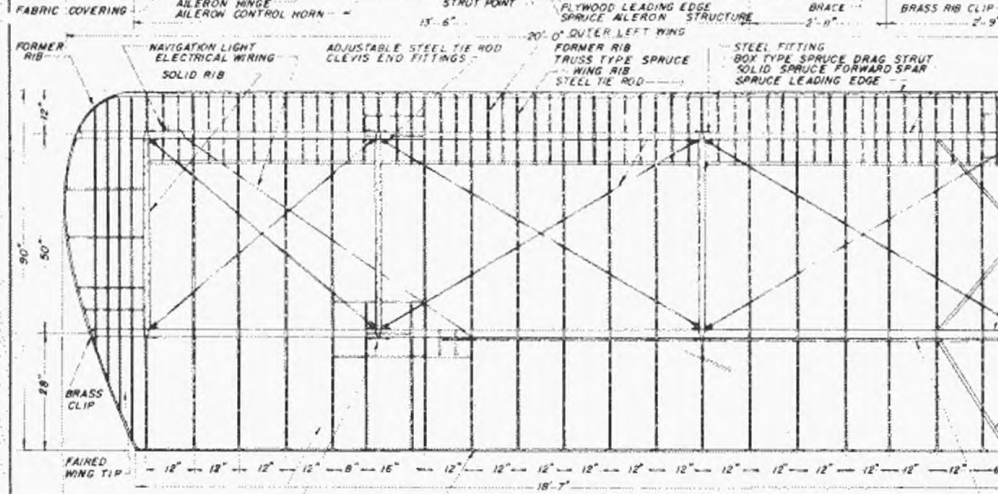
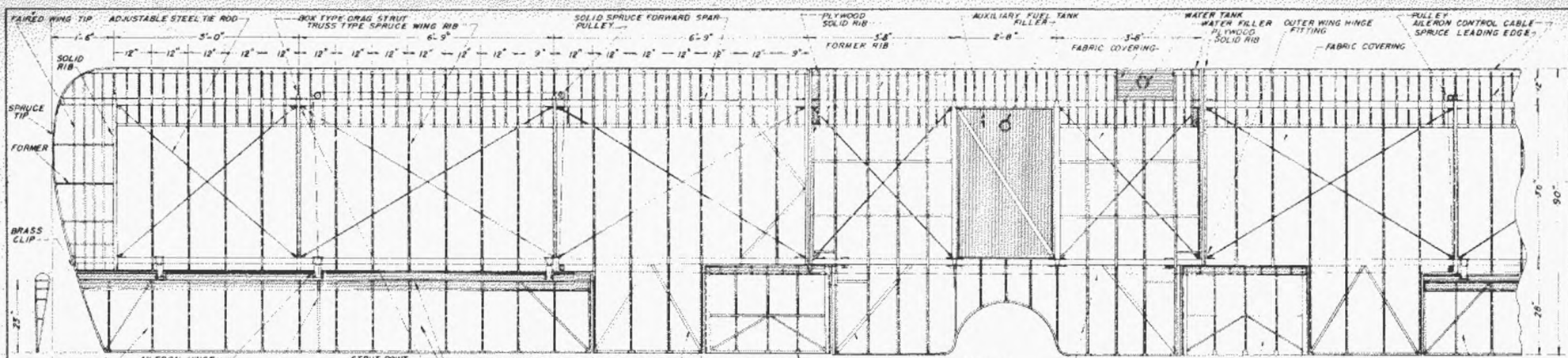
HEAD-ON VIEW
 PHOTOGRAPHIC DATA WAS OBTAINED BY MR ROBERT C STROBE, I. ASSOCIATE CURATOR NATIONAL AIR MUSEUM, WASHINGTON, D.C.

RIGHT SIDE VIEW
 EACH AIRPLANE CARRIED A SMALL SET OF SPARE PARTS FOR A SURVIVAL KIT AND A SET OF ENGINE AND AIRFRAME REPAIR TOOLS.

PILOT'S INSTRUMENT PANEL
 THE INSTRUMENTS WERE SUPPLIED AS SET BY THE AIR FORCE... THE INSTRUMENT PANEL WAS BUILT BY B&W.

LIBERTY ENGINE DATA
 12 CYLINDER VEE TYPE 45"
 HEIGHT 89.00 INCHES (21.00 METERS)
 WEIGHT 425 LBS (193 KG)
 HORSEPOWER 425 @ 1800 RPM
 NORMAL R.P.M. 1700-2000
 OIL CONSUMPTION 0.04 GALLONS PER HOUR
 WATER PUMP CAPACITY 100 GALLONS PER HOUR
 TWO COIL PUMPS
 16-VOLT BATTERY TYPE IGNITION
 TWO INDEPENDENT BREAKERS AND CONTACTORS TO START GENERATOR
 CONTACTS WERE ON 100 P
 POSITION CONTACTS WERE ON 100 P
 ONE ENGINE VALVE CAMSHAFT
 ENGINES BUILT BY B&W





TYPICAL WING RIB
(TOP AND BOTTOM WINGS)

BOX RIBS WERE SIMILAR EXCEPT THESE HAVE SOLID WEBS ON EACH SIDE OF CAP STRIPS. WEBS OF BOX RIBS WERE PROVIDED WITH SPACERS TO INCREASE RIGIDITY. ALL RIBS WERE PRIMED AND SEALED AND FINISHED WITH TWO COATS SPAR VARNISH. END RIBS OF TOP AND BOTTOM WING CENTER SECTION WERE SOLID WEB TYPE WITH APPROPRIATE CUT-OUTS FOR LINES, FITTINGS, CABLES, ETC. THE BOX RIBS FUNCTION AS DRAG TRUSS STRUTS. ALL STEEL WING FITTINGS WERE HAND MADE. FORWARD AND AFT WING SPARS WERE SOLID ONE PIECE SPRUCE MEMBERS.

WING AREA INCLUDING ALERONS	707	50	FT
ALERON AREA	58	-	-
STABILIZER AREA	50	-	-
ELEVATOR AREA	37	-	-
RUDDER AREA	16	-	-
FIN AREA	12	-	-

WEIGHT EMPTY	500LB.	4300 LB
DISPOSABLE LOAD	2615	2615
GROSS WEIGHT	7715	6915
WING LOADING	10.9	9.7
POWER LOADING	18.3	16.3
AIR SPEED MAX.	100	83
LANDING SPEED	55	53

THE POSITION OF THE CENTER OF GRAVITY EMPTY WAS 26.3" AFT OF UPPER WING LEADING EDGE. THE AIRPLANES WERE ANALYZED FOR 6 BASIC CONDITIONS OF FLIGHT LOADINGS. THE DISTANCE FROM THE REFERENCE LINE (CENTERLINE OF RADIATOR) IS 86" THE MAXIMUM AFT LOCATION OF THE C. OF G. IS 36.2" AFT OF L.E.

CLOCK, ALTIMETER, AND AIRSPEED INDICATOR WERE STANDARD U.S.A. AIR SERVICE TYPE.

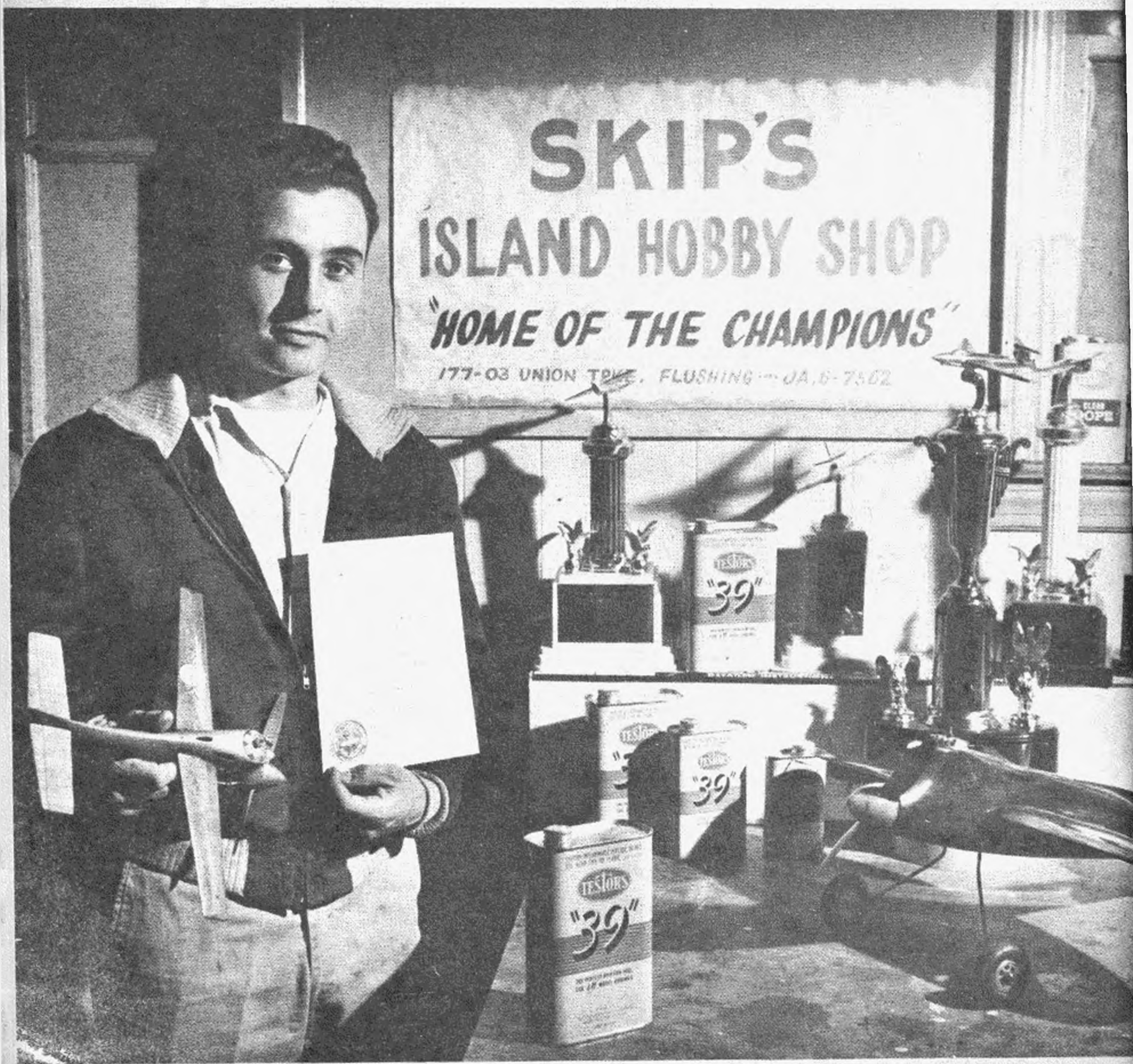
OBSERVER'S INSTRUMENT PANEL
(NEAR COCKPIT)

NAVIGATION LIGHT WIRING RUNS INSIDE STEEL TUBE LEADING EDGE.

RUDDER

Again!

**NEW CLASS "A"
OF 139.48**



SENIOR SPEED RECORD M.P.H. ... SET WITH



"39" FUEL

Yes, sir! *Another new speed record for Testor's "39" Fuel* . . . this time, a National AMA record of 139.48 MPH for gas models, control line speed, Class B Senior which was set by Barrie Freeman (AMA No. 5827) at the second annual Long Island Industrial Model Championships, Bethpage State Park, L. I. on June 5, 1955. Says Freeman in commenting on his new record: "I must count on quality at all times,

and I'm sure of it with Testor's. Take it from me, Testor's products are real championship material for winning meets . . . and champs all over the country agree!"

You, too, will find Testor's "39" unequalled for *top performance* in stunt, contest, or just-for-fun flying. Insist on it — *by name* — at dealers everywhere . . .

TESTOR CHEMICAL COMPANY • ROCKFORD, ILL.



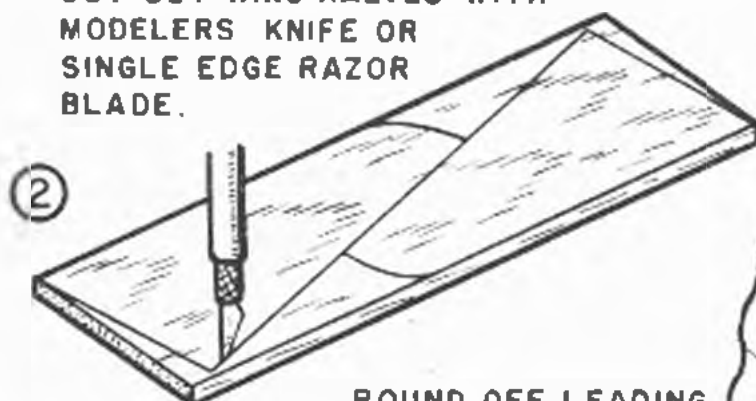
L to R—Hand-launched glider, VTO or Vertical Take-Off, and ROG or the Rise Off Ground. Decals to dress 'em up, all fixings, at the dealer's.

WING CONSTRUCTION DETAILS

① MAKE COPY OF WING PATTERN HALF AND TRANSFER TO SHEET BALSA BY DRAWING AROUND PATTERN COPY OUTLINE WITH PENCIL OR BALL POINT PEN.



② CUT OUT WING HALVES WITH MODELERS KNIFE OR SINGLE EDGE RAZOR BLADE.



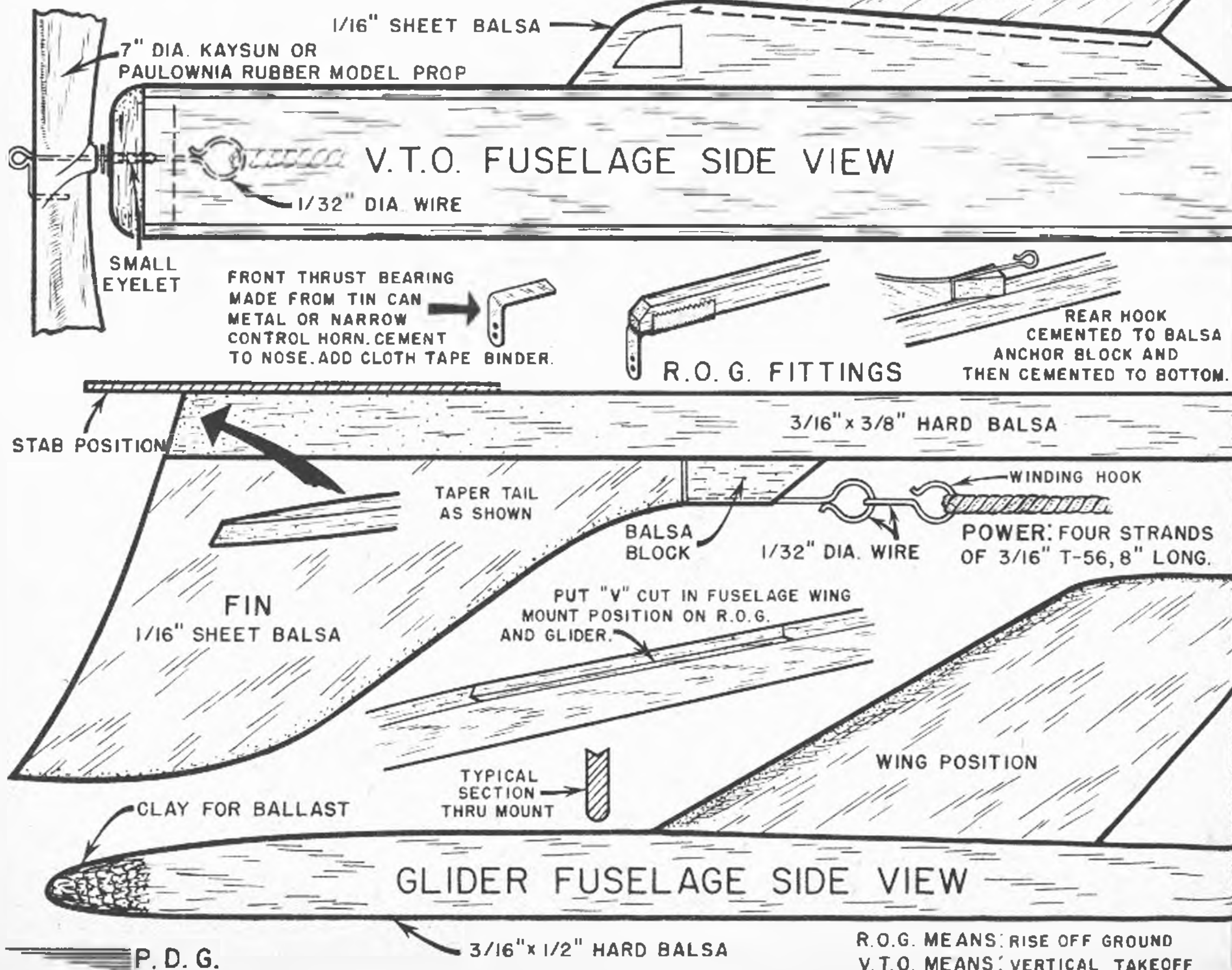
③ ROUND OFF LEADING AND TAPER TRAILING EDGE WITH ROUGH TO SMOOTH SANDPAPER.



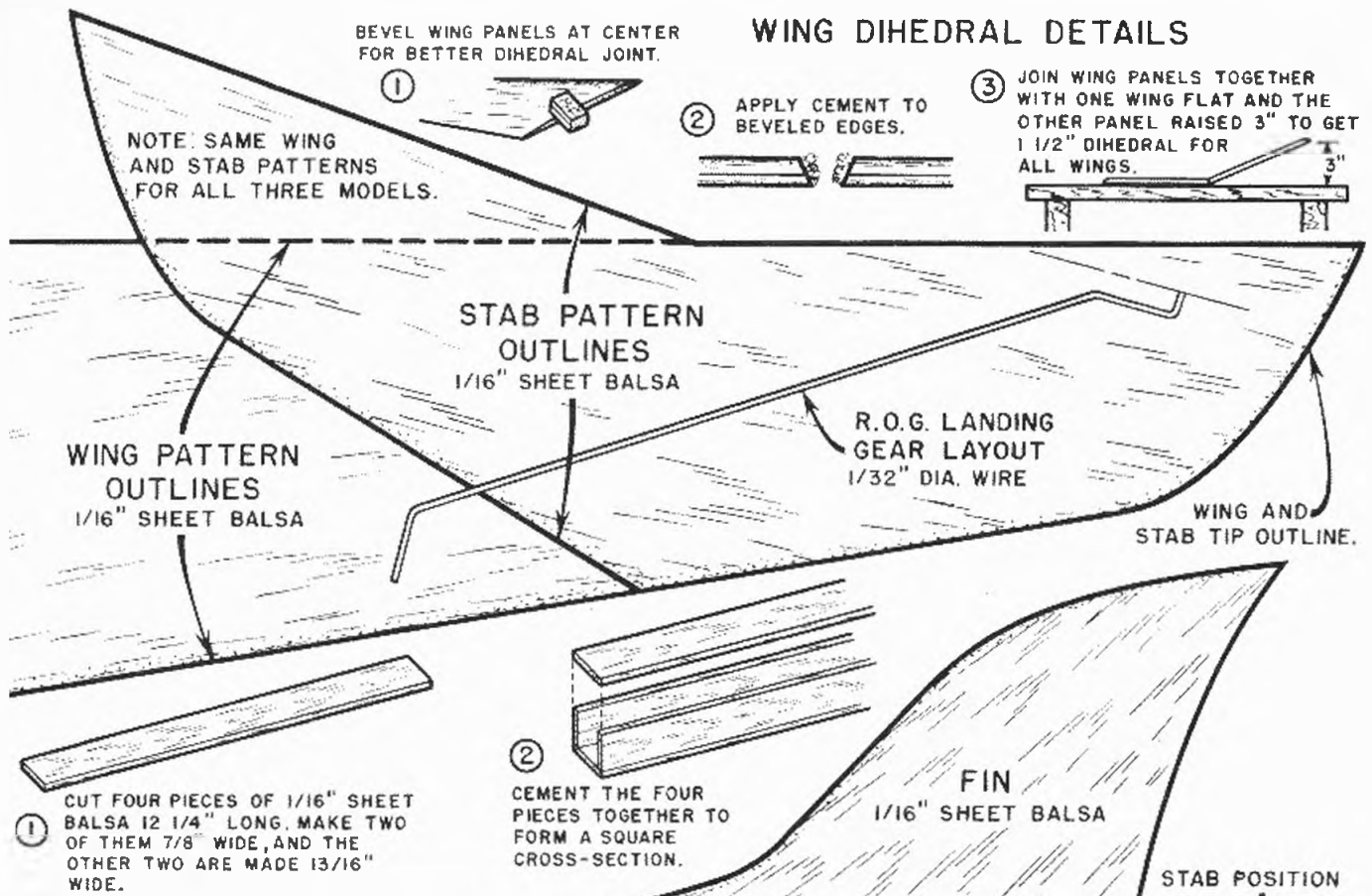
Three Aces

By PAUL E. DEL GATTO

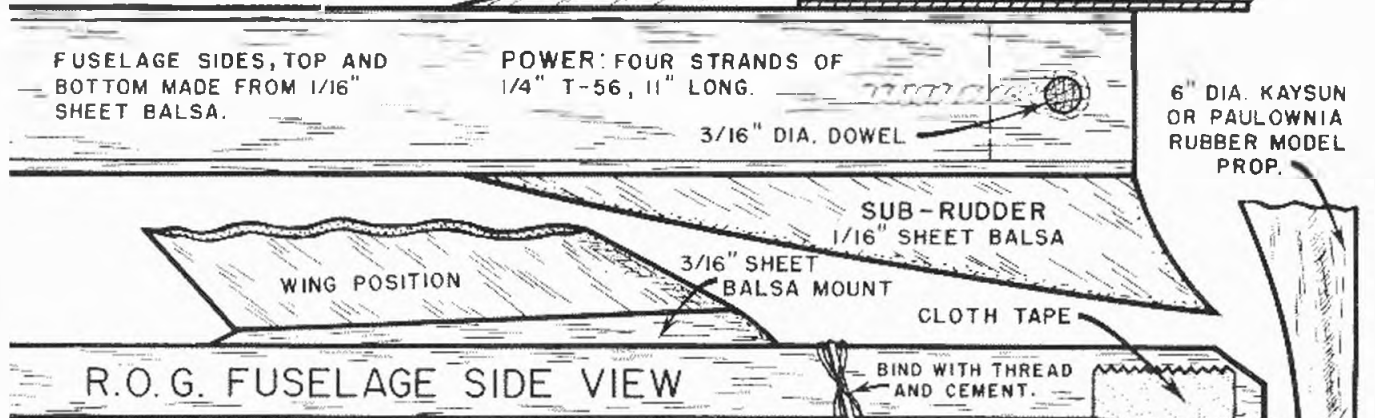
From these full size drawings you can make any one or all of the three balsa fliers. Quickies and flight tested.



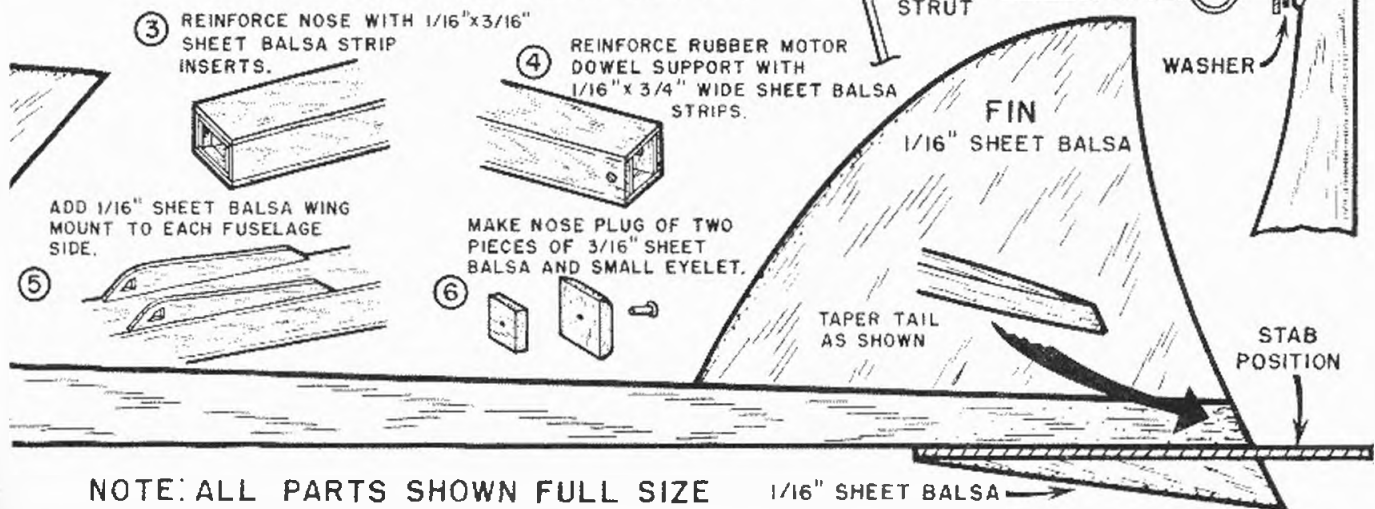
WING DIHEDRAL DETAILS



V.T.O. FUSELAGE DETAILS



V.T.O. FUSELAGE DETAILS (CONT.)



R/C Reliability

ESSENTIAL FOR BEGINNER
MOST FUN FOR THE EXPERT

Unmatched reliability has made Babcock radio control the standard of efficiency the world over—the only system you can trust implicitly in all environments. Easiest to install, simplest to operate and proven best protection against model damage, the fool-proof Babcock system is *your best investment, by far!*



Single Channel
Multi-Channel

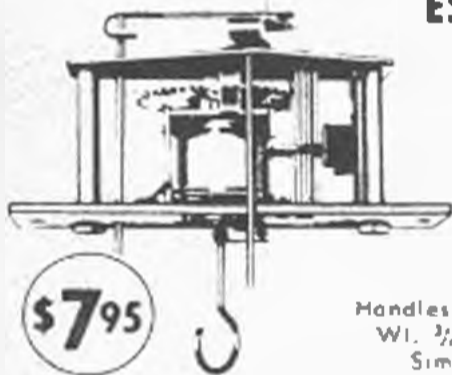


Installation kits, too!

GO BABCOCK ALL THE WAY!

Super-Compound ESCAPEMENT

for R/C models
of all sizes



**VERSATILE
EFFICIENT**

\$7⁹⁵

Handles 1/4 to 3/4" rubber
Wt. 1/2 oz., 2 3/8" wide
Simple to install.

● Special coaxial magnetic circuit guarantees *many times more efficiency* than that of any other escapement.

ELECTRIC MOTOR SPEED CONTROL AND SEQUENCE REVERSING RELAY

for battery powered
R/C model boats,
cars, trucks, etc.



TROUBLE-FREE

**START, STOP, REVERSE
& 2 SPEEDS FORWARD**

\$12⁹⁵

● Handles *any* battery powered motor, even 2 large motors operating twin screws. Transmitter signals move contact wheel fast as operator desires. Exclusive features.

Babcock Elevator Servo (also for boats) \$12.50
Babcock BR-1 Subminiature Relay 9.00

BUY BABCOCK from your Dealer

BABCOCK RADIO ENGINEERING, INC.
7942 Woodley Ave., Van Nuys, Calif.

Export Dept., Frazar & Hansen, Ltd., 301 Clay St.
San Francisco, Calif., USA



P. G. F. CHINN

By P. G. F. CHINN

World Champs: Revise Rules?

► With so many contestants in the Wakefield and power events recording five maximums, a world championships event is now apt to be run in two parts, the first proper becoming virtually an eliminating event in which top contestants prove the capabilities of their models by recording the maximum possible score of five three-minute flights. The results may then be settled between them by a fly-off in which flights are unlimited and the final placing may, therefore, be decided partly by thermal activity and luck. This system seems to have outlived its usefulness and a fly-off should be regarded as an unsatisfactory means of settling an important event. We feel that the rules should be revised in order to make maximum flight times less easy to reach.

Italy

Top line performers in their respective classes are the new Half-A Super-Tigre Diesels. Built by the makers of the world-record holding G.20 glow plug .15, the .03 cu. in. G.28 and the .049 cu. in. G.29 display usual Super-Tigre high standards of workmanship. The G.29 is, perhaps, the best .049 available in Europe at the present time.

Signor Garofali, designer of the noted Italian Super-Tigre engines, has become the first manufacturer outside the United States to produce an outboard. Somewhat resembling the design of the Allyn single-cylinder outboard, the motor employs a power-head based on the glow version of the .049 Super-Tigre G.29 airplane motor. Designer states that tests have been encouraging, displaying easy starting, and says that speeds of up to 20 mph have been reached with three-pointer and regular hulls.

Poland

It is quite pleasing to see that political frontiers do not deter Communist European countries from taking an interest in Western modeling. They are "taking a leaf out of our book" quite frequently. Writing in a recent issue of the Polish model-building magazine, *Modelarz*, the noted Polish modeler, Vladyslav Niestoj, makes good use

FOREIGN NOTES

A monthly world-wide round-up of technical developments, designs, significant industrial products.



Astonishing double delta canard, Sgt. McHard, won unorthodox event RAF Champs. A good flier.

of data and illustrations from our many articles on model engines from all parts of the world and no attempt is made to disguise the fact that Western products offer somewhat more impressive specifications and performances than the home efforts. Also from Poland come details of a unique .217 cu. in. flat twin Diesel which has a one-piece, two-throw shaft and split conrod bearings. Poland continues its interest in rubber models, both indoor and outdoor, and some pleasing designs are in evidence in the Wakefield Class and in Nordic A.2 towliners.

Australia

Once again, while we, in the Northern hemisphere, will not, in general, be regarding Christmas and the New Year as the ideal time to fly model airplanes, the Aussies will be preparing for their week of National Championship events. However, flying continues in many parts of Australia throughout the year, along with displays arranged in conjunction with local exhibitions and similar undertakings. At the 1955 Queensland Industries Fair, the Queensland Model Aeronautical Assn. put on a good show, including combat sessions which carried silver and bronze medals as prizes. An unusual feature was a 23-gallon free fuel supply for competitors.

Scandinavia

The Norwegian David-Andersen .06 and .15 Diesels have earned high praise in the U.S. for their beautiful construction. Designer Jan David-Andersen now tells us that he is working on a new front-rotary .15 which, unlike the old D-A .15 work-horse, will be a top notch racing job. The main bearing is being designed as a unit by a Swedish ball-bearing company and will incorporate a roller main at the rear, with rollers running direct on the shaft, thus allowing a very large diameter journal, with a consequent increase in intake port



New Zealand-made Velojet 50 uses Jetex pellets. Extended body for two pellets also can be had.

area, without excessive weight. A small ball bearing will support the front end of the shaft. Unlike almost all other Diesels, the new motor will have a loop-scavenged cylinder; i.e., single opposed bypass and exhaust ports and a deflector piston. Bore and stroke will be .591 x .551 in. and expected output is ca. .30 bhp at 14-15,000 rpm.

This year, Norway's summer was the best for 50 years and flying a hydro model on one of the fiords is certainly a nice way to spend an afternoon. Using an .06 cu. in. David-Andersen Diesel, Sigurd Heiret has a reduced scale Henry Struck Sea Cat (MAN, 8/54) RC flying boat which performs well. Span is 51 in. and weight, 35 oz.

Russia

The Soviet Union is reported to have won the jet event at the recent Eastern Internationals held in Czechoslovakia and to have a new FAI world record claim pending of 177 mph.

Japan

In a previous column we mentioned the genuine hand-made Japanese tissue manufactured by Seiso Tachibana of Toyama-ken and available in the U.S. from Model Aircraft Co. Now we have received samples of another tissue from the O.S. Model Manufacturing Co. of Osaka. Like Tachibana's tissue, this is also available in all colors and various weights and is good stuff. It appears that these tissues are the only genuine colored Japanese tissues being manufactured anywhere today.

Czechoslovakia

Czechoslovakia's convincing individual win in the World Speed Championships and the high placing of all their team members have given rise to speculation regarding the .15 cu. in. racing glow plug motors used for these achievements. Obviously, these engines are at least equal to any .15 currently produced anywhere in the world today. Actually, two distinctly different versions were used by the Czech team, winner Josef Sladky using an ultra-short stroke disc valve model designed in accordance with his personal ideas and, with its short front housing and inclined rear intake, looking like a baby Dooling 61, while the other three team members used the MVVS 2.5-1955D type motor, originally a product of the Sladky-Husicka design partnership, and of the shaft-valve type.

These engines have been referred to as "State-produced" and it would appear that the production of the precision engineered components used in their construction may well have been the responsibility of some section of the Czech nationalized industry. It is not clear to what extent State sponsorship may have extended, nor is it known whether we may expect these engines, or developments of them, eventually to appear on the market.

New Zealand

"The largest range of models in the British Empire" is the claim of New Zealand's Beta Model Aeroplane Supply Co., which turns out no less than 161 different model kits. Having now concluded an agreement with Berkeley Model Supplies to manufacture Berkeley kits in New Zealand under license, they will have an even bigger range shortly.

A recent product of the firm is the Velocity. Built in two sizes, a "50" and a "100," it uses Jetex fuel pellets but is of somewhat different design from the standard Jetex motor. Instead of using spring clips, case sections screw together and in order to

(Continued on page 36)

POLK'S EVERYTHING for HOBBYISTS!

ANTIQUE GUNS



Luger 9MM—2.50

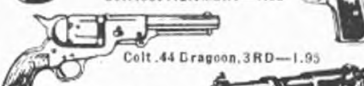
ALL PARTS AND FITTINGS CUT-TO-SHAPE! AUTHENTIC REPLICAS OF FAMOUS HISTORIC PISTOLS. MAKES A HANDSOME FIREARM.



Colt .44 Frontier—1.95



Flintlock (Duelling)—1.75



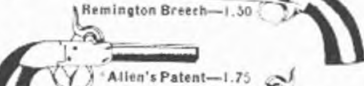
Colt .380 Automatic—1.95



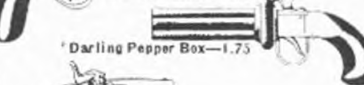
Colt .44 Dragon, 3RD—1.95



Walther P-38 Automatic—2.50



Police 38/44 Special—1.95



Remington Breech—1.50



Allen's Patent—1.75



Darling Pepper Box—1.75



Philadelphia Derringer—1.95

*With Cast Metal Parts



Designed expressly for R/C. Full 2 5/8" meter. Sturdily built, accurate testing unit covering every R/C need ±2%! This is

NOT a 'reworked' surplus test meter! Moving coil type meter. All readings to 1000 MA, 200 V DC, 100 to 10K ohms. Zero adjusting screw. Ohms adjust. Black and red test leads with prods supplied. High-impact, black plastic case. Detailed instruction book **\$14.95**

ARISTO LORENZ

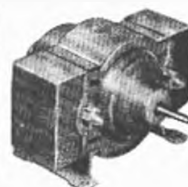
3-D 2 TUBE RECEIVER

- Designed by E. J. Lorenz
- Uses diodes and printed circuits
- Lowest tube idle
- Low filament drain

Printed Circuitry and use of Very High Quality Sub-miniature parts guarantee trouble-free assembly and operation. Kit Price **8.95**



Double PER-MAG MOTORS



Redi Mount, 1.5 to 6V. Battery Operation, Heavy Duty.

- No. 1 1.25
- No. 2 1.50
- No. 3 2.00
- No. 4 2.50
- No. 5 (Illust.) 4.95

Colonial SPINNING WHEEL



CONSTRUCTO MINIATURE

13" high, 10" wide. Beautifully grained, hardwood parts. Ready-finished (carved, grooved, rounded, etc.) Assembles neatly, quickly with minimum sanding. **\$2.95**

Marine POWER-PACK

Ready-to-Install in Motor Boats, Vehicle, etc. Contains: Motor Mount, Switch, Battery Box, Universal Joint Screws, Light, Life Preserver. A for Small Boats 1.75 B for Larger Boats 2.00



CONSTRUCTO SHIPS

The HISPANIOLA Detailed, pre-fabbed hardwood parts. Complete with stand. Other models: Mediterranean Galley, Cat Boat, Tug, Sampan. **\$1.50** etc.



AIR-WHEELS

Inflatable, with Adapter, super-light weight. 1 yr. guarantee.

2"	2.95	3"	4.95
2 1/2"	3.95	4"	5.95
6"	16.50		

ARISTO-REV MOTOR

as described by McEntee & Lorenz

- Length O.V.A. 2 3/4"
- Ball Bearing
- Max. Diam 1"
- Wgt 2 1/4 ozs.
- Carbon Brushes
- 4800 R.P.M. on 3 Volts or double R.P.M. and power on 4 1/2 Volt. Amazing 1:100 Amp. drain. Approx. 40 hours on 2 Pencil's. New Low Price **\$2.95**

PROPELLERS

Guaranteed Unbreakable Plastic

6" x 4"	.75	8" x 8"	1.00
7" x 8"	1.00	9" x 8"	1.25
8" x 4"	1.00	10" x 8"	1.40
9" x 4 3/4"	1.00	11" x 5 1/2"	1.40
8" x 6"	1.00	14" x 6"	3.00

SCALE, 5 PLAN PACKETS

SINGLE PACKETS for \$1 32 PLANS ... \$2 In Detailed 1/4" = 1 foot Scale FIGHTERS and BOMBERS



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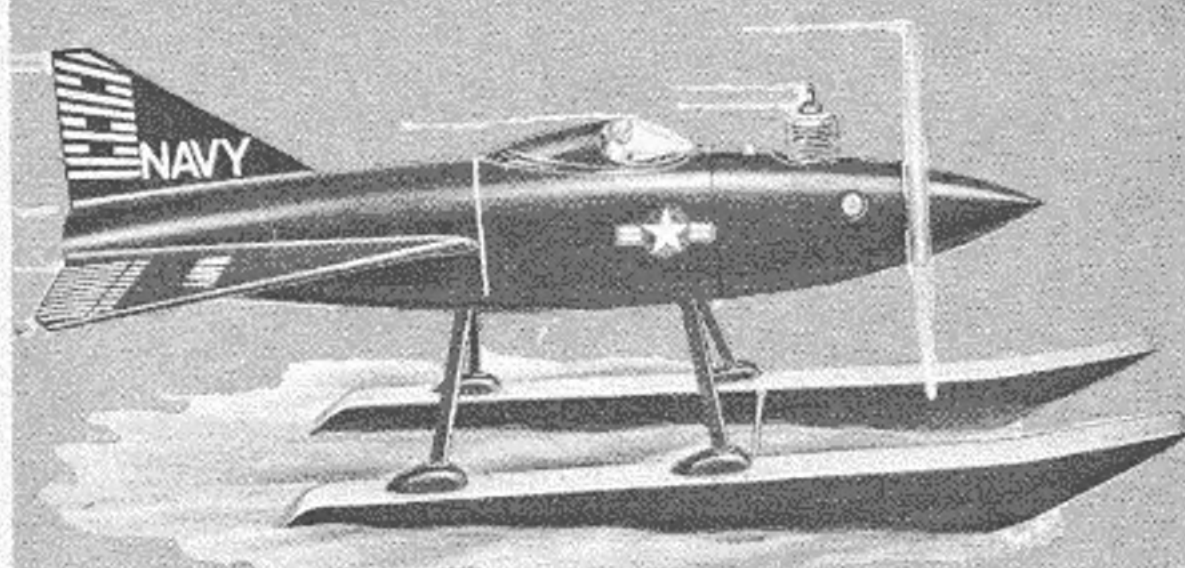
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Wow! Talk about speed . . . here's the fastest, sleekest, most beautiful speedster ever to hit the water! Sheer dynamite for boating thrills and high-powered performance! New advanced hydro-skis seem to lift out of the water as they flash along the surface.

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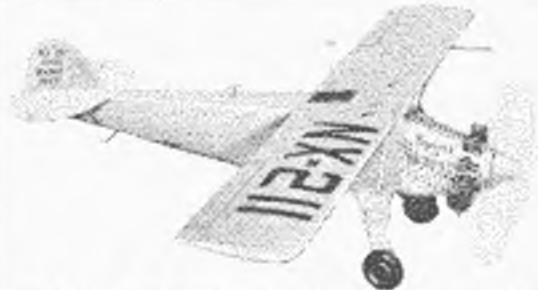
Powers with Any Small Bore Gas Engine .035 to .074

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Scale model of USAF observ. plane. Big value kit . . . prefabbed with carved fuselage, etc.



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SPAN: 18" For .035 to .074 Eng.
Authentic scale model . . . prefabbed for quick, easy assembly. Has a carved fuselage.



PIPER CUB CRUISER \$1.50

SPAN: 18" For .035 to .074 Eng.
All prefabbed, carved balsa fuselage model. It's scaled after the world famous "Cub."



CESSNA "180" \$1.50

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Scale model of world-famous private plane. An excellent sport flyer. Prefabbed.



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The stunt-nest 1/2A stunt plane ever . . . all prefabbed with a carved fuselage, etc.



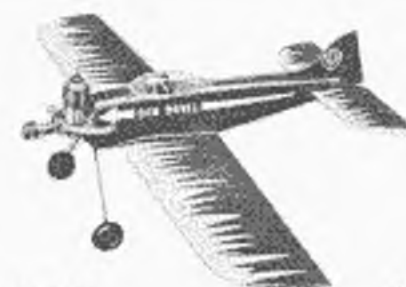
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SPAN: 16" For .020 to .074 Eng.
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Scale model of first U.S. supersonic jet fighter. A terrific flyer. All prefabbed kit.



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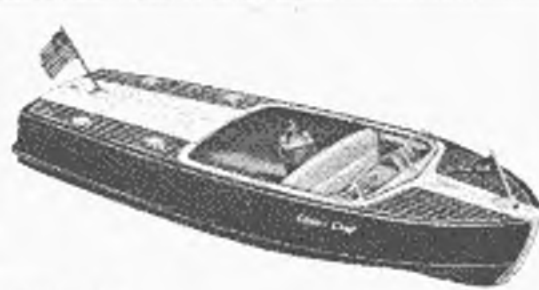
TORPEDO SPEEDBOAT \$2.50

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Sleek new speedboat for OUTBOARD engines. Prefabbed, w/ genuine mahogany veneer hull.



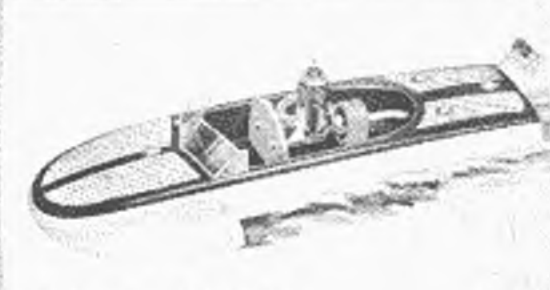
SEA HAWK \$2.50

1/2A" Eng., CO₂ or Elec. Motors
Has a 12" carved balsa hull, brass metal fittings, etc. Aeronautical design.



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Authentic Chris-Craft replica with 12" carved balsa hull & brass fittings. All parts finished.



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SCIENTIFIC

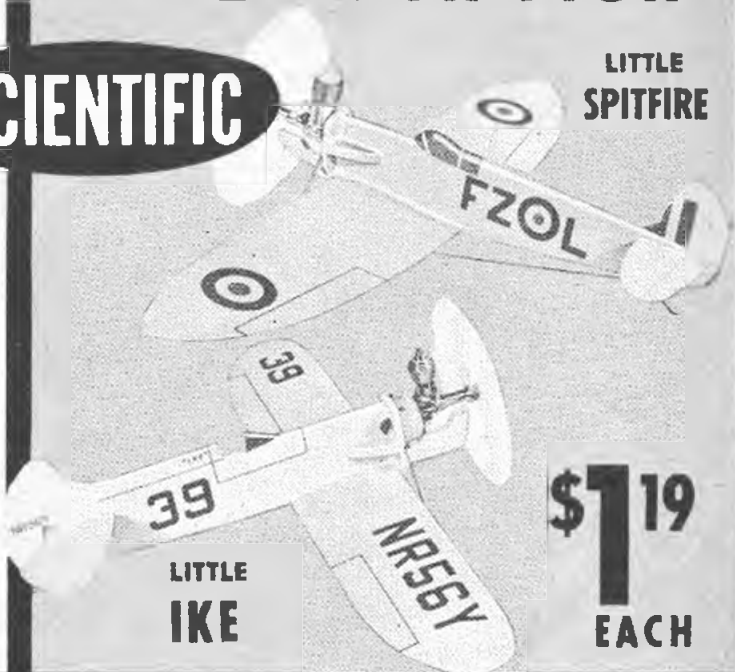
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WORLD'S NEWEST & BIGGEST VALUE IN CONTROL-LINE FLYING

Take a gander at these 2 new flying sensations. Imagine . . . a mere \$1.19 each! One of the models (Little Spitfire) is Great Britain's famed WW II fighter . . . hero of the "Battle of Britain." The second, our Little Ike, is the granddaddy of the present day "Goodyear Trophy Racers" . . . Ben Howard's unforgettable IKE.

Honestly . . . you just won't believe you could get so much flying fun for so little money. They're both control-line flyers . . . and simply terrific performers! Both have 18" wingspans and power with any of the small bore gas engines .035 to .074. They're extremely sturdy planes, too . . . rugged profile jobs that will stand up to a lot of punishment. Each model is prefabricated to assemble in "nothing flat." See these sensational models at your dealers . . . SOON!

\$1.19
EACH



LITTLE SPITFIRE

LITTLE IKE

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MORE EXCITING ACTION MODELS FROM SCIENTIFIC . . . SEE YOUR DEALER!

FIREBIRD RACE CAR

Our new race car sensation! A real "speed demon" . . . with a new futuristic design. Powers with any small bore gas engine .035 to .074. All prefabbed model with a completely carved bullet-type balsa body, 4 racing-type rubber wheels, etc.



SPEEDS UP TO 60 M.P.H.

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SUBMERGES! SURFACES!



Model cruises on the surface . . . submerges to periscope depth . . . then automatically re-surfaces. Fully half-a-yard long. Prefabbed, with rubber power unit included. Just add some lead ballast.

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WACO CABIN \$1.50

For .020 to .049 Engines
Imagine! Carved fuselage biplane "beauty" for only \$1.50. Prefabbed for U-Control.



LITTLE DEVIL \$1.50

SPAN: 18" For .020 to .074 Eng.
Economically priced U-C model. Prefabbed parts include: formed balsa fuselage & wing.



LITTLE BIPE \$1.50

SPAN: 16" For .020 to .074 Eng.
Carved balsa fuselage bi-plane, prefabbed for easy assembly. It's control-line. A real value!



MONOCOUCHE 90A \$1.50

SPAN: 18" For .035 to .074 Eng.
Scale model of America's favorite private plane. Prefabbed with a carved balsa fuselage, etc.



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SPAN: 17 1/2" For .020 to .074 Eng.
Deluxe U-Control model. 100% complete—with carved balsa fuselage, wings, etc.



SPORT RACER \$1.50

SPAN: 18" For .020 to .074 Eng.
Good U-Control performer at a remarkably low price. Completely prefabbed kit. Easy to fly.



LITTLE MERCURY \$1.50

SPAN: 18" For .039 to .074 Eng.
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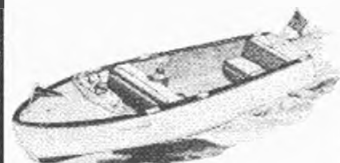
LITTLE ACE \$1.95

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For team racing or sport flying. 100% complete with formed fuselage, wing, metal cowling.



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A "beaut" of a speedboat. Prefabbed with a carved balsa hull, brass fittings, etc.



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Popular Chris-Craft runabout . . . all prefabbed, carved 12" balsa hull, metal fittings.



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SF-3 '29 Travel Air Mystery Ship T.T. Racer 21-3/4"	4.75
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SF-97 Navy Grumman F6F "Hellcat" Fighter 31-3/4"	5.95
SF-100 Boeing B17 "Flying Fortress" Bomber 72"	17.50
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SF-107 Ryan "Navion" Executive Plane 25-1/4"	3.50
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Be sure to enclose 35c for post.-post. Special Delivery (US only) 45c extra. Foreign customers add 20% for all special charges, plus 35c post.-post. Ohioans only add 3% for sales tax. SEND 10c TO BE PLACED ON OUR MAILING LIST FOR CURRENT AND FUTURE PRICE LISTS.

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World's Oldest Model Manufacturers "Since 1919"
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Foreign Notes

(Continued from page 33)

provide a safe escape for gas pressure, should the jet become blocked, there is a spring-loaded safety valve at the front. For "100" units there is available the Flite Extenda Tube and, for the "50," the Flite Extenda Barrel, each of which allows the insertion of two fuel charges instead of the usual one, thus giving a longer flight. These motors are being sold in many countries outside New Zealand, including Australia, South Africa, Italy, Sweden, Holland and the U.S.A.

England

The British Henley Club does not believe in taking chances and since they have figured increasingly in contest results during the past two years, their methods would seem to be worth investigating. They use anti-warp boards, to which wings and other parts are strapped permanently and are only removed when the model is required for use.

Something entirely new in gas tanks has just been announced: the Elmic Limitank. With it, you need no timer and no cut-off valve. Limitank performs all three functions. Has adjusting valve on top and just needs connection direct to engine with fuel line.

East Germany

We have lately received several publications from East Germany which indicate increased attention to model building there. Up to the present, modelers in that area have suffered from a lack of engines of adequate performance but several new models are now in various stages of development and we hope to give some details of them in the future.

Contest Calendar

DECEMBER

- 4 *Inglewood, Calif.:* Skywolves' Record Trials for CL. Don C. Crystal, C.D., 805 E. Palmer Ave., Compton, Calif.
- 4 *Wichita, Kan.:* Wichihawks' Record Trials for all outdoor classes except ROW. Jean P. Valle, C.D., 3891 E. Bruce, Wichita, Kan.
- 4 *Phoenix, Ariz.:* Class A Model Aircraft Rodeo for RC, FFG, TR, CLS, CLC. Entry is restricted to members of PMAC. Quentin Webster, C.D., 521 E. Camelback Rd., Phoenix, Ariz.
- 4 *El Paso, Tex.:* Record Trials for FFG, OR, TLG, OHLG. Fred Lind, C.D., 1610 E. Yardell, El Paso, Tex.
- 4 *Los Angeles, Calif.:* Inglewood Flightmasters' Monthly Record Trials for FFG, OR. Robert E. Moncrieff, C.D., 2108 Santa Fe Ave., Torrance, Calif.
- 11 *Ft. Worth, Tex.:* Cowtown Sahibs' Record Trials for all outdoor classes. Ralph Tenny, C.D., 608 W. Prairie, Arlington, Tex.
- 11 *Arcadia, Calif.:* Class AA Team Racing Contest. Les McBraver, C.D., 1238 1/2 So. 2nd St., Alhambra, Calif.
- 26 *Fresno, Calif.:* Fresno Gas Model Record Trials for FFG. Jim Scheidt, C.D., 2225 Brown Ave., Fresno, Calif.
- 30-January 2—*Miami, Fla.:* Class AAA 2nd King Orange Internationals for FFG, OR, TLG, Jetex, PL, OHLG, RC, CL, CLFS, CLS, CLC, TR, NC. Charles R. Quick, C.D., 1896 N.W. 36th St., Miami, Fla.

GOOD NEWS TELECOMMANDER
RADIO CONTROL
PRICE REDUCED

Was \$21.95
NOW
only \$19.95

including
P-100 RELAY
(see box below)

951 B Receiver

COMPARE TELECOMMANDER QUALITY WITH ALL OTHERS

- Lighter Weight
- Fully Enclosed
- No Relay Adjustments
- Guaranteed

The TELECOMMANDER 951 B Receiver is the finest unit of its kind... completely enclosed in strong bakelite case to protect from fuel and dirt... special field tested hard tube circuit. Can be used with any 27 mc band transmitter. All external wiring attached to one 6-pin socket for easy, instant installation and exchange between models.

SPECIFICATIONS... Frequency 27 mc. Size: 1 1/2" x 2 1/2" x 1 1/2". Wght: 3 oz. "A" Voltage 1 1/2 v; "B" voltage 67 1/2 v; NEW LOW PRICE includes P-100 POLARIZED Relay, 3V4 Tube and 6-pin socket... Now Only \$19.95.

P-100 POLARIZED RELAY \$7.95

(Included in 951 B Receiver)

The P-100 Relay is the most sensitive, sub-miniature, relay known... tiny size, light wght., high sensitivity, great thermal and shock stability and fast reaction time. Dimen 1-3/16" x 7/8" x 11/16"; Wght, 1 oz.; 3500 ohms; sensitivity less than 20 milliwatts.



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Ever-working. Never-failing. Built to last! 1/2 pt. or pt. ea. 65c
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Uni-Flex \$.75 ea.
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World's Best time-and-money-saving ACCESSORIES
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TINY FLEX NEEDLES
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O. K. 40c
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AUSTIN-CRAFT

431 S. VICTORY BLVD. BURBANK, CALIF.

Radio Control News

(Continued from page 17)

boys, with no RC experience, and Jack says the results have been amazing. As happens with all RC fliers, Jack is ready to go into dial control work and has several questions regarding receivers and relays.

First, what type of receiver is good for pulse work and, secondly, what is the best relay for pulse work? As far as receivers are concerned, the gas tube, hard tube or tone job will perform equally well, provided certain precautions are taken. Basically, the antenna loading should be as light as possible and, at the same time, maintain normal operation. If the antenna is too heavily loaded, there could be a slight time delay after the incoming signal has been removed. When using gas tube receivers employing two or more diodes, in voltage doubling or tripling circuits, it may be necessary to add from one to three megohms as the gridleak resistor of the second stage. This helps discharge the capacitors in the voltage multiplying circuit. Since normal pulsing rates are usually from two to ten cps, there should be virtually no trouble encountered in pulsing a receiver.

The relay, however, could be the weak point in the system. Sticky contacts, arcing of the points, insufficient contact pressure, etc., all add up to possible faulty operation. We'll still stick with the Sigma 4F relay for general all around use and for pulse work. The inductance of the Sigma 8,000 or 10,000 ohm coil is large enough that smaller values of capacitance may be used for delay action. By all means, a spark suppressor should be used across the points which carry current. This could employ a .05 to .25 mfd capacitor used alone or in series with a 10 to 100 ohm resistor across the points. A diode could also be used for arc suppression.

From Charles Wood, 3815 51st, S.W., Seattle, Wash., came news that we really enjoyed. Chuck told of a considerable amount of RC scale work out his way, especially at a contest held on Sept. 11. Chuck Hollinger took first place with his Cub J-3, followed by K. Miller with an Aeronca C-3 and F. Guyton with a Tri-Pacer. Other entries included a 6 ft. Curtiss Robin, more Cubs, various Cessna models, a Fokker D-8 and Chuck Hollinger's new three-channel PT-19, a low winged Fairchild trainer of WWII days.

TECHNICAL TOPICS

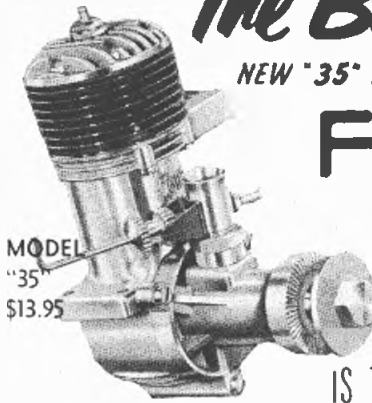
To believe that it takes a radio genius to come up with new ideas for RC work is strictly a misconception. Frank Ritchy of East Park, N. Y., who has been doing quite a bit of boat work this past summer, has really been hitting the jackpot on new ideas. Using a Veco 35 tugboat with a 465 receiver in it, Frank increased the range over water by using a radar-type antenna, as mentioned in the Nov. '55 issue of MAN. When viewed broadside, this antenna, about 4 in. wide and 3 in. high, picked up a signal quite well. However, when the boat turned, it presented practically no pick-up from the transmitter. The solution? Frank used a Berkeley Wonder motor with a 324-1 reduction to rotate the antenna. This motor operated as soon as the receiver power was applied and thus allowed the antenna to rotate and pick up a signal at all times. The antenna connection was made through a slipping brush pick-up. It works fine and there is no loss of signal even at extreme range, in the order of 700 to 800 ft. While on the subject of boats, Frank has been running an RC Chris-Craft Express Cruiser by Sterling Models. This is the small 14 in.

The Best Deal Yet!

NEW "35" FRONT ROTARY VALVE ENGINE BY

FORSTER

MODEL
"35"
\$13.95



THE WAY TO CUT...

Cost

IS TO TRADE YOUR ENGINE IN WITH US!

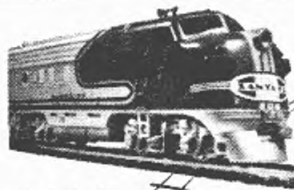
\$5.00 TRADE-IN ALLOWANCE ON YOUR OLD ENGINE,— no matter what make, size or condition! Just mail it to us, together with \$8.95 plus 35c to cover postage and insurance and your new FORSTER "35" front rotary valve glow engine will be on its way! A lapped, cast iron piston, forged aluminum connecting rod, square rotary ports etc., give it the power of a "C" class engine with the weight of a "29". It is the finest engine made by the oldest established model engine manufacturer in the U.S.A., known the world over for outstanding quality.

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Light weight - Easy starting - Smooth power

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IN DECEMBER ISSUE

Model railroading made easy

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Bore: .56"
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Capacity:
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Power: .23 hp
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... winner of the International Class Payload Event and National Champ two years running chose the BWM for the Payload Event because of its great power, remarkable starting ease and all around dependability. Similar comments have been made by other well known figures in model airplane circles as well as nationally known writers on model planes.

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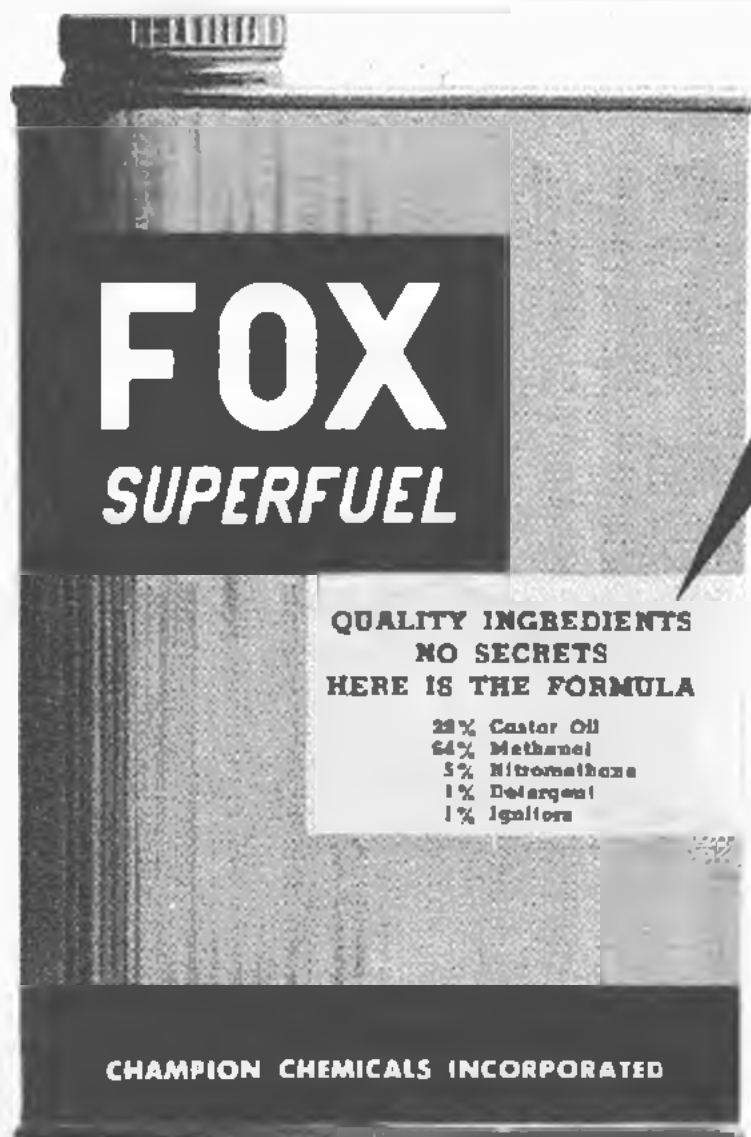
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\$1.98 plastic model. The receiver is a Polk's 3-D job, using an XFG-1 and an IAG4. An Aristo-Rev motor on 4 1/2 volts drives it. Rudder action is by a deBolt servo. Needless to say, it took some neat installing to pack all of the gear into such a small space.

Every once in a while someone decides to build his own version of a deBolt servo. The main trouble encountered comes when he tries to use an electric motor, such as the Aristo-Rev, for the power. This extremely low drain motor is very good for many drive purposes but on this job it falls down through excessive inertia. Therefore, stopping the servo at neutral or at one of the control positions is all but impossible.

Fig. 1 shows a circuit for operation in the 50-54 mc band. It is to be used only by those holding the required amateur license. Similar to some of the original RC transmitters for 50-54 mc, this one offers greater stability with very good power output. Those fliers holding the required amateur license could help alleviate the crowded condition in the 27 mc spot by utilizing this higher band. Note that this transmitter is not crystal controlled and you must possess the proper type of amateur license to operate it. Next month we shall give a schematic or two for a crystal-controlled transmitter on 50-54 mc.

Here is a tip on more reliable operation of reed transmitters and receivers. These suggestions come from CG Electronics Corp. (305 Dallas St., N.E., Albuquerque, N.M.). The transmitter batteries should be aged before using by turning on the transmitter and allowing it to sit for three or four hours. This will take the initial peak off the batteries and allow them to operate on a flatter portion of the current drain vs. life curve. Even though the transmitter is allowed to idle for three to four hours, there is in excess of 30 hours of battery life left (XX30's and 4F's). It is better to sacrifice a little battery life and be assured of more reliable performance of your equipment. If your reed unit appears to be receiving the proper audio signal but the secondary relays do not pick up, *do not* get out the pliers and go to work on the reeds. Run a piece of clean bond paper between the reed and the contact or, if oil is present on the unit, clean the contact area with a fine bristled brush which has been dipped in carbon tetrachloride. This same treatment could apply to the secondary relay points. While the above suggestions pertain to CG equipment, they should hold true for other units.

Fig. 2 gives the schematic for the CG transistorized reed unit. Before going into detail on it, we wish to say that we built up a regular factory kit which contained an etched circuit and completely prefabricated top cover assembly in an hour and a half. The unit worked perfectly the first time it was hooked up, tuning to the RF frequency being the only adjustment needed. Some of the parts used in this unit are of a subminiature type not readily available. The transistors have been specially selected for optimum performance. Even though the kit, which sells for \$24.95 (less reed bank and relays) is a two-channel job, a three-channel unit may be made by using the CG three-unit reed bank. The RFC on the schematic has a value of 100 uh and the tank coil consists of 15 turns of No. 28 enameled wire, wound at the base of a CTC printed circuit coil form. This slug tuned coil is .285 in. in diameter and has four mounting lugs. The antenna coil is two turns of No. 20 plastic covered wire. Since one pen cell
(Continued on page 40)



The winner, and still champion, the "free flight is dying" model.

'55 NATS BREAKDOWN

Reading from top to bottom on the chart below are the events in order of popularity. Food for thought, yes?

EVENT	NUMBER OF CONTESTANTS
1 FREE FLIGHT GAS - 1/2 A	286
2 FREE FLIGHT GAS - A	273
3 FREE FLIGHT GAS - B	227
4 HAND LAUNCHED GLIDER	214
5 R.O.W. FREE FLIGHT GAS	184
6 CONTROL LINE COMBAT	151
INDOOR H.L. GLIDER	151
7 FREE FLIGHT GAS - C	131
8 NORDIC TOWLINE GLIDER	123
9 PAA LOAD - AMERICA CLASS	103
10 CONTROL LINE STUNT	98
11 UNLIMITED RUBBER	94
12 LIMITED TOWLINE GLIDER	80
13 C/L SPEED - CLASS B	73
14 RADIO CONTROL (RUDDER)	68
15 C/L SPEED - CLASS C	62
INDOOR PAPER STICK	62
16 C/L SPEED - CLASS 1/2 A	57
17 C/L SPEED - CLASS A	55
WAKEFIELD RUBBER	55
18 C/L TEAM RACING	52
19 C/L PROTO SPEED	45
C/L US NAVY CARRIER	45
20 FREE FLIGHT SCALE	44
21 C/L SPEED - JET CLASS	43
22 PAA LOAD - INTERNAT. CLASS	38
23 C/L FLYING SCALE	37
24 RADIO CONTROL (MULTI)	31
25 PAA CLIPPER CARGO - 1/2 A	25
26 INDOOR RUBBER - STICK	20
27 FREE FLIGHT HELICOPTER	16
28 INDOOR RUBBER - CABIN	12

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- WINNIE MAE: Lockheed Vega ukie, .049.
PELICAN: Willard flying boat, .049.
- VICTOR SCOUT: Scale control, .075.
SUPERMARINE: Ducted fan job for .09.
- THE SPACER: Class AB free flight.
STUMPY: .09 combat U-control.
- THE CHAMP: Profile free flight .049.
THE TWELVE: .29 - .35 stunter.
- DAREDEVIL: Sport free flight low wing.
WRANGLER: Famous British team racer.
- SNAPPER: Simple, all-balsa Half-A stunter.
DIESELAIRE: Sport free flight, .045 to .065.
- BEAVER: .19 - .35 scale.
ZENITH: Taibi A free flight.
- SNIPE: Half-A stunt.
STRATOHAWK: Limited rubber.
- SHEIK: .29 team racer.
DRIFTWOOD: .049 free flight.
- FOXY: Aldrich .29 combat.
BIG TIME: Large towliner.
- FLYING RAZOR: Half-A Fokker D-8 free flight.
TRAVEL AIR: Scale biplane for .29 to .35
- EL DIABLO: .19 - .35 stunter.
TRI-PACER: Scale ukie Piper.
PLAY PLANE: All-balsa FF, .049.
- HALF WILD GOOSE: .049 free flight.
FIRECRACKER: .29 scale.
- LONG TOM: .29 - .35 free flight.
SIDEWINDER: .049 profile ukie.
- SKEETER: Half-A scale team racer.
INTERNATIONALIST: FAI (.15) free flight.
- BOUNDER: Record .29 speed.
ZEPHYR: .049 free flight.
- NOBLER: Aldrich .29 stunt.
FUNSTER: Hot .049 free flight.
- SKY WING: .049 flying wing.
CHALLENGER: .29 team racer.

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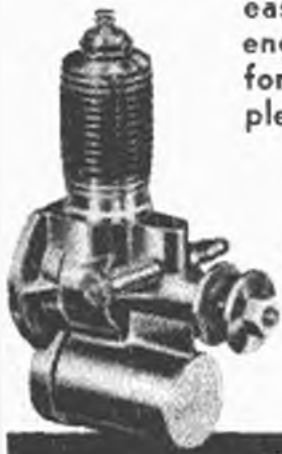
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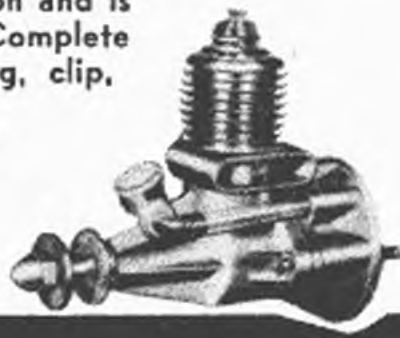
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(Continued from page 38)

and a 30v hearing aid battery will operate this unit, it seems ideal for multi-channel Class A jobs.

This next explanation may help solve the mystery of malfunction of a transmitter or receiver. How many times have you bought new batteries (not individual cells), tested them before placing them into your installation, gotten in a few flights and then found that the radio was inoperative? Brand new batteries and they go dead on you. This happened to MAN editor (three times: once receiver, twice transmitter—Editor) about two years ago and, only recently, to Dr. Walter Good. In both cases the culprit was the same. As we have mentioned before, batteries are made up of individual cells, in some form or configuration. If the battery is subjected to rough handling, such as being dropped or shaken up in a crash, the inter-cell connections may become disconnected and hence we have a dead battery. The Burgess method of construction, for certain types of their batteries, as described in New Items section, eliminates this problem, since the conductive silver wax used to connect the cells will give, under normal and even severe handling. You wouldn't drop a power supply which contains tubes and similar equipment, so why handle a battery in a careless manner?

Several construction hints which we believe should be passed on include: Do not use acid core solder for electrical work. We recommend Ersin Multicore solder of 60/40 tin-lead composition. This particular solder is used in the best of electronic assemblies and is completely non-corrosive. Be sure to use a lightweight soldering iron, such as the Ungar pencil iron with a 23kw tip, when soldering etched wiring assemblies. Too much heat from the soldering iron can cause delamination of the copper foil. When soldering diodes or transistors directly into the circuit, whether by conventional wiring or on etched circuits, do not use any more heat than is necessary to effect a good solder joint. It is also advisable to provide a heat shunt on the leads of the diodes or transistors. This may be done by wetting a small dab of cotton with cold water and applying the cotton around the leads and body of the component. Semi-conductor devices like these are susceptible to heat and may be damaged by improper soldering techniques.

NEW ITEMS

Techniques, Inc., 135 Belmont St., Englewood, N. J. has etched-wiring circuit kits, \$3.75 to \$47. For a first try, the simple kit furnishes all needed materials, such as copper clad laminate, etchant material, tube sockets, etc. The serious-minded club groups might want to investigate the potential of etched wiring a little more. In this case there is an Industrial Laboratory Kit for \$27 which will enable you to make photo resist type etchings, thus producing uniform and well defined patterns.

Quite a few readers have inquired as to the "clockwork" escapement that has been mentioned in boat installations. This unit is the ED Clockwork Escapement sold by Polk's Model Craft Hobbies, 314 Fifth Ave., New York City, for \$11.50. Features a spring-wound motor which is capable of handling about 200 pulses before rewinding. Operation is from a 3v battery and a compact installation may be made, since no extended rubber bands are required for mechanical power. An extra escapement arm supplied permits either two or four-position operation.

About the new Water Cell construction developed by the Burgess Battery Co., Freeport, Ill. An artificial manganese diox-

ide mix between discs of zinc and carbon is wrapped in airtight plicofilm and heat sealed. This makes for a very compact cell. Each individual cell is interconnected by a spot of silver wax. This conductive wax will yield under rough handling, molding itself to any necessary configuration between the cells and thus maintaining perfect electrical contact. The Y15 battery, as shown, is 22½v and will provide for current drains up to about 2 ma.

CG Electronics Corp. has a three-channel reed conversion unit, shown, which is designed to be attached to their regular single-tone receiver. We tried one of their two-reed units as a conversion and were amazed at the way it operated "right out of the box." This is a painless way for the novice to get started in RC work. First, you buy a single-channel set, use it and become familiar with it. When you want to advance into multi-channel work, merely buy the conversion unit for the receiver and the modulator unit for the transmitter and you are in business. This conversion set was ground-checked at a quarter mile and was working perfectly. It is also available as a two-reed unit.

Items to look into in your spare time are the VC series of sub-miniature pots from Lafayette Radio, 100 Avenue of the Americas, New York 13, N. Y. Built like a large size job but only ¾ in. in diameter. With or without switch-in, from 1,000 ohms to 1 megohm, at only 49c and 69c, respectively. Also, their ¾ in. diameter four-position switch and a variety of coil forms and sub-miniature tube sockets. All in Catalogue No. 10-55. Crystals for the 50-54 mc band, which are obtainable from Ace Radio Control, Higginville, Mo. Look no further, if you've been searching for a complete listing of RC equipment, whether built-up or in kit form, including receivers, transmitters, planes, actuators, boats, component parts, to name a few; write to Joe's Hobby Center, 9830 Wyoming Ave., Detroit 4, Mich. for their Catalogue RC-1, which is one of the first of its kind that we've seen. It's free.

Hans L. Weiss of the Wilshire Model Center, 1326 Wilshire Blvd., Santa Monica, Calif., has announced that the Graupner Standard 10 and 20 German receiver and transmitter, shown in October MAN, will be available early in 1956. The main feature of the receiver, based on our two-tube principle, is the idling current of .2 ma and a B battery voltage of but 30v. Also available from Germany will be the Electra RC model, a 55 in. span job, suitable for .09 to .14 engines. The RC model which won the German Nationals in 1954 will also be obtainable from Wilshire. This is a 63 in. model which will handle engines from .14 to .23 displacements.

Polk's Model Craft Hobbies has a new ball bearing electric motor which operates on from 1½ to 6v. Plenty of power is available and the brushes are replaceable. A nice item for that new boat or car.

In signing off for this month, we'd like to mention that examination of several German and Australian receivers and transmitters shows that good engineering and workmanship have gone into these sets. They are not yet available on the American market, so no names will be mentioned. The German unit was typical of the fine quality of products turned out in that country, especially the escapement, which was well-machined and of rugged construction. All of the receivers, from both countries, were housed in a crash-proof case. Most foreign receivers are built along this line and it appears that various American manufacturers are turning toward this design. **END**

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Mooney Mite

(Continued from page 10)

from longeron to longeron. Add two pieces of 1/4 in. sheet on each side below this piece and carve to fit the wing LE, using the wing as a guide.

For the wing fillets which are built onto the fuselage, we first cut a piece of 1/16 in. sheet balsa to the shape of the top view of the fillets. This piece must be pinned temporarily to the wing and the wing pinned to the fuselage. Where the fillet piece contacts former B and the longerons, it is cemented securely. Then the two balsa fillet pieces are fitted and cemented in place. When this is dry, the wing can be detached and the aft fillet pieces (made of postcard material) can be cemented in place.

While this is drying, bend up the two pieces that make up the nose gear and, after wrapping them with thin copper wire, securely solder them together. Again, remember to put the tubing in place before bending. Sew the tubing to the firewall with wire and securely cement it in place.

Now slide the firewall back over the motor mount beams and cement it to them and to formers. Assemble the plywood gussets on the motor mount beams. It is suggested that Weldwood cement be used for the firewall and gussets. The free ends of the nose gear go through holes in the gussets.

On the original model, the cowl was made of Fibreglas, using a carved male form and a plaster mold. No attempt was made to build a scale motor but a quickly simulated set of cylinders was attached to the cowl. On the plans, the cylinders were drawn to scale for those who wish to make an exact scale engine. Also, a balsa wood cowl is shown. The side pieces of the balsa cowl must be hollowed enough to clear the landing gear. The cowl shown in the plans is open between the side pieces to the bottom and front which will give excellent cooling and access to the engine. The top of the cowl is a third block of balsa, carved and hollowed.

The entire airplane is covered. The original was done with silk, but Silkspan or Japanese tissue will work. These latter two will be lighter, but weaker. Three coats of clear dope were used and, after that, three coats of silver dope sprayed on. Then the color trim was added. The stripes on the tips of the wing and tail are red on the tip, white and then blue. The top of the vertical tail is blue. All lettering and numbers are blue. The LE of the wing and horizontal tail has a red stripe. The center of the rudder and fin is white. The bottom of the rudder and fin and the top of the fuselage are red. All the rest is silver, with the exception of the black wing walks.

The windshield of the Mooney Mite has

(Continued on page 44)

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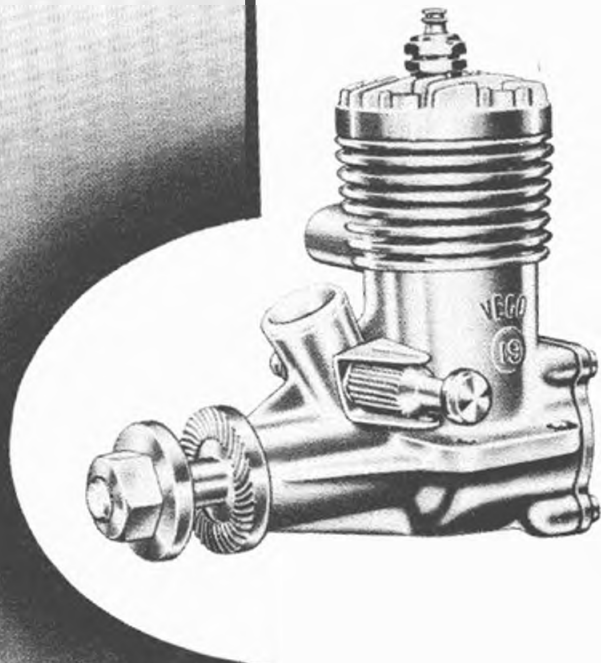
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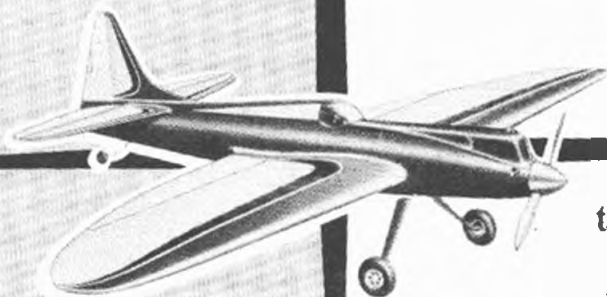


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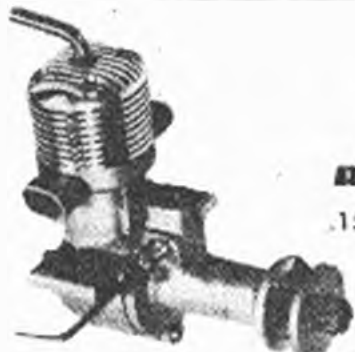


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WORLD ENGINES

P. O. BOX 905, WARREN, OHIO

(Continued from page 42)

single curvature and is simple to make. The aft part of the canopy, however, is a blown shape and if it is to be simulated exactly, a balsa form must be carved and the celluloid sheet pulled to shape while hot. (See MAN, 12/54, p. 30, *Mold Your Own Canopies*, Don A. Rivers.)

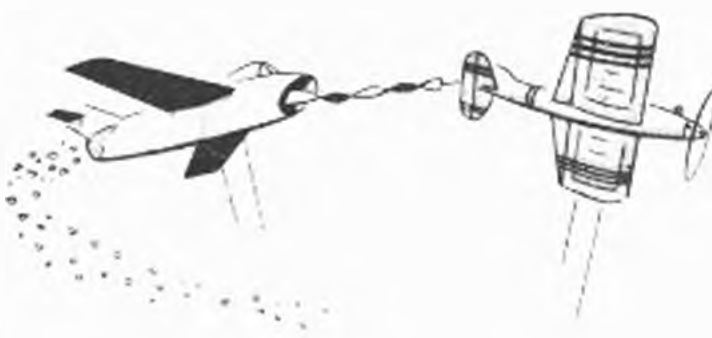
On the original model a balsa form was carved to the shape of the entire cockpit area, including the windshield. This was finished with five coats of sanding sealer. The piece of plastic to be used was 8½ x 11 in. and was clamped between two pieces of ¼ in. plywood, 1 x 11 in. long on its two long sides. This was heated over the stove until the plastic was quite saggy and then it was pulled down over the form which had been coated with petroleum jelly. This was held in position until it cooled. This also gave a formed piece of plastic which included the windshield as well as the canopy.

If you don't want to go to the trouble of making the sliding canopy (you'll have to, if you want to carry a payload dummy), just trim off the edges and fit the entire canopy windshield combination in one piece.

The sliding canopy, however, is not too difficult once the plastic forming is completed. The windshield is cut from the canopy and installed on the model, using a piece of 1/32 dia music wire for a frame. The wire is embedded in the fuselage.

Make the track out of ¼ sheet. A piece is added in the cockpit area on top of the longeron and a tapered piece is added aft of the cockpit. Make a groove lengthwise of these pieces on the outside. The groove to be of 1/16 radius. Then make up a frame of .040 music wire. Two bows are bent and two runners are soldered to the inside of the bows. The runners fit into the grooves in the tracks and the bows should have the same contour as former C and just be able to clear the former when the runners are in the tracks. The bows should be bent so that, when the runners are not in the tracks, they extend about ¼ in. less than the width of the fuselage. Thus, spring loaded, they will hold themselves in position in the tracks. Put the frame in the tracks and cement the canopy on the frame. To simulate the aluminum canopy frames of the real plane, use strips of paper-backed tinfoil cemented to the canopy. Paint the top of the canopy silver, as shown on the plane.

In flight, the crucial test is upon you. Check for warps. Make sure all surfaces are in the correct position. If you use 10° of flap, make sure they are set the same amount on both sides of the fuselage. Check the center of gravity. If it is nose or tail heavy, correct by adding clay. Put the propeller on backward and, with low



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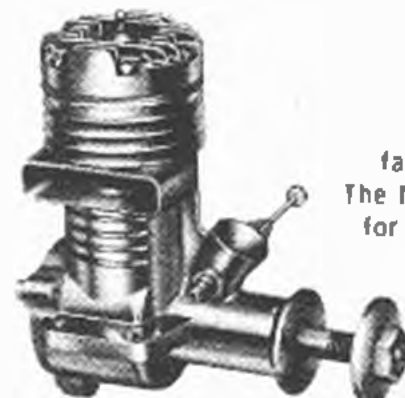
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power, let the plane ROG. Low wing airplanes are hard to hand-launch well. The right thrust and downthrust built into the motor mounts are correct for the original model. Keep adding power each flight as long as things go well. Correct power flight troubles with the thrustline and gliding troubles with the surfaces. The original model flew left under power and right in the glide.

All Metal!

(Continued from page 21)

the bend, work the sheet over the edge of the radius as far as you can. Take off the clamps and keep working the surfaces together until the TE's touch and you have a slight airfoil section in the rudder. If you have a perfect bend, the TE's will be even. If the TE's are not even, your bend was not straight, or it was in the wrong place. If so, cut out a new piece and try again. When you have a perfect job, you are ready to go ahead with the riveting.

For flush-head rivets, you will need a 90° countersink and some No. 50, or 1/16 in., drills. The rivets should be placed as close to the edge as possible but not so the head is on the edge. The distance between rivets will be up to your own judgment. I usually put them at least 1/4 in. apart on the tail section.

With the TE's clamped tightly together, make sure there is no twist in the fin or rudder and drill all holes necessary before riveting. After you have drilled the holes, countersink for the flush-head rivets so that the head is just flush with the skin or sheet surface. If you like, the opposite side of the hole can be countersunk also; however, I have found that the rivets tend to loosen quickly when this is done. I countersink mine on the head side only, always on the upper surface of the wing and stabilizer and on the right side of the rudder. The small bump on the opposite side of the surface does not harm the model in appearance or in flying ability and is well worth the added life of the joint.

Use a small steel block with the edges rounded for an anvil and place the rudder with the head of the rivet down on the block. The rivets will probably be too long, so with a pair of side cutters or a sharp file, cut the length of the rivet down until it is only about 3/64 in. above the surface. If you like, take a piece of steel and make a jig to slip the rivet through so that you can file them all the right length before you start riveting. With the surfaces held down tightly over the rivet on the anvil, hit lightly with a small hammer until the end of the rivet is about 3/32 in. in diameter. It would be a good idea to practice on some scrap material, if you have never done any riveting before.

Do not strike the surface of the sheet material with the hammer when riveting, as this will cause the sheet to buckle between rivets. When you have all the rivets in place, make a small aluminum block about 1/2 in. square by 1/2 in. long, or a piece of aluminum angle about 1/2 in. wide, and rivet it inside the bottom of the rudder where it fits into the fuselage. This piece will be drilled and tapped later when the rudder is installed on the fuselage.

The stabilizer is next and is drawn over the edge of the bench the same as the rudder was, to put a slight curve in the entire surface. It is next clamped in the same manner and folded over at the LE's. Remove the clamps and work the surfaces together until they are about 1/8 in. apart. Cut a piece of 1/16 in. or 3/32 in. thick material the same shape as the stabilizer tips and round the outer edge. Inserting it between the surfaces at the tip, work the

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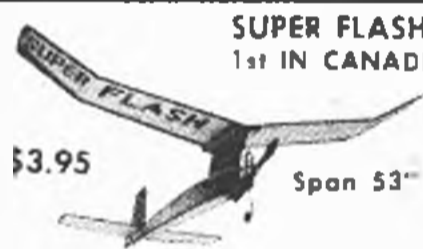


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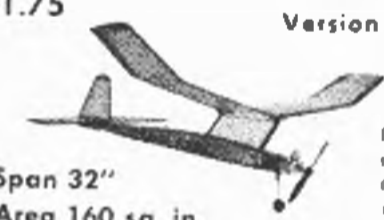


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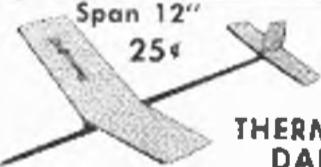
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edges of the tip round with a leather mallet or a dowel stick and remove the insert. Cut one piece from $\frac{1}{8}$ in. thick material about $\frac{1}{2}$ in. square and one piece about $\frac{1}{2} \times 1$ in. The 1 in. piece is placed between the sheets at the center of the LE and is riveted in two or three places. The $\frac{1}{8}$ in. square piece will form part of the elevator hinge, so a notch will have to be cut in each corner and a hole drilled as shown in the drawing. The piece is now placed between the sheet surfaces at the center rear edge of the stabilizer, with the center of the hole even with the TE. Rivet the piece in three or four places. Cut four more pieces from $\frac{1}{8}$ in. material in the shape of a T and drill a hole in the stem of the T parallel with the cross. File the stem round close to the hole and rivet in the positions shown, at the TE of the stabilizer with the hole even with the edge.

The elevators are next and are folded in the same manner as the rudder and stabilizer, working the TE's together and riveting about $\frac{1}{8}$ in. apart or equally spaced at the TE. File the slots in the LE of the elevators to fit over the T hinges, so that when the hinge wire is pushed through, there is sufficient up and down movement of the elevators.

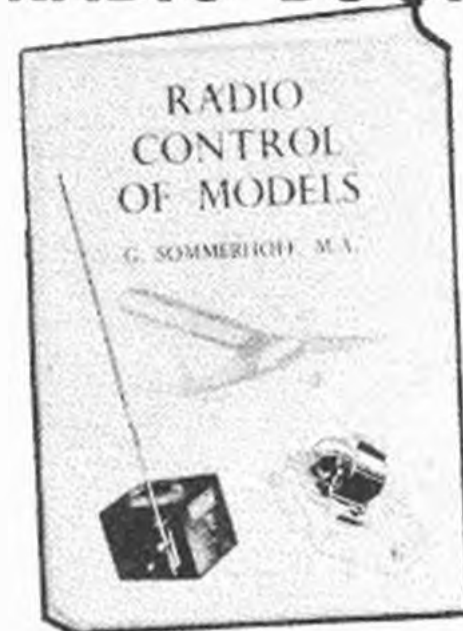
I use a section of aluminum Tee-angle for my elevator horn. If you cannot obtain suitable angle, make some by riveting two pieces of .030 in. sheet together. The top of the Tee is slipped inside the elevators and a hole is drilled and tapped through the bottom surface of the elevator and into the Tee. Shorten two round head screws so they are just long enough to go through the tapped pieces without hitting the top elevator surface. Drill a hole in the stem of the Tee about $\frac{1}{8}$ in. below the elevator hinge line for the pushrod.

The wing is now rubbed over the edges of the bench to put a curve in the surface, more toward the LE and less toward the TE. The LE of the wing can be bent over the rounded edge of a piece of angle iron, or a tapered stick can be used. The tapered stick is preferable on tapered wings because it makes a better LE shape. Work the metal until the TE's are close together and you have an airfoil section approximately 10 per cent of the chord in thickness. If you intend to make a thinner wing than 10 per cent, it will be necessary to put a full length spar in the wing. Also, if you have a flat-bottomed wing planned, it will require a spar, because it is the combined top and bottom convex curves on the wings that hold them rigid without spars or ribs. Once this curve is removed, the wing will be weakened and easily bent. Unless you plan to fly this model at speeds around 150 mph, a thin wing is not only impractical but aerodynamically unsound. The heavier your model is for a given wing area, the more lift is required to get it into the air, and unless you are flying fast enough to create that lift from a thin wing, the model has to fly at higher angles of attack, or nose high, in order to get lift. Consequently, it is creating more drag than a sufficiently thick wing flying at lower angles of attack.

A thin wing flying at high angle of attack in order to stay in the air is flying in a stalled condition when the engine stops, has to recover from the stall in order to make a decent landing and usually does not have sufficient altitude in which to recover, therefore dropping like a streamlined brick into the ground. Don't be afraid to build a thick wing on your model for you will find that it is just as fast and that flying and landing are far superior.

When you have the approximate airfoil formed in the wing panels, clamp the TE's together in a manner that will allow you to drill all the rivet holes. Check the wing panels for any twist that may have ap-

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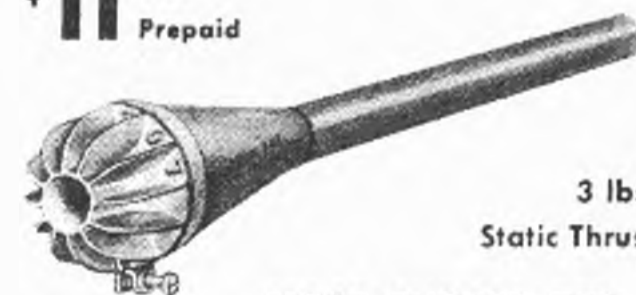
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peared in the clamping and align the LE and TE by sighting along the bottom from front and back of the panels. When the panels are as straight as possible, drill all rivet holes and countersink them. Space the holes about $\frac{3}{4}$ to 1 in. apart, rivet the TE's together from the center toward each end. Cut a piece of .050 in. aluminum sheet in the same curve as the wing tips and about $\frac{1}{4}$ in. wide. Round the outer curve on both edges and taper toward the TE until the piece will fit smoothly into the left wing tip. Clamp the tip so that the piece is about $\frac{1}{32}$ in. inside the tip edge and rivet in place. Work the sheet surfaces smoothly over the outer curve with a soft mallet or dowel stick and drill the holes for the leadout wires.

The right wing tip insert should be made from a piece of steel or lead in the same manner and lightened if necessary to about $\frac{3}{4}$ to 1 oz. Rivet in place and round the wing tip the same way as the left wing was done. In the case where your model has thick square tips, these pieces can be shaped from hard wood or aluminum blocks. Hollow out the left wing tip and leave the right wing tip solid or add weight as necessary.

The wing panels are now ready to be riveted together. Lay them out upside down on your bench and align carefully with the correct width between the panels for the fuselage and the center section tabs overlapping. Clamp in place and, after checking alignment again, rivet the bottom tabs together. Now turn the wing right side up and place a block under each tip to give it the correct amount of dihedral. Clamp the upper center section tabs together and check the wing panels for twist or misalignment. When sure the wing is straight, rivet the tabs together, using four rivets at the front and four at the rear of the section. Bend the proper shape in the airfoil brace tabs but do not rivet them to the lower surface. The tabs will be held in place when the wing is mounted to the fuselage. Make a control horn from .050 in. aluminum with the leadout wires spaced at least 2 in. apart and pushrod hole only $\frac{1}{8}$ in. from the pivot hole. The control horn is mounted as shown in the drawing with spacers inside the wing center section so that a bolt may be put through from the bottom to the top of the wing and pulled up rightly. Before mounting the control horn, push the leadout wires through the wing tip and fasten in the proper holes in the horn. Push a bicycle spoke through the pushrod hole in the horn and mount the unit in place. Use a locking type nut on the bolt to prevent its working loose and dropping out.

Next month we will build the fuselage and finish the model.

Pen Pals

► A varied background rich in aviation activities may be shared for the asking by writing to Leslie E. Dwight, 14 Flesher Ave., Christchurch N.E. 1, New Zealand, 35-year-old engineer with weakness for ukie, FF, scale, TR . . . Spaceward-gazing modelers may be able to help Edwin E. Hunt, 2144 S. Winchester, Milwaukee 7, Wis., find a formula for mixing rocket-powering powder or for building any rocket-powered replica; he's also interested in back issues of Aeromodeller for 1953 through 1955 . . . Al Tenuta, Jr., 2754 N. Neva, Chicago 35, Ill., will be happy to find construction plans for B-17 and PB-5 . . . If you've flown during WWI or any other "nostalgic" era of aviation—or even just enjoy reading about those times—you're promised faithful response to all letters by L.O. Davis, Jr., 1119 W. Third St., Owensboro, Ky. Tell him, too, if you can swap or sell Camouflage '14-'18 Air-

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DON ALBERTS, New Mexico, set a new senior free flight record in winning with his 1/2 A "Privy Boy" and a 5 1/4" 4 POWER PROP at the '55 Nationals. His time of 36 minutes not only won the event, but the two Top Flite trophies shown above!



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GARY CHRISTIANSEN, Utah, nearly doubled the existing national record in class "C" Open Free Flight. Last August at Twin Falls, Idaho, his "Royona" using a 10'6" TOP FLITE set a great new mark of 53 minutes, 28 seconds, officially approved by the Academy of Model Aeronautics.



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Swap ideas with A. Russell, 492 Ferguson St., Palmerston North, North Island, New Zealand, 17, stunt, combat, flying scale (FF, CL) . . . Don Fisher, Monavale R.D. 3, Cambridge, New Zealand, about 18, scale CL, TR . . . Wolfgang Heitzmann, Neippergstr. 4, Stuttgart-Feuerbach, Germany, 16, CL.

More readers seek fellow air fans' aid in locating elusive modeling miscellany: Anthony Chikes, 2318 14th Ave., San Francisco 16, Calif., wants to replace MAN back-issue file destroyed by fire, especially issues that carried WWI covers . . . Allbon Bumbi .15 Diesel offered for K & B .15, Fox .35 or Dooling .29 by George Smith, Drysdale Service Station, Via Geelong, Victoria, Australia . . . Back issues of various air modeling publications and an O & R motor available from Forrest Bonjour, Fayette, Ia. . . Friendship with an American club is sought by West Bromwich Model Aircraft Club represented by secretary, M. Grimmett, 46 Victoria St., West Bromwich, Staffordshire, England . . . You can get some MAN back issues between 1944 and 1948 from N.O. Burgdorf, 6739 Aliceton Ave., Afton 23, Mo. . . Long list of model motors, including four Dyna-Jets, for sale by Joseph C.N. Gonzales, 766 1/2 W. 16th St., Los Angeles 21, Calif. . . All kinds of air modeling publications, including the old Flying Aces, available from Jerry Brewton, 5020 E. Hawthorne, Tucson, Ariz. . . And Reaves Hall, Midlothian, Va., will sell his Forster F-31 and Cub .049 or trade them for two Cub .29's.

Waco Cabin

(Continued from page 15)

Make up landing gear wires and bind into position with thread, bind forward and rear landing gear wire with soft wire and solder together. Now mount upper wing in position so that forward and rear spars, cemented down against longeron, may give the wing proper incidence. If you care to doublecheck this, the upper wing has 2° incidence in reference to center line of airplane. Lower wing is 0° and stabilizer is -2°.

Now lower wing may be mounted, using B3 and B4 and two wing mounts shown directly under side view of lower wing. Add the rest of body formers and stringers on top and bottom of fuselage and install tail wheel strut (non-swivel type used) to help on take-offs. Use 1/32 sheet from B1 to B2, bottom side of fuselage, then install rudder and stabilizer. Make Silkspan fairing from fin to fuselage. Silkspan goes on top and bottom of fuselage, then wing fairings and complete lower wing fairing are added with Aero Gloss Plastic Balsa. Silkspan also goes on upper surface of upper wing fairing.

Then make firewall mount and plywood firewall. Cut strip of tin can as shown on drawing. Drill holes for mounting motor in firewall and strip of tin. Now bolt motor onto firewall with tin strip between firewall and nuts. Solder nuts to strip so that motor can be loosened to adjust offset without removing nose of fuselage. Now cement firewall to its mount and, when it is dry, cement the firewall mount to the front of fuselage. Build up landing gear fairings and wheel pants as shown, making sure that wheels roll freely in wheel pants. It is suggested that celluloid or plywood inlays be fitted on inside of wheel pants where landing gear wires go through to reinforce these points. Wing struts may be added at this time. Aero Gloss Plastic Balsa streamlined fillets were used where wing struts contact wing.

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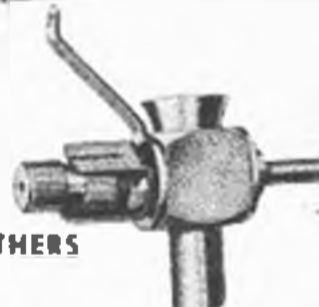
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Engine cowl comes next, with 1/32 sheet around rings to make rear part of cowl. Do not install windshield or upper window until entire airplane has been doped. Colors are black trim and Waco maroon. Then install windshield and upper window.

If model is balanced at CG shown on side view and engine offset as shown on drawing, model should be ready to fly. Try to get a left turn under power and a right turn in the glide.

The ship is likely to spiral in with right turn under power.

Word of warning: don't use too much fuel for the first of two models was lost that way.

The model will take off unassisted. A slight breeze will aid take-off by holding the airplane weathercocked into the wind. Waco should fly well in a moderate breeze.

The '55 Rambler

(Continued from page 19)

wing at contact points.

Use straight-edged ruler to level off tops of formers 4, 5, 6 to get proper height. Cut off bottom of 3A until you get proper height, then cement on wing. Cut out push-rod hole first before cementing.

Cut out fuel tank .010 tin stock, using drawing as a template. Bend into proper shape, then solder. Leave rear tab open for final fuel capacity check, 29 cc only.

Cut and bend fuel line to shape, solder in tank. The feed line picks up fuel at extreme back end of tank at the outer side (right side). Install vent and filler pipes. Wash out tank, then seal back end. Make sure you have only 29 cc; if over, squeeze tank in on left side only. Install tank in proper position, front center line of tank to line up center of fuselage. Rear of tank to be 1/16 toward outer side (right side) of fuselage center line. This is important if all fuel is to be gotten out of tank during flight. Install DE shut-off valve as shown with band holding in position on former 2. Install BC and lead-in wires.

Bend to shape 1/16 valve shut-off wire, shut-off valve to operate at 3/4 down-elevator (make this adjustment later). Set motor in position between MM (no offset).

Mark drill holes for 5-40 screws. Make up tin plate. Drill holes; solder two 5-40 nuts in proper place. Clean plate so the cement will stick, then cement in place, using MM screws to hold in place.

Use a 2 in. Perfect BC. Cut and bend as shown in drawings. Install flexible lead-in wires: make a short, safe loop at BC. Install BC and put a drop of solder on BC nut. Bend 1/16 steel pushrod wire to shape to go from BC to 1 in. past former 3A.

Make up stabilizer out of 1/8 medium hard balsa; elevator, out of 1/8 hard balsa. Cut two pieces of nylon to cover stabilizer and elevator. Mark hinge line and close stitch along this line. Make up elevator horn, install on elevator, then cover stabilizer and elevator with pre-cut nylon.

Bend piece 1/16 steel pushrod wire to shape. Insert in elevator horn, then cement stabilizer to top edge of side planks. Pushrod to meet front BC pushrod between formers 3A, 4. Join together with 1/8 brass tubing 1 1/2 in. long. Slide over joint. Before crimping and soldering, make sure BC and elevator are in natural position. Recheck shut-off valve to operate at 3/4 down elevator. Eliminate excess shut-off valve by adjusting pushrod wire. Closer adjustment is possible by turning DE shut-off valve either way.

Cut and shape nose and fuselage piece using 3/4 x 7/8 x 2 1/2 medium hard balsa. Gouge out for BC movement and crankcase clearance. Drill out two fuel pipe holes, also one for shut-off valve reset wire; double-cement, using a good grade of fuel-



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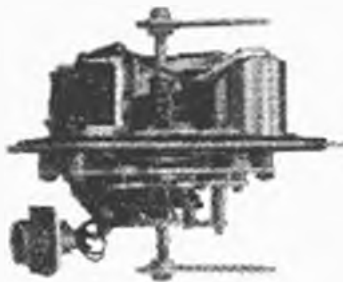
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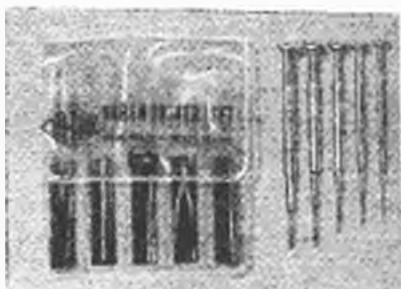


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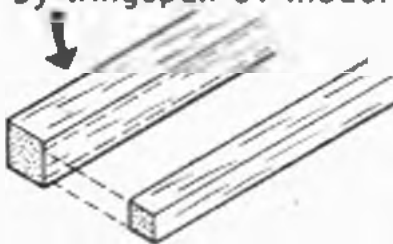
RECOMMENDED FOR STRAIGHT OR MODERATELY TAPERED WINGS



STEP ONE: Decide on airfoil section and chord. Select wood sizes to suit structure.



STEP TWO: Cement strips for leading edge and sheet balsa support together. Length is determined by wingspan of model.



Use pre-shaped leading edge if available.

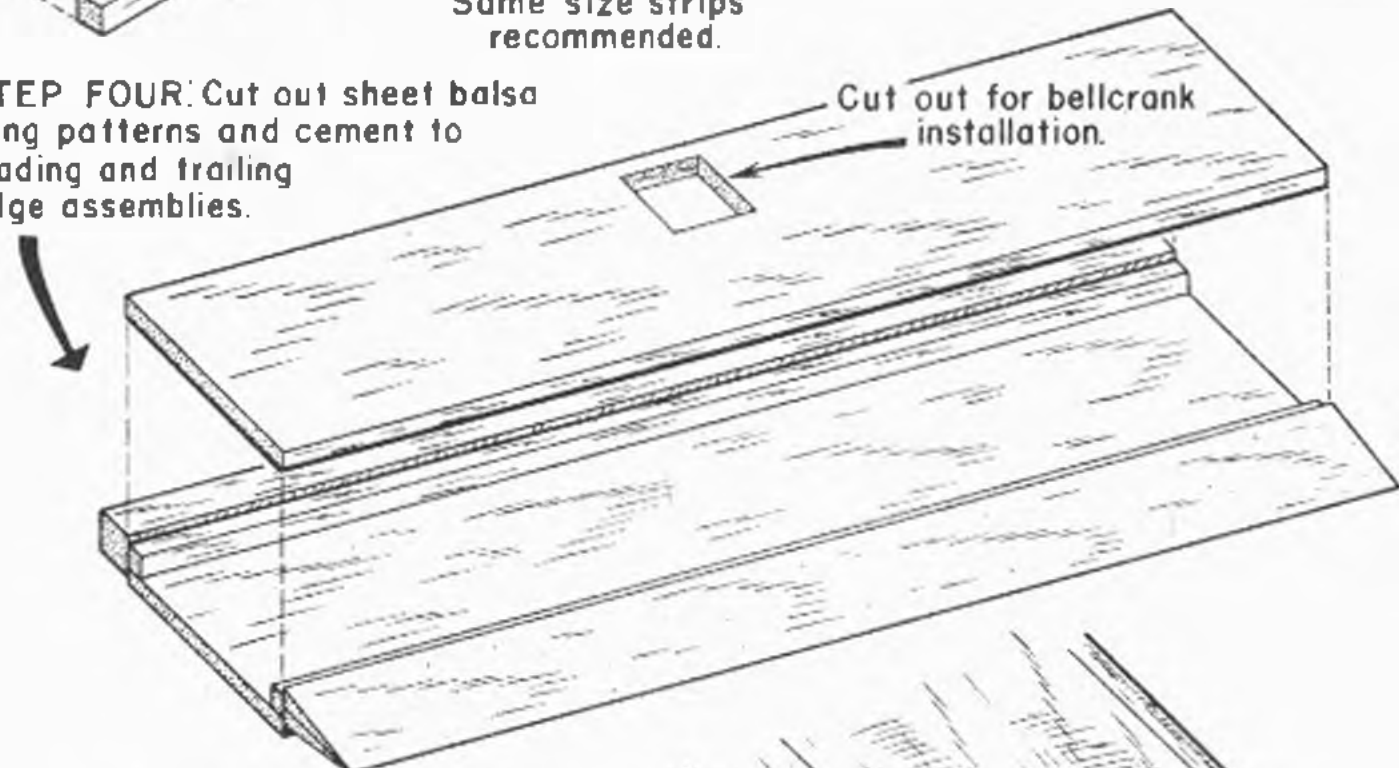
Same size strips recommended.

STEP THREE: Cement tapered trailing edges together if required, and cement strip for sheet balsa support in place.



Tapered trailing edges available in a variety of sizes.

STEP FOUR: Cut out sheet balsa wing patterns and cement to leading and trailing edge assemblies.



Cut out for bellcrank installation.

STEP FIVE: Shape wing to desired airfoil section.



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STEP SIX: Add balsa wing tips. Drill thru and insert tubing for lead-outs.



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proof cement. Note drawing on front section of this piece: leave at full height an MM nut area. Make a $\frac{1}{4}$ groove $\frac{1}{2}$ in. from each side of nose section, about $2\frac{1}{2}$ in. long; round off all sharp edges and shape nose to prop washer 1 in. dia.

Make No. 1 cross-piece out of white pine. Shape and cement in place. Leave enough clearance for front part of motor housing. Make up landing gear plate using $\frac{1}{8}$ plywood; also bend to shape $\frac{1}{8}$ steel wire for landing gear. Fasten to plywood plate

using J bolts. Cut off excess of J bolt protruding out of nut. Cement landing gear in proper position. (Suggestion: Landing gear should be $\frac{1}{8}$ in. longer for taking off in grass.)

Make up two $\frac{1}{8}$ plywood tail skid plates. Cement in place. Add bottom fuselage piece $\frac{3}{8}$ x 13 medium hard balsa. Then drill hole for 6-32 bolt. Make up small tin plate to solder 6-32 nut to same. Then cement in place, using tail skid bolt to hold plate in position.

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Cut two small side planks and level off bottom with straight edge of formers 3, 4, 5, 6. Cement in place. Level bottom for formers 3, 4, 5, 6 and tail wedge, using a straight edge. Have all formers touching straight edge. Then cement bottom $\frac{3}{8}$ x 13 pre-cut piece.

Cut out two top side planks using 1/16 medium hard balsa, planks to fit level with tops of formers 3A, 4, 5, 6. Cement in place. Cement 1/16 medium hard strips over side plank seams on inside of fuselage. Now cut and shape a piece of $\frac{3}{8}$ x 10 soft balsa to fit over all formers; also, top of stabilizer. Cement in place.

Cut out rudder, using 1/16 plywood. Cut slot in top of fuselage at rear section. Front of rudder is offset 1/32 toward inside of circle; back of rudder, offset 1/32 toward outer side of circle. Cut out bottom of rudder for elevator movement, then cement rudder in place. Sand the whole plane smooth and then cover top nose piece with nylon, back to cockpit.

Cut filler vent pipes to proper height. Solder top of vent pipe and drill hole on inner side. Shape a pipe canopy out of solid aluminum or tin stock. This is a great help in saving fuel; also, changes in wind don't affect needle valve setting. Install canopy using a wire hinge, with the canopy spring-loaded to stay shut, so in case of a flip-over, you won't be tearing it off.

Install soft balsa block, covering landing gear wire, and make smooth joint at former 3. Gouge out air vent. Cover this bottom section with nylon back to former 3 and up to wing. Make up engine cowling with box-type construction. Have venturi hole a snug fit. Shape and sand, then cover with nylon. Cowling held on by rubber bands, two small screws into MM and two near bottom of cowling. Small rubber band wrapped around these screws hold cowling in place.

Install pilot dummy making sure its head is $3\frac{1}{2}$ in. from bottom of fuselage. Cut to shape a Minnow, Quest or P-51 canopy and cement in place.

Install 1- $\frac{3}{8}$ in. Veco wheels; solder washer as per drawing. Tail skid wire as shown has a sharp loop, which takes the strain off the tail wedge.

Use your favorite method in painting the plane. Remember that the timers have to see this plane, so don't use any colors that blend with trees, buildings or other elements of the environment.

Use a bright color; it's easier on yourself, when counting those laps for proper pit stops.

Remember, this is a contest ship. We don't haul around any more plane than is necessary. This plane has 126 sq. in. wing area which works out just right for this size plane and weight. It takes off fast, flies fast and lands fast. On pit stops—or whenever ship comes in to land—bring model down to 2 ft. off the ground. When it slows down, it will settle by itself for a perfect landing.

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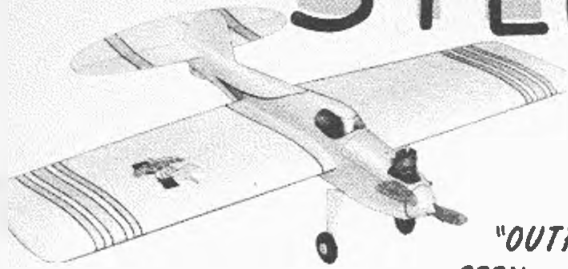
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STERLING'S NEWEST MODELS!



SUPER RINGMASTER

Stunt Control Line Model **\$3.95**

Kit S-6—Span 42" for engines from .19 to 60

"OUTFLIES ANYTHING I'VE EVER SEEN... AND I'VE SEEN THEM ALL!" says Matt Kania, world-famous model designer.

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Captain Eddie Rickenbacker's

NIEUPOORT '28'

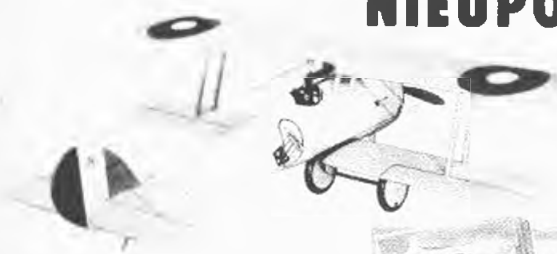
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—Span 33"
Length 27"

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Captain Eddie Rickenbacker, Ace Commander of the famous 94th "Hat in the Ring" Squadron of World War I, scored some of his 25 victories in the Nieuport '28!

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Sterling models

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ADVT. INDEX, JANUARY, 1956

A-J Aircraft Co	4th cover
American Telasco	36
America's Hobby Center	4, 5, 6, 7
Austin Craft	36
Babcock Radio Engineering	32
Berkeley Models	54, 55, 56
Bonner Specialties	49
C & H Sales Co.	50
Champion Chemicals	38
Cleveland Models	36
Cobb Hobby	42
Comet Model Hobbycraft	41
Craft, Model & Hobby Industry	41, 45
DeBolt Model Engineering	52
Deltron Co.	44
Dynamic Products	41, 46
Ectron Products	47
Forster Brothers	37
Fox Mfg. Co.	44
Francisco Laboratories	53
Great Lakes Battery Co.	49
Paul K. Guillow	51
Gull Model Airplane Co.	42, 45
Gyro Electronics	42
Hawk Model Co.	49
Henry Engineering	43
Herkimer Tool & Model Works	3
Hoffman Products	48
Jasco Models	46
K & B Allyn Co.	3rd cover
Kay Specialties	48
Minnesota Engine Works	46
Model Trains	37
Moer Trading Co.	38
Monogram Models	8
Ohlsson Mfg. Co.	51
Paetra Chemical Co.	2nd cover
Polk's Model Craft Hobbies	33
Radiomodels	46, 40
Reedrack	48
Scientific Model Airplane Co.	34, 35
Spitfire Products	40
Stanco Mfg.	45
Sterling Models	53
Testar Chemical Co.	28, 29
Topflite Models	47
Wilshire Model Center	48
World Engines	44
X-Acto Crescent Products	52



Senator Estes Kefauver receives from wholesaler Carl Maxwell on behalf of the Southern California Hobby Industry Association a ready-to-fly plane made by L. M. Cox. Kefauver, who heads the United States Senate on juvenile delinquency, made a stirring speech emphasizing importance of hobbies like plane building to combat delinquency. "... To give the child something creative to do with his leisure time is important," said the Senator. "Telling a child what not to do is never enough."

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"1/2 A" FLYING SCALE...

For Free-Flight Gas — Controline — Rubber Power



The Nationals Winning PIPER "SUPER CRUISER"

.035 to .049 Engines—35" Wingspan .049 to .099 Engines for Controline

Completely re-designed to match its Nationals winning record with "1/2 A" engines, modern pre-fabrication and simplified sheet balsa construction techniques. This design will soar to honors in the contest season ahead!

\$295



\$295

Free-Flight,
Rubber or Controline

"SUPER CADET"

For .035 to .049 Engines—35" Wingspan
.049 to .099 Engines for Controline

This is the current version of the "Interstate Cadet," many time National's winner. Authentically detailed and structurally re-designed for "1/2 A" free-flight. Full Size Plans show rubber, controline adaptations, etc.

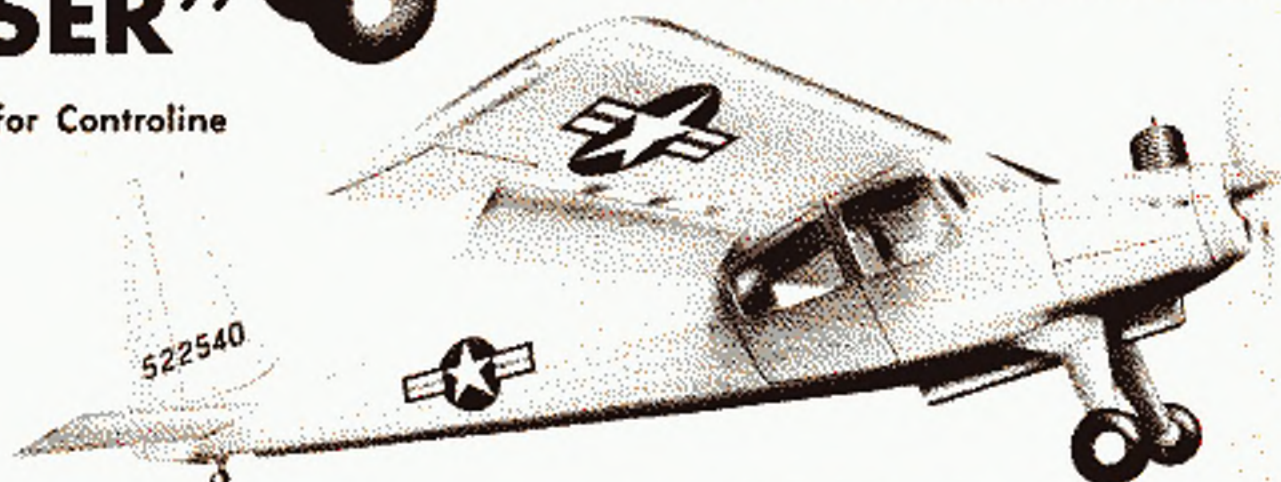


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For .035 to .049 Engines—35" Wingspan
1" Scale—Free-Flight, Rubber or Controline
.049 to .099 Engines for Controline use



Army Liaison YL-24 "HELIOPLANE"

Variable Camber Wing for Two-Speed Radio Control Flying
For .049 to .14 Engines — 39" Wingspan — 1" Scale

The "Helioplane" is the first model that permits the use of scale wing flaps. Depress 10 degrees for free flight; 25 degrees for slow speed control by radio; or raise wing flaps 5 degrees for high speed flight!

Radio Control
Controline
Free-Flight

\$395

For Free-Flight Gas — Controline — Rubber Power



Cessna L-19 "BIRD DOG"

.035 to .049 Engines for Free-Flight
.049 to .099 Engines for Controline

In active duty in Korea, this new liaison plane is perfect in proportions for model work. Plans show it as a free-flight "1/2 A" gas, with details for rubber and controline conversion. Authentic decals, die-cut balsa, plywood and tel-luloid; shaped and notched wing edges; formed gear, etc.

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STINSON SENTINEL "L-5"

33 1/2" Wingspan

This model is a constant winner at National Meets. It is a commercial version of the Army's "Flying Jeep."



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34" Wingspan

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Largest in the series is the never to be forgotten Fairchild. Stable, strong, detailed, it is ideal for contest experimentation.

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\$250

AERONCA SEDAN

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CULVER "V"

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This low-wing sport plane turns in long stable flights. The tricycle landing gear adds realism to landings.

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R.C. FLYING SCALE

Treasured as a Christmas gift, Radio Control is a stepping stone toward aerodynamics and electronics. It is the gift with a future...

For Radio Control — Free-Flight — PAA-Load

"PIPER CUB J-3"

For .15 to .23 Engines—71" Span—2" Scale

Weight: 4½ lbs. — 700 Sq. In. Wing Area — 14.2 oz. Loading

The "Piper Cub J-3" needs no introduction. Most famous of all light aircraft, it's a natural for R.C. or Free-Flight flying. The six foot span permits the extra R.C. installation that you dream about. This is a rugged, detailed, flight proven design. Full-Size Plan with R.C. installations. Authentic Details, etc.

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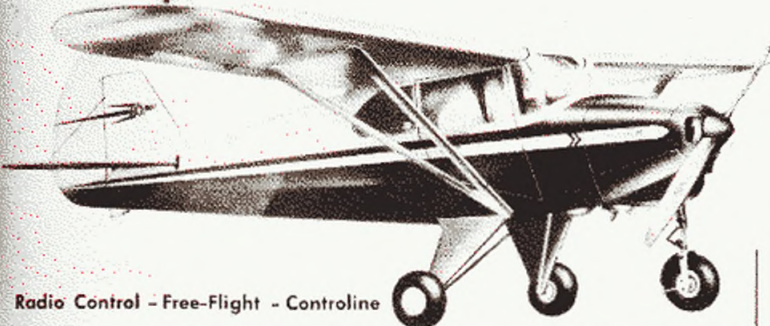
CESSNA "170"

For Radio Control — Free-Flight — PAA-Load

For .25 to .35 Engines — 72" Span — 2" Scale

Controlling your "Cessna 170" by Radio is a thrill you will not forget! Perfect in scale, rugged, stable in all attitudes, yet responsive in control, with good wind penetration qualities. The gear location is ideal for extended take-off runs. The larger than average size makes it easier to control in winny weather.

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Radio Control — Free-Flight — Controline

Piper "TRI-PACER"

\$5.95

This perfect scale R.C. design may be built as a Free-Flight or Controline version if desired. Full Size Plans cover special details for all three versions. Flaps, elevator, rudder, motor and nose gear may be operated by K.C. Ailerons for trim, cabin door access to Radio. Highly Pre-fabricated. Authentic Details.

1½" 1 Scale—44" Wingspan

.065 to .099 Engines—Radio Control

.035 to .075 Engines—Free-Flight

.075 to .15 Engines—Controline



"GIANT" FLYING SCALE

\$13.95

2" Scale — 68" Wingspan

NAVION "Super 260"

• Full Size Plans with Radio Control Details

For .29 to .35 Engines Radio Control

For .23 to .29 Engines Free-Flight

For .29 to .65 Engines Controline

This beautiful scale replica of the famous "Navion" is a fast, rugged and truly different R.C. or Free Flight design, easily adapted to Controline Flying. Thrill to its flashing performance and smooth response. As a free-flight, it will give you experience and confidence in low wing designs. Big, racy, and well engineered, it will set the pace whenever it's flown. Easy to build!

• Molded and Embossed Celluloid Canopy
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100% Dependable Radio Control...

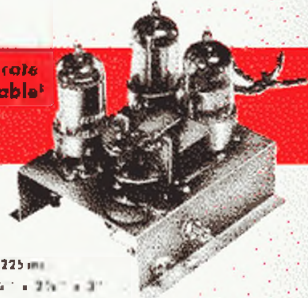
Tone Control on 27.225 mc. (Examination Free)
Easy to adjust, dependable, trouble free operation.

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Designed by:
Dr. Walter Good



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Low battery drain. Three tubes operate for long periods without any adjustment. **\$29.95**
Receiver complete with a 5000 Ohm relay

Receiver is not apt to pick up R.F. Carrier from wrong transmitter as signal must be modulated at audio frequency. Perfect for R.C. Novice flyers



Crystal Controlled Dust Core Tuned

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and Radio Control Accessories!

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Kits may be assembled in less than two hours. No radio experience necessary. Step-by-step plans, color coded wiring. Just solder and screw together. Chassis and all electrical components are included.



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"1/2A" Flying Scale:



\$2.95

The Nationals Winning PIPER "SUPER CRUISER"

.035 to .049 Engines for Free-Flight
.049 to .099 Engines for Controline
35" Wingspan

1" Scale—Free-Flight, Rubber or Controline

Completely re-designed to match its Nationals winning record with "1/2A" engines, modern pre-fabrication and simplified sheet balsa construction techniques. This design will soar to honors in the contest season ahead!

These Full One-Inch Scale models have proven themselves on the contest field.

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STINSON SENTINEL "L-5"
STINSON VOYAGER "150"
AERONCA SEDAN
CULVER "V" Each — \$2.50

Free Flight Gas —
Controline —
Rubber

Cessna L-19
"BIRD DOG"
"SUPER CADET"
CESSNA "180" Each — \$2.95



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Newest in Combat Stunt — ZILCH "X-PENDABLE"

For .19 to .35 Engines — 38" Wingspan

Kit includes all Pre-fabricated Wood Parts; Complete Controline Hardware; Metal Landing Gear; Rubber Wheels; and FULL SIZED PLANS, detailed as only Berkeley details them.



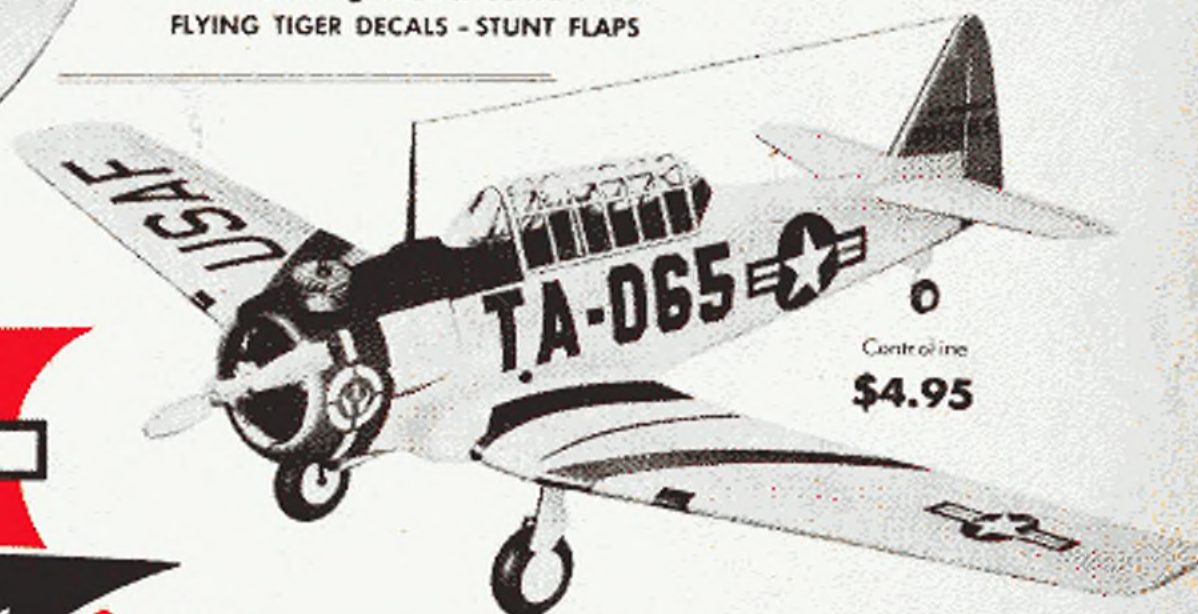
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"P-40 WARHAWK"

For .19 to .35 Engines—45" Wingspan

Featuring: METAL COWL —
FLYING TIGER DECALS — STUNT FLAPS



Controline
\$4.95

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(U.S. Navy Designation SNJ-5)

For .19 to .33 Engines — 31" Wingspan

Authentic and complete down to both Army and Navy decals, the AT-6 is one of the most popular kits of all time. Performance is excellent.

THIS CHRISTMAS—

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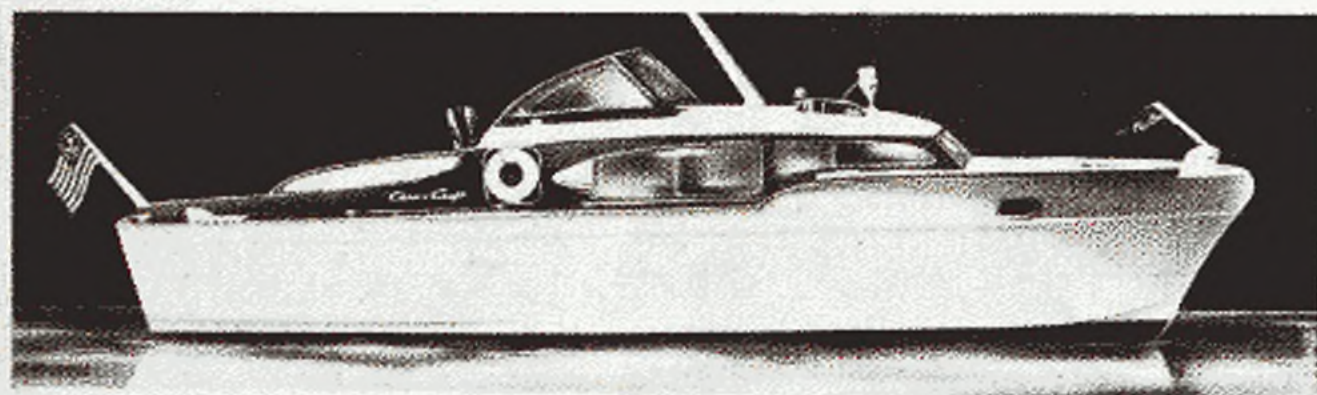
"COBRA"

- Full Size Plans with R.C. Details
- Die-Cut Mahogany Veneer, Balsa, Plywood
- Celluloid, Deck Hardware, Decals • Scored Decking

\$9.95

Build this big Mahogany planked scale replica of Chris-Craft's 1955 Sport Boat. Engine Compartment completely separated from optional Radio Control gear.

.09 to .35 Engines —
1 1/2" = 1" Scale — 31 1/2" Long



Chris-Craft 32' CRUISER

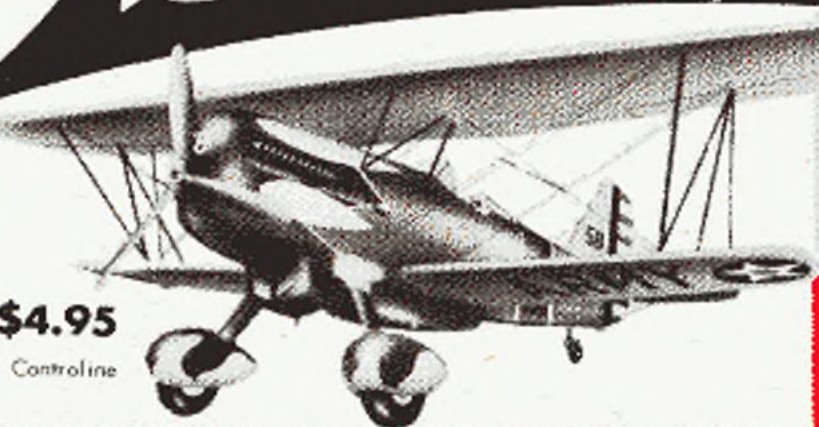
NEVER ANYTHING LIKE IT... A 32" FORMED PLASTIC HULL!

For up to a .29 Gas Engine or
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\$14.95 RADIO CONTROL OPTIONAL!

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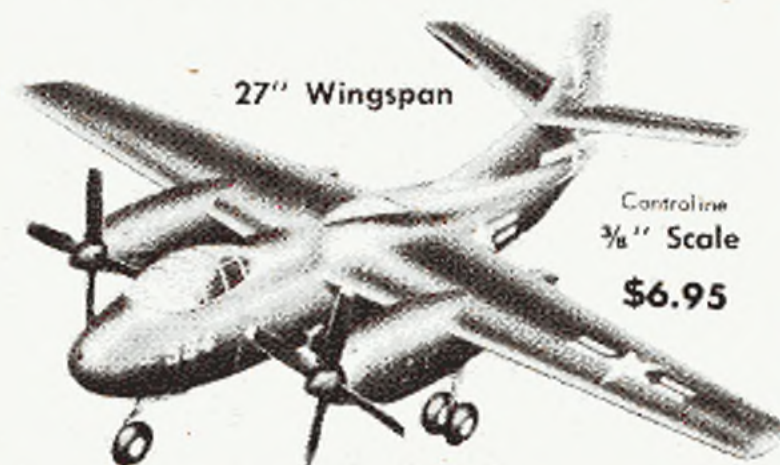
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Controline

CURTISS HAWK "P-6E"

For .09 to .15 Engines — 24" Wingspan
Metal Cowl; Metal Wheel Pants; Colorful Decals

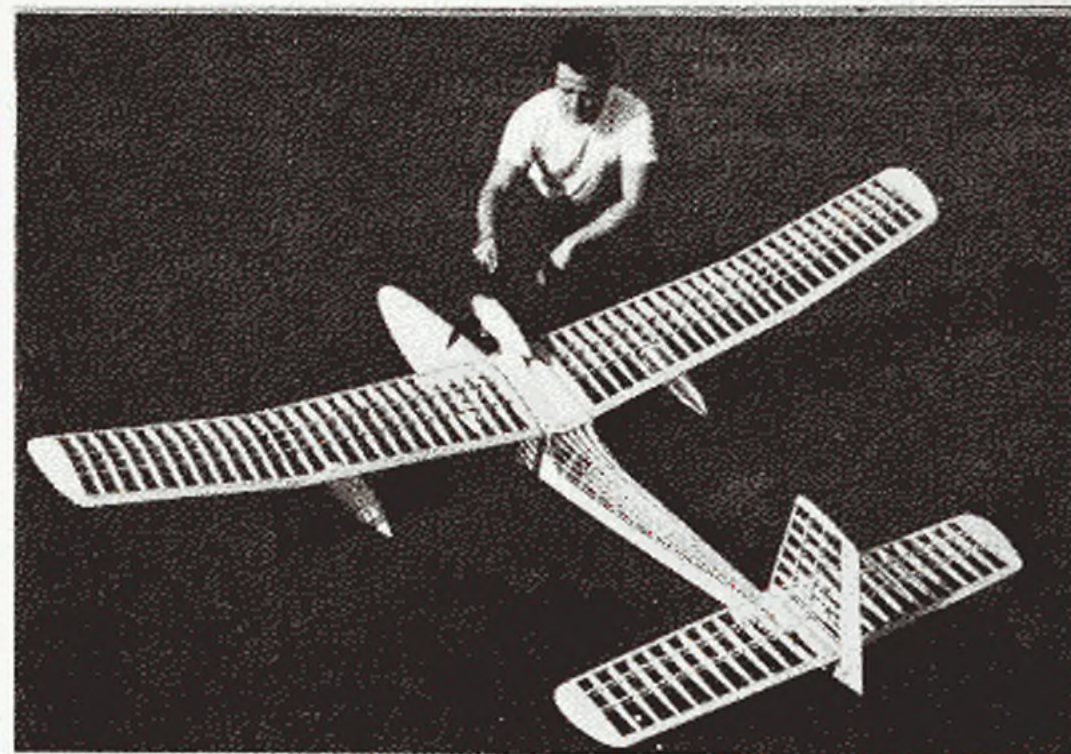


27" Wingspan

Controline
3/8" Scale
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For two .045 to .099 Engines plus Jetex 100,
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"LONG PLANING HULL" FLYING BOAT

For .45 to 1.20 Engines — 114" Wingspan (9 1/2' Feet)
Weight with R.C. — 9 1/2 lbs. (115.2 oz. Loading)

1440 Sq. In.
Wing Area

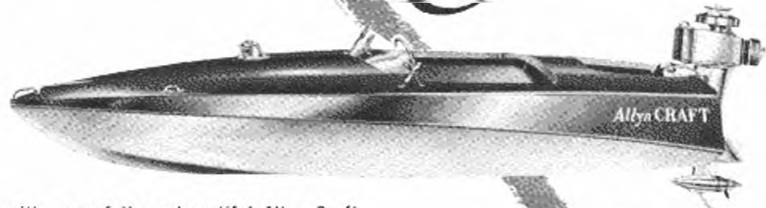
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Radio Control —
Free-Flight

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Give Yourself a Hobby Christmas

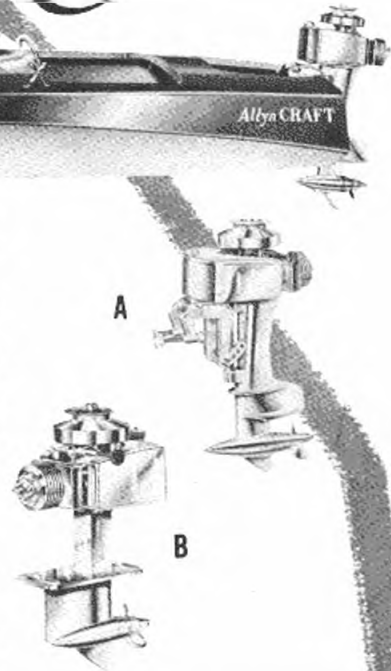


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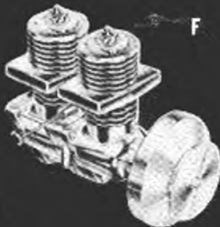
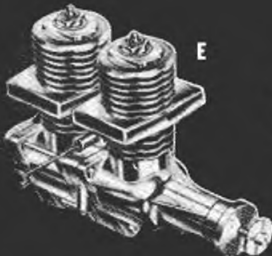
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Also available in Twin Inboard and Outboard12—\$14.95, .15—\$16.95



To assure yourself of the best performance in any glow plug engine use K&B Supersonic Fuels. It is absolutely the finest, cleanest burning fuel on the market today. We point to its superiority with pride! In the past 5 years they have taken more **FIRST PLACES** at the **NATIONALS** than any other brand!

	1/2 pints	pints
Supersonic "100"50	.80
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The fame of the well-known Torpedo engines with their ever growing long list of National and International wins leaves no question as to their superiority in the model aircraft engine field. The "Choice of the Champions" yet their versatility makes them equally good for beginner and veteran alike.

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D Torpedo 2-Speed .15—\$11.95, .19—\$16.95

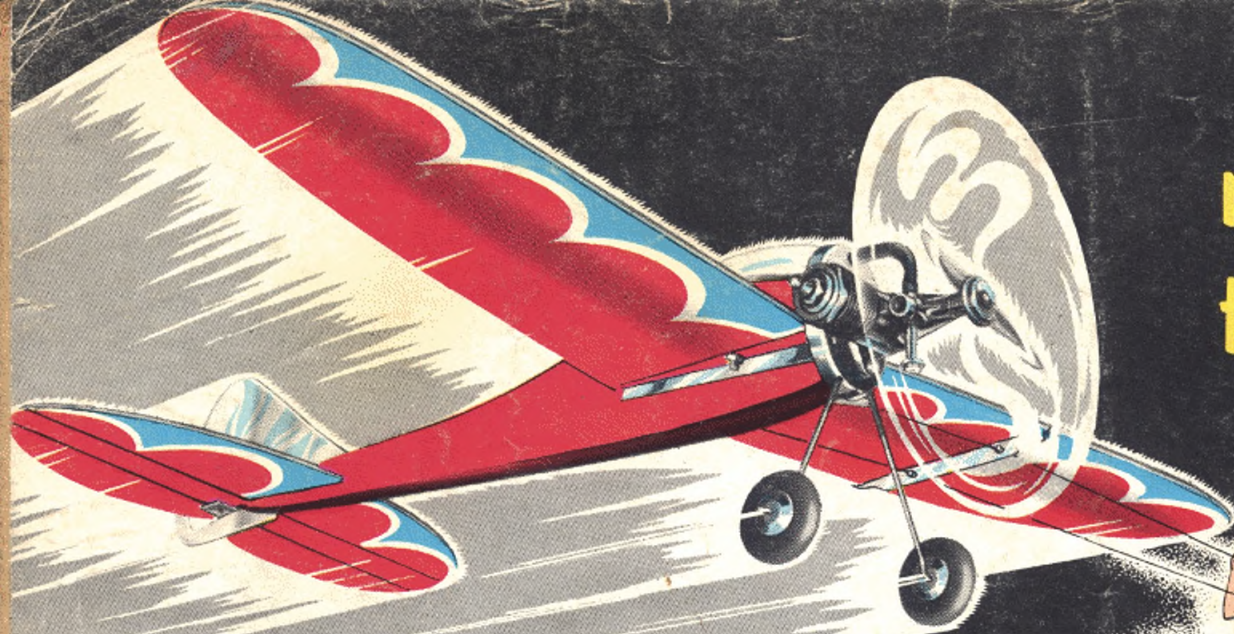
Only the Fury Twin Engines offer the advantages of twin cylinder construction with alternate firing—an engine of ultimate smoothness and minimum power loss. For better performance and greater power in the same weight displacement install a Fury Twin.

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