Sam Abdow

MR. MULLIGAN

Long a favorite modeling subject in any category, this one is for Control Line and a .60-size engine. The author detailed his for Sport Scale competitions, but since the structures are accurately sized with respect to the prototype, detailing can be carried out to the extent of the builder's capability.

BEN HOWARD'S DGA-6 Mr. Mulligan was one of the classics of the Golden Era of Aviation—the 1930s. It was the only airplane to win both the Bendix Race (at a speed of 238.704 mph) and the Thompson Trophy free-for-all (at a speed of 220.194 mph)—it won both in 1935.

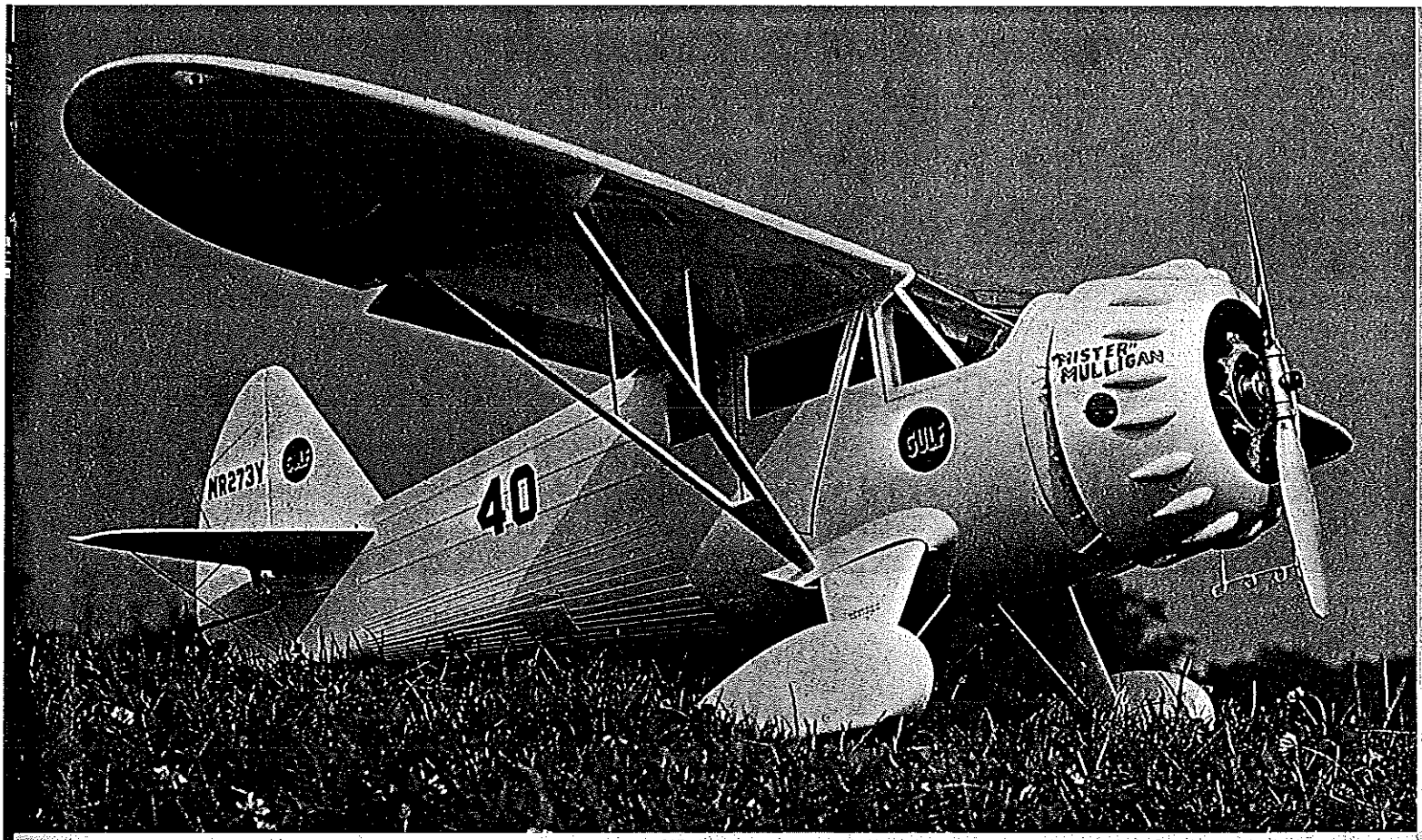
Mr. Mulligan looked every inch a racer, although it had the lines of a comfortable touring machine. Later, the same lines and built-in performance would make the Howard DGA-15P equally as famous as Mr. Mulligan. DGA stood for damn good airplane.

In its time Mr. Mulligan was faster than any Army or Navy airplane. It had a maximum speed of 287 mph and landing speed with flaps of 64 mph. It was powered by a Pratt & Whitney Wasp S.E. Special having a normal rating of 500 hp.

Mr. Mulligan's career was short-lived. In 1936, while making a trial flight from Floyd Bennett Field in New York to California, for the upcoming Bendix Transcontinental Race in September, Mr. Mulligan started shaking violently over New Mexico. It threw a propeller blade and crashed on a Navajo Reservation near Crownpoint, NM. Ben Howard and his wife were lucky to survive the crash.

The classic Mulligan has always been popular with modelers. When I heard that the 1983 Nationals was coming to the East Coast at Westover Air Force Base in Massachusetts, I decided to scratch-build a Scale Control Line model of Mr. Mulli-

Miss Mendy Methe, the author/designer's niece, helps to display the 56-in.-span, 9½-lb. gleaming white beauty in this studio photo by James Padilla.



Scale-judging prop in place and the line guides obscured, it is hard to tell that this is a model and not the full-size plane. Registration and racing numbers, lettering on the cowl, and company logos set off the all-white airplane. This and following color pictures by Charles Petit.

gan. I used Historical Aviation Album's drawings to enlarge a set of plans to a scale of 1¼ in. to 1 ft. so that it would comfortably house a .60-size engine within the cowl. If you intend to enter competition, you should obtain the documentation-type drawings from Historical Aviation Album, P.O. Box 33, Temple City, CA 91780 (Howard DGA-6 Mr. Mulligan, three sheets, No. 14-99A).

I drew my plans to exact scale. Therefore, they could be used to build a model either for Precision Scale or Sport Scale. I chose to build mine for Sport Scale, because I planned to enter my Howard DGA-15P in Precision Scale. I started building my Mulligan in January 1983. Being retired, I was able to work on the model every day, which enabled me to complete it in May of the same year. However, it is not a project for beginners.

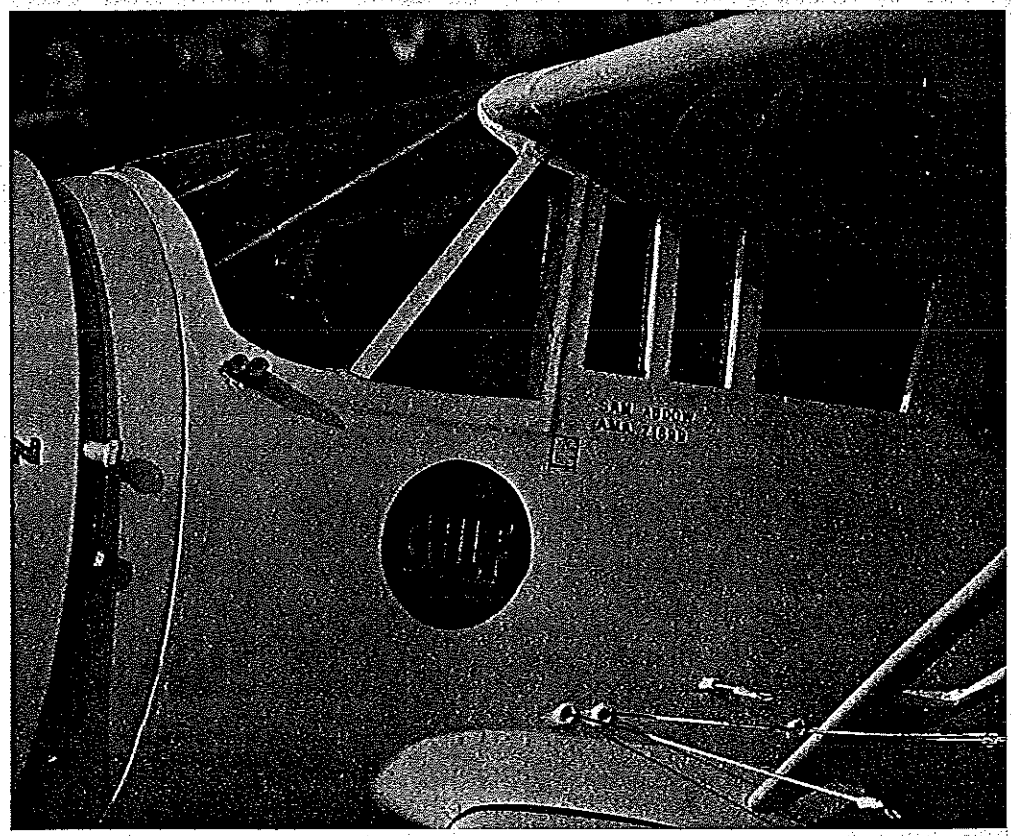
For those who would wish to do so, this Mr. Mulligan could be converted easily to RC.

My Mr. Mulligan weighs 9½ lb., including 16 oz. of lead I had to use in the cowl to balance the airplane properly. When you build yours, build the tail end light to eliminate the need for that much lead weight.

Incidentally, at the 1983 Nats, my Mr. Mulligan placed fourth in Open CL Sport Scale, missing third place by one point. My Howard placed second in Open CL Precision Scale. In September of 1983, Mr. Mulligan placed second at a Flushing Meadow Park (NY) meet.

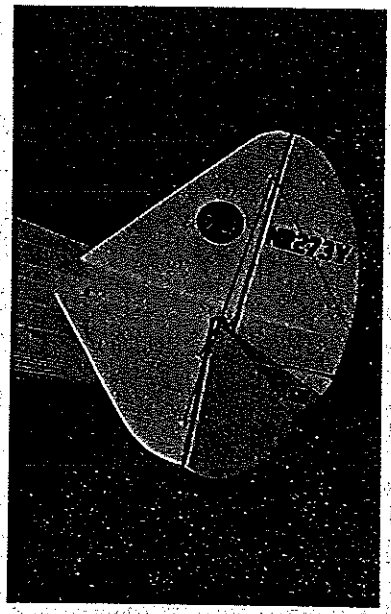
Before beginning construction of the model, study the plans thoroughly. Take your time. When you think that you've got everything figured out, begin by pre-kitting the model as much as possible.

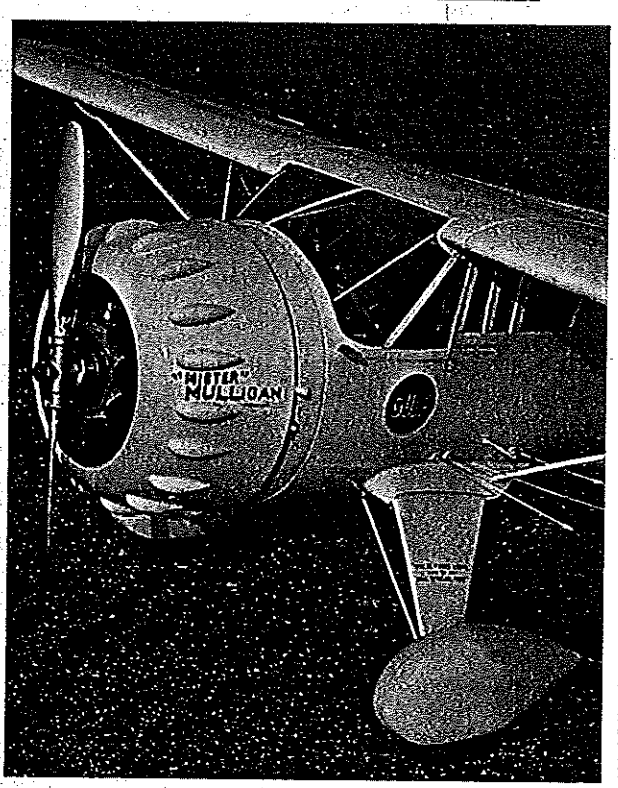
The fuselage, which is the most important construction phase of this aircraft, should be built first. Since it is an assembly of a keel, crutch, and formers, first construct a



Detailing of the cabin area shows the nice touches that are possible for a careful craftsman. Note the lead-outs for the three-line control system seen just above the landing gear fairing.

No shaky flying for this Scale model. The .60 engine gives it a safe flying speed and plenty of line tension. Construction has the sturdiness to match. The J-Roberts three-line control system allows demonstration of engine speed control and flaps.





Above Left: Sam Abdow's Mr. Mulligan has done well in competition, though Sam's greatest joy is in building and flying nice-looking models and talking with others of like interests. Above Center: The tail surfaces are ¼-in. soft balsa sheet, large Du-Bro hinges used on the elevators. Right: The static scale prop uses Rev-Up 12-16 prop blades and a lathe-turned hub with ⅜-in. holes in the ends for epoxy-gluing the blades. The hub is painted silver, the blades covered with aluminum MonoKote. Below: Rear view shows the location of the wing registration numbers.

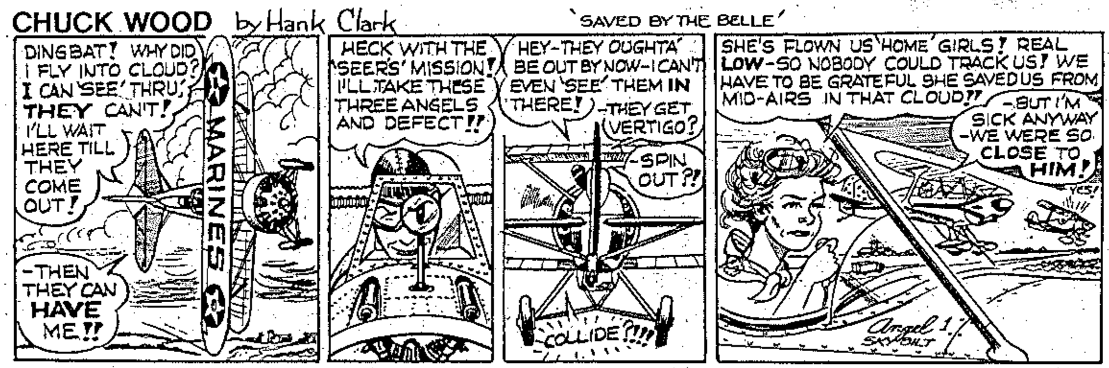
simple jig.

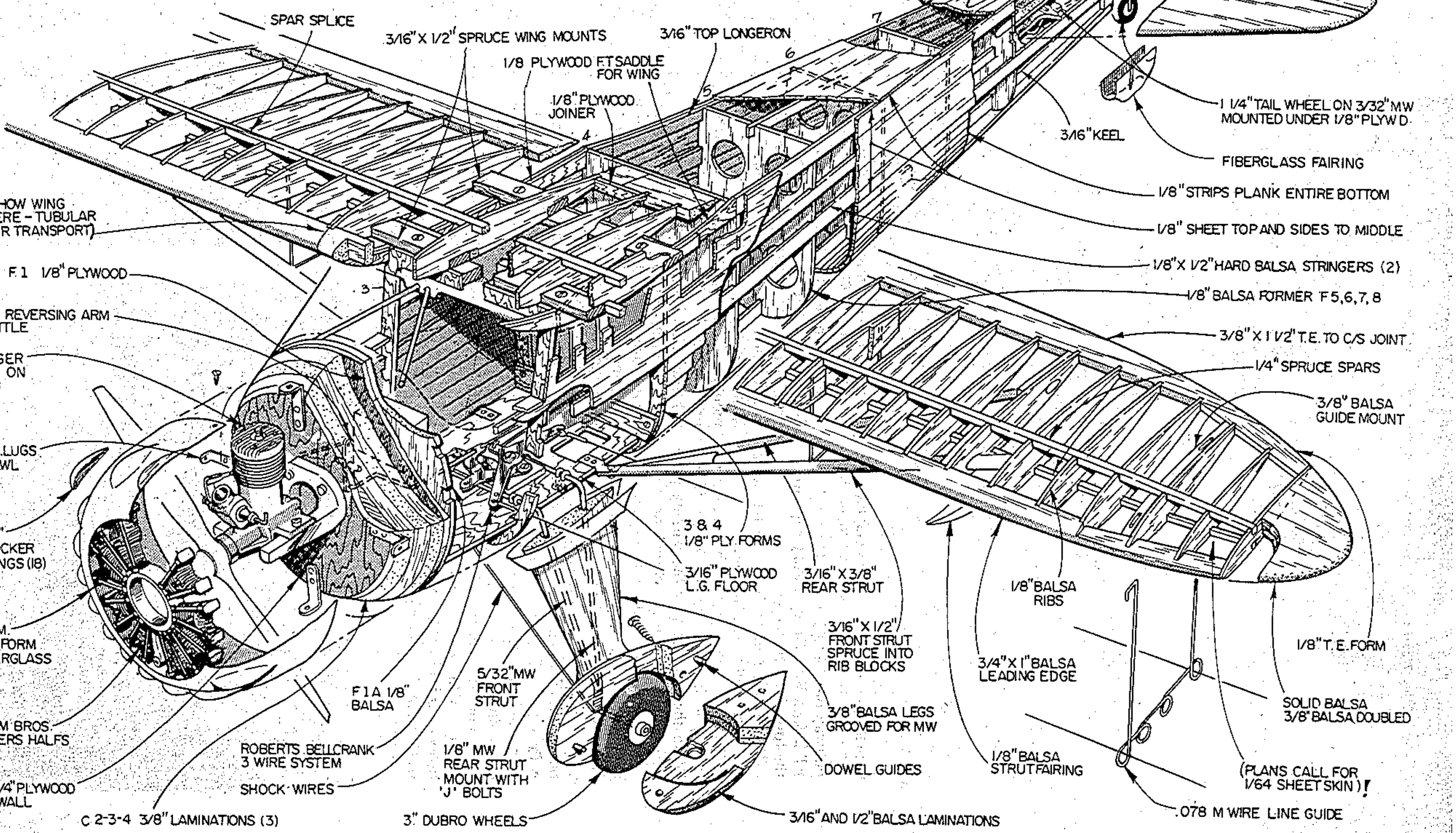
The jig is made up of ¾-in. pine stock. Select nice, straight pieces. The base is 36 in. long and 6 in. wide. Draw a centerline down the middle of the base. Screw vertical pieces to the base at the proper locations. These vertical pieces will serve to hold the formers for insertion of the ⅛ x ½-in. crutch pieces.

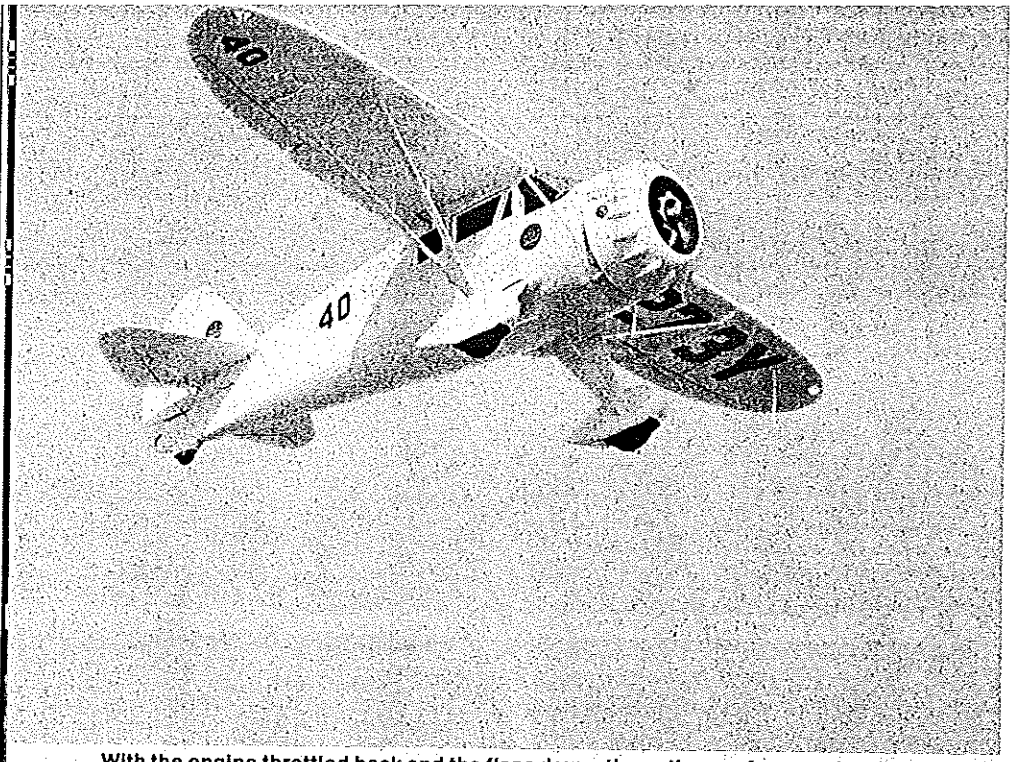
Draw a centerline on the top and front side of each station. This will keep all formers true. Draw centerlines on Formers F-1 to F-8.

Begin building the fuselage by gluing F-1 to F-1A. When dry, pin this to the front side of Sta. F-1. Continue by pinning F-2 through F-9 on centerlines and fronts of all stations.

Glue the ⅛ x ½-in. balsa crutches to the formers, then glue KT-1, KT-4, and TC. Also glue FT-L and FT-R to the notches in the top sides of the formers from F-2 to


CHUCK WOOD by Hank Clark
'SAVED BY THE BELLE'
DINGBAT! WHY DID I FLY INTO CLOUD? I CAN 'SEE' THRU, THEY CAN'T! I'LL WAIT HERE TILL THEY COME OUT!
MARINES
-THEN THEY CAN HAVE ME.!!
HECK WITH THE 'SEERS' MISSION! I'LL TAKE THESE THREE ANGELS AND DEFECT!!
HEY-THEY OUGHTA' BE OUT BY NOW-I CAN'T EVEN 'SEE' THEM IN THERE!
-THEY GET VERTIGO?
-SPIN OUT?!
-COLLIDE?!!!
SHE'S FLOWN US 'HOME' GIRLS! REAL LOW-SO NOBODY COULD TRACK US! WE HAVE TO BE GRATEFUL SHE SAVED US FROM MID-AIRS IN THAT CLOUD!!
-BUT I'M SICK ANYWAY -WE WERE SO CLOSE TO HIM!
YES!


1/4" SHEET BALSA ALL TAIL SURFACES
SIGS RYAN FLYING WIRES
1/8" BALSA STAB. MOUNT
3/16" SHEET TRIPLED FOR TAIL CONE PART OF FUSELAGE
COVER WITH 3/4" OZ. GLASS
1/4" X 3/8" SPRUCE ELEVATOR JOINER
SPAR SPLICE
3/16" X 1/2" SPRUCE WING MOUNTS
3/16" TOP LONGERON
1/8 PLYWOOD F.T. SADDLE FOR WING
1/8" PLYWOOD JOINER
1 1/4" TAIL WHEEL ON 3/32" MW MOUNTED UNDER 1/8" PLYWD.
3/16" KEEL
FIBERGLASS FAIRING
(PHOTOS SHOW WING BREAK HERE - TUBULAR JOIN UP OR TRANSPORT)
1/8" STRIPS PLANK ENTIRE BOTTOM
1/8" SHEET TOP AND SIDES TO MIDDLE
1/8" X 1/2" HARD BALSA STRINGERS (2)
F.1 1/8" PLYWOOD
1/8" BALSA FORMER F 5, 6, 7, 8
1/16" ALUM. REVERSING ARM TO THROTTLE
3/8" X 1 1/2" T.E. TO C/S JOINT
SUPER TIGER 45 TO 60 ON SULLIVAN MOUNT
1/4" SPRUCE SPARS
3/8" BALSA GUIDE MOUNT
1/16" ALUM. LUGS MOUNT COWL
3/8" X 1/2" BALSA ROCKER BOX FAIRINGS (18)
3 & 4 1/8" PLY. FORMS
3/16" PLYWOOD L.G. FLOOR
3/16" X 3/8" REAR STRUT
1/8" BALSA RIBS
3/32" ALUM. COWL OR FORM WITH FIBERGLASS
3/16" X 1/2" FRONT STRUT SPRUCE INTO RIB BLOCKS
3/4" X 1" BALSA LEADING EDGE
1/8" T.E. FORM
5/32" MW FRONT STRUT
F 1 A 1/8" BALSA
SOLID BALSA 3/8" BALSA DOUBLED
3/8" BALSA LEGS GROOVED FOR MW
WILLIAM BROS. CYLINDERS HALFS
ROBERTS BELLCRANK 3 WIRE SYSTEM
1/8" MW REAR STRUT MOUNT WITH 'J' BOLTS
DOWEL GUIDES
1/8" BALSA STRUT FAIRING
(PLANS CALL FOR 1/64 SHEET SKIN)!
C 1 1/4" PLYWOOD FIREWALL
SHOCK WIRES
.078 M WIRE LINE GUIDE
C 2-3-4 3/8" LAMINATIONS (3)
3" DUBRO WHEELS
3/16" AND 1/2" BALSA LAMINATIONS



With the engine throttled back and the flaps down, the author performs a slow flyby for the camera. It's a very stable flier, and, ah, what a sight! B&W pics by Charles Petit and author.

halfway on F-4. Also glue the FT-1 and FT-2 $\frac{1}{16}$ x $\frac{1}{2}$-in. spruce wing support in the top of the fuselage.

When dry, remove from the jig. Glue the lower keel to the fuselage.

Bend the landing gear to shape, then attach it with J-bolts to the $\frac{1}{16}$ ply floor. Wrap the lower end of the landing gear with fine copper wire; check the alignment, then solder in place. Epoxy the gear in its proper position in the lower fuselage.

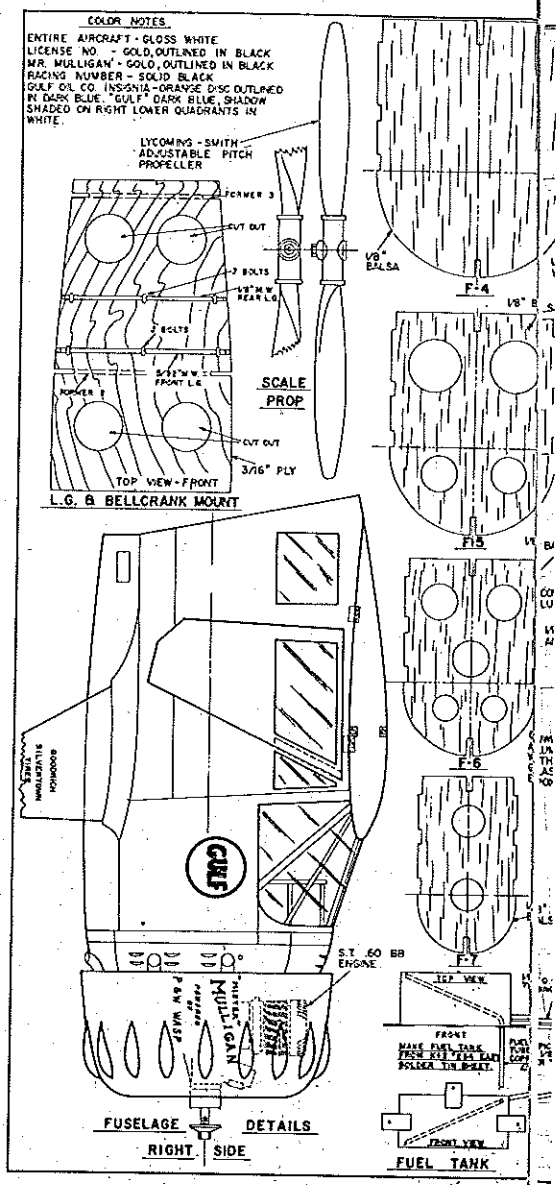
Cut out the cabin sides as per the templates. Carefully cut out the window areas with a sharp X-Acto #11 knife. Attach .015 celluloid windows on the inside of the cabin sides with RC-56 glue. When dry, mask both sides of the windows to avoid damage. Glue both cabin sides in their proper positions. Cut out reversing arm sections in C-2 through C-4, then glue them to F-1.

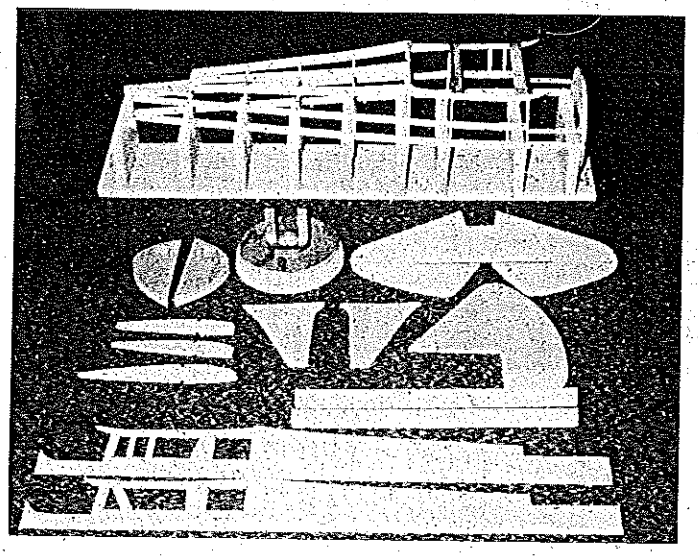
Install a Sullivan MM-2 (.45 to .60) engine mount to the ¼ ply firewall using 8-32 socket-head cap screws and blind nuts. Install the reversing arm in proper position on the rear of the firewall. Drill a ¼-in. hole through the firewall and engine mount to line up with the carburetor throttle arm.

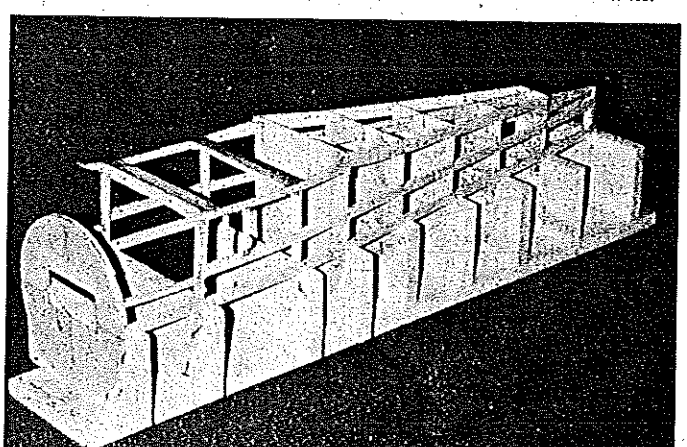
Install a Du-Bro 2-56 threaded rod with the threaded end toward the carburetor throttle arm; use a Du-Bro Kwik-Link for adjusting purposes. Hook the other end to the upper reversing arm hole. I also use the same system on the lower end of the reversing arm hole. Bend the lower rod as per the plans to fit the J-Roberts bellcrank. Epoxy the firewall to C-1, and sand the complete nose section to shape. Temporarily install the J-Roberts three-line control system on the centerline of the landing gear floor.

The stabilizer and elevator are built from ¼-in. soft balsa. Mount the control horn and large Du-Bro hinges, though at this point temporarily pin them in the proper position. Mount your engine (I used a Supertigre .60 B.B. engine). Hook up all the controls. When everything is working smoothly and properly, permanently install the J-Roberts three-line control system.

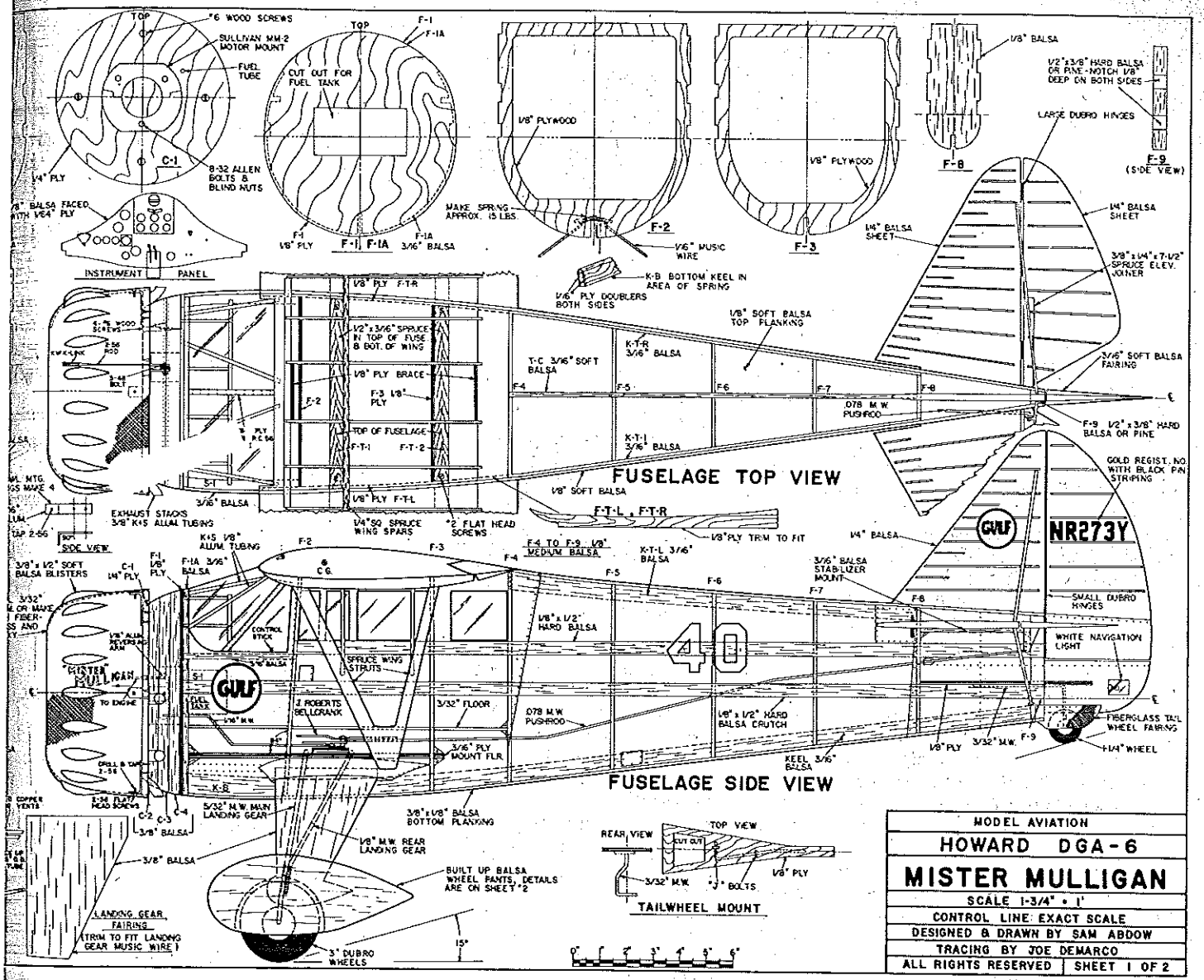
The next step is to build the fuel tank.







Left: Various parts of the model are precut before construction begins. Holes are cut in the wing tips (to left of the engine mount) for dummy lights. Above: The first step in constructing the fuselage. This method results in a very true and accurate structure.

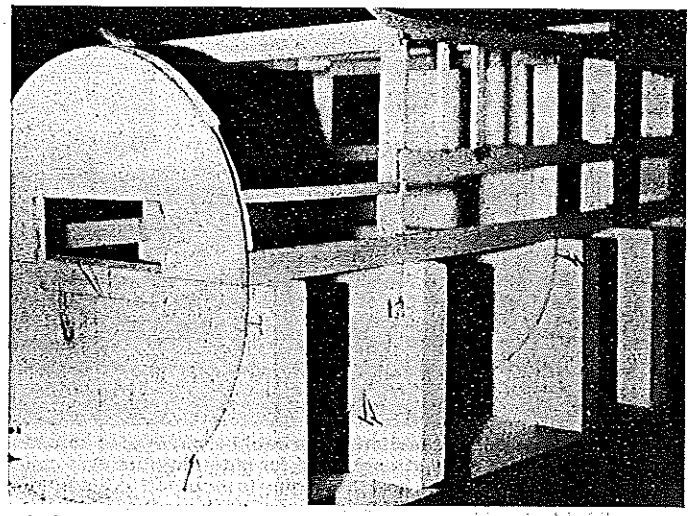


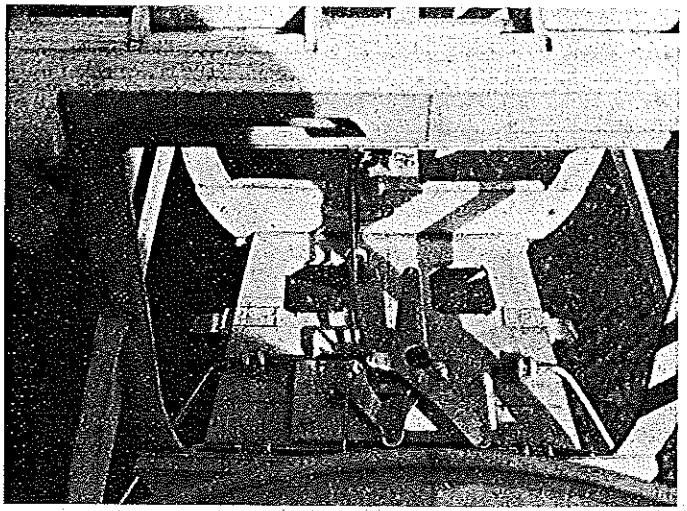
Solder it well, and pressure-test it. Install the tank in place.

Install the instrument panel. If you plan to have a scale cockpit, now is the time to do it. Finish planking the fuselage. Having access to my brother's machine shop, I spun my own aluminum cowl. An alternative is to mold a fiberglass cowl. I hand-carved the 18 blisters and epoxied them to the cowl in the proper positions. I also machined my own scale exhaust system.

Shape and assemble the fin and rudder; install in place at the proper time. The landing gear fairings are shaped from stencil board. Carefully align them and epoxy in place. Carve and shape the wheel pants, making one side of each pant removable as per the plans. Epoxy the other half to the landing gear fairings.

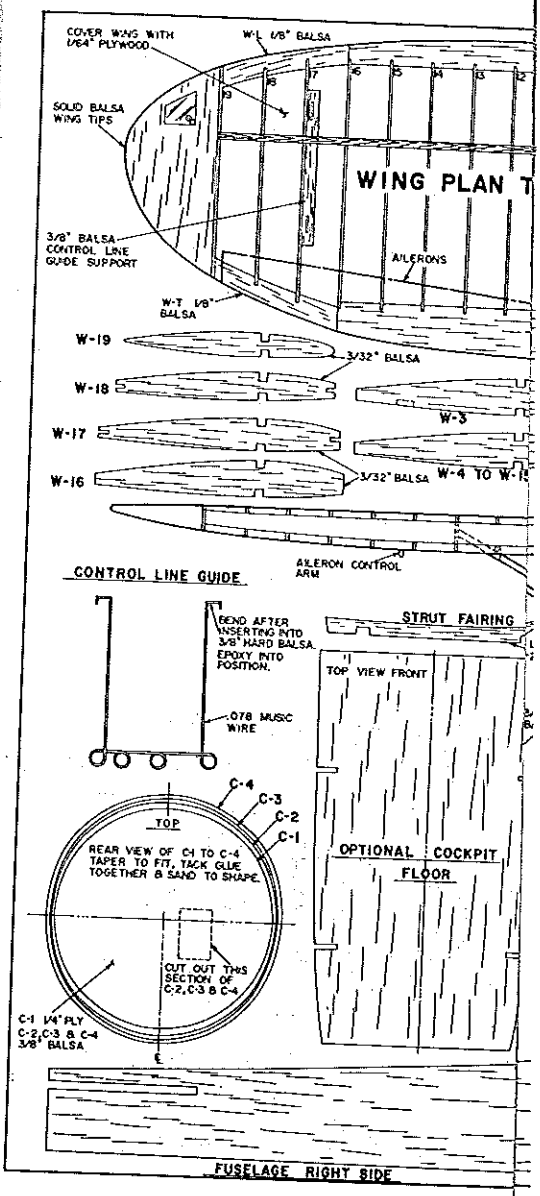
The wing is built *inverted* over the plans.





Left: Formers are pinned to the vertical stations of the fuselage jig. Right: Study this picture carefully. It shows the mounting of the landing gear wires and the J-Roberts three-line control system. Actuation of the flaps is mechanical, using cams and a slotted lever.

The tail wheel cover is a fiberglass-reinforced molding. Other things to see are the stringers on the fuselage side and bottom, dummy tail light, and location of the tail brace wires.



Flaps and removable wings are optional; use your own preferred method. If you plan to enter it in Scale competition, flaps are a must for added points. Start by pinning waxed paper over the wing plan. (I pinned the wing plan on a straight 5-ft. length of soft pine, 10 in. wide by ¾ in. thick, for a building surface.)

Splice and glue the ¼ sq. spruce top spar. When dry, cut to the proper length and pin to the plans. Glue on Ribs W-1 to W-19 *inverted*. Check the alignment. Shim the ribs until they are all lined up exactly. A warped wing will cause the model to fly poorly.

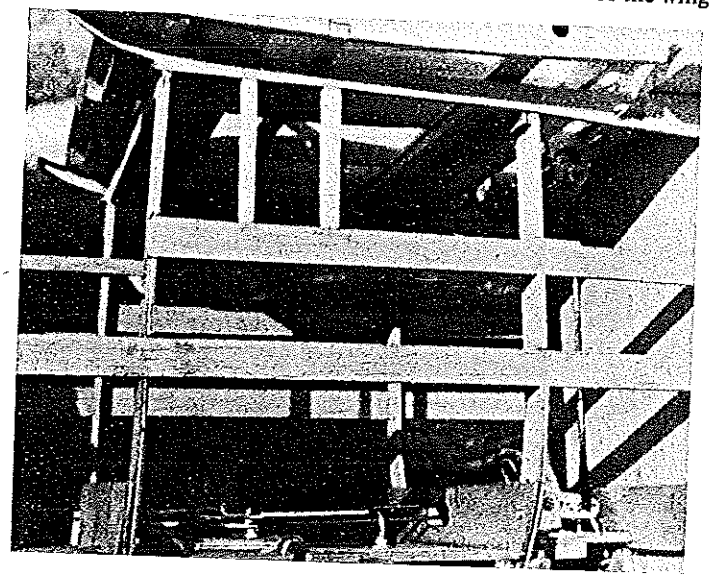
Sand the leading edge to shape. Cut out the leading edge center section for the windshield. Also, make the notches for the wing ribs. Glue WL-1 to the rear of the leading edge center section. When dry, cut notches for Ribs W-1 and W-2. Glue the leading edge to all the wing ribs. Again, check the alignment. Notch the trailing edge for the ribs. Sand and glue on *inverted*. Glue in the ¼ ply center braces. Glue WT-1 and WT-2 trailing edges to Ribs W-17, W-18, and W-19. Now, splice the ¼ sq. spruce bottom spar, and glue it together. When dry, cut the spar to the proper length and glue it to the bottom of the wing.

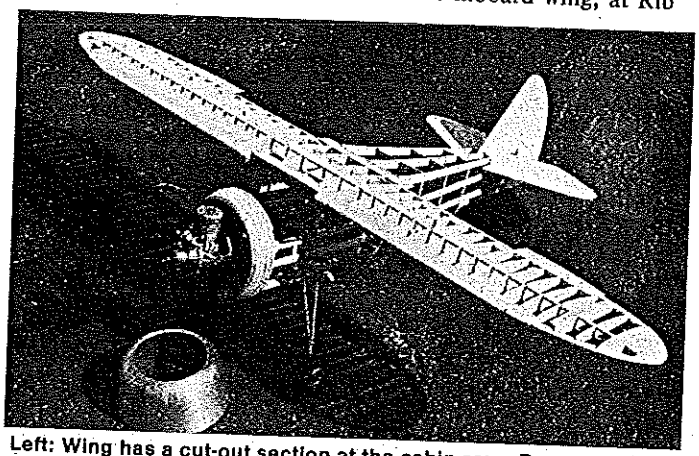
Wing tips are laminated by gluing two ⅛-in. soft balsa sheets together. Let dry thoroughly, then trim to shape and glue to Ribs W-19 *inverted*.

Glue wing hold-down supports WS-1 and WS-2 to the bottom of Ribs W-1 through W-3.

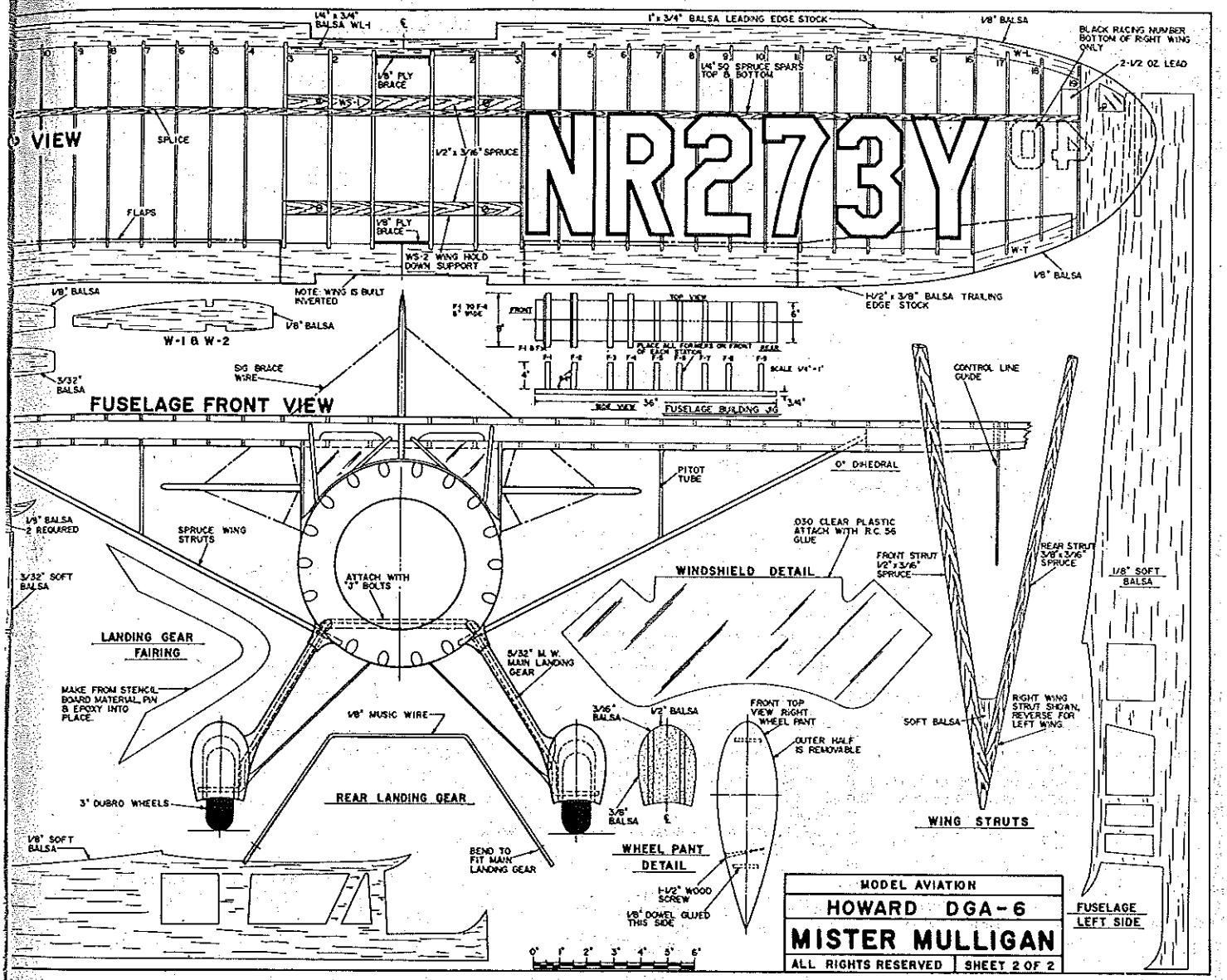
When the wing gluing is completely dry, remove the structure from the building board. Then sand the entire wing to shape. I chose to cover the wing with 1/64 ply to simulate the covering on the full-size Mr. Mulligan. An alternative is to use 1/16 medium sheet balsa. Cover the entire bottom of the wing first. Sand it until you have a smooth surface.

Glue the wing-strut fairings in the proper places. It's a good idea at this time to glue 1½ oz. of lead in the outboard wing panel next to Rib 19 in line with the fore-aft balance point; this will help the model to fly level. On the inboard wing, at Rib





Left: Wing has a cut-out section at the cabin area. Braces across F-2 and F-3 are for extra strength and for mounting the optional cockpit floor. Above: Note how the engine is mounted to the nose section. If you can't spin an aluminum cowl as the author did, your best choice would be to make a fiberglass molding. In this view, the basic structures have been completed, planking still to come.



W-17, glue a ¼-in. hard balsa support for the .078 music wire line guides. Position as shown on the plan.

Build and sand the wing struts to shape. Attach the wing to the fuselage with glue and screws. Trim, fit, and glue the wing struts in position. Cover the wing strut fairings with stencil board material. When the glue is dry, cover the top of the wing with ⅛" plywood. Sand the wing with 360-grit sandpaper. Also, sand the fuselage and tail surfaces. Fill in all nicks and dents using Dap Spackling Compound; sand to a smooth finish. For all the fillets, I used micro-balloons mixed to a heavy paste with K&B fiberglass resin.

Cover the fuselage and tail surfaces with ¼-oz. fiberglass cloth and K&B polyester resin. When cured, sand to a smooth finish. To give the effect of fabric over tubing on the lower part of the fuselage, I used button and carpet thread cut to the proper length and pre-glued. Mark all the lines with a hard, sharp pencil—making a small groove—then glue the threads in place. When completely dry, give the threaded areas a coat of fiberglass resin.

Use the same procedure on the tail surfaces. The brace and anti-flutter wires on the tail surfaces are made from Sig's Ryan STA flying wires.

Cut the windshield to fit. Pin in place

Continued on page 180

Sam connects the starting battery preparing for a practice flight, the model held by Paul Geaudreau. Not a beginner's model, but for those with the capability, results are rewarding.

clattered into a trash barrel after quenching a long afternoon thirst. A tail gate slammed, and the last car engine started. Tires scrunched the gravel as the car backed out, stopped, then turned down the taxi strip of what was to have been Bong Army Air Base.

At eventide the soft breeze of the day gently tousled the hair of the prairie grass. The sun shone brilliantly from a cloudless sky of rich blue. "The tumult and the shouting" were gone. "The captains and the kings departed" to the banquet hall. A kildeer piped shrilly three times. SAM Champs was a memory.

Some Useful Addresses

Forster .99 engines and parts, diesel engines and parts: M&G Engines, Inc., P.O. Box 6026, Denver, CO 80206.

Brown, Hurleman, Ohlsson Gold Seal engines, parts and overhaul. Herb's Model Motors, Box 61, Forksville, PA 18616, 717/924-3892 or 717/323-5686.

Parts for Arden, Anderson, Atom, Atwood, Baby Cyclone, Bantam .19, Barker, Bullet 100, Bunch, Cannon, Comet, Delong, Dennymite pre & postwar, Dooling, Elf, Forster, Hi-Speed, Hurricane, McCoy, Merlin, Mohawk, O.K., Ohlsson, Phantom, Pierce, Rocket, Skychief, Super Cyclone, and Synchro Ace: Micro Model Engineering, 1301 W. LaFayette St., Sturgin, MI 49091, 616/651-5431.

Mr. Mulligan/Abdow

Continued from page 103

and adhere it with RC-56 glue.

Finishing. I primed my model with Martin Senour's Lacquer Primer, light gray #7865. Let it dry for 24 to 36 hours. Then sand with 400-grit paper.

I painted my Mr. Mulligan with Pactra Formula-U Polar White. Let it dry thoroughly for at least 72 hours.

The black racing numbers were cut out of a Sig black decal sheet. The gold registration numbers were cut from gold Trim MonoKote. For the black trim around the wing registration numbers, I used Goldberg ⅛-in. striping tape. I painted the black trim around the rudder registration numbers with Formula-U and the "Mr. Mulligan" on the cowl with gold leaf.

The Pratt & Whitney logo on the cowl was used in the 1936 racing season. To make the Pratt & Whitney logo, I started with a colored logo from a Pratt & Whitney's brochure. I photographed it to the proper size using a 35mm camera set up on a tripod. Then, I cut out the picture with an X-Acto knife and No. 11 blade. I peeled all the back side off the photograph, leaving just the emulsion with the logo on it; I then attached this to the cowl with RC-56 glue.

I used the same procedure to make the Gulf emblems on the fuselage and rudder, using a Gulf decal from an old Sterling kit. When dry, cover the logos (only) with Formula-U clear.

Even weighing 9½ lb., my Mr. Mulligan is an excellent flier.