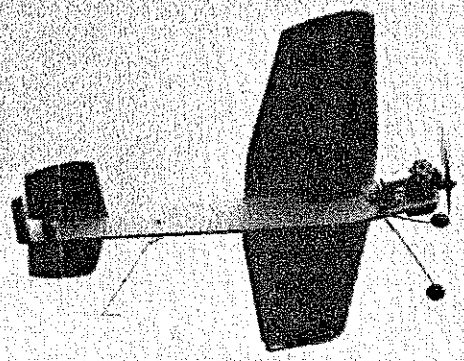


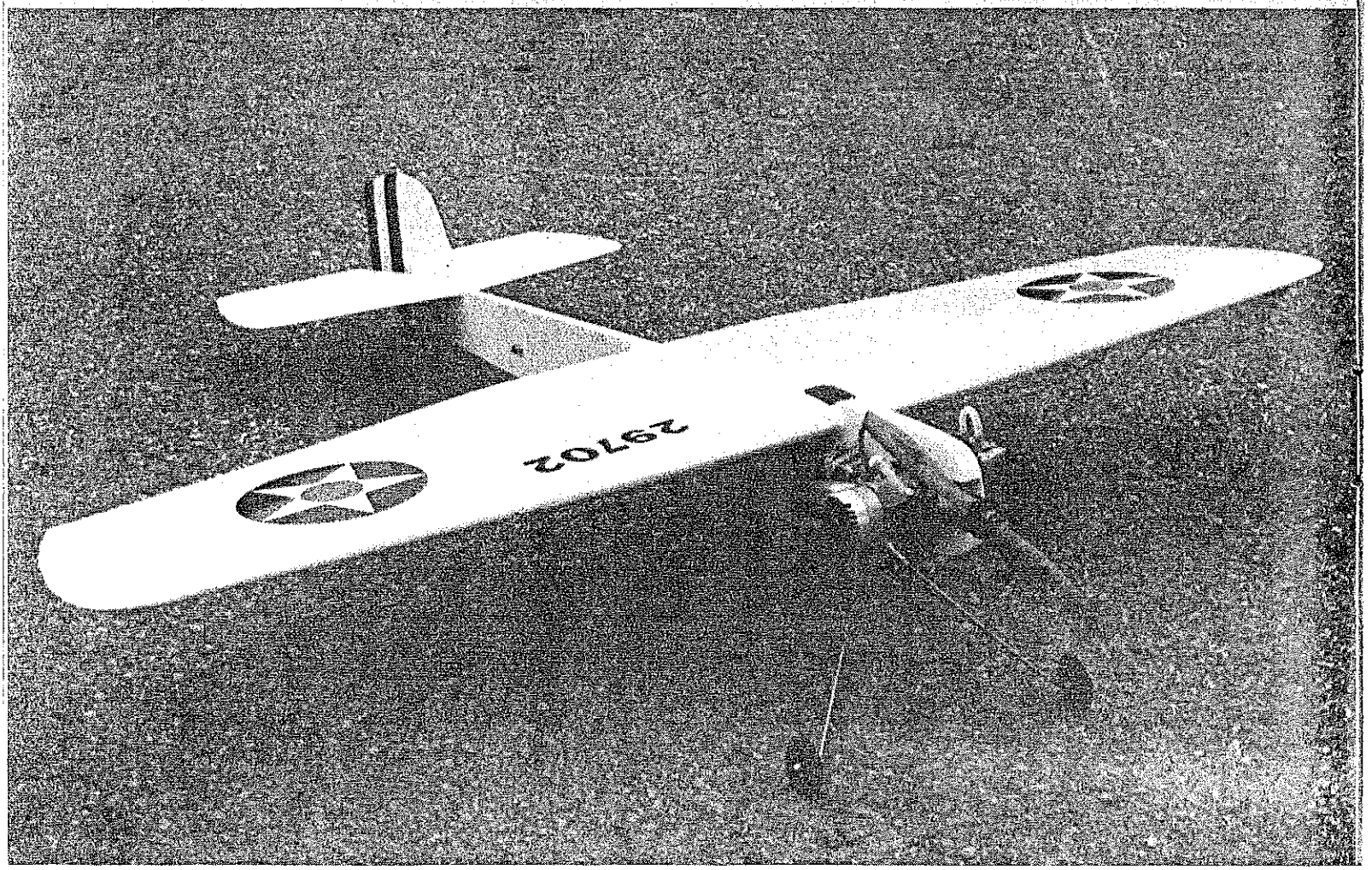
THE MO–1 was built in 1922 by the Glenn L. Martin Co., then in Cleveland, Ohio. It was the first all-metal monoplane that carried a crew of three and used either landing gear or floats. Just six were built, No. 6455–6460, and only two were used in carrier operations in 1924. They were used as Navy observation or spotter planes but were considered by the Navy as not suited for this purpose. This could be the reason so little is known about the MO-1.

The real success of the MO-1 as a model was to come in the late 1960's from a cooperative effort by Don Gerber and Charles Reeves—not as a scout plane, but as a control-line Navy Carrier plane. Simple, clean lines, a generous low profile fin and rudder, and a shoulder wing for stable flight, are a few reasons why it fits our needs. The time may be gone when those very sleek, racing style Profile Carrier models can compete with the scale planes. Ten bonus points are hard to make up for using an original design. If you're looking

For Navy Carrier··

The MARTIN MO~1

This little known aircraft makes an ideal Profile for the Fox .36 Carrier Special, or the Supertigre. Its designer passes on all those vital details that will make you truly competitive in a popular event. ■ Tom Hazen



Photographs by Rene's Mills

for a scale subject packed with potential, build an MO-1.

In 1924, the Martin all-metal MO-1, on gear or floats, was used by the Navy for observation/spotting —two seeing carrier operations (probably the venerable Langley). In the 1960's, Don Gerber and Charles Reeves proved it ideal for model Carrier. Left: Tom Hazen with his thoroughly refined MO-1, about as an effective profile type that the most discriminating pilot could wish.

Wing Construction: The wing is large but is designed for minimum drag. I used symmetrical airfoil instead of a flat-bottomed wing because a high-lift wing is also a high-drag wing. To reduce drag even more, the wing thickness at the tip is half that of the center section.

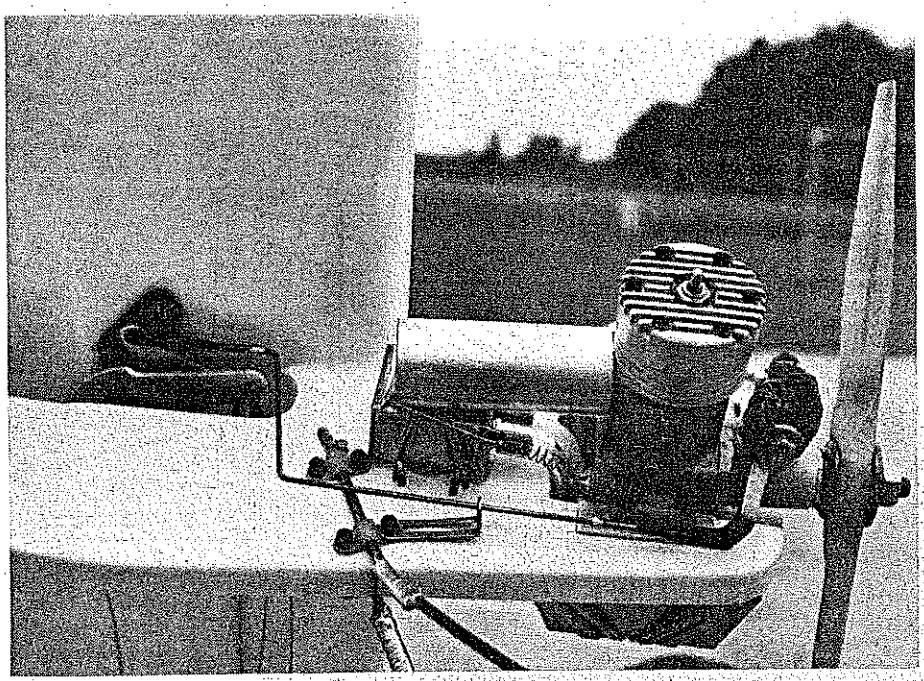
To begin construction cut out ribs and trailing edge sections. Lay T.E. pieces over the plans, making sure the spliced areas fit closely. Apply tape over splice, turn over, fill joint with glue and wipe off excess.

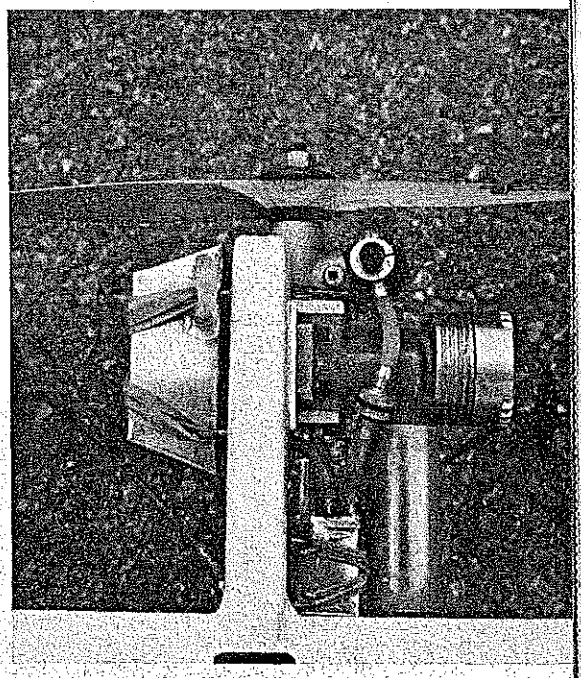
Make the ½" sq. leading edge. Before gluing it together draw a center line down the full length of each section, front and back. These lines are used as a reference for positioning ribs and forming the leading edge. Now glue the L.E. sections together with epoxy and add short ½" sq. pieces at the splices. Mark the position of each rib on the L.E. and saw ⅛" deep cuts for ribs. Draw a center line down one side of the rib. Assemble the L.E., T.E., and ribs, making sure the center lines on the ribs and L.E. are lined up. Glue them all together, then add the ¼" sq. spars.

The mating surfaces of the spars at the tip are beveled. Carefully sand the leading edge to shape, using the center line as a reference. Sheet the area between the L.E. and the spars. Add sheeting to the bottom of the center section. Make the bellcrank platform from ⅛ ply and position it on the under side of the wing. Trace around it and cut out this section of sheeting.

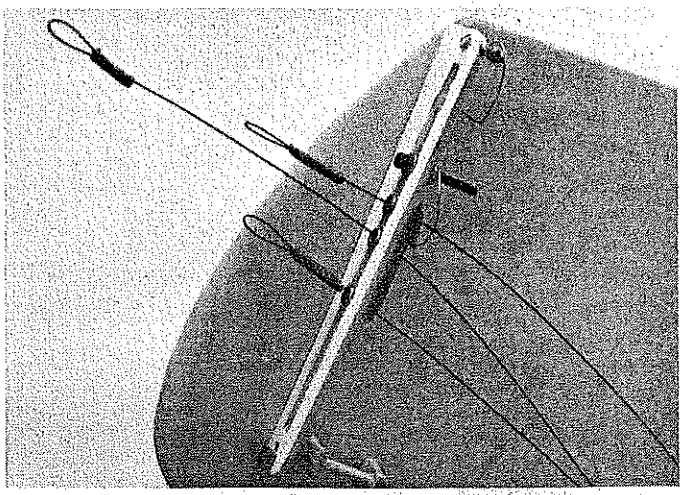
The platform is epoxied in place after it has been drilled and slotted for the inverted bellcrank. The bellcrank is mounted with socket head bolts with blind nuts. Before adding top sheeting, secure blind nuts so they can't be pushed out. Sheet the top center section, add cap strips, wing tips, and two ounces of tip weight. Sand wing thoroughly.

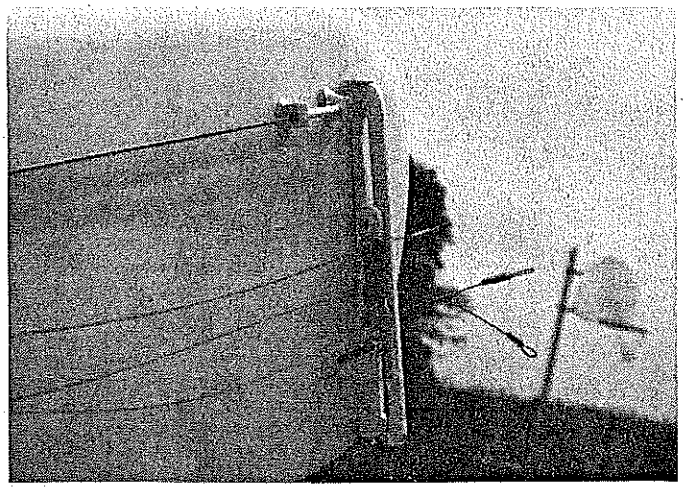
Fuselage: The fuselage is made from ½ × 4 balsa. The width tapers to ¼ at the tail. The hook must be mounted through a hardwood insert. I used a ½" dowel with a ⅛ O.D. brass bushing. The motor mounts are spaced for a Fox Carrier Special. Out of the box, the Fox will give you 23–25 second high-speed times. If you choose to use the more



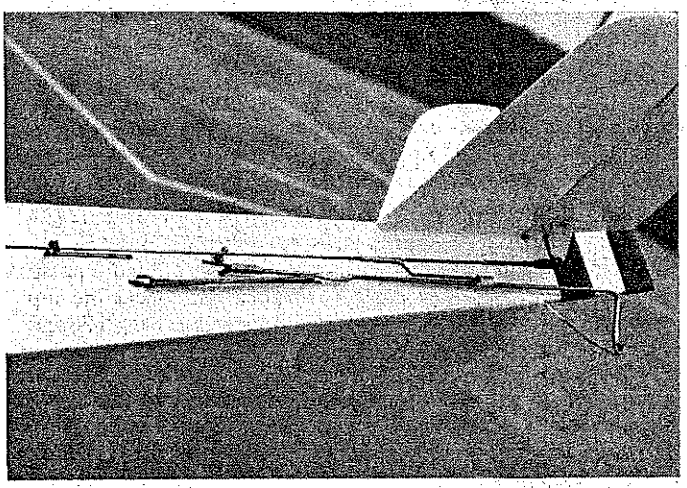


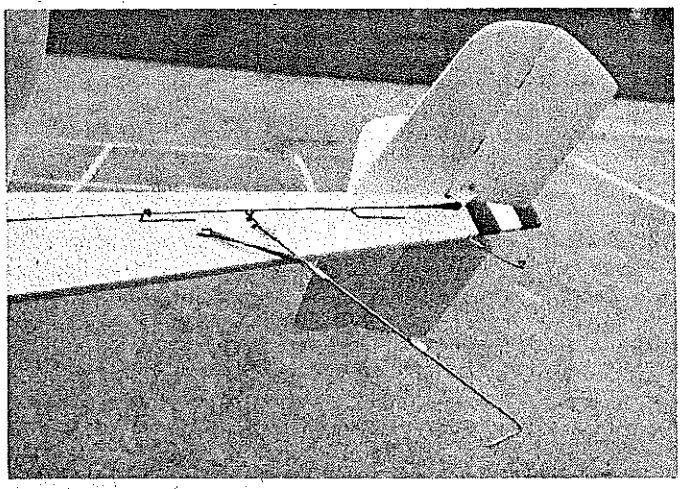
Installation of the rear exhaust Fox Carrier Special—details of linkage are obvious to Carrier people. A chicken-hopper tank appears in the pictures, but Tom recommends first using some 3-oz. uniflow tank, since tank height is not restricted on this plane. Tank location and design should supply most constant head pressure possible. Right: Top view clarifies the chicken-hopper set-up. Tom uses a Perry carb from a K&B 40, though a bushing had to be made. Rear exhaust is not for performance; it keeps most gop off exposed bellcrank, and heat off rubber bands.





The moveable leadout installation seen from the outside, left, and inside. Tom devotes considerable copy to its function and the mechanics, so the most ambitious caption would be too general. However, the details are eloquently clear in his excellent photographs.





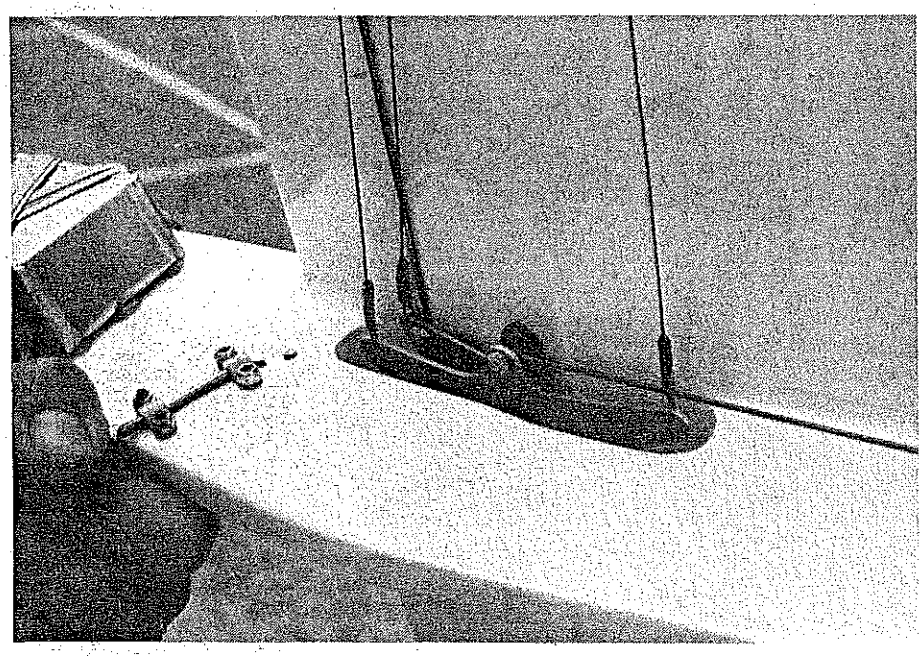
The extendable carrier hook for snagging the deck lines is shown in the up position, at left, and in the extended position. All linkages used in the aircraft must be simple and troublefree, and hours of preparation may be needed on the bench prior to the 5-minute attempt to win.

popular Supertigre, the mounts will have to be spaced at 1¼".

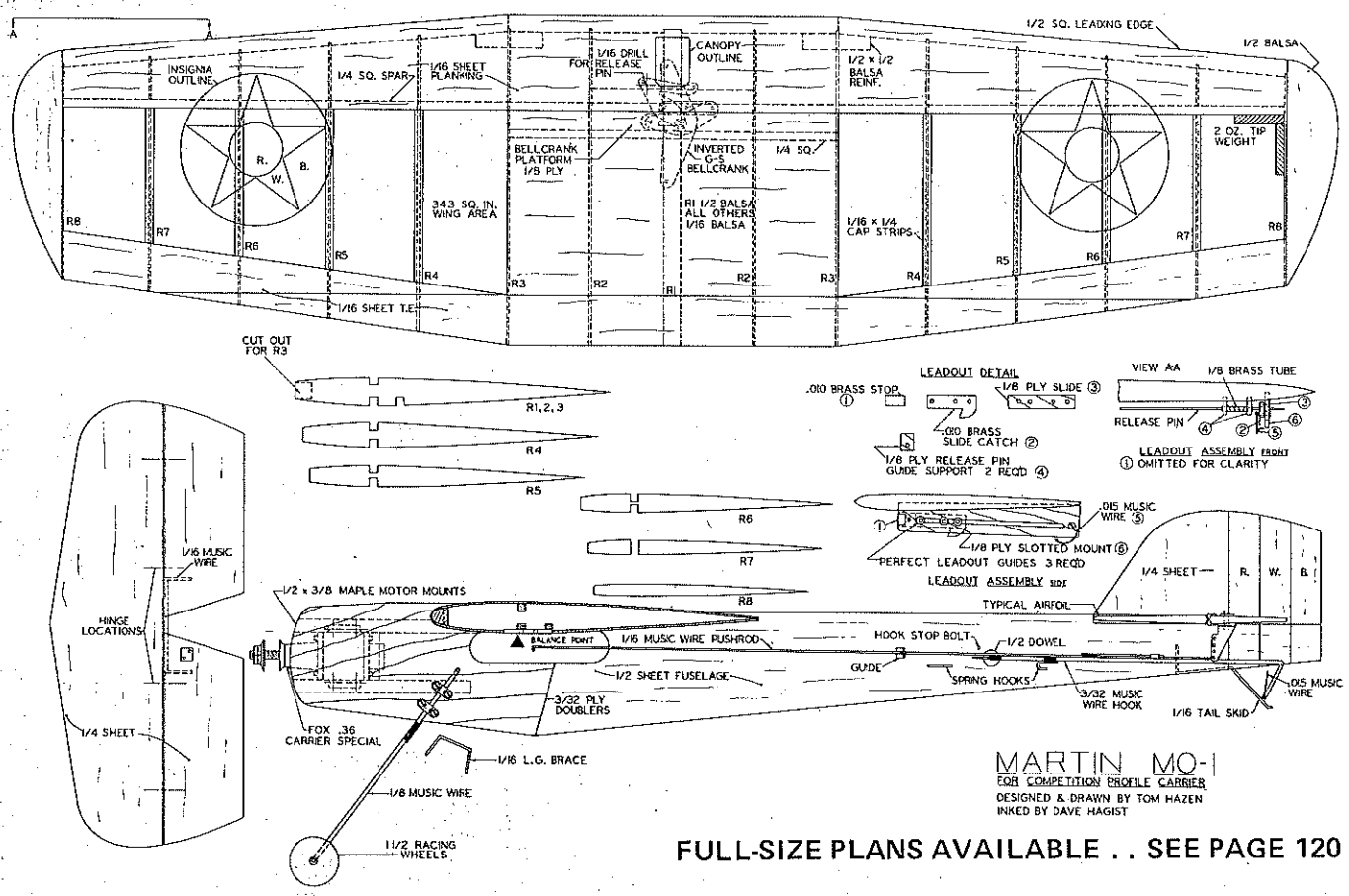
The landing gear shown has proven to be indestructable. Each piece of the two-piece gear extends through the fuselage. The nylon mounts are opposite each other and use mounting bolts common to each. After final assembly, form a piece of 1/16 music wire to fit between the two gear just under the fuselage and running down each gear about ¾", then wrap and solder. The plastic racing wheels are available from Glenn Lee. Epoxy the tail skid in place and reinforce with nylon tape.

Tail: The tail section is made from ¼" balsa. A lot of this wood is sanded away while shaping the airfoil. The extra thickness of the hinge line helps prevent cracking around the nylon hinges. If you use the lighter Supertigre engine make the tail light. It may be necessary to mount the Supertigre farther forward for balance.

Finish: Make sure the wing fits in the fuselage, then remove it. The wing is covered using only two pieces of MonoKote. Navy insignias are made from red, white, and blue Trim MonoKote. Again, place the wing in the fuselage and trace around the gluing areas. Remove the wing and carefully cut away the MonoKote ⅜" outside these lines. Epoxy wing to fuselage, then tail assembly. Make fillets for extra strength. Fill wood brain and nicks with talcum powder and Aero Gloss clear, sand well, apply one coat of Hobbypoxy clear and then your favorite military color coats. Trim rudder with red, white, and blue Hobbypoxy. The scheme on the real plane was a gray



The fiercest competition is between man and his machine, says Tom, and the neatness of this 3-line bellcrank reflect meticulous attention to detail. Installation is recessed in fuselage cutout. Spanwise pushrod at front end can be picked up in photos of moveable leadout guide. An incidental finepoint is the use of liquid silicone rubber under fuel tank to reduce fuel foaming.



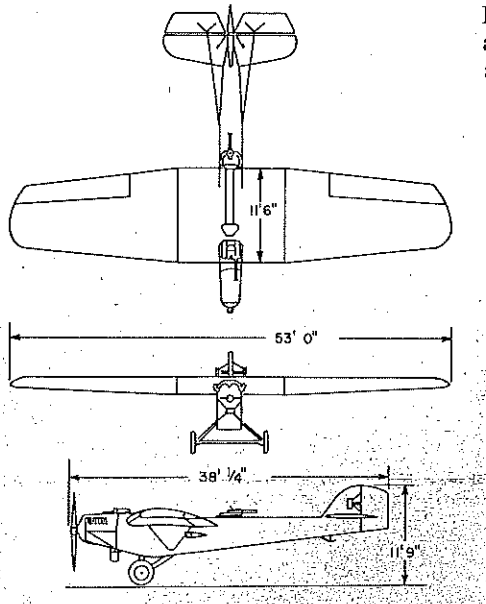
FULL-SIZE PLANS AVAILABLE . . SEE PAGE 120

fuselage, gray wing, and stab bottoms. The wing and stab tops were yellow with a red, white, and blue rudder.

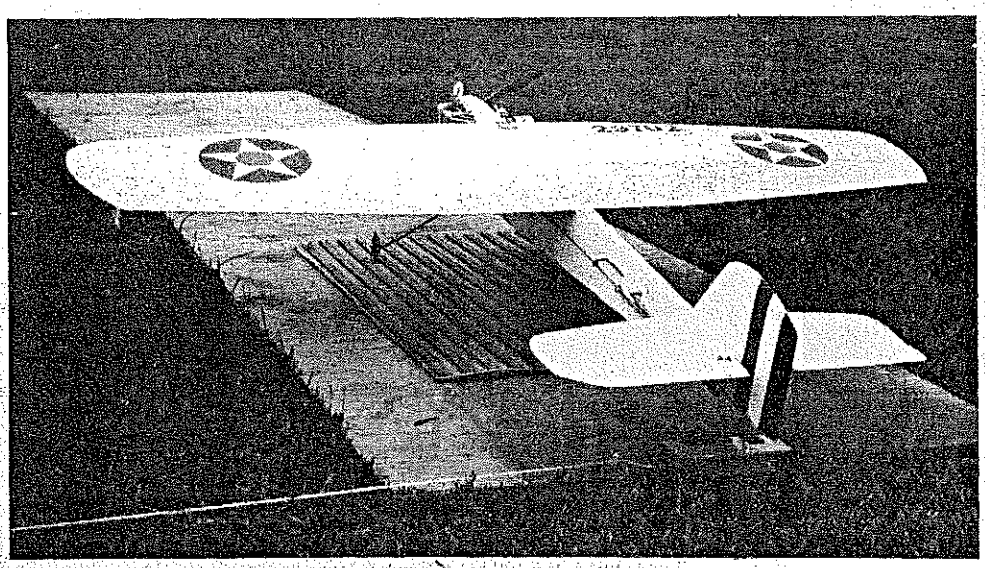
Leadouts: I think it would be safe to say moveable leadouts are more common than not, the advantage being increased line tension during low-speed flight. These leadouts have two big advantages. First is 100% accessibility and, second, the engine can remain idling until the pilot reaches the handle.

Although building instructions are long and detailed, moveable leadouts are mechanically simple and easy to build. Begin construction by sawing out the traveling slide and slotted mount from ⅛" ply. Use a straight edge and a #11 Xacto blade to cut slot. Drill three ⅛" holes down the center of the slide for the leadout wires. Insert Perfect brand leadout guides through slot followed by the slide. With the leading edges of each piece flush, drill a ⅛" hole through both, for the release pin, 5/16" from the front. Glue in a ⅛" O.D. brass bushing in each piece. Make sure the slide works smoothly. Disassemble and paint wood surfaces. Use scissors to cut out the .010" brass slide catch. Glue this to the inboard side of the slide over the three leadout holes, then redrill these holes through the brass. Again insert the Perfect leadout guides through the slot, followed by the slide. Gap the two pieces slightly and, if required, file the slot so everything moves with absolutely no binds. Now solder the three guides to the brass slide catch. Trim off any portion of the leadout guides that extends past the solder joint and remove burrs. At the rear of the slotted mount, glue in a ½" 4–40 bolt where shown. To this, solder a .015" spring wire. Hold slide in the rear position and bend this wire to catch the slide. Cut a ⅛"

Continued on page 110



Glenn L. Martin MO-1; Engine, 350-hp Curtiss D-12; Speed, 105 mph; Climb in 10 min., 4700 ft.; Service Ceiling, 10,000 ft.



Rear-quarter view showing configuration and areas is eloquent proof of the MO-1's suitability.

looks just like the "big boys," with real magnesium pan and metal wing, you can write John Newton at 2154 Los Padres Drive, Rowland Heights, CA 91748. Price is around $104 for a semi-finished kit.

Charlie Johnson, 3716 Ingraham St., San Diego, CA 92109.

Martin MO-1/Hazen

continued from page 45

wide groove on the underside of the inboard wing tip to accept the slotted mount and epoxy in place. Attach leadout cables, elevator push-rod, throttle linkage, and release pin, to the bellcrank. The 1/16 music wire release pin is attached to the bellcrank through a 1/16 hole as shown on the plans and extends through a ⅛" brass tube guide, slide and slotted mount. Trim release pin so that at approximately 10% throttle the pin releases the slide.

Now file the tip of the release pin to a point to guarantee smooth action. The release pin must extend at least ⅜" to ½" past the slotted mount so the leadouts aren't accidently tripped on takeoff. The ⅛" brass guide tube is supported by two small pieces of ⅛" plywood which are glued to the wing through the sheeting. The release pin must not bind in the tube. With the throttle in full position, and the leadouts locked forward, epoxy the .010" brass tab to the slotted mount and bend 90 degrees to touch the slide. This tab enables you to line up and lock the slide in place while you're at the handle. The moveable leadouts just described, and shown on the plans, vary slightly from the photos. The photos show an extra lock at the rear and a little different slide catch. That extra lock was for experimenting with different line sweeps. The results were that the more sweep the better handling characteristics.

Now it's time to add all the other little hardware items, such as pushrod guide, throttle guide, removeable hook, hook release and stop, and gas tank. Most of these items are self-explanatory, but the real secret is to make it simple and trouble-free. Almost all linkage problems can, and should, be solved on the bench. Hours and hours of preparation go into that five-minute attempt for the winning score and if something can go wrong it happens then, or seems to. The fiercest conflict in competition Carrier is man against machine.

Some of the items seen in the photos have been only mentioned and may not be recommended in all cases. The chicken hopper gas tank is one. The Fox Carrier Special seems to be very particular when it comes to the fuel system. Tank location and design should supply the most constant head pressure possible. The chicken hopper has worked best for me after dozens of tank variations of locations and designs on a previous and different model. I would recommend using some type of 3 oz. uniflow tank first before using the more complicated chicken hopper, because the MO-1 design doesn't restrict tank elevation. In my opinion you can't buy a tank better than one you can make yourself.

If you find you need a custom fit tank, make it from .008" or .010" brass. The .010" brass is more difficult to bend. If you're satisfied with a commercial design, resolder all joints and tubes with Sta-Brite solder. Gas tanks that are mounted with bolts have a tendency to crack from vibration. The tank should be mounted with rubber bands and the back side should be cushioned, using dots of silicone sealer. This also protects the finish.

Chances are your greatest fuel problem will not be the tank,but the stock carb. Idle is generally poor and usually you end up in the "drink" during low-speed flight. Don't

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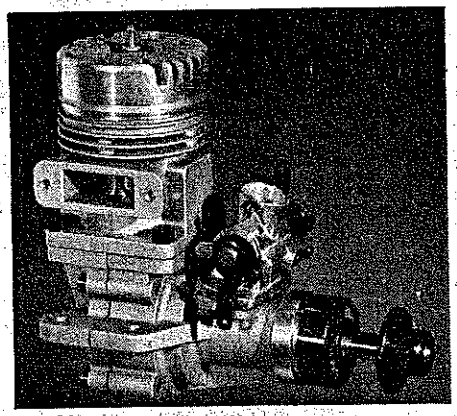
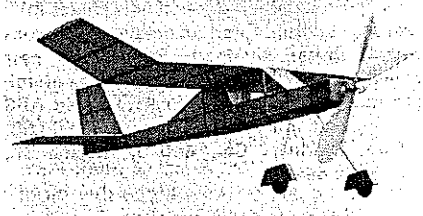
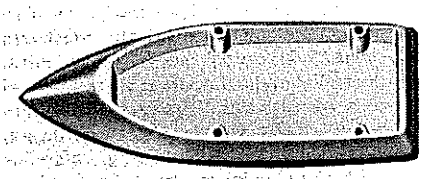
¼ Scale Servo: Big brother to Logictrol's SM servo, new XM Servo has heavy duty gear train, six pounds thrust, transit time of .3 seconds, weighs only 2 oz. Price $49.95. Logictrol International Corp., 3300 Stovall St., Irving, TX 75061.



Eagle II: New 60 is said to appeal to pattern fliers because of high output and durability. Available in side and rear exhaust versions. Weighs 17 oz., has unusually large connecting rod and rod bearings. $125.00. Fox Manufacturing Co., 5305 Towson Ave., Fort Smith, AR 72901.



Prairie Bird: 16-in. span rubber-powered model designed to meet popular Embryo Endurance contest rules. Plastic prop, wheels, nylon thrust bearing, tissue, full-size plans. $3.95. Peck-Polymers, P.O. Box 2498, La Mesa, CA 92041.



Replacement Iron Shoe: If your Top Flite sealing iron shoe is damaged, or worn, it now can be replaced without buying new iron. Removal of 4 screws on iron permits easy replacement with new shoe. $4.95. Top Flite Models, Inc., 1901 N. Narragansett Ave., Chicago, IL 60639.

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take the chance. Replace it with an H.P. .40, or better yet, a Perry carb. I use a Perry that was made for a K&B .40 with an aluminum bushing necessary for it to fit the engine. The bushing is not available on the market and has to be made. Another modification to the Perry carb is a longer throttle arm to increase throttle movement at the handle.

The exhaust extension is not for increased performance. Performance is not increased or decreased, but the extension does keep a lot of oil off the exposed bellcrank. Also, without the extension the heat of the exhaust breaks the rubber bands that hold the tank.

Flying: After an engine break-in period, a pre-flight check, and you have the handle in your hand, swing the handle to the left bringing the leadouts fully forward. Increase throttle to full, locking the leadouts in place, and signal for release. Climb should be gradual without engine hesitation. The MO–1 grooves as well as my Magician through the fast laps. After the seventh lap decrease the throttle slowly. When the leadouts trip, the plane will climb 3' to 5' due to the angle changes of the lines, if you use the type of bellcrank shown. If you use the J. Roberts bellcrank the plane will lose attitude. Low-speed flight can be described as smooth and predictable. It's very easy to handle. Even with a large wing, a nose-high attitude can be achieved. The landing approach should be gradual, using the throttle to control altitude, and when the mousetrap hook snags a line it stays snagged.

I would like to say that this design of the MO–1 is the ultimate Profile Carrier plane and that you have to build it this way. This is impossible. I'll just say try it, possibly using your own ideas to improve it. I would be glad to hear of improvements or answer questions. The MO–1 is truly a natural.

I'd like to finish by passing on some of my observations of the Profile event. Even though I'm a relatively new carrier flier, and geographically isolated from intense carrier activity, I've been able to form some valid opinions. Here are a few brief, random thoughts:

An effort has been made to make Profile Carrier a beginner's event. A beginner's skill and ability is underestimated. Profile Carrier is not a beginner's event, but a good place to begin.

Beginners look up to experienced fliers. A few words of praise or sincere interest in his equipment will do more to encourage the beginner than any other single factor.

Finally, the people that fly Carrier are the greatest. Get to know them.

½A Pylon/Scidmore

continued from page 56

requirement has a triple function. First, it tends to equalize drag associated with the fuselage. Second, it tends to produce an aircraft that bears some semblance to real racing airplanes. Third, it provides sufficient fuselage area to accommodate the usual receiver, servos and battery packs without having to buy the ultraminiature, more expensive components. The use of canopies, cheeks, etc. with the 4" height or the 2" width were allowed, provided that these extensions of the basic body had a minimum base width of one inch. I would enlarge the width to 2¼" minimum to allow the use of the larger servos side by side in the minimal fuselage. This would only increase frontal area by about 2 to 3%.

7) The minimum weight requirement was kept at 20 ounces. It was felt that reducing the weight limit would have only detrimental effects. It would reduce induced drag, increasing speed and kinetic energy, and requiring a quicker reaction time of both pilot and spectator in the event of an emergency. It would encourage the use of the more expensive ultraminiature components, as well as weaker construction—a detriment to safety.

8) Bearing in mind that not all racers and races are associated with large clubs and metropolitan areas, the number of personnel required for a race was kept to a minimum. The minimum crew would consist of a judge at each pylon and one manning the start-finish line. To minimize the confusion, the simplest procedure on cuts was to announce them at the conclusion of the race. Each individual who makes one cut gets 1 point, two or more cuts scores a zero. First, second, third place are awarded only to pilots scoring no cuts.

Any scheme which allows a flier to make up a cut pylon by flying another lap implies