

Lockheed ORION

**Jimmy Doolittle's famous Shell plane was
fastest transport in service back in '32.
Build this three-quarter-inch scale
replica for engines from .23 to .49 cu. in.**

By D. A. NEWELL



THE large petroleum corporations of the United States have, for the past two decades, sponsored some of our finest pilots in their attempts at record-breaking flights and other aeronautical accomplishment. Wiley Post, Frank Hawks, Al Williams and many other notables have attributed their success to this sponsorship.

General James H. Doolittle (then Major Doolittle) of the Tokyo bombing fame and world-famous speed record breaker was sponsored by the Shell Oil Company on a very memorable flight on July 25, 1932. That year marked the 200th anniversary of the birth of George Washington. The flight traced the entire route, in one day, that George Washington had covered in his lifetime! With two passengers, Jimmy Doolittle took off at dawn and flew the 2,610 miles by dusk.

The flight was made in a beautiful Lockheed Orion, which was the fastest transport plane in the world at that time. Domestic and foreign airlines were proud to use this plane in their fast express routes. Powered by a Wright Cyclone of 575 hp, the ship attained a top speed of around 220 mph. Provisions were made for six passengers and pilot. The completely retractable landing gear got considerable attention from the public at airfields.

Any engine from .23 to .49 cu. in. displacement can be used in this model. Glow plug is suggested. Anyone who can follow plans and handle a razor blade and knife can build this trim monoplane.

Cut the plywood wing joiner and cement the leading edge blocks to it. While this is drying cut the ribs and bottom covering from plywood and sheet balsa. Now, building one wing panel at a time, pin the bottom wing covering to the workbench and cement the leading edge and ribs to it. When the second panel is completed, insert the center-section leading edge, bottom covering, and slide the plywood landing strut support in place. Apply the cement generously. The landing struts are carefully bent to shape as shown. Bind joints with fine copper wire and solder well. Attach the landing gear assemblies to the wing joiner and support, using strong thread and plenty of cement. Sand the trailing edge of the bottom covering to a sharp edge as shown and cover the top of the wing. Cement the solid balsa wing tips in place. When thoroughly dry, the entire unit can be sanded smooth.

The body outline is traced onto two balsa blocks that have been cemented together very lightly. When the top and side views have been sawed to shape, cut out the bottom of the body to fit the wing center section. Now the body can be carved to shape, using a sharp knife. Consult the sections on the plan in order to obtain the proper contours. Sandpaper smooth and split apart along the cemented seam. Hollow the body to about 3/16" thickness or as the plans indicate (some portions are heavier). Clear-dope the inside of the body shells and install the engine mounts to fit the engine used. Cement (*Continued on page 87*)

nected extrusions that are hat-shaped.

In a plane combining both these features, such as the Northrop RB-49 flying wing, the control of boundary layer flow becomes at last a practical possibility. Research now being carried on by Dr. Werner Pfenninger indicates that tremendous advantages may be gained. According to his calculations, if the 213,000-pound all-wing bomber were fully slotted for boundary layer control, it could attain its rated 500 mph top speed and carry the same load with only two of the eight engines now required.

Three thousand cubic feet per second of boundary layer air would be whisked off the surface of the wing, sucked into the gas turbines and ejected as propulsive jets. It is estimated that the fuel saved by the elimination of the extra engines would enable the RB-49 to increase its range to 25,000 miles—enough to circle the earth at the equator, nonstop! If the present eight engines were retained and the advantages of boundary layer control channeled in the direction of faster flight, the big bomber could easily break the sonic barrier.

The delta-shaped airplane shown illustrated on pages 30 and 31 offers even better possibilities for controlling the boundary layer, since its projected span for a given area is smaller than that of a "conventional" flying wing. Location of the slots is closer to the jet engines. The entire design is compact, requiring considerably less "plumbing" and ducting than if these slots were spread across a wing having a span of more than 100 feet. This means less structure and additional weight economy, which translates into further increase in fuel capacity and still longer range for such a delta-wing plane.

Lockheed Orion

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the bellcrank support in place and bolt the bellcrank to it with a few washers in between as spacers.

Cut the tail surfaces from sheet balsa and sand to shape. Hinge the elevator to the stabilizer and cement the stabilizer in place after the fuselage bottom has been notched for it. Install the control horn and push rod. Bend the lead-out lines and install on the bellcrank. Install the fuel tank and also an ignition system if you desire one. The model photographed was glow-plug equipped.

The wing is now cemented in place, using plenty of cement. Fillets are made with Testor's Fyll. Cement the fin to the fuselage and attach the rudder at the angle the plans indicate. The installation of the tailwheel and the cut-out in the cowl for the engine cylinder prepare the model for finishing.

Our model was entirely covered with fine silk. This not only improves the finish but also makes the model practically indestructible. It is optional, however. Clear-dope the model a few times and sand smooth. Then apply the color. Doolittle's plane was all yellow with bright red trim, which creates quite an attractive appearance. We used Testor's STA fuel proof dope. When the paint is thoroughly dry rub it down with automobile rubbing compound. When painting be sure to apply the yellow first because you will never be able to cover red with the yellow.

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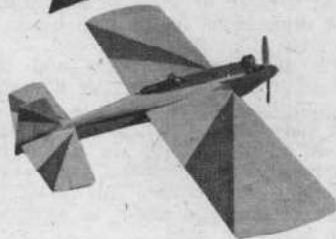
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The cockpit hood can be cemented in place now. This is made from the forward portion of a standard commercial bubble canopy.

When powered with the Forster .29 our model really traveled, therefore we did all our flying from a cement schoolyard on sixty-foot lines in order to prevent nose-overs and provide realistic flights. Do not attempt to fly the model on lines less than .012" thick for safety's sake. Add lead weight (strips of solder) to the nose or tail until the model balances at the point shown on the plans. Use about three-quarters engine power for the first few flights and then give it the gun and enjoy the realistic flying obtained from this 3/4" to the foot scale replica of a famous plane.

Orion—Bill of Materials

Fuselage: 1pc. 20" x 3" x 2 3/4" medium balsa, fuselage top. 1 pc. 20" x 3" x 2" medium balsa, fuselage bottom. 2 pc. 3/8" x 1/2" x 5" hardwood, engine mounts. 1 pc. 1/16" music wire 16" long, push rod and tail wheel strut. 1 pc. 2 1/4" x 3/4" x 1/16" aluminum, bellcrank. 1 pc. 3/8" x 1/2" x 1 1/4" hardwood, bellcrank mount.

Wing: 1 pc. 1" x 1 1/2" x 30" medium soft balsa, leading edge. 2 pcs. 2" x 1/16" x 36" soft balsa, wing covering. 2 pcs. 3" x 1/16" x 36" soft balsa, wing covering. 2 pcs. 1/2" x 4" x 1 1/2" soft balsa wing tip. 1 pc. 12" x 2" x 1/8" plywood, wing joiner, rib, L. G. support. 1 30" length of 3/32" music wire, landing gear. 2 pcs. 8" x 4" very thin sheet brass, wheel covers. 1 pc. 1/8" x 2" x 12" balsa, wing ribs.

Empennage: 1 pc. 3/16" x 28" x 3" soft balsa, tail surfaces. 1 pc. .049" music wire, elevator joiner. 1 pc. .032" x 1/4" x 1/2" brass, control horn.

Miscellaneous: Silk, 2" dia. wheels, 5/8" dia. wheel, heavy thread, cement, 4 oz. yellow dope, 2 oz. red dope, masking tape, screws, nuts & bolts, solder, 1 oz. black dope, forward portion of bubble canopy, sandpaper, rubbing compound.

Fuel System

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how to construct a tank for Class D motors which the author has found most successful for top stunt competition. A tank like that illustrated was used in both the first and second place stunt winners at the last Mirror Model Flying Fair. The proportions of 1-2-3 inches should be retained for the smaller engines. A .30 engine will run well on a tank of 3/4"x1 1/8"x2", while the .065 jobs will take a tank 3/8"x3/4"x1". The Class D size shown, incidentally, will last for about 7 minutes with the average engine.

Cut a block of wood to the required tank dimensions for a form block and assembly jig. Place the end of the block on a sheet of tin and trace around it with a scriber or any sharp pointed instrument. We use sheet tin (tin plated iron) which can be purchased at most hardware stores. It is generally sold as "flashing" to go around chimneys on a house. This material is much cleaner and easier to work with than scrap tin cans.

Cut out with shears or large scissors,

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