FLY THIS MILES MASTER

How you can build and fly a model of Britain's fastest training plane

by **SYDNEY STRUHL**

AS OUR flying scale feature this month we present the ship in which British fighter pilots receive their final instructions, the Miles Master. The Master is the fastest single engine training plane yet produced, a machine specially designed to provide familiarity with all the advanced scientific equipment and handling characteristics of high speed pursuit planes.

When the student-pilot completes his final stages of training in the Miles Master he transfers over to a Spitfire or new Hurricane with no sudden change of new technique. He is, thanks to this training plane used, almost immediately at home in the fastest of operational pursuit planes.

In all but top speed, the Master's performance is comparable to that of present day fighters; and the flying and handling characteristics are very similar. For example, the wing loading of the Master is the same as the famed Spitfire.

Construction is almost entirely of wood, spruce members covered with three plywood, which gives a very rigid structure. For a long period metal has been the only material used in the RAF for high performance aircraft; but wood, for a high performance training plane, retains its advantages and is fully justified by the performance of the Miles Master. The design provides the same strength and safety factors as metal and in addition, the wood, which is often easier to repair, is not likely to present a shortage such as metal would.

The Master is powered by a 585 hp Rolls-Royce Kestrel XXX engine, has a maximum speed of 270 mph at 15,000 feet and cruising speed of 220 at the same altitude. Climbing at 1,500 per minute, service ceiling is 28,000 feet and an absolute ceiling of nearly 30,000. Range is estimated to be 500 miles. The Master has a wingspan of 39 feet, is 30 ft., 8 in. long, and measures 10 ft. in overall height.

A model of the Miles Master is interesting to build and fly. Structural simplicity and efficient aerodynamic design combine to produce a low-wing model with flight capacity comparable to many high-wing models, flying steadily with plenty of power and the appearance of a full size plane.

Before actual construction of the model study the plans carefully to become familiar with the details. With a clear picture of each detail in mind, gather all the necessary material and begin.

FUSELAGE: The manner of fuselage construction calls for use of four keels cut to the required shape from 1/8" sheet balsa. To obtain their patterns trace the top, bottom and side outlines of the body. The keels are shown in grain. Bulkheads are cut from 1/16" sheet to the patterns shown in

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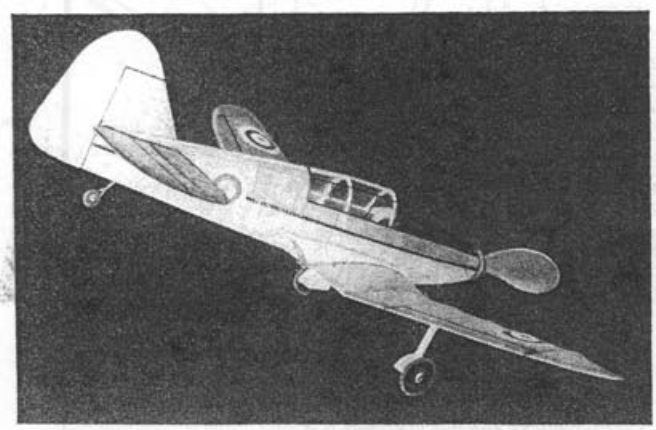
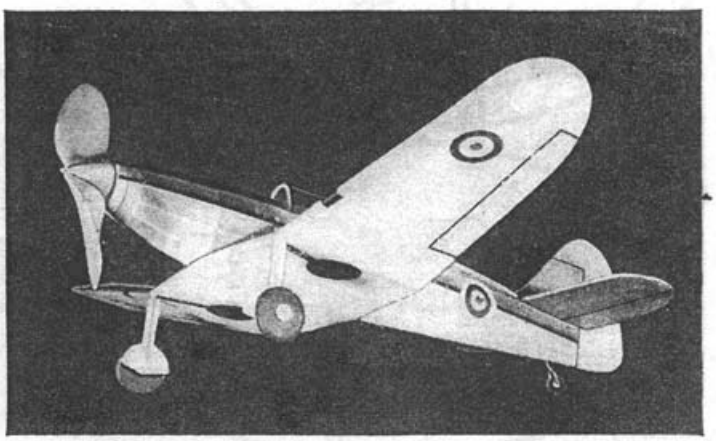
Carefully detailed, it is very realistic



A large propeller gives it fine performance



Fly This Miles Master

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the plans. Cut only the notches for the keels, as shown, leaving the other to be cut as a later operation; their positions should be marked as shown for later reference.

Pin the top and bottom keels to position over the fuselage side view and then cement half the bulkheads in their proper locations. Attach a side keel and then, when dry, remove the structure from the plans and add the remaining bulkheads and keel. All stringers are 1/16" square balsa. Attach the ones nearest the side keels first, cutting notches as required. Always attach stringers to corresponding positions of each side of the fuselage at the same time to prevent pulling the body out of line.

Between bulkheads B and E, where the wing fits in, curved pieces are cut from soft 1/16" sheet and fitted so as to make the fuselage sides fit the wing curvature. Add 1/16" sheet to form the dashboard and in the rear of the fuselage to act as an anchor to hold the rubber motor.

The nose block, just forward of bulkhead A, is made from two pieces of 1/4" sheet. The first is removable but is held in place by a small cube that fits into the second piece which in turn is cemented to A.

TAIL SURFACES: Construction of tail surfaces is easy; both the rudder and the stabilizer are constructed in a similar manner. For greatest strength the stabilizer is made in one piece, so make a full size plan. Pin all stock directly on the plans. Dimensions are given in the plans. When dry remove the frames from the plans, trim and sand the surfaces to a final shape. Check against warps.

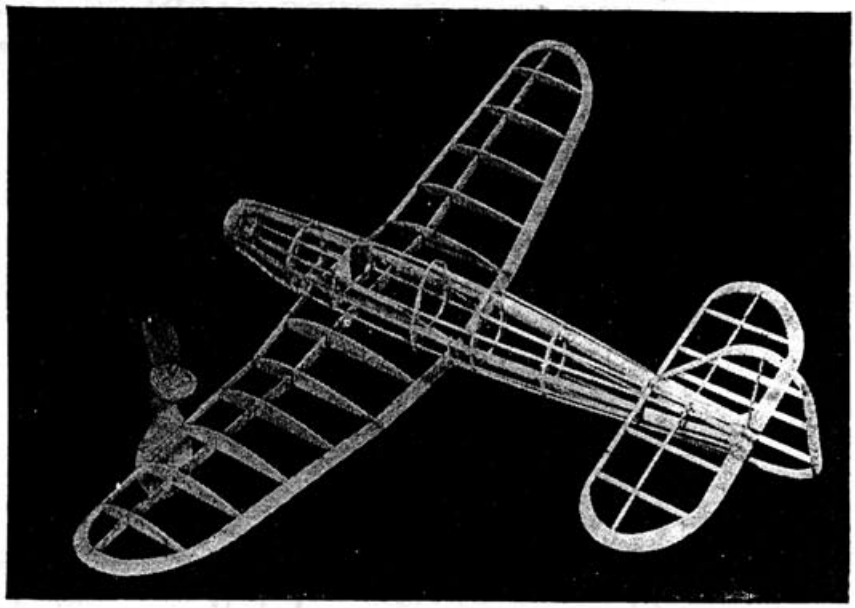
WING: The wing is made in one piece. Thus it will be necessary to make a tracing of the other half of the wing as space allows us to present only the right half. The entire wing frame is built over this full size plan and then cracked at rib 3 for the required dihedral.

Two of each type rib with the exception of No. 1 are required; all are cut from 1/20" or 1/16" sheet balsa. Notches for the spar must be cut with accuracy to insure a neat job. The leading edge and wing spar taper is shown by the broken lines.

Taper the trailing edges to correct cross-section before pinning them to place over the plans. Assemble the parts right over the plans using pins to hold them in place until the cement is hard. Tips are cut from 1/16" sheet to the correct shape and cemented in place. Trim the edges and tips to shape, finish with sandpaper. Crack at ribs 3 and install 1-3/4" dihedral under each tip.

LANDING GEAR: Landing gear struts are bent from .040 music wire which is bent so as to join the wing spar and rib No. 3. Be sure to make a right and left strut and then attach them to place with thread and lots of cement. Use a needle and thread to sew right through the ribs and around the wire. Apply several coats of cement to the entire adjacent area. The 1/32" sheet landing gear leg covers are not added until the wing is covered.

Lightweight wheels can be purchased or they may easily be made from scraps of 1/8" sheet balsa that have been laminated together. Washers or bearings should be attached to each wheel so they will turn freely and accurately.



The structure is light, strong and easy to build

PROPELLER: For best performance any flying model must have an efficient propeller. Select a hard balsa block 1" x 1-1/2" x 7-1/2" and cut the blank to the shape shown. Drill the tiny hole for the prop shaft then start to carve a right-hand propeller. Finish the back surface of the blades first, then cut away the front to the desired thickness. Round the blade tips similar to the prop shown in the photos. Use rough and then fine sandpaper to smooth and balance the blades.

The spinner is made in two individual pieces cemented to the sides of the hub. A free-wheel device should be attached to improve the glide and a bearing is cemented to the back so the prop will revolve smoothly. Apply several coats of clear dope with light sandings between each and then color dope to a smooth finish.

For the propeller shaft use .040 music wire. Place several washers between the prop and nose plug before bending a loop in the end into which a winder can be hooked.

COVERING: Before the frames are covered, carefully sand to remove all flaws and roughness. Either colored tissue or Silkspan may be used and banana oil or thin dope is the adhesive. Use individual sections of tissue for each flat section of each side of wing, tips, tail surfaces, etc. In covering the fuselage it will be necessary to use numerous small pieces to work around the curves without wrinkles; the tissue must be lapped carefully to assure a neat job. Lightly spray the covered parts with water to tighten the tissue. The flying surfaces must be supported level while drying so they will not warp.

Assembly of the Miles Master is simple. First fit the wing into the recess in the fuselage and cement firmly. If parts have been built with accuracy, the angle of incidence will automatically be correct. Finish the section from wing to fuselage with small pieces of 1/16" sq. Wing fillet patterns are given and two are cut from 1/32" sheet. They are to fit accurately from fuselage to wing and may need a bit of alteration to fit exactly on your model. If the builder desires, the trailing edge of each fillet may be strengthened by laminating another small piece of 1/32" sheet to the underside.

It will be necessary to temporarily cut the top keel behind H to admit the stabilizer which is cemented in position. Cement the rudder to place with a bit of offset to counteract torque. The stabilizer trailing edge may have to be cut a bit to allow the rudder to be in position. Tissue fillets are placed between the tail surfaces and fuselage. Any wrinkles in the covering should be moistened with water and permitted to dry before the entire model is given a coat or two of clear dope.

The model cannot be considered complete until numerous minor details are added. The cockpit is made of thin celluloid. When cementing the celluloid in place be careful to avoid cement smears. The structural detail is represented by doping thin strips of black tissue to the transparent enclosure. Wheels are colored and then held to the axles by small washers soldered to the ends. The outer landing gear covers are cut from 1/32" sheet and then covered with tissue to match the rest of the plan. Control surface outlines are simply thin strips of black tissue doped to place. Items such as tail wheel, exhaust ports, etc., are made from scraps. The British insignia is found on the wings and fuselage sides of the real plane, and can be made from colored tissue.