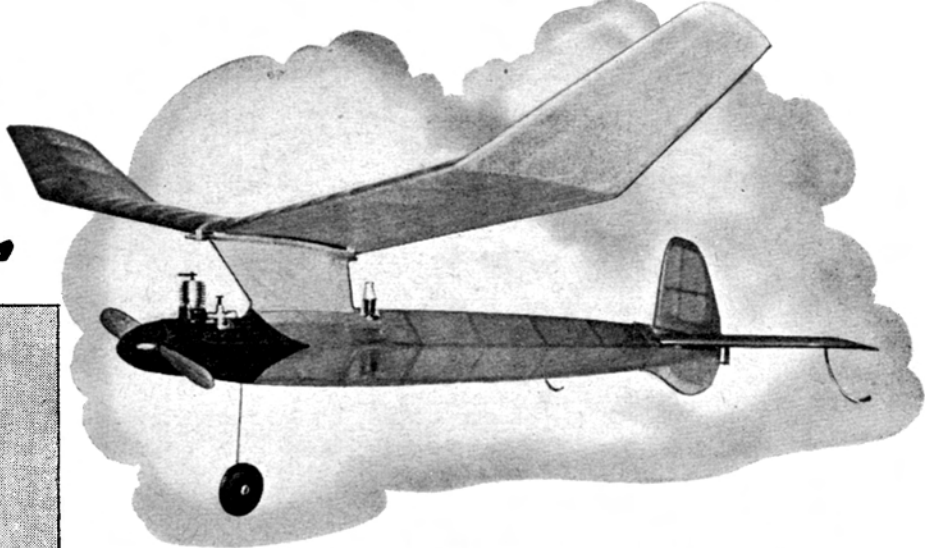
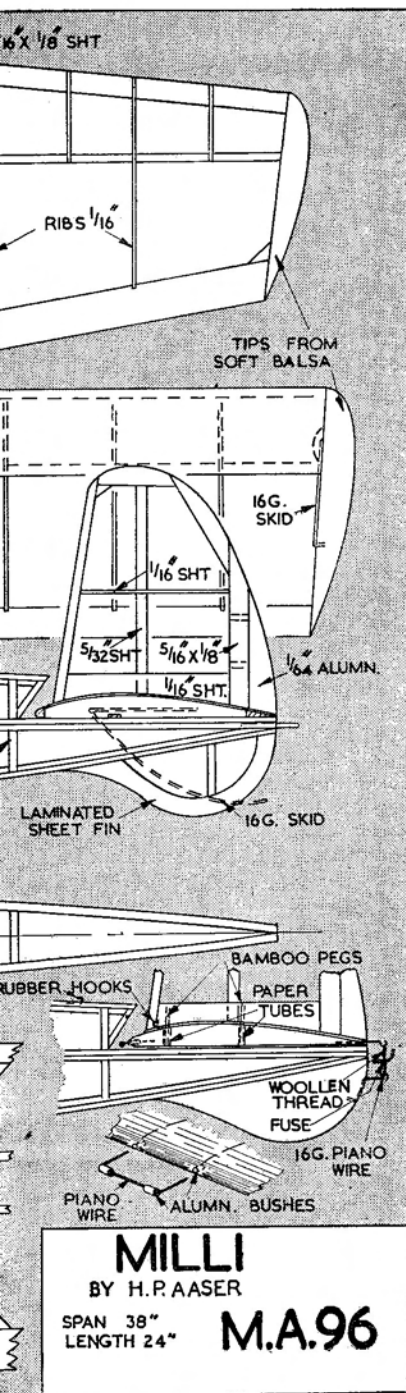


H.P. Aaser



THE prototype was designed primarily as an experiment. The purpose was to investigate how a small and light model powered with an engine of 1 cm³ or less would fare in competition with larger and higher powered models. Experience with the Milli has shown that whilst the small model is far better in some respects, it also has its disadvantages. The small model is, of course, easier to store, transport, process and handle on field. It may be built with lighter wing loading than the average higher powered model. Climb is good, but probably slower than that of the higher powered model. Glide is fairly good, but not the sailplane glide that may be obtained with larger models. The small size is a definite disadvantage when model is about to fly o.o.s. Also the comparatively fragile construction means that you have to act with some care when starting the engine, and retrievers with too many thumbs have no difficulties in puncturing single layers of Japanese tissue.

The Milli has proved to be a consistent flier and easy to trim. In the 1950 Norwegian Nationals it took first prize in class D.1—power duration models 0.5 cm³—with aggregate time of 599.3 seconds. The first flight was o.o.s. and the shortest flight of the three was 169 seconds.

Construction

The writer prefers to start with the tailplane.

Make a rib template and cut out eight ribs of $\frac{1}{16}$ in. medium sheet for the elevator. Sand the trailing edge to triangular cross-section, make notches for the ribs and pin trailing and leading edges to the plan. Cement ribs and tips in place. Cement the $\frac{1}{32}$ in. soft sheet to the leading edge and leave until the joint is thoroughly dry. Now cement the sheet to the ribs. The elevator is then removed from the plan and spar and top covering of centre section added. Put paper tubes for the fin and the small bits of aluminium tubing for the d.t. in place and cement well. Also put the rear piano wire in place with plenty of glue. Finally, add the $\frac{1}{32}$ in. sheet bottom covering of the centre-section.

Make the fin from scraps. The rib is non-lifting, streamlined section. Cement the bamboo pegs securely in place and put on a trim tab of $\frac{1}{64}$ in. aluminium.

Wings

Make a template from cardboard or aluminium and cut 16 ribs from $\frac{1}{16}$ in. medium sheet. Be very careful when the slots for the spars are cut, as a warp-face wing can only be obtained when the ribs are exactly alike. Cut 16 nose ribs from $\frac{1}{16}$ in. medium sheet. Sand the trailing edge strip to triangular cross-section and cut the notches for the ribs. Pin trailing and leading edges for the inner panel of the wing to the plan. Cement ribs in position and when dry push the spars in from the side and cement securely. Add the nose ribs.

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Milli (Continued from page 131)

Pin the trailing and leading edges of the outer wing panel to the plan and cement the ribs in their proper positions. Make these ribs by sanding down the main ribs. Push the spar in place, add nose ribs and wing tip. When cement has dried, remove pins from the outer panel and raise tip $2\frac{1}{2}$ in. Join the two wing panels.

Make the other half of the wing in the same way. Finally, make the centre-section. Place the two wing halves on a flat table with inner ribs $1\frac{1}{2}$ in. apart and tips raised to $4\frac{1}{2}$ in. Fill in centre-section with spars, trailing and leading edges. Finally add $\frac{1}{8}$ in. sheet covering of the centre section.

Fuselage

The fuselage is made from $5/32$ in. sq. medium hard balsa. Make two sides in the usual way by building the second one on top of the first one thus ensuring exactly equal sides. Join the sides at front and in the rear and then add the spacers. Be certain the spacers are of correct length. Cut the $1\frac{1}{2}$ in. square front bulkhead from $3/32$ in. plywood. Make holes for the engine bearers. Bend the under-carriage from piano wire and fasten to bulkhead with aluminium clips and small bolts. Cement bulkhead to body. Make the engine bearers from ash, $\frac{3}{4}$ in. by $\frac{1}{2}$ in. and $4\frac{1}{2}$ in. long. Drill holes and mount engine. Slip engine mounts into holes in bulkhead, align engine and cement mount to bulkhead. Fill in with small balsa blocks at rear ends of mounts. Be careful to keep dust out of the engine by wrapping it in soft cloth before starting the construction of the engine mounts.

Construction of the pylon is the trickiest part. Cut one pair of leading edges and one pair of trailing edges from $\frac{3}{4}$ in. by $\frac{1}{4}$ in. medium balsa. On both sides of the top fuselage longerons cut notches $\frac{3}{4}$ in. long and of such depth that $3/32$ in. of the longeron remains. Make one pair of notches just behind the front bulkhead and another pair just behind the first spacer. Cement pylon leading and trailing edges in these notches in the top longeron and to the bottom longeron in the positions indicated. Fill in the $3/32$ in. space between the two leading edges and the two trailing edges with balsa sheet. Add rib from $\frac{1}{4}$ in. by $\frac{1}{4}$ in. balsa and fill in between leading edges and engine mounts with balsa blocks. Make pylon platform by laminating two sheets of balsa $\frac{1}{8}$ in. thick. Do the lamination directly on the underside of the centre-section of the wing. When dry place wing and pylon platform on top of pylon. Align for correct incidence of 4° and cement platform to pylon. Fasten rubber hooks in positions indicated and cover pylon with $\frac{1}{8}$ in. sheet.

The engine covering is made as follows:—Cut a $1\frac{1}{2}$ in. diameter ring from $\frac{1}{8}$ in. plywood. Thread it on to the crankshaft housing of the engine, then put on propeller and spinner. Screw the engine on to the mounts. Temporarily fasten the plywood ring to the spinner with pieces of $\frac{1}{8}$ in. sheet.

Cement stringers between ring and front bulkhead and cover with $\frac{1}{8}$ in. balsa sheet. Make the upper half of the covering removable. It may be fastened with dress snaps or rubber bands.

For contest work an automatic timer is indispensable. On the original Milli an Elmic timer was placed in the fuselage just behind the pylon and it has been found to work perfectly.

Covering

The framework of wing, tailplane and fuselage are well sanded. Wing and tailplane are covered with one layer of Jap tissue or its nearest equivalent and given three coats of thin clear dope. Fuselage of the prototype was covered with one layer of Jap tissue, but two layers would possibly be more practical.

Give the fuselage covering several coats of thin dope.

Flying

The assembled model should balance at approximately 60 per cent. of the wing chord from the leading edge. Test glide in high grass, and when a straight glide just on point of stalling has been obtained try powered flights of 5 seconds motor run. Adjust engine thrust and trim tab on fin for a straight, steep climb and a circling glide. Under full power the original climbed straight and very nearly vertically. The model may, in fact, be hand launched vertically. Do not allow more than 10 seconds motor run on test flights and *always* use the dethermaliser.