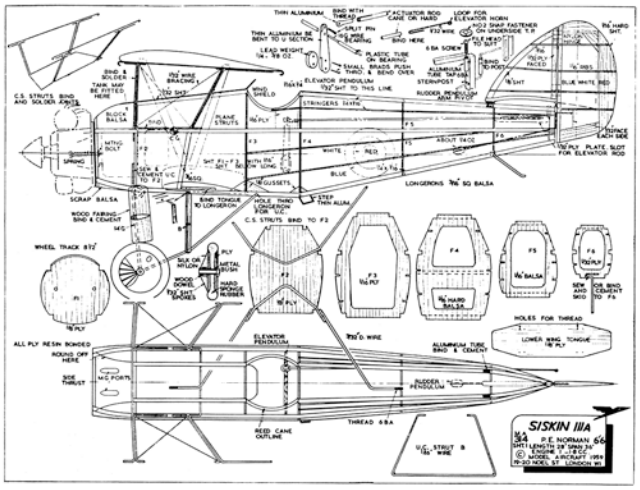
Siskin IIIA



Building a free-flight model of the plane on the cover the Siskin IIIA.
P. E. Norman, who painted the original of this month's cover, gives detailed instructions on how to build your own replica of his exciting model.

The Siskin III single-seat fighter entered service with the R.A.F. in 1924, when 41 and III Squadrons were equipped with it. It was an aircraft with several distinctive features, and was both liked and disliked by the pilots who flew it. Of rather gawky and angular appearance it had a slab-sided fuselage with angular decking and angular tipped wings and tail, but its most distinctive feature was its large broad chord upper wing and very small and narrow chord lower wing with " V " interplane struts.

The undercarriage, which had the then comparatively new oleo legs, was complicated and drag producing, and was rather long. This, coupled with the amount that the legs extended when in flight, gave it a rather " daddy long- legs " appearance. This tall undercarriage and the fact that the lower wing stalled easily made the machine rather tricky to land, and there are many old pilots still carrying a " Siskin nose," a distinctive feature brought about by that organ coming into rapid contact with the cockpit edge, or the trailing edge of the mainplane when the aircraft nosed-over on landing.

The engine, a 325 h.p. Jaguar two-row 14 cylinder air-cooled radial, appeared to be stuck onto the nose as an afterthought with a flatish cone spinner on the two bladed airscrew. An aluminium cone segment between the airscrew and front of the engine formed the only streamlining.

All machines were doped silver overall except for the front fuselage panels and the deck in front of the cockpit which were either dark green or black.

The red, white and blue roundels were carried on the fuselage sides, just aft of the cockpit and on the top and bottom surfaces of the top wing only, as the lower plane was considered too narrow to carry them. The rudder carried red, white and blue vertical stripes (blue forward) and the machine sported the gay and colourful squadron markings on the fuselage sides and between the roundels on the top wing (41 squadron—a red bar, 111 squadron a black bar). The wheel discs (canvas) were painted the flight colour, i.e. red, blue or yellow.

Squadron Markings :
No. 1. Two parallel red bars.
No. 19. Blue and white checks.
No. 25. Two parallel black bars.
No. 29. Two intersecting zig-zag lines.
No. 32. Blue band intersected obliquely with white.
No. 43. Black and white checks.
No. 56. Red and white checks.

An extensively modified version (the Mk. IIIA) was widely used by the R.A.F. and equipped Nos. 1, 19, 25, 29, 32, 41, 43, 56 and III squadrons, remaining in

Siskin IIIA

service until about 1932. The final development was the Mk. IIIB, which had a Jaguar Major engine, enclosed in a Townend ring. It had a top speed of about 187 m.p.h. at 1,500 ft., but did not see service with the R.A.F.

My original model powered by an old 1.8 c.c. Elfin radial mounted diesel, represents the Siskin Mk. IIIA, as flown by the C/O of No. 43 squadron. When correctly trimmed its flight with this power unit is very exhilarating, and this, coupled with a comparatively slow glide and strong construction, should well reward its builder with several years of flying.

Study the plans and the following notes carefully, and become fully acquainted with them before commencing construction with the…..

Fuselage and Undercarriage: Cut out fuselage formers and drill engine mount bolt-holes in former 1. Cement reinforcing strips of 1/16 x 1/4 in. balsa across formers 5 and 6 between the longeron slots at top and bottom and at center of former 4 (this acts as pendulum slop to prevent the elevator pendulum swinging too far backwards).

Cut the four main longerons of 3/16 x 3/16 in. from 3/16 in. hard sheet—cutting them slightly longer than necessary. Gently " break " and cement the two lower longerons to the correct angle shown on the plan. Assemble the two upper longerons to formers 1, 2, 3, 4, 5 and 6, holding temporarily in position with pins and elastic bands until set.

Position the two lower longerons and cement in position, checking that the formers are in their correct positions and truly square. Cut the sternpost from 1/4 in. sq. hard balsa, und having cut the ends of the longerons to length, cement firmly to the sternpost holding with spring paper clips until dry.

Bend the U/C legs from 3/32 in. dia. piano wire. To form the spring-coil in the wire at the top of each leg, leave the wire in its full 3 ft. length -hold a 1/4 in. dia. steel rod vertically in the vice ; mark the leg and axle length plus about 1 in. on the wire with chalk or a piece of cotton. Slip a length of stout tubing onto the wire up to approximately this position. Hold the wire firmly against the steel rod in the vice and pull the other end of the wire tightly round the rod. Another length of tubing slipped on the other end of the wire will help this operation. Measure off the distance to the second loop and repeat the operation.

Now bend the wire between the loops to form the legs but do not bend the axle angles until the wire is fastened to former 2. Hold the formed wire in position on the back of former 2, and mark the position with a pencil line. Drill small holes at intervals through the ply and sew and glue the wire firmly in position using strong carpet thread and plenty of cement. Don't forget to place wire on the front face of former 2 for final fixing.

Allow the undercarriage wire to set firmly before bending the axle angles. The axles will be too long, but they are cut to length alter the wheels are lilted. The wheels are retained either by threading the ends of the axles, or by soldering washers on the axle ends.

Bend the center-section struts from 1/16 in. piano wire and bind and glue securely in place - do not complete the outer parts of struts at this stage.

Add top fuselage longerons between formers 2 und 3, and 4 and 6, and bend a length of 1/8 in. dia. cane to form the cockpit edge, cement in position. Fit the soft block balsa between formers 1 and 2, cement, and sand to shape, then cut the M.G. apertures.

Cut the 3/8 in. lengths of aluminium tubing and bind and glue firmly in position on top longerons to receive the tailplane prongs. Form the tailskid from 1/32 in. piano wire and bind and cement to bottom of former 6. Slip a length of P.V.A. tubing over the skid to give thicker scale appearance.

Cut the fuselage stringers from 1/16 x 1/4 in. balsa, and cement in position, ensuring that when finally sanded they stand proud of the formers. Cement the 1/16 in. ply plates between the top longerons and top stringers and against former 4, to take the elevator pendulum.

Cut the lower wing tongue from 1/8 in. plywood, drill small holes for thread and securely sew and cement in correct position on top of the lower longerons.

Siskin IIIA

Cover the fuselage sides with light 1/16 in. sheet from former 1 to 3. Sheet all the upper fuselage to a point midway between formers 4 and 5, with 1/32 in. sheet, ensuring the grain on top surfaces runs across the fuselage.

Form the rudder pendulum arm from 1/32 in. piano wire and fit a short length of aluminium tube bearing. Cut a shallow groove in the rear of the sternpost, make a small hole for the pendulum arm to pass through and ensure that this hole clears the pendulum arm to allow free lateral movement. Cut and drill a small piece of lead (about 1/4 oz. will be sufficient) and slip over the end of the pendulum wire inside the tail end of the fuselage, bend over the end of the pendulum wire for about 1/4 in. and hold the weights in position with thread binding and cement. Push the arm into correct position, line up the aluminium bearing in the sternpost slot and bind and cement thoroughly. Check that the arm swings freely.

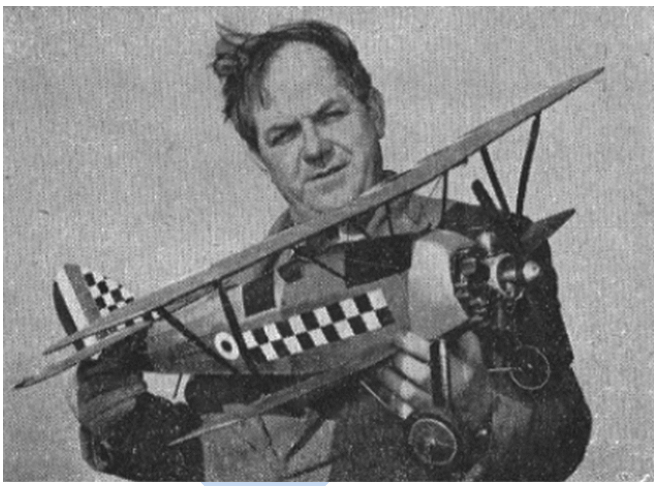
Cut a 1/2 in. length of aluminium tubing of large enough diameter to tap internally 6 B.A. Bind and cement to a short length of hard balsa, and cement thoroughly to the inside of the stern- post to form thread for 6 B.A. screw, which in turn is filed to fit the press snapper on the underside of the tailplane. This secures the tail in position and allows the tailplane incidence to be adjusted.

Fill in the underside of the fuselage between formers 1 and 2 with 3/16 in. sheet balsa. Insert 1 1/4 in x 6 B.A. screws with washers into the holes in former 1, passing them through from the rear and screwing on nuts to hold them temporarily in position.

Sand the fuselage smooth and examine all joints, ensuring that there are no bumps or pieces of cement that will spoil the covered surface.

The center section struts may now be completed by forming the bracing wires between front and rear struts and adding the top wing runners. Bind and cement thoroughly or wrap with thin fuse wire and solder, whichever you prefer.

Each oleo leg is built up from two pieces of 1/8 in. balsa. Fit carefully to each side of the U/C wire,



cement in place and when dry sand to a streamline section, wrap with 1/2 in. strips of silk or nylon, and soak with cement.

Cover the fuselage with thin lightweight silk, applied damp. When dry, give two coats of clear shrinking dope and allow to dry.

The rest of the undercarriage is now completed using plastic cored or thin gauge plastic tubing (between 1/16 in. and 3/32 in. dia.) and 1/32 in. piano wire faired with thin hard balsa glued and wrapped with silk. The cross axle is omitted to help prevent nose overs. Holes are drilled in the bottom longerons and plastic cord is passed through them from side to side to form the rear strut.

The plastic cord is now bound and cemented to the bottom of the piano wire U/C struts and then pulled forward over the axles, doubled back onto itself, and securely bound with thread.

Small details such as the wind driven generator and oil pump may be made and added. The front panels, two on each side of the nose, are cut from cartridge paper and cemented in place.

The Wheels:
Method 1.

These may be built up from circular laminations of 1/8 in. hard balsa and 3/16 in. three-ply, sanded to section, and fitted with aluminium or brass bushes. The cone sides may be made from stiff drawing paper, cut to size and cemented in position.

Method 2.

Siskin IIIA

Cut circular discs from a sorbo rubber kneeling mat, these may be purchased from Mence Smiths or Timothy Whites and are about 1/2 to 5/8 in. thick. Mark circles on the surfacee of mat with pencil compasses (using a soft pencil), then cut carefully with sharp long-bladed scissors.

If you have access to an electric grindstone the section of the tyre may now be ground to shape, ensure that you have a really strong grip on the rubber disc and rotate it slowly as the grindstone will “ snatch " very strongly. If no grindstone is available, trim to section carefully with the scissors then sandpaper until they are ns true as possible. The tyre section is now given two or three coats of rubber solution allowing each coat to dry thoroughly. Now stain the rubber with black leather shoe stain and allow to dry.

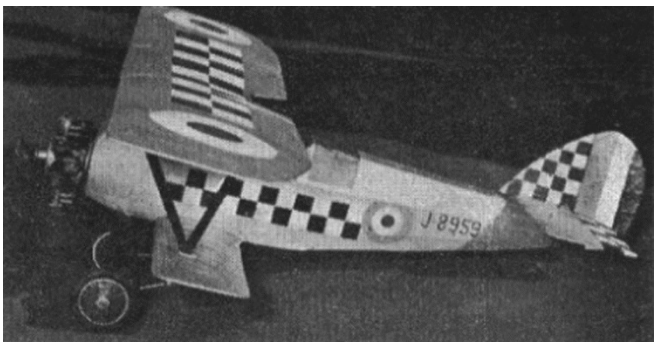
The two hub discs for each wheel are cut from 1/8 in. 3-ply or preferably 1/8 in. hardboard, drilled centrally and the edge on one side of each chamfered (this chamfer is eventually placed towards the rubber " tyre ”).

The spokes are represented by slats of 1/32 in. balsa, spaced evenly round a short length of 3/8 in. wood dowel which is centrally drilled and cemented to the face of the disc.

When dry the "spokes" are sanded off to the circumference edge (I used 24 spokes on each wheel covered with silk and doped); the wheels are now assembled by passing a suitable size brass bush (threaded externally 2 B.A.) through the outside covered disc “ tyre," and inside disc, and then screwed up tightly with a 2 B.A. nut. These wheels are very effective, fairly simple to make, and arc quite inexpensive.

The Mainplane: The top mainplane is built in one piece and is held in position on the center section struts by elastic bands passing over the upper surface.

Make a rib section template from 1/32 in. plywood or thin card, allowing slight extra thickness at leading and trailing edges. Cut out the ribs, using the template to mark them out.



Cut out the leading edge riblets using the front of the template as a marking guide. Cut all notches for leading edges and gaps in underside of trailing edges.

Make the trailing edge in one piece, ignoring the center section cut-away at present. Cut the curved ends of the trailing edge as shown on the plan and cement. Lay the trailing edge on the plan and pin in position. Place the ribs in position on the trailing edge out as far as the sweep forward.

Trim the outer ribs from the trailing edge to fit the tapering panels. Cement ribs to trailing edge and pin temporarily. Carefully fit leading edge into rib slots and cement. Cement the leading edge riblets and wing tips in position, allow to set. Remove the wing frame from the plan and very carefully just break the leading and trailing edges at the center rib position.

The mainspar is cut from two pieces of 1/8 in. hard balsa with the center trimmed to give the slight dihedral angle shown on the plans. Cut the dihedral braces from 1/32 in. plywood, and securely cement and pin to each side of the main- spar. Lay the mainspar in position on the plan and carefully cut out the rib slots in the under-side of the mainspar. Place the mainspar in the correct position on the wing frame and carefully push it down into the rib slots, easing the wing up slightly at the ends to form the correct dihedral angle.

Mark the position of the mainspar on each rib with a cut from a sharp knife or razor blade, then remove the spar and carefully cut slots in each rib deep enough for the spar to drop down into position.

Place the spar in position and cement each interlocking joint. Carefully; press the spar down into the riblets, blocking up (ho wing frame at the ends to form the dihedral. Trim the ends of the spar to fit the

Siskin IIIA

wing tips. Ensure that the spar is truly seated in position with the bottom surface flush with the bottom edges of the ribs, and allow to set thoroughly.

Cut, fit and cement the secondary mainspar as described for the mainspar. Cut away the trailing edge at the center section and build up with | in. sheet as shown on the plan. When set check the wing frame for any possible warps.

Sand the leading edge to the correct section and shape under and upper surfaces of the T.E. to give a knife-edge. Sand the wing frame carefully all over. Cut four aluminium or sheet tin pieces for the interplane strut fittings and make small slots with a knife blade in the ribs at the correct position, having previously wrapped the ribs at these points with narrow strips of silk well cemented. Insert the fittings through the ribs, bend the ends over with pliers and cement.

Cover the wing with thin dampened silk, covering the underside first. When dry, give two coats of clear dope, pinning the wing down to prevent warping. Reinforce the undersurface of the wing in the region of the center interplane struts with 1 in. wide nylon ribbon tape dampened and doped in position with thick dope.

The lower mainplanes arc constructed in a similar manner.

Make the lower wing boxes on the tongues —using 1/32 in. 3-ply for top and bottom surfaces and 1/8 in. hard balsa for the box edges. Cement, pin, and bind with strong thin thread and check that they are a good tight fit on their tongues. Place the wings in position on top of the boxes, which are fitted in place on the tongues, and carefully mark the box positions on the wing root ribs.

Cut the wing root rib away to fit tightly and correctly over the boxes. Check the dihedral angle and incidence and when correct cement and pin securely in position over the boxes. Allow to dry and then remove from the tongue and add the small hook for the retainer rubber bands on the lower surface. Cover with silk as for upper wings.

Tailplane and Elevator: The tailplane ribs are each cut in one piece, the spar gap being cut away later. Pin down the trailing edge and tips and cement the ribs in position, holding them with pins. Insert the leading edge and add the reed tips. Before removing from the plan cut away each rib. to allow the full depth spars to be cemented in position. On one side of each spar cement a 1/32 in. ply facing to increase the strength.

When dry remove the completed frames and sandpaper smooth. Place the tail temporarily in position on the fuselage and mark the positions of the tubes for the piano wire prongs, and the position of the tail incidence adjustment screw, on the rear of the fuselage.

Bend the piano wire prong-piece and cement and bind it in position on the leading edge. Cut a gap in the underside of the tailplane to receive the female half of a dress snapper, and sew and cement it securely in place.

See that the tail fits correctly in position, and then cut the elevator portion tree from the tail. Make the elevator horn from 1/32 in. piano wire and bind and cement it in position on the spar.

Cover the completed tail and elevator with thin silk and apply two coats of dope. Hinge the elevator to the tail with short strips of 3/8 in. wide nylon ribbon, and make sure that the elevator moves freely.

Fin and Rudder: Make the complete frame as for the tail, using the same method of mainspar construction. When dry, check that the fin fits the upper surface of the tail correctly and if necessary trim carefully until it does. Separate the rudder portion from the fin, slightly round off the leading edge of the rudder to allow close fit and side movement. Cut a slot in the leading edge of the rudder to engage with the pendulum rod projecting from the rear end of the fuselage. Cement thin sheet balsa on each side of the projection to secure the wire.

Cover the fin and rudder with silk and use nylon hinges, as for the elevators. When the dope is dry, cement the fin firmly and correctly lined up, both vertically and longitudinally, on the upper surface of the tailplane.

Check that the completed unit fits squarely in position on the fuselage and that the incidence angle is

Siskin IIIA

adjustable, and rudder and elevator movement still free. All the tailplane components should be kept as light as possible.

The airframe is now complete and it is as well to assemble it completely to see that the wings and tail seat true, and to get the general feel of the model. You may balance it by passing an elastic band round the center of the top wing and suspending the model from a hook. Plasticine or lead or some other suitable weight may be attached to the front bulkhead until the model balances roughly at the correct position. This will indicate how much the fuel tank, engine mount, propeller, and dummy engine should weigh. If you have the engine and propeller already available, this may be temporarily attached, thus giving a little better idea of the remaining weight for mount, dummy engine, etc.

Engine Mount: The engine mount, tank, and dummy engine are attached as a complete unit to the fuselage by my usual practice of passing two bolts through the front bulkhead and then through the mount, held by strong springs and locknuts on the screws. This method is quite rigid enough and the tension of the springs may be adjusted by the locknuts. The method permits full thrust line adjustment by inserting packing (afterwards built in) on the held during flying. The whole unit is easily detachable should the need arise. for replacement, etc. I normally use fiber for the mount but good resin bonded 3-ply will serve just as well provided it is thoroughly doped or fuel proofed against oil seepage. Plywood is not quite as strong as the fiber of course.

Cut the mounting bulkhead to the same shape as former I and drill holes to correspond. If you are using n radial mount engine, this may be bolted direct to the bulkhead, countersinking this on the back to allow the nuts to be flush with the rear surface. The fuel lank may be held to the bulkhead with a thin gauge aluminium strap screwed to the bulkhead.

If the engine is to be beam mounted, engine supports may be cut from hardwood, securely screwed from the back of the bulkhead, and then drilled to take the engine holding down bolts.

The Dummy Engine: The Siskin had a 14-cylinder double row air-cooled engine. The two banks of seven cylinders were, of course, staggered to each other so that your dummy engine will consist of 13 cylinders and the one diesel engine cylinder.

The crankcase of the engine may be made by wrapping a piece of thin aluminium into a cone shape or correct diameter. It is riveted or bolted with small 8 B.A. nuts and bolts, filed off to length. The appropriate gaps for the diesel cylinder, air intake, etc., are now cut so that the truncated cone fits easily. The positions of the center of the base of each dummy cylinder may now be marked out evenly and holes for 10 or 8 B.A. fixing bolts drilled.

The Cylinders: Cut a 14 in. length of 1 in. x 1 in. medium balsa and shape this into a true circular rod. Finish off with several grades of sandpaper till smooth and the final diameter is 3/4 in. Cut the rod into lengths as shown on the drawing and carefully shape one end of each piece to conform to the curve and angle of the dummy crankcase.

Wrap each cylinder with a layer of gummed strip paper, finishing off neatly at top and bottom. When all are finished bore a central hole large enough for an 8 or 10 B.A. bolt to pass through from top to bottom. The cylinders should now be " soaked ” thoroughly in a jar containing dope, then removed and allowed to dry.

They are held to the crankcase by means of 8 or 10 B.A. bolts passing right through each cylinder, and then secured with a locknut and well cemented. The rocker arm housings are cut from scraps of hard balsa and cemented to the head of each cylinder, two being required per cylinder. The completed engine should be doped black or dark grey, except the rocker housings which should be aluminium.

Super detail such as rocker push rods, etc., may be made from pins, but on a practical flying model, these are really unnecessary as they would soon be “ lost ’’ during heavy landings, which will be inevitable.

Glide Testing and Flying: With 1.5 to 1.9 c.c. engines I recommend a 10 x 6 or 11 x 6 Truflex propeller which

Siskin IIIA

has had the blades cut down in width closer to true scale shape.

With this type of scale aircraft it is much better and safer to use a large slow revving propeller as it will help stability and give a more scalish flight.

With the model completely assembled and using only one 1/4 in. or 3/14 in. elastic band on each attachment point, i.e. over the wings and holding the two lower wings together, test glide, prefer-ably over longish grass and if possible down an incline. With pendulum controlled models it is advisable to run forward with the machine, having one hand under the front of the fuselage and the other gripping the base of the rudder and fuselage rear cost.

Launch horizontally and not too fast and observe the glide characteristics. If the model tends to climb, the positive angle on tail must be increased (packing under the leading edge).

If there is a turning tendency to left or right check wings for alignment und warps. If warped twist the wing gently to coax the warp out. The fin may be warped over slightly too, for if this is not true longitudinally, it will have to be removed and re-cemented.

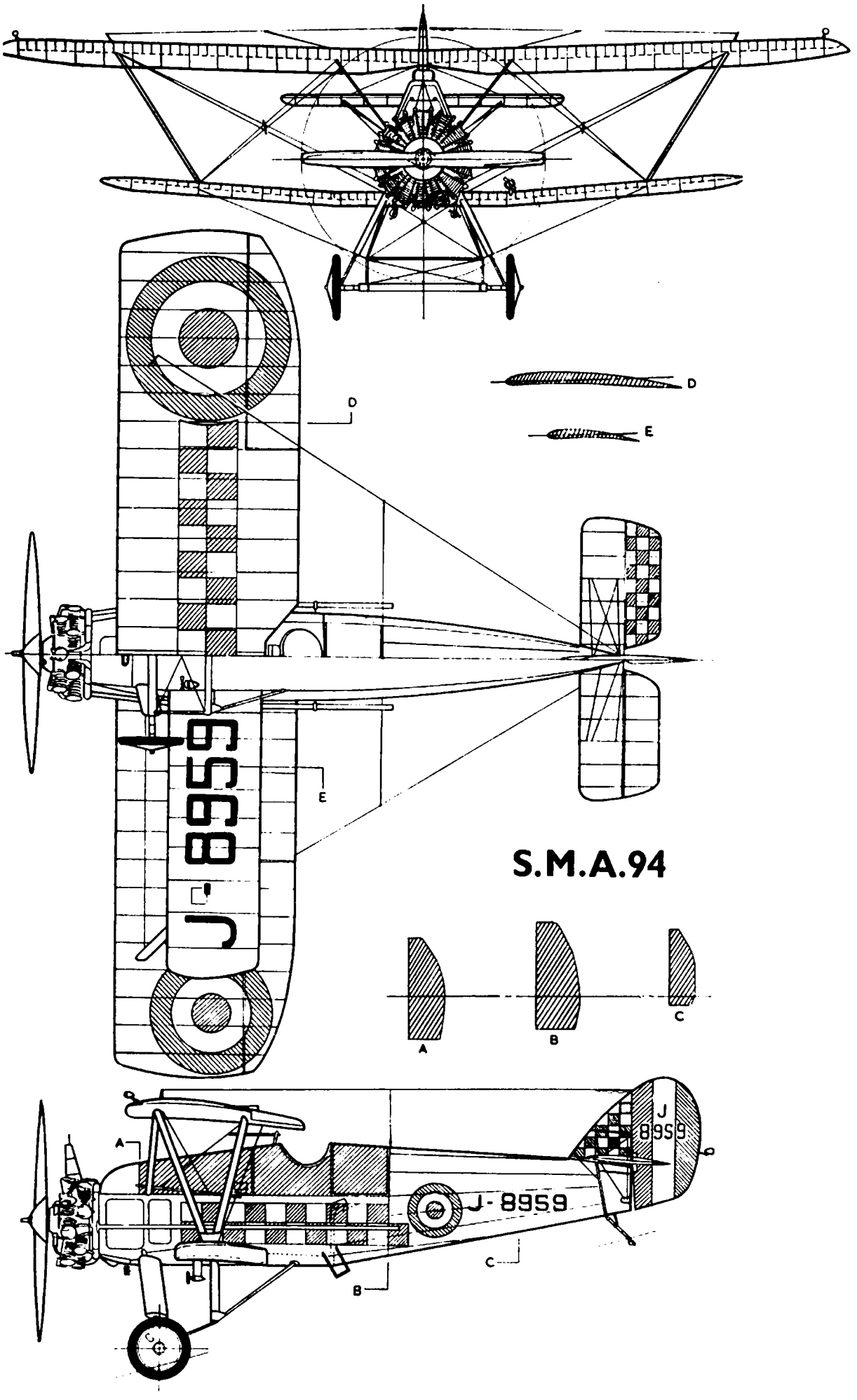
The glide trim may need a considerable amount of patience. Do not change the c.g. position drastically. When the glide is satisfactory (and not until) a power night may be tried. Do not run the engine too fast, launch model as for gliding tests, and observe results. With the engine running slowly the model should fly straight or very, very slightly to the right.

Remember that with increased engine revs the model will tend to turn more to the left. The amount of left turn can be taken care of by inserting a temporary packing behind the engine mount to give side thrust. Only use 1/32 in. at a time. Do not let model turn sharply to the right as a gyroscopic turn and crash will result. Control too much climb or lack of climb under power by placing thin packing pieces at the top or bottom of the mount.

When correctly trimmed the model will climb away almost dead straight but with left wing slightly down and hold climb to about 200 ft., when it will gently bank to the left and continue a large circular flight pattern.

The glide is fairly slow and may be slightly to the right, which is just as well, as the model reaches a good height in a very short time.

Model Aircraft Magazine April 1960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