ABLE GULL

There's many a fresh idea in this new style Class B team racer from U.S.A.

by T. GRANGER WILLIAMS

AS AN ADVOCATE of all metal Team Racers for several years, (see P.177, *Control-line Manual*), Granger Williams decided to build a Team Racer of wood for a change, in order not to get into a construction rut. He wanted an aeroplane that was small, light, fast, manoeuvrable, and with the clean lines of a racer. All of these requirements were realised in *Able Gull*, so named because of its gull wings and ability to live up to its designer's needs.

The basic plywood frame of the model makes it rigid and strong without too much weight. Finished model weighs just twenty three ounces. To start construction, cut two 1/16 in. sheet plywood sides, note that they taper to a point on the thrust line just behind the spinner and are a full 18 in. long. Now cut two ¼ in. sheet balsa sides the same size and shape as the plywood sides (do not cut out slot for hardwood U/C mount) and lay them aside for later use. Cut two 1/16 in. sheet plywood bulkheads F1 and F2 as shown on the drawing. Here is where one must decide the type of engine bearers.

Cut wooden engine bearers from ⅜ in. by ½ in. hard maple or birch and glue them to the plywood sides in the proper position. For those using metal engine bearers, cut them ⅜ by ½ by 12 s.w.g. aluminium angle. Taper the ⅜ in. wide leg from the control horn mount, to the aft bulkhead as shown. The ½ in. leg of the angle is tapered from the forward bulkhead, forward to match the plywood sides. Drill and tap the holes in the angles as shown, and drill holes to match in the plywood sides. Screw the engine bearers to the sides in proper alignment. Block up the sides and F1 and F2 on a flat area and check for alignment, then glue the formers in place. If you can get hold of some pattern makers leather fillet material, glue this in the corners where the sides and formers join. The leather fillet will increase the strength of the fuselage tenfold.

While the glue on the fuselage is drying, cut two wing spars from 1/16 in. sheet plywood and one from 16 s.w.g. aluminium. Drill a number of holes through the aluminium spar for glue penetration and using white glue, epoxy, or contact cement, sandwich the aluminium between the two plywood spars and clamp tight. While the spar is drying, cut the U/C from 16 s.w.g. Dural. File the U/C legs to a streamlined shape and bend to match the drawing. Drill and tap holes for the wheel screws and drill holes for the mounting screws.

Now cut the wing struts from sheet metal, the starboard or outboard strut from 16 s.w.g. brass and the port or inboard strut from 16 s.w.g. aluminium. The difference in weight will have the same effect as adding lead to the outboard wing tip. The holes in the ends of the strut tabs are for glue penetration when they are assembled in the wings. Now we will go back to the fuselage. Pull the tail of the fuselage sides together and bevel the corner until there is a flat area for a good glue joint. Take the two ¼ in. balsa sides you cut earlier and glue them to the plywood sides, at the same time pulling the tail of the sides together and glueing them. Use plenty of clamps (spring clothes pins) and set aside to dry.

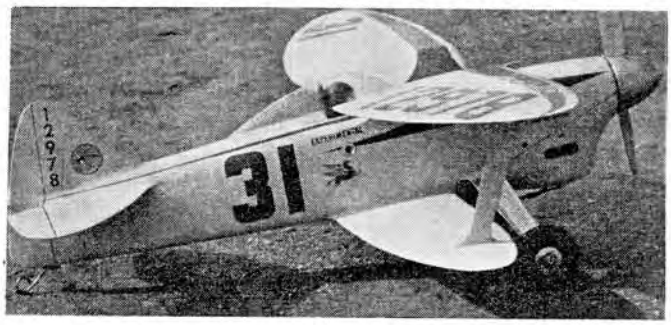
The lower wing is cut from a ¼ in. balsa sheet 3½ in. wide and 18 in. long. Carve and sand to a symmetrical airfoil section except for the area where the wing joins the fuselage. Leave this area flat for later blending into the fuselage contours. Locate the strut positions on the lower wing and cut a cavity to fit the strut tabs.

The upper wing, from the gull section out, is cut from ½ in. sheet balsa. The ½ in. by 1 in. leading edge should be cut from fairly hard balsa and the ½ in. by 4 in. section of the wing from medium grade balsa. Cut a 3/16 in. by 3 in. notch in the wing to shape. Use the type of elevator hinge you like best. Linen hinges are shown. The elevator horn used is bent 18 s.w.g. piano wire and serving as elevator connector.

The bellcrank mount is a piece of ⅜ in by ⅜ in. hardwood screwed and glued below the tank as shown in the drawing. Use a bellcrank with the pushrod hole about ⅜ in. from the pivot. This is not a stunt model and too much elevator travel or too quick a control will be dangerous. Attach the bellcrank with the 16 s.w.g. wire pushrod in place and after placing the elevator on the end of the pushrod, glue the tailplane to the fuselage. Cut holes in the fuselage sides for the control lead out wires and install the wires.

A fuel tank of 30 c.c. capacity can be bent and soldered from tin can stock or thin brass, its inside dimensions should be 10 m.m. by 30 m.m. by 100 m.m. A piece of 16 s.w.g. wire bent and slipped through a short piece of brass tubing soldered to the tank as a pivot, is tripped by the wire extended from the push-rod.

From ½ in. sheet balsa cut a piece for the top of the fuselage from F1 to the tail and slot it for the shaped fin. Cut block for fuselage top between the two bulkheads, carve and sand to the proper contour and cut cockpit.



Locate the position of the spar and cut the slot in the block to match. Glue the spar and blocks in place, check for alignment and carve and sand the entire fuselage to the proper contours. The fuselage is eliptical in section, becoming flat sided at the tail. Slip the upper wings on to the spars and if alignment is satisfactory glue them in place. All surfaces on this model are set neutral. Place the wing struts in place and glue securely.

Cut pieces from $\frac{1}{2}$ in. sheet balsa to fit in the gull section between wings and fuselage and cement in place.

The engine will have to be mounted in place to fit the cowling blocks. Fit a $1\frac{3}{4}$ in. spinner to the engine and give the engine two degrees of right thrust. Carve the top cowling from block to fit clear of the engine and to blend into contours. Glue the top block into place.

Carve the lower cowling from one large block or several small ones glued together. Make a plaster cast from the wooden cowling and after sealing it with shellac, apply a coat of release agent and lay up a thickness of about 1/16 in. of fibre glass. Fasten with two small screws threaded into tabs glued to plywood sides.

Give the entire model a fine sanding and sand between coats of filler until there is no grain showing. The original model was painted Chartreuse with Red trim using synthetic enamel. Numbers were Red, experimental and model name were black. U/C was polished natural.

Bend tail skid from 16 s.w.g. wire and drill and tap the hardwood tail piece for a machine screw. Screw skid into place. Install $1\frac{1}{2}$ in. wheels. Point both wheels about five degrees to the outside of the flying circle to help keep model on tight lines in take off and landing roll.

If you are going to fly fast in Team Racing, a quick-connect booster lead is a must. Install a miniature phone jack on the right side of the cockpit, through the metal engine bearer if they are used. If wood bearers are used install the jack below the bearer and an extra wire will have to be run to the engine for glowplug body connection. Alternatively, place a brass contact strip above and below wing trailing edge for a clothes peg type boost connection which will automatically detach on release.

Install the pilot and instrument panel in the cockpit and fit a plastic canopy. You should now be ready for flying. Remember this is a small plane for the power plant. It takes off quickly so keep your eyes open, and it lands with a fast flat glide. In the air she is as fast as any of them and more responsive than most. Best results were found with an $8\frac{1}{2}$ in. diameter 8 in. pitch prop.

Gull top wing on Granger's snappy Bipe adds realism to a functional design with great potential. Granger was a pioneer of Team Racing—one of the first ever to take up this section of the hobby in the FAST Club, California. Currently he manufactures a fine line of plastic mouldings for bell-cranks, horns, hinges, etc., wheels and pilots under the trade name of Williams Bros. Another example of a good modeller developing his own business with speciality accessories

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