PETER HOLLAND'S SIZE 9

A NOVEL 'V' TAIL FLYING BOAT FOR ESCAPEMENTS OR SINGLE CHANNEL PULSE SYSTEMS

A FLYING boat with a normal hull, when scaled down to a convenient size for small motors and lightweight radio gear, suffers in terms of efficiency when it comes to lifting off cleanly and landing without taking a severe ducking. Some hulls have sponsons to prevent them healing, small sponsons are comparatively inefficient, and when added to a slim hull result in a plan form which may not be best for take-off.

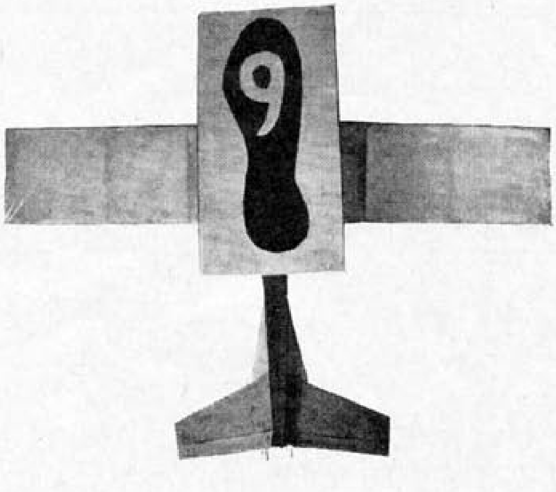
A simple single sponson which forms the hull really takes this model out of the "seaplane" category. Single float seaplanes usually have additional tip stabilisers, so they really classify as a three float craft. We want the minimum number of components in a simple model, so "Size 9" just has one large "boot" on which to ride the waves.

Like all the best boots, this part is removable and retained with rubber bands (elastic sided?). The reason in this case is to take landing shocks if the model comes in heavily. There is a likelihood that the windscreen then takes some of the shock, but with strong bands, the effect is vaguely similar to a sprung undercarriage and certainly saves some damage to the hull when flown over grass. There is a false bottom to the fuselage so that the radio gear keeps dry. The whole radio bay, being in the cabin is reinforced fore and aft by tapering fairings built round corners 3 and 4. A hole is shown cut in the latter to accept Elmic Conquest escapement which is connected via usual balsa torque rod to a special 90 deg. crank designed for kick either rudder of a "V" tail up, in turn.

The same linkage may be used for a pulse proportional actuator of the Septalette type or a geared electric motor used in simple rudder only systems. The "V" tail configuration can, by use of "kick up only" control surfaces obtain a touch of up "elevator and rudder" together. This, when control is applied carefully, can assist in keeping the model fairly level in a turn. If the model is trimmed for penetration, blipping left and right quickly will produce climb ; for both control surfaces operate in the "up" part of their arc and contribute to the elevator effect. They simply blow back against stops for the neutral position. A thin piece of shirring elastic will assist the control surfaces back to neutral, this bias is hardly necessary and must of course be very weak so that little additional load is placed on the actuator. The stops are an extention of the control surface operation levers bolted to the control surface. Slivers of $\frac{1}{32}$ in. ply packing can be fixed to the under surfaces of the tail to give the correct pitch trim.

Dual Proportional

A simple rudder only type proportional actuator may be used, but an improvement in neutral condition may be obtained by arranging the "V" shaped crank on the torque rod so that a few degrees of movement are allowed before one or other of its arms strikes the appropriate control surface operating lever. In this condition both surfaces are against their stops and neutral drift of the actuator produces no unwanted effect.



Heading photo shows a version without the windscreen, this is more "prang" resistant when the hull knocks off. Right: Did you say a flying boat or a flying "boot"! "Size 9" flaps neatly on to the water instead of digging in.

If the pulse rate is changed, a low rate in the neutral position produces an equal deflection of the control surfaces (both up), a high rate in the neutral position allows both control surfaces to rest on their stops. It is thus possible to fly almost like Galloping Ghost with a magnetic actuator. A larger model would need a geared motor with the same purpose, but the linkage is, if anything, more simple to construct and with down trim, the hitherto sensitive "rudder" effect is not felt.

Manual pulse could also be flown this way for a really "groovy" neutral. Doug Bolton uses an arm and striker type of linkage for manual pulse on ailerons, this method was described in the December, 1964, Gadget page. Our "size 9" application gives pitch control, the designer cannot recall any previous "V" tail configuration which has used this groovy neutral linkage, plain escapements have been used successfully on "V" tail slope soarers and special linkages have been devised for multi models with "V" tails. The effect tried on proportional seems certainly worth carrying further.

Construction

The wings have a sheet top surface structure with a tissue lower surface covering. The leading edge is sanded from $1\frac{1}{2}$ x $\frac{1}{4}$ in. and sits at an angle on the wide spaced ribs. A piece of 4 in. x $\frac{3}{32}$ in. forms the remaining part of the structure. Double ribs are used at the tips and centre section, a piece of 16 s.w.g. piano wire bent to the dihedral angle is taped to the centre section trailing edge to prevent the wing bands cutting in. More scrim or bandage is cemented over the centre section top and bottom to reinforce the joint once the wing halves have been set at the correct dihedral angle ($1\frac{1}{2}$ in. under one tip). This form of construction is used successfully on the "Twophin" (December, 1963) which is still going strong. The fuselage is a $\frac{1}{16}$ in. sheet box with cross grained $\frac{1}{16}$ in. sheet doublers between formers 3 and 4. The two top corners are chamfered to take the fins and strakes which are cemented at 45 deg. (90 deg. to each other). The tail end is small in cross section but there is just room for a $\frac{3}{16}$ in. square torque rod and a loop of $\frac{1}{8}$ in. flat rubber. A piece of plastic wire sleeving serves as a bush for the wire end of the torque rod, the winding hook is bent over the open end as a means of attachment.

Choice of engine capacity must be governed by the preference of the builder for flying from water, or merely using this design over land as a change from a more orthodox configuration. A .5 c.c. motor is adequate in this case, but up to 1 c.c. could be used for fast water-borne operation. Do not exceed 1 c.c., the wing area is small. If you have a choice of motors, so much the better; start with something small, hand launch, then when the control technique has been mastered (whichever system you have chosen), a more powerful motor will enable you to enjoy a much hotter performance. A .5 c.c. motor must be tuned to provide maximum "urge" to lift the radio payload and overcome water drag on take-off. Wiggling the "rudders" should help the model during the initial taxiing period, once it is planing nicely it should unstick on its own. The high thrust line tends to put the nose down, so careful positioning of the C.G., C.B. (centre of buoyancy) and thrust line was necessary in the design stage.

If the under surface of the hull is covered in $\frac{1}{32}$ in. ply the model will last longer, thin celluloid or Polyglaze could be used instead to give a nice shiny planing surface. Heavyweight tissue covering is adequate for "size 9" but a good standard of doping and fuel proofing is necessary to prevent the balsa becoming waterlogged. It is most important to pop the receiver and the batteries into a thick Polythene bag, the neck of which should be bound securely where the harness emerges. A 3 pin "slice" from an AEI connector serves as a switch.

Top: Strikers and levers, note lever extension for stop and block stop on fuselage. Lower three, top to bottom: Unretouched action shots of proportional Down, Up, and Right.