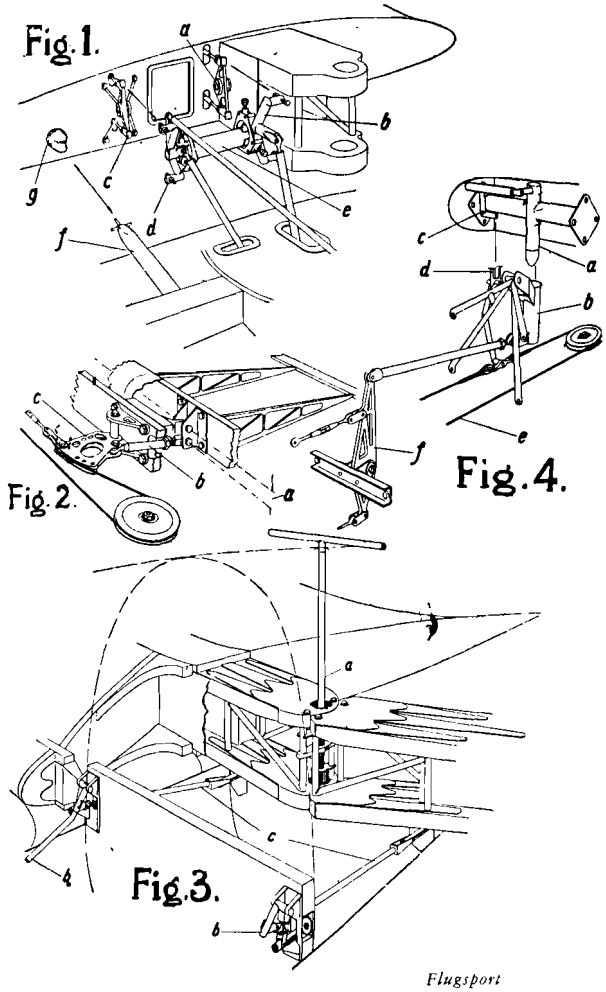
The REIHER

High Performance Sailplane

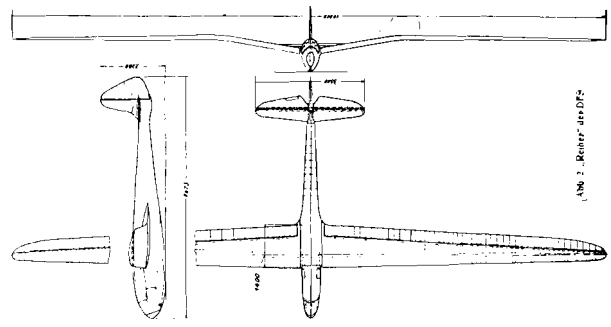
The "Reiher", whose name means "Heron", was developed in 1937 by the German DFS and first tested the same year by Hanna Reitsch on the Rhön. It is a special sailplane designed for very high performance with a thin wing section and an exceptionally smooth surface for minimum drag. In addition to having all control horns inside, this ship has a sharp trailing edge and a thin tail section.

Also designed to have flying qualities such that any good pilot could handle it, the Reiher was at first somewhat of a disappointment in this respect, although in the matter of its remarkable performance, its designers were completely satisfied. Another fault was the difficulty of assembly. Recently, the Reiher has been improved so that its flying characteristics are now good throughout its speed range and it can be assembled by four men in the record time of two minutes.

The fuselage construction is normal monocoque with plywood covering. The cockpit cover fairing is especially clean. The tail skid conforms to the graceful lines of the fin and rudder. The horizontal stabilizer, thin for one that is full cantilever, fastens onto the fuselage at three points. The wing section is the Göttingen 549



Flugsport



changing to the 676 at two-thirds of the way out from the roots to the tips.

In its use of a monospar, full cantilever, grulled shoulder wing, this design follows usual procedure. Having the spars join in the center of the fuselage is also accepted practice. Exceptional, however, is the fact that the drag and twisting loads are not carried back into the shoulder piece, but forward through a nose spar. This solution, as opposed to the shoulder construction, is structurally more favorable and simple, but it necessitates the addition of a special assembly for mounting spar and nose spar bolts.

From the root fairing to the ailerons, the split trailing edge is movable as a flap to increase lift and drag. When flaps are 15° down, the ailerons are trimmed 8° down. All connections of the flap and aileron controls are automatically coupled when the wing is attached to the fuselage. This can be seen in Figure 1. The levers a and b working the ailerons connect with each other on a common axis. In the same manner, levers c and d join to work the brake flaps (spoilers). Levers b and d are fastened to the fuselage through an adjustable tubular shaft, e. The connecting up of the actuating tube f is done through its engaging obliquely the claw g in the wing.

The aileron mechanism lies within the wing. Due to the small depth of the ailerons and rear spar, the length of the leverage a, Figure 2, is only 2.5 cm. (1 inch). In order to make this construction sufficiently firm, the levers and the mounting of the aileron are combined with the aileron hinge attachment. The large ailerons had to be partially mass balanced, as at high speed, in very gusty air, they become quite unstable.

The main spar has broad flanges and cross-pieces which are built up as fully covered ribs. The depth of the spars at their junction is 188 mm. (7.4 inches). The great spar width is due to the stiffness requirements. The metal plates of the main spar connection are horizontal on the upper and lower surfaces of the spar. The compression and fuselage weight forces at this junction are taken by steel tube diagonals.

The connection between the spars and the wing and fuselage are shown in Figure 3. The cylindrical bolts for the main fitting are inserted or removed by means of the shaft a. Connection between wing and fuselage is made by two bolts lying horizontally in the line of flight which can be inserted or removed with a handle by the levers b and the push rods c. A coupling makes it easy to remove the bolts which lie behind one another and are taken out separately.

The coupling for the elevator and trimming tab mechanism is shown in Figure 4. When connecting the control mechanism for the elevator, the lever a is pushed into the socket b on the fuselage. At the same time, the small lever c slips into the fork d coupling the

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