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AIRCRAFT CIRCULARS

NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS

No. 108

THE COMPER C(LA)7 "SWIFT" AIRPLANE (ENGLISH)

A High-Wing Single-Seat Monoplane

Washington
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THE COMPER C(LA)7 "SWIFT" AIRPLANE (ENGLISH)*

A High-Wing Single-Seat Monoplane.

Designed as a low-powered, low-priced single-seater, with a performance equal to that of the modern two-seat light airplane, the Comper "Swift" is the first airplane to be produced by F/Lt. Nicholas Comper since he left the R.A.F. and formed The Comper Aircraft Company, Ltd.

Of previous Comper designs, the C.L.A. 3 was that which the new "Swift" most closely resembles, and from which it may, in fact, be said to have been evolved. That the "Swift" represents a very considerable improvement on the C.L.A. 3 is hardly to be doubted, and this improvement is not confined to performance only, i.e., speed, climb, etc., but also includes controllability, comfort for the pilot, and generally better appearance. Concerning the last-mentioned feature, the "Swift" is one of those airplanes which one comes across occasionally which do not look especially "pretty" in the three-view general arrangement drawings (Fig. 1), but which are found to have very good lines when seen in the completed airplane. The views (Figs. 2, 3, and 4) which accompany this Circular bring out this point rather well. For example, the side elevation of Figure 1 shows a fuselage which is very deep in front, yet when

*From Flight, January 17, 1930.

one looks at the photographs, and even more when the actual airplane is inspected, the appearance is one of slimness.

Nothing is so likely to make a pilot dissatisfied with his mount as a poor view. For each "blind spot" in an airplane, the pilot is apt to lose a certain amount of confidence, and many an otherwise excellent airplane has failed to become popular merely on this count. Knowing this, F/Lt. Comper set himself the task from the beginning, in designing the "Swift," to produce an airplane with the best possible view. In a single-seater using a very light engine this is not easy of accomplishment. If the wing is to be on a level with the pilot's eyes, as it should be to get view upward and forward, it means placing the pilot aft of the wing and not under it. To counteract the rearward placing of the pilot's weight, the engine must, being quite light, be pushed forward of the wing a considerable distance, and this results in a fair amount of vertical surface ahead of the center of gravity. To bring the center of vertical area aft of the C.G., fairly large tail areas (i.e., fin and rudder) are required, and it will be observed that in the "Swift" these two members are large in proportion to the small size of the airplane.

When examining the "Swift" with a view to assessing the

value of its aerodynamic design, one is impressed by the cleanness of its lines. The fuselage, no wider than strictly necessary, is deep but of almost perfect streamline form except for the coaming of the cockpit. The monoplane wing rests on but a narrow portion of fuselage, and so the portion of wing rendered inefficient in the center is a very small proportion of the wing area. A single pair of vee struts on each side brace the wing, and the landing gear is partly housed inside the fuselage, at least the shock absorber portion. The stabilizer is almost pure cantilever, with but a single short stabilizing strut on each side. Altogether the aerodynamic design strikes one as having been very carefully thought out.

Structurally the "Swift" has a great deal of family resemblance with previous Comper designs, the fuselage being a light fabric-covered girder composed of longerons and diagonal struts attached to the longerons with three-ply wood gussets (Figs. 5 and 6). This construction is light for its strength, and does not require any truing-up after prolonged use. The fuselage is actually built in three separate units, the front portion carrying the engine mounting, the cockpit portion, and the tail-carrying portion.

The wing is of equally simple construction, with two spindled-out spruce spars and light girder ribs (Fig. 7). The wing is in three sections, of which the very narrow center section is built as an integral part of the fuselage, on two of the

bulkheads of which it rests (Figs. 1 and 8). The wings are designed to fold so that the airplane, in itself quite diminutive, will occupy a very small space indeed when folded. The wing covering is fabric. All wing fittings are of simple steel plate type.

The landing gear is somewhat unusual, and its arrangement may best be understood by reference to Figure 9. The axles are bent, and the wheels located in a fore and aft direction by rearward-sloping radius rods. The "legs" run to internal members carrying the shock absorbers, which are housed entirely inside the fuselage and thus offer no extra drag.

The cockpit is very comfortable, and the instruments have been arranged in a manner which facilitates reading of those most frequently required, and which are not "mixed up" with those that only need an occasional glance. The altimeter is mounted on the back of the rear spar, on the port side, and the air-speed indicator in a similar position on the starboard side (Fig. 8). The other instruments are mounted on a dash inside the cockpit.

The gasoline is carried in a gravity tank with a capacity of 9 gallons, located in the deck fairing aft of the engine. Actually the tank has a partition which separates one gallon out of the nine from the main supply. Thus when the bulk of the gasoline is used up, the pilot turns on the reserve gallon, which leaves him ample time to search out a landing ground be-

fore his supply is exhausted.

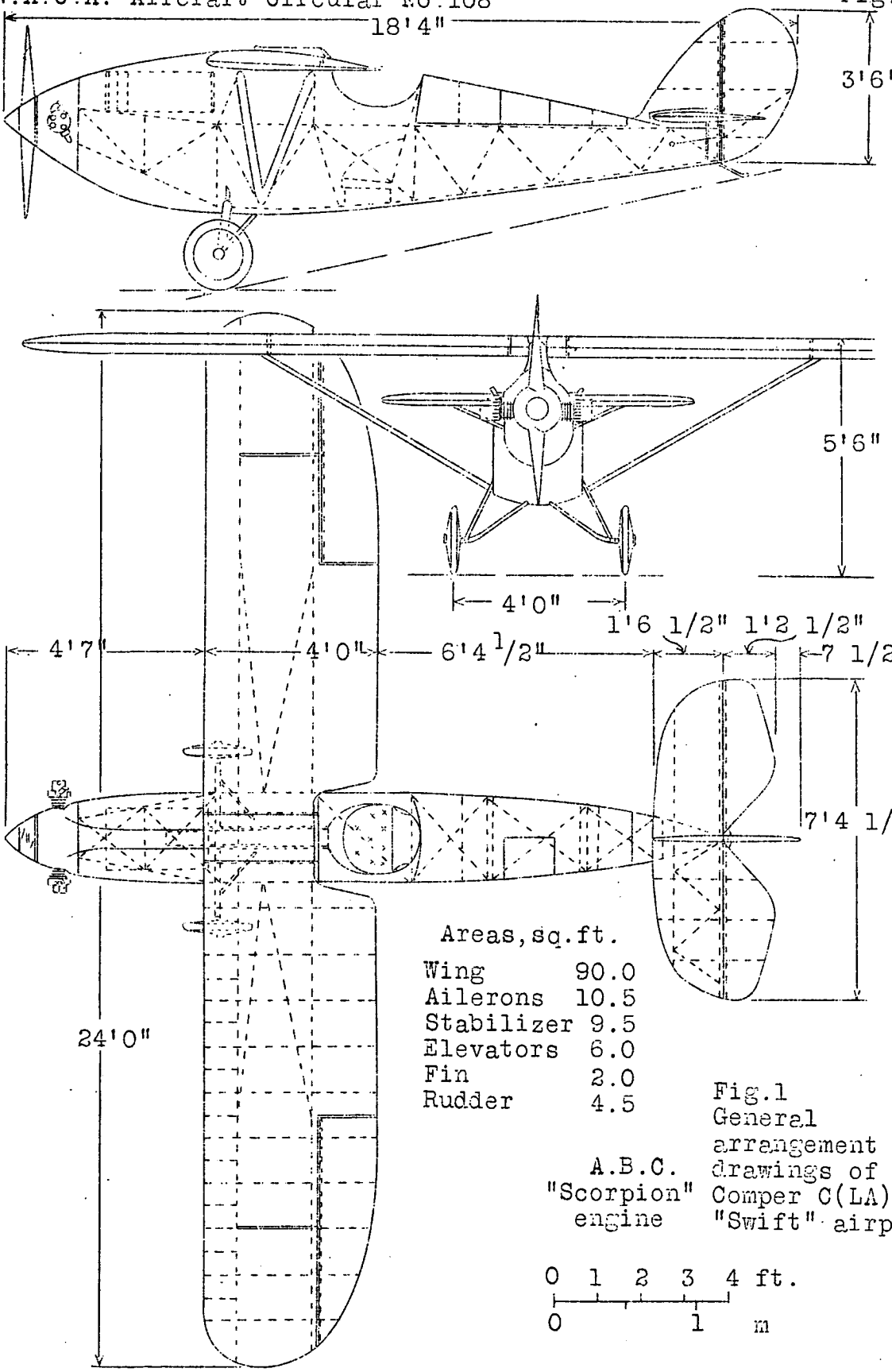
The A.B.C. "Scorpion" engine is mounted on special patented vibration-absorbing units, which have been found after extensive use to reduce almost to vanishing point the amount of vibration transmitted to the fuselage structure (Fig. 10).

Characteristics

Length (over-all)	18 ft. 9 in.
Wing span	24 " 0 "
Wing chord	4 " 0 "
Aspect ratio	6
Areas:	
Wing	90 sq.ft.
Ailerons	10.5 "
Stabilizer	9.5 "
Elevators	6.0 "
Fin	2.0 "
Rudder	4.5 "
Tare weight	350 lb.
Gross weight (for aerobatic C. of A.)	670 "
Wing loading	7.4 lb./sq.ft.
Power "	16.7 lb./hp

It is estimated that the "Swift" will cruise at something like 80 m.p.h. for a gasoline consumption of 40 miles per gallon.

The airplane has not, at the moment of writing, been tested at Martlesham, but it is estimated that a top speed of 105 m.p.h. should be attained, while the landing speed should be about 35 m.p.h. The range at cruising speed should be in the neighborhood of 350 miles.



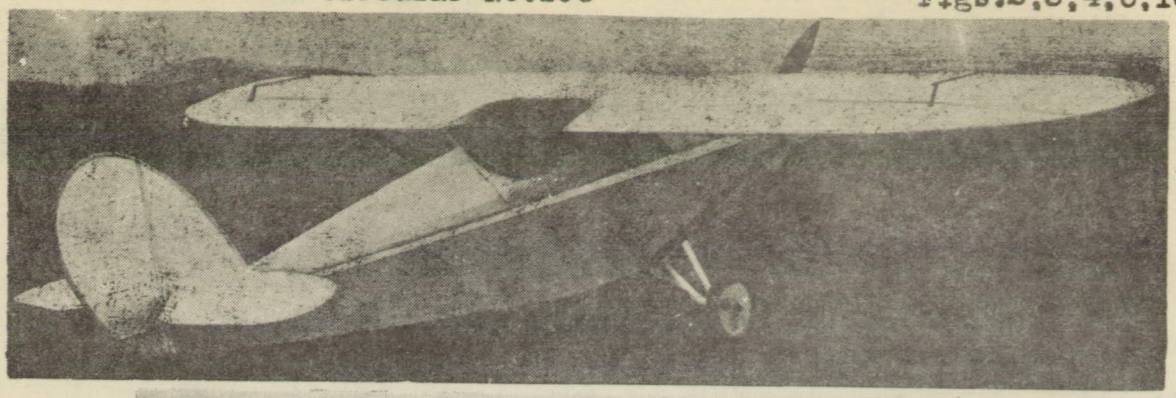
Areas, sq.ft.

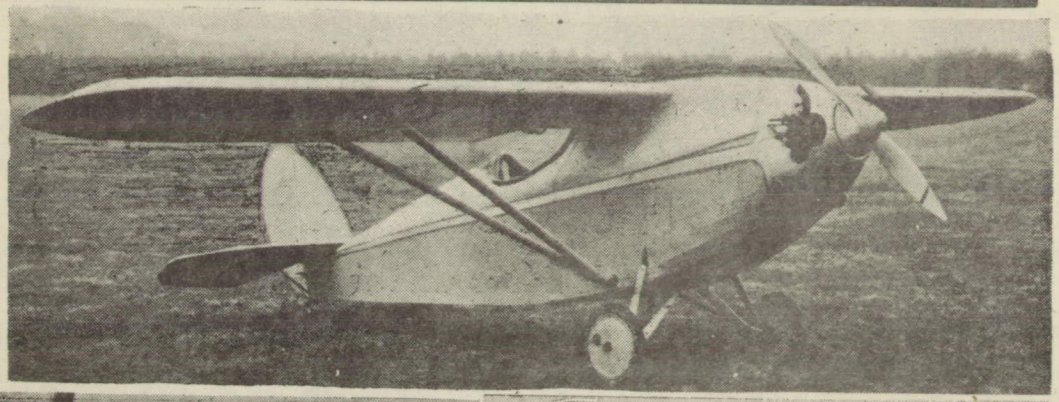
Wing	90.0
Ailerons	10.5
Stabilizer	9.5
Elevators	6.0
Fin	2.0
Rudder	4.5

A.B.C. "Scorpion" engine

0 1 2 3 4 ft.
0 1 m

Fig.1 General arrangement drawings of the Comper C(LA)7 "Swift" airplane.





Figs. 2 & 3. Three-quarter views of the Comper "Swift" C(LA)7

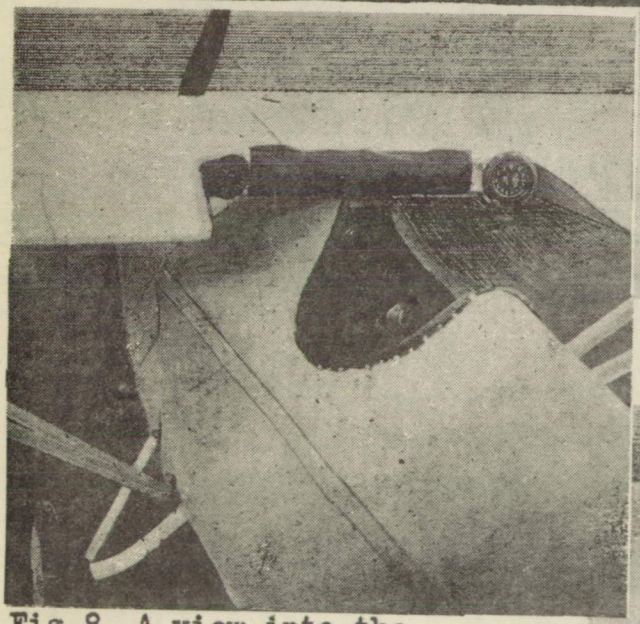


Fig.8 A view into the cockpit

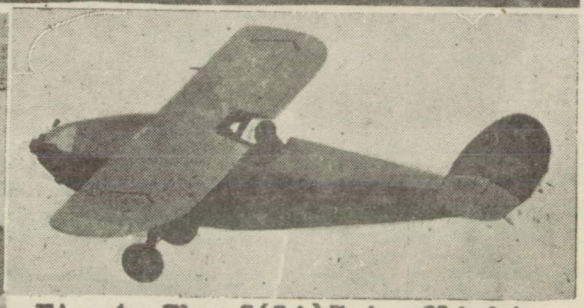


Fig.4 The C(LA)7 in flight

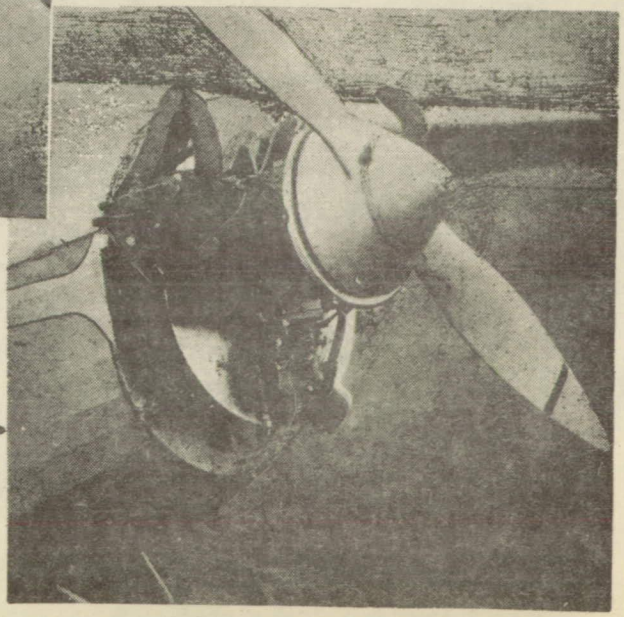


Fig.10 Mounting of the A.B.C. "Scorpion" 40 hp engine with the cowling removed.

Taken from "Flight Jan. 17-30

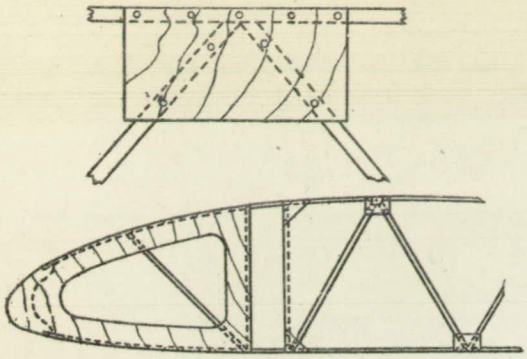


Fig.7 Details of rib construction. The nose ribs are covered with plywood up to the front spar.

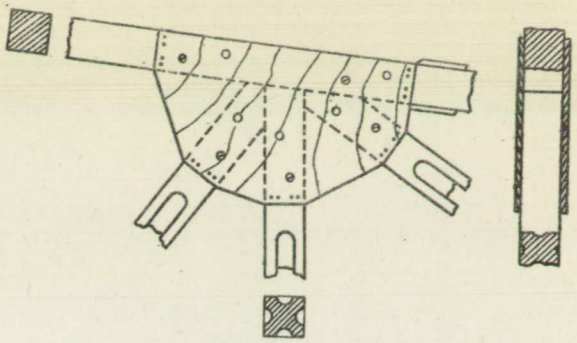
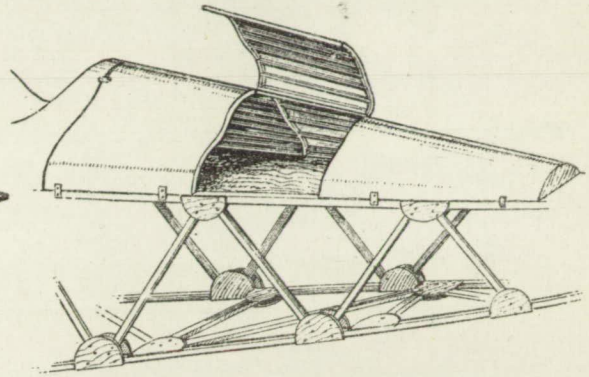
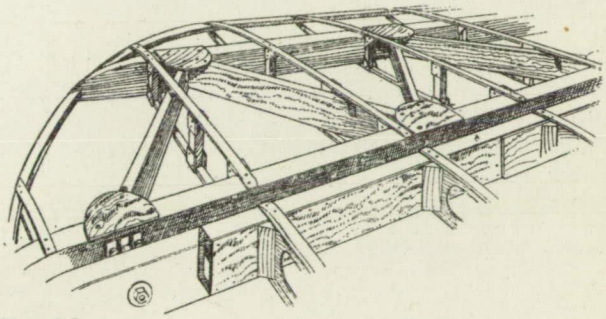


Fig.5 A typical fuselage joint

Fig.6 The deck fairing is detachable to facilitate inspection and contains a luggage locker.





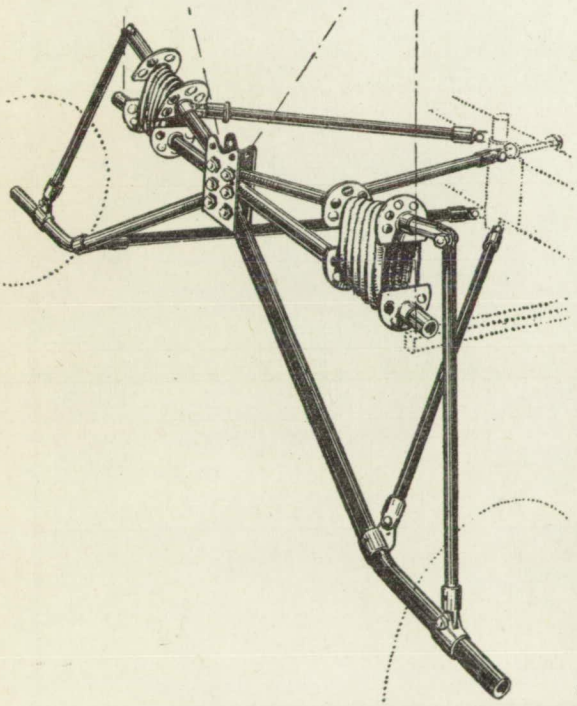


Fig.11 Details of the stabilizer and elevator construction

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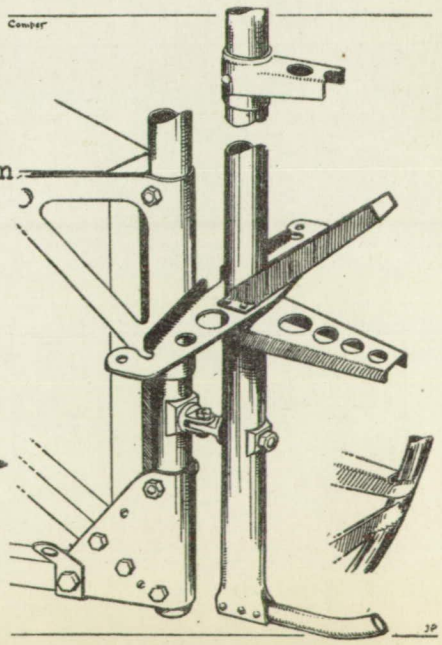

Fig.9 The landing gear

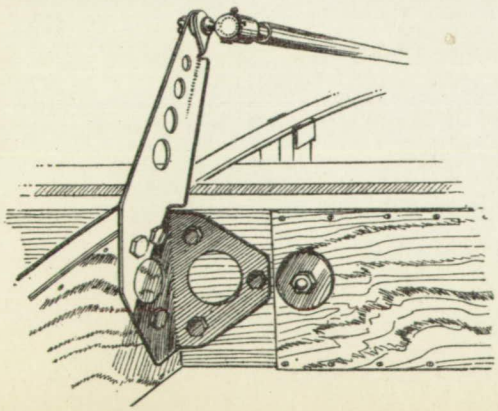

Fig.12 Stern post, rudder post, etc. of metal.

Fig.13 The aileron crank and its operating rod.