

AIRCRAFT CIRCULARS  
NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS

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THE HENDERSON "HENDY" 302 CABIN AIRPLANE (BRITISH)

A Two-Seat Low-Wing Cantilever Monoplane

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Washington  
September, 1930

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THE HENDERSON "HENDY" 302 CABIN AIRPLANE (BRITISH)\*

A Two-Seat Low-Wing Cantilever Monoplane.

The "Hendy" 302, constructed by the Henderson Aircraft Company, is a two-seat, low-wing cantilever monoplane, with the occupants protected by a hinged cabin top (Figs. 1, 2, and 3).

Structurally, the "Hendy" 302 is almost entirely of wood construction, the exception being the landing gear, the engine mounting, and a very few metal fittings. Three-ply wood enters largely into the construction, the fuselage being planked with this material, which also serves many purposes in the wing structure.

The cabin is very roomy, and the seats are comfortable (Fig. 3). Contrary to expectations, the view from both seats is very good. For some peculiar reason the chord of the wing seems to "shrink" as soon as the airplane has reached a height of a hundred feet or so, and it is then possible from the rear seat to look over the leading edge, while this seat is far enough back to enable one to look straight down. From the pilot's seat (the front one) the view is also very good in practically all directions, the narrow top of the engine cowling, and the generous window panel area, giving a degree of view which one would scarcely expect from an external examination of

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\*From Flight, August 22, 1930.

the airplane.

A novel form of wing construction has been used in the "Hendy" 302. The two main spars are I-section beams built up of a single central web of three-ply, with rectangular-section strips on each side forming the flanges, as shown in Figures 4 and 5. The drag bracing, composed of wooden strips arranged in the form of a lattice, is in top and bottom planes of the spar flanges, and attached to them by three-ply gussets or "biscuits" (Figs. 5 and 6). The construction is very simple and has proved exceptionally strong in torsion. Moreover, it could readily be "translated" into metal construction. The wing section is a "calculated" one, in which the center of pressure is not entirely stationary, but its movement has been kept down to a very small amount. We do not know what is the minimum drag coefficient of the section, nor the maximum lift coefficient, but the speed range of the airplane indicates that the section is a good one, and on climb, taking into account slip-stream effect, etc., the L/D of the whole airplane is about 8.3.

The wide-track landing gear is of the "split" type, and the telescopic legs have spiral springs and oleo gear for absorbing shock and damping bouncing (Figs. 7 and 8).

A steel tube mounting supports the overhung engine, forked plates securing the mounting to the fuselage corners (Fig. 9). The engine cowling is slightly unusual, and has scoops in the

top (Fig. 8), from which short lengths of tube project down to the cylinder heads, directing the draft on to the hottest parts of the cylinder heads. Normally, the oil temperature does not exceed 50 degrees, and even in the King's Cup Race, with the engine running "full out" the temperature never exceeded 70 degrees.

Gasoline is carried in the wings. At present there is a tank of 16 gallons capacity in the port wing, and a gravity tank of 9 gallons in the fuselage. If desired, another 16-gallon tank can be put into the starboard wing, thus increasing the total capacity to 41 gallons, or a range of about 750 miles.

#### Characteristics

Engine, Cirrus "Hermes" - 105/115 hp

Length (over-all)            6.96 m            22 ft. 10 in.

Wing span                    10.67 "            35 " 0 "

#### Areas:

Wing                         15.15 m<sup>2</sup>            163 sq.ft.

Ailerons                    1.39 "            15 "

Stabilizer                  1.42 "            15.3 "

Elevator                    0.95 "            10.2 "

Fin                          0.37 "            4.0 "

Rudder                      0.74 "            8.0 "

W e i g h t s

Tare . . . . .	474 kg	1045 lb.
Gross* . . . . .	771 "	1700 "

Performance

Maximum speed near ground	213 km/h	132 mi./hr.
Cruising speed (at 1900 r.p.m.)**	180 "	112 "
Minimum speed	60 "	37 "
Initial rate of climb	4.32 m/s	850 ft./min.
Time of climb to 1525 m (5000 ft.)	7.1 min.	
Service ceiling	4880 m	16000 ft.

\*This is the Certificate of Airworthiness gross weight granted for the King's Cup Race. The designed C. of A. weight is 726 kg (1600 lb.) for aerobatics, and 862 kg (1900 lb.) for normal.

\*\*At 1900 r.p.m. the fuel consumption is about 6 gallons per hour, giving a mileage of about 19 miles per gallon (at 112 m.p.h.).

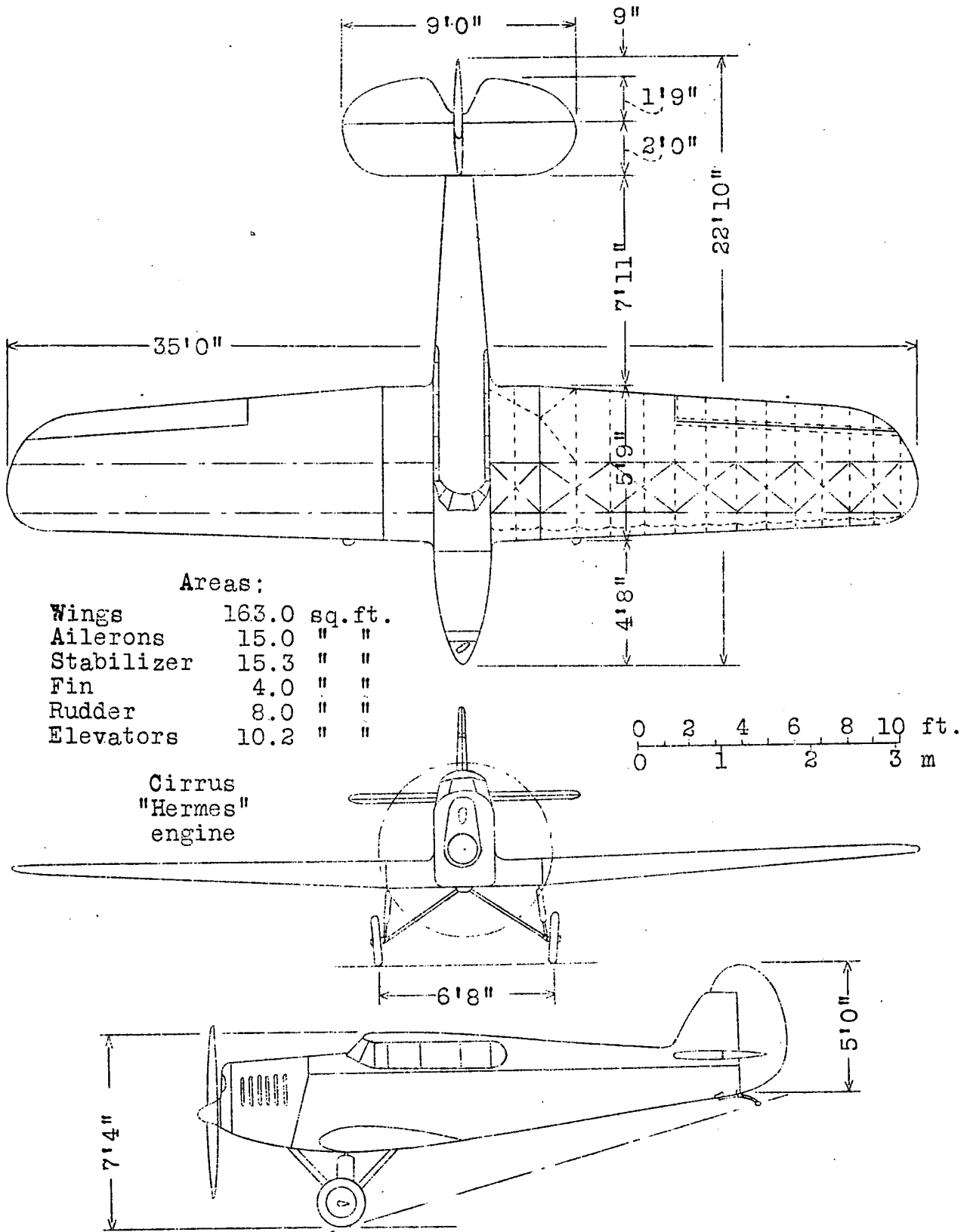


Fig.1 General arrangement drawings of the Hendy 302 airplane.

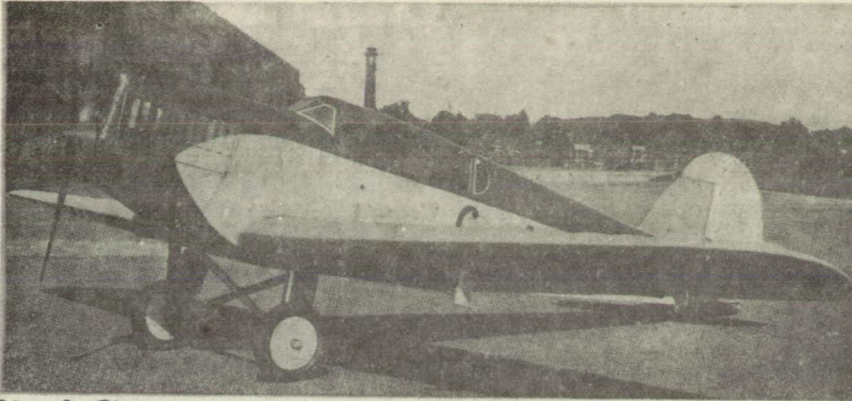
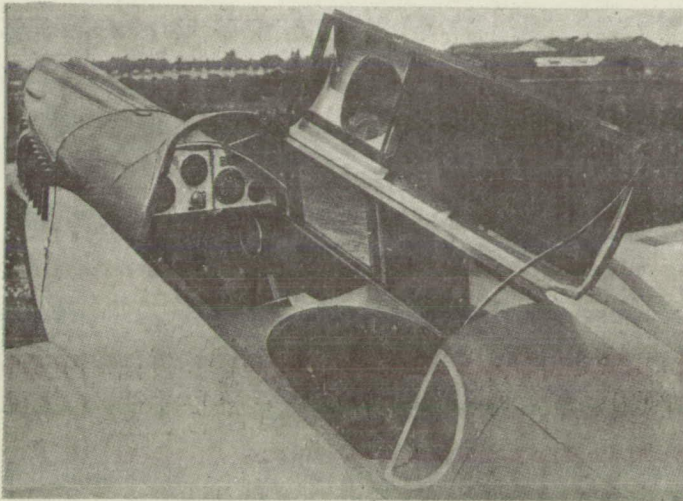


Fig.2 Three-quarter view of the Hendy 302 airplane. The engine is a Cirrus Hermes.

Fig.3 The cabin is very comfortable, with plenty of leg and elbow room. The view is good,



much better than one would expect from the external appearance.

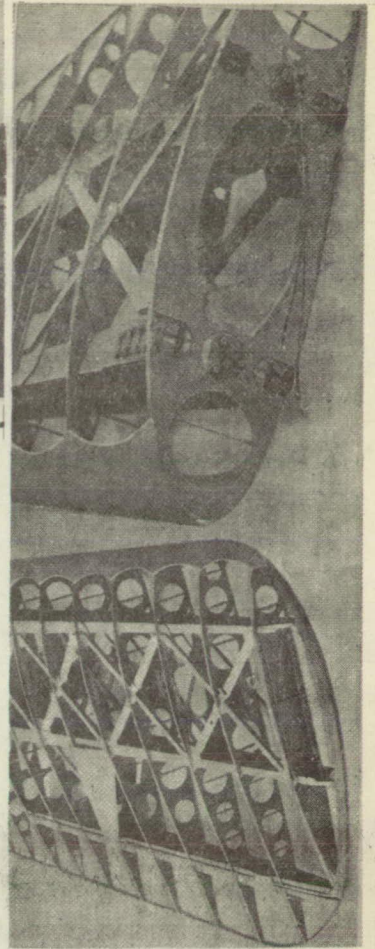


Fig.4 Details of the wing construction. Note the lattice type drag bracing of the main spars.



Fig.8 The cowling of the Hermes engine in the Hendy 302 has been carefully designed and although totally enclosed, the engine keeps remarkably cool.

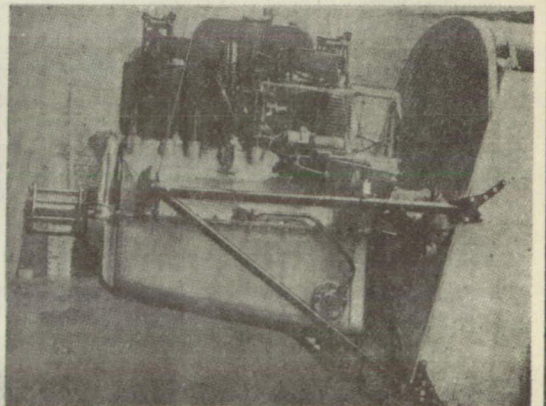


Fig.9 The mounting of the Hermes engine is very simple, and the attachment to fuselage corners is by stirrup plates.

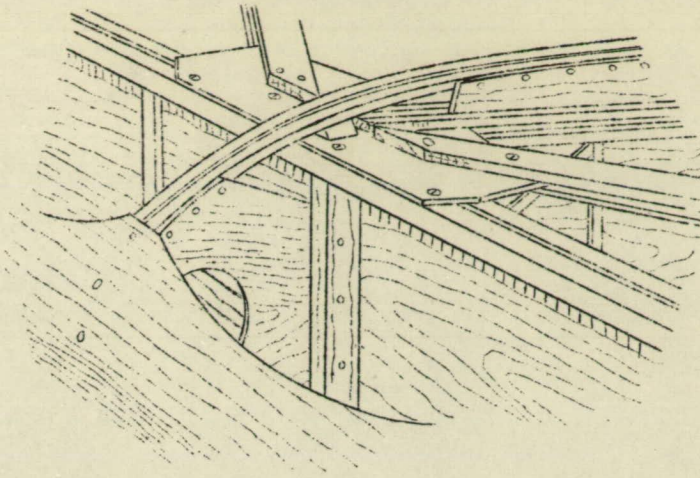
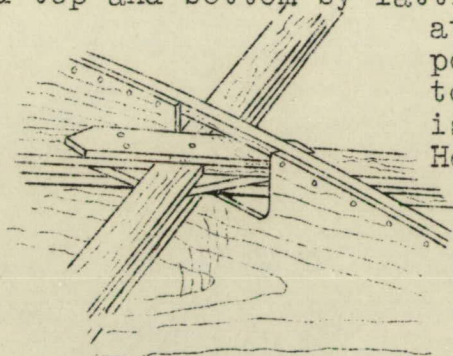


Fig.5

Fig.5,6. A novel form of main spar bracing, in which the spars are braced top and bottom by lattice strips anchored

at their ends and points of intersection to three-ply gussets, is employed in the Hendy 302 airplane.



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Fig.6

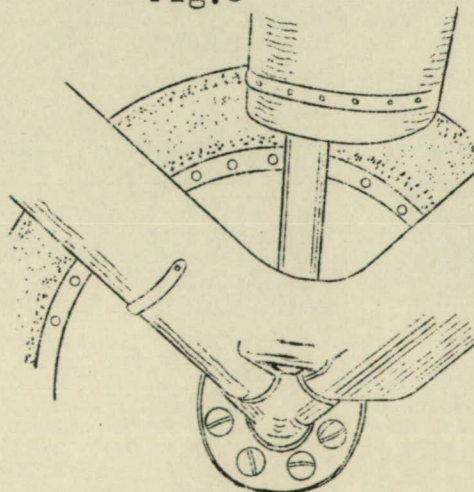


Fig.7 Portion of landing gear. Provision is made for the support of a jack under the axle.