

FILE COPY
NO. 5

AIRCRAFT CIRCULARS
NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS

No. 38

HEINKEL H.E.5 COMMERCIAL SEAPLANE

(Winner of the 1926 German Seaplane Contest at Warnemünde)

Washington
April, 1927

FILE COPY
To be returned to
the files of the National
Advisory Committee
for Aeronautics.

NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS.

AIRCRAFT CIRCULAR NO. 38.

HEINKEL H.E.5 COMMERCIAL SEAPLANE*

(Winner of the 1926 German Seaplane Contest at Warnemünde)

This is the most recent of the series of highly successful productions of Dr. Ernst Heinkel. It represents a further development of the epoch-making monoplane produced by Dr. Heinkel during the latter part of the war and improved from time to time in keeping with the demands of the day and the progress of scientific and technical knowledge.

The most prominent characteristics of the H.E.5, resulting from its great reserve power, are a remarkably short start, agreeable flying qualities and long radius of action. It is extremely stable and strong and combines a very high flight speed with a relatively very low landing speed.

Contrary to the previous types (H.E. 1-4) the fuselage of the H.E.5 has four tubular longerons with welded tubular bulkheads. It has a rectangular cross section strongly arched on top. The internal bracing consists of steel wires and cables, with tubular struts wherever necessary. The fuselage is covered with doped linen and slopes up at the rear, so that the tail is high above the water. The pilot sits behind the engine, but so far forward as to afford a clear view of the front

*From a circular published by the Ernst Heinkel Airplane Company.

ends of the floats in taking off and in alighting. The two seats behind the pilot have good downward visibility afforded by the cutting out of portions of the trailing edge of the wing. The fuselage is very spacious and affords room for the installation of radio apparatus and complicated photograph cameras in addition to plenty of baggage.

The steel-tubing support of the engine is secured by four conical bolts to the ends of the four main longerons. It is easily replaceable and carries the engine accessories including the whole cooling plant of a water-cooled engine. The engine is separated from the pilot's cockpit by a steel bulkhead, the stopcock of the fuel pipe being within reach of the pilot. The fuel tanks are in the wing. The fuel is delivered by special pumps. There is no fuel tank in the fuselage.

The arched wing section, which has proved so satisfactory in the tests of this type, enables the use of two high box girders designed for stunt flying according to the results of the latest researches. The ribs have spruce flanges and plywood webs. The inside bracing consists of steel tubing. Both wing halves are attached to the fuselage by hook fittings; are braced against the floats by N-struts; and are about 2/3 overhung. The leading edge is plywood and the whole wing is covered with doped linen.

The landing gear consists of cold-drawn tubular steel struts, streamlined with balsa. It has been subjected to many tests and

has been found especially seaworthy, in that the landing shocks are transmitted directly to the main mass of the seaplane, thus relieving the stresses on the floats. The latter are attached by clamps to the ends of the transverse distance struts of the landing gear, in such a way that they can be quickly detached. The rigidity of the landing gear is maintained, even without the floats, by a longitudinal tube for each pair of junctions. The floats are divided into a number of water-tight compartments by bulkheads with wood ribs and plywood walls. Each float has a continuous plywood top and duralumin bottom. The displacement of each float is somewhat greater than the flying weight of the seaplane so that one float alone could support the seaplane on the water. Each float has a single step with a keel-shaped bottom behind the step.

The action of the elevator, rudder and ailerons is such that the seaplane flies in perfect balance. Even in gusty weather, its flight is very smooth. The horizontal stabilizer can be adjusted during flight by a hand wheel in the pilot's cockpit.

The seaplane makes a remarkably short start, due to its relatively small wing loading, and takes off smoothly in any strength of wind. It alights smoothly at a very low speed.

The seaplane can be equipped with any good engine of 350-600 HP. It participated in the 1926 German seaplane contest

with a 420 HP. air-cooled Gnome-Rhone "Jupiter 9 Ab" and also with a 450 HP. water-cooled Napier "Lion", series 5. . . .

Its radius of action is 800-900 km (497-559 miles).

Characteristics*		
Span	16.8 m	(55.11 ft.)
Length	11.78 "	(38.65 ")
Wing area (without ailerons)	41.35 m ²	(445.09 sq.ft.)
Ailerons	5.39 "	(58.02 ")
Stabilizer	2.86 "	(30.78 ")
Elevator	2.67 "	(28.74 ")
Fin	0.57 "	(6.14 ")
Rudder	1.82 "	(19.59 ")
Total wing area (aerodynamic airfoil)	48.90 "	(526.35 ")
Engine	"Lion"	"Jupiter"
Horsepower	450	420
Weight empty	1840 kg (3615.58 lb.)	1500 kg (3306.93 lb.)
Load	860 kg (1895.97 lb.)	420 kg (925.94 lb.)
Flying weight	2500 kg (5511.55 lb.)	1920 kg (4232.87 lb.)
Wing loading	51.1 kg/m ² (10.47 lb./sq.ft.)	39.3 kg/m ² (8.05 lb./sq.ft.)
Power "	5.6 kg/HP (12.18 lb./HP.)	4.6 kg/HP (10.00 lb./HP.)
Power/Area	9.2 HP/m ² (.844 HP./sq.ft.)	8.6 HP/m ² (.787 HP./sq.ft.)
Maximum speed	207 km/h (128.62 M.P.H.)	200 km/h (124.27 M.P.H.)
Landing "	85 km/h (52.82 M.P.H.)	75 km/h (46.60 M.P.H.)

*See next page.

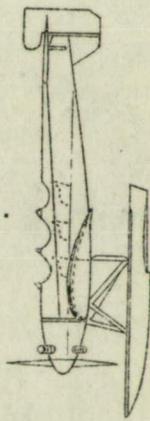
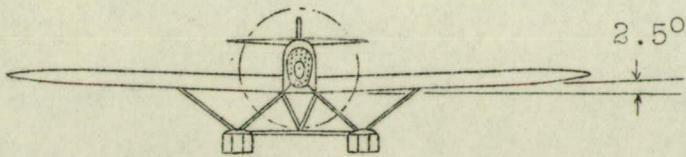
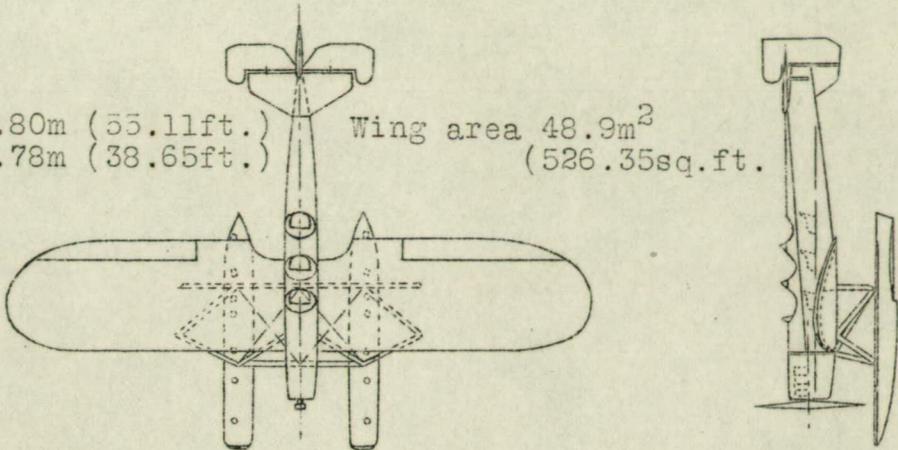
Characteristics* (Cont.)

	"Lion"	"Jupiter"
Climb to 1000 m (3281 ft.)	3.6 min.	2.6 min.
Climb to 2000 m (6562 ft.)	8.0 "	5.5 "
Ceiling	6500 m (21325 ft.)	7500 m (24606 ft.)
Speed coefficient	16.1	15.9
Distance "	4.3	3.4
Altitude "	6.7	6.2

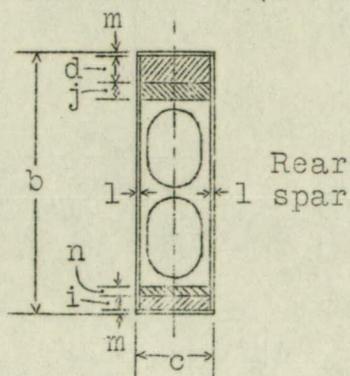
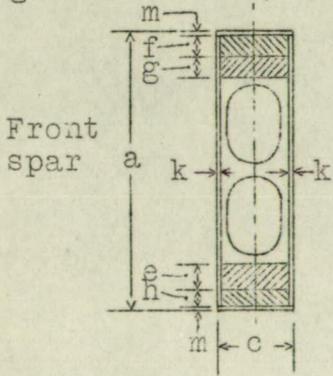
*From "Zeitschrift für Flugtechnik und Motorluftschiffahrt,"
September 14, 1926, pp. 378-379.

Translation by Dwight M. Miner,
National Advisory Committee
for Aeronautics.

Span 16.80m (55.11ft.) Wing area 48.9m²
 Length 11.78m (38.65ft.) (526.35sq.ft.)



a = 369.0 mm (14.52 in.)	h = 24.5 mm (.96 in.)
b = 345.0 " (13.58 ")	i = 20.5 " (.81 ")
c = 100.0 " (3.94 ")	j = 20.0 " (.79 ")
d = 38.5 " (1.52 ")	k = 3.5 " (.14 ")
e = 36.0 " (1.42 ")	l = 3.0 " (.12 ")
f = 30.5 " (1.20 ")	m = 1.5 " (.06 ")
g = 26.0 " (1.02 ")	n = 10.0 " (.39 ")



420 or 450 HP.
 engine.

Taken from
 Z.F.M.
 Sept.14,1926

Fig.1 The Heinkel H.E.5. seaplane with sections of spars.



Fig.2 Heinkel seaplane H.E. 5 with 450 HP Napier "Lion" engine, showing triangular arrangement of struts.

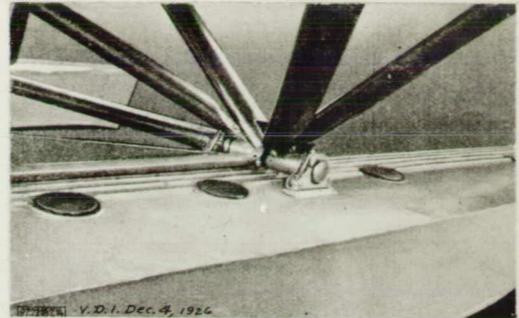


Fig. 4 Float attachment. Float can be easily detached in a few minutes. Glass windows over compartments.

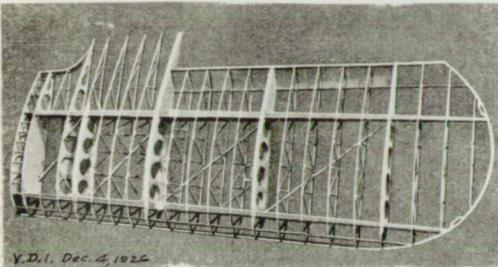


Fig. 3 Heinkel wing. Wood framework is reinforced by steel tubing.

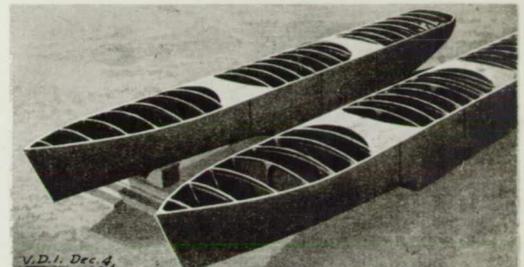


Fig. 5 Float structure: wood with duralumin keels; sloping bows.



Fig.6 Heinkel H.E.5 seaplane with 420 HP Gnome-Rhone "Jupiter" engine, which gave best performances.

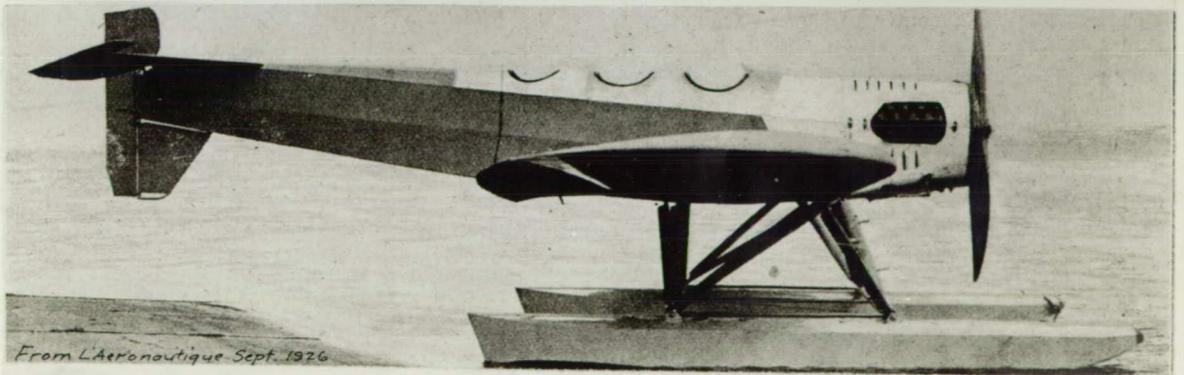


Fig.7 Heinkel H.E.5 seaplane, 450 HP Napier "Lion" eng. victor of contest.



Figs. 8 & 9 Heinkel H.E.5;450 HP. Napier "Lion" engine. Winner of 1926 German seaplane competition.



Figs. 10 & 11 Heinkel H.E.5;420 HP. Gnome-Rhone "Jupiter" engine.