AIRCRAFT CIRCULARS

NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS

No. 135

THE DEWOITINE D.30 COMMERCIAL AIRPLANE (FRENCH)

A High-Wing Cantilever Monoplane

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A High-Wing Cantilever Monoplane

Wing.- The monoplane wing is tapered in plan and has elliptical tips (Figs. 1, 10 and 11). It consists of five parts with hinges for the leading edge (Figs. 5, 6). The fuel tanks are located in the central portion behind the single spar, on each side of the fuselage. The wing is attached to the fuselage by four easily accessible bolts. Each wing portion consists of a single spar connected with the duralumin box-type leading edge and with tubular ribs carrying the fabric of the trailing edge. The spar, located at 1/3 of the chord, consists of two section-duralumin flanges and of two sheet-duralumin webs. The thickness of the flanges decreases along the span. The web is greatly lightened by openwork. The vertical members are of the box type. The diagonals, working normally in tension, are nevertheless stiffened by shapes riveted to each side. The spars of the two wing portions are connected by very strong hinge-type fittings. The leading edge consists of frames of 0.3 mm (0.012 in.) duralumin connected by 0.5 mm (0.02 in.) duralumin channel sections. The sheet duralumin covering is riveted to this framework. The leading edge is then joined to the spar. The covering is hinged to the spar and the box ribs are pinned directly to it.

*From data supplied by makers and L'Aéronautique, December, 1930, pp. 456-457.

The trailing edge is constructed of tubular duralumin ribs joined by gussets and tubular rivets by the Dewoitine method. These ribs are very light and strong and of remarkable rigidity. Near the wing tips the trailing edge consists of the ailerons and, toward the central portion, of an adjustable edge for the initial adjustment of the airplane.

The wing is joined to the fuselage by four easily accessible bolts.

Fuselage.- The fuselage consists of three sections:

a) The power plant section,

b) The central section,

c) The rear section.

a) Power plant.- The engine mount (Fig. 4) is joined to the central section of the fuselage by four bolts. It consists of two V members of drawn rectangular tubing, supported by tubular duralumin diagonals. Transverse rigidity is obtained by two frames - one at the front and the other at the rear.

b) Central section.- This contains the pilot's cockpit in front with dual controls and all the instruments for the pilot and navigator. A baggage room of 1.25 m^3 (44 cu.ft.) is located beneath the pilot's cockpit.

The cabin accommodates 10 passengers. Its inside dimensions are:

Length	4.25 m	13.9 ft.
Width	1.5 "	4.9 "
Height	1.85 "	6.1 "

All the seats face in the direction of flight. Large sliding windows afford excellent visibility. Heating is by hot air drawn in around the exhaust pipe. Its intensity can be regulated by the passengers. The front part of the cabin can be partitioned off, thus affording a large additional baggage room of 2.35 m^3 (83 cu.ft.), and still leaving room for 8 passengers. The lavatory is in the rear. The structure of the central portion consists of main and auxiliary frames connected by four main corner longerons and by small stringers (Figs. 3, 8, 9). The covering panels are of sheet duralumin. The frames consist of channel members connected by gussets. The auxiliary frames also consist of small channel stringers.

c) Rear portion.- The rear portion of the fuselage carries the tail group and skid. It is connected with the front portion by four pins passing through fittings mounted on the longerons. It has a framework of duralumin tubes connected vertically by gussets and horizontally by eyebolts and lugs. The cross bracing of the horizontal members and frames consists of "Jacottet" wires. The fuselage ends in a tubular duralumin sternpost.

Tail surfaces.- The stabilizer is mounted above the fuselage and has an area of 6.27 m^2 (67.4 sq.ft.). It is adjustable in flight. It has two box spars (Fig. 7) and tubular ribs. The front spar is connected with the fuselage longerons by two pins. The rear spar is mounted, in the airplane axis, on a

square-threaded screw, controlled by a nut which is connected by cables with a wheel near the pilot. The exact incidence of the stabilizer is indicated by a pointer connected with this wheel. The rear spar is braced by two small rods connected with the control screw. The divided elevator has a total area of 2.37 m^2 (25.5 sq.ft.). The two parts are connected in the fuselage axis by a sleeve-type tube. The elevator is of standard construction and has 0.5 mm(0.02 in.) sheet duralumin ribs.

The fin has an area of 2.61 m^2 (28 sq.ft.). Its rear edge is hinged to a duralumin box spar forming an extension of the sternpost. Its front end is connected with the fuselage by a duralumin tube. The ribs are of 0.92 mm (0.35 in.) duralumin tubing.

The rudder is similar in construction to the elevator and has an area of 2.13 m^2 (22.9 sq.ft.).

Landing gear.- The landing gear has a track of about 4.5 m (14.8 ft.). The two wheels, of 1 m (3.28 ft.) diameter, are equipped with brakes and mounted on bent axles. These axles are attached to the sides of the fuselage. Each axle is held laterally by a small rod and vertically by a tube connected with the wing spar and carrying the shock absorber.

The brakes reduce the landing run by 30 to 40%. Each wheel can be braked independently by means of a differential control, the maneuverability on the ground being thus improved. The braking effect is limited by a stop placed on the control quad-

rant, in order to prevent capsizing. This stop can be passed only by a voluntary act of the pilot for the purpose of blocking the wheels completely (to test the engine, for example). The tail skid is provided with a steerable wheel and is connected with a shock absorber in the sternpost.

Flight controls.- The pilot's cockpit is placed in front and is provided with dual controls. The ailerons are operated by rotating the control wheel, while the elevator is controlled by the fore-and-aft motion of the stick. No controls pass through the baggage room. The ailerons are controlled by a rotating shaft and a pinion with a chain. A rotating motion is imparted by a cable to a tube located in the longitudinal axis of the fuselage. A vertical horn, mounted on this tube, controls "Jacottet" wires parallel to the span. These operate three bell cranks on each side, the motion of the latter being transmitted to the control rods of the aileron horns. Each aileron has three parts.

The elevator cables run from the control stick over pulleys in the top of the fuselage on its left side. The two control sticks are rigidly joined by a tube.

The rudder bars are replaced by hinged pedals. The force is transmitted by cables which run from the pedals along the upper part of the fuselage.

The rear spar of the stabilizer is mounted on a screw with a square thread, which is raised or lowered by a circular nut.

Grooves on the outside of the nut carry a cable which is connected with a wheel near the pilot's seat. The motion is limited by stops.

The fin stay is mounted on a screw with a square thread and a circular nut. The latter has external grooves which carry a cable connected with a wheel near the pilot's seat. On the left of the seat are two wheels, each of which causes a pointer to move over its respective dial. The larger wheel controls the incidence of the stabilizer and the smaller one, that of the fin. The balance, when disturbed in normal flight by a reduction of the engine speed or by the failure of a lateral engine (when the airplane has three engines), can be maintained by this device.

Electrical equipment.- This is provided for regular night flying. The generator is driven by a windmill impeller and is located in the leading edge of the right wing. The storage battery is under the seat of the second pilot. The passenger cabin is lighted by ceiling lights and the crew's compartment by regulation lights. The signalling lights are at the bottom of the left side of the fuselage and inclined at 45°. Landing flares are provided on the lower surface and at the tips of the wing. The piloting and other controls are readily accessible on the instrument board. The landing lights are in the leading edge of the wing.

Sending-receiving wireless installation.- The remote-control radio set is behind the pilot's cockpit. It is supplied with current by a wind-driven dynamo located on the left side of the fuselage in the leading edge of the wing. The transmitter is forward and at the right of the second pilot. The antenna reel is within easy reach of the second pilot. The radio set and all its accessories are easily accessible during flight.

Power plant.- The 650 hp 12 N.B.R. Hispano-Suiza engine is mounted at the nose of the airplane on a frame secured to the fuselage by four bolts. It is separated from the pilot's cockpit by an absolutely tight fire wall. Danger of fire is reduced as much as possible by placing the fuel and oil tanks outside of the engine compartment. The 700-liter fuel tanks are located in the wing behind the spar and can be dumped during flight. The 55-liter oil tank is mounted behind the fire wall, where it cannot be crushed by the engine in case of a shock. All the cowlings can be easily removed in a few minutes, thus rendering the engine perfectly accessible.

Characteristics

Span	25.000 m	82.02 ft.
Length	14.850 "	48.72 "
Height	4.115 "	13.50 "
Wing area	65 m^2	699.65 sq.ft.
Weight of glider	1242 kg	2738.14 lb.
Power plant	862 "	1900.38 "
Standard equipment	215 "	473.99 "
Special "	157 "	346.13 "
Weight empty	2476 "	5458.64 "
Fuel load	550 "	1212.54 "
Crew	160 "	352.74 "
Pay load	1300 "	2866.01 "
Useful load	2010 "	4431.29 "
Total load	4486 "	9889.93 "
Wing loading	69 kg/m^2	14.1 lb./sq.ft.
Power "	6.9 kg/hp	15.2 lb./hp

Performances

Maximum speed	215 km/h	134 mi./hr.
Minimum "	111 "	69 "
Ceiling	6000 m	19680 ft.
Range	860 km	534 mi.

Translation by
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for Aeronautics.

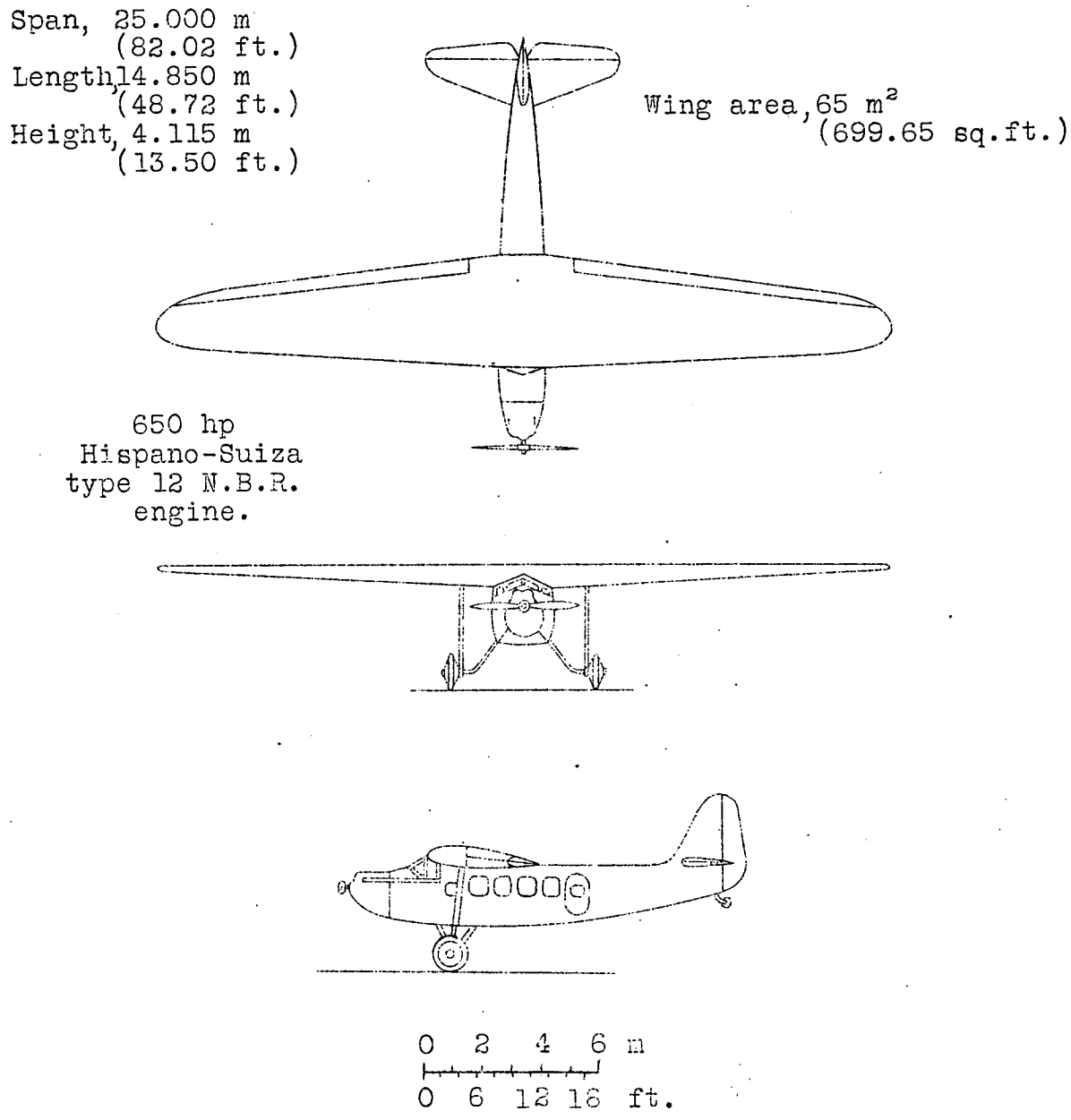


Fig. 1 General arrangement drawings of the Dewoitine D.30 airplane.

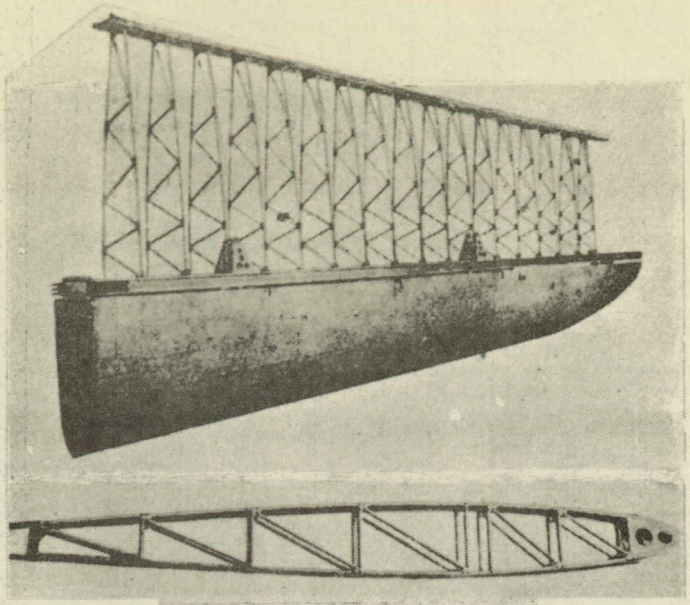


Fig. 2
Wing structure
of the D.30

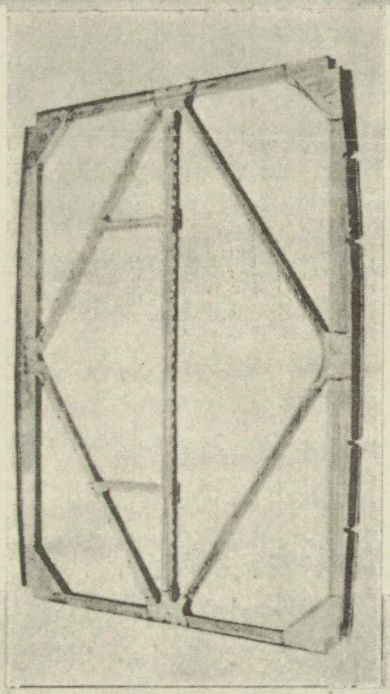


Fig. 3
Fuselage
frame

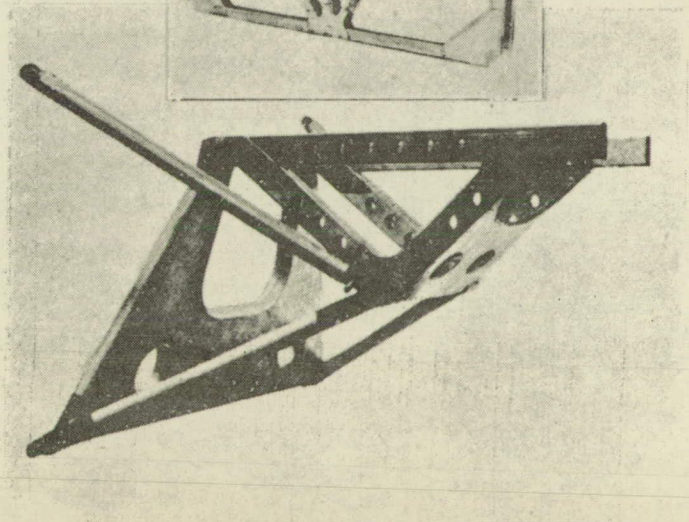


Fig. 4
Engine
support

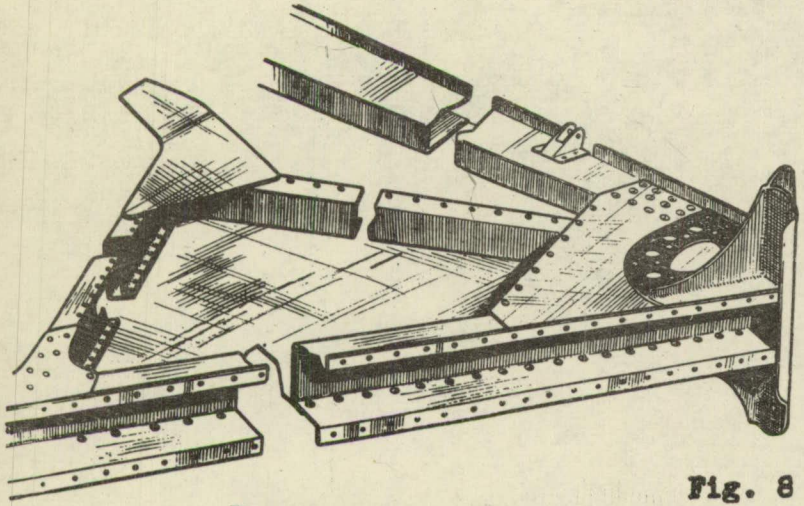


Fig. 8

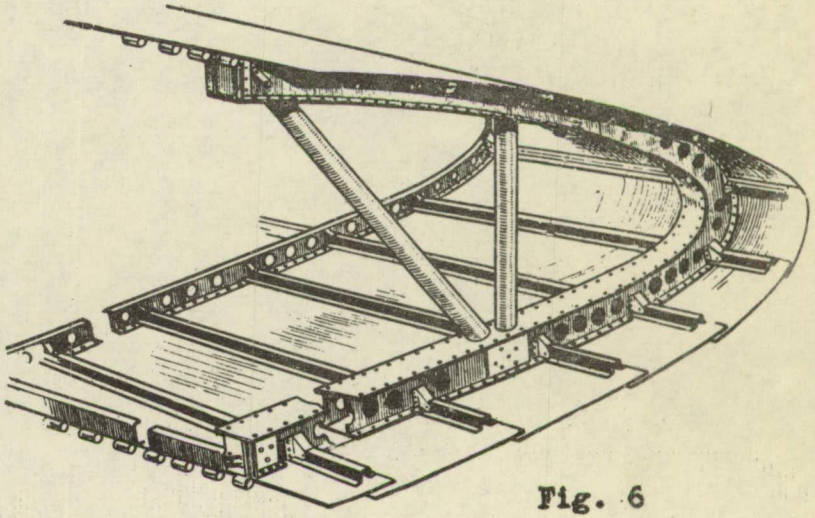
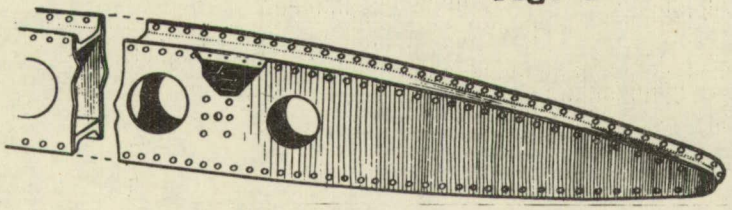


Fig. 6

Fig. 7



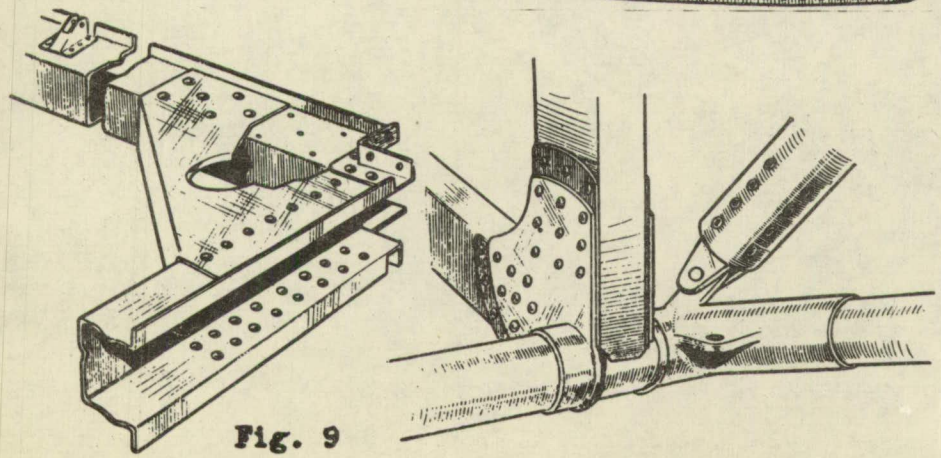


Fig. 9

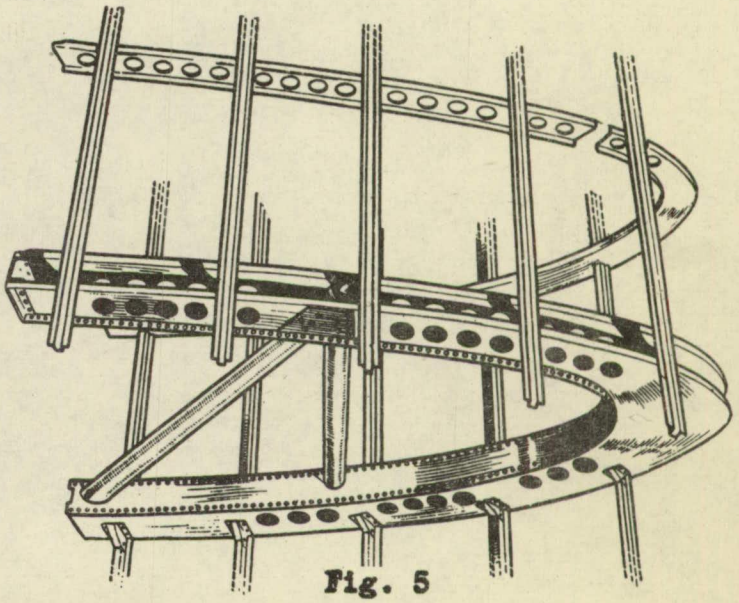


Fig. 5

Structural details of the D.30

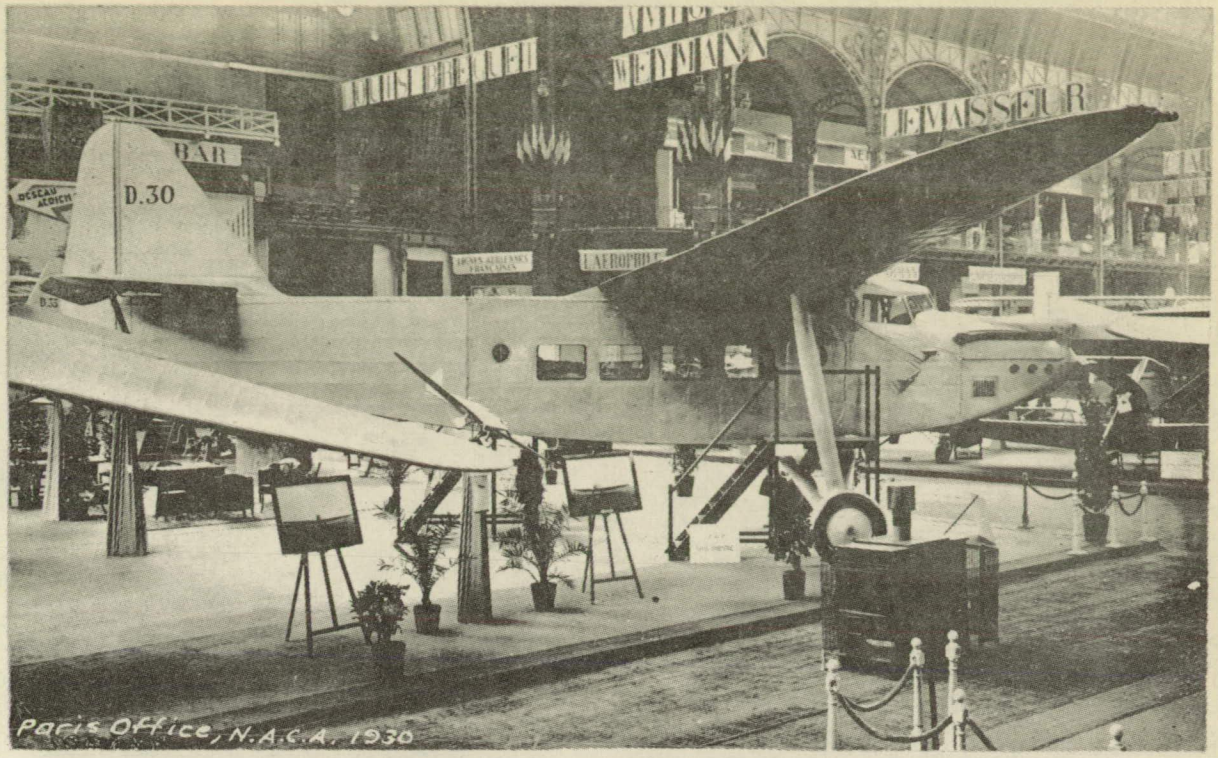
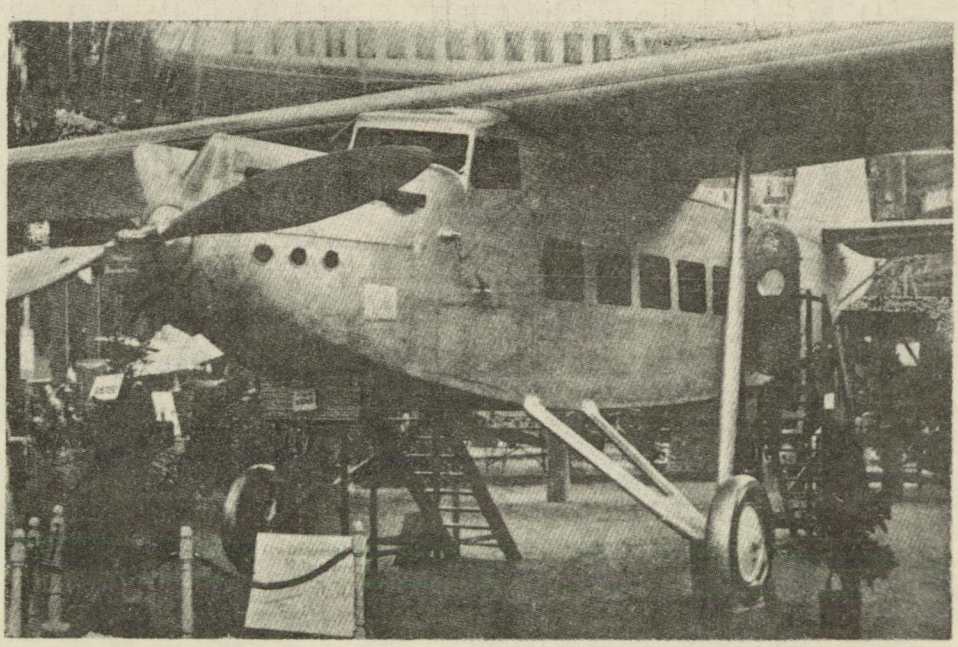


Fig. 10 Side view.



Taken from Flight. Dec. 12 1930.

Fig. 11 Three-quarter close up front view.

Dewoitine D.30 airplane on exihibition at the Paris Aviation Salon Nov. 28 - Dec. 14, 1930.