

AIRCRAFT CIRCULARS  
NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS

---

No. 53

---

THE WESTLAND "WIDGEON III"  
"Cirrus II" or "Genet II" Engine

From "Flight," July 28, 1927

---

Washington  
August, 1927

NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS.

---

AIRCRAFT CIRCULAR NO. 53

---

THE WESTLAND "WIDGEON III"\*

"Cirrus II" or "Genet II" Engine.

In the Westland "Widgeon III," we believe that practical rather than aerodynamic considerations led to the decision to market a monoplane, and by choosing the parasol type of monoplane the Westlandt Aircraft Works of Yeovil claim to have attained certain very practical advantages. For instance, the placing of the wing some distance above the fuselage provides an all-round view which would not be possible in a biplane. Downwards, to the sides, forward and aft, there is nothing but the fuselage to hinder the view. Placed as he is, some distance aft of the wing, the pilot can look in all directions except diagonally, forwards and upwards, and even here, owing to the angle between the wing and the line of vision, only a very small area is obscured by the wing, which is, in fact, seen by the pilot almost "edge on." The passenger is situated immediately below the wing, and thus cannot see upwards, but otherwise has an unobstructed view. Moreover, the parasol arrangement greatly facilitates access to the cockpits, the aft, or pilot's, being clear of the cut-out in the wing, and the front one being reached through a small door, much as one enters a motor car. The fact that the wing is strut-braced makes for a minimum of encumbrances,

---

\*From "Flight," July 28, 1927.

and the front seat is reached entirely without the acrobatic feats required in some airplanes.

The strut bracing of the "Widgeon" wing is also claimed to reduce maintenance cost, since there are no wires whatever, in the airplane, other than control cables, to require attention. Once in place on the airplane, the wing bracing is not touched except in case of damage, and the wing will, it is claimed, remain true without any attention from the user. The arrangement of the wing struts of the "Widgeon" is such that folding the wings is an extremely easy operation, all that is necessary being the release of two pins, one on each side, when the two halves of the wing are free to swing back along the tail (Fig. 1). The aileron cables are so arranged that as the wings fold back the return cable goes slack, allowing the ailerons to hang down, and thereby reducing the folded width of the airplane, which in the folded condition is only 10 ft. 6 in.

Thus the main features of the "Widgeon III" of interest to the owner-pilot may be summed up as follows: excellence of view, ease of access to cockpits, absence of wire bracing (Figs. 2, 3, and 4), with consequent reduction in maintenance cost and work, and general simplicity of construction. This summary does not, however, by any means exhaust the features of the airplane, as the following descriptive notes on the construction will show.

### Constructional Features

It has already been pointed out that simplicity of construction is one of the objects aimed at in the "Widgeon III." Thus the fuselage is of the type in which there is no wire bracing, the inner framework being covered and partly braced by the three-ply "skin." From the fact that three-ply is used for covering it will be gathered that the fuselage is flat-sided and flat-bottomed. The deck, however, is of the usual curved or cambered shape, made up in panels or sections, and supported internally by hoops or formers. Experience has shown this type of fuselage construction to be rigid, capable of standing hard wear, and requiring minimum attention during use. A fabric covering on top of the three-ply protects it against moisture.

The cockpits, as already stated, are very easy of access, and are, in addition, roomy and comfortable. Dual controls are provided, so that the airplane may be flown from either cockpit, or the front controls may be disconnected if the airplane is being used for passenger work only. The instruments, which include the usual range, are very neatly arranged and the various dials are easily seen. The seats are somewhat unusual in that they are separate from their back rests. Normally, fairly high seats, of light plywood construction, are fitted, and provided with air cushions. Should the owner prefer to fly regularly with a pack parachute, the seats are changed to slightly lower ones on which the parachute pack rests, the seat frameworks of

the two types of seat being so proportioned that the over-all height is the same in both cases.

Between the two cockpits, in the deck fairing, is a luggage compartment with a separate door, while in front of the forward cockpit is another and slightly smaller luggage space. Thus it is quite feasible to go touring on the "Widgeon III" and take sufficient luggage for ordinary requirements. The front cockpit is provided with a door on the starboard side, and as a small steel tube step is fitted to the lower longeron, underneath the door, one can step into this cockpit without any climbing whatever.

### The Wing

The wing construction is of the perfectly straightforward type, with wooden box spars, spruce ribs, and fabric covering. The ailerons, which run over the whole span of the wing, are of narrow chord, being hinged to an auxiliary spar, and are thus of high aspect ratio and claimed to be very effective while working very easily and with small forces on the control stick. They are operated by short cables running through the sides of the fuselage, the control crank being situated at the inner end of the aileron. Constructionally, the ailerons differ from the wings in being of metal construction, as are also all the tail surfaces. Duralumin and aluminum are the materials used, the tubular spar or leading edge of the ailerons being duralumin and

the ribs of sheet aluminum. The wing section used is R.A.F. 34.

The wings hinge on the points of attachment of the rear spars to the center section (Fig. 5), and with the steel tube wing bracing employed, which is very rigid, no "jury struts" are required unless the airplane is to be transported over long distances. The center section of the wing contains the gasoline tank, the high position enabling direct gravity feed to be employed, with consequent simplification of the fuel system. An extension handle pointing back from the tank enables the pilot to turn the gasoline on or off from his seat. The gasoline capacity is 15 gallons, and as the airplane does an average of 20 miles per gallon, the range is about 300 miles.

#### Undercarriage

The undercarriage of the "Widgeon III" is of special type. The telescopic rear "legs" are of oval section steel tube. The load is taken by stout coil springs of steel, and bouncing is prevented by interposing between the two portions of the telescopic "legs," Ferrodo dampers. This type of undercarriage is claimed to be particularly durable and robust, there being no rubber to perish, no air pressure to maintain, no glands to need attention.

#### Engine Installation

The engine installation in the "Widgeon III" is particularly interesting (Fig. 6), and has been so planned that the whole

engine unit can be removed after undoing four bolts, and, of course, the usual gasoline leads, engine controls, etc. The engine bed is of welded steel tubing, and two types have been standardized, one of which takes the "Cirrus II" engine, and the other the Armstrong-Whitworth "Genet II." Owing to the difference in weight between the two engines, the center of gravity would be slightly displaced by the substitution of one for the other. To counteract this, the Westland Aircraft Works employ the neat arrangement of standardizing two center sections, one of which gives a slightly greater sweepback to the wings than the other.

#### Load Factors

The Westland "Widgeon III" has been designed to give the required load factors for the British Air Ministry's "Aerobatic" Airworthiness Certificate with a total loaded weight of 1400 lb., and for normal flying, the factors cover a loaded weight up to 1600 lb.

Specifications

Wing area	200 sq.ft.	
Ailerons	28 "	
Stabilizer	12.5 "	
Elevators	10.25"	
Fin	2.0 "	
Rudder	10.5 "	
Wing loading .....	"Cirrus"	7.0 lb./sq.ft.
	"Genet"	6.6 lb./sq.ft.
Power loading - "Cirrus" .....	$\frac{1400}{78}$	= 17.9 lb./HP.
Power loading - "Genet" .....	$\frac{1323}{72}$	= 18.4 lb./HP.
Weight empty - "Cirrus" .....	852 lb.	
Weight empty - "Genet" .....	775 "	

These figures are made up as follows:

Wing, with bracing, center section, etc	242	"
Tail .....	30	"
Fuselage and engine mounting .....	240	"
Power unit exclusive of tanks "Cirrus"	321	"
Power unit exclusive of tanks "Genet"	240	"
Total weight of power unit, inclusive of tanks, gaso- line (113 lb.) and oil (15 lb.) .....	- "Cirrus" 468 "Genet" 391	" "
Pilot, passengers and luggage .....	420	"
Total loaded weight.....	"Cirrus" 1400 "Genet" 1323	" "



## Performance

Following are the performances of the "Widgeon III":

Top speed	100 M.P.H.
Cruising speed	85-90 M.P.H.
Minimum speed	42 M.P.H.
Initial rate of climb	560 ft./min.
Service ceiling	14,000 ft.
Climb to	5,000 ft. in 11 min.
Climb to	10,000 ft. in 27 min. 40 sec.

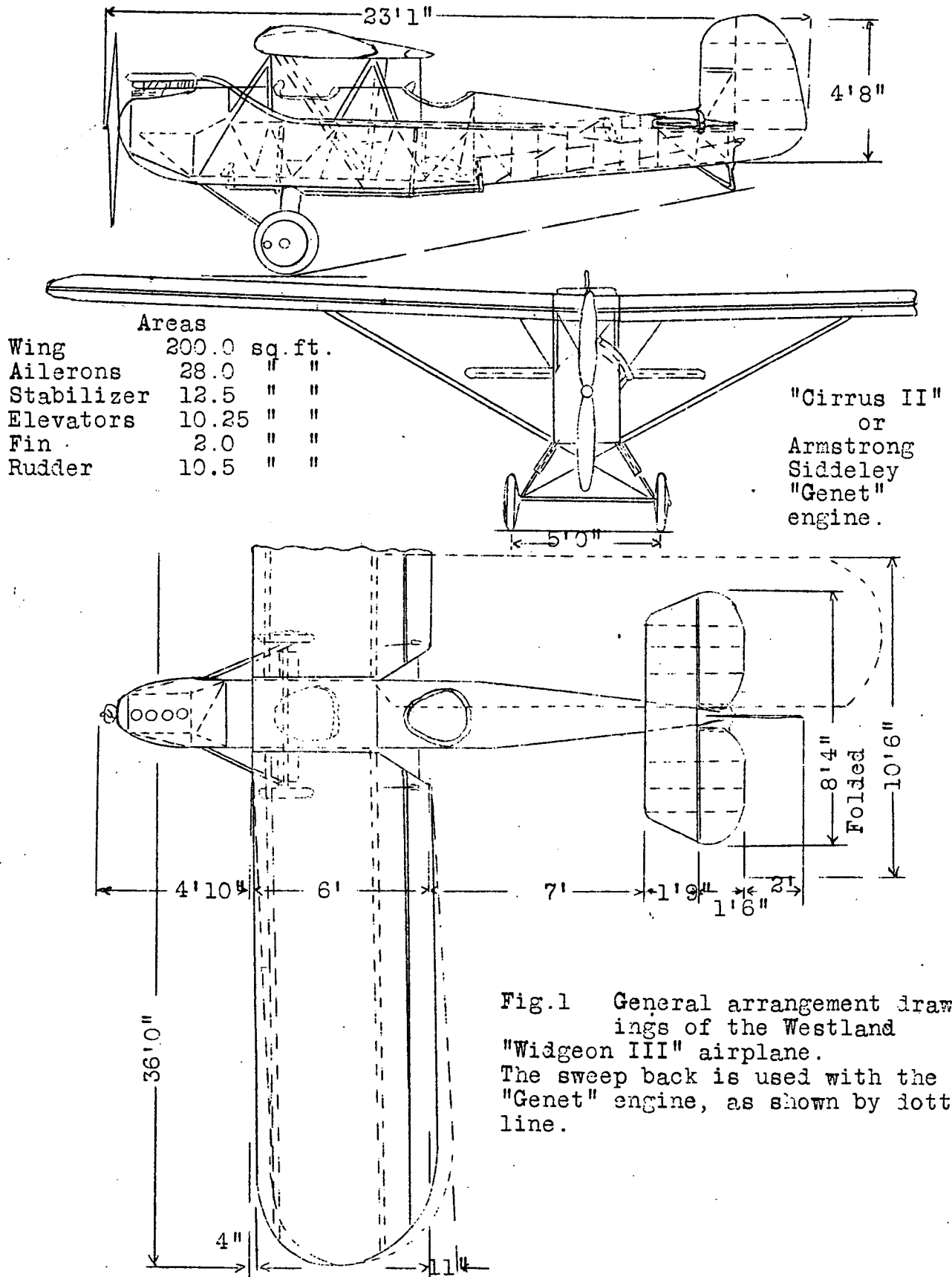


Fig.1 General arrangement drawings of the Westland "Widgeon III" airplane. The sweep back is used with the "Genet" engine, as shown by dotted line.



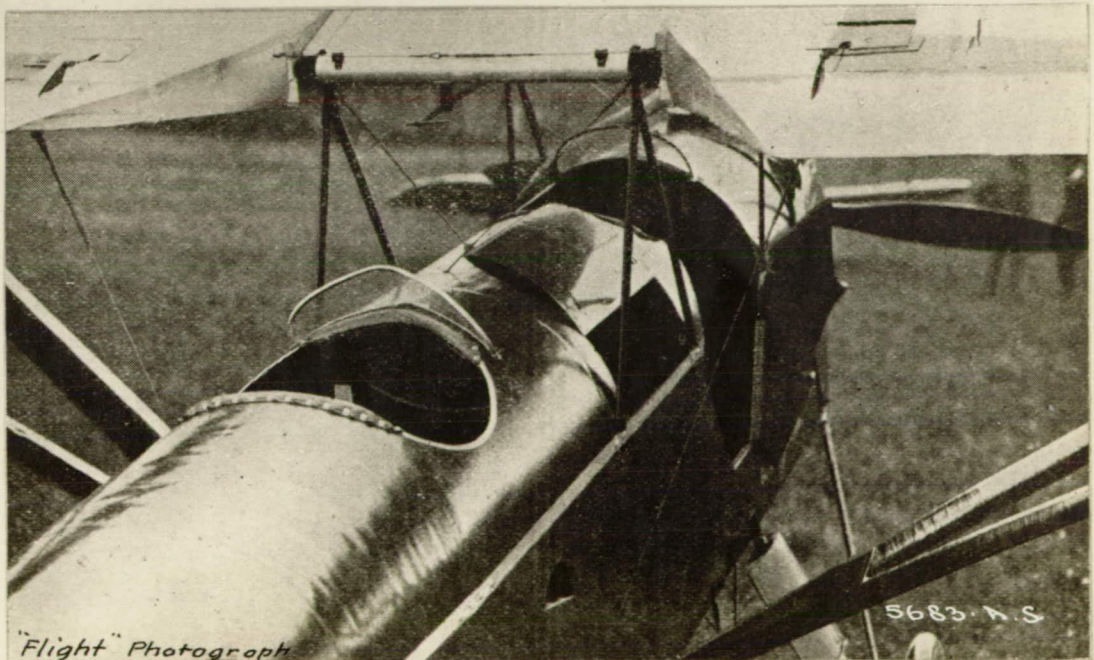
*Flight Photograph*

Fig.3 Front view of the Widgeon III airplane with a "Cirrus" Mark II engine



*Flight Photograph*

Fig.3 Three-quarter rear view of the Widgeon III airplane

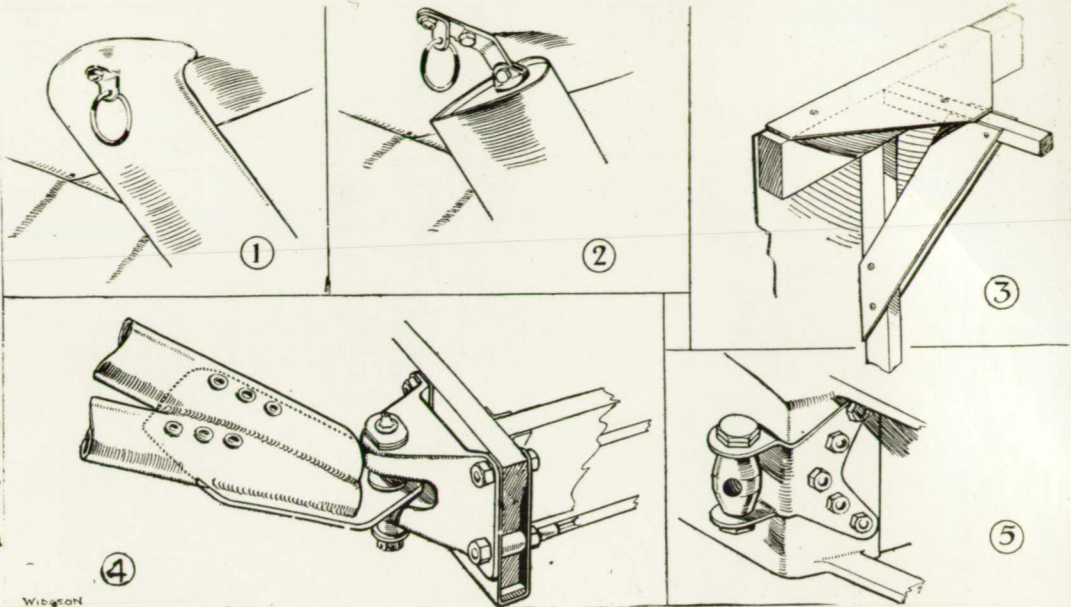


*"Flight" Photograph*

Fig.4 Cockpits of the Widgeon III airplane. Note the door giving access to the front cockpit. Also the luggage compartment in the deck fairing.

Copyright Sketch by "Flight" 7-28-27. Reproduced by permission.

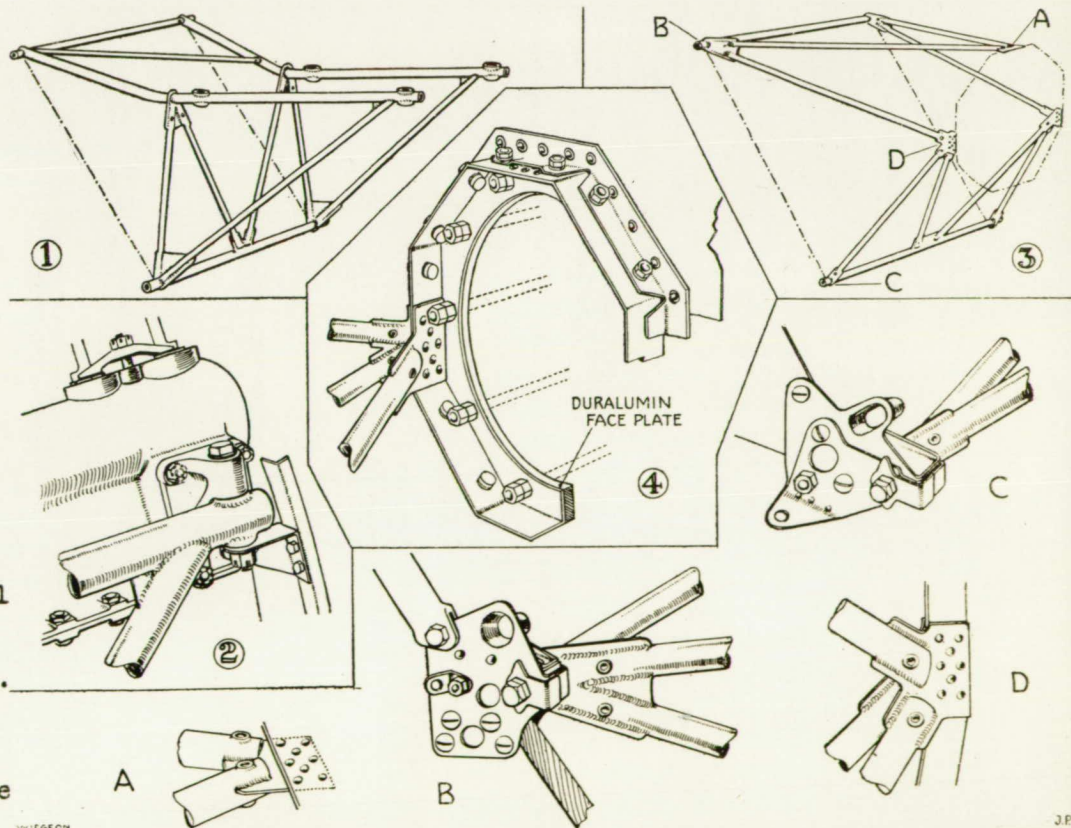
Fig. 5 Some constructional details. 1, shows the manner of fairing the wing-strut attachment with papier mache, the actual metal fitting being shown in 2. 3, a typical



fuselage joint, while 4 shows the attachment of lift struts to lower fuselage longeron. The hinge on the rear wing spar is shown in 5. This engages with a corresponding fitting on the center-section, and forms the hinge for folding the wings.

Copyright Sketch by "Flight" 7-28-27. Reproduced by permission.

Fig. 6 Details of the two types of engine mountings which have been standardized. 1, shows the welded steel tube mounting for a "Cirrus" eng. with a more detailed view of a front engine bracket in 2. The mounting for the "Genet" engine is shown in 3, with details of the duralumin face plate in 4, Sketches A, B, C, and D refer to details at corresponding points of 3



2. The mounting for the "Genet" engine is shown in 3, with details of the duralumin face plate in 4, Sketches A, B, C, and D refer to details at corresponding points of 3