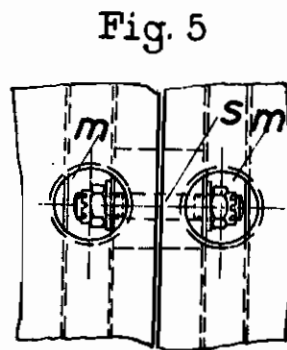
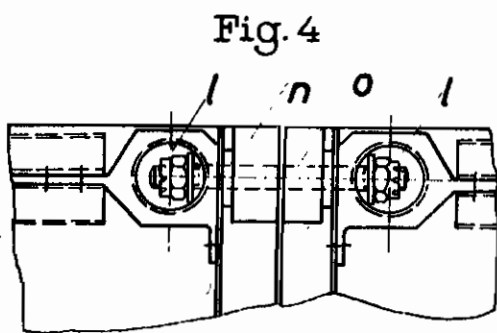
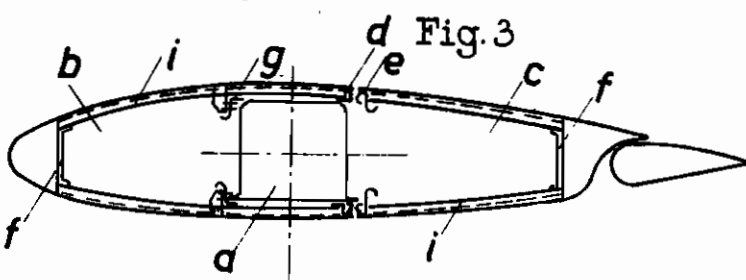
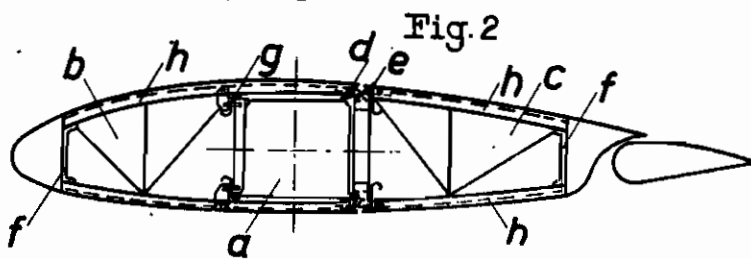
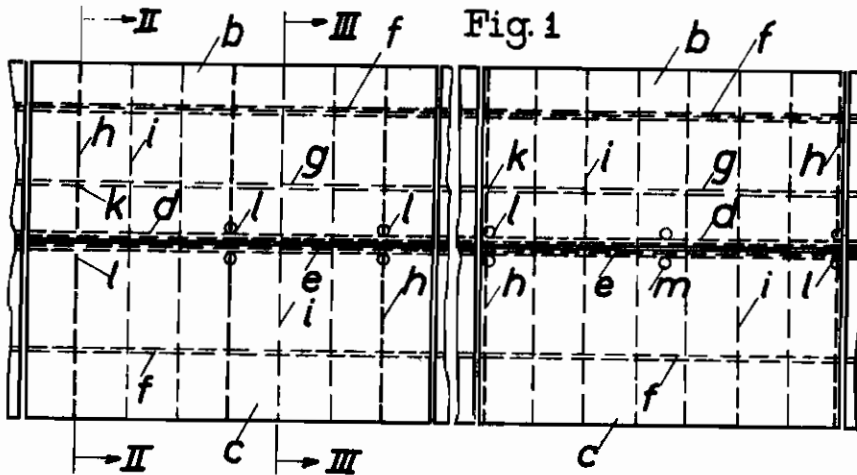


PUBLISHED
MAY 25, 1943.
BY A. P. C.

E. SCHELER ET AL
AIRCRAFT WING
Filed June 13, 1940

Serial No.
340,336



Inventor:
EMIL SCHELER.
By: *Richardson*
Attorneys:

ALIEN PROPERTY CUSTODIAN

AIRCRAFT WING

Emil Scheler, Vegesack, near Bremen, and Adolf K. Rohrbach, deceased, late of Bremen-Oberneuland, Germany, by Gustav Edzard, administrator, Bremen, Germany; vested in the Alien Property Custodian

Application filed June 13, 1940

This invention relates to an aircraft wing of the type described in our co-pending application Ser. No. 218,010, filed July 7, 1938, which is built up around a single spar in the form of a hollow closed body constructed to resist bending and twisting forces and comprises also front and rear wing parts completely enclosing the spar and secured thereto, the ribs of said parts being easily attachably and detachably fastened to the spar and the skin, between said front and rear parts, forming joints which extend transversely to the direction of flight and are preferably located at the rear wall of the spar.

The present invention has for its object to build up the front and rear wing parts in the simplest possible manner to save time, to provide for their easy attachment and detachment within a relatively short time, and to reduce the cost of production and the weight of the wing. For this purpose, some of the ribs supporting the covering of the front and rear wing parts are strengthened and braced to serve as special supporting ribs by means of which the front and rear parts are detachably secured to the spar. As the forces acting upon the wing are transmitted by these supporting ribs to the spar, the remaining ribs of the front and end portions may be made less strong and function only in an auxiliary manner for taking up slight transverse forces and also air forces that have merely a local effect upon them. This involves considerable simplification of production with respect to the attachable parts and a saving in material.

The supporting and auxiliary ribs are interconnected near the spar by longitudinal sections extending in the longitudinal axis of the wing and at more distant points from the spar by auxiliary supports extending parallel to the spar, both the auxiliary supports and the longitudinal profiles serving for transmitting the forces acting upon the wing to the supporting ribs for transmission to the spar. The longitudinal profiles aid also in stiffening the edges of the skin of the front and rear parts with which they are connected for instance by riveting.

Further saving in weight can be effected by detachably arranging on the spar, besides the supporting ribs, one or more auxiliary ribs or, at a few points, the longitudinal sections which interconnect the ribs.

The choice of ribs to be strengthened and to serve as special supports is optional. For example, if the front and rear wing parts are subdivided transversely to the direction of flight, it

is advisable to strengthen the ribs limiting these parts.

In order to render accessible the fastening points for the supporting ribs, auxiliary ribs or longitudinal sections the coverings of the front and rear wing parts near these points possess oval, circular or similarly formed clearances which may be closed by easily detachable flaps, etc. Such clearances are dispensed with at points where connections found for instance at the front part of the spar do not require special accessibility. The joints extending transversely to the direction of flight between the skins of the front and rear wing parts need not all to be disposed near the rear or front wall of the spar. When the ribs of the front and rear parts respectively embrace the top and underside of the spar, the clearances may be provided near the rear wall of the spar on the upper side of the wing and near the front wall of the spar on the underside of the wing, in which case the front and rear parts may be articulated to the spar so that they can be turned up and down in known manner. A construction of this kind affords the advantage that complete removal of front and rear parts of the wing to repair control gear, wires, cables, etc. arranged along the side walls of the spar is not necessary any more, since it suffices to loosen the connections on the top or bottom side of the wing. It is also possible of course to have the rib of the front parts embrace the underside of the spar and the ribs of the rear parts surround the top side thereof while the front parts can be turned up and the rear parts turned down.

A further feature of the invention is that the supporting ribs of the front and rear wing parts can be used for supporting ailerons, landing flaps, slats, etc. and special stiffening members for bearing them are not needed.

Furthermore, to prevent fire caused by the engine from spreading over the entire wing the supporting ribs of the front and rear parts adjacent to the engine bearing may be made solid and thereby enabled to fulfill the function of the fireproof bulkheads hitherto in use.

The invention is illustrated by way of example in the accompanying drawing, in which

Figure 1 is a plan view of a portion of a wing constructed according to the invention;

Fig. 2, a cross section of the wing on the line II—II, of Fig. 1;

Fig. 3, a cross section of the wing on the line III—III, of Fig. 1;

Fig. 4, a view showing on an enlarged scale a

manner of connecting the supporting ribs of the front and rear wing parts with one another and with the spar; and

Fig. 5 shows on an enlarged scale a connection of the longitudinal sections to the spar.

The wing is built up of a spar *a* having the form of a closed hollow body constructed to resist bending and twisting forces and of front and rear parts *b*, *c* attached to it transversely to the longitudinal axis of the wing. Ribs *h*, *i* supporting the skin of the front and rear parts *b*, *c* are interconnected near the rear wall of the spar by longitudinal sections *d*, *e* extending in the direction of the longitudinal wing axis and at places more distant from the spar by auxiliary supports *f*. The front wing parts *b* are, moreover, provided with additional longitudinal sections *g* located near the front wall of the spar. The auxiliary supports *f* and the longitudinal sections *d*, *e*, *g* serve for transmitting the forces acting upon the wing to the specially constructed supporting ribs *h* of which three are shown in the left-hand portion of Fig. 1 for fastening the front and rear parts of the wing, the front and rear parts shown to the right in Fig. 1 possessing each only two supporting ribs *h*. As indicated in Fig. 2, the supporting ribs *h* are particularly strong and stiffened by braces.

They transmit the main portion of all forces acting upon the wing to the spar *a*, and the remaining ribs *i* are therefore weaker and serve only as auxiliary members for taking up slight transverse forces and locally acting air forces.

The supporting ribs *h* are detachably secured to the spar *a* or to one another at the front wall of the spar *a*, for instance at the points *k*, and at the rear wall thereof at the points *l* provided with flaps or covers. As fastening means serve pins or shear bolts, flanges and bores or other means, as described in our co-pending application Ser. No. 218,010. In the construction shown in Fig. 4 the supporting ribs *h* are connected with the aid of a bolt *o* having two nuts and arranged in a small support *n* united with the spar *a*.

Fig. 5 shows how the longitudinal sections *d*, *e* interconnecting the ribs *h*, *i* are secured to the spar *a* by means of a screw *s* which can be easily reached through openings *m* in the wing skin.

The joints extending between the front and rear parts *b*, *c* transversely to the direction of flight are covered for instance by arranging the longitudinal sections *d*, *e* so that one slides under the other and thereby causes overlapping of the skins.

EMIL SCHELER.
GUSTAV EDZARD.