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C. DORNIER

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FLYING MACHINE STRUCTURE

Filed Jan. 27, 1928

Fig. 1.

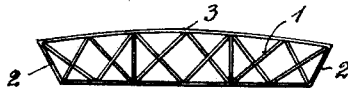


Fig. 2.

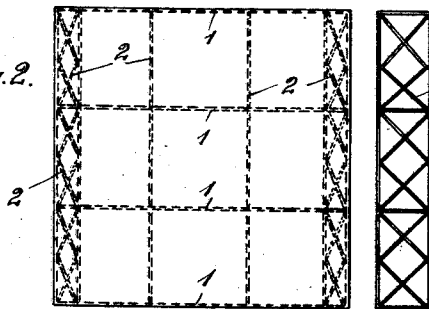


Fig. 3.

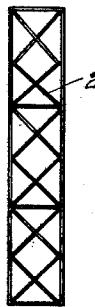


Fig. 5.

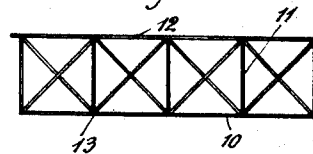


Fig. 4.



Fig. 6.

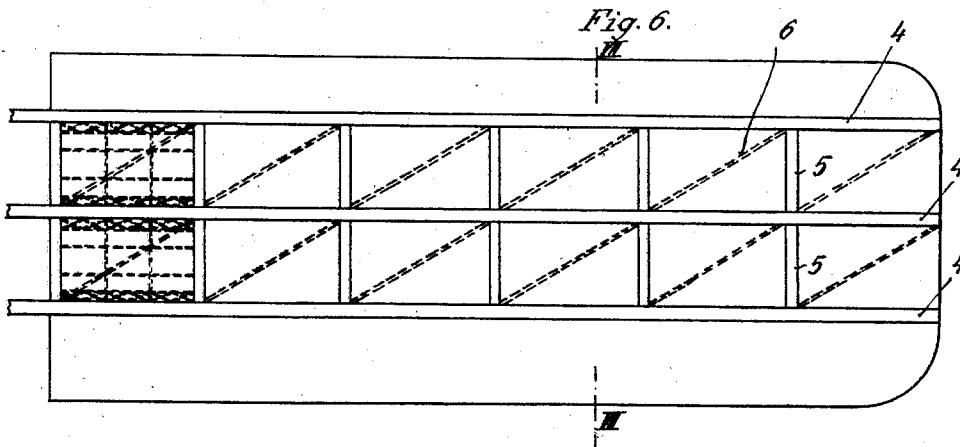


Fig. 7.

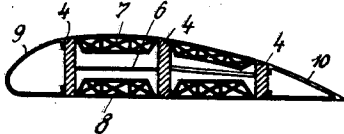


Fig. 8.



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UNITED STATES PATENT OFFICE

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FLYING-MACHINE STRUCTURE

Application filed January 27, 1928, Serial No. 250,064, and in Germany February 3, 1927.

My invention refers to flying machines and more particularly to the wings of aeroplanes, and has for its primary object to design the bearing planes of aeroplanes in a manner whereby they can be manufactured and assembled from a greater number of substantially identical parts in a cheaper and more convenient manner than was hitherto possible.

In the construction of the bearing planes of aeroplanes, more especially large-sized ones, it has already been suggested to form each wing with one or several longitudinal spars or girders extending at right angles to the direction of flight, ribs extending from these spars and between them, if several such spars are provided, in the direction of flight, the wing structure being thus formed of a plurality of intersecting spars and ribs, preferably of girder shape. The rectangular or square cells formed by the intersecting spars and ribs were covered up by means of sheet metal plates forming in their totality the outer skin of the wing.

I have now found that in wings having a skeleton structure such as above described, the sheet metal plates forming the outer skin are replaced with great advantage by framework members covered on one or both sides with a suitable covering material, for instance canvas, either a single body of this kind filling a cell or several such members closing the rectangular space at the top and at the bottom. These members are preferably connected with the wing skeleton or with each other in an easily detachable manner.

In the drawings affixed to this specification and forming part thereof wing structures embodying my invention are illustrated diagrammatically by way of example.

In the drawings,

Fig. 1 is an end view of a filling member designed to cover the top of a rectangular cell forming part of the wing skeleton.

Fig. 2 is a plan view.

Fig. 3 is a side view.

Fig. 4 is an end view of a similar member, designed to form the bottom closure for such rectangular cell.

Fig. 5 is an end view of another form of

filling member, which is adapted to completely fill one of the wing cells.

Fig. 6 is a plan view of a wing showing the spars and ribs and the rectangular cells formed between them.

Fig. 7 is a cross-section on the line VII—VII in Fig. 6, taken in the direction of flight, and a wing having the cells closed by top and bottom members, such as shown in Figs. 1 and 4, and

Fig. 8 is a similar view of a wing in which the cells are filled with filling members, as shown in Fig. 5.

Referring first to Figs. 1-3, the member here shown forms a framework in space, consisting of four framework girders 1, as shown in Fig. 1, having trapezoidal section and four framework girders 2 as shown in Fig. 3, two of the girders 2 intersecting the girders 1, while two others form the inclined sides of the framework structure. There is thus formed the square framework body shown in plan view in Fig. 2, having a larger top and smaller bottom surface. This member is enveloped in a suitable envelope, for instance of canvas or the like indicated at 3, and thus forms a sort of braced box-shaped body capable of withdrawing high pressures. Two such bodies, one being shown in Fig. 1, the other in Fig. 4, can now be placed in position in the cells formed by the spars and ribs of a wing as illustrated in Figs. 6 and 7, wherein 4 are three longitudinal spars, while 5 are the ribs extending at right angles thereto and forming with the spars a framework skeleton structure which is attached to the fuselage or to a middle structure of the craft. The cells formed between the spars and ribs are reinforced by diagonal braces 6 and are closed at the top and bottom by the filling members 7 and 8 described with reference to Figs. 1-4. Sheet metal head and tail pieces 9 and 10, respectively, are secured to the front and rear spars 4, in order to complete the wing.

In Fig. 5 is shown a framework filling member capable of filling entirely one of the cells of a wing structure such as shown in Fig. 6. Here the member is shown as being formed of a plurality of intersecting framework girders 10 and 11, the top and bottom

of the member being for instance covered by means of sheet metal plates 12 and 13.

Fig. 8 illustrates a wing as shown in Fig. 6 with filling members according to Fig. 5 secured in place in the wing cells.

Obviously the particular kind of framework here shown can be replaced by any other structural means and the number of girder-like bodies forming part of each top or bottom member according to Figs. 1 and 4 or of each filling member according to Fig. 5 may be varied. I may also use any kind of covering or envelope to take up the vertical forces acting on the wing, and I may use any suitable means such as rivets, screw bolts or the like for fixing the filling members in place in the structure. Obviously a wing having a single longitudinal middle spar with transverse ribs extending therefrom may be constructed with similar filling members, and I wish it to be understood that the number of spars and ribs does not form part of this invention, but can be varied according to requirements. The same applies to the head and tail pieces shown in the drawings and to the general construction of the wing shown by way of example.

I claim:—

Wing structure for flying machines comprising two spars arranged in the direction of the main spread of the wing, ribs extending between and connecting said spars and forming substantially rectangular cells and filling members, each forming a framework in space, detachably inserted in said cells to serve as supports for a covering and as additional bracing members for said ribs.

In testimony whereof, I affix my signature.
CLAUDIUS DÖRNIER.

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