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C. DORNIER
AIRCRAFT FUSELAGE
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Serial No.
283,962
2 Sheets-Sheet 1

Fig. 1.

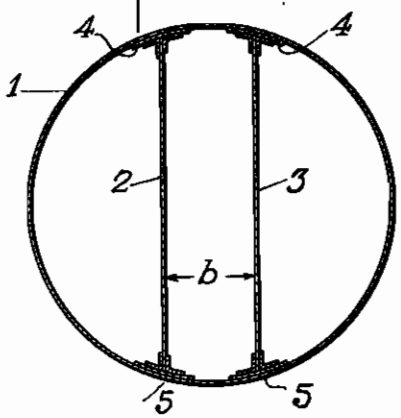

Fig. 2.

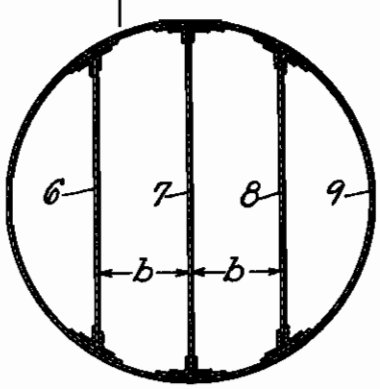

Fig. 3.

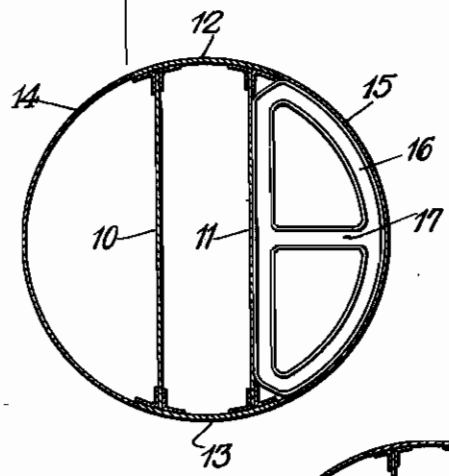

Fig. 4.

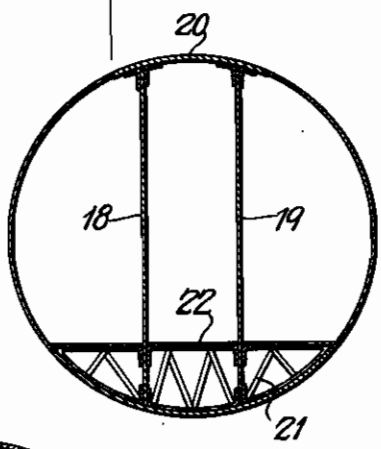

Fig. 5.

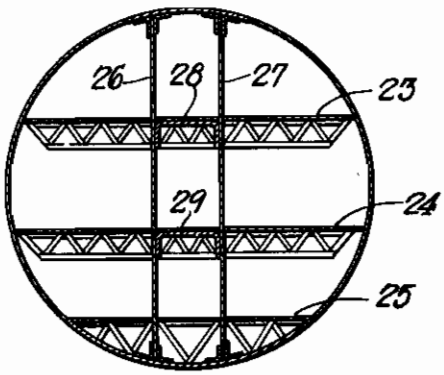

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Fig. 6.

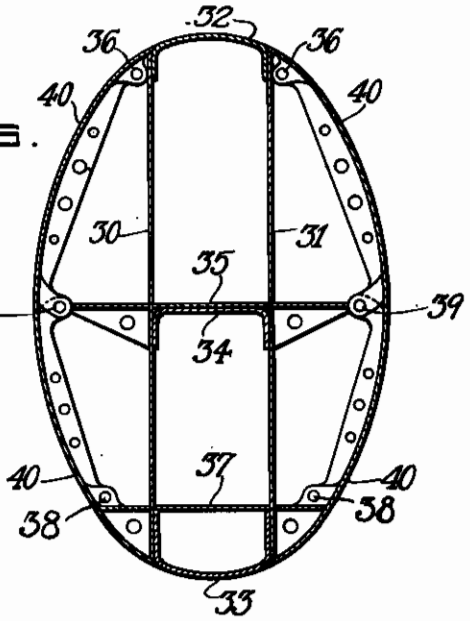


Fig. 7.

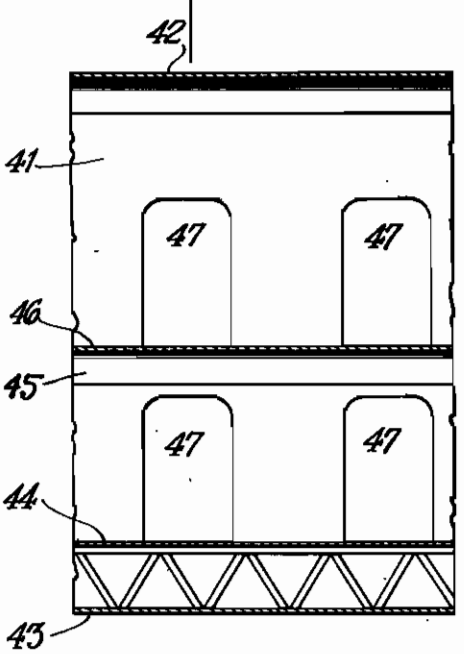
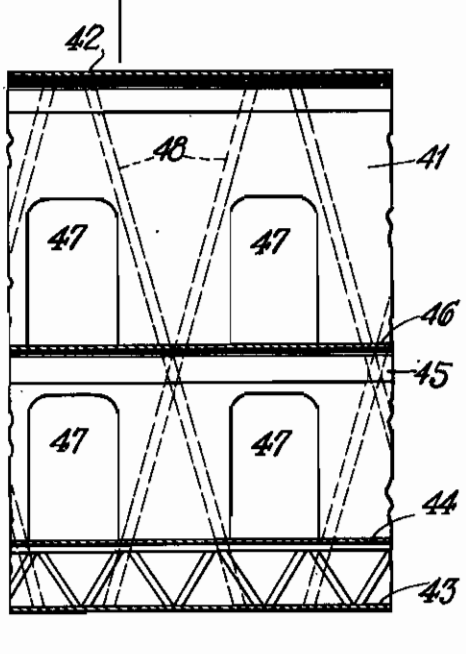


Fig. 8.



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ALIEN PROPERTY CUSTODIAN

AIRCRAFT FUSELAGE

Claude Dornier, Friedrichshafen A. B., Germany;
vested in the Alien Property Custodian

Application filed July 12, 1939

The present invention relates to a new construction of fuselages for aircraft more particularly to fuselages of large air liners whereby the fuselage is subdivided in such a manner that a gangway extends longitudinally through the fuselage.

The fuselage according to the present invention is provided with an interior framework comprising at least two longitudinal beams which are disposed symmetrically with respect to the longitudinal axis of the fuselage. It is not new to provide fuselages with longitudinal beams which are located in the center of the fuselage. It is also known to arrange two longitudinal beams which are disposed close to the side walls of the fuselage. In contradistinction to these known constructions with longitudinal beams, at least two longitudinal beams, are provided in a fuselage according to the present invention which beams are just so far separated that they form a gangway inbetween. With this type of construction the whole support structure is formed by or built in the walls of the gangway and the space on the side of the gangway is completely free from the support structure and unobstructed. Large air liners require a very strong framework in the fuselage. This framework as a rule requires much space and obstructs the interior of the fuselage in an undesired manner. It is an object of the present invention to provide a support framework in the fuselage which is coincident with the separating walls in the fuselage which are required in any case. In a fuselage according to the present invention either the walls which divide the longitudinal gangway from the lateral chambers are at the same time the longitudinal beams of the fuselage framework, or the longitudinal beams which may be for example of the checkerwork type are disposed in the planes of the walls of the gangway and covered on one or both sides in any desired manner so that the framework is not visible and the desired subdivision of the interior of the fuselage is not interfered with. Usually there is only one longitudinal gangway in the center and the longitudinal beam is naturally subdivided into two longitudinal beam members. According to the present invention, however, also more than two longitudinal beam members may be provided forming a plurality of longitudinal gangways. The longitudinal beam members may be interconnected by means of flanges so that a box frame is formed extending from the fore end to the rear end of the fuselage and having a gangway in its interior. The flanges may be used in many ways for improving the static structure of the fuselage. For example, the flanges may form at the same time a part of the skin of the fuselage. In this case lateral fuselage parts are formed in between the upper and lower flange which may simply serve as a closure or may be built in such a manner that they prevent bending of the longitudinal beam or beams to the side. The lower flange may be adapted to form or to support the lowermost deck. In this case a flange is produced of considerable height which forms also the keel framework of the fuselage and considerably contributes to the stiffening of the whole construction. In a case where a plurality of decks are provided above one another these decks may preferably be supported by support structures which are connected to the longitudinal beam members and also serve as intermediary flanges. If the present invention is applied to fuselages of substantially elliptical cross sectional configuration whereby the horizontal axis is smaller than the vertical axis the intermediary flanges or the decks supported thereby may be connected with the side portions of the fuselage and utilized for holding said side portions in the desired position and maintaining the cross sectional configuration of the fuselage. This is of particular importance in airplanes in which there is considerable interior pressure in the fuselage. In fuselages of circular configuration this feature is of less importance; however, also in this case, the side portions of the fuselage skin are preferably connected with the decks if any.

Further and other objects and advantages of the present invention will be apparent from the accompanying specification and claims and shown in the drawings which, by way of illustration, show what I now consider to be preferred embodiments of my invention.

In the drawings:

Figure 1 is a diagrammatic showing of a cross section through a fuselage according to the present invention.

Figure 2 is a diagrammatic showing of a cross section of a modified fuselage according to the present invention.

Figure 3 is a cross sectional view of another modification of the present invention.

Figure 4 is a cross sectional view of a further modification of the present invention.

Figure 5 is a cross sectional view of still another modified fuselage according to the present invention.

Figure 6 is a cross sectional view of an elliptic fuselage according to the present invention.

Figure 7 is a diagrammatic longitudinal sectional view through a fuselage according to the present invention.

Figure 8 is a diagrammatic longitudinal sectional view through a modified fuselage according to the present invention.

Like parts are designated by like numerals in all figures of the drawings.

Referring more particularly to Figure 1 of the drawings two longitudinal beam members 2 and 3 are provided in the interior of a fuselage of circular cross sectional configuration having an outer skin 1. The beam members 2 and 3 are positioned to form a chamber of the width *b*. The width *b* is the width of a longitudinal gangway and is at least as great as to permit a person to walk between the beams 2 and 3. This measure *b* may be somewhat larger or smaller without departing from the present invention. It will seldom be greater than the width of a gangway in which two persons can pass one another. The beams 2 and 3 are individually provided with upper flanges 4 and lower flanges 5.

Figure 2 also shows a fuselage of circular cross sectional configuration. Three longitudinal beams 6, 7 and 8 are provided in the interior of the fuselage forming two longitudinal gangways each of the width *b*. Also in this case the flanges of the longitudinal beams are independent of one another and the whole fuselage is surrounded by means of exterior skin 9.

Figure 3 illustrates a circular fuselage having two longitudinal beams 10 and 11. In contradistinction to the previously described arrangements there is an upper flange 12 and a lower flange 13 common to both longitudinal beams, both flanges forming at the same time a portion of the fuselage skin. A frame or a plurality of frames 16 may be provided to maintain the outer skin of the fuselage in the desired position and to utilize said skin to prevent bending of the longitudinal beam to the side. The frame members 16 are provided with horizontal stays 17 which apparently obstruct the space outside of the gangway. If however the frame members 18 are covered they form walls which subdivide the side chambers into a plurality of rooms.

In Figure 4 a construction is shown in which the longitudinal beam members 18 and 19 are connected by means of a common upper flange 20 which forms the upper wall portion of the fuselage. The common lower frame 21 is of considerable height and width and has an upper part which forms a deck 22 which extends lengthwise through the fuselage.

Figure 5 is a cross section through a fuselage of a large air liner having three decks 23, 24 and 25. Two longitudinal interior beam members 26 and 27 are provided. The lower flange which at the same time forms or carries the lower deck 25 is constructed in the same way as the lower flange in Figure 4. Additional intermediary flanges 28 and 29 are provided which contribute to the stiffening of the interior framework and which also extend outward so as to form the decks 23 and 24.

Figure 6 is a cross section through a fuselage of elliptic cross sectional configuration. The horizontal axis is smaller than the vertical axis. Longitudinal beam members 30 and 31 are provided in the interior of the fuselage and are held together by means of a common upper flange 32 and a common lower flange 33. These flanges form also a part of the wall portion of the fuselage. In addition, an intermediary flange 34 is provided which carries the upper deck 35. The upper flange 32 is provided with holes 36 for bolts and, in a similar way, the lower flange 33 which carries the deck 37 with holes 38. The intermediary flange 34 which is situated in the neutral zone of the beam and therefore contributes very little to increasing the strength of the beam system is provided with connecting holes 39. The lateral wall portions 40 of the fuselage are connected by means of bolts extending through the holes 36, 38 and 39. In case the interior of the fuselage is exposed to high pressure, the intermediary flange 34 together with the deck 35 carried by said flange serves as a tie member between the connecting points 39 and assures maintenance of the elliptic cross sectional configuration.

Figure 7 is a longitudinal section through a fuselage having longitudinal beam members 41 according to the present invention which are built of sheet material. The longitudinal beam members of which only one is shown are connected by means of a common upper flange 42 and a common lower flange 43 which carries the lower deck 44. There is also an intermediary flange 45 which carries the upper deck 48. In the web of the longitudinal beam which serves also as a partition wall between the gangway and the side chambers a plurality of doors 47 are arranged.

Figure 8 shows substantially the same construction as Figure 7. However, the longitudinal beams are composed of a framework 48 which is covered on one or both sides so that a smooth wall is formed.

While I believe the above described embodiments of my invention to be preferred embodiments, I wish it to be understood that I do not desire to be limited to the exact details of design and construction shown and described, for obvious modifications will occur to a person skilled in the art.

CLAUDE DORNIER.