

Sept. 25, 1928.

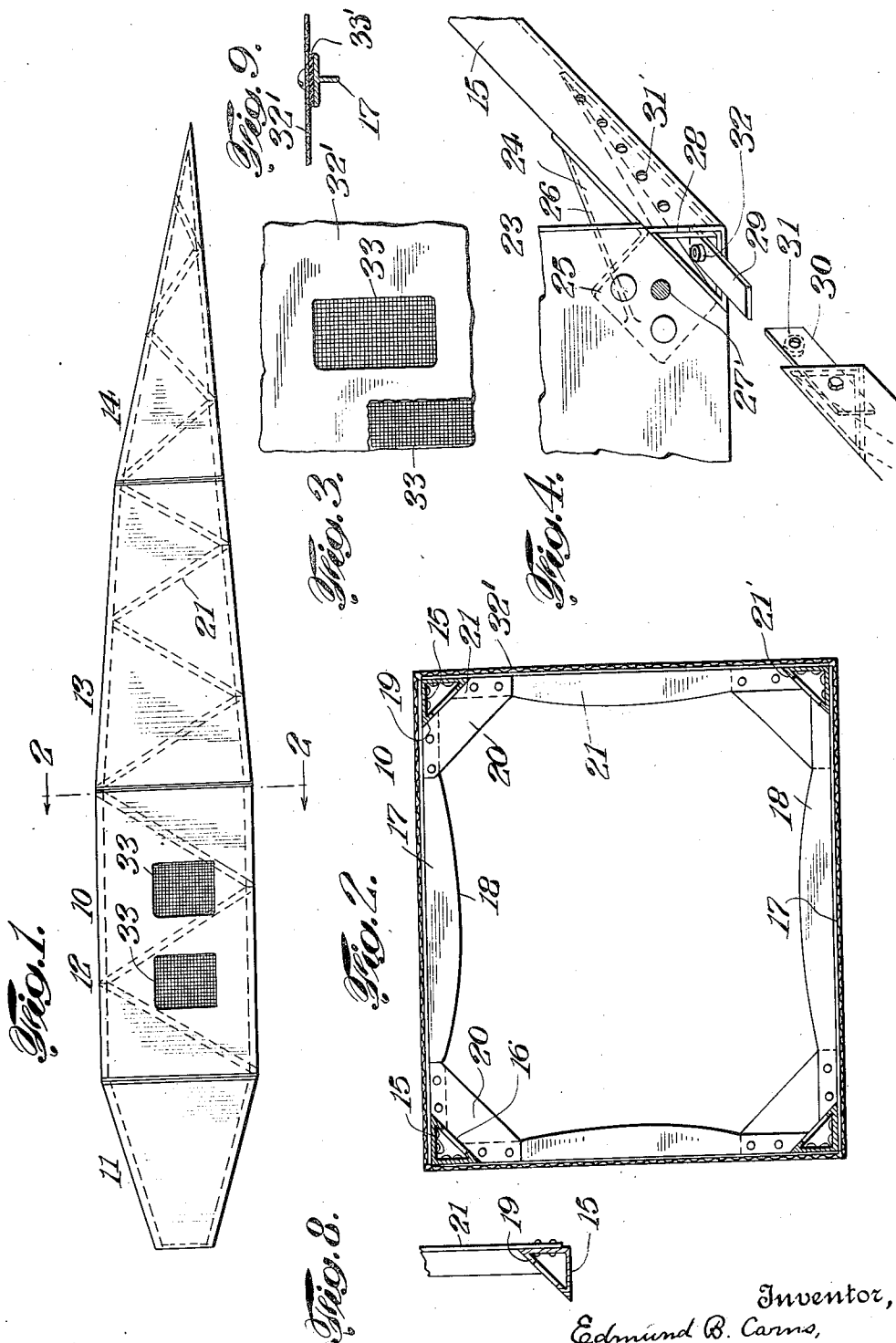
1,685,121

E. B. CARNS

FUSELAGE

Filed May 18, 1927

2 Sheets-Sheet 1



Inventor,
Edmund B. Carns,
By his Attorneys,
Hoquet & Neary.

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Fig. 7.

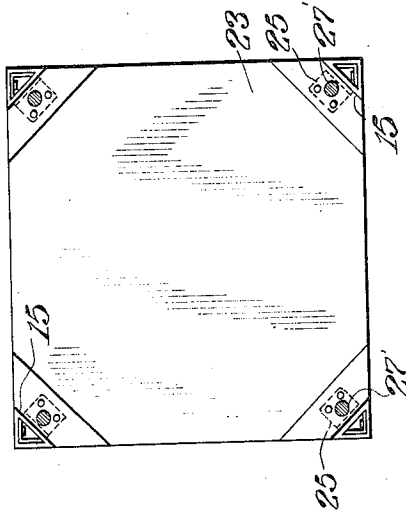


Fig. 5.

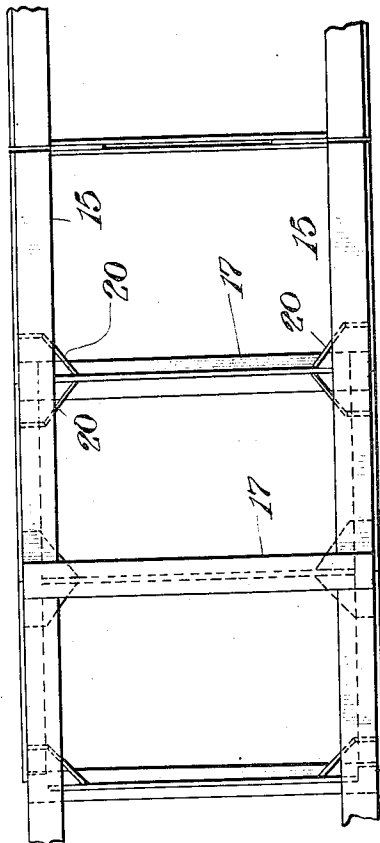
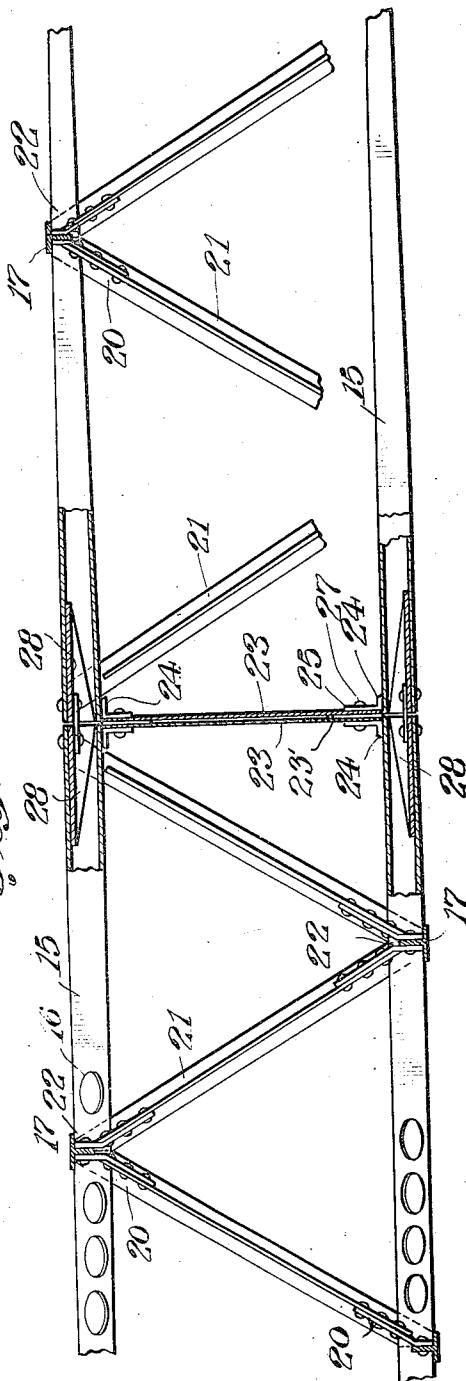


Fig. 6.



Inventor,
Edmund B. Carns.

By his Attorneys,
Hoquet & Neary.

UNITED STATES PATENT OFFICE.

EDMUND B. CARNS, OF NEW YORK, N. Y.

FUSELAGE.

Application filed May 18, 1927. Serial No. 192,243.

My invention relates to improvements in fuselages, and the object of my invention is to produce a simple, light, strong, and easily assembled fuselage.

5 My invention is further and especially intended to produce a fuselage in which the parts can be light, but disposed so as to comprise, when assembled, a stiff body, and to construct these parts so that they may be made conveniently and economically in duplicate, and the fuselage produced productively in large numbers, to advantage.

My invention is further intended to produce a structure which can be conveniently made in longitudinally separable sections, and with these sections constructed so that they can easily unite in a manner to make the body, as a whole, as rigid as if it were not sectional.

20 My invention is, also, intended to cover the frame with a metallic fabric, adapted to offer little air resistance and to give secure protection to the inside of the machine, and of such a character that parts may be readily left clear for requisite side openings such as doors and windows.

My invention, also, relates to details of construction which will be clearly pointed out below.

30 Reference is to be had to the accompanying drawings in which similar reference characters represent the corresponding parts in all views.

Figure 1 is a side elevation of a fuselage showing my improvements.

Figure 2 is a cross section showing an enlarged section on the line 2—2 of Figure 1.

Figure 3 is a broken detail in elevation showing the cover openings.

40 Figure 4 is a broken detail perspective view illustrating the manner of connecting adjacent longérons.

Figure 5 is a broken plan view of a part of the frame.

5 Figure 6 is a broken side elevation, partly in section, showing the details of the frame construction.

Figure 7 is a cross section showing a bulk head, and its connection with the longérons.

9 Figure 8 is a fragmentary view showing a connection between a longéron and an adjacent part, and Figure 9 is a detail section illustrating the manner of applying the cover.

The fuselage 10 is preferably made up in

longitudinally separable sections, each complete in itself, and shaped to give the desired contour to the body when the latter is assembled.

I have shown the sections 11, 12, 13, and 14, but so far as my invention is concerned, there may be a greater or less number of these sections and, in fact, certain features of the construction, as will appear, are applicable to a body which is not of separable sections.

65 The body of the fuselage or, more specifically, its frame, has longérons 15 which are preferably triangular in cross section and are, in any event, tubular, or substantially so, these having openings 16 in one of the flat sides, to lighten the longérons and to afford access for riveting or fastening operations. The triangular shape of the longérons causes them to fit nicely in the corners of the frame, especially if the frame is rectangular in cross section, which it preferably is, and if this shape is departed from, the longérons have external flat sides to enable the cover to fit upon them, and to enable the struts and ribs presently referred to, to have a firm bearing on and secure connection with the longérons.

85 The longérons, when united end to end, form each a complete longéron, and taper as shown in Figure 6, from the mid-section of the fuselage or body, toward the ends.

The two upper longérons 15 and, also, the two lower longérons, are connected together by cross ribs 17 which are in the form of Ts of substantially conventional shape, except that the Ts have their webs bellied or thickened in the center, and tapering towards the ends.

95 Where the ribs are connected with the longérons, the web part is cut away as shown in Figure 2 at 19 so as to fit the inner oblique face of a longéron, while the flange part is left plain so as to lie against the top or bottom flat side of a longéron, to which it is riveted or otherwise fastened as the drawing shows. Thus, the cross ribs are essentially dove tailed to the longéron in a simple manner, so as to bear upon two faces thereof, and when they are fastened to the longéron, the bracing, while simple, is especially secure.

105 At the corners of the body, the cross ribs 17 connect by straps or braces 20, with the struts 21, on the sides of the frame, and each

strap or brace 20 is preferably of sheet metal, has its inner edge bearing against the adjacent longéron, and its end portions riveted or otherwise securely fastened to the adjacent
5 rib 17 and strut 21.

The struts 21 are vertically arranged, and connect the upper and lower longérons 15 on each side, and the struts are diagonally disposed to act like cantilever braces. They
10 are preferably similar in shape to the ribs 17 already described, and where the straps or braces 20 connect with the ribs 17, they fit snugly against and are riveted or fastened to the webs of the ribs as shown at 22.

This structure is especially designed to be made up in sections which can be readily fastened together, and each section has, at the end, a transverse bulk head 23, which can be of sheet metal, so that the bulk heads of adjacent sections will lie flat against each other, as in Figure 6, and the bulk heads, as illustrated, are shown as complete sheets, but their middle portions can be cut away, if desired.

Where the bulk heads join the longérons 15, angle braces 24 can be advantageously used, these being fastened, and having a long bearing on the longéron, and having their flanged parts 25 braced by ribs 26, see Figure 4, and riveted or otherwise fastened, as at
20 27, to the bulk heads. At these corner portions of the bulk heads gaskets 23' are preferably placed between them to absorb and prevent the transmission of metallic sound waves.

At these points, at least one relatively large bolt or rivet 27' is preferably extended through the flanges 25, and bulk heads 23.

Each longéron section has, at its end, an internal angle brace 28 which fits at least two sides of a longéron, and serves to stiffen the longéron at this point, and, also, makes a thicker and better connection for the tongues 29 and 30, as shown in Figure 4.

One tongue or tenon 29 is rigidly fastened at one end to one of the braces 28, and on one face thereof, while a second tongue or tenon 30 is secured to another face at an angle to the first and on the second longéron, so that when the longéron or frame sections are brought together, these tongues or tenons will project into the two abutting longérons, and will lie against two faces which are at an angle to each other.

A series of holes 31' can be provided through the longéron and its brace, to receive fastener rivets, and the tongue has a corresponding hole 31.

When the adjacent fuselage sections are brought together, and the tongues are in place, they can be riveted or folded, or otherwise fastened, and if bolts are used, the tongue 29 or 30 can have a thickened or nut part 32 on the back, so as to form a longer and better gripping surface for the bolt.

It will be seen that the frame sections can

thus be very readily and firmly secured together. Each section or the frame of the fuselage, as a whole, is provided with a suitable cover, and I prefer to use a cover 32' which is a flexible metallic fabric and is, preferably, an air tight metal mesh the interstices of which are sealed.

This is the cover that I prefer to use, as it is strong, wind proof, easily applied, and offers little air resistance; furthermore, I can protect the parts of the wire mesh body so that no deposition will take place thereon, and these parts can correspond to the sight openings 33, and at such places, the wire mesh can be covered with a transparent material which will keep out wind, but will not materially interfere with vision. In applying this cover I place relatively soft and preferably non-hygroscopic strips 33', see Figure 9, between the cover and the parts of the frame against which it would otherwise lie. This prevents the crystallizing and breaking of the cover at such parts.

I claim:

1. A fuselage having, at the corners, triangular tubular longérons, transverse ribs connecting the upper longérons and, also, the lower longérons, rigidly disposed struts connecting the upper and lower longérons on each side of the fuselage, and diagonal braces connecting the adjacent struts and ribs, and, also, bearing against the longérons.

2. A fuselage of rectangular cross section, having sectionally triangular tapering longérons at the corners, transverse T ribs connecting the upper longérons, and, also, the lower longérons, rigidly disposed struts connecting the upper and lower longérons on each side of the fuselage, and diagonal braces connecting the adjacent struts and ribs, and, also, bearing against the longérons.

3. A fuselage of rectangular cross section, having sectionally triangular tapering longérons at the corners, transverse T ribs connecting the upper longérons and, also, the lower longérons, rigidly disposed T struts connecting the upper and lower longérons on each side, and diagonally disposed braces connecting the struts and ribs, and bearing against the longérons.

4. A fuselage having essentially triangular longérons at the corners, transverse ribs of T cross section connecting the upper longérons and, also, the lower longérons, said ribs having their flange portions lying against certain flat faces of the longérons and their web portions abutting with other faces thereof, and struts connecting the upper and lower longérons on each side of the fuselage.

5. A fuselage having triangular longérons disposed at the corners of the fuselage, and struts and braces connecting the longérons, the struts and braces being of T cross section, and with the end portion of their webs shaped to fit the inner faces of the longérons, while

their flange portions lie flat upon the outer faces of the longérons.

6. A fuselage composed of longitudinally separable sections, each having tubular triangular longérons at the corners, transverse abutting bulkheads, and means for fastening the bulkheads between the sections and the abutting longéron ends together.

7. In a structure of the kind described, the combination with the triangular longéron of a transverse bulkhead and angular braces connecting the bulkhead and longérons, said braces having flanges attached to the longérons and bulkheads.

8. A structure of the kind described, comprising separable fuselage sections, each having transverse bulkheads adapted to lie one against the other, corner triangular tubular longérons adapted to abut end to end, braces fastened to the longérons and bulkheads, means for fastening the longérons together end to end, and fastening elements extending through the adjacent bulkheads and their braces.

9. In a structure of the kind described, the combination with the angular tubular longérons adapted to abut end to end, of tongues or tenons entering the adjacent longérons and disposed so as to lie against at least two faces of the longéron.

10. In a structure of the kind described, the combination with the separable longérons, adapted to abut end to end, of internal angle braces secured to the longérons at their end portions, and tongues or tenons entering the

abutting longérons, and secured to at least two faces thereof.

11. A fuselage having a frame, and a covering therefor comprising an air tight metal fabric with a wire mesh body having sealed interstices with parts of the sealing omitted to form openings through the cover.

12. A fuselage composed of longitudinally separable sections, with meeting bulkheads at the junction of the sections, means for fastening the sections and bulkheads together at the corners, and gaskets disposed between the corner portions of the bulkheads.

13. A fuselage having a drum tight metallic cover and shock absorbing material between the cover and adjacent parts of the fuselage frame.

14. A fuselage having tubular tapering longérons with flat sides, at least one of which has openings therethrough, and with bracing parts lying against and secured to such flat longéron sides.

15. A structure of the kind described comprising separable fuselage sections adapted to be fastened together end to end, said sections having at the corner tubular longérons which taper progressively whereby when the sections are fastened together the complete longérons of the fuselage will taper from the middle portions to the end portions of the fuselage.

In testimony whereof, I have signed my name to this specification this 13th day of May, 1927.

EDMUND B. CARNES.