

March 16, 1926.

1,576,559

J. K. SWIFT

STRUCTURAL MATERIAL

Filed August 3, 1925

2 Sheets-Sheet 1

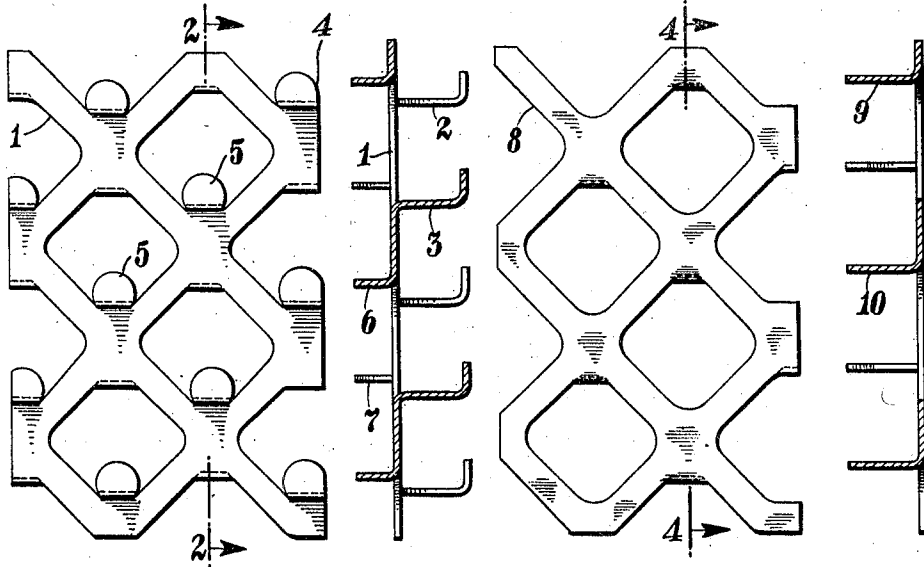


FIG. 1.

FIG. 2.

FIG. 3.

FIG. 4.

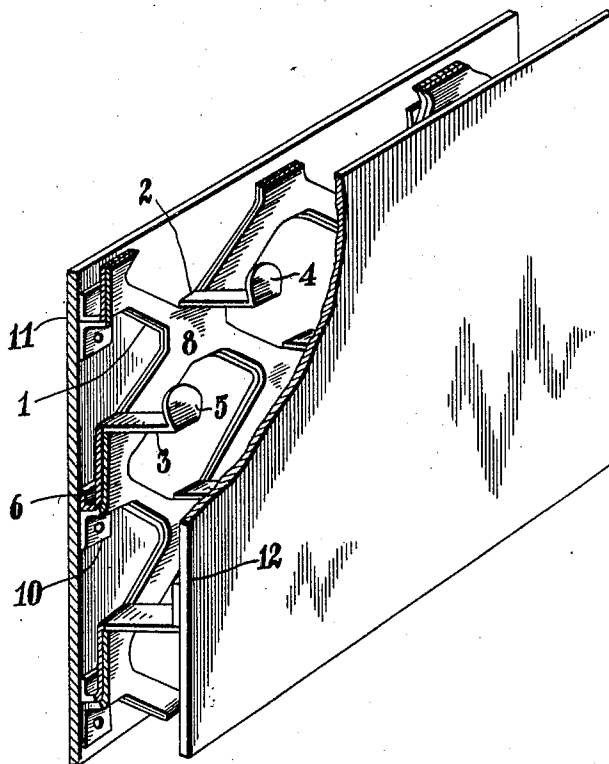


FIG. 5.

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2 Sheets-Sheet 2

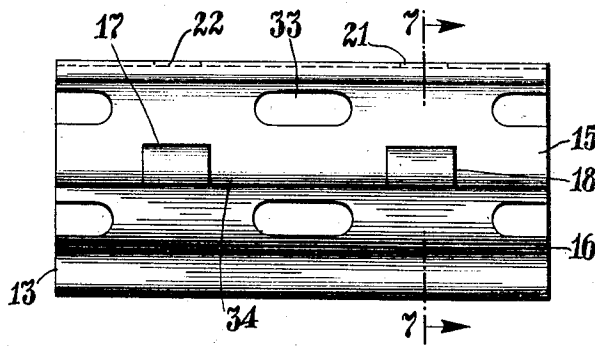


FIG. 6.

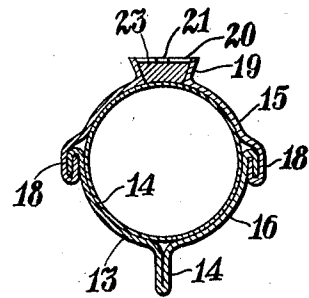


FIG. 7.

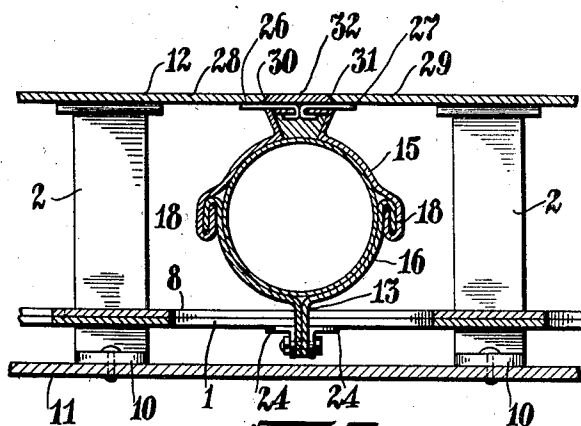


FIG. 8.

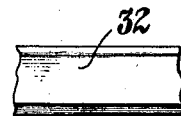


FIG. 9.



FIG. 10.

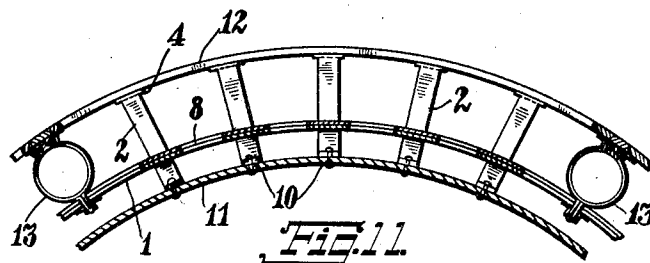


FIG. 11.

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## UNITED STATES PATENT OFFICE.

JOSEPH KAY SWIFT, OF BROOKLYN, NEW YORK.

## STRUCTURAL MATERIAL.

Application filed August 3, 1925. Serial No. 47,735.

*To all whom it may concern:*

Be it known that I, JOSEPH KAY SWIFT, a subject of the King of Great Britain, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Structural Materials, of which the following is a specification.

This invention relates to improvements in structural materials, and especially of that type adapted for aircraft bodies, or any vehicles or structures requiring great strength combined with lightness of weight, and the chief object of my invention is to provide an article of the character described which shall possess the above mentioned qualities and at the same time be of simple form of construction and readily adapted to be fitted and secured in such various contours and shapes as the requirements may demand.

Further objects are to provide a material which may be used as a retainer for fillers intended to withhold or exclude heat or cold, or to act as a non-conductor of sound vibrations and the like.

Other objects and characteristic features of my invention will become more fully apparent in the following description and disclosed in the accompanying drawings; in which:—

Fig. 1 shows a portion of perforated material having projecting members bent outwardly therefrom in opposite directions.

Fig. 2 shows a section on the line 2—2 of Figure 1.

Fig. 3 shows a portion of perforated material having projecting members bent outwardly from one of its surfaces.

Fig. 4 shows a section on the line 4—4 of Figure 3.

Fig. 5 shows a perspective view of the above portions secured to each other and forming a medium of attachment between a frame member and an outer panel, a portion of which is cut away to show details of construction.

Fig. 6 shows a side view of a tubular re-inforcement.

Fig. 7 shows a section on the line 7—7 of Figure 6.

Fig. 8 shows the tubular re-inforcement mounted between the perforated structure and a panel secured thereto.

Fig. 9 shows a strip of beveled material.

Fig. 10 shows a section of the beveled material.

Fig. 11 shows the structural material secured to a curved frame section and having tubular re-inforcements between the said material and an outer panel secured thereto.

Referring more particularly to the component parts of my invention; a sheet of perforated material 1 has bent outward from its surface a series of tie members as shown at 2 and 3, the said tie members having disk shaped ends upturned therefrom as shown at 4 and 5. Short tongues as shown at 6 and 7 are bent outward in a direction opposite to that of the tie members.

A second sheet of material 8 has bent outward from its surface long tongues as shown at 9 and 10. The sheet 1 is secured to the sheet 8 by spot welding, or in any suitable manner in such a position that the perforations of both sheets are in coincidence; the tie members projecting through the perforations in the sheet 8 and the long and short tongues lying close together.

The members thus described comprise the main element of my invention, and the structural material thus formed is adapted to be secured to a frame member as shown at 11 and to have its disk members 4—5, etc., welded, or otherwise secured to a panel as shown at 12.

It will be seen that the structural material thus formed provides a means for securing a finishing panel to any structure and at the same time greatly increases the strength of the whole, while adding the minimum of weight thereto.

Additional strength may be provided by the use of the tubular re-inforcement 13, a brief description of which is as follows: A tube 14 is encased by an upper member 15 and a lower member 16, the two being secured together by the interlocked seams as shown at 17 and 18. The upper member is formed as shown at 19 having a flat upper surface 20 in which, at intervals are slots as indicated at 21 and 22. A suitable filler may be enclosed within the casing at this point as shown at 23. The lower member of the said re-inforcement has along the bottom portion thereof a longitudinal tongue 14 perforated at intervals for bolting to the main element. When required, this re-inforcing member may be applied in the following manner: Angle pieces as shown at 24 and 25 are welded, or

otherwise secured to the main element, and in turn bolted to the tongue 14. U plates 26 and 27 are secured to the surface 20, being inserted within the slots thereof. These U plates in turn are welded, or otherwise secured to sections of panelling as shown at 28 and 29, the said sections having bevelled edges thereon as shown at 30 and 31. A bevel strip 32 is inserted between the edges of the sections 28 and 29 and secured in position by peening, soldering, or in any suitable manner. This produces a smooth, flush finish on the outer panel. Perforations as shown at 33 and 34 serve to lighten the weight of the tubular member.

The structural material may be applied to produce stream line effects on curved surfaces in the manner shown in Figure 11 of the drawings. It will be seen that with the tongues of the main element secured to a frame section as shown, the tie members radiate therefrom giving the required spread at the points where they are secured to the panel member.

It will be seen that the invention as shown and described may, in its various forms be adapted to a variety of purposes in all of which it fulfills the objects set forth in the foregoing specification.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is as follows:

1. In a structural material of the class described, a sheet of perforated material having projecting members, flat ends on the said members adapted for attachment to a panel or the like, and tongues projecting from the surface of the said sheet opposite to that first described, secured to the said sheet a secondary sheet also perforated and with the said perforations coinciding with those of the first sheet, tongues projecting from the said secondary sheet in contact with the tongues of the first and forming with them bifurcated clips adapted to secure the whole to a basic structure substantially as shown and described.

2. In a structural material of the class described, a double perforated sheet of suitable material, the parts thereof securely attached together, tie members projecting from one surface of the said sheet, the said tie members having disk shaped ends at right angles to their length and adapted to be secured to a panel or the like, bifurcated tongue members projecting from the reverse surface of the said sheet with ends turned flat and adapted for securing the

whole to a basic structure, substantially as shown and described herewith.

3. In a structural material of the class described, an element consisting of two sheets of material perforated with a series of diamond shaped openings, the said sheets suitably secured together with the openings in coincidence, tie members with flat upturned ends projecting from one surface of the said element and bifurcated tongues projecting from the opposite side thereof, the said tongues and tie members serving to secure together a panel and a basic structure, substantially as shown and described.

4. In a structural material of the class described, a structural element comprising a double perforated sheet of material with tie members projecting from one surface thereof and adapted for securing to a panel or the like, bifurcated tongues projecting from the opposite side of the said element and adapted for securing to a basic structure, and intervening between, and secured to the said element and a panel surface, a tubular re-inforcement consisting of an upper and a lower casing locked together around a central tube, substantially as shown and described herewith.

5. In a structural material of the class described, an element consisting of sheets of suitable material secured together, the said sheets perforated in series and the said perforations in coincidence with each other, and tie members projecting from one surface of the said element, the said tie members having upturned flat ends adapted for securing to a panel surface, and tongue members projecting from the reverse side of the element and adapted for securing to a basic structure, and secured to the said element a tubular re-inforcement having means for attachment on one side to a panel, substantially as shown and described.

6. In a structural material of the class described, a tubular re-inforcement consisting of an upper and a lower shell secured around a central tube by means of interlocking seams, a longitudinal tongue on the lower casing and a flat surfaced member on the upper casing, slots in the said upper member adapted for receiving U clips and means for securing the whole between a panel on the one side and a perforated structural element on the other side, all as shown and described herewith.

In testimony whereof I have affixed my signature.

JOSEPH KAY SWIFT.