Oct. 11, 1927. 1,645,060

H. T. KRAFT

TRUSS CONSTRUCTION

Filed July 11, 1925

Fig. 1.

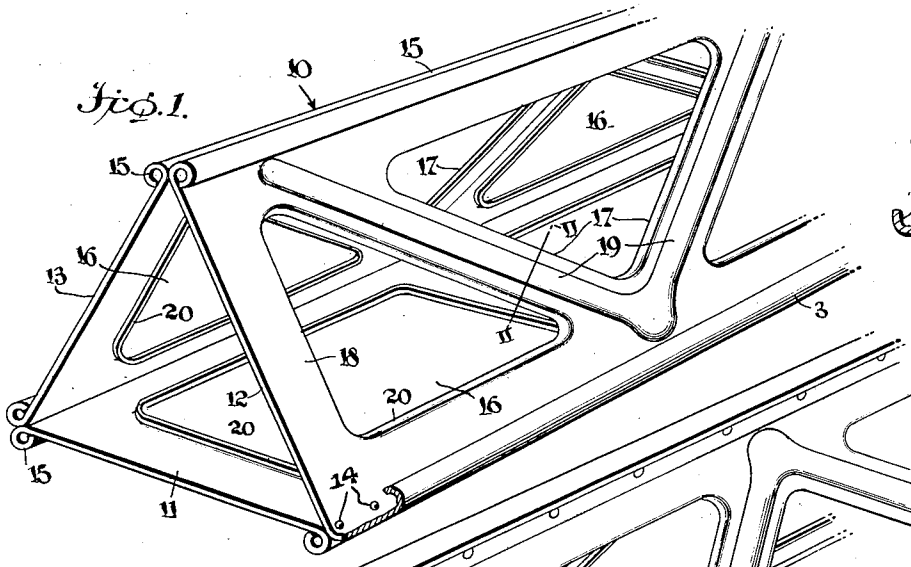


Fig. 2.

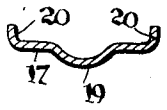


Fig. 3.

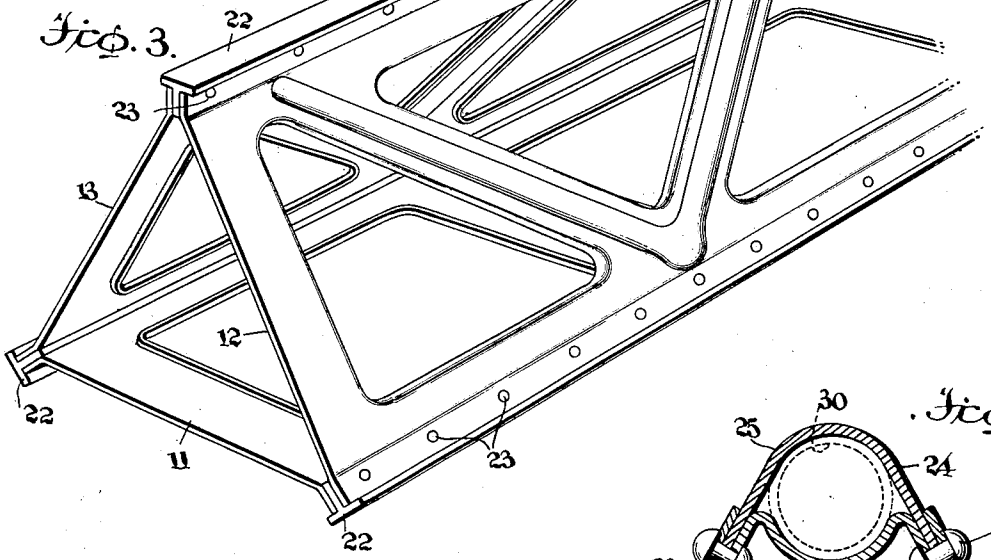


Fig. 4.

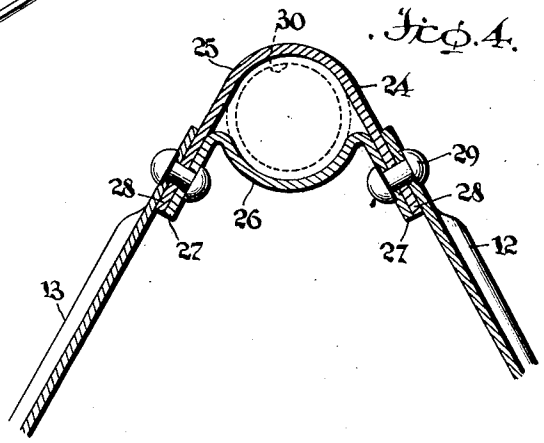
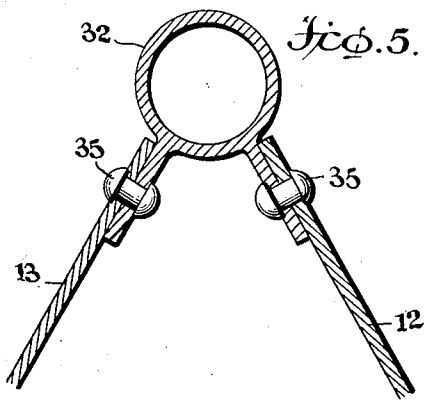


Fig. 5.



INVENTOR

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BY

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Patented Oct. 11, 1927. 1,645,060

UNITED STATES PATENT OFFICE.

HERMAN T. KRAFT, OF AKRON, OHIO, ASSIGNOR TO THE GOODYEAR TIRE & RUBBER COMPANY, OF AKRON, OHIO, A CORPORATION OF OHIO.

TRUSS CONSTRUCTION.

Application filed July 11, 1925. Serial No. 43,006.

My present invention relates to fabricated trusses or columns and it has particular relation to structures of the character designated which are adapted to be employed in the superstructure of rigid or semi-rigid airships.

One object of my invention consists in providing a novel type of column or girder which is relatively light in weight, simple and inexpensive in construction, and which is particularly adapted to withstand great bending or compressive stresses.

Another object of my invention is to provide a column or girder in which comparatively few structural members are embodied and in which a novel means of reinforcement is employed.

Heretofore, in the construction of girders and columns for the superstructure of aircraft, particularly those employed in rigid airships, an excessive amount of labor was required in securing together the lattice work incident to the fabrication of such trusses. This being true, it will be apparent that structures of this nature can be produced economically only in localities where labor is plentiful and in the production of devices in which the cost of such labor is a relatively minor item of consideration with respect to the total expense.

Instead of employing a great number of separate lattice members in the construction of structural elements of an aircraft, I have provided sheets of metal so perforated that web members similar to the lattice members are formed integrally with the longitudinal elements of the trusses or girders. This form of structure insures more inherent strength than that found in trusses formed by separately riveting numerous lattice members. Moreover, in structures where numerous rivets are employed, the riveting often causes well-known undesirable variation in the strength of such structures. The ratio between the value of waste material caused by perforating or punching sheet metal in constructing a column in accordance with my invention and the labor cost in constructing an intricate lattice work, favors the punching process of manufacture as being very much less expensive.

A second feature of my invention consists in providing novel reinforcing members adapted to be used in conjunction with girders or trusses of the usual quadrilateral or triangular cross-section. These reinforcing members are in the form of tubular or angular members secured to the columns at the points where longitudinal elements are connected, thus providing great strength at the point where it is most needed, that is, along the corners defined by the angular configuration of the truss.

For a better understanding of my invention reference may now be had to the accompanying drawings, forming a part of this specification, of which;

Fig. 1 is a perspective view of a triangular column or girder constructed in accordance with the principles of my invention;

Fig. 2 is a cross-sectional view of a structural web member, the section being taken substantially along the line II—II of Fig. 1;

Fig. 3 is a perspective view of a triangular truss illustrating another form of my invention;

Fig. 4 is a fragmentary cross-sectional view of a truss member illustrating another form which my invention may assume; and

Fig. 5 is a fragmentary cross-sectional view similar to that shown in Fig. 4 illustrating an additional embodiment of my invention.

In practicing my invention, I have provided a column or girder 10 which consists of elongate metal side members 11, 12, and 13 arranged in the form of a triangle in cross-section and secured together by means of rivets 14 adjacent their meeting edges. Each of the members 11, 12, and 13, is formed with a longitudinally extending rolled tubular edge portion 15 encasing the heads of the rivets 14. Because of the location and formation of the reinforcing tubular members 15 at the corner of the triangular structure, material strength is added thereto to resist

compression, shearing or any other stresses to which trusses of this nature are commonly subjected.

For the purpose of reducing the weight of the truss and at the same time maintaining adequate strength thereof, each of the members 11, 12, and 13 is perforated or punched, as indicated at 16, in order to form integral web or lattice members 17, extending diagonally of the truss. Additional transverse integral members 18 are formed at the ends of the members 11, 12, and 13. Further rigidity and strength is added to the member 17 by crimping the central portion 19 and bending the edges 20, as clearly illustrated in Fig. 2. The crimping operation may be accomplished in the same operation as that by which the side members are perforated.

The form of my invention illustrated in Fig. 3 is similar to that shown in Fig. 1 with the exception that the tubular edges 15 are omitted and reinforcing T-shape bars 22 are employed at the corners of the truss and are confined between the adjacent edges of the members 11, 12, and 13. Suitable rivets 23 secure the side members and the T-shape members together. The stamped or punched configuration of the side members 11, 12, and 13 illustrated in this embodiment of my invention is identical with that described with reference to Fig. 1.

An additional form of my invention, as illustrated in Fig. 4, relates to a reinforcing structure suitable for incorporation at the corners formed by the adjacent edges of the members 11, 12, and 13. The reinforcing members, in this instance, consist of a tubular member 24 formed of two arcuate conjugate sections 25 and 26 of sheet metal which extend longitudinally of the truss members 11, 12, and 13. Flanges 27 and 28 formed upon the sections 25 and 26, respectively, engage each other and provide connecting edges which are secured to the members 12 and 13 by means of conventional rivets 29. If it is desired to provide still greater strength at the corners of the truss, an additional tubular member 30 may be disposed within the member 24.

Referring to Fig. 5, I have illustrated another form of my invention in which a tubular member 32 is secured at the corners of the truss member. This tubular member is provided with integral flanges 33 and 34 which are adapted to be riveted to the side members 12 and 13, as indicated at 35.

From the foregoing description it will be apparent that I have provided a novel construction of truss or girder which is composed of relatively new elements and which is adapted to offer great resistance to bending or tensional forces to which the superstructure of an aircraft may be subjected.

Although I have illustrated but the preferred forms which my invention may assume and have described those forms in detail, it will be apparent to those skilled in the art that the invention is not so limited but that various minor modifications and changes may be made therein without departing from the spirit of my invention or from the scope of the appended claims.

What I claim is:

1. A rigid metal support comprising elongate members riveted together and tubular reinforcing elements symmetrically arranged with respect to the members extending longitudinally of the support.

2. A metal column comprising a plurality of elongate side members having integral crimped lattice members formed therein, substantially closed tubular reinforcing members tangentially disposed with respect to each other and to the side members, and securing means connecting the side members along the line of the reinforcing members.

3. A rigid elongate metal support comprising a plurality of substantially flat angularly disposed plates connected together adjacent their edges, each of said plates being composed of a single piece of stamped metal of lattice configuration and substantially closed tubular reinforcing means formed in pairs tangent to each other on the edges of said plates.

4. A rigid elongate metal support comprising a plurality of angularly disposed perforated side members, rivets for interconnecting the members adjacent their edges and tubular reinforcing members encasing the heads of the rivets, said tubular members extending along the edges of the side members.

5. A column comprising a plurality of metal side members secured together adjacent their edges, integral elongate web members extending between the edges of each side member, rivets connecting the side members adjacent their edges and tubular members formed integrally from the edges of each side member beyond the rivets in tangentially disposed pairs.

6. A metal girder comprising a plurality of elongate side members, the edges of the side members meeting at angles to each other, each of the side members comprising a plurality of crimped web portions formed by stamping, and an integral tubular portion formed separately along each of the edges of said side members.

7. A metal support comprising a plurality of angularly disposed side members connected together, crimped lattice members formed integral with each side member integral inturned flanges entirely surrounding each opening formed by the lattice members and longitudinally extending oppositely rolled tubular members formed integral with the contiguous edges of said side members.

8. A rigid metal support comprising

elongate members rigidly interconnected at their edges and reinforcing units for the support symmetrical with respect to the members and arranged externally of the interconnected edges.

9. A rigid metal support comprising elongate members rigidly interconnected adjacent their edges in polygonal formation and longitudinal reinforcing members extending beyond the interconnected portions symmetrically arranged with respect to the edges of the adjacent elongate members.

In witness whereof, I have hereunto signed my name.

HERMAN T. KRAFT.