June 3, 1924.

1,496,304

C. DORNIER

HOLLOW METAL SPAR

Filed June 28, 1920

Fig. 1.

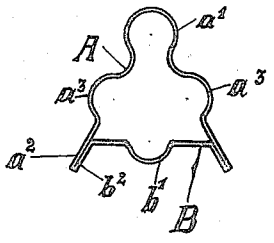
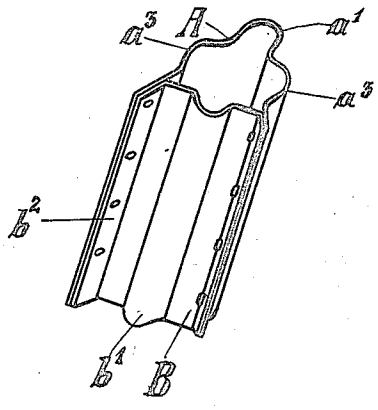


Fig. 2.



INVENTOR:

Claudius Dornier.

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UNITED STATES PATENT OFFICE.

CLAUDIUS DORNIER, OF FRIEDRICHSHAFEN, GERMANY.

HOLLOW METAL SPAR.

Application filed June 28, 1920. Serial No. 392,554.

To all whom it may concern:

Be it known that I, CLAUDIUS DORNIER, a citizen of the German Empire, residing at Friedrichshafen a/B., Germany, have invented certain new and useful Improvements in Hollow Metal Spars (for which I have filed application in Germany October 22, 1914), of which the following is a specification.

My invention refers to riveted hollow spars especially destined for air-craft construction and distinguished by great lightness combined with great resistance against compressional and bending strains.

The hollow spars known hitherto, are often made from seamless tubes. For transformation into the desired shape the tubes are worked from the outside in such a way as to form by folding in their longitudinal direction shanks which form the stiffening webs and serve as flanges. This type of spar can be applied satisfactorily even with plate of comparatively large thickness. In the case of plate of relatively small thickness as compared to the cross section of the spar, as required in air-craft construction for the purpose of economizing weight, the form and construction of the spars and posts hitherto known, fail completely: For, owing to the small thickness of the plates, the sides of a hollow spar of triangular section are apt to collapse. Moreover, a tube consisting of a material such as steel or duralumin which can be worked only with difficulty, cannot be subjected to a subsequent accurate shaping operation by rolling or pressing.

Furthermore the folding of the thin plates which is necessary for the formation of the flanges, results in a decrease of strength exactly in those places which play the leading role in connecting the spar with other constructional members.

It is an object of my invention to obviate these drawbacks and to obtain from thin sheet metal hollow spars which combine great safety against collapsing with the least possible weight, and which can be produced with any desired degree of accuracy and allow of an easy connecting with other constructional parts, so that they can be employed to special advantage in air-craft construction. The hollow metal spar according to my invention is formed by a thin walled longitudinally corrugated sheet metal strip of V-section and an equally thin walled channel bridging the spar between the shanks of the first strip and connected thereto by rivets.

In the drawings attached to this specification and forming part thereof,

Fig. 1 is a cross section and

Fig. 2 a perspective view of a spar embodying my invention.

The sheet metal strip has two conveying shanks forming a V with a rounded common edge a^1. The free end a^2 of each shank is plane and serves as a flange. Each shank is provided with at least one longitudinal corrugation a^3.

The sheet metal strip or channel B forming the third side has two flanges b^2 which connect the two shanks of the strip A and also serve to connect therewith other constructional parts, such as stays for instance. The flanges b^2 preferably extend approximately in the direction of the shanks of the strip A and have such a position with regard to the central plane that any struts which may be attached to their outer sides are situated within the triangle enclosing the spar on the outside. In order to allow of connecting the spar to other constructional parts, not only laterally by means of two flanges, but also in its central plane, the strip B is also provided with a longitudinal corrugation b^1.

By forming the hollow metal spar of two strips of plate, several advantages are gained. The two parts of the spar can be rolled separately or, in view of the thin sheet metal employed, be drawn with or without previous rough-rolling on the flanging-machine, and in doing so a degree of accuracy can be attained which would be impossible in the case of a subsequent rolling or pressing of a seamless tube, on account of the peculiar cross-section and the thickness of the walls even if a mandrel were employed.

Besides aluminum very thin high-class steel plate may also be used in the construction of the novel spar which has a considerably smaller weight and greater strength than those employed hitheto.

Owing to one edge of the spar being rounded, a girder composed of several such spars can be covered with textile fabric without danger of the fabric being damaged by a sharp edge.

I wish it to be understood that I do not desire to be limited to the exact details of

construction and configuration shown and described, for obvious modifications will occur to a person skilled in the art.

I claim:—

1. Hollow metal spar for use in aircraft construction and the like, comprising in combination, a thin-walled, longitudinally corrugated sheet metal strip of substantially V-section and a thin-walled strip of substantially U-section having its lateral webs riveted to the inner faces of said V-shaped strip.

2. Hollow metal spar for use in aircraft construction and the like, comprising in combination, a thin-walled longitudinally corrugated sheet metal strip of substantially V-section and a thin-walled strip of substantially U-section having its lateral webs riveted to the inner faces of said V-shaped strip, the longitudinal edges of said strips adjoining one another.

3. Hollow metal spar for use in aircraft construction and the like, comprising in combination, a thin-walled longitudinally corrugated sheet metal strip of substantially V-section and a thin-walled longitudinally corrugated strip of substantially U-section having its lateral webs riveted to the inner faces of said V-shaped strip.

In testimony whereof I affix my signature.

CLAUDIUS DORNIER.