

Feb. 2, 1926.

1,571,238

C. DORNIER

WOODEN GIRDER

Filed June 28, 1920

2 Sheets-Sheet 1

Fig. 1.

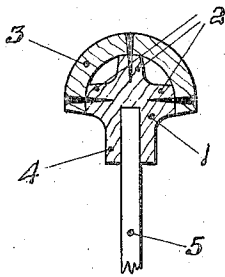


Fig. 4.

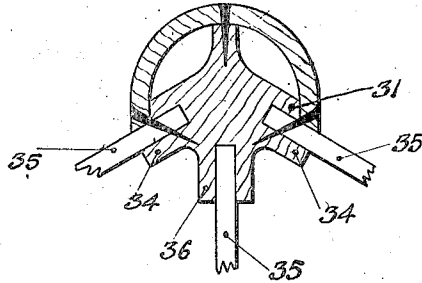


Fig. 2.

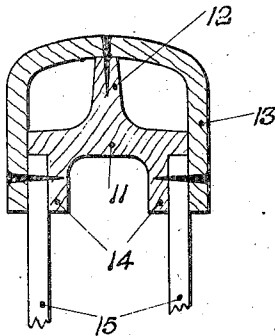


Fig. 5.

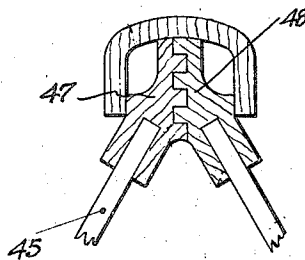


Fig. 3.

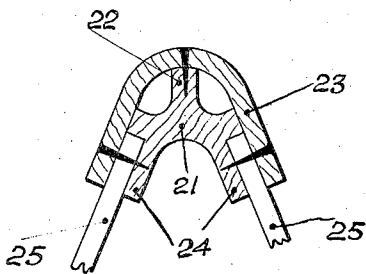
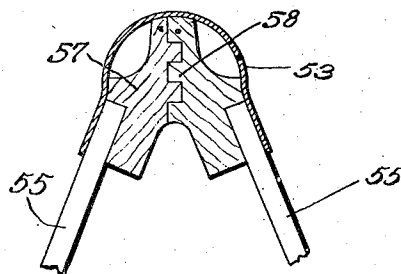


Fig. 6.



INVENTOR:

Claudio Dornier.

by R. K. H. H. H.
Att

Feb. 2, 1926.

1,571,238

C. DORNIER

WOODEN GIRDER

Filed June 28, 1920

2 Sheets-Sheet 2

Fig. 7.

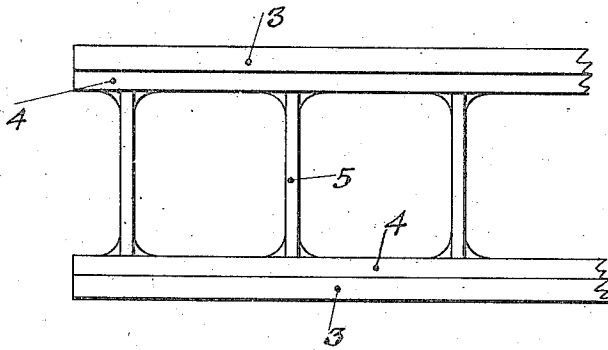


Fig. 9.

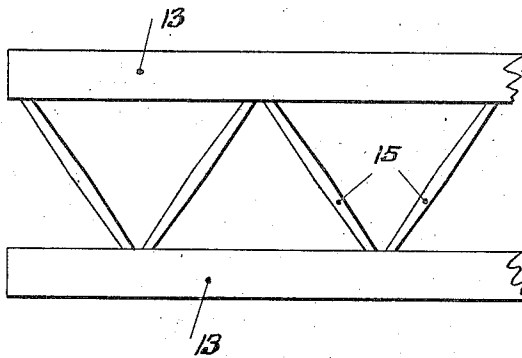


Fig. 11.

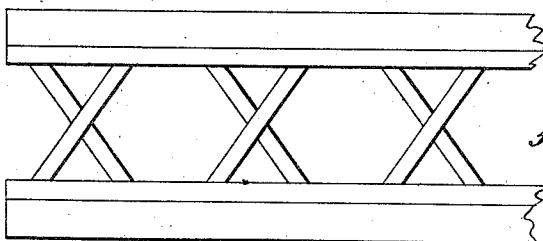


Fig. 8.

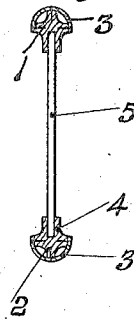


Fig. 10.

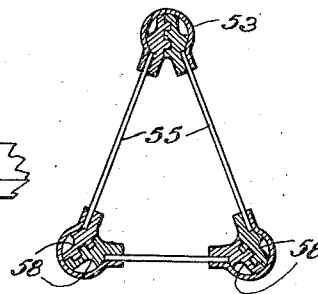
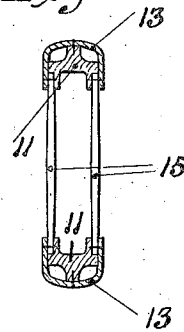


Fig. 12.

INVENTOR:

Claudio Dornier.

By *W. H. H. H. H.*
Atty.

Patented Feb. 2, 1926.

1,571,238

UNITED STATES PATENT OFFICE.

CLAUDIUS DORNIER, OF FRIEDRICHSHAFEN-ON-THE-BODENSEE, GERMANY.

WOODEN GIRDER.

Application filed June 28, 1920. Serial No. 392,556.

(GRANTED UNDER THE PROVISIONS OF THE ACT OF MARCH 3, 1921, 41 STAT. L., 1313.)

To all whom it may concern:

Be it known that I, CLAUDIUS DORNIER, a citizen of the German Empire, residing at Friedrichshafen-on-the-Bodensee, Germany, have invented certain new and useful Improvements in Wooden Girders (for which I have filed application in Germany, August 25, 1915, Patent No. 298,584), of which the following is a specification.

My invention refers to frame work girders and more especially to the construction of boom members for girders especially used in the construction of air craft, which are to be made as strong and at the same time as light as possible. In order to reduce their own weight as much as possible in spite of an increased resistance against forces acting from outside, especially bending forces, according to the invention members are used, which due to their special design assisted by their material possess a high moment of inertia at a given weight per unit of length, and which afford good connections for other structural parts.

Thus the object of my invention is a boom member for wooden girders, especially suitable for the construction of air craft, in which the section of the boom member is composed of a core consisting of one or several divisions with rib-like longitudinal webs partly grooved for inserting branch bars and of a cap partly enclosing the webs like a mantle.

In the drawings affixed to this specification and forming part thereof several modifications of a girder embodying my invention are illustrated by way of example.

Fig. 1 is a cross section of a flange member adapted to receive a single row of panel rods,

Fig. 2 is a similar view of a flange member with two rows of panel rods extending therefrom.

Fig. 3 is a like view of a flange member differing from the one shown in Fig. 2 in that the rows of flange rods are set at an angle to one another.

Fig. 4 is a cross section of a flange member with three rows of panel rods associated therewith.

Fig. 5 is a like view of a longitudinally divided flange member, and

Fig. 6 shows another modification of the divided flange member shown in Fig. 5.

Fig. 7 is an elevation, and

Fig. 8 is an end view of a girder comprising flange members such as disclosed in Fig. 1.

Figs. 9 and 10 are corresponding views of a girder having its flange members shaped after the manner of that shown in Fig. 2, and

Figs. 11 and 12 disclose in similar views a girder of triangular section having flange members such as illustrated in Fig. 6.

In the example according to Fig. 1 the boom or flange member consists of a core 1 in one piece provided with three ribs 2 enclosed by a cap 3 as by a mantle, while a fourth wider rib-shaped web 4 is grooved longitudinally. The continuous groove thus formed serves to receive branch or web members 5, if e. g. a plane rigid frame is to be made similar to that shown in Fig. 7, in which two bars according to Fig. 1 are the booms. The ribs 2 and 4 preferably arranged in the plane of the main forces give the single bar 1 high resistance against breaking, while cap 3 on the one hand prevents the single ribs from being damaged and on the other hand gives the sections a good shape as to its resistance to the air. Though these good qualities are to be found in a single bar and permit using it independently in many cases, they appear more especially in the case where several bars are united to form a girder.

For some purposes, a double row of web members are required, in which case the core 11 according to Fig. 2 preferably has two ribs 14, each grooved on one side. The outside wall of the two continuous grooves thus obtained is formed by cap 13 reaching further down to match, which may consist of wood or of some other light and highly resistant material. In Figs. 9 and 10 a box-shaped girder is shown composed of such bars.

The most important application of these bars is that for booms of girders in space. A modification of a boom member for a triangular open frame work girder similar to that in Figs. 11 and 12 is shown in Fig. 3. Both bottom ribs 24 provided

on the core 21 are arranged at the required angle relatively to each other. Cap 23 matching the angular shape forms again the outer mantle. Instead of arranging the web bars in a continuous bond like that of Fig. 9, single cross webs of some well known kind may be used for reinforcing according to the example in Fig. 11.

The web or branch bars may be connected with the boom at any angle required and more than two bars may be joined on as shown in Fig. 4. In this modification between two outside webs 34 branching off at flat angles a third rib-like web 36 is inserted. In these three grooves three rows of webs 35 can thus be inserted e. g. for a quadrangular box girder (not shown in the drawing), which is reinforced by a diagonal web. In a similar manner an open frame work of every description can be made of boom members correspondingly chosen and any kind of web filling in use before now can be employed in it. The core need not absolutely consist of wood. The main thing is to use some material sufficiently light for making webs resist against buckling without overstepping the customary weight limit for air craft.

The cap may be connected with the core and equally the web with the boom members in several ways, e. g. by means of wire nails, by gluing or screwing them together or in some other suitable manner. More than one kind of connections may be employed at the same time.

For a larger number of branches or, if the shape is not quite simple, the core is preferably made in more than one piece and the separate parts are united in some suitable way, e. g. by a tongue-and-groove joint and by gluing them together. Thus the cores can be made especially strong, as the small sections can be easier made

of high class material. Figs. 5 and 6 show two modifications comprising cores in two pieces 47, 48 and 57, 58, respectively, assembled by means of a tongue and groove joint.

As may be gleaned especially from Figs. 5, 6 and 11, a particular advantage of the cores composed of several pieces is that with open girders two parts of the core connected by a row of web bars form the booms of plane girders. The open girder can be constructed with their aid in a very simple way by joining the booms of the girder parts preferably provided with tongues and grooves and by strengthening the resistance of each united boom member by a mantle-shaped cap.

I claim:

1. A girder comprising in combination, nonmetallic boom members, a longitudinal grooved rib on said members, caps extending along said members and a row of panel rods connecting said members and having their ends inserted in said grooved ribs.

2. A girder comprising in combination, non-metallic boom members, a longitudinal grooved rib on said members, caps extending along said members and a row of panel rods connecting said members and having their ends inserted between said grooved ribs and said caps.

3. A girder comprising in combination, non-metallic longitudinally divided boom members, a longitudinal grooved rib on each half of said members, caps extending along and uniting said divided boom members and a row of panel rods connecting said members and having their ends inserted in said grooved ribs.

In testimony whereof I affix my signature.

CLAUDIUS DORNIER.