

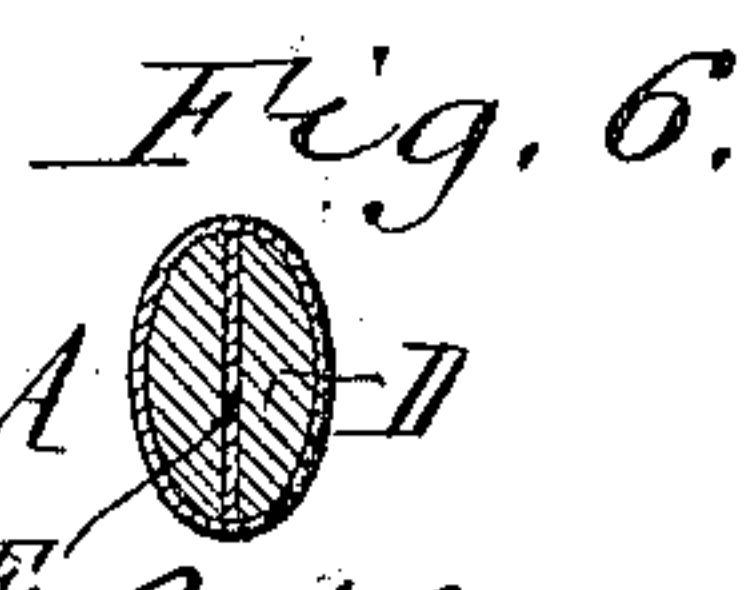
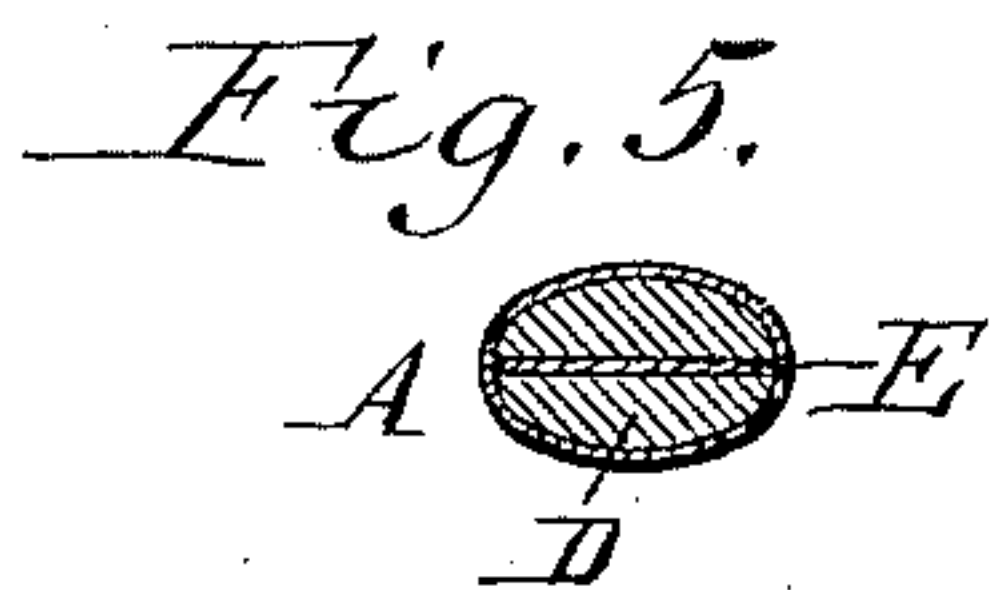
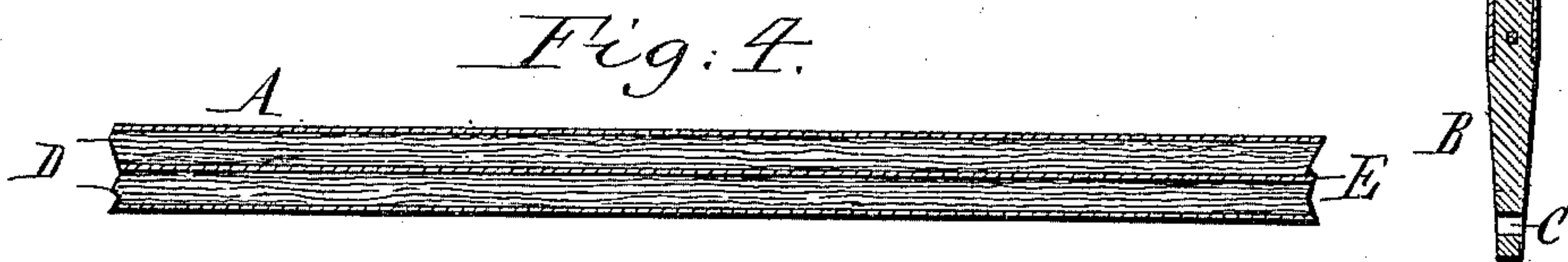
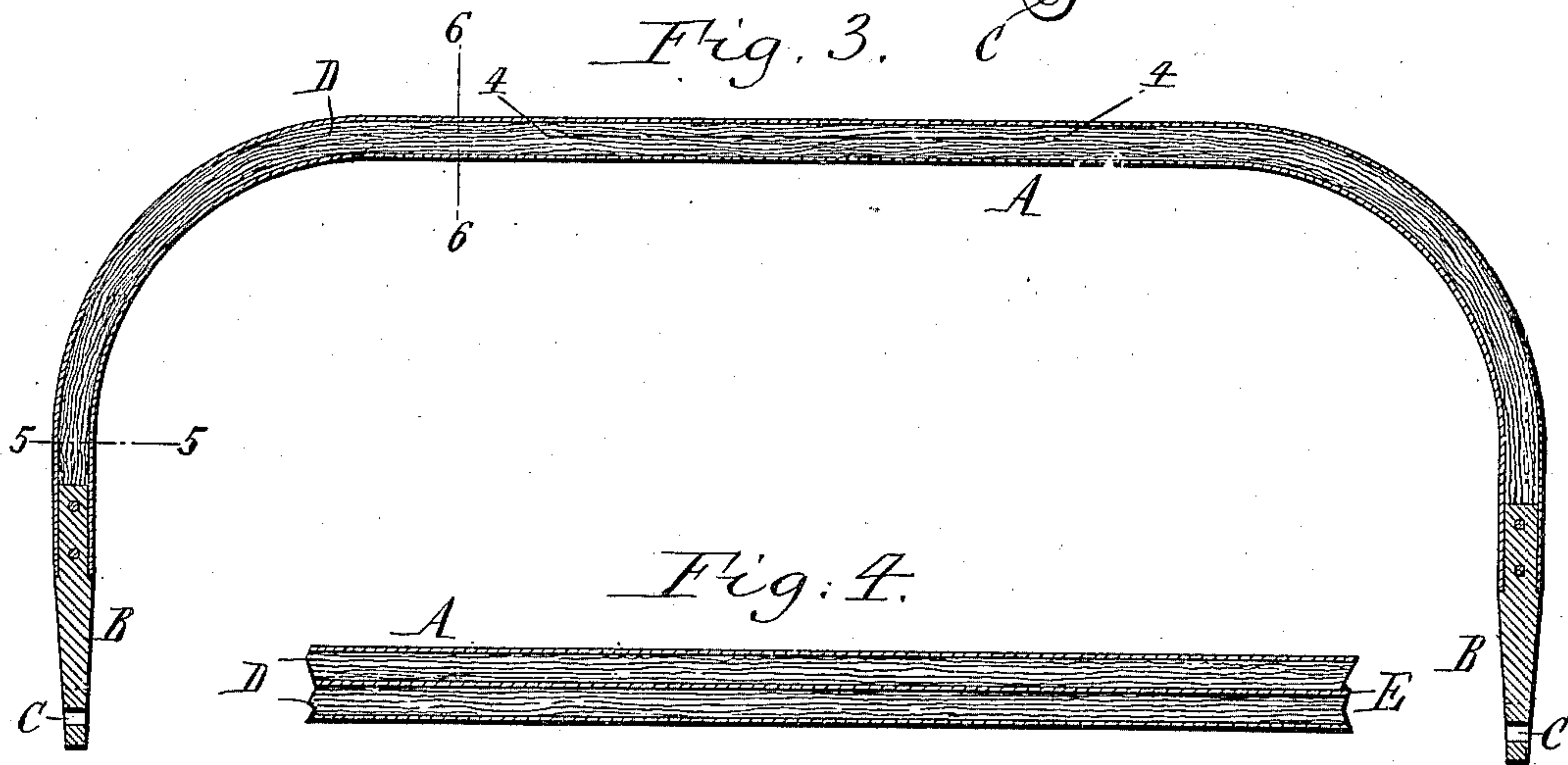
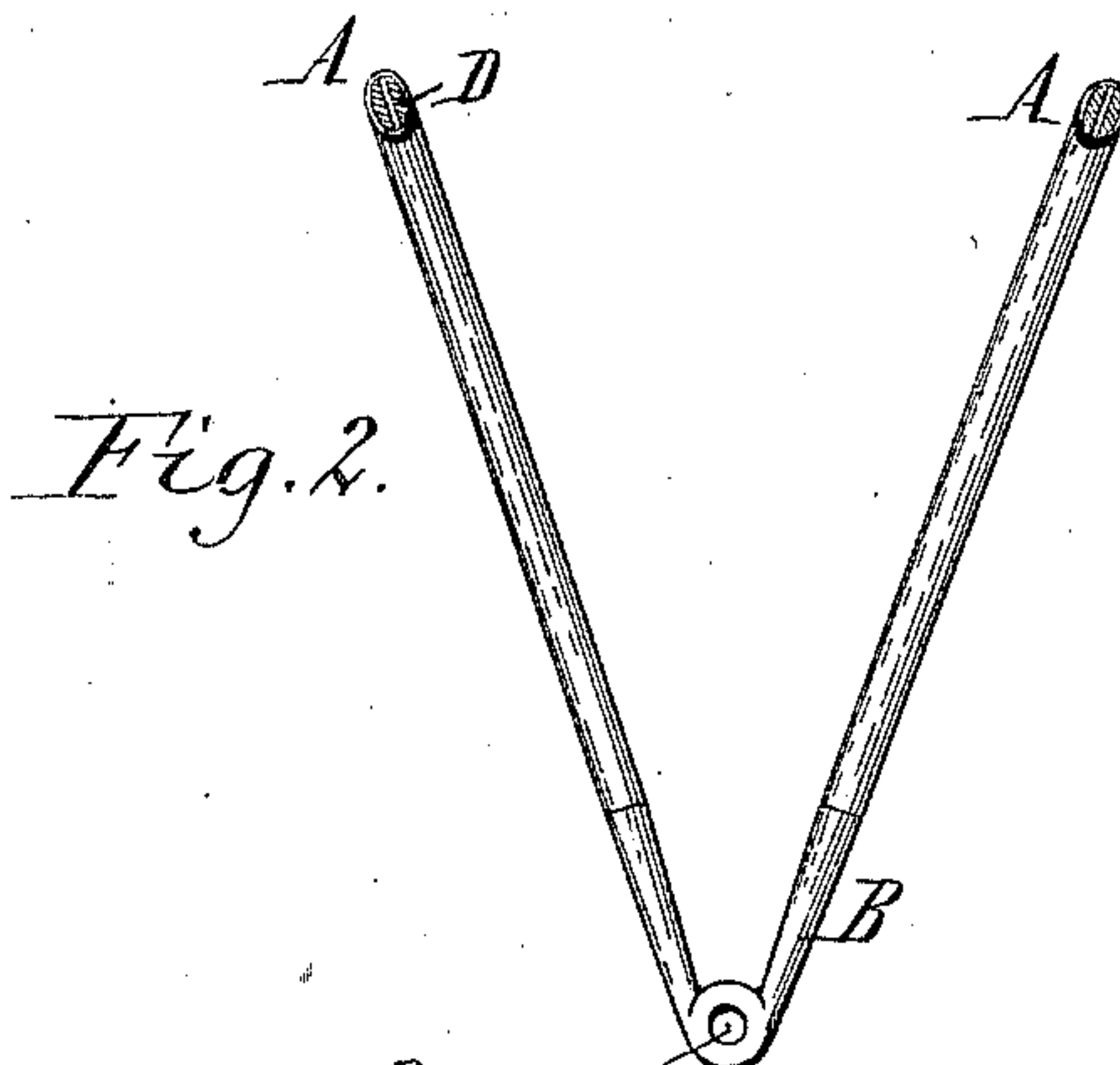
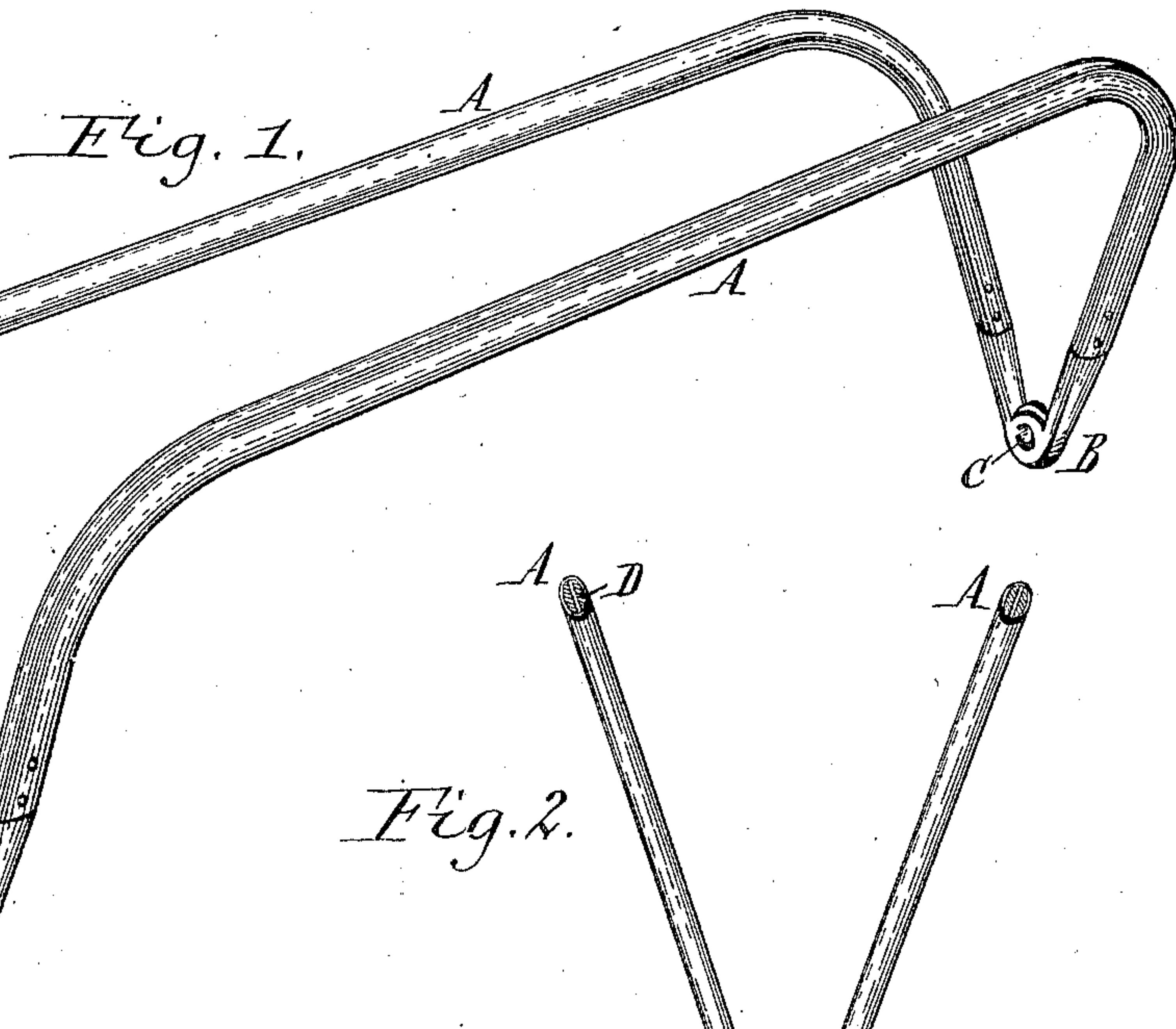
No. 679,180.

Patented July 23, 1901.

B. S. MORDEN.  
VEHICLE AXLE.

(Application filed Apr. 22, 1901.)

(No Model.)



Witnesses:  
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# UNITED STATES PATENT OFFICE.

BISHOP S. MORDEN, OF BUFFALO, NEW YORK.

## VEHICLE-AXLE.

SPECIFICATION forming part of Letters Patent No. 679,180, dated July 23, 1901.

Application filed April 22, 1901. Serial No. 56,818. (No model.)

*To all whom it may concern:*

Be it known that I, BISHOP S. MORDEN, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented a new and useful Improvement in Vehicle-Axles, of which the following is a specification.

This invention relates to tubular vehicle-axles, and more particularly to the arched tubular axles employed in light vehicles which are used for speeding purposes, such as sulkies and speed-wagons.

One of the objects of my invention is the construction of an inexpensive tubular axle which is considerably stronger than an ordinary tubular axle of the same transverse dimensions, permitting the same to be made correspondingly lighter and neater in appearance.

The invention has the further object to core or internally reinforce the axle in such manner that the usual braces can be fastened thereto by rivets or bolts without danger of crushing or collapsing the axle, thereby avoiding the common practice of brazing the braces to the axle and saving the time and expense incidental thereto.

In the accompanying drawings, Figure 1 is a perspective view of a duplex-arched axle embodying my invention. Fig. 2 is a transverse vertical section thereof. Fig. 3 is a vertical longitudinal section of one of the tubular axle members. Fig. 4 is a longitudinal section, on an enlarged scale, in line 4 4, Fig. 3. Figs. 5 and 6 are cross-sections in lines 5 5 and 6 6, Fig. 3.

Like letters of reference refer to like parts in the several figures.

A A are the arched members of the axle, which are preferably inclined toward each other and connected at their ends by V-shaped brackets or fittings B, provided at their lower ends with eyes C, in which the usual axle-spindles are secured, which spindles are not shown in the drawings. The brackets B are provided at their upper ends with reduced extensions, which fit into the ends of the axle members and are riveted or otherwise secured therein, as shown in Fig. 3.

Each of the axle members A consists of a continuous length of tubing, preferably of oval or elliptical cross-section, with its long

axis arranged vertically in the horizontal body portion of the member and with the long axis arranged lengthwise of the member in its vertical end portions, as shown in the drawings. Each axle member is provided with a core or filling D, of wood or similar material, which may extend from one end bracket B of the axle to the other, as shown. This filling preferably consists of a continuous wooden bar of the proper size and cross-section to fit snugly within the tubular axle member and having its grain running lengthwise of the axle.

In forming the axle members the wooden filling-bar D is inserted in the straight tube-blank in a straight condition without previous steaming or similar treatment, and the end portions of the tube-blank are then bent at the desired angle to the main portion of the blank to form the depending ends of the axle member. The filling-bar is retained in its bent form by the metallic tube, which resists the tendency of the ends of the bar to spring back to their original position. By this construction the axle-tube is greatly stiffened and reinforced, and by employing a continuous filling-bar the tube is uniformly stiffened throughout its length and all liability of leaving weak spots in the filling, which is apt to be the case with a jointed or sectional filling, is obviated. The oval construction of the axle, with its long axis arranged as described and shown, produces a comparatively strong axle in the absence of any filling.

Owing to the increased strength obtained by my improved construction, the axle can be made much lighter than an ordinary tubular axle without reducing its safety and efficiency, rendering the same neater and more graceful in appearance. The wooden filling prevents crushing or flattening of the axle-tube and permits the usual braces of the axle to be fastened to the latter by rivets or bolts without unduly weakening the axle, thus doing away with the necessity of brazing the braces to the axle, which has hitherto been the custom, and enabling the vehicle to be ironed or braced in much less time and with greater security than by brazing. By constructing the axle member of elliptical form set on edge the member presents a comparatively large surface, which facilitates the attachment of the usual braces and other fittings.



In some cases the filling of the axle-tubes may be arranged only in the horizontal portions thereof, if desired.

In order to further stiffen the axle members, each of the same may be provided with an internal longitudinal web or partition E, of metal, which coincides with the long axis of the member, as shown in Figs. 4, 5, and 6. This web bears at its edges against opposite walls of the tubular axle member and may extend throughout the length of the wooden filling, or it may extend only from end to end of the horizontal portion of the filling. When it extends throughout the horizontal and vertical portions of the axle member, the wooden filling is divided into two sections, between which the web is interposed, and when the web is arranged only in the horizontal portion of the axle member the corresponding portion of the filling may be simply slotted to receive the web, it being understood that the web is applied to the filling before the latter is inserted in the tube-blank, which forms the axle member.

While I have herein shown my invention embodied in a duplex-arched axle, it is also applicable to an axle consisting of a single arch and to a straight axle.

I claim as my invention—

1. A vehicle-axle having a horizontal body portion and depending end portions arranged substantially at right angles to its horizontal portion, and composed of a continuous piece of tubing bent from a straight tube-blank, and a continuous core or filling of flexible

material arranged both in the horizontal and depending portions of the axle-tube and bent from a straight blank, the end portions of which are sprung or bent with the corresponding portions of the axle-tube after inserting the straight filling-blank in the straight tube-blank, substantially as set forth.

2. A continuous tubular axle having a horizontal body portion and depending end portions, and constructed of elliptical cross-section with the long axis of the tube arranged vertically in the horizontal portion of the axle, and lengthwise of the axle in its depending portions, and a continuous wooden core-bar of corresponding cross-section arranged in the horizontal and depending portions of the axle, substantially as set forth.

3. A tubular vehicle-axle having an internal stiffening web or partition arranged lengthwise thereof, and a filling arranged in the axle on opposite sides of said web, substantially as set forth.

4. A vehicle-axle, consisting of a tube of elliptical cross-section with its long axis arranged vertically, and a longitudinal stiffening web or partition arranged in said tube coincident with its long axis, substantially as set forth.

Witness my hand this 18th day of April, 1901.

BISHOP S. MORDEN.

Witnesses:

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