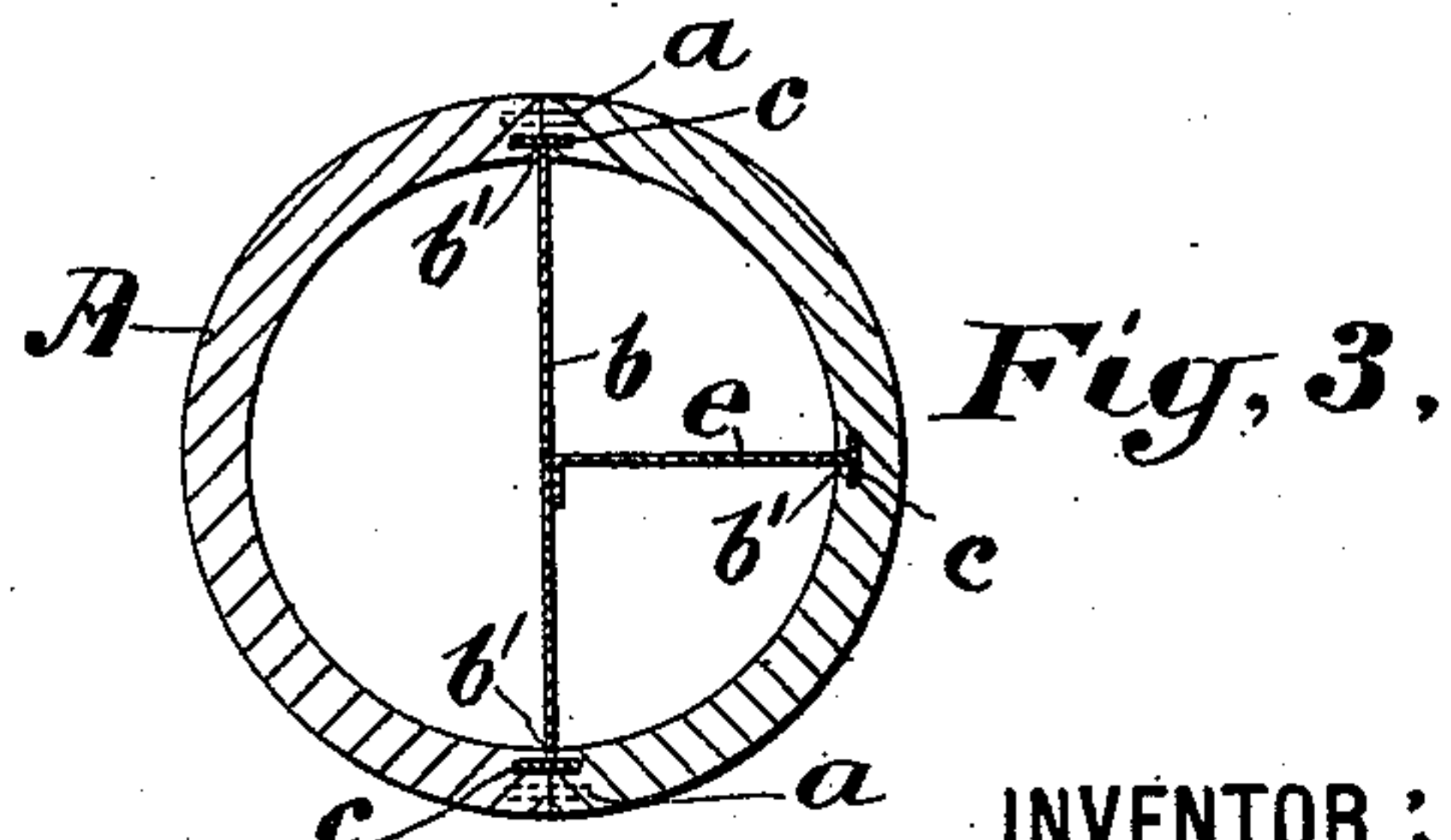
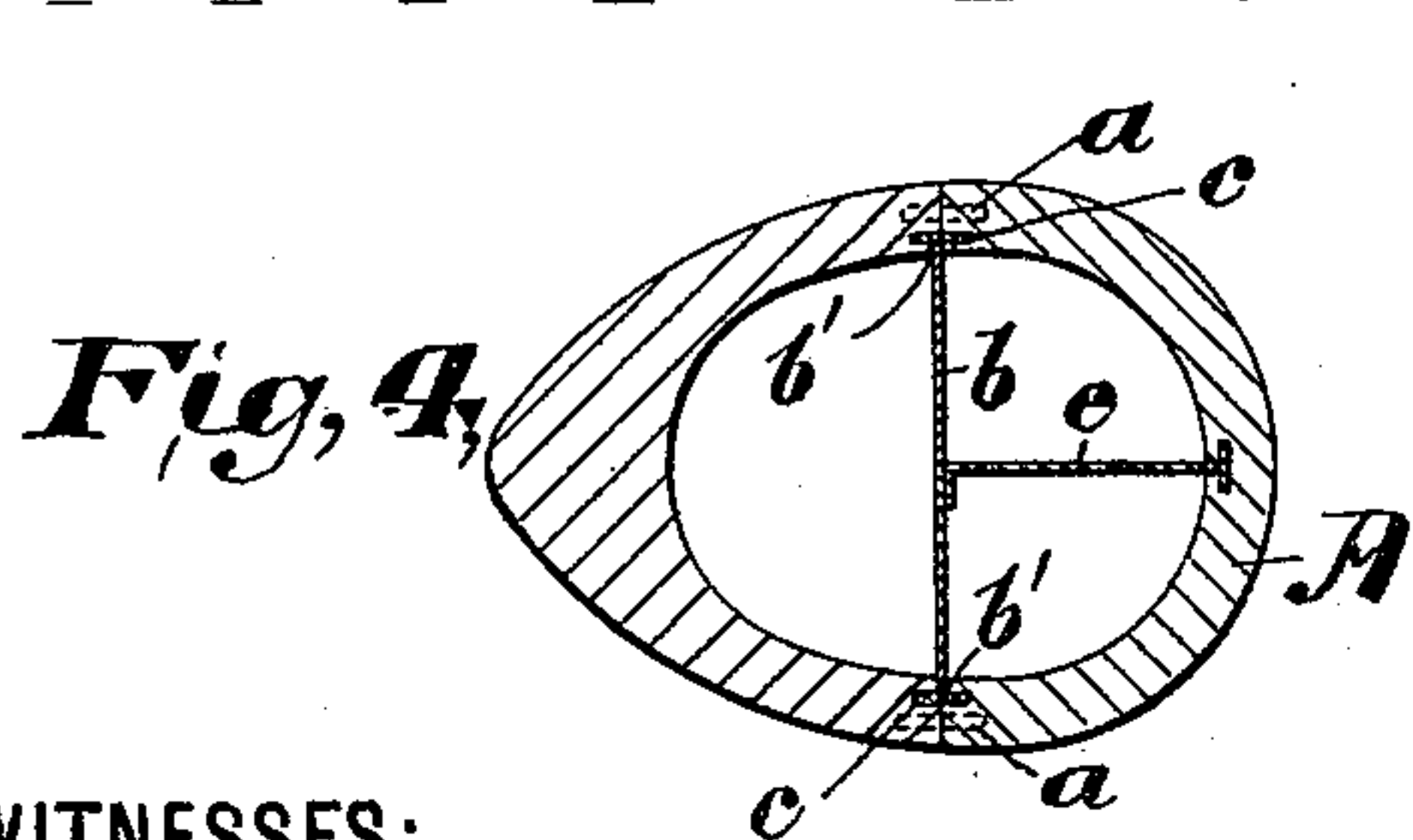
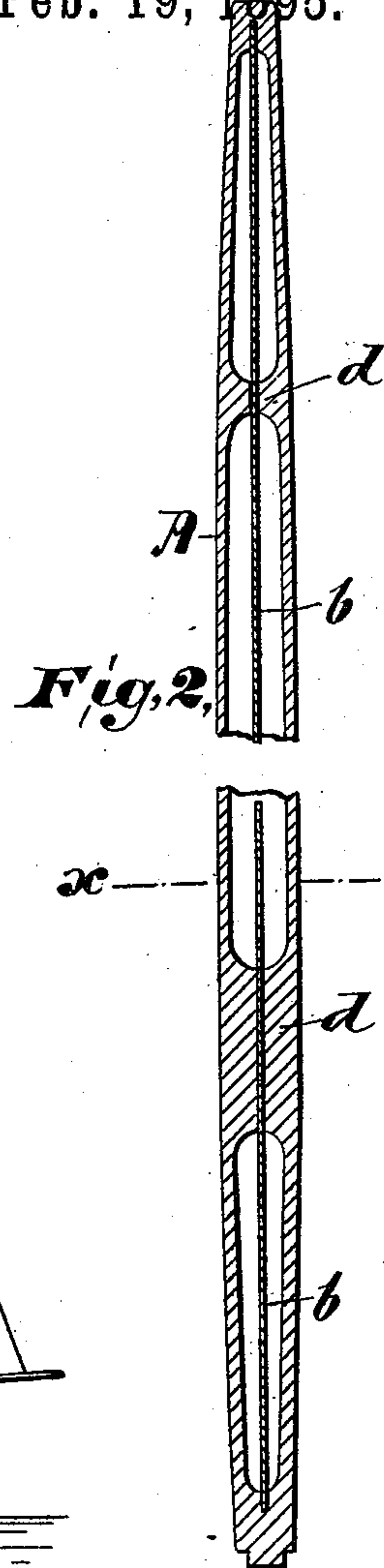
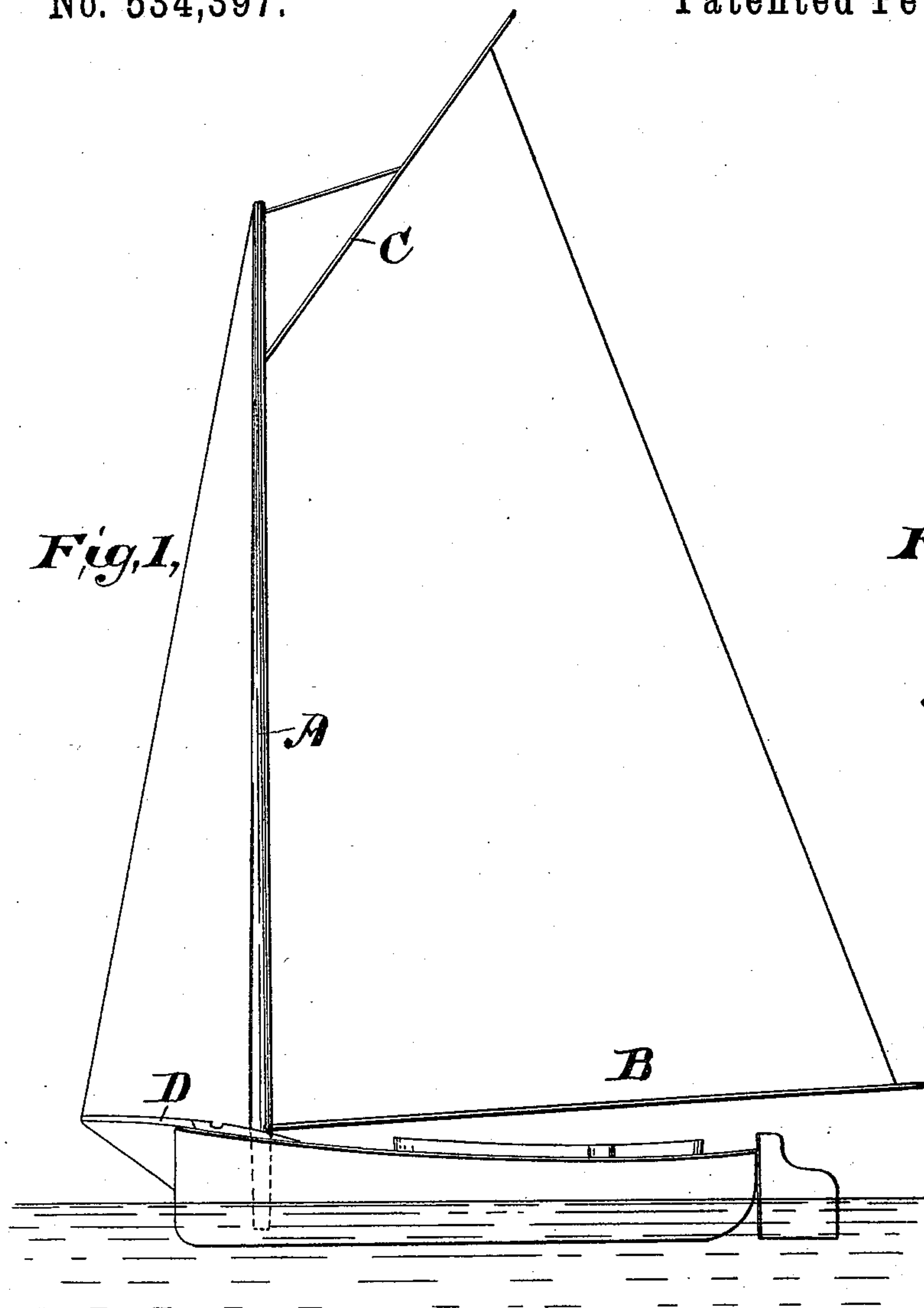


(No Model.)

W. E. LEWIS.  
MAST OR SPAR.

No. 534,397.

Patented Feb. 19, 1895.



WITNESSES:

*Robert Sollerger*  
*Louisa Browne*

INVENTOR;

*William E. Lewis*

BY *Drake & Co.* ATTY'S.

# UNITED STATES PATENT OFFICE.

WILLIAM E. LEWIS, OF NEWARK, NEW JERSEY.

## MAST OR SPAR.

SPECIFICATION forming part of Letters Patent No. 534,397, dated February 19, 1895.

Application filed May 2, 1894. Serial No. 509,858. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM E. LEWIS, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Masts and Spars; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

The object of this invention is to decrease the weight of the masts, and other spars, to decrease the size and the resistance thereof, and at the same time to increase their strength, and to secure other advantages and results hereinafter referred to.

The invention consists in the improvements and in the combinations and arrangements of the parts thereof, as herein set forth and finally pointed out in the claims.

Referring to the accompanying drawings in which like letters of reference indicate corresponding parts in each of the figures where they occur, Figure 1 represents (in elevation) a sloop-rigged-yacht having a mast, boom and gaff, and embodying my improvement. Fig. 2 is a central longitudinal section of the mast and a certain stiffening plate arranged in the center thereof. Fig. 3 is a transverse section through line *x*, and showing an additional stiffening plate, and Fig. 4 is a similar view showing a modified form of the mast.

In said drawings, A, designates the mast; B, the boom; C, the gaff, and D the bow sprit. Said mast is preferably made of wood and in two longitudinal sections, each side or section being hollowed out at intervals, as indicated in Fig. 2, or it may be hollow throughout its entire length. The two sections are then firmly glued together, and further secured at intervals by dowels *a*. Through the center of the mast or spar, is arranged a metal plate *b*, composed of steel, iron, bronze, or other appropriate material; said plate being seated in a rabbet or recess *b'*, in one of the sections and, when the sections are together, firmly clamping said plate between them, as will be understood upon reference to Figs. 2 and 3.

By arranging the plate *b* across the mast with its edges seated in longitudinal grooves, it is evident that when the strain comes upon the mast in the line of the plate, the plate would afford the greatest resistance to bending with the mast and the result would be that the grooved surfaces of the mast would be forced against the knife edge of the plate which would cause it to split in the line of the plate and thereby render the mast worthless. To avoid this difficulty, the narrow plate *c* is arranged at the bottom of each of the grooves or recesses in the mast at right angles to the plate *b* as shown in Fig. 3, so that any strain against the edge of the plate *b* would be taken up by the plate *c* and the liability of the splitting of the mast would be avoided. By extending this narrow plate *c* the length of the mast it will be readily seen that the mast is rendered much lighter and stronger than a solid wooden mast of equal dimension.

When a mast is hollowed out at intervals, as indicated in Fig. 2, partitions *d*, will be left through which the plate *b*, passes which serve as braces to brace the latter and prevent buckling, or bending, as will be readily understood.

In cases where a mast is made hollow throughout or within a short distance from its extremities, I provide a supplemental plate, *e*, Fig. 3, which is inserted and stayed in the wooden shell at one edge in the same manner as plate *b*, and intersects with and is firmly bolted or riveted to said plate *b*, as will be understood.

While I have only shown the invention as applied to a mast, it is obvious that the same may be carried out in connection with the booms, gaffs, yard-arms, and other spars, used by sailing vessels.

By this construction, a mast or spar of a given length can be much smaller than one made of solid wood, and also much stronger and lighter. This is of considerable importance considered in connection with racing yachts, because of their decreased resistance to the atmosphere, for which purpose the modified form shown in Fig. 4 possesses also some advantage, as will be readily understood.

Having thus described my invention, what



I claim as new, and wish to secure by Letters Patent, is—

1. The combination, with a hollow wooden mast, the inner surface of which is grooved  
5 longitudinally upon its opposite sides, of a plate *b* extending across the hollow of the mast with its edges seated in the recesses, and a cross-plate *c* at the bottom of each recess and standing at right angles to the plate *b*,  
10 whereby the strain upon the edges of the plate *b* will be taken up by the plate *c* and the liability of splitting the mast along the line of the edges of plate *b* is avoided, substantially as set forth.

15 2. In a hollow wooden mast, the combination of a central longitudinal plate, and transverse braces arranged at intervals between the top and bottom of the mast to stay and

support said plate, as described and for the purposes set forth. 20

3. In a hollow wooden mast, the combination of a metal plate passing through the center thereof, longitudinally, and seated at its opposite sides in a recess formed in the wooden shell, a supplemental plate arranged at right  
25 angles to the plate aforesaid, and a cross plate also seated in the shell against which one edge of the supplemental plate abuts substantially as set forth.

In testimony that I claim the foregoing I  
30 have hereunto set my hand this 21st day of April, 1894.

WILLIAM E. LEWIS.

Witnesses:

OLIVER DRAKE,

WILLIAM C. FREEMAN.