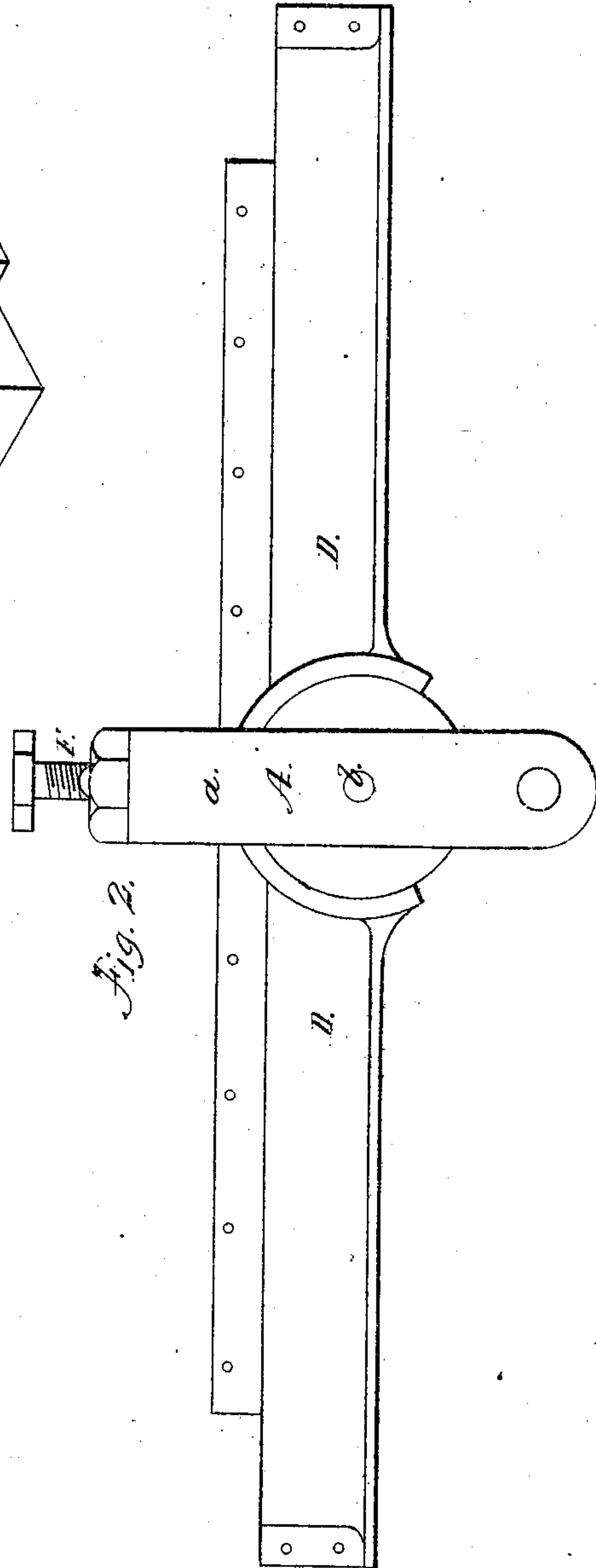
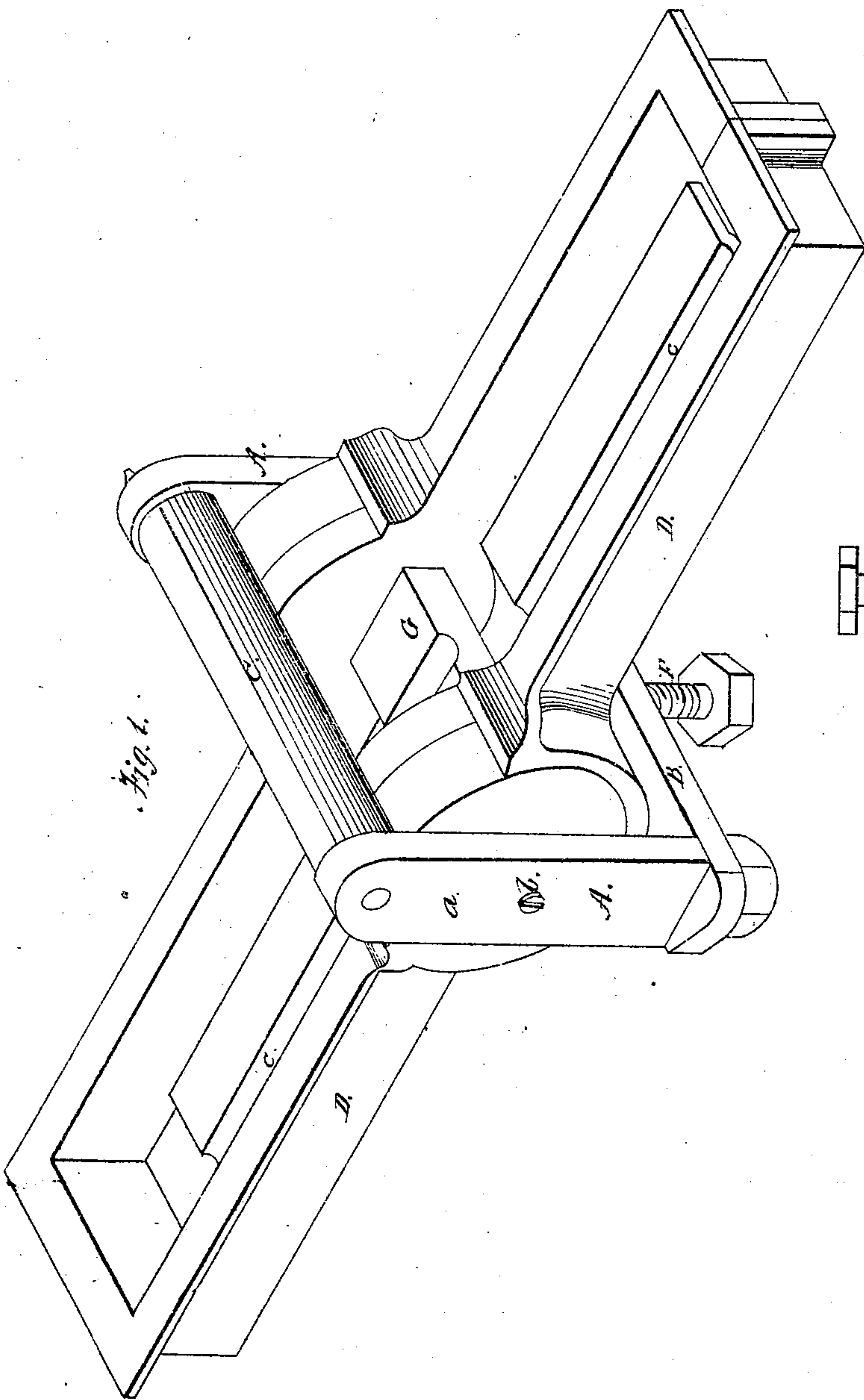


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Wood-Bending.

N^o 73493

Patented Jan. 21, 1868.



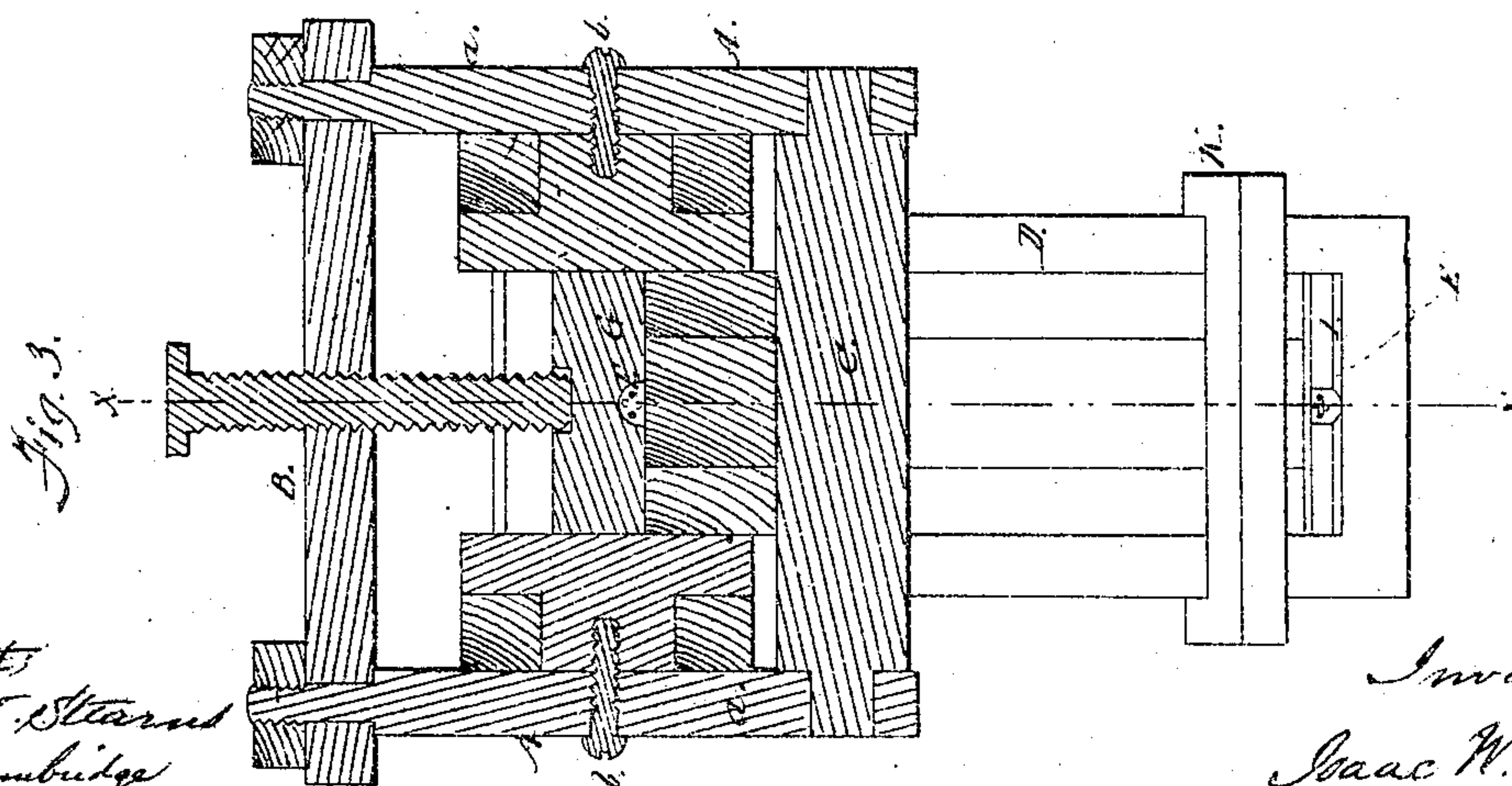
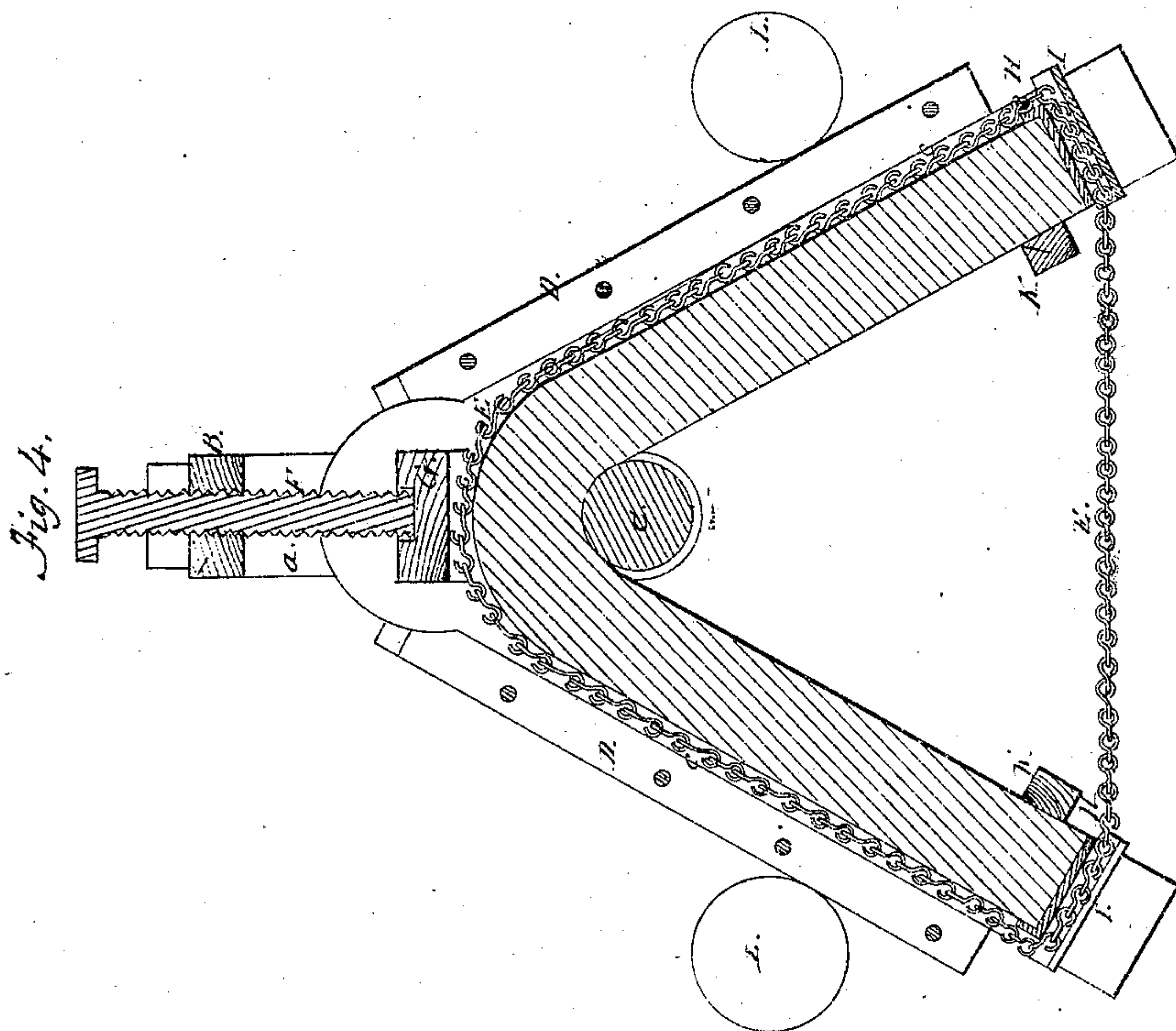
Attest,
N. W. Stearns.
W. J. Cambridge

Inventor
Isaac W. Bowers.

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United States Patent Office.

ISAAC W. BOWERS, OF BOSTON, MASSACHUSETTS.

Letters Patent No. 73,493, dated January 21, 1868.

IMPROVEMENT IN WOOD-BENDING MACHINES.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, ISAAC W. BOWERS, of Boston, in the county of Suffolk, and State of Massachusetts, have invented certain Improvements in Apparatus for Bending Ship-Timber, &c., of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a perspective view of my improved apparatus for bending ship-timber.

Figure 2 is a side elevation of the same.

Figure 3 is a transverse central section, representing the apparatus with the timber therein, when bent around to the inclination desired.

Figure 4 is a longitudinal section on the line *x x* of fig. 3.

Attempts have frequently been made to bend ship-timber by the agency of metal straps, but, owing to the immense resistance to be overcome in upsetting the fibres, the strain upon the straps has generally been so great as to cause them to break. To bend the timber without the use of these straps is the object of my invention, which consists in an apparatus having two of its portions pivoted together to allow them to be inclined to any angle desired to be given the timber, which is placed within the apparatus when its pivoted portions are open, and is pressed, by a screw or otherwise, against a former, the centre of which is situated at a distance from the pivot on which these portions turn, just sufficient for preventing the outer fibres of the timber from bursting or being condensed while being bent.

To enable others skilled in the art to understand and use my invention, I will proceed to describe the manner in which I have carried it out.

In the said drawings, A represents an open frame, the sides *a* of which are united at one end by a cross-bar, B, while their opposite end is connected by a "former," C. Within this frame, at *b*, are pivoted two portions, D D, of the apparatus, which is rectangular in cross-section, and serves as a box for receiving one or more of the heavy timbers to be bent, the two portions of the apparatus being opened out horizontally into the position seen in fig. 1, to allow of the timber or timbers, after being steamed, to be laid therein, the inner sides of the two portions being provided with a longitudinal groove, *c*, for the reception of a chain, E, to be employed, in a manner presently to be described, for retaining the timber in the position given it after being bent, when removed from the apparatus. When the two portions D D of the apparatus are laid open in a horizontal position, the lines forming their back inner edges abut together, or unite on a common line, with the exception of a small semicircular opening in each, which forms a circular hole for the entrance of a screw, F, which passes through the cross-bar B. The inner end of this screw rests in the bottom of a cavity made in a block, G, the length of which is equal to the width of the timber or timbers to be bent, and extends transversely across them, snugly fitting the inner sides of the two portions D D, and being pressed by the screw against the timbers to force them tightly up to the former, a groove, similar to *a*, being provided in the inner side of the block for the passage of the chain, and thus allow the block to have an even bearing upon the timbers. At each of the opposite extremities of the timbers is placed a metal plate or shoe, H, provided with a shoulder, over which the chain passes, a wedge or key, I, with a groove for the chain to lie in, being driven down between the shoe and the inner end of each portion D D, the shoes serving to bring the ends of the timbers to an equal bearing on the wedges, and also to hold the timbers in place when removed from the apparatus to dry.

In the construction of the said apparatus it is absolutely essential that the centre of the "former" should be just so far removed from the pivot, on which the portions D D turn, that the length of the outer line of the timber, after being bent, shall remain exactly the same as this line previous to being bent. This distance is determined by experiment. If the said two points were too near together, the outer line of the fibres would be burst, and its length would consequently be greater than the original line when unbroken; and should these points be too far apart, the fibres at the back of the timber would be condensed, and the length of the outer line contracted. The "former" is represented as stationary, but it may revolve on its centre if desired. K K are clamps, slipped over the outer extremities of the portions D D, to keep the timbers in place when laid therein.

Operation.

The apparatus being in the position shown in fig. 1, and the chain E placed in its groove *e*, the several timbers, of a uniform length, are laid side by side, and the clamps K slipped over the ends of the portions D D, when the whole is placed in the steaming-receptacle. The metal plates or shoes H are now placed over the ends of the timbers, and the chain drawn down over the shoes, when the wedges or keys I are driven home, the projection or shoulder of the shoe lapping over the ends of the timbers, so as not to be displaced by the chain, which is free to slide by it within the grooved keys I. The screw F now being turned, the block G is pressed against the timbers until they are forced hard upon the former C, in which position it will be seen that the timber is completely enclosed on all sides at three points, viz, at its two extremities where the clamps K are placed, and at its centre where it is to be bent around the former. The apparatus, after being removed from the steaming-receptacle, is now placed, with one of the sides of the frame A resting in a groove or on ways, on a solid bed or table, provided with two rollers, L, seen in red, fig. 4, and the compressor or plunger being applied to the outer side of the former, the timbers are gradually bent to the angle required, the two portions D D of the apparatus swinging freely on their pivot, and being closed between the rollers by the yielding of the timbers from a straight line to a bent form, as shown, the fibres sliding past or slipping over each other, and being condensed from the inner surfaces of the timbers in contact with the former, to their outer surfaces, where the fibres are simply bent without being compressed. After receiving the desired shape, the timber is prevented from departing therefrom by keys, which are driven in slots in the table, and serve to hold it immovably until the compressor or plunger is withdrawn, when the chain is hooked, as seen in fig. 4, and the timbers are taken out of the apparatus by unscrewing and removing its upper side.

Claim.

What I claim as my invention, and desire to secure by Letters Patent, as an improvement in apparatus for bending ship-timber, is—

The portions D D pivoted together, in combination with the former C, operating substantially as set forth.

ISAAC W. BOWERS.

Witnesses:

N. W. STEARNS,

W. J. CAMBRIDGE.