I. W. Bowers,

Bending Wood,

No. 51,793, Patented Jan. 2, 1866.

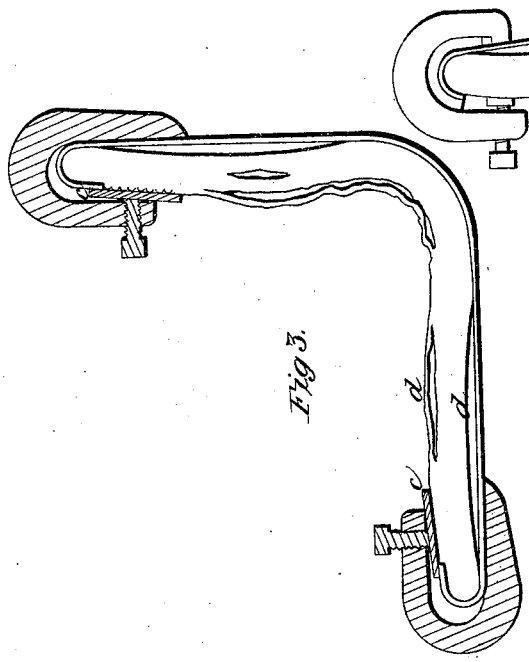

Fig 3.

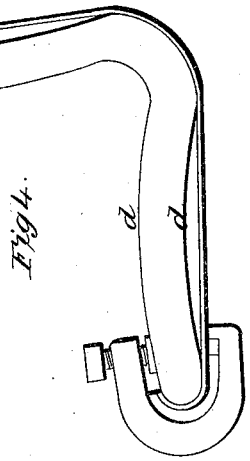

Fig 4.

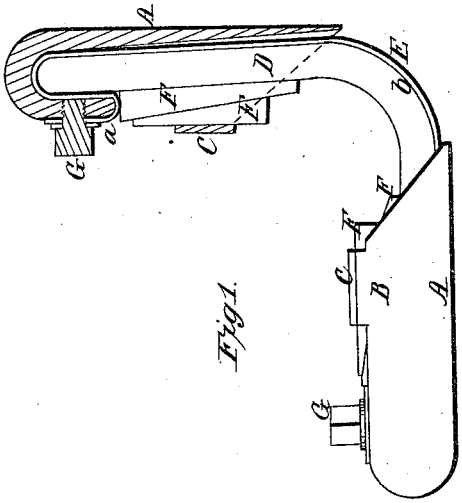

Fig 1.

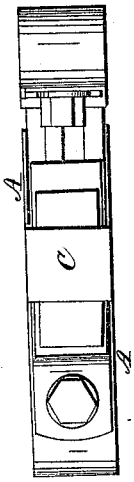

Fig 2.

Witnesses:

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T. W. Stearns

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UNITED STATES PATENT OFFICE.

ISAAC W. BOWERS, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN BENDING WOOD.

Specification forming part of Letters Patent No. **51,793**, dated January 2, 1866.

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 a new and useful Improvement in Clamps for Holding Ship-Timbers while being Bent, 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 represents my improved clamp with a ship-timber confined therein, one end being shown in elevation and the other in section. Fig. 2 is a plan of the same when in the position shown in Fig. 1. Figs. 3 and 4 represent clamps now in use and their effect upon the timber.

My invention relates to that class of clamps which are used in holding ship-timbers while being bent. In clamps of this description the ends only of the timber are tightly compressed, the effect of which, in bending the timber, is to destroy the cohesion of the fibers on the inside between the confined ends of the timber and cause the fibers to be torn asunder and doubled up, while the timber was bulged or curved inward between the center and ends.

To overcome these difficulties is the object of my invention, which consists in a shoe or clamp which surrounds the timber on all sides and extends sufficiently far toward its center to prevent the timber from being bulged in between the center and its extremities.

My invention also consists in passing the strap around the ends of the timber and the upper part of the clamp, to which it is secured by a screw-bolt, whereby they are prevented from being drawn apart when the strain is applied, which frequently occurs with straps secured in the ordinary manner.

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 is the metal base of the shoe or clamp, the sides B of which are made of sheet-iron, and are connected at their top by the bridge-piece C, of the same material. The base A is of a wedge form, and its outer end is curved and returned, as seen at *a*, Fig. 1, while its inner end extends nearly to the center of the timber D to be bent.

E is a flexible metal strap, to each end of which is secured one of these shoes or clamps, within which and upon the strap is secured the timber D, which is firmly held in place by wedges F. This strap E prevents the timber from breaking at the point *b*, and conforms to the interior surface of the clamp, and is bent around the outside, where it is securely fastened by a screw-bolt, G, (see Fig. 1,) which is readily removed when it is desired to detach the strap from the clamp.

Operation: The timber D to be bent being thoroughly steamed, a strap, E, of the required length, is fitted thereto, when a clamp is placed over each end of the timber and secured to the strap by means of a screw, G. The wedges F are now driven in between the bridges C and the timber D, thus confining it immovably within the clamps, which are firmly held while pressure is applied in the ordinary way on the inside of the curve, the tendency of the timber to bend or curve inward between the center and ends being counteracted by the wedges, which, in connection with the elongated base A of the clamp, extend over and confine so large a portion of the timber that the fibers at or near its inner surface are prevented from being loosened and doubling up.

In the above description I have spoken of a single timber only being bent at one operation; but it is evident that a number of pieces may be placed in the clamp and bent, thus avoiding the necessity of cutting a large timber in a bent form.

Figs. 3 and 4 represent clamps now in use, the ends only of the timber being compressed by a screw-plate, *c*, in consequence of which the compression is confined to a small portion of the timber, thereby causing the fibers to become loosened and doubled up, as shown in Fig. 3.

In addition to the above-mentioned objection the timber is bent inward, leaving the strap as shown at *d*, Figs. 3 and 4. The manner of fastening the strap to the clamp is also insecure, and they are frequently torn apart when pressure is applied.

By the employment of my improved clamp

the softened fibers of the timber will be compressed and condensed more compactly toward the inner curve, while the outer fibers are bent along with the strap, thus retaining the original length on the outside of the timber and giving it the required form when bent.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The elongated shoe or clamp A B, with its bridge-piece C, between which the timber is wedged or confined while being bent.

2. Bending the strap E around the portion *a* of the shoe or clamp and securing it thereto by the screw G, substantially as and for the purpose described.

I. W. BOWERS.

Witnesses:
P. E. TESCHEMACHER,
N. W. STEARNS.