

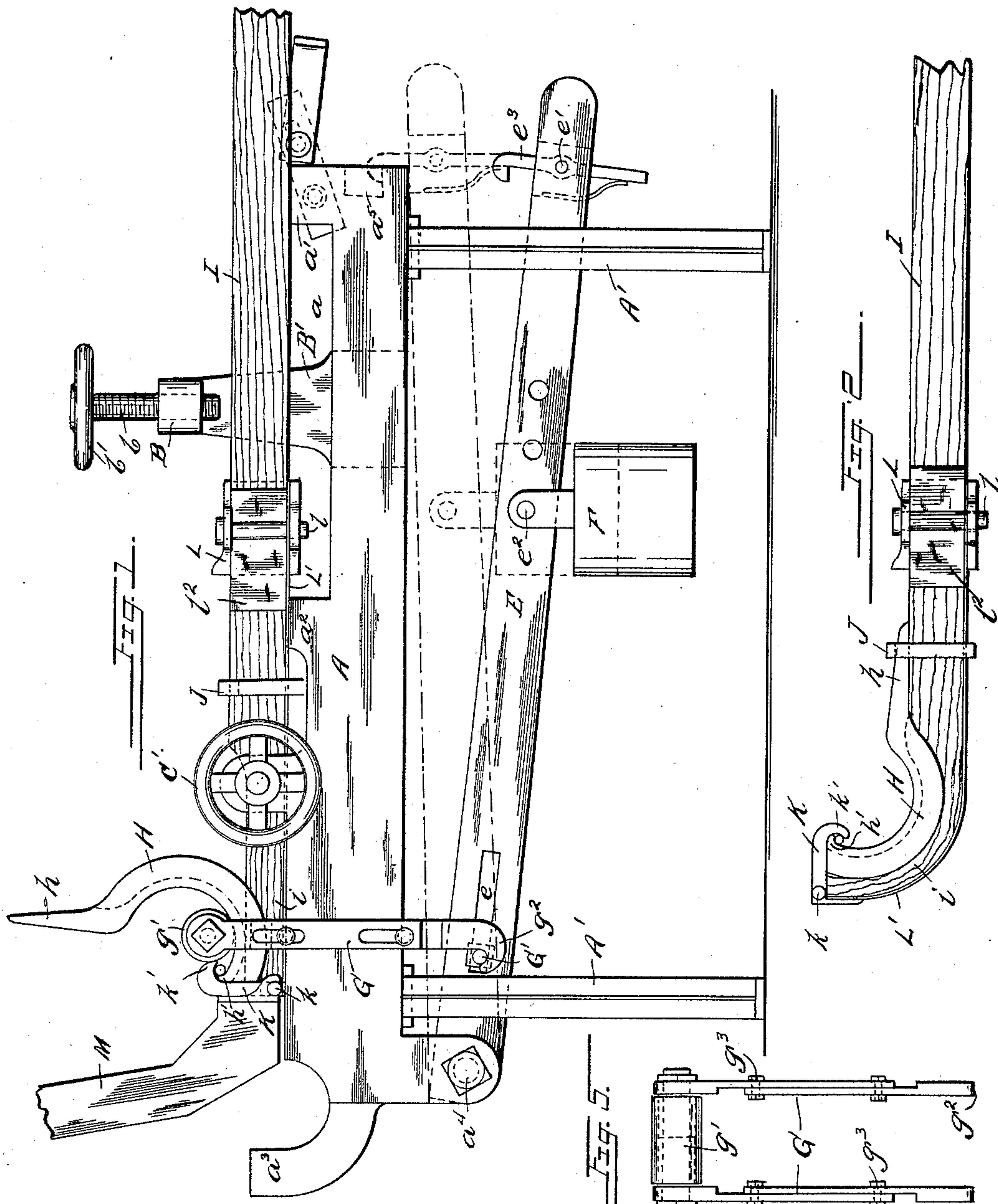
(No Model.)

2 Sheets—Sheet 1.

J. KLAHR.  
WOOD BENDING MACHINE.

No. 485,800.

Patented Nov. 8, 1892.



Witnesses

*E. A. Kelly*  
*Caleb J. Fisher*

*Joseph Klahr* Inventor

By his Attorney *W. H. Smith*

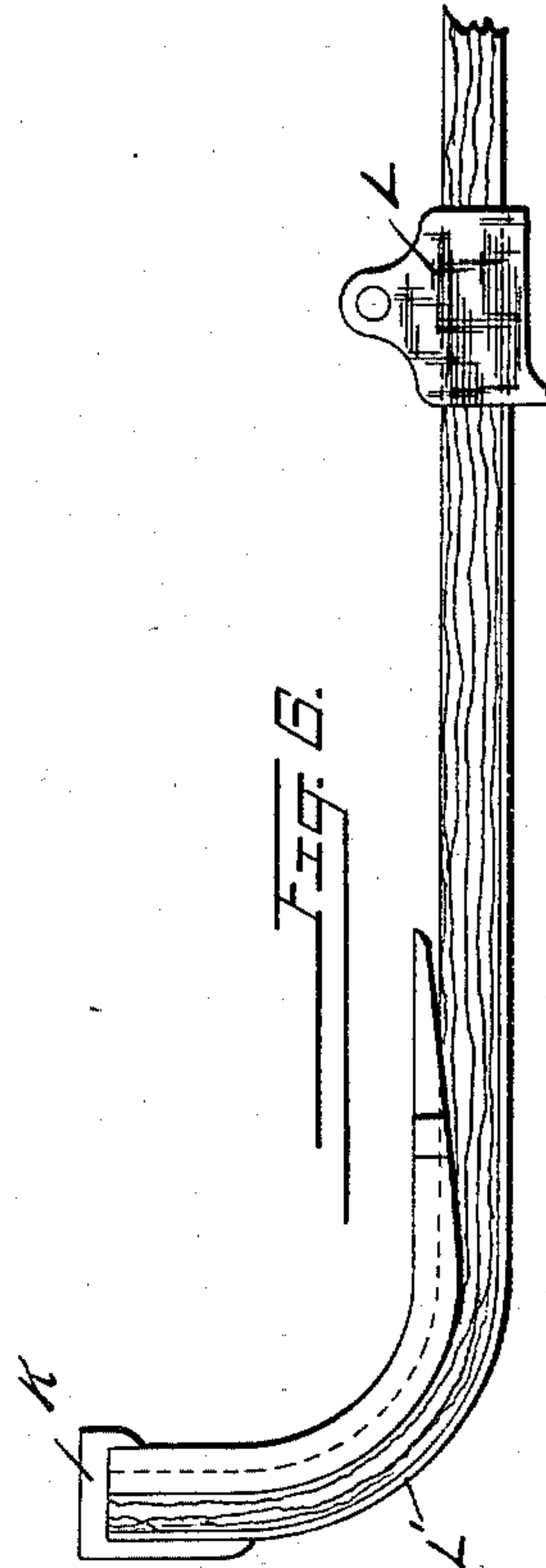
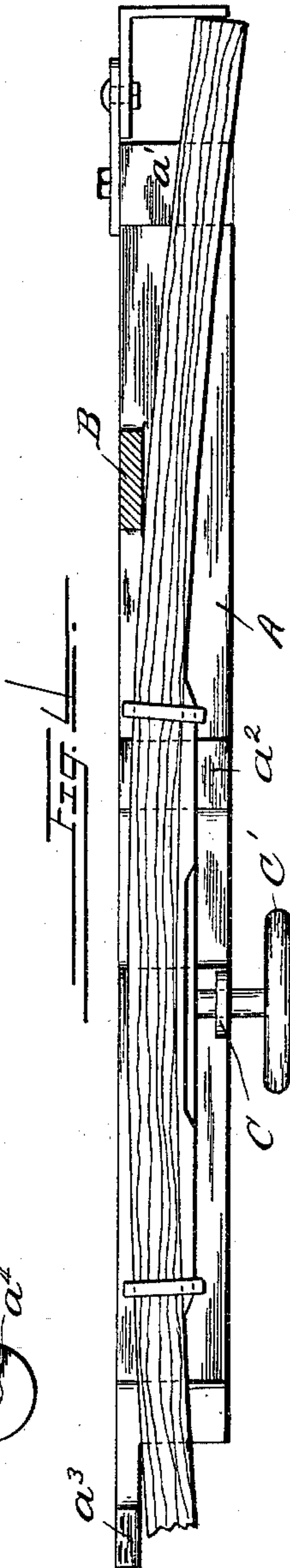
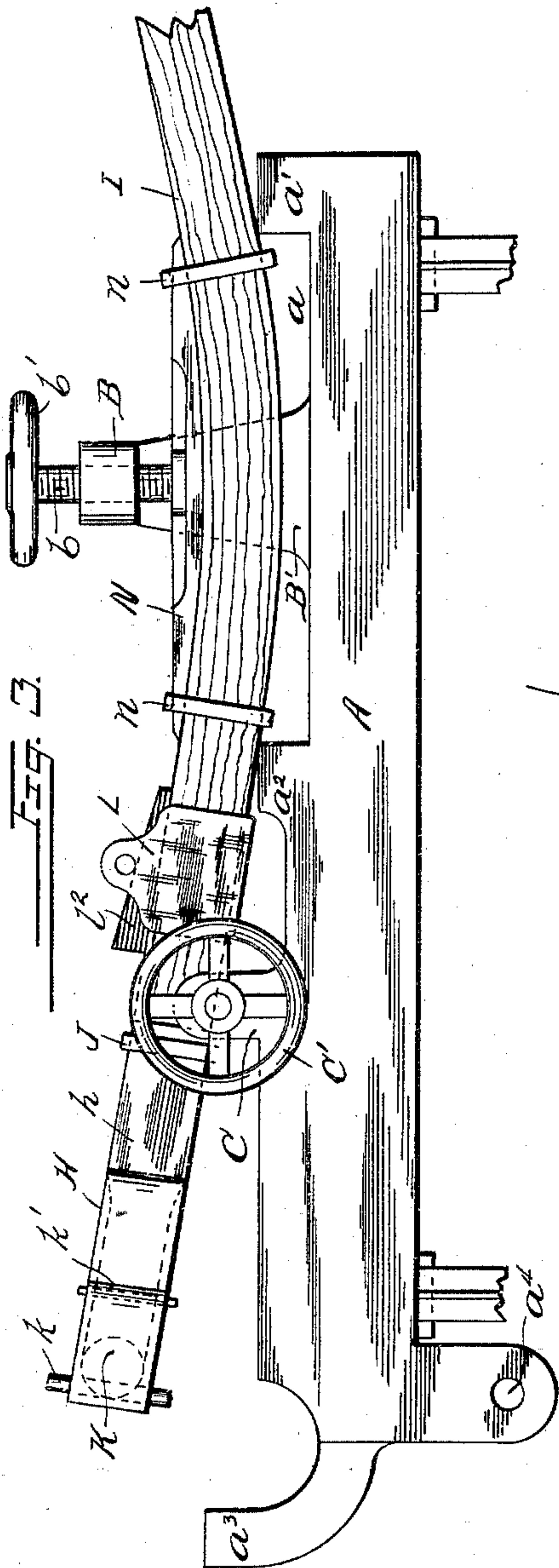
(No Model.)

2 Sheets—Sheet 2.

J. KLAHR.  
WOOD BENDING MACHINE.

No. 485,800.

Patented Nov. 8, 1892.



Witnesses

*E. A. Kelly.*  
*Calvin J. Pieber.*

*Joseph Klahr*  
Inventor

By *his* Attorney *J. H. Smith.*



# UNITED STATES PATENT OFFICE.

JOSEPH KLAHR, OF HAMBURG, PENNSYLVANIA.

## WOOD-BENDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 485,800, dated November 8, 1892.

Application filed February 8, 1892. Serial No. 420,684. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH KLAHR, a citizen of the United States, residing at Hamburg, in the county of Berks, State of Pennsylvania, have invented certain Improvements in Wood-Bending Machines, of which the following is a specification.

My invention relates more particularly to a wood-bending machine adapted to form in a satisfactory and economical manner such articles as plow-handles, carriage-shafts, &c.

Heretofore different forming devices have been employed by means of which the previously-steamed wood has been bent to desired curvatures, and a number of machines have also been devised in which to hold the wood and apply the bending pressure.

The object of my invention is to furnish a simple and economical apparatus which will be capable of performing a variety of work in a perfectly-satisfactory manner and with a minimum expenditure of time and in which different bends may be readily made and held until set with but a single steaming of the wood.

The invention consists in certain novel details of construction and combinations of parts, which are fully described in connection with the accompanying drawings and are specifically pointed out in the claims.

Figure 1 is a longitudinal elevation of my improved machine, showing the manner of using the same for bending the end curve, as for a plow-handle. Fig. 2 shows the bend completed and firmly maintained by the forming mechanism after removal from the machine. Fig. 3 shows the manner of using the machine to form a longer intermediate curve and also gives another view of the forming mechanism of the end curve. Fig. 4 is a plan view. Fig. 5 is a detail view of the link. Fig. 6 shows a slightly-modified forming mechanism.

The frame A, which is represented as supported upon legs A', is formed near one end with a bending-recess  $a$  in its upper surface, extending longitudinally between blocks or lugs  $a'$  and  $a^2$ . Midway between these blocks is a yoke or bracket B', with overhanging head B, through which passes a screw  $b$ , represented as provided with a hand-wheel  $b'$ , by means of which it may be operated as a screw-press.

At the opposite end of the frame is a side offset  $a^3$ , extending above the level of the frame and corresponding in transverse position with the yoke B', in connection with which it thus serves to support a length of steamed wood while subjecting the same to bending pressure by means of an intermediate screw-press C, operating at about right angles to the press B. A lever E, pivoted at one end to a point  $a^4$  of the frame, is provided at its opposite end with a spring-hook  $e^3$ , pivoted to the lever at  $e'$ , which automatically engages a recess  $a^5$  in the end of the frame when the lever is raised to its normal position. This lever is also provided with a longitudinal slot  $e$ , in which is secured an adjustable trunnion-piece G', which is engaged by the hooked ends  $g^2$  of a link G, which spans the frame and is provided at its upper end with a roller  $g'$ , adapted to bear upon a former H in the operation of bending, as will be more fully described hereinafter. This link is preferably made adjustable in length by forming it in two parts connected by means of bolts  $g^3$ , passing through slots  $g$ , as shown. A weight F is pivoted to the lever at a point  $e^2$ , so located as to produce a sufficient downward pressure upon the link-roller  $g'$ .

The forming mechanism which I employ in connection with the link and weighted lever above described resembles in its general features devices heretofore used for bending wood, but differs from them in some important matters of detail, as well as in the manner of using it. The former H is curved to the desired shape of the bend and is grooved to receive the rounded end portion  $i$  of the wood. It is provided with a tapering shank  $h$ , and the point  $h'$  of its butt-end is adapted to be engaged by the hooked portion of an end piece K, which is secured to the usual flexible strap L' at right angles thereto. The opposite end of this strap is attached to a U-shaped clamp L, which is clamped to the wood considerably beyond the beginning of the curve to be formed by means of a wedge  $l^2$ , which is pressed against the side of the wood, with its opposite face bearing against a pin or roller  $l$ , as shown.

In bending the end of a stick I, so as to form a plow-handle, the straight stick is laid upon the strap L', with the end butted against the



end piece K, the former H is placed upon it with its shank  $h$  in vertical position and its butt-end against the end piece K and engaged by the hooked portion  $k'$  of the latter, and the clamp L is tightened upon the wood by means of the wedge  $l^2$ , all as indicated in Fig. 1. The link G is then placed in position with the roller resting upon the inner curve of the former H and its lower end hooked over the trunnion-piece  $G'$ . The spring-hook  $e^3$  at the end of the lever is then released, thus producing a downward pressure upon the link-roller  $g'$ . A lever M, adapted to engage projections  $k$  on the end piece K near the strap, is used to effect the bending, the heel  $m$  of the lever pressing against the outer portion of the end piece and the roller  $g'$  pressing the former uniformly against the wood during the operation. When the shank  $h$  of the former has been brought in contact with the straight surface of the wood, the bend is completed and is so held by means of a clamp J, which engages the tapering shank  $h$ . During the bending process the outer portion of the bent wood is subjected to a tensile strain, which somewhat extends it, while the inner portion is considerably compressed. The band  $L'$ , being in contact with the outer surface, is kept in tension, thus maintaining an end pressure upon the wood, the clamp L slipping, however, so as to prevent this strain becoming excessive. The weighted lever E, which has moved freely to correspond with the different positions of the link-roller  $g'$ , is locked in its normal position by the spring-catch  $e^3$  at the end of the operation, and the link G is unhooked and removed, leaving the stick I free. This operation requires but a very short time, and other bends may be made in succession on the same stick, as desired. For instance, Fig. 3 represents a side bend being given to the same stick by means of the screw-press B, which forces the intermediate wood down in the recess  $a$  by means of a former N, while supporting the stick upon the blocks  $a' a^2$ , the bend thus made being retained after the pressure is removed by means of bands  $n$  and the stick being laid aside in this condition and allowed time to set.

In the plan view, Fig. 4, the manner of using the transverse screw-press C is shown, the operation being similar to that illustrated in Fig. 3, but the distance between the supports  $B'$  and  $a^3$  being considerably greater, so as to provide for such bends as are required for carriage-shafts, &c.

The slightly-modified former shown in Fig. 6 is adapted for making a bend which does not extend to the end of the stick—such as is required, for instance, for carriage-shafts. Obviously a great variety of other formers

may be devised to suit different requirements and be used in connection with my machine.

I do not limit myself to the exact construction shown and described; but

What I claim is—

1. In a wood-bending machine, the frame provided with a bending-recess between blocks  $a' a^2$ , an intermediate yoke and screw-press B, a side offset  $a^3$ , corresponding with said yoke, and an intermediate screw-press C, operating at an angle to the press B, all substantially as set forth.

2. In a wood-bending machine, the combination, with the frame and the weighted lever E, pivoted thereto, of the link G, carried by said lever and spanning the frame, and the former H, upon which said link bears, all substantially as and for the purpose set forth.

3. In a wood-bending machine, the combination, with the frame and the weighted lever pivoted thereto, of the adjustable link G, adjustably pivoted to said lever, substantially as described, and spanning the frame, and the former H, upon which said link bears, substantially as and for the purpose set forth.

4. In a wood-bending machine, the combination, with the frame and the weighted lever E, pivoted thereto, of the link G, carried by said lever and spanning the frame, and the former H, upon which said link bears, said lever being provided with a catch  $e^3$ , adapted to lock it fast to the frame, substantially as set forth.

5. In a wood-bending machine, the combination, with the frame, of the weighted lever E, pivoted thereto and provided with a longitudinal slot  $e$ , the trunnion-piece adjustably secured in said slot, the link G, spanning the frame and having hooked ends engaging the trunnion-piece, and the former H, upon which said link bears, substantially as set forth.

6. In a wood-bending machine, the combination, with the frame and the weighted lever pivoted thereto, of the link G, spanning the frame and provided with a roller  $g'$  on the cross-bar and hooked ends to engage the lever, and the former H, upon which said roller bears, substantially as set forth.

7. In a wood-bending machine, the curved former H, in combination with the strap  $L'$ , having an end piece K, trunnions  $k$  for attaching an operating-lever, and hooked end  $k'$  to engage the end of the former, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JOSEPH KLAHR.

Witnesses:

GEO. W. HUBER,

GEO. F. POTTEIGER.