

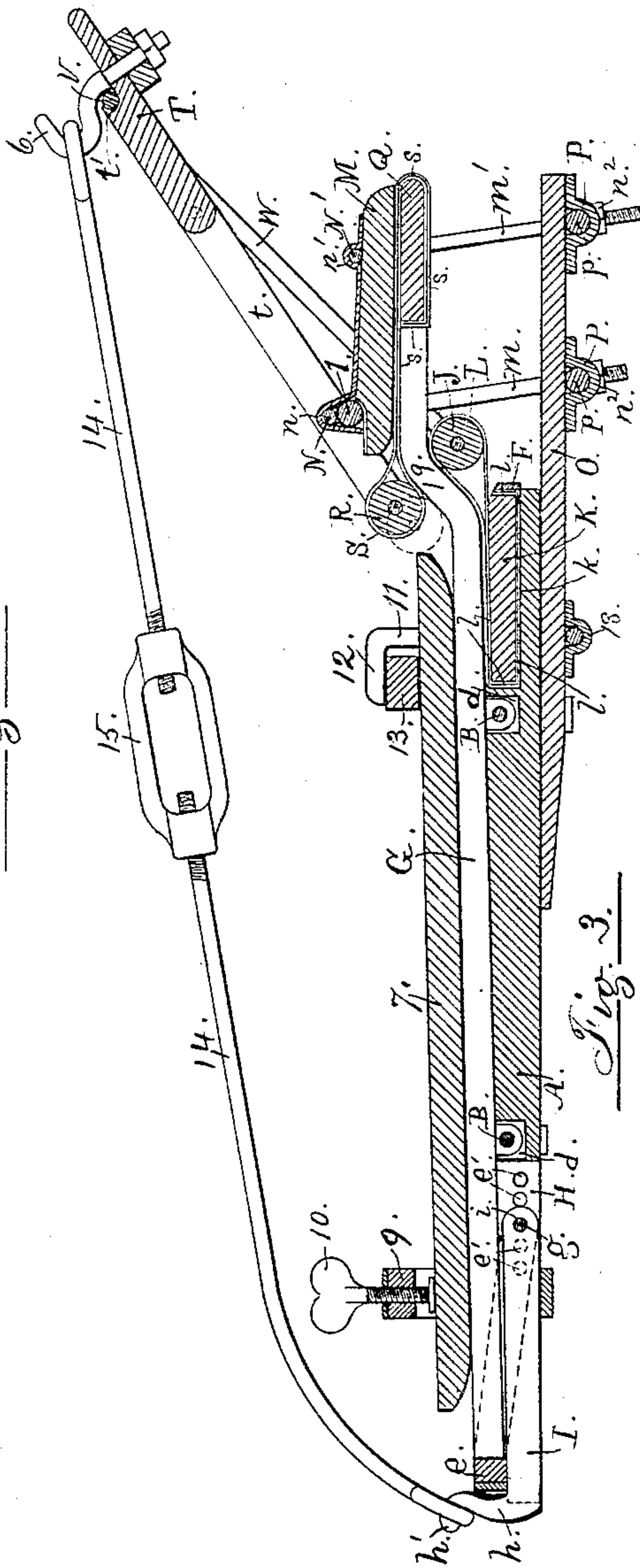
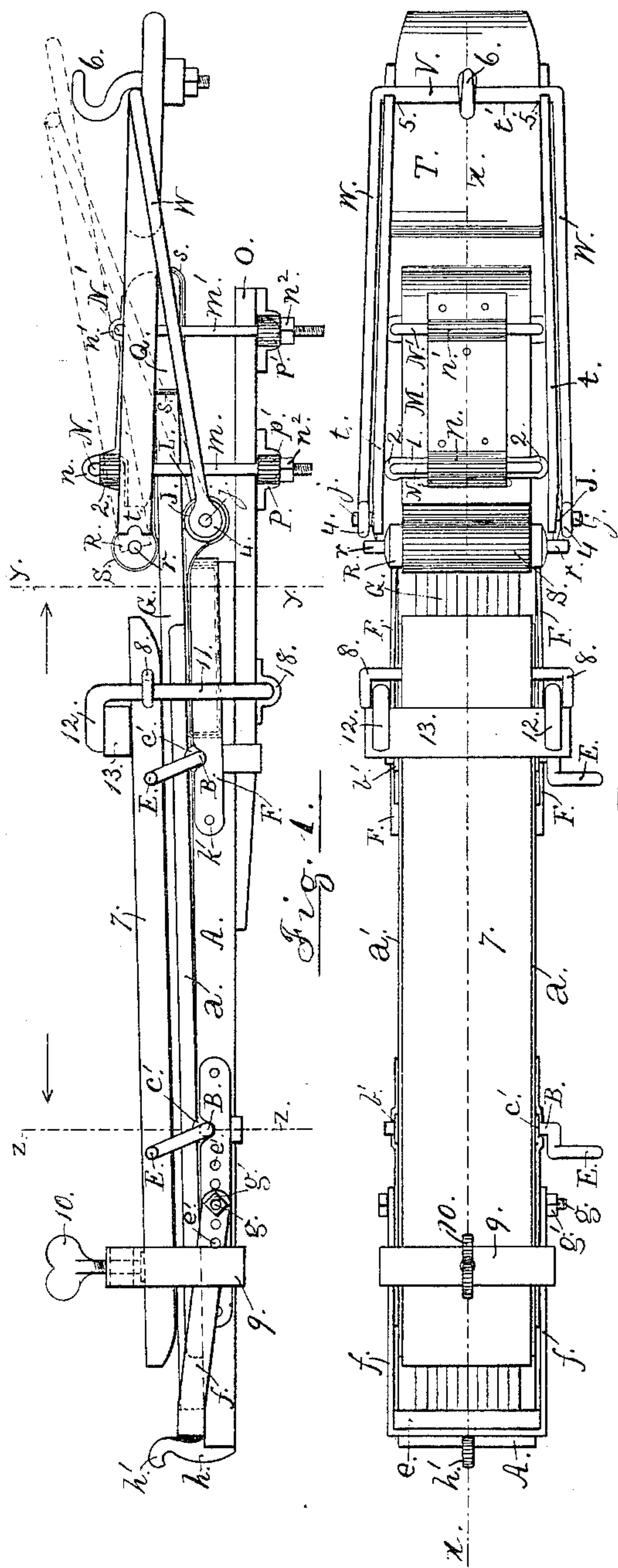
(No Model.)

2 Sheets—Sheet 1.

J. STOLL.
DEVICE FOR BENDING WOOD.

No. 433,221.

Patented July 29, 1890.



Witnesses

Dan. H. Herr
Geo. A. Lane

Inventor

John Stoll

By his Attorney Wm. R. Gerhart

(No Model.)

2 Sheets—Sheet 2.

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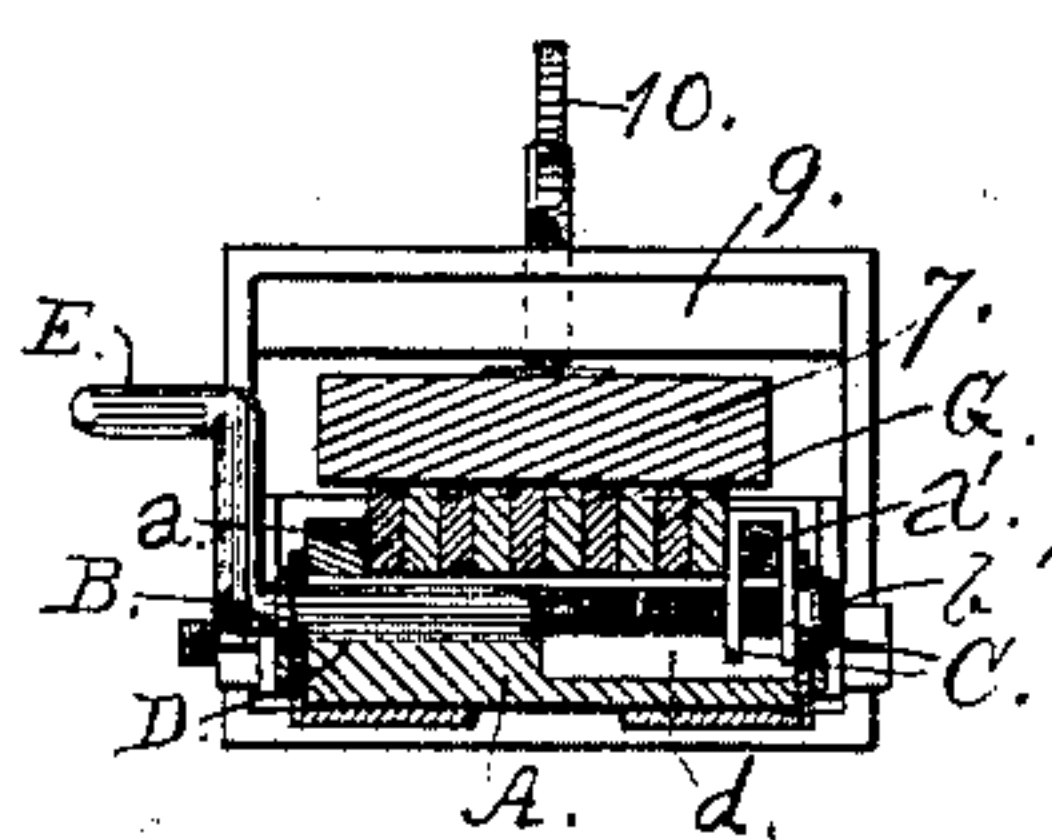


Fig. 5.

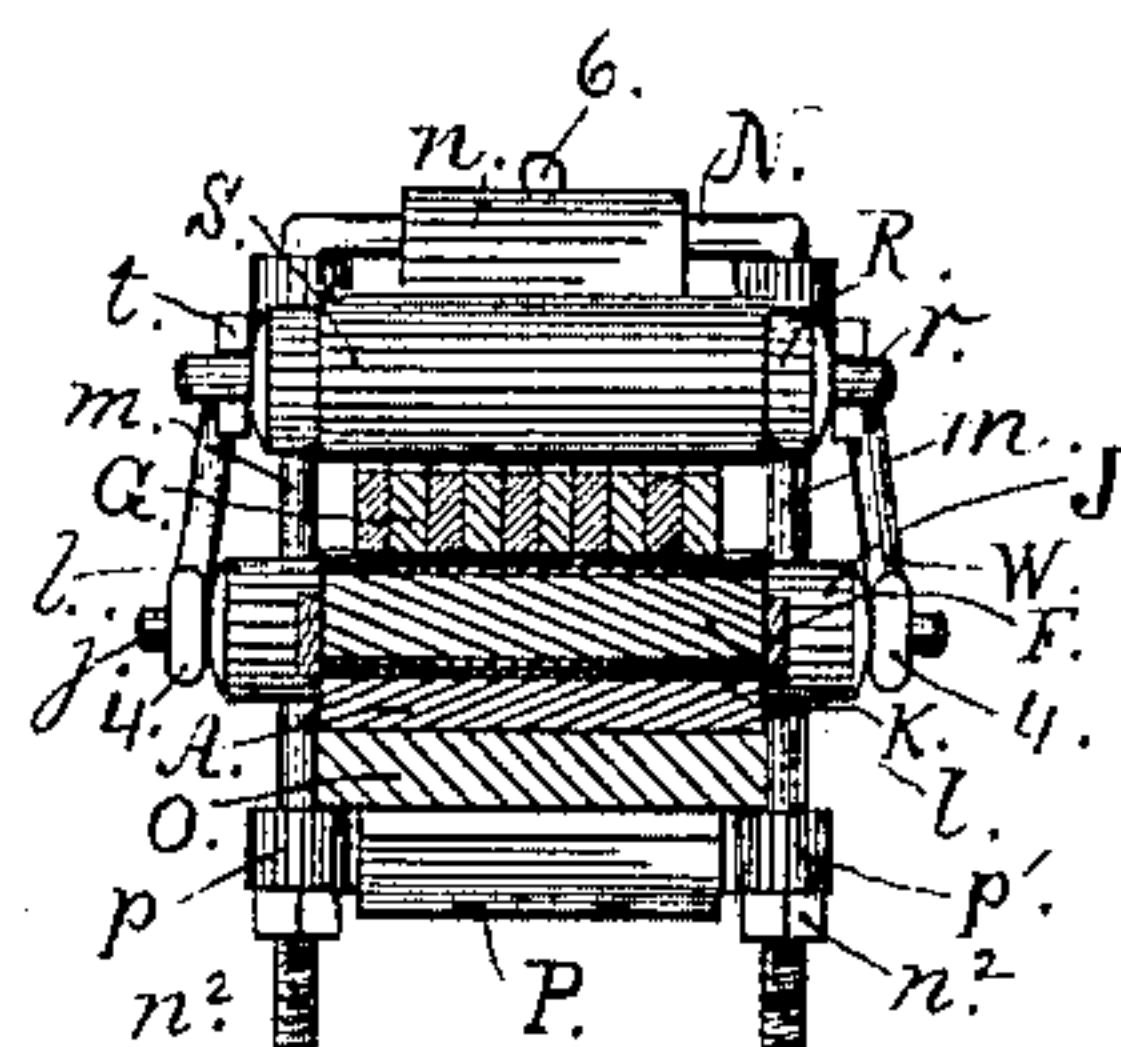


Fig. 4.

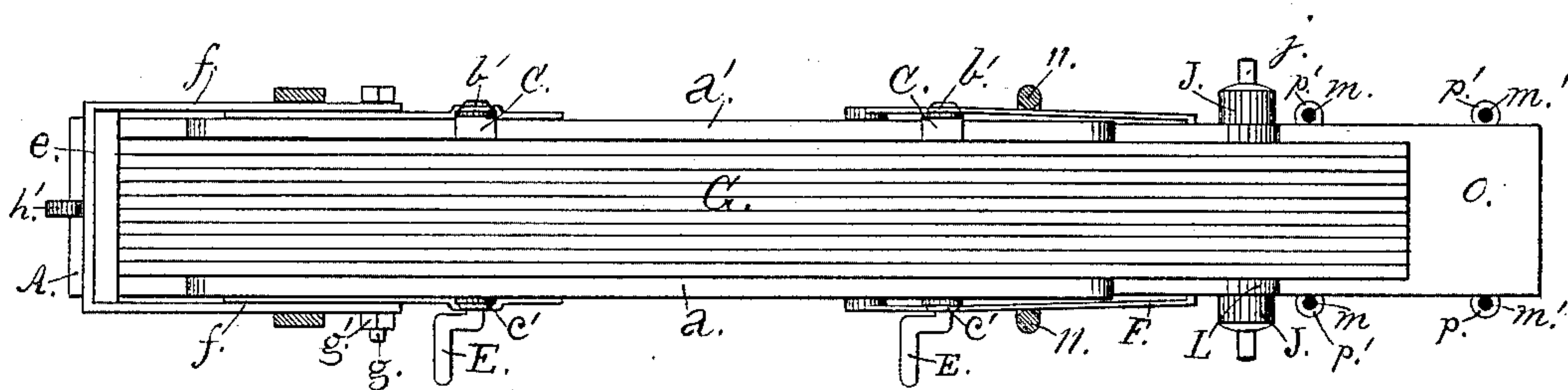


Fig. 6.

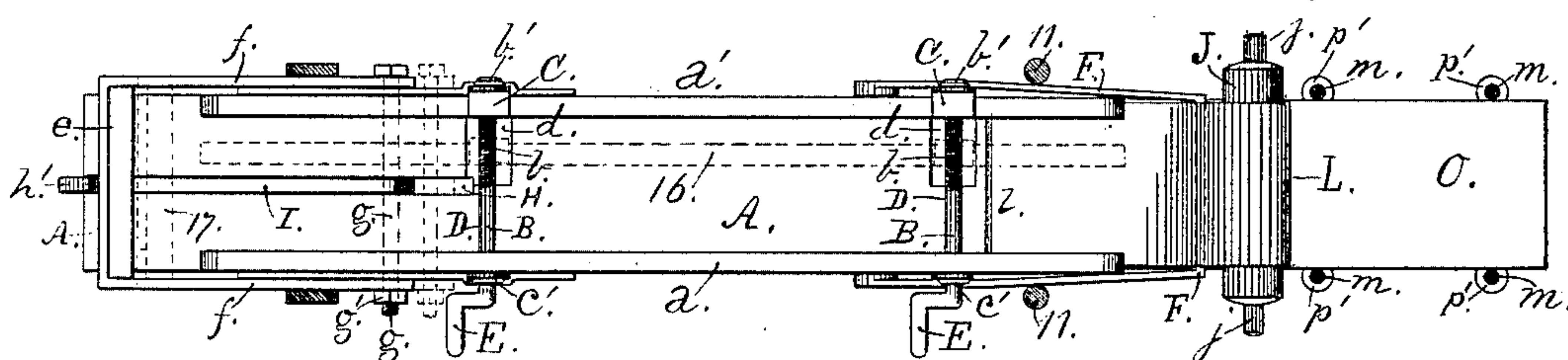


Fig. 7.

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UNITED STATES PATENT OFFICE.

JOHN STOLL, OF LANCASTER, PENNSYLVANIA.

DEVICE FOR BENDING WOOD.

SPECIFICATION forming part of Letters Patent No. 433,221, dated July 29, 1890.

Application filed May 20, 1889. Serial No. 311,385. (No model.)

To all whom it may concern:

Be it known that I, JOHN STOLL, a citizen of the United States, residing at Lancaster, in the county of Lancaster and State of Pennsylvania, have invented certain Improvements in Devices for Bending Wood, of which the following is a specification.

My invention relates to certain new and useful improvements in devices for bending wood, and is more particularly designed for bending or forming the ends of reaches of vehicles; and the object of my improvement is to bend the two curves forming the reverse curve of the reach simultaneously and to prevent at the same time any longitudinal stretching of the wood.

My invention consists in a support upon which the reach rests while being bent, means for preventing buckling or vertical movement of the reach, mechanism for bending or forming a curve in the reach, and bearings to prevent longitudinal expansion of the wood under the action of the bending mechanism, as will hereinafter be fully described and claimed. I accomplish my objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of my device, showing it in the position it occupies when the reach-bars are placed therein to be bent. Fig. 2 is a top or plan view of the same in the position shown in Fig. 1. Fig. 3 is a longitudinal vertical section on the line *xx* of Fig. 2, but with the device in the position occupied by it as the reverse curve is bent in the reach-bars. Fig. 4 is a vertical transverse section on the line *yy*, Fig. 1. Fig. 5 is a similar view on the line *zz*, Fig. 1. Fig. 6 is a top view, the covering-plate, top roller, and head-block being removed, showing the clamping-rods in section and a number of reach-bars in place preparatory to being bent. Fig. 7 is a similar view, but with the reach-bars also removed.

In the drawings, A represents the bed-plate provided with side strips *a a'*, between which the reach-bars are held while being bent. Of these strips one *a* is rigidly fastened to the bed-plate, and the other *a'* is adjustable transversely of the bed-plate by adjusting-rods B, extending across the bed-plate and

having one end *b* threaded, so as to engage threaded perforations in the ends of yokes C. These yokes embrace the strip *a'* and have their ends extending below the same. Grooves D, in which the adjusting-rods rest, extend across the bed-plate and are of such depth that the adjusting-rods lie entirely below the upper surface of the bed-plate. Recesses *d* are formed below the strip *a'*, into which the ends of the yoke depend, and they extend inward a sufficient distance to allow for the adjustment of that strip. The ends *b* of the adjusting-rods are provided with heads and washers *b'*, while the other ends have collars *c'* and cranks E fixed thereon.

At the foot of the bed-plate there is a hinged bearing, against which one end of the reach-bars G rest, consisting of a cross-piece *e*, and two arms or side bars *f*, the inner ends of the latter being hinged on a horizontal rod or bolt *g*, which passes entirely through the bed-plate and is held in place by a nut *g'*. This bolt *g* is removable and can be engaged with any one of a horizontal series of perforations *e'*, made through the bed-plate, so that the cross-piece *e* can be adjusted backward and forward to afford a bearing for reach-bars of different lengths.

There is a vertical slot H cut through the center of the bed-plate and extending from the foot toward the head thereof somewhat beyond the series of perforations *e'*. In this slot there is located a tongue I, carrying a bearing-post *h* on its outer end. One side of the post *h* bears against the center of the cross-piece *e* and serves to support the same, while at the top thereof there is a hook *h'*, formed for a purpose to be explained. The bolt *g* also passes through a perforation *i* in the tongue I, and when the cross-piece *e* is moved forward or back the tongue and bearing-post are moved with it, so that the bearing-post always rests against the cross-piece *e*.

In the end of the bed-plate toward the head of the device, there is a recess *k* formed, in which rests a strain-block K, held in place and secured to the bed-plate by a metallic strap F, which passes around the outer edges of the block and has its ends fastened to opposite sides of the bed-plate, as shown at *k'*, Fig. 1. A roller J, located beyond the end of the bed-

plate and having spindles *j*, is connected with the block K by a metallic strap L, which passes around the roller and has both its ends *l* carried back over the top of the block K, around its inner edge, under it, and up against its front edge, where they are securely fastened to the block.

The head-block M of the device is located beyond the forward end of the bed-plate and is supported by arms *m m'* of yokes N N', connected with a platform O, secured to the underside of the bed-plate. Transverse loops *n n'* are formed on the top face of the head, in which the cross-bars of the yokes are hinged. The loop *n* is higher than loop *n'*, and a rod 1 rests therein, upon which the yoke N bears. The rod 1 has its bearing in a recess 3 in the end of the head M. Eyes 2 are formed on the ends of rod 1, through which the arms *m m'* pass. Beneath the platform O loops P, similar to loops *n n'*, are formed, in which rest round rods *p*, provided at their ends with eyes *p'*, through which the threaded ends of the arms *m m'* pass and are engaged beneath by nuts *n*².

At the front end and beneath the head-block M is firmly secured a strain-block Q, similar to the block K. A roller R, having spindles *r*, is supported above the roller J by a metallic strap S, which passes around the roller and has both its ends *s* carried forward over the strain-block Q, and between it and the head-block M, thence around the front edge, and back beneath it, and up against its rear edge, where it is secured.

A lever-plate T, having arms *t*, with semi-circular recesses in their ends which engage the spindles *r* of the roller R, is operated in front of and over the head-block M. Near the front end of the plate T there is a shoulder *t'* formed that affords a bearing for a transverse rod V, connecting the arms W, having eyes 4, which fit over the spindles *j* of the roller J. The cross-rod V also engages in recesses 5 in the front ends of the arms *t*, and the plate T is provided with a hook 6, the bend of which curves over the rod V to prevent it from becoming disengaged from the shoulder *t'*.

The operation of the device is as follows: The lever-plate T and the rollers being placed in the position shown in Fig. 1, a number of reach-bars G are placed in the machine on the bed-plate, having one end bearing against the cross-piece *e* and the other inserted between the rollers R and J and bearing against the strain-block Q. If the number of reach-bars is not sufficient to fill the machine to its utmost capacity the adjustable side strip *a'* is drawn in, as shown by the dotted lines 16, Fig. 7, so as to hold the bars firmly in position, and the cross-piece *e* and bearing-post *h* are adjusted, as shown by dotted lines at 17, Fig. 7, to a proper position to support the ends of the said bars. A covering-plate 7 is then placed on the reach-bars and clamped in position by a set-screw 10 working in the up-

per cross-piece of a rectangular frame 9, which is pushed over the foot of the device far enough to embrace the covering-plate. Near the point where the head of the covering-plate rests a rod 11 is placed on each side of the bed-plate, which rods are connected with each other beneath it by a transverse rod supported by a loop 18. Each rod is provided with a horizontal arm 12 at its upper end, and between those arms and the covering-plate a wedge-shaped block 13 is forced to hold that end of said plate in place. These dispositions having been made the lever-plate T is raised until it reaches the position shown in Fig. 3. This movement forces the rollers and head of the machine into the positions shown in Fig. 3, the greater radius of the yoke N causing that end of the head-block to throw the roller R far enough forward to allow ample space for the reach-bars between the two rollers in their changed position. In this movement of the lever-plate T the lower roller is raised and the upper roller thrown forward and depressed, forming the reverse curve 19 in the reach-bars, as shown in Fig. 3. After the lever-block has been raised to the desired height, tension-rods 14 are engaged with the hooks *h'* and 6 and then tightened up by the turn-buckle 15 to hold the lever up until the wood is set. As will be observed the head-block is forced somewhat forward by the raising of the lever-plate T. This compensates for the shortening of the reach-bars by the formation of the curve therein, and during the whole process of bending preserves a firm bearing for both ends of those bars and prevents them from stretching longitudinally. By the ordinary process for bending the curves forming the reverse curve they are formed consecutively and without any provision for preventing the longitudinal expansion of the bars, frequently causing the wood to split horizontally, so that a very large proportion of bars are rendered worthless. In my machine the curves are formed simultaneously and the ends of the bars are firmly supported in such manner as to prevent the expansion of any portion of the wood.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with the bed-plate provided with a series of perforations *e'* and a longitudinal vertical slot cut through the foot thereof, of a cross-piece *e*, having arms *f*, secured to an adjustable rod engaging said perforations, and a tongue adapted to be received in the slot and adjustably secured therein, and a bearing-post *h* formed on the tongue, substantially as and for the purpose specified.

2. The combination, with the bed-plate having a series of perforations *e'* and a longitudinal slot through the foot thereof, of a cross-piece *e*, provided with arms *f*, perforated at the ends, a bearing-post having a tongue adapted to be received in said slot

and having a hole through the inner end, and a rod *g*, constructed to engage the perforations in the ends of the arms, the perforations through the bed-plate, and the hole through the tongue, substantially as specified.

3. The combination, with the bed-plate, head-block, rollers, and lever, of the cross-piece *e*, secured to the bed-plate, and the strain-block *Q*, attached to the head-block and forming a shoulder whereby a movable bearing is formed for an end of the reach-bars, substantially as and for the purpose specified.

4. The combination, with the bed-plate, rollers, and lever, of a cross-piece *e*, secured to the bed-plate, the movable head-block having a shoulder formed therein, and means for preventing buckling or vertical movement of the reach-bars while curves are being formed in the same, substantially as specified.

5. The combination, with the bed-plate, rollers, and lever, of a cross-piece *e*, secured to the bed-plate, the movable head-block having a shoulder formed therein, and a covering-plate *7*, removably secured to the bed-plate and adapted to hold the reach-bars in position on the bed-plate, substantially as and for the purpose specified.

6. In a wood-bending device, the combination, with a bed-plate and a head-block located at the end of said bed-plate, of mechanism for forming a curve in wooden bars situated between the bed-plate and head-block, and bearings adapted to be held in contact with the ends of said bars while a curve is being bent therein, substantially as specified.

7. In a wood-bending device, the combination, with a bed-plate and mechanism for forming a curve in wooden bars, of a head-block located at the end of the bed-plate and constructed to take over the ends of the bars and having a bearing adapted to abut against said ends, the head-block being constructed to move toward the bed-plate as the curve is bent in the bars, substantially as and for the purpose specified.

8. In a wood-bending device, the combination, with the bed-plate and a head-block located at the end of said bed-plate, of a bending mechanism situated between said bed-plate and head-block, substantially as specified.

9. In a wood-bending device, the combination, with the bed-plate and a head-block situated at the end of said bed-plate, of a bending mechanism formed of rollers suitably located between the bed-plate and head-block, substantially as specified.

10. In a wood-bending device, the combination, with the bed-plate and head-block, of two rollers, one connected with the bed-plate and the other with the head-block, and mechanism for operating said rollers, substantially as specified.

11. In a wood-bending device, the combination, with the bed-plate and head-block, of a

roller connected with the bed-plate and another with the head-block, and lever-arms engaging the spindles of said rollers and adapted to move the rollers one about the other, substantially as specified.

12. In a wood-bending device, the combination, with the bed-plate and head-block, of a roller connected with each, one being located above the other, and lever-arms engaging with said rollers and connected with the same lever-plate *T*, substantially as specified.

13. In a wood-bending device, the combination, with the bed-plate and head-block, of rollers attached thereto, and lever-arms *t*, connected with one of the rollers, as *R*, and a lever-plate *T*, and other lever-arms *W*, engaging with the other roller, as *J*, and connected by a transverse rod *V*, engaging a shoulder of the lever-plate and recesses in the lever-arms *t*, substantially as and for the purpose specified.

14. In a wood-bending device, the combination, with the bed-plate provided with a bearing *e*, and a post *h*, adapted to rest against said bearing, and a head-block having a bearing *Q*, of rollers *R* and *J*, respectively connected with the bed-plate and head-block, lever-arms *t*, engaging with one of the rollers *R* and secured upon each side of a lever-plate *T*, other lever-arms *W*, connected with the other roller *J* and joined by a transverse rod *V*, engaging a shoulder of the lever-plate and recesses in the lever-arms *t*, a hook *6*, fastened to the plate *T* and bearing against the rod *V*, and tension-rods *14*, connected by a tightening device and engaging the hook *6* and post *h*, all constructed and operating substantially as and for the purpose specified.

15. The combination, with the bed-plate, head-block, and rollers, of a strain-block *K*, secured to the bed-plate, and one *Q* fastened to the head-block, and a strap passing around each roller and having both ends wrapped about and fastened to the strain-block with which the roller is connected, substantially as specified.

16. The combination, with the bed-plate, of a head-block pivotally supported in front of the bed-plate, rollers connected with the bed-plate and head-block, and a lever adapted to move the rollers about each other, substantially as and for the purpose specified.

17. The combination, with the bed-plate and head-block, the rollers fastened thereto, and the lever, of yokes hinged to the head-block, the arms *m m'* of said yokes supporting the head-block and having their lower ends hinged to a platform below the head-block, substantially as specified.

18. The combination, with the rollers, secured as described, and the head-block, of yokes hinged on the top of the head-block, the arms of the yokes supporting said head-block and being hinged to a platform below the same, the arms *m m'* of the yokes adjoining the rollers being longer than the arms *m'*

m' of the yoke in front of it, substantially as specified.

19. In a wood-bending device, the combination, with the bed-plate, rollers, and levers, of a platform O, secured to and projecting in front of the bed-plates, arms $m' m'$, hinged to the platform and front of the head-block, and arms $m m$, of greater length than the arms

$m' m'$, hinged to the platform and rear end of the head-block, substantially as and for the purpose specified.

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Witnesses:

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