

(No Model.)

2 Sheets—Sheet 1.

R. STECHER.
STAVE BENDING MACHINE.

No. 535,632.

Patented Mar. 12, 1895.

Fig. 1.

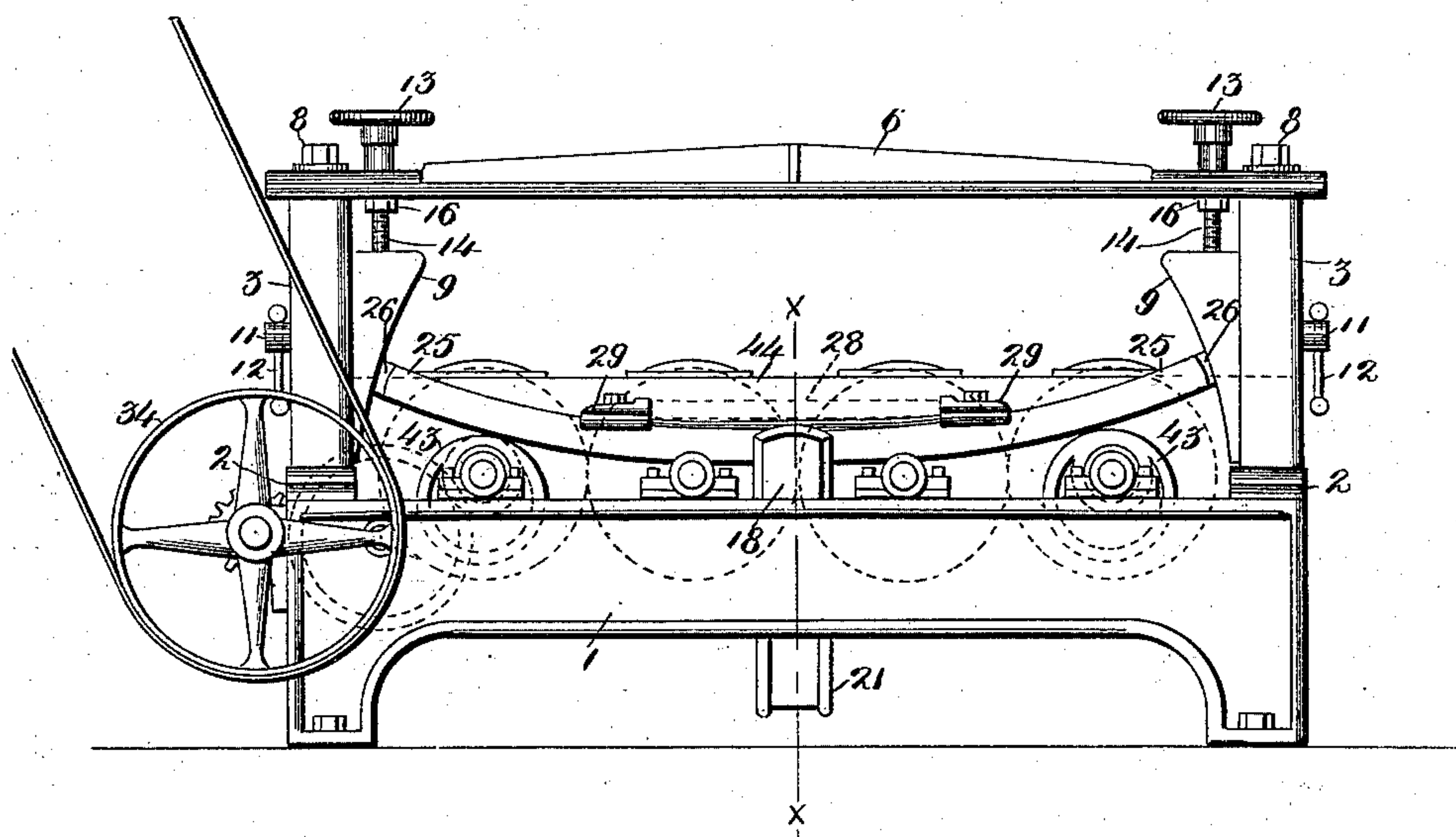
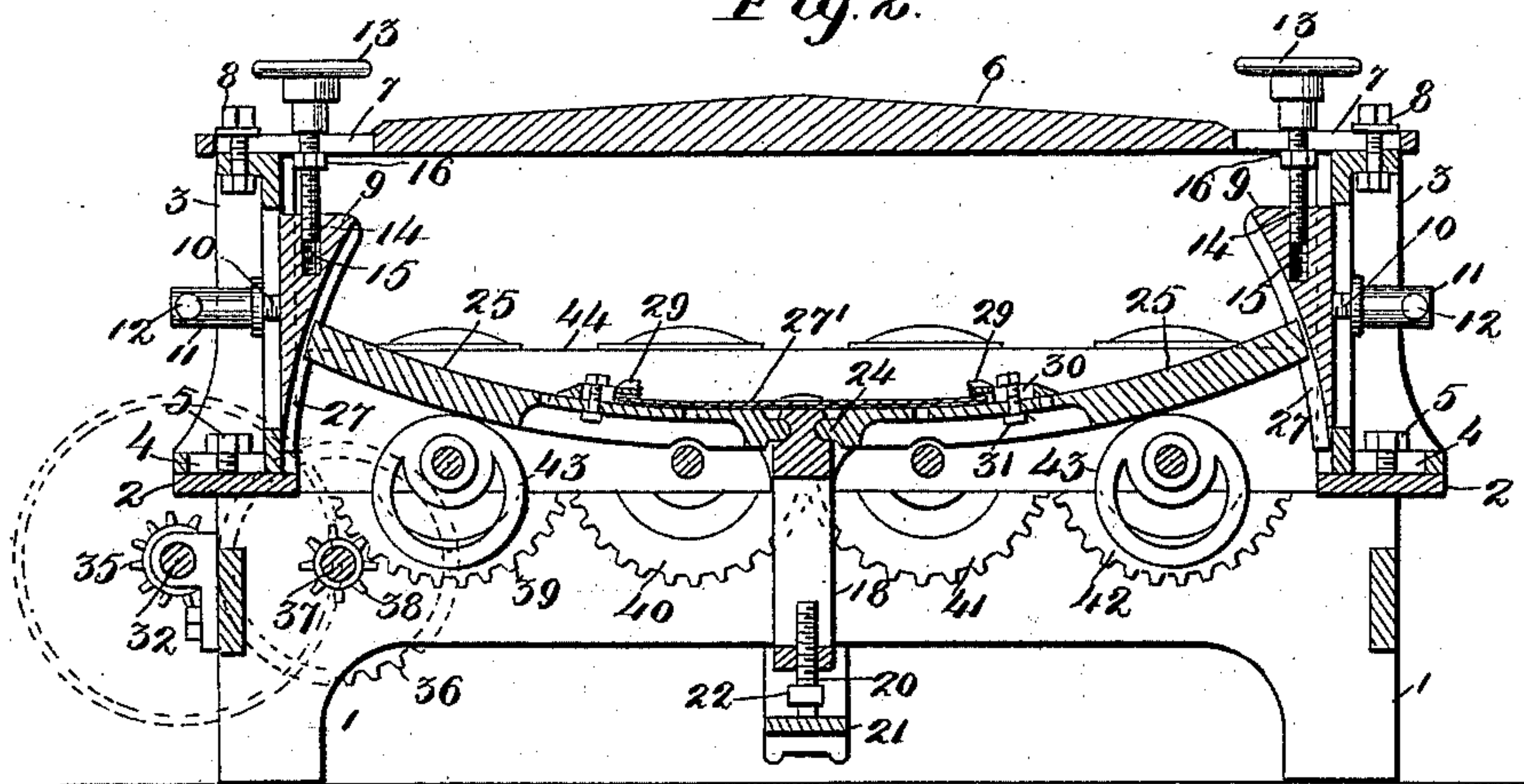


Fig. 2.



Witnesses

J. J. Donohoe
J. P. Mastine.

Inventor

Rudolf Stecher.

By his Attorneys

Keller & Stares

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Fig. 3.

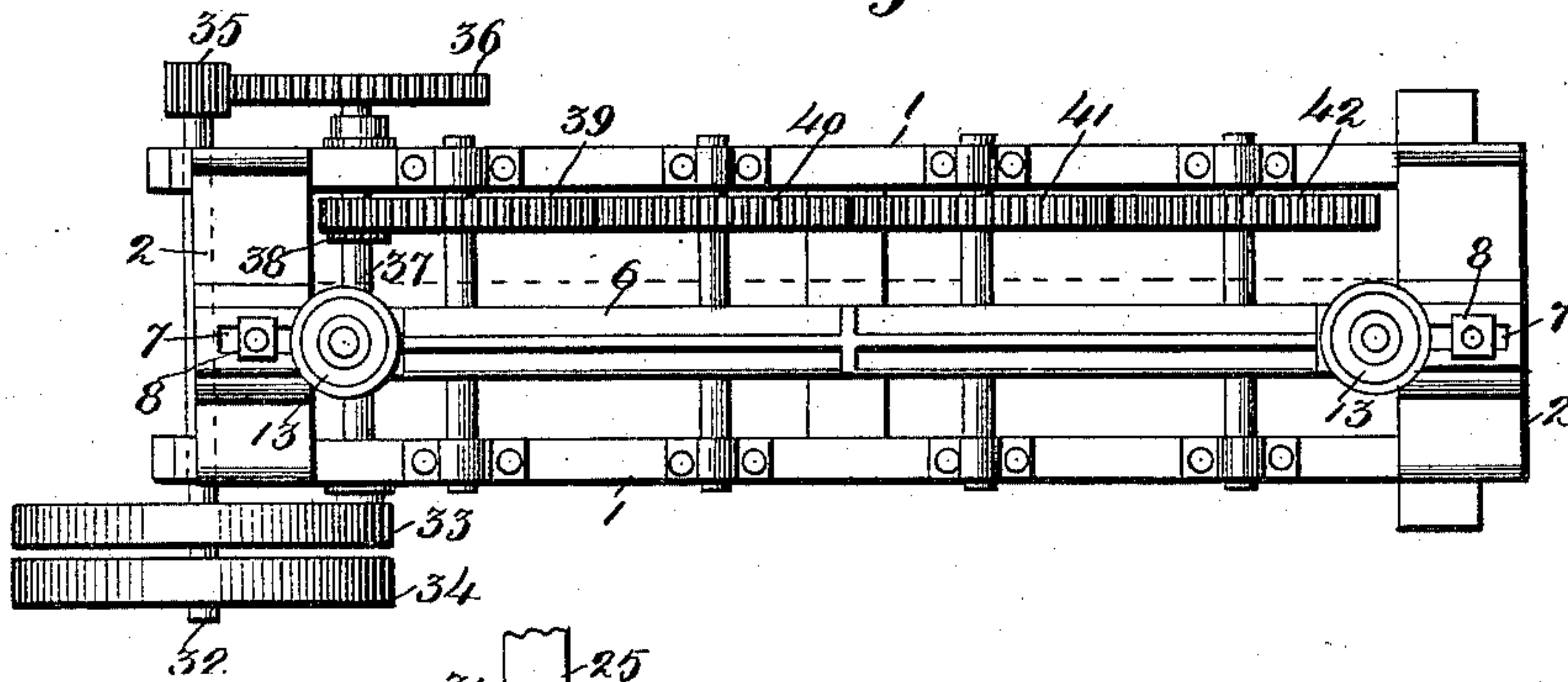


Fig. 4.

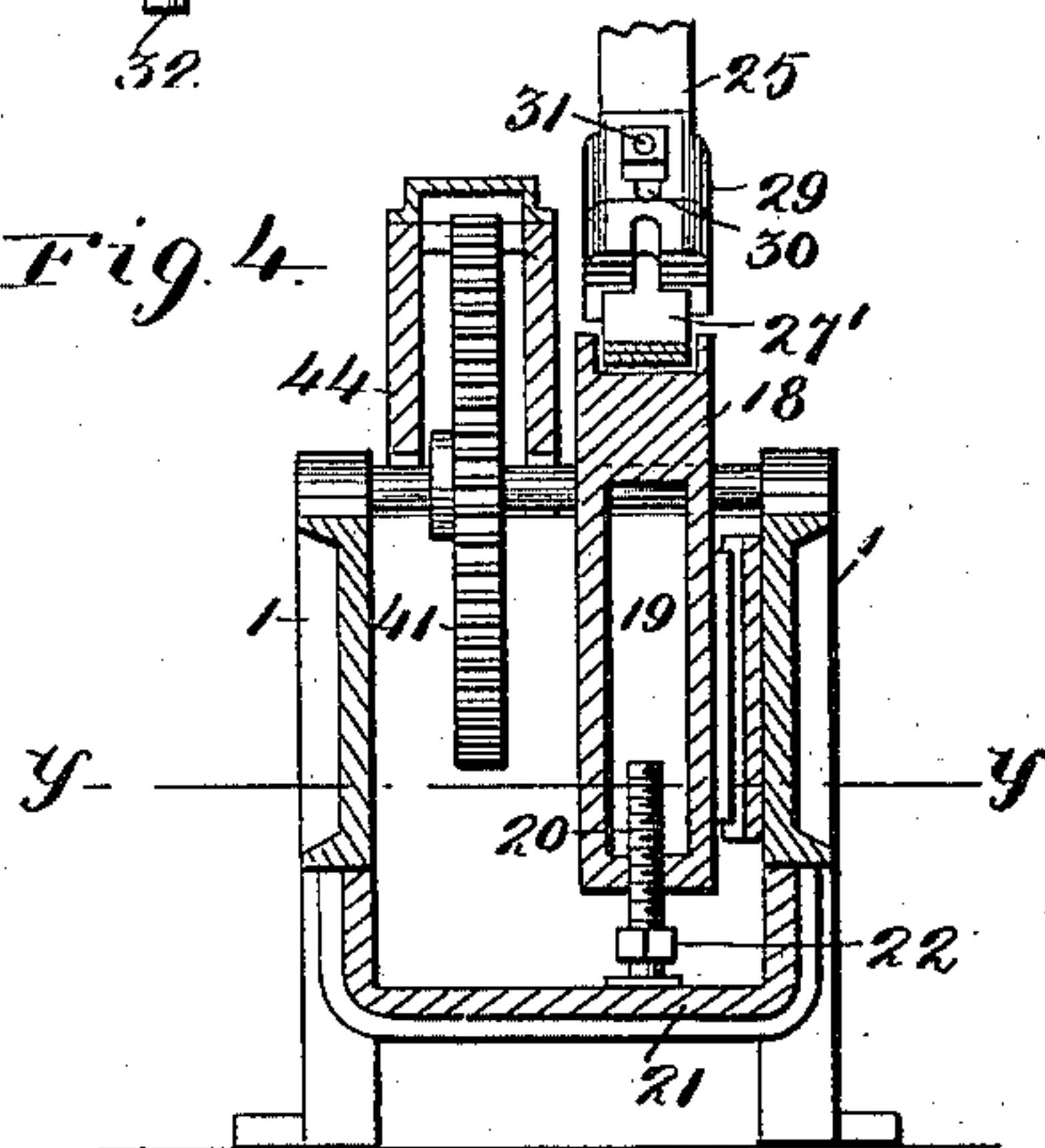


Fig. 5.

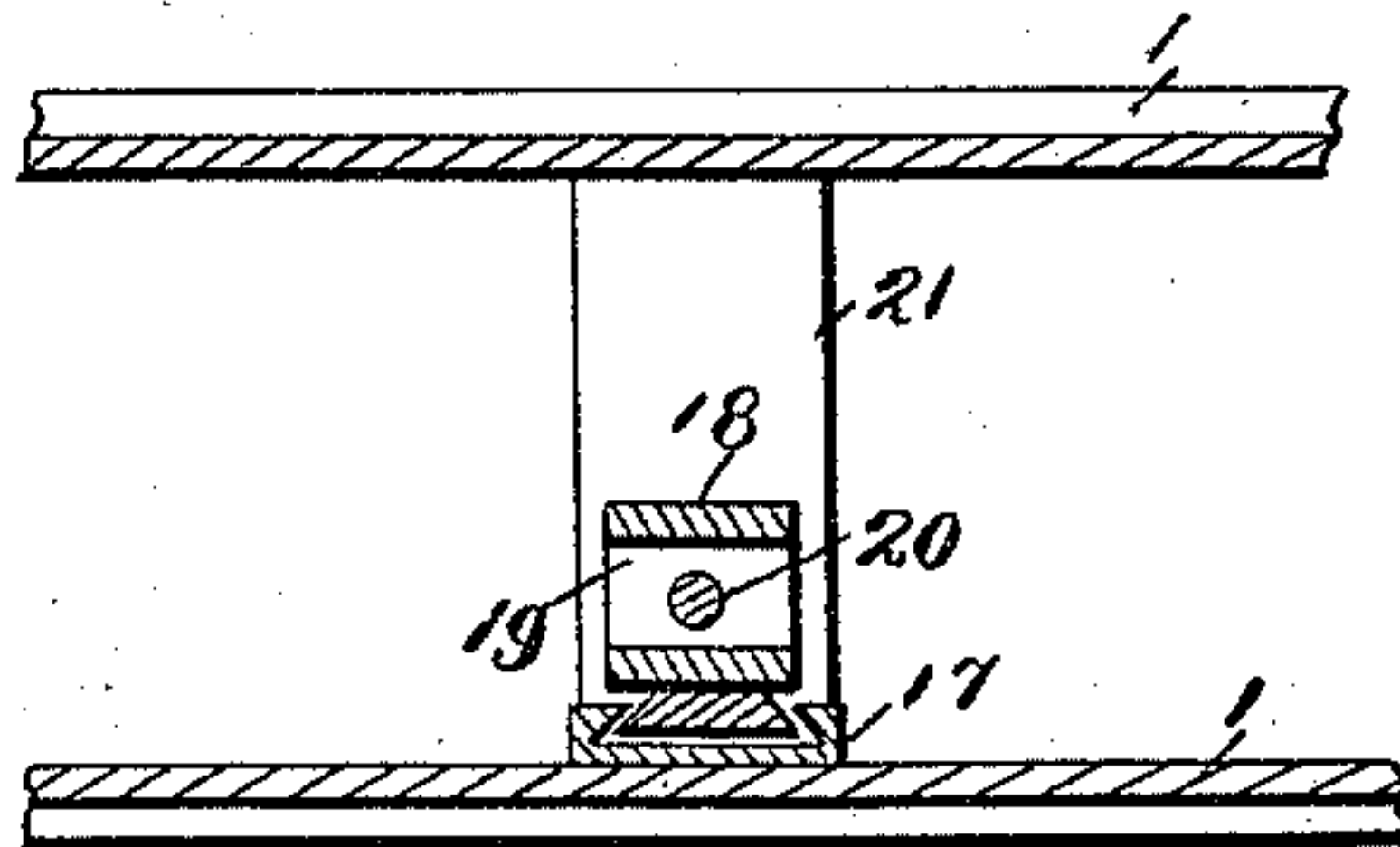


Fig. 6.

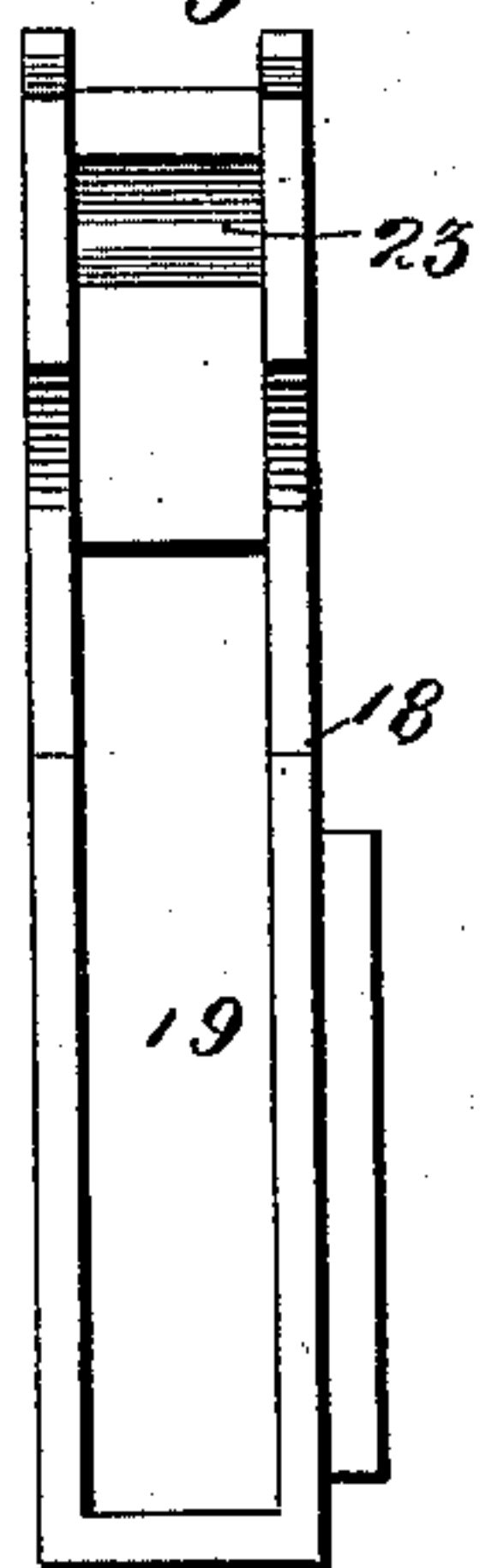


Fig. 7.

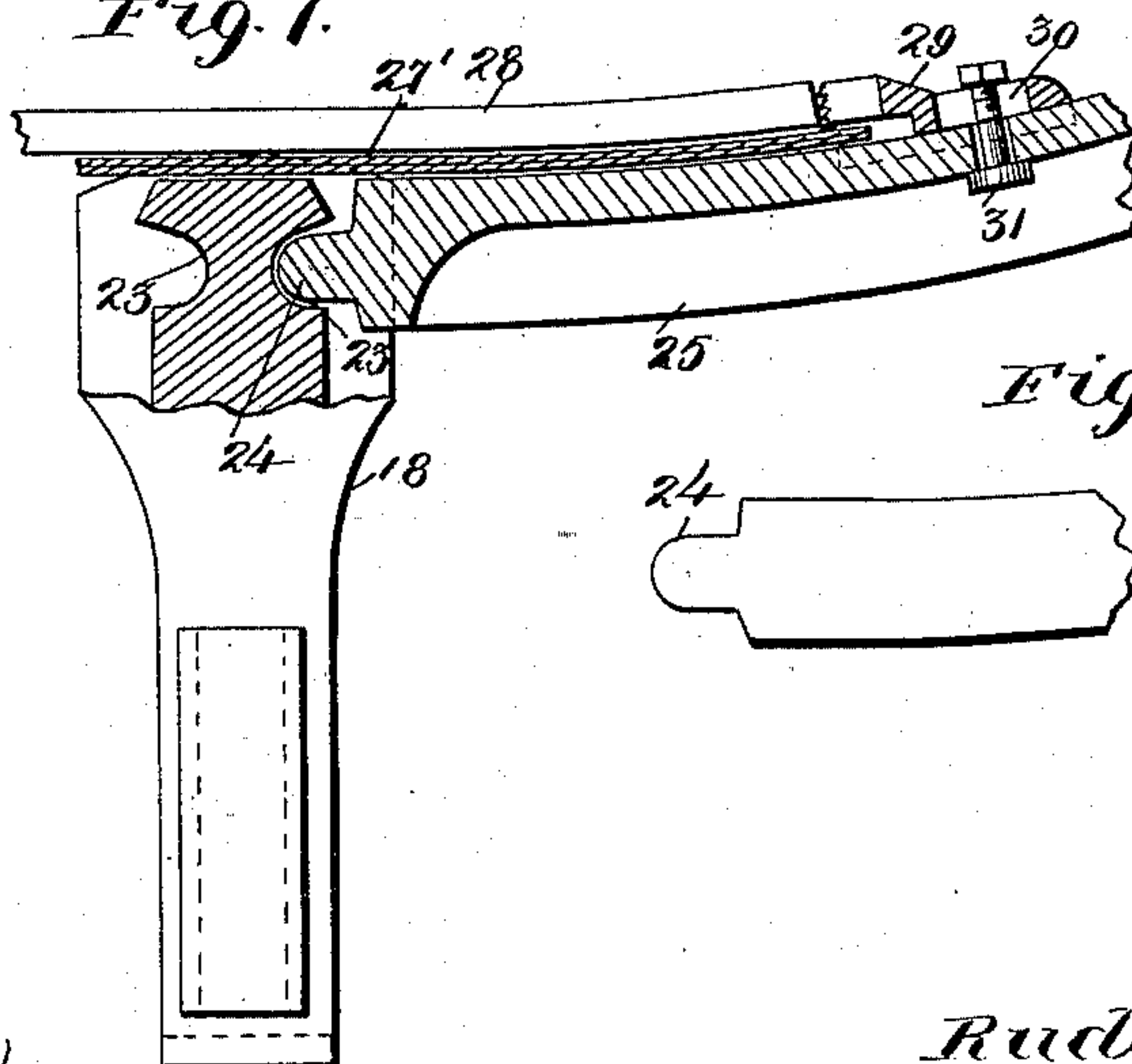
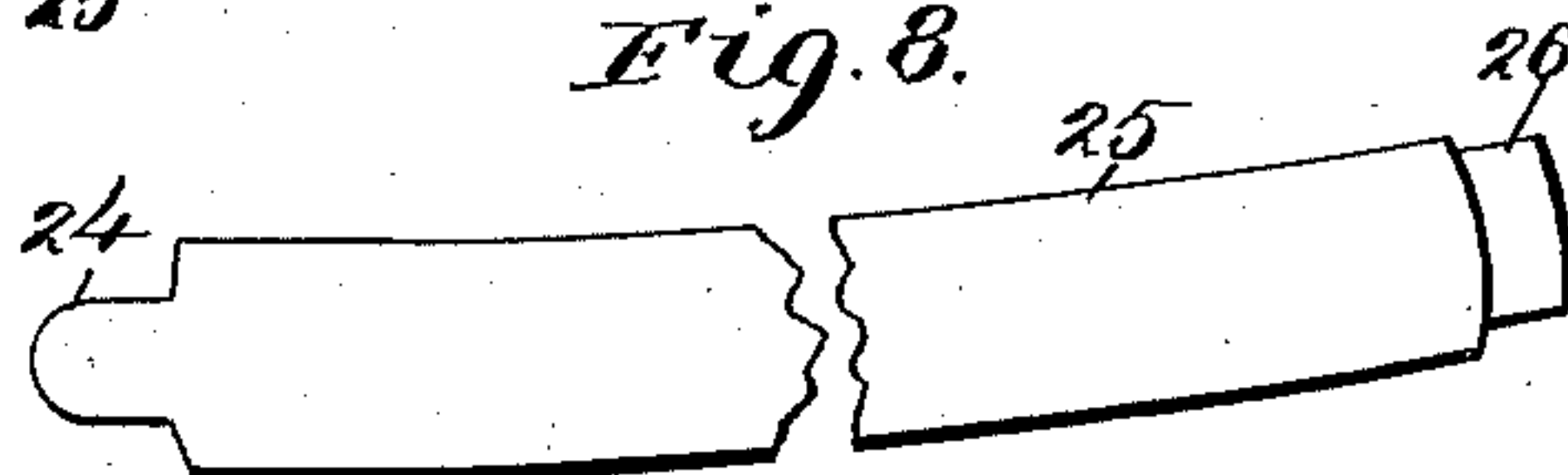


Fig. 8.



Witnesses

J. J. O'Donohoe
J. P. Vantine

Inventor

Rudolf Stecher

By his Attorneys,

Keller & Starek

UNITED STATES PATENT OFFICE.

RUDOLF STECHER, OF ST. LOUIS, MISSOURI.

STAVE-BENDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 535,632, dated March 12, 1895.

Application filed May 5, 1894. Serial No. 510,153. (No model.)

To all whom it may concern:

Be it known that I, RUDOLF STECHER, of the city of St. Louis, State of Missouri, have invented certain new and useful Improvements in Stave-Bending Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part thereof.

My invention has relation to improvements in stave bending machines and consists in the novel arrangement and combination of parts more fully set forth in the specification and pointed out in the claims.

In the drawings, Figure 1 is a side elevation of my complete invention. Fig. 2 is a middle vertical longitudinal section of the same. Fig. 3 is a plan view thereof with boxing for the gearing removed. Fig. 4 is a detail section on the line $x-x$ of Fig. 1. Fig. 5 is a section on the line $y-y$ of Fig. 4. Fig. 6 is a detail end view of the adjustable block for supporting the bending arms. Fig. 7 is a detail side sectional elevation of one of the bending arms pivoted to its supporting block, showing a stave resting on said arm; and Fig. 8 is a detail side view of one of the bending arms.

The object of my invention is to construct a stave bending machine which will be simple and effective, one that will be positive in its action and bend the stave without subjecting it to the danger of splitting about its medial portion. This is accomplished by giving the bending arms a movement by which the stave is gradually bent, the bending arms being raised by a system of revolving cams which contact with the moving arms along different points of their surface during the sweep of said arms.

The machine consists in details to be described as follows:

Referring to the drawings, 1 represents the base or bed of the machine having at either end thereof suitable bearing surfaces 2 which form supports for the standards 3. The standards 3 are adjustable on the bed to and from each other, the amount of such adjustment being determined by the slots 4 at the base of each standard, through which slots pass the bolts and nuts 5 securing each standard to its respective surface 2. The standards 3 are braced at their upper ends by the brace rod 6 which has corresponding longitudinal termi-

nals slots 7 to allow for the adjustment referred to, the said brace rod being firmly secured to the standards by the nutted bolt 8. Vertically sliding within suitable guides along the inner faces of the standards 3 are guide blocks 9 from the back of each of which projects a screw-threaded bolt 10 by means of which each block can be securely clamped to its standard by the clamping head 11 operated by the sliding handle 12. (See Figs. 1 and 2.) The said blocks are operated vertically by the hand wheels 13 secured to the upper ends of the bolts 14 passing through the ends of the brace rod 6 and into screw-threaded depressions 15 in the blocks 9, a nut 16 preventing the bolts from being withdrawn. Upon turning the hand wheels in one or the opposite direction the blocks can be lowered or elevated according to circumstances, this depending of course on the sweep to be given to the bending arms as subsequently described.

Midway between the ends of the base or bed 1 of the machine and guided by a suitable bevel or dovetail groove of the plate 17 secured to or forming part of the inner wall of one of the sides of the base, is an adjustable upright supporting block 18 preferably cast with a chamber 19 for the reception of an adjusting bolt 20, the bottom of the bolt resting upon a suitable base or supporting plate 21 and provided with a nut 22, by turning which will turn the bolt and thus raise or lower (according to the direction of the turning) the block 18 at will. The top of the block 18 and on the sides facing the guide blocks 9, is provided with depressions or grooves 23 into which loosely fit the pivotal ends 24 of the bending arms 25, the free ends of the said arms being guided by their reduced ends 26 working in the grooves 27 of the guide blocks 9, the sweep of the free ends of the arms being of course determined by the variable elevation of said guide blocks, and depending of course on the degree to which the staves are to be bent. Laid upon the bending arms and on either side of the center are one or more plates 27' acting as a bed or support for the stave 28, the said stave being held in place by the toothed or roughened face of the retaining clamps 29, which are made adjustable to and from each other (according to the length of the stave to be

bent) by the slots 30 through which pass the bolts 31 which secure the clamps to the bending arms.

At one end of the base 1 is a driving shaft 5 32 carrying fixed and loose pulleys 33, and 34 respectively, the opposite end of the shaft having secured thereto a pinion 35 which meshes with the gear 36 mounted at the end of a second shaft 37 and on which is mounted 10 intermediate of the lateral walls of the base 1 a pinion 38 meshing with gears 39, 40, 41, and 42 respectively geared to each other and each mounted on a separate shaft. The extreme shafts carrying the gears 39 and 42 have each 15 secured thereto immediately under each bending arm a cam 43 each cam revolving by reason of the gear connections, in opposite directions. It is obvious that as the cams revolve they raise the bending arms 25 about their pivotal points, each cam in its revolution contacting with successively different points along the under surface of the bending arms, and at the same time raising said arms. It is to this motion that a perfect bending of 25 the stave is attributable, there being no tendency to crack the stave about its medial portion as is now very frequent with machines of other designs, and where the bending arms are raised by different mechanical means. 30 The series of gears are covered, to protect the operator, by a boxing 44 as seen in the drawings.

The operation of the machine is obvious from the arrangement of the gears. When 35 the stave is bent it is seized by an ordinary hook in common use, in the hands of the operator which retains it temporarily in its bent position until the stave is set.

Having described my invention, what I 40 claim is—

1. A stave bending machine comprising a suitable bed, suitably pivoted stave bending arms, an adjustable block for supporting the adjacent ends of the bending arms, and suitable 45 cams on either side of said block for sweeping said arms about their pivotal points, substantially as set forth.

2. A stave bending machine comprising a suitable bed, adjacently pivoted stave bending 50 arms, an adjustable block for supporting the pivotal end of each arm, grooved depressions on said block for the reception of the pivotal ends of said arms, guide blocks for the free ends of the bending arms, and suitable revolving cams on either side of the block 55 for raising said arms, substantially as set forth.

3. In a stave bending machine, a suitable

bed, adjustable supporting standards at either end of the bed, suitable pivoted stave-bending 60 arms vertically adjustable guide blocks along the inner faces of said standards for the free ends of the bending arms, means for securely clamping said blocks to the standards, and means for vertically adjusting said 65 blocks, substantially as set forth.

4. In a stave bending machine, a movable block suitably pivoted bending arms, having their adjacent ends pivoted to said block and extending in opposite directions, suitable 70 plates resting on said arms and adapted to support a stave, and adjustable clamps secured to said arms for holding the stave during the bending operation, substantially as set forth. 75

5. A stave bending machine comprising a suitable bed, a vertically adjustable block at the medial portion of said bed, said block having a hollow chamber, a screw-threaded bolt 80 passing into said chamber and carrying a nut, a supporting base plate for said bolt, suitable grooved depressions carried by the upper end of said block, bending arms having their pivotal ends in said depressions, reduced free 85 ends on said arms, suitable guide blocks having grooves for the reception of said reduced ends, adjustable standards at either end of the bed to which the guide blocks are secured, a transverse brace rod having terminal slots, 90 for bracing the upper ends of the standards, suitable hand wheels and depending screw-threaded bolts passing into suitable depressions in said guide blocks for vertically adjusting the latter on the standards, a rotating 95 cam under each bending arm on either side of its pivotal point, intermediate gearing between said cams, and a suitable motor for operating the parts, substantially as set forth.

6. In a stave bending machine, suitable pivoted bending arms, an adjustable block for 100 supporting the adjacent pivoted ends of said arms, a suitable clamp for the stave secured to each arm on either side of the pivotal ends thereof, slots in said clamps for adjusting the same along the arms, bolts passing through 105 the slots for securing the clamps to the arms, the said clamps having toothed or roughened surfaces for seizing the staves, substantially as set forth.

In testimony whereof I affix my signature 110 in the presence of two witnesses.

RUDOLF STECHER.

Witnesses:

JAMES J. O'DONOHUE,
EMIL STAREK.