

(No Model.)

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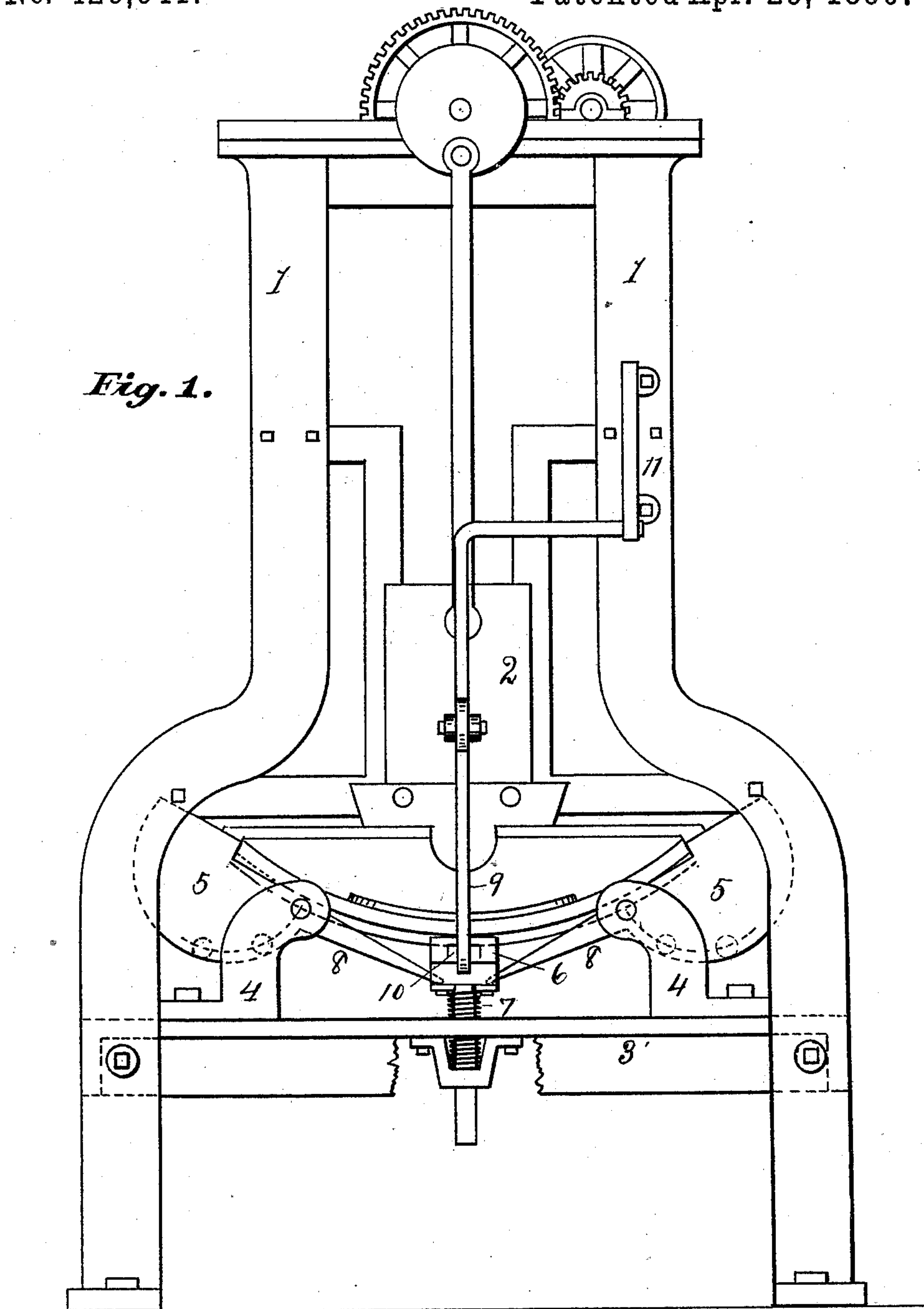
A. HIRSHHEIMER & C. M. MUELLER.

MACHINE FOR BENDING WOOD.

No. 426,641.

Patented Apr. 29, 1890.

Fig. 1.



Witnesses.

Wm. Carson

John F. Merrill

Inventors.

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(No Model.)

3 Sheets—Sheet 2.

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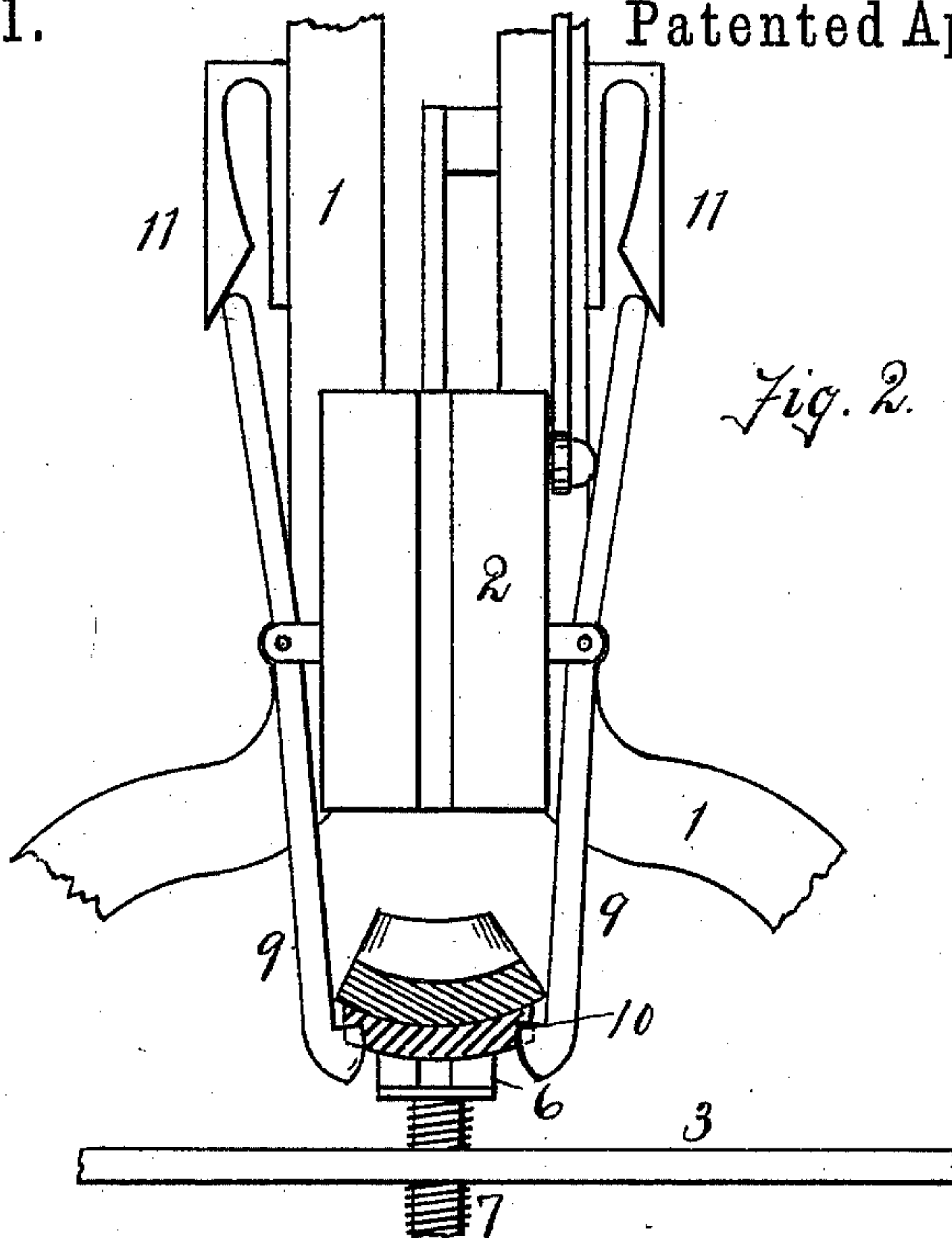


Fig. 2.

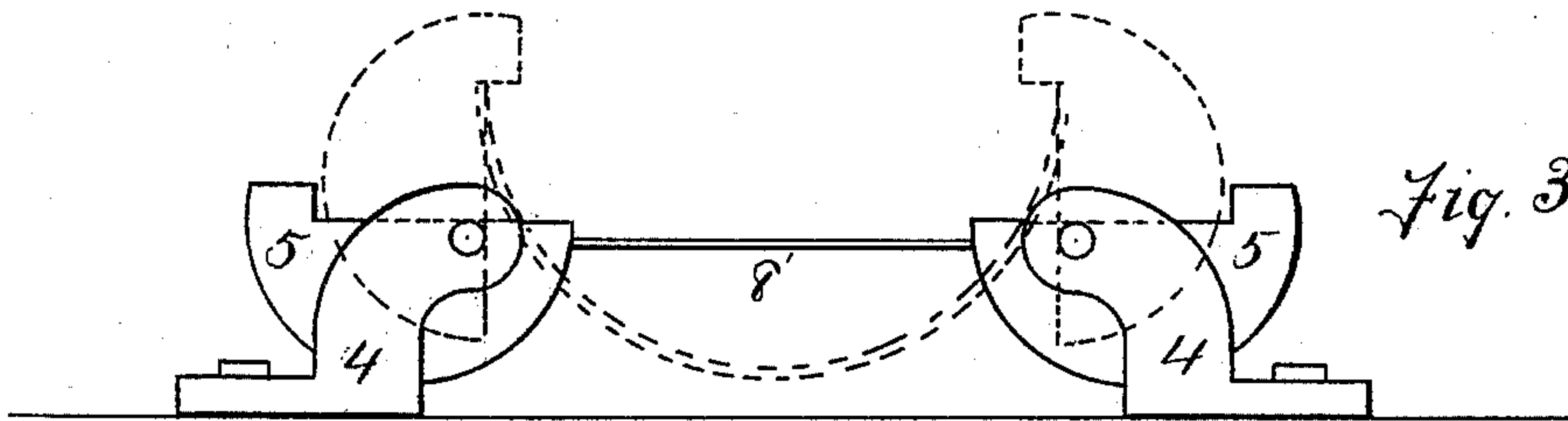


Fig. 3.

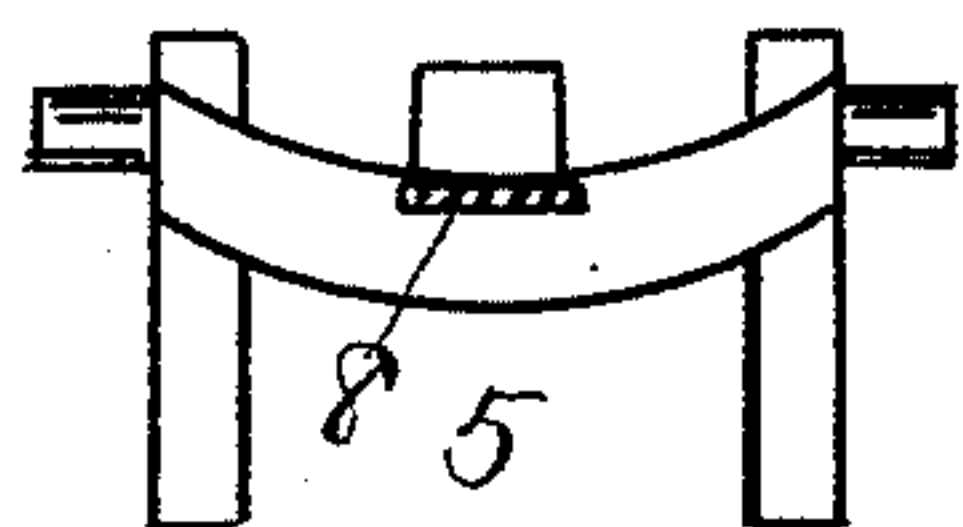


Fig. 4.

Witnesses.

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3 Sheets—Sheet 3.

A. HIRSHHEIMER & C. M. MUELLER.
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Fig. 4^a

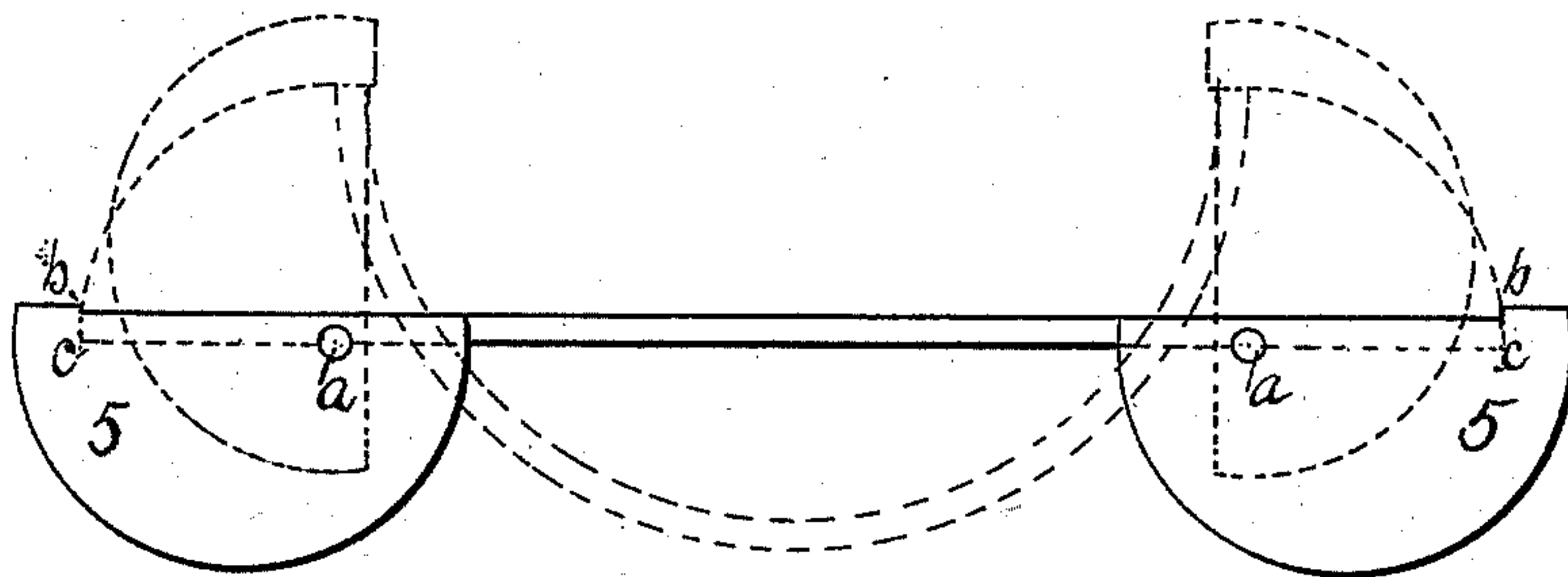
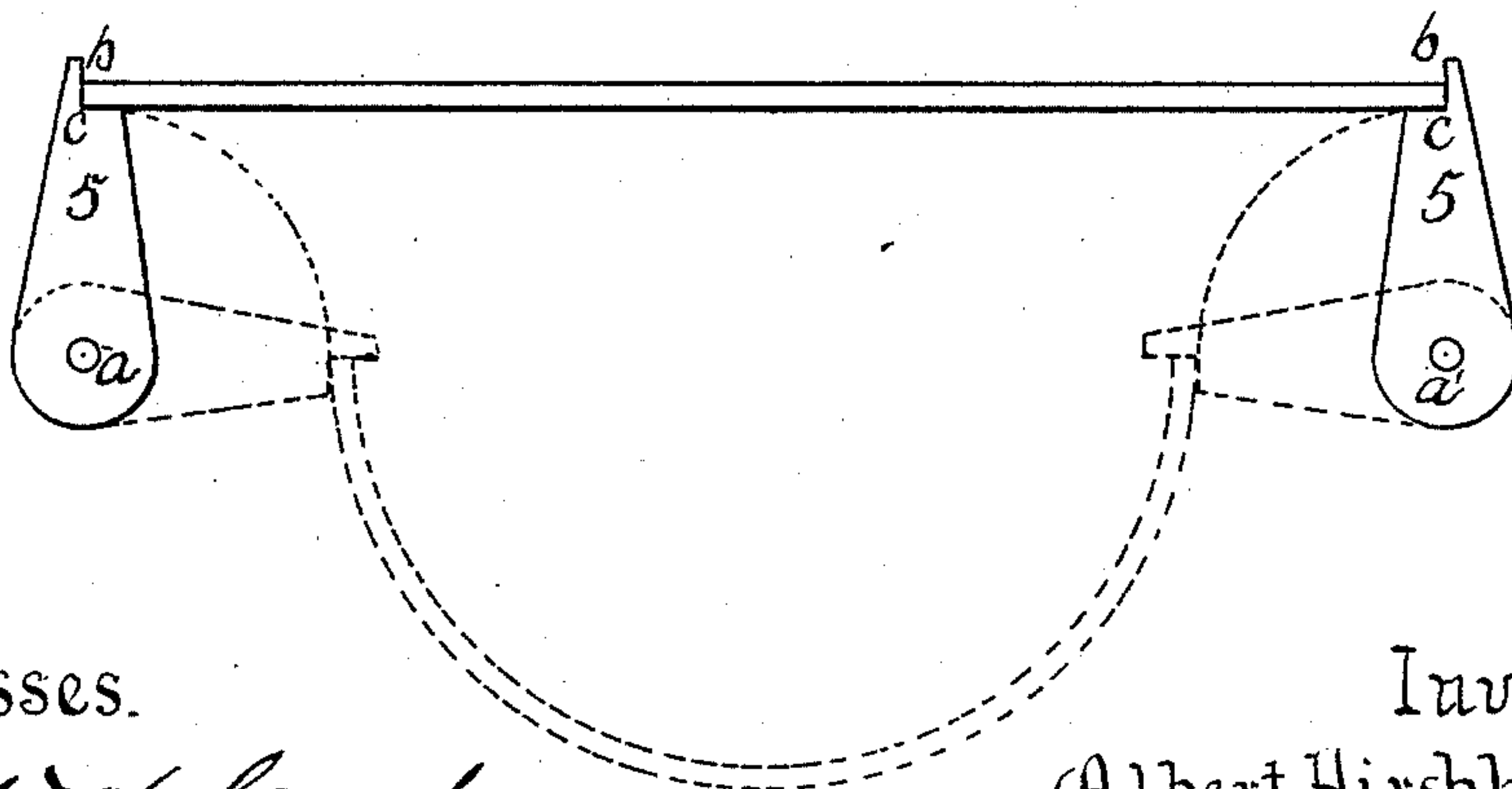


Fig. 5.



Witnesses.

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UNITED STATES PATENT OFFICE.

ALBERT HIRSHHEIMER AND CHARLES M. MUELLER, OF LA CROSSE,
WISCONSIN.

MACHINE FOR BENDING WOOD.

SPECIFICATION forming part of Letters Patent No. 426,641, dated April 29, 1890.

Application filed April 1, 1889. Serial No. 305,622. (No model.)

To all whom it may concern:

Be it known that we, ALBERT HIRSHHEIMER and CHARLES M. MUELLER, citizens of the United States, residing at La Crosse, in the county of La Crosse and State of Wisconsin, have invented certain new and useful Improvements in Machines for Bending Wood; and we do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to improvements in mechanism for bending wood; and the object is, primarily, to apply the power in such a manner and at such points that the fibers of the wood shall be compressed longitudinally at the same time and to the same extent that pressure is exerted in a lateral direction; in the construction and means for controlling the bed, and in the means for lifting the bent article and former from the brackets when the operation is completed, and, further, in the relative positions of the centers upon which the tilting brackets turn and the upright shoulders upon the same, by means of which the pressure is exerted upon the ends of the blank.

The invention is an improvement upon the machine described in Letters Patent No. 391,794, granted to us October 30, 1888, (machine for bending staves,) and in the principal features of construction and arrangement are similar thereto.

Our improvements are illustrated in the accompanying drawings, in which—

Figure 1 is a front view of the machine. Fig. 2 is a fragmentary side view, partly in vertical section, showing the yielding bed and the means for controlling the same. Figs. 3 and 4 are detail views of the blank-bending tilting brackets. Figs. 4^a and 5 are details showing the relative positions of the centers and abutments of the tilting brackets.

1 is the upright main frame, in which reciprocates vertically the presser-block 2, actuated by pitman connection with suitable

driving-gear at the top of the frame. At a suitable height upon the frame is a horizontal table 3, to which are secured at suitable distances from the path of the presser-block the blank-supporting brackets 4 4. These brackets are so located that the presser-block shall be over the middle of the blank when resting upon the brackets. The brackets are substantially of the form described in our patent previously mentioned, with the exception that a certain fixed relation between the position of the centers *a* upon which the tilting sections 5 5 turn, and the upright shoulders *b b* upon the same, against which the blank abuts, is found to be of considerable importance in order that the bending may be accomplished perfectly without danger of slivering or otherwise parting the fibers of the wood. The centers should be so located with reference to the abutment, and the brackets should be so located upon the table, that the distance between the axis and the point *c* from which the shoulders rise and the distance apart of the two opposite abutments when the beds upon which the blank rests are horizontal, and when, consequently, the said abutments are vertical, have such relation to each other that the former is equal to one-half the difference in length of the semi-circumference and the diameter of a circle having a semi-circumference equal in length to said last-named distance—that is, the distance between the two abutments, by which the end pressure is exerted when in normal position, being represented by a straight line, the distance between the axis upon which the bracket turns and the apex *c* of the angle formed by the abutment and the supporting-surface is equal to one-half the difference between the length of said line and the diameter of a circle whose semi-circumference has the same length as said line. By this arrangement the abutments always lie in the line of the radius of curvature at that particular point, and there is no possibility of the end of the blank becoming slivered by unequal pressure at different points, and the breaking and slivering of the blank at the center by reason of unequal pressure in different parts of the blank

are also prevented. The pressure at the ends and in the center is always equal, exerted at the same time, and equally distributed throughout the whole length of the blank.

5 In the middle of the table immediately underneath the follower-die is mounted the yielding bed 6, having either a flat or concave upper surface, according to the style of work to be done, and located upon the top of an
10 upright bar mounted in suitable bearings firmly secured in the frame-work, so as to slide up and down therein. Around this bar, or otherwise connected with said bed in position to raise the same in its bearings, is a
15 stiff spring 7, which acts normally to keep the said bed on a level with the supporting-surfaces of the brackets, so that when the blank is introduced under the die it shall rest evenly upon the three supports. The three partial
20 supports are connected and the bed made continuous by means of arms 8 8, extending inwardly from the front of each tilting bracket, as shown in Fig. 1, and entering recesses in the under side of the center bed 6 to assist in
25 making the operation of the bed and brackets simultaneous when the blank is operated upon by the follower-die. As a modification of this construction, we have shown a strap of steel connecting the bed-surface of the two
30 opposite tilting brackets and secured to them and to the bed. This construction is in some respects preferable, as a continuous yielding back is afforded for the blank, and in connection with the evenly-distributed pressure
35 obtained by this construction slivering is impossible.

For the purpose of bending staves we make use of the former described in our previous patent before mentioned. It is found, how-
40 ever, that the pressure upon the ends of the blanks exerted by the tilting brackets is so great as at times to make it difficult to lift the former and blank off the brackets when the operation is completed. To obviate this
45 difficulty we have attached to the front and back of the follower grappling-hooks 9 9, which, as the follower lowers, engage underneath the edges of the center bed in notches 10 10, and which lift the same and the
50 former carrying the stave therewith, releasing it from the brackets. To render the operation of these grappling-hooks entirely automatic they are hinged at the front and back, respectively, of the follower, as shown, and
55 suitable cams or their equivalent 11 11 are located upon the frame in position to release the same from engagement with the bed when it has risen high enough to free the former from the brackets and to allow the same to
60 drop back into position to engage with the bed upon the downward movement of the follower. The most important function of the hooks, however, is to grip the bed 6 at the moment when pressure is begun to be ex-
65 erted upon the blank by the downward movement of the die, thus grasping the blank

closely between the bed and the former and preventing the bed from moving away from the blank as the pressure is increased. The bed is held closely up against the blank, even
70 though the spring may not be sufficiently strong to hold the same in place of itself. The upper surface of the center bed 6 being concave in form when used for this class of work to correspond with the outside of a fin-
75 ished stave, the blank is thus firmly supported at all points.

We claim as our invention—

1. In a bending-machine, the brackets having blank-supporting surfaces, upright abut-
80 ments upon said surfaces, pivots supported in bearings upon which said brackets are adapted to tilt, the said brackets being so constructed and located that the distance apart of the
85 abutments of the two opposite brackets when in normal position, and the distance from the shoulder formed by the abutment and the supporting-surface to the axis upon which the bracket tilts, have such relation to each other
90 that the latter is equal to one-half the difference in length of the semi-circumference and the diameter of a circle having a semi-circumference equal in length to said first-named distance, substantially as and for the purpose
95 herein specified.

2. In a bending-machine, the follower-die, and means, substantially as described, for operating the same, tilting brackets mounted upon suitable supports at right angles to the
100 path of said follower and at equal distances on each side thereof, each bracket being formed with a blank-supporting surface and abutment perpendicular thereto, the distance apart of the abutments of the two opposite
105 brackets when in normal position, and the distance from the shoulder formed by the abutment and the supporting-surface to the axis upon which the bracket tilts having such relation to each other that the latter is equal
110 to one-half the difference in length between the semi-circumference and the diameter of a circle having a semi-circumference equal in length to said first-named distance, substantially as and for the purpose herein specified.

3. In a bending-machine, the follower-die, means, substantially as described, for actuat-
115 ing the same, tilting blank-supporting brackets supported at equal distances on each side of the path of the same, yielding bed midway between said brackets, and connections be-
120 tween said brackets and yielding bed adapted to form a continuous support for the blank and distribute pressure uniformly thereupon, substantially as and for the purpose specified.

4. In a bending-machine, a presser-die, means, substantially as described, for actuat-
125 ing the same, tilting blank-supporting brackets located at equal distances on each side of the path of said die, abutments upon said brackets adapted to engage with the ends of
130 the blank, yielding bed located in the path of said die, and a metal strap attached to said

brackets and said yielding bed, substantially as specified, whereby a continuous yielding bed is formed for supporting the blank.

5 5. In a bending-machine, a follower-die, means, substantially as described, for actuating the same, tilting blank-supporting brackets located at equal distances on each side of the path of the said die, yielding bed in the path of said die, and cam-operated grappling-hooks attached to and moving with said die in position to grasp said bed when pressure is exerted upon the same by the movement of said die, substantially as and for the purpose specified.

15 6. In a bending-machine, a follower-die, means, substantially as described, for operating the same, tilting brackets having shoulders adapted to abut against the ends of the blank and located at equal distances upon each side of the path of said die, yielding bed 20 in the path of said die, cam-actuated grappling-hooks carried by said die, adapted to grasp said bed when pressure is exerted thereupon by the die, and to be released therefrom when the bed shall have returned to its normal position, substantially as and for the purpose herein set forth. 25

In testimony whereof we affix our signatures in presence of two witnesses.

ALBERT HIRSHHEIMER.
CHARLES M. MUELLER.

Witnesses:

HARRY MARSH,
F. W. LANE.