

No. 768,434.

PATENTED AUG. 23, 1904.

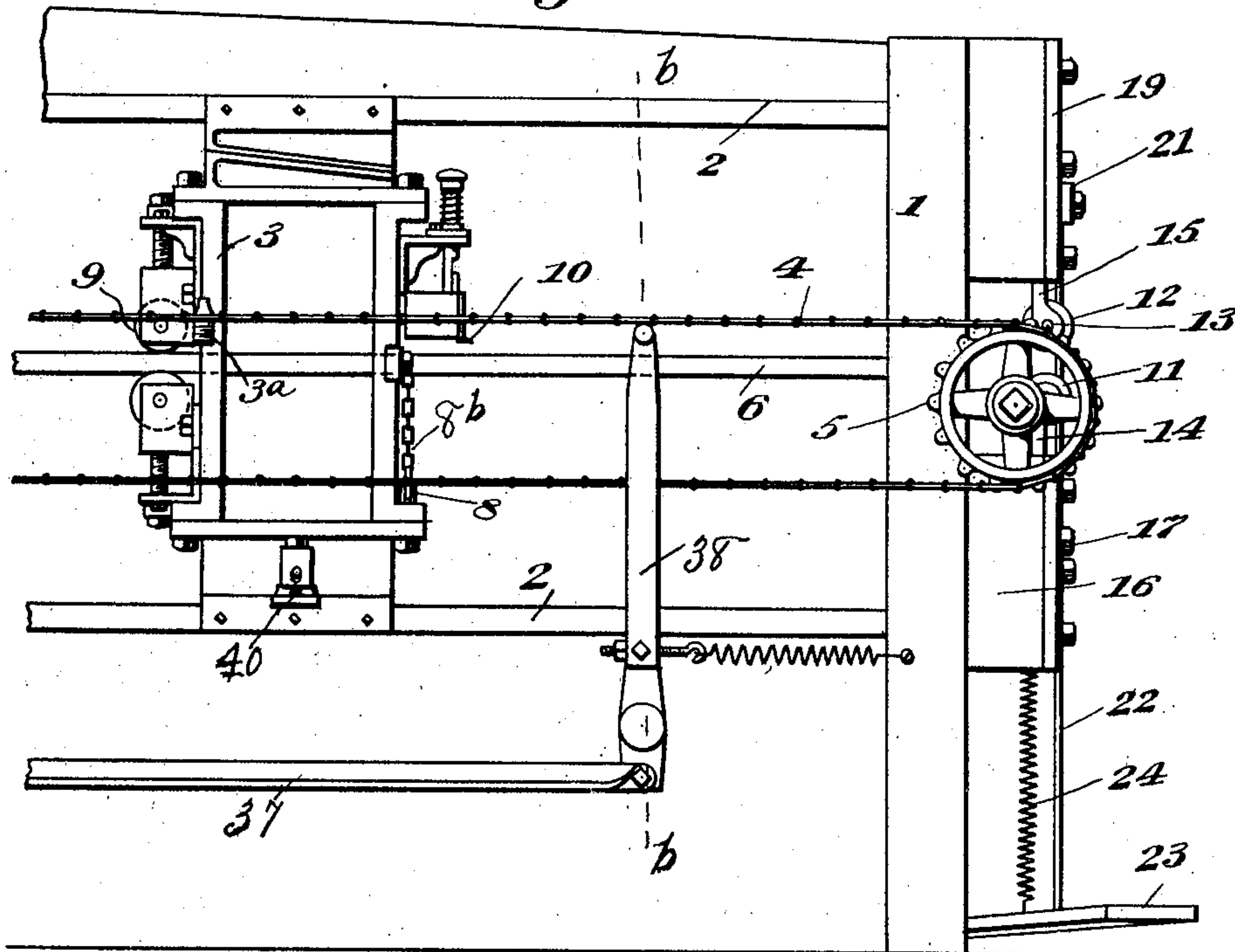
E. W. EDWARDS.  
SHEET METAL PIPE MACHINE.

APPLICATION FILED FEB. 24, 1902.

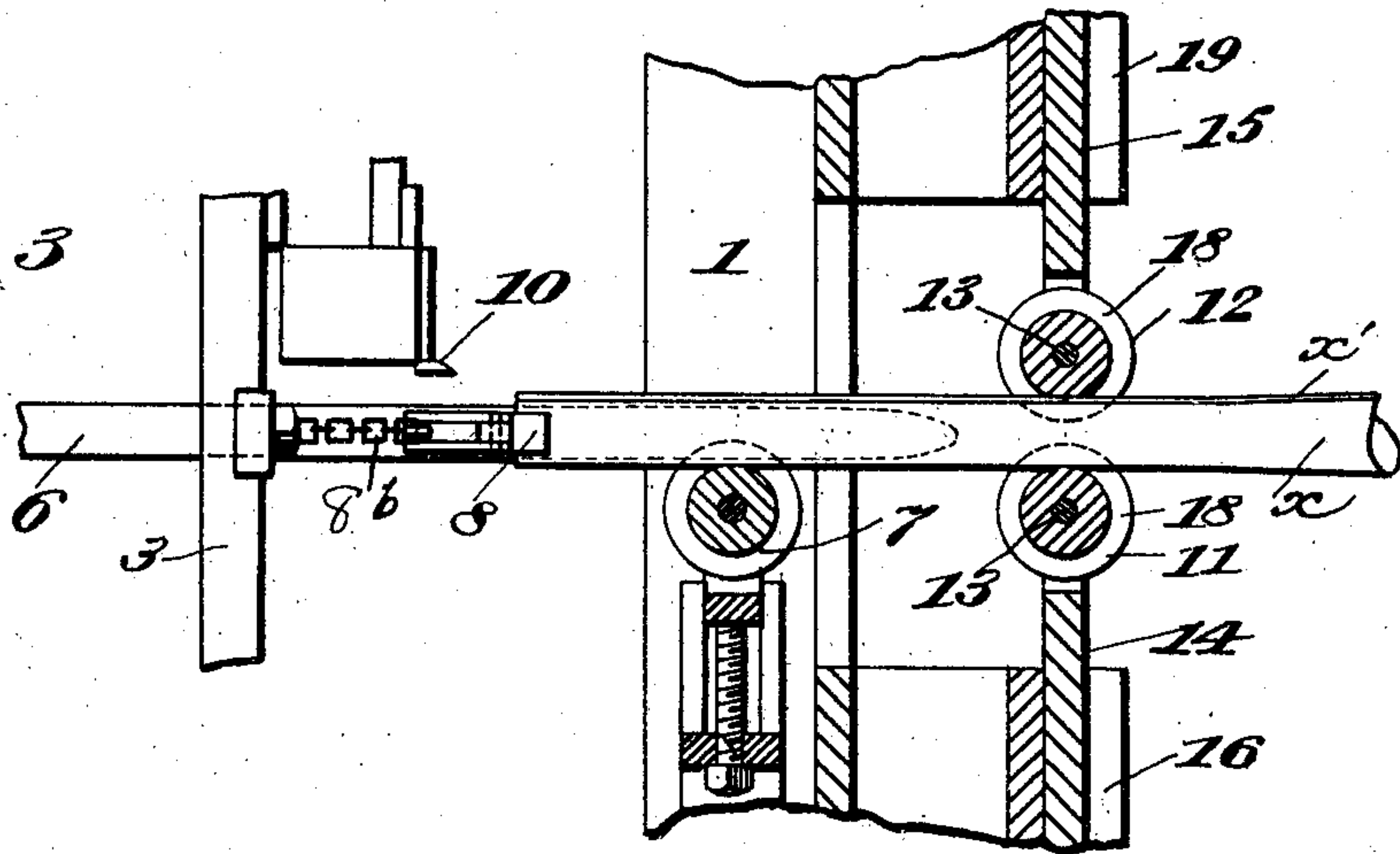
NO MODEL.

3 SHEETS—SHEET 1.

*Fig. 1*



*Fig. 3*



*Witnesses*

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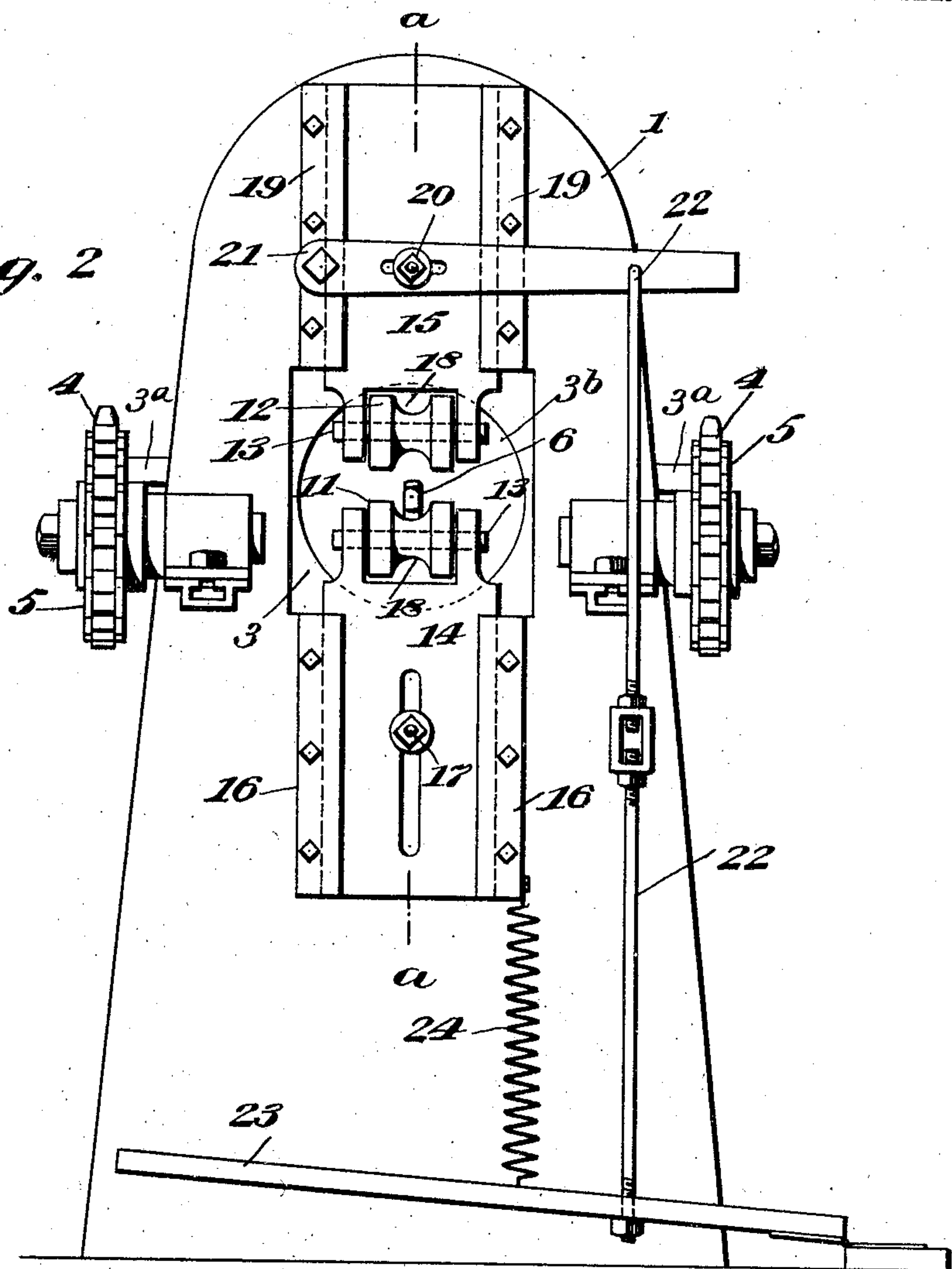
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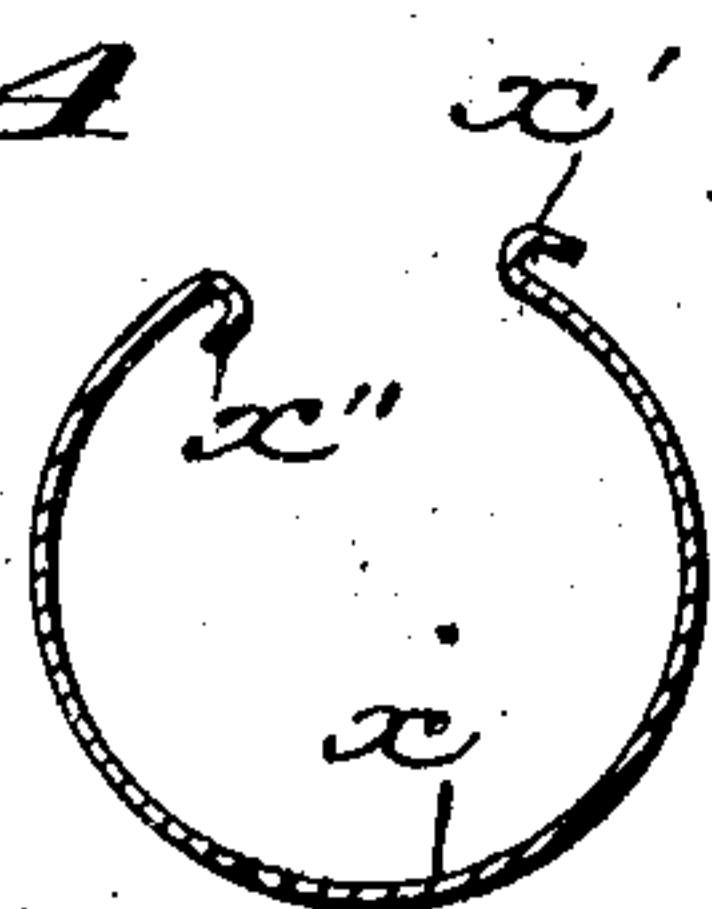
NO MODEL.

3 SHEETS—SHEET 2.

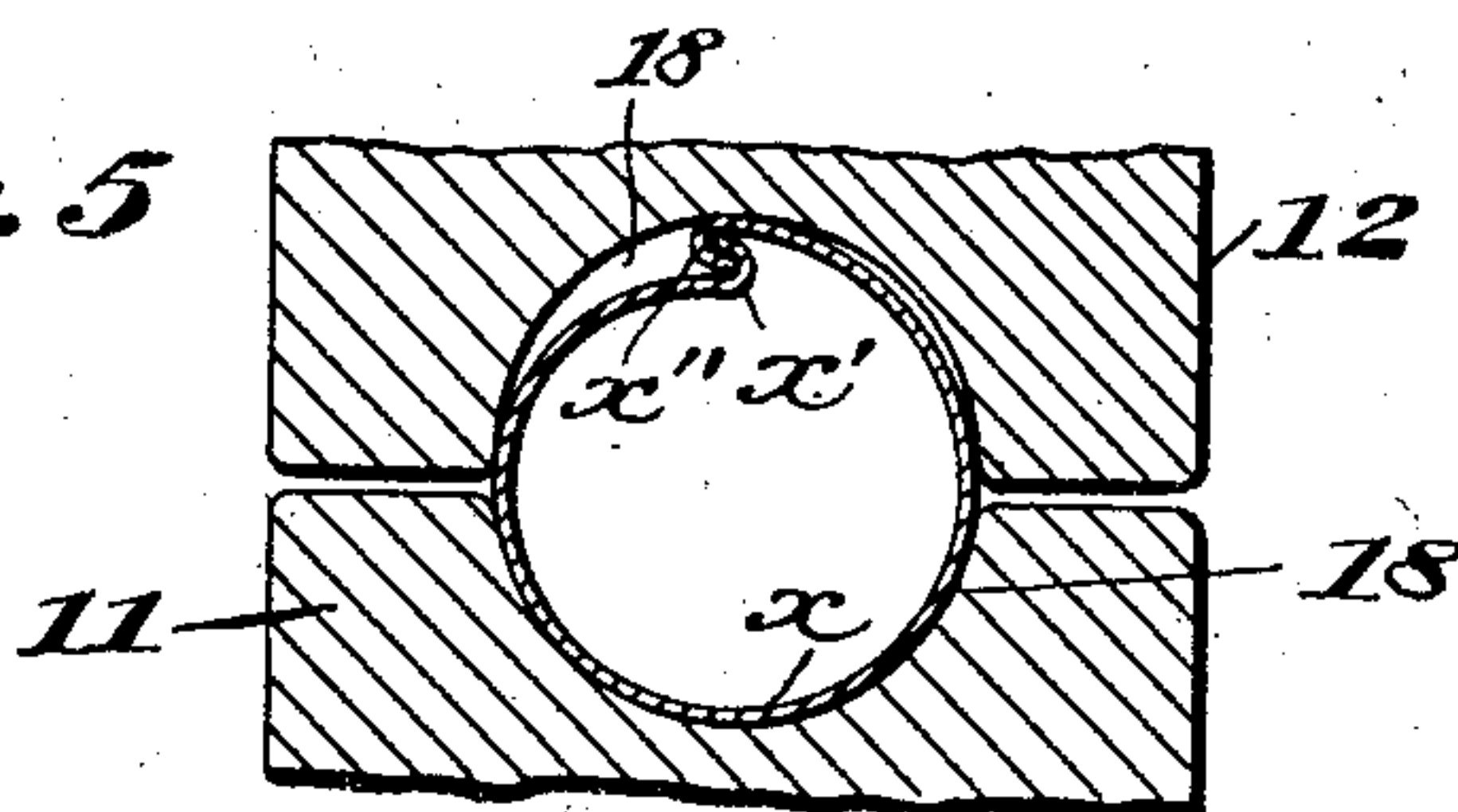
*Fig. 2*



*Fig. 4*



*Fig. 5*



*Witnesses*

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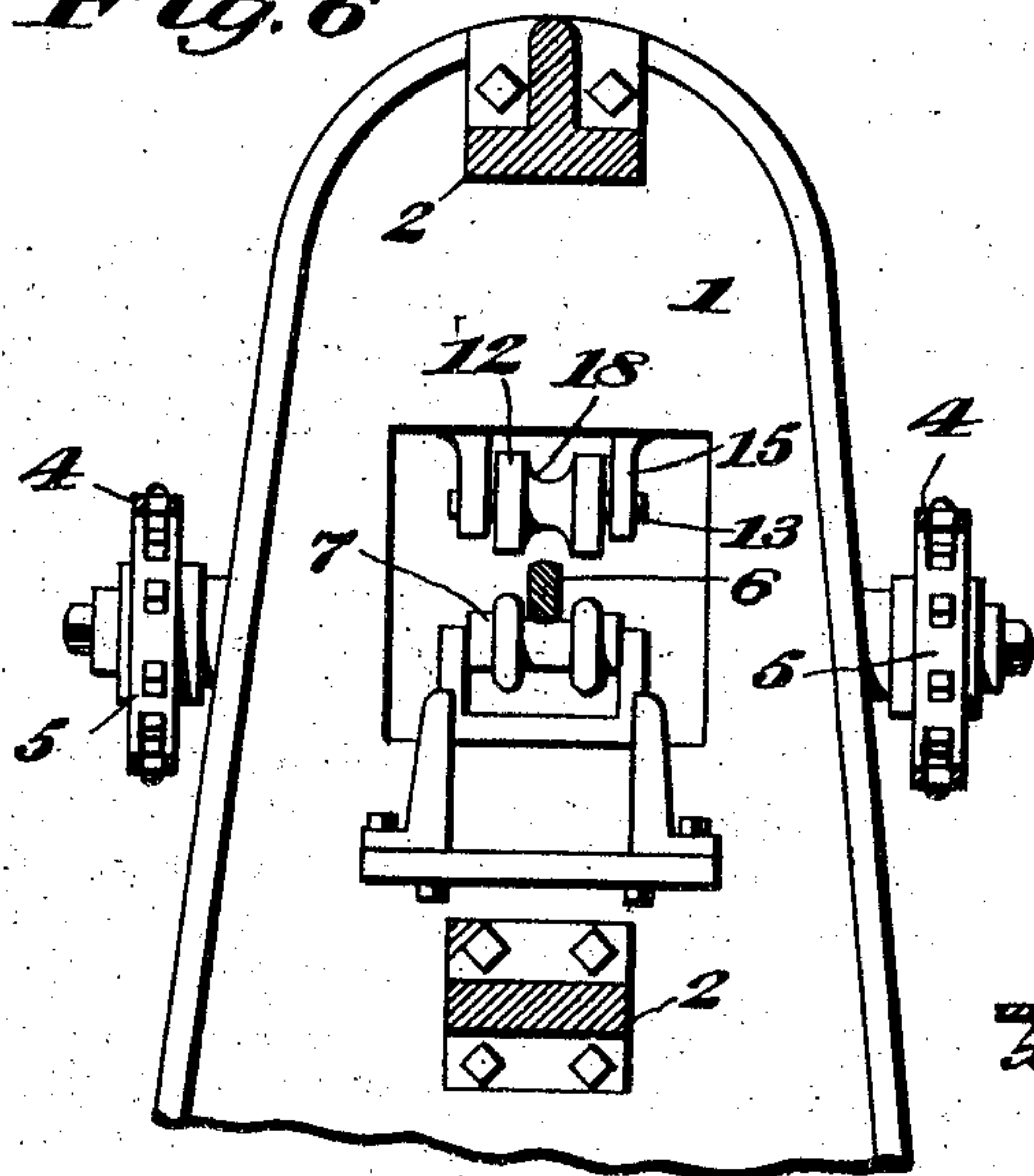
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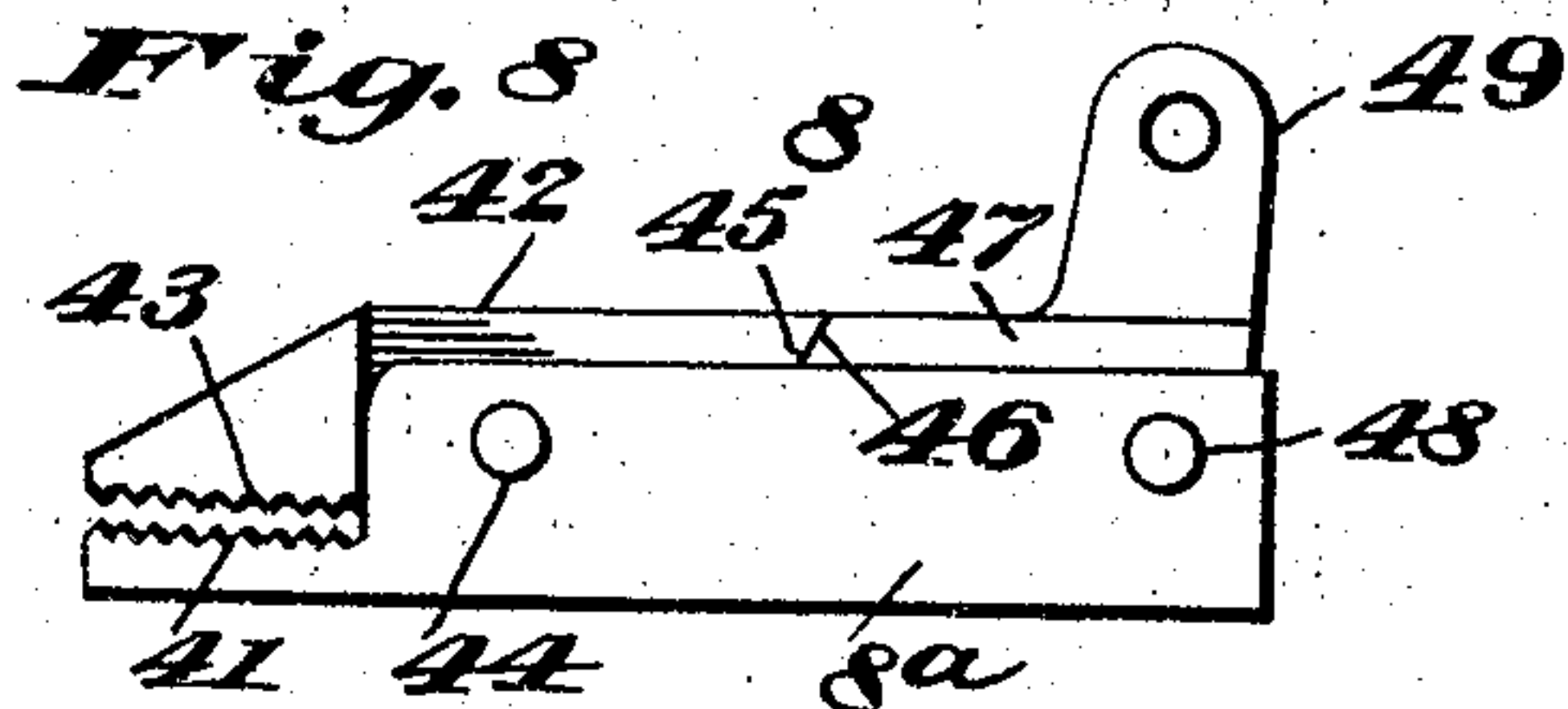
NO MODEL.

3 SHEETS—SHEET 3.

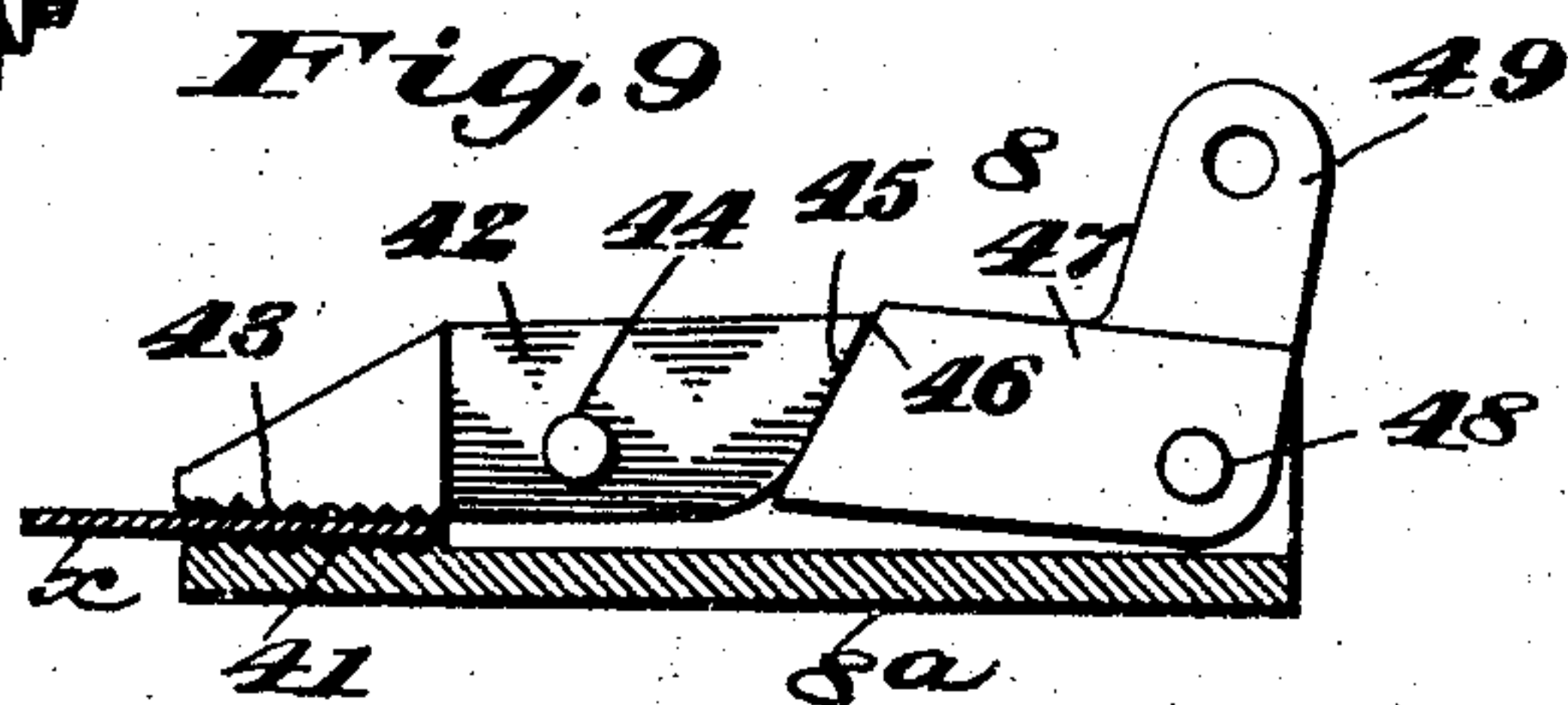
*Fig. 6*



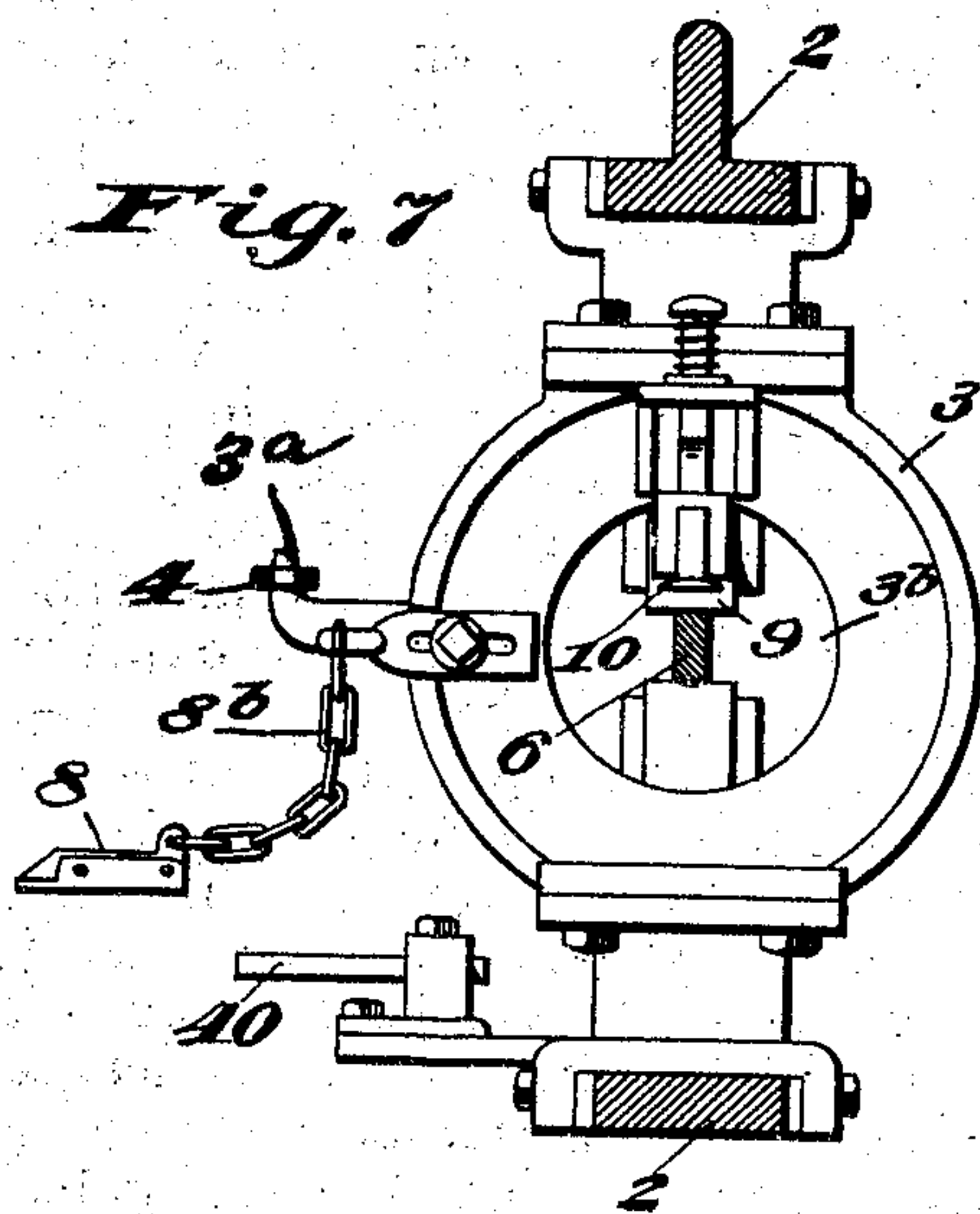
*Fig. 8*



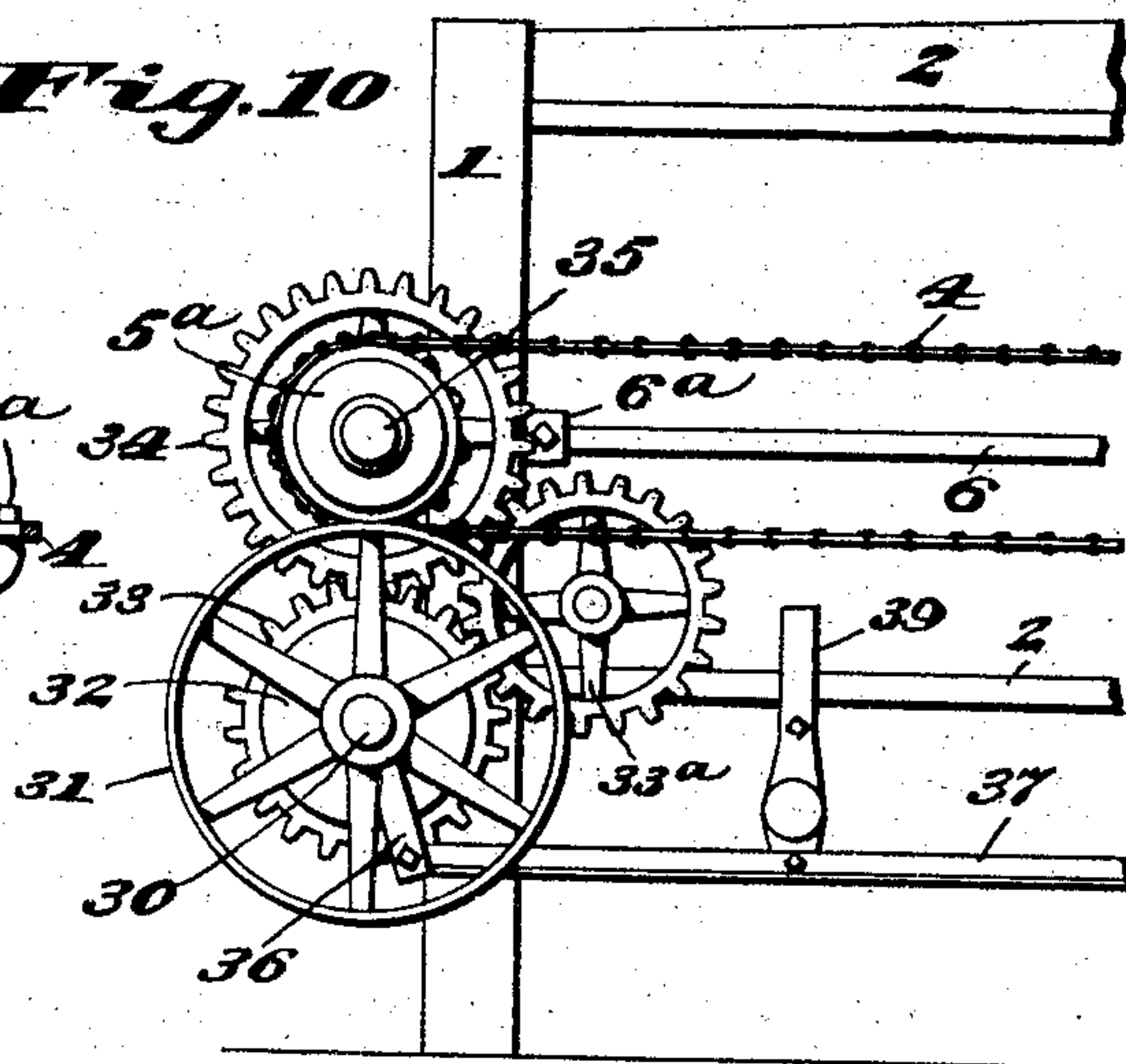
*Fig. 9*



*Fig. 7*



*Fig. 10*



*Witnesses*

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# UNITED STATES PATENT OFFICE.

EDWARD W. EDWARDS, OF CINCINNATI, OHIO.

## SHEET-METAL-PIPE MACHINE.

SPECIFICATION forming part of Letters Patent No. 768,434, dated August 23, 1904.

Application filed February 24, 1902. Serial No. 95,375. (No model.)

*To all whom it may concern:*

Be it known that I, EDWARD W. EDWARDS, a citizen of the United States of America, and a resident of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Sheet-Metal-Pipe Machines, of which the following is a specification.

This invention relates to certain improvements in that class of machinery or apparatus which is employed for the manufacture of sheet-metal pipe, and more especially such sheet-metal pipe as is formed with a longitudinal seam; and the object of the invention is to provide means for engaging the flanged edges of such pipe preliminarily to the seaming operation, whereby the loss of time and increased labor and expense heretofore caused by the engagement of such flanged edges by the hands of the workmen, as has been customary heretofore, is altogether obviated.

The invention consists in a machine or apparatus of this general character comprising two movable parts arranged for engagement upon opposite sides of the bent sheet-metal-pipe blank, one of said parts being movable toward the other and being provided with actuating mechanism and means for drawing the sheet-metal-pipe blank between said movable parts.

The invention also contemplates certain novel features of the construction, combination, and arrangement of the various parts of the improved machine or apparatus, whereby certain important advantages are attained and the device is made simpler and cheaper and is otherwise better adapted and made more convenient for use, all as will be hereinafter fully set forth.

The novel features of the invention will be carefully defined in the claims.

In the accompanying drawings, which serve to illustrate my invention, Figure 1 is a partial side elevation of a pipe-seaming machine or apparatus comprising my improvements, and Fig. 2 is an end elevation of the same. Fig. 3 is a partial section taken through the improved machine in the plane indicated by the line *a a* in Fig. 2. Fig. 4 is an enlarged sectional view taken transversely through the

bent pipe-blank, showing the flanged edges as they appear before being engaged with each other. Fig. 5 is a sectional view similar to Fig. 4, but showing the flanged edges of the pipe-blank engaged with each other. Fig. 6 is a sectional view taken vertically through the machine in the plane indicated by the line *b b* in Fig. 1, showing portions at the right-hand side of said plane; and Fig. 7 is a similar view taken in substantially the same plane and showing the carriage at the left-hand side of said plane. Fig. 8 is an enlarged detail view showing the gripper or dog for holding the bent metal blank to be seamed to the carriage, and Fig. 9 is a sectional elevation showing certain details of structure of the same part. Fig. 10 is a view drawn to a reduced scale and showing the left-hand end of the machine with certain driving devices located at that part of the machine.

The machine to which my improvements are applied, as shown in the drawings, comprises a frame having at its ends standards or uprights 1 1 and having upper and lower guides 2 2 extended longitudinally along it between said standards or uprights, the said guides being spaced away from each other and adapted to receive a carriage 3, which is mounted for sliding movement along the guides and extends across the space between them, the carriage 3 being provided with arms 3<sup>a</sup> 3<sup>a</sup>, extended from its opposite sides and connected with endless chains 4 4 at opposite sides of the frame, said chains being passed about chain-wheels 5 5<sup>a</sup> upon the frame uprights or standards and being provided with means for moving them alternately in opposite directions, whereby a reciprocatory movement is imparted to the carriage to move it back and forth in the direction of the length of the guides 2 2. This means for moving the carriage comprises a shaft 30, (see Fig. 10,) whereon is a pulley 31, adapted to receive a belt or band whereby the shaft may be driven from a suitable source of power, said shaft being adapted for driving connection with a shaft 35, whereon the wheels 5<sup>a</sup> at one of the uprights or standards are held through the medium of gear-wheels 33, 33<sup>a</sup>, and 34, the operation of which for driving the shaft



35 from shaft 30 is controlled by a double or reversible clutch device 32, held at shaft 30 and actuated from a lever 36. By this arrangement it will be understood that when lever 36 is moved in one direction the clutch device 32 will be actuated to throw certain of the gears 33, 33<sup>a</sup>, and 34 into operation to drive the shaft 35 in one direction, and when said lever 36 is moved in an opposite direction the clutch device 32 is actuated to throw out of operation those gears which had previously been employed and to throw in operation certain other gears of the series 33, 33<sup>a</sup>, and 34, by means of which the shaft 35 will be reversely driven from shaft 30. Since the endless chains 4 4 are driven from wheels 5<sup>a</sup> and are connected with carriage 3, it is obvious that the reverse movements of shaft 35 will be transmitted to said carriage to slide or move it in opposite directions along the guides 2 2, first toward one end of the frame and then toward the other end thereof.

37 indicates a bar or rod extended lengthwise of the frame and having connection at one end with an upright arm 38, adjacent to one of the uprights or standards 1 and at its opposite end portion with another upright arm 39, adjacent to the other upright or standard of the frame. The arms 38 and 39 are adapted to be engaged by a stud 40, extended laterally from the carriage 3, as shown in Figs. 1 and 7, and by this arrangement it will be seen that as the carriage 3 is moved by its driving means in one direction—as, for example, toward the right as the parts are shown on the drawings—the stud 40 will contact with the arm 38 as the carriage approaches the right-hand end of the machine. The movement of the carriage will in this way be communicated to the arm 38 and through the bar 37 will serve to move the lever 36, so as to actuate the clutch device 32 and change the direction of movement of the carriage 3, which will thereupon be moved toward the left-hand end of the machine, and as the carriage nears the limit of its movement in that direction the stud 40 will engage the arm 39 and through the bar 37 will again, but reversely, move the lever 36 to reversely actuate the clutch device 32 and drive carriage 3 in the opposite direction toward the right-hand end of the frame.

The machine herein shown is also provided with a mandrel 6, extended lengthwise of the frame and central between the guides 2 2, the carriage 3 having a central opening 3<sup>b</sup>, as seen in Fig. 7, through which said mandrel is extended. The sheet-metal blank is drawn in the operation of the machine upon this mandrel, and the flanged edges of said blank are in the reciprocation of the carriage pressed upon by a seaming-roll 9, borne by the carriage in such a way as to cause said flanged edges to be securely engaged together to complete the pipe. The mandrel 6 is of course

removably held in the machine, as shown at 6<sup>a</sup> in Fig. 10, so that it can be readily taken out and replaced, there being a different mandrel employed for each of the different sizes and styles of pipe which the machine is capable of being employed for seaming. One end of the mandrel 6—that at the right as shown in Fig. 3—is loosely rested upon a grooved roll 7, held to turn on the frame and over which the pipe-blank is adapted to freely pass when drawn into the machine. The carriage 3 is provided with a clamping device or dog 8, held thereto by a chain 8<sup>b</sup> or other flexible connection, and this dog 8 has, as seen in Figs. 8 and 9, jaws 41 and 43, adapted to be engaged with the end of the pipe-blank *w*, as indicated in Figs. 3 and 9, whereby the said pipe-blank is caused to be drawn into the machine and upon the mandrel 6 in the reciprocatory movement of the carriage.

As seen in Figs. 8 and 9, the dog or clamping device 8 has a frame 8<sup>a</sup>, whereon the jaw 41 is produced, the jaw 43 being on one end of a member 42, pivoted at 44 on frame 8<sup>a</sup> and having its opposite end beveled, as seen at 45, said beveled end being engaged by a similarly-beveled end 46 of an elbow-lever 47, pivoted at 48 on the frame 8<sup>a</sup> and having an angular arm 49, to which the chain 8<sup>b</sup> for attachment to carriage 3 is connected. By this structure it will be seen that when one end portion of a pipe-blank *w* is engaged between jaws 41 and 43 and the carriage 3 is moved to draw said blank upon the mandrel 6 the draft exerted on the chain 8<sup>b</sup> will be transmitted to the elbow-lever 47 to move the same pivotally, so that the beveled end 46 thereof will impinge upon the beveled end 45 of member 42 and will move said member pivotally, so that the jaw 43 thereon will be forcibly pressed toward the jaw 41 to securely grip and hold the end of the blank *w*, which will thereupon be drawn into the machine and upon the mandrel 6 as the carriage is moved along its guides 2 2. When the carriage reaches the end of its stroke in that direction and has its direction of movement reversed, as above described, it will be evident that the draft on chain 8<sup>b</sup> will be relaxed, so that the dog or clamping device may be readily disengaged from the end of the pipe-blank to permit the following and reverse reciprocatory movement of the carriage. When the clamping device or dog 8 is not in use for holding the end of the pipe-blank for drawing the same into the machine, the chain 8<sup>b</sup>, whereby said dog is held to the carriage, permits the said dog or clamping device to hang down at one side of the carriage and out of the way.

In the manufacture of sheet-metal pipe it has heretofore been customary to first bend or strike up flanges upon opposite edges of the sheet-metal blank, one of the flanges, *w'*, as shown in Fig. 4, being directed outwardly and the other flange, *w''*, being directed in-



wardly. The blank  $x$  is then bent upon a mandrel to impart a curved form to it in cross-section, as indicated in Fig. 4, after which its flanges are engaged with each other, and its end being laid upon the roll 7 over the end of mandrel 6 is engaged with the dog 8 on carriage 3. A reciprocatory movement is then imparted to said carriage, so as to cause the pipe-blank to be drawn upon the mandrel 6, after which the dog 8 is disengaged from the end of said blank, and by engagement of stud 40 with arm 39 a second reciprocatory movement is imparted to the carriage, but in a reverse direction, causing the seaming-roll 9 on the carriage to traverse the flanges  $x'$  and  $x''$  and press them securely into engagement. When the carriage arrives again at the receiving end of the machine, its direction of movement is again changed by engagement of stud 40 with arm 38 to cause the said carriage to be returned to the opposite end of its path. At this end of the path of carriage 3 stud 40 again contacts with arm 39 and again reverses the direction of movement of the carriage, whereupon a spring-supported catch 10 upon the carriage is actuated and pressed downward to engage its lower end beneath the edge of that end of the seamed pipe, the movement of the carriage then serving to press the seamed pipe again longitudinally toward the receiving end of the machine and off the mandrel, leaving the latter free to receive another pipe-blank to be seamed. According to my invention I arrange at the receiving end of the machine upper, and lower rolls 11 and 12, removably held upon shafts or studs 13, extended between the forks of slides 14 and 15, respectively. The slide 14 of the lower roll 11 is mounted for vertical adjustment in guides 16 upon the end of the frame 1 of the machine and is adapted to be securely held in adjusted position by means of a bolt 17, passed through a slot in said slide in a well-known way. Each of the rolls 11 and 12 is formed with a central peripheral groove 18, adapted to conform to the curvature of the pipe-blank  $x$ , and the rolls being removably held upon their slides permit of being conveniently removed and replaced, so that different rolls for different sizes and styles of pipe may be used.

The slide 15 for the upper roll 12 is held for vertical sliding movement in a guide 19 on the frame 1 of the machine and has connection, as shown at 20 in Fig. 2, with a lever 21, one end of which has pivotal connection with the guide 19 at one side of the slide, while the opposite end of said lever is extended out beyond the side of the guide and has connection with a downwardly-extended link or coupling-rod 22, the lower end of which is connected to a treadle-lever 23, adapted to be operated by the foot of a workman standing at the receiving end of the machine. A spring 24, connected with said treadle-lever at its

lower end and with its upper end extended up and connected with the frame 1, serves to hold said treadle-lever, together with the upper roll 12, normally raised, so that normally said upper roll is held up out of contact with the upper surface of a pipe-blank inserted in the receiving end of the machine.

In the operation of the device instead of engaging the flanges  $x'$  and  $x''$  along the whole length of the curved pipe-blank  $x$  preliminarily to the drawing of said blank upon the seaming-machine mandrel 6 the workman merely engages said edges at one end of the blank, which end is then inserted between the rolls 11 and 12 and into the receiving end of the machine upon the mandrel, after which the clamping device or dog 8 is then engaged with said end of the blank, as shown in Fig. 3, and the upper roll 12 is forcibly pressed down upon the upper surface of the blank to hold the edges in engagement. The carriage 3 of the machine being then set in motion serves to draw the bent and flanged pipe-blank  $x$  upon the mandrel 6, and the pressure exerted upon said blank by the downwardly-pressed upper roll 12 serves as said blank is drawn between the upper and lower rolls to engage the flanged edges  $x'$  and  $x''$  along the entire length of the pipe-blank without requiring any handling of the blank at all by the workmen. After the pipe-blank  $x$  has by the reciprocation of the carriage 3 been drawn into the machine and upon the mandrel the operations of seaming said blank and of removing the finished and seamed pipe from the machine are performed in the same manner as heretofore by the reciprocatory movement of the carriage.

From the above description it will be seen that the device constructed according to my invention is of an extremely simple and inexpensive nature and may be readily applied to such machines or apparatuses as have been heretofore employed for the manufacture of sheet-metal pipe without requiring any change in such machines. It will also be obvious from the above description that my improvements may be employed in connection with various other forms of machine than the one herein shown, and for this reason I do not wish to be understood as limiting myself to the employment of the device in connection with any particular machine.

The employment of my improvements permits of a very important economy in the manufacture of the sheet-metal pipe, since it saves the time and labor of the workmen heretofore employed for engaging the flanged edges of the bent blank and at the same time requires no special skill on the part of the workman employed for feeding the seaming-machine.

It will also be obvious from the above description that the device is capable of considerable change without material departure from the principles and spirit of the invention,



and for this reason I do not wish to be understood as limiting myself to the precise form and arrangement of the device as herein shown.

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

1. In a machine of the character described, the combination of a frame, a mandrel supported thereon, a part movable along the frame in the direction of the length of the mandrel and having means to engage a pipe-blank for drawing the blank upon the mandrel and devices held against movement lengthwise of the mandrel and adapted to bear on opposite sides of a pipe-blank while the same is being drawn over the mandrel.

2. In a machine of the character described, the combination of a frame, a mandrel supported thereon, a part movable along the frame in the direction of the length of the mandrel and having means to engage a pipe-blank for drawing the blank upon the mandrel and devices held against movement lengthwise of the mandrel and adapted to bear on opposite sides of the pipe-blank while the same is being drawn over the mandrel, one of said devices being mounted for movement toward and away from the pipe-blank and being provided with actuating mechanism for so moving it.

3. In a machine of the character described, the combination of a frame, a mandrel supported thereon, a part movable along the frame in the direction of the length of the mandrel and having means to engage a pipe-blank for drawing the blank upon the mandrel and rolls held to turn at the receiving end of the mandrel but held against movement lengthwise of said mandrel and adapted to bear on opposite sides of a pipe-blank while the same is being drawn over the mandrel.

4. In a machine of the character described, the combination of a frame, a mandrel supported thereon, a part movable along the frame in the direction of the length of the mandrel and having means to engage a pipe-blank for drawing said blank upon the mandrel, two rolls mounted to turn at the receiving end of the mandrel but held against movement lengthwise of said mandrel and adapted to bear on opposite sides of a pipe-blank while the same is being drawn over the mandrel, one of said

rolls being adapted for movement toward and away from the pipe-blank, means for holding said last-named roll normally away from the pipe-blank and means for forcing said roll toward and into contact with the pipe-blank.

5. In a machine of the character described, the combination of a frame having guides extended lengthwise upon it, a mandrel extended lengthwise of the frame and having one end arranged to receive a pipe-blank to be drawn endwise over the mandrel, devices mounted on the frame at the receiving end of the mandrel and held against movement lengthwise of the frame, but adapted for engagement upon opposite sides of a pipe-blank being drawn upon the mandrel, one of the devices being movable toward and away from the other and having actuating mechanism for forcing it into engagement with the pipe-blank to be drawn upon the mandrel and a carriage movable along the guides with relation to the mandrel and having a device to be engaged with a pipe-blank to draw said blank endwise upon the mandrel, substantially as set forth.

6. In a machine of the character described, the combination of a frame having guides extended lengthwise upon it, a mandrel extended lengthwise of the frame and having one end arranged to receive a pipe-blank to be drawn endwise over the mandrel, rolls mounted on the frame at the receiving end of the mandrel and held against movement lengthwise of the frame but adapted for engagement upon opposite sides of a pipe-blank being drawn upon the mandrel, one of the rolls being movable toward and away from the other and having means for holding it normally out of contact with the pipe-blank and provided with actuating mechanism for forcing it into engagement with the pipe-blank to be drawn upon the mandrel and a carriage movable along the guides with relation to the mandrel and having a device to be engaged with a pipe-blank to draw said blank endwise upon the mandrel, substantially as set forth.

Signed at Cincinnati, Ohio, this 19th of February, 1902.

EDWARD W. EDWARDS.

Witnesses:

JOHN ELIAS JONES,  
L. M. JONES.