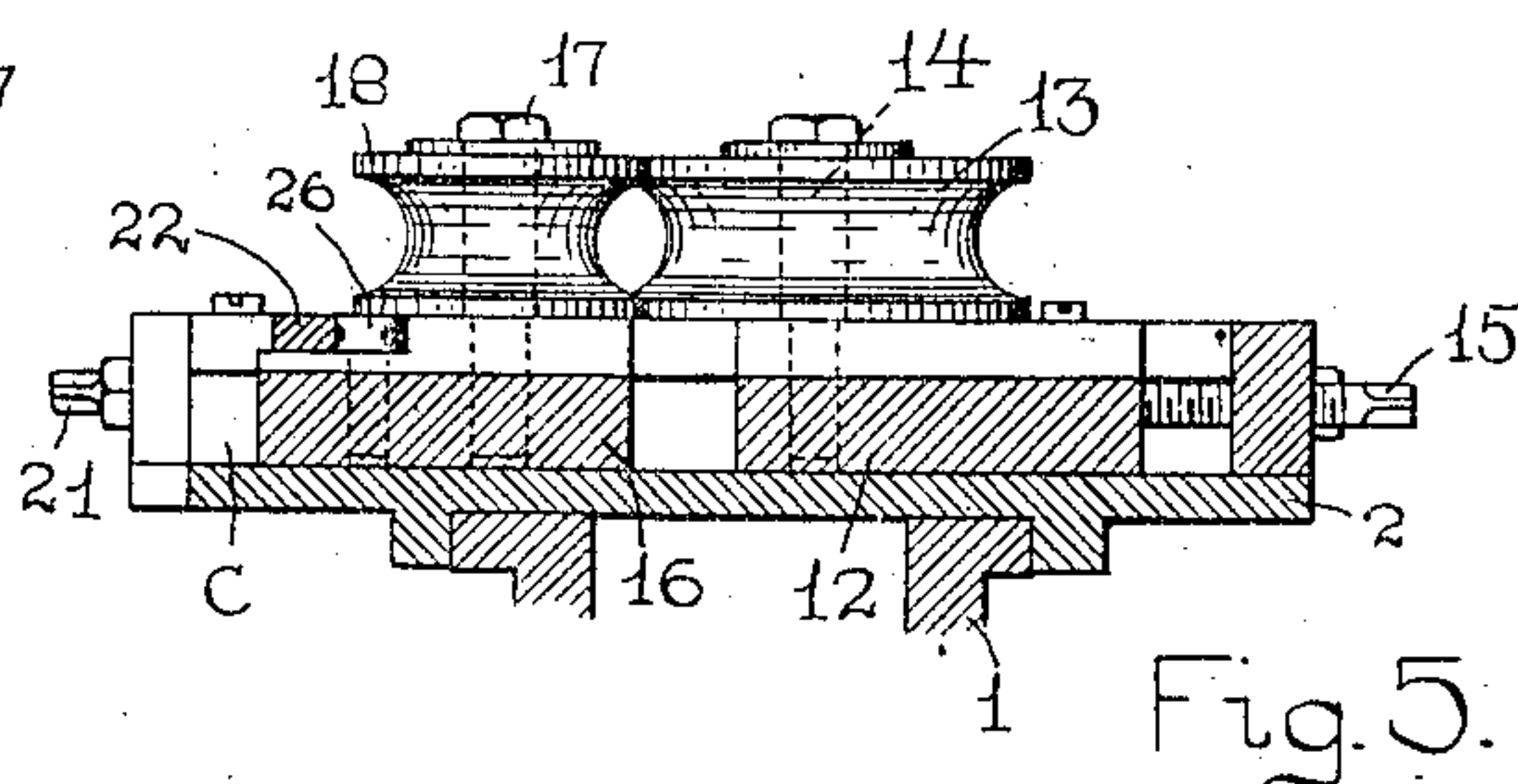
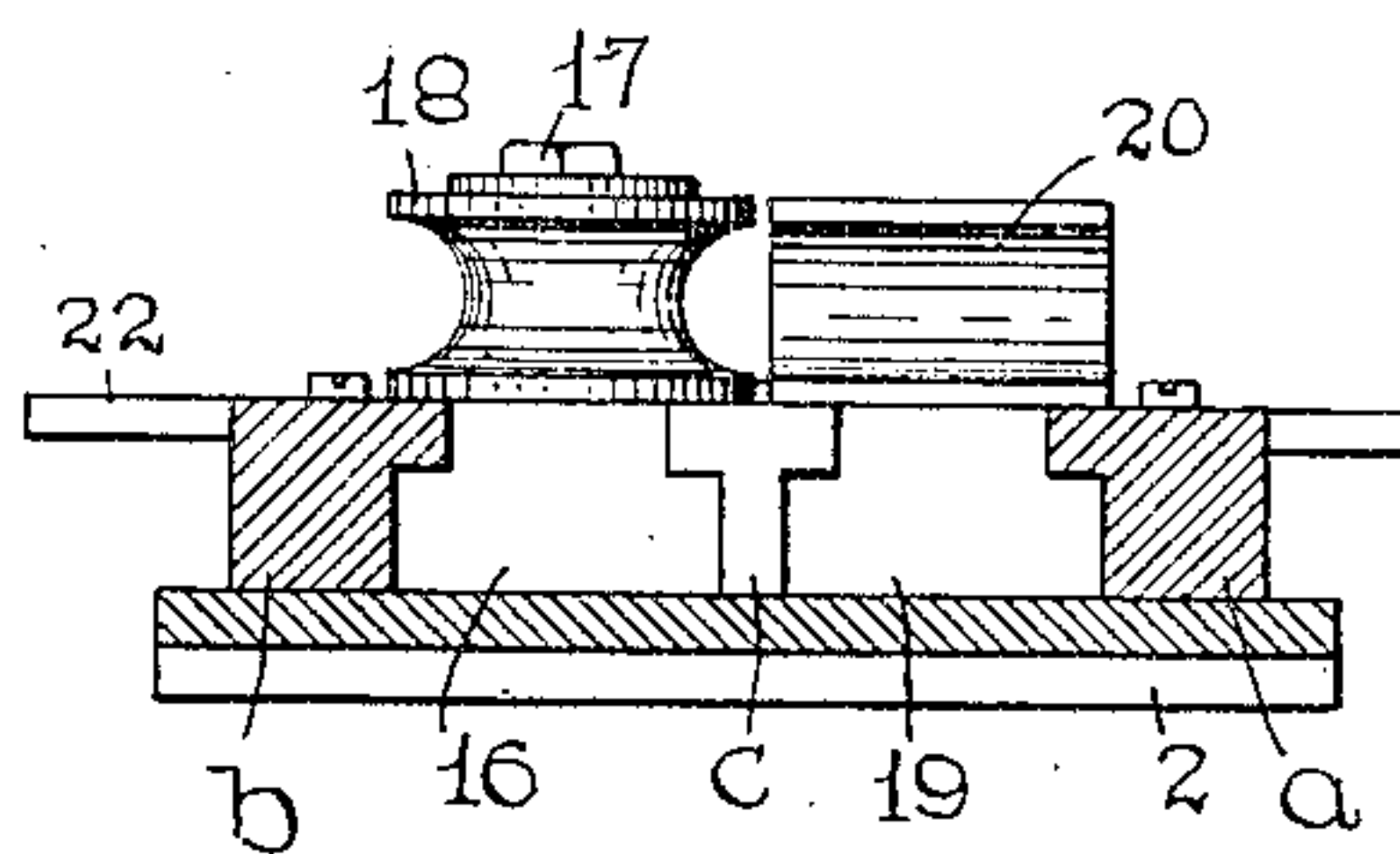
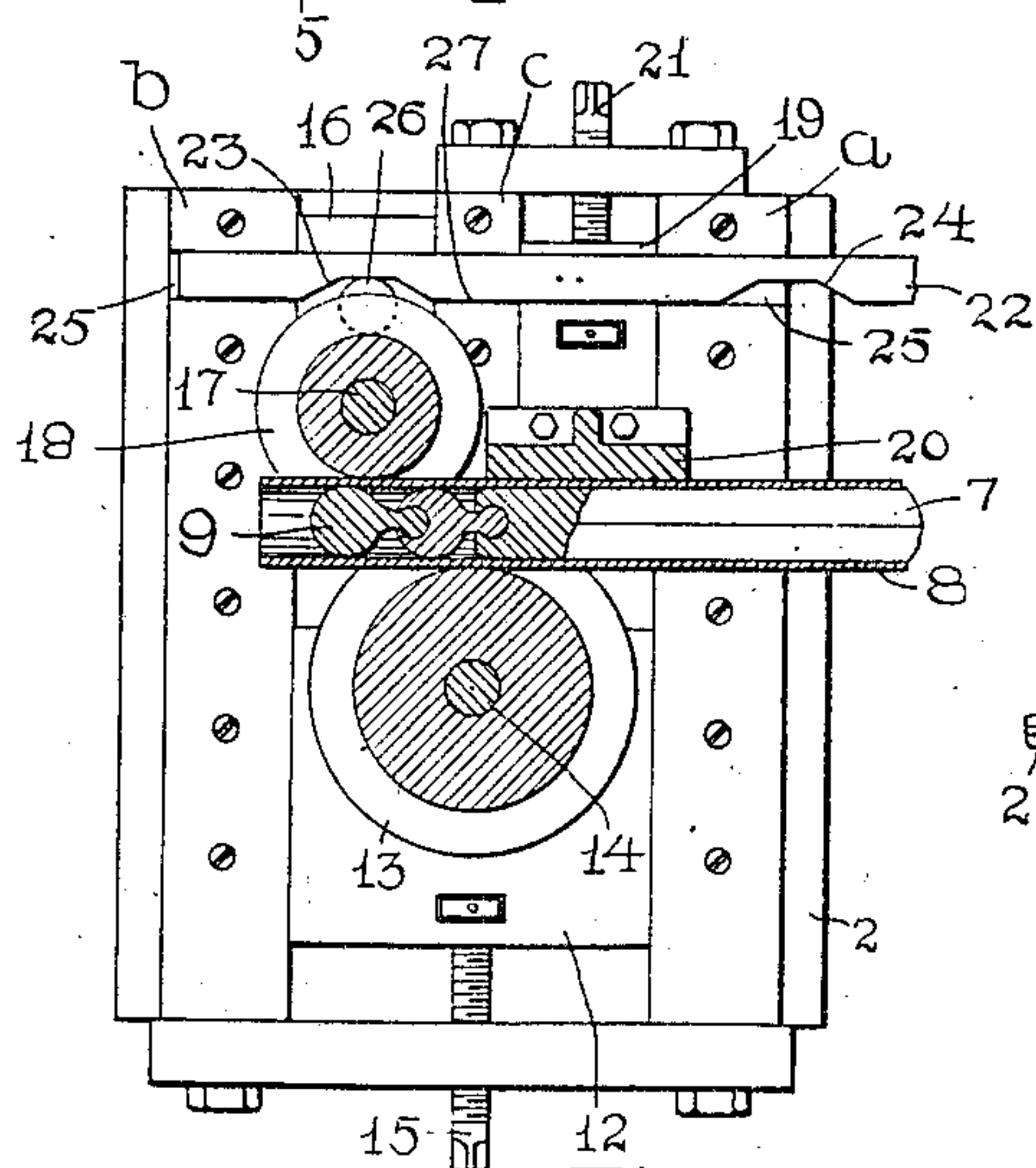
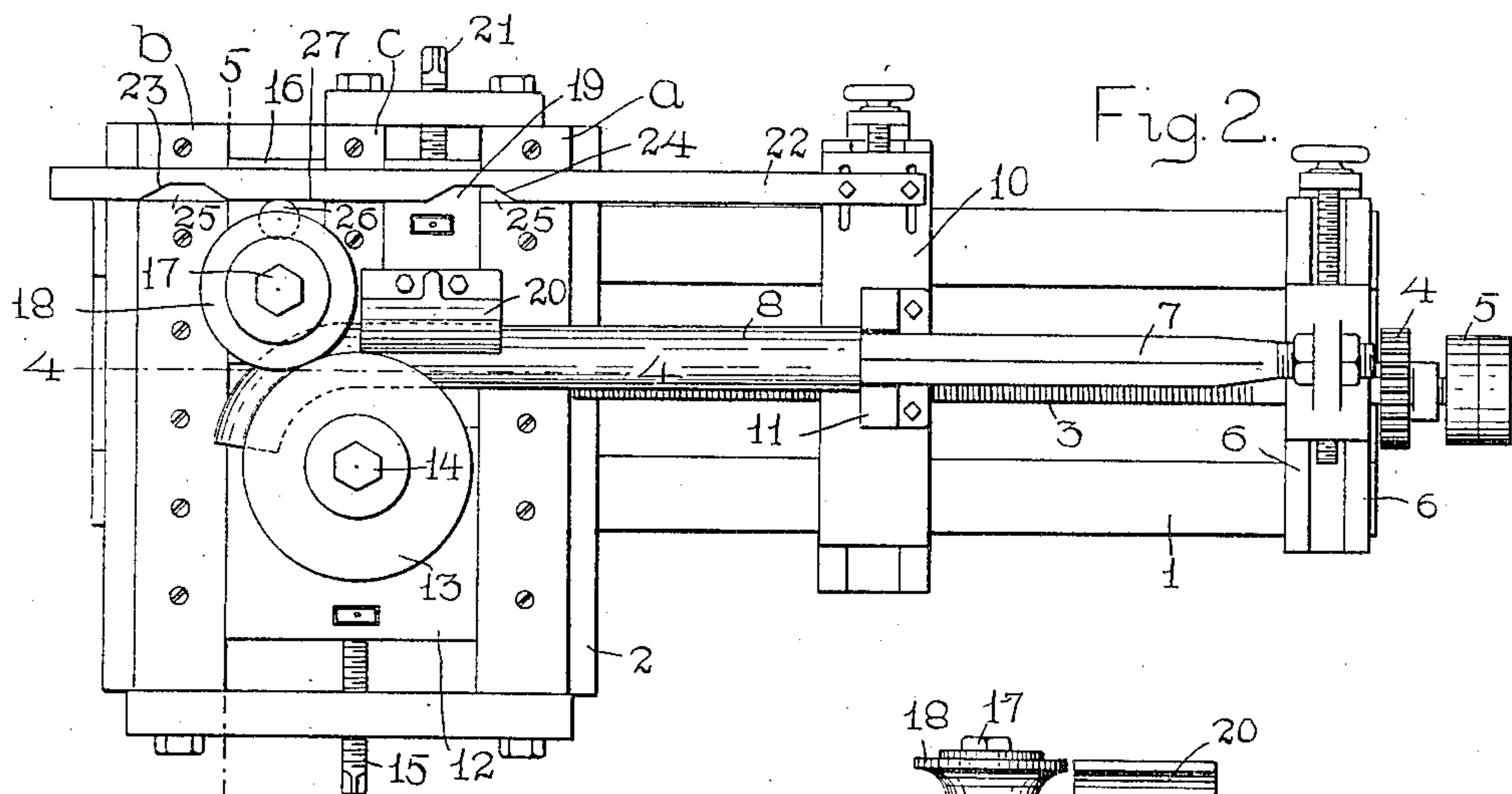
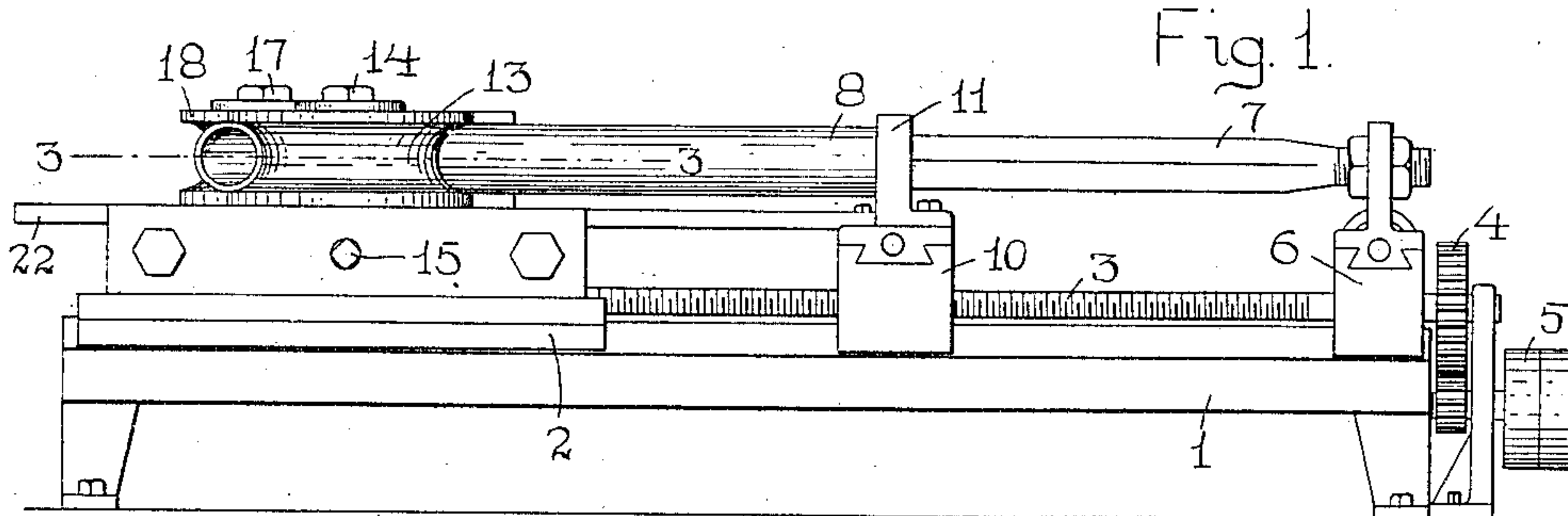


No. 812,258.

PATENTED FEB. 13, 1906.

L. H. BRINKMAN.  
AUTOMATIC BENDING MACHINE.  
APPLICATION FILED DEC. 12, 1904.



Witnesses  
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Fig. 6

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# UNITED STATES PATENT OFFICE.

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## AUTOMATIC BENDING-MACHINE.

No. 812,258.

Specification of Letters Patent.

Patented Feb. 13, 1906.

Application filed December 12, 1904. Serial No. 236,515.

*To all whom it may concern:*

Be it known that I, LOUIS H. BRINKMAN, a citizen of the United States, residing at West Hartford, in the county of Hartford and State of Connecticut, have invented a new and useful Improvement in Automatic Bending-Machines, of which the following is a specification, accompanied by drawings forming a part of the same, in which—

Figure 1 is a side elevation. Fig. 2 is a plan view. Fig. 3 is a plan view of a portion of the machine shown partly in section on line 3 3, Fig. 1. Fig. 4 is a sectional view of part of the machine on line 4 4, Fig. 2. Fig. 5 is a sectional view of part of the machine on line 5 5, Fig. 2; and Fig. 6 is a detached view of the supporting-block behind the bending-roll.

Similar reference letters and figures refer to similar parts in the different views.

My invention relates to that class of pipe-bending machines designed for bending pipe and embodying a bending-roll, a forming-roll, and means for advancing the pipe between the two rolls; and it has for its object to provide an automatic means for controlling the bend in the pipe. It also embraces means for regulating the amount and curvature of the bend and for automatically relieving the pipe from the bending strain at a predetermined point; and it consists in the construction and arrangement of parts, as hereinafter described, and pointed out in the annexed claims.

Referring to the accompanying drawings, 1 denotes the bed or support for the bending mechanism. Attached to the bed 1 is a table 2, on which are mounted the bending and forming rolls. Journaled in bearings supported by the bed 1 is a screw 3, which is revolved by gears 4 from a counter-shaft carrying pulleys 5. Also attached to the bed 1 is a support 6, to which is adjustably attached a mandrel 7, upon which is slipped the pipe 8 to be bent. Upon the end of said mandrel 7 are balls 9, Fig. 3, connected by articulated joints to support the pipe 8 at the point of bending. Actuated by the screw 3 is a carriage 10, movable along ways on the bed 1 and supporting a pushing-plate 11, adapted to bear against the end of the pipe to be bent. By the revolution of the screw 3 the carriage 10 may be advanced toward the table 2 in

order to push the pipe longitudinally between the forming and bending rolls.

Mounted in ways *a b* on the table 2 is a sliding block 12, upon which is carried the forming-roll 13, capable of turning on a spindle 14. The position of the block 12 and roll 13 may be changed by means of the screw 15 to fit the apparatus for varying sizes of pipe. Mounted in the ways *b c* on the table 2 is a sliding block 16, which carries on a spindle 17 the bending-roll 18, whose movement is adjusted as is hereinafter described, and mounted on a sliding block 19 in ways *a c* is a pipe-supporting block 20, which is adjustable by the screw 21 and which receives the strain of the bending process.

Adjustably attached to the movable carriage 10 is a plate 22, fitted with recesses 23 24 and sliding in ways 25 on the table 2. Mounted on the block 16 between the plate 22 and the bending-roll 18 is a friction-roller 26. A movement is imparted to the block 16 and the bending-roll 18 in the ways *b c* toward the forming-roll 13 by the movement of the plate 22 bringing said friction-roller 26 out of the recess 23 onto the straight edge 27 of the plate 22, and by the continued movement of said plate 22 the bending-roll 18 is held in position to impart the desired curvature to the pipe until the bending-roll is allowed to move away from said forming-roll when the friction-roller 26 enters the recess 24. As the plate 22 is attached to and moves with the carriage 10, a movement will be imparted to the bending-roll 18 as the carriage 10 moves—that is, as the pipe is advanced between the rolls 13 and 18 by the movement of the carriage 10, the plate 22 will also be advanced and the bending-roll 18 will be moved toward the forming-roll 13. The rolls are then in position to bend the pipe and the bending continues until by the continued movement, as described above, the friction-roller enters the recess 24. The bending of the pipe is therefore automatic and may be repeated on any number of pipes in succession, all of which will be offset the same amount and with the same curvature.

The operation of my device is as follows: When the rolls are in the position shown in Fig. 3, the pipe which it is desired to bend is inserted between them and upon the mandrel 7, the necessary adjustments having first



been made of the forming-roll 13, the mandrel 7, and the carriage 10. The pipe being in position, the carriage 10 is moved toward the rolls, by means of which the pipe 8 and the plate 22 are simultaneously advanced. By the movement of the plate 22 the bending-roll 18 is moved into position to bend the pipe, as has already been described. This bending continues until the friction-roller 26 enters the recess 24, when the bending ceases and the machine is stopped and the bent pipe removed. When the parts have been reversed to their original position, a new pipe may be inserted and the operation repeated.

My invention therefore comprises automatically moving the bending-roll into an operative position in connection with the forward movement of the pipe, and while I have shown this accomplished by a sliding plate I do not confine myself to the specific means shown for moving the bending-roll into and out of operative position, the essential feature of this part of my apparatus consisting in coördinating the movement of the bending-roll with the longitudinal movement of the pipe.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a pipe-bending machine, the combination with a forming-roll and a bending-roll, of means for advancing a pipe between said rolls, and means automatically controlled by the movement of the pipe for moving the bending-roll toward said forming-roll.

2. In a pipe-bending machine, the combination with a forming-roll and a bending-roll, of means for advancing a pipe between said rolls, and means for advancing said bending-roll toward said forming-roll, and for allowing it to recede therefrom at predetermined points in the movement of the pipe.

3. In a pipe-bending machine, the combination with a forming-roll, of a bending-roll, means for advancing a pipe to be bent between said rolls, and a recessed plate for advancing said bending-roll to an operative position and allowing it to withdraw therefrom, means for longitudinally moving said plate simultaneously with the movement of the pipe.

4. In a pipe-bending machine, the combination with a forming-roll and a bending-roll, of means for advancing a pipe to be bent between said rolls, and means automatically controlled by the movement of the pipe for advancing said bending-roll toward said forming-roll, for holding it in said position and for allowing it to recede therefrom.

5. In a pipe-bending machine, the combi-

nation of forming and bending rolls, a fixed mandrel, means for imparting a longitudinal movement to the pipe on said mandrel and between said rolls, and means automatically controlled by the movement of the pipe for moving the bending-roll toward said forming-roll.

6. In a pipe-bending machine, the combination of a mandrel held at one end from longitudinal movement, with its free end adapted to enter the pipe to be bent, means for pushing the pipe off the free end of the mandrel, a forming and a bending roll arranged to apply a bending strain to the pipe as it is delivered from the mandrel, means for adjusting said rolls relatively to the mandrel, and means for moving the bending-roll relatively to the forming-roll as determined by the longitudinal movement of the pipe.

7. In a pipe-bending machine, the combination of a framework provided with ways, a carriage movable along said ways, means for actuating said carriage, a mandrel held at one end from longitudinal movement, a pusher-plate attached to said carriage and adapted to contact with the end of a pipe held on said mandrel, a forming-roll, a bending-roll, arranged to apply a bending strain to the pipe as it is pushed from the free end of said mandrel, means for moving the bending-roll toward the forming-roll as determined by the forward movement of the pipe, and a support for the pipe behind said bending-roll and opposite the forming-roll.

8. In a pipe-bending machine, the combination of bending and forming rolls for applying a bending strain to a pipe passing between said rolls, a mandrel held at one end with its free end adapted to enter the pipe, means for forcing the pipe off the free end of the mandrel, and means automatically controlled by the movement of the pipe, for changing the position of said rolls relatively to each other.

9. In a pipe-bending machine, the combination of a forming-roll, a bending-roll, means for imparting a longitudinal movement to the pipe to be bent between said rolls, a slidable block carrying said bending-roll, and means for moving said slidable block consisting of a recessed plate and means for moving said plate simultaneously with the forward movement of the pipe.

Dated this 6th day of December, 1904.

LOUIS H. BRINKMAN.

Witnesses:

E. D. REDFIELD,  
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