

No. 662,664.

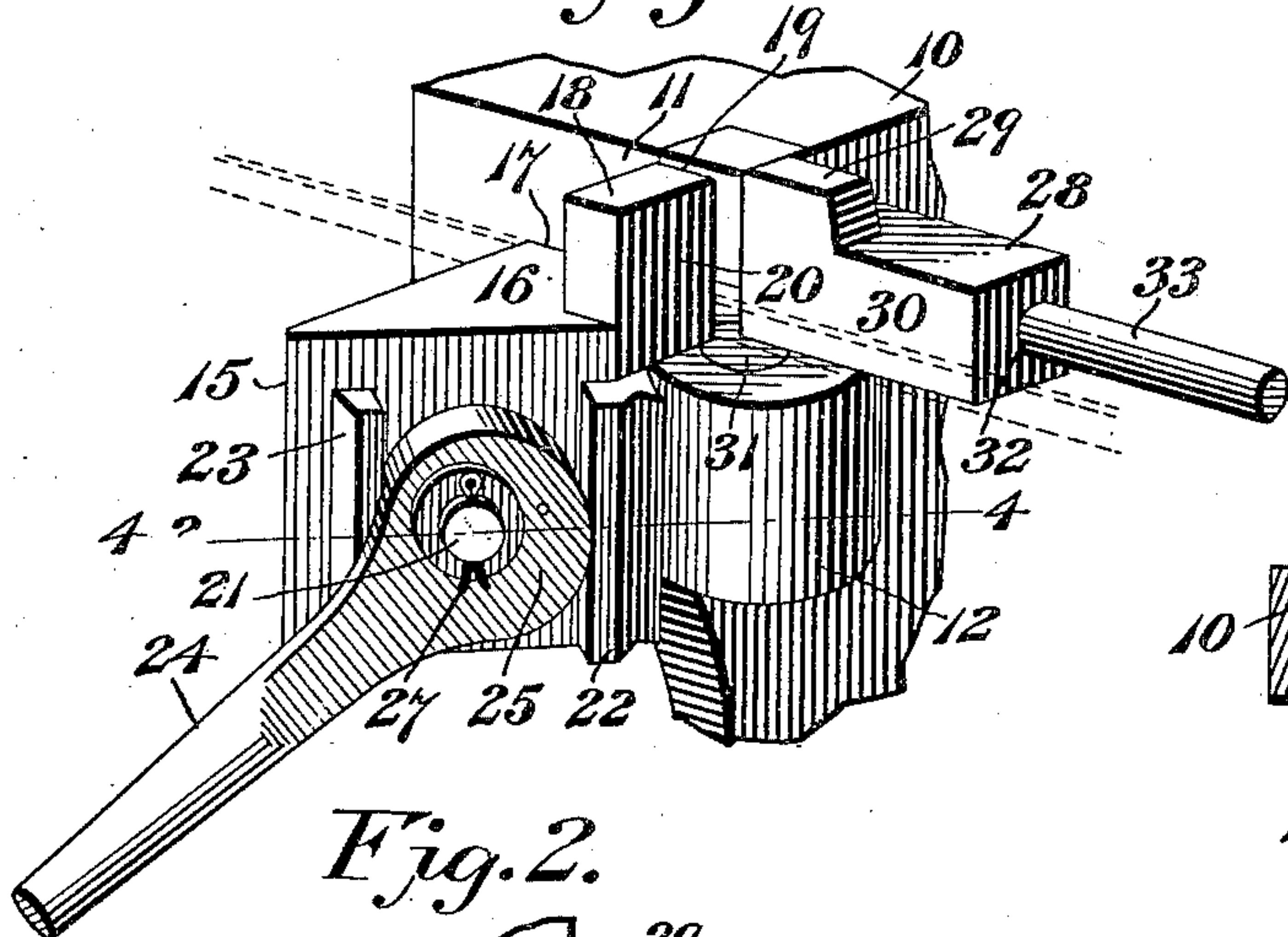
Patented Nov. 27, 1900.

R. BATES.  
ANGLE BENDING MECHANISM.

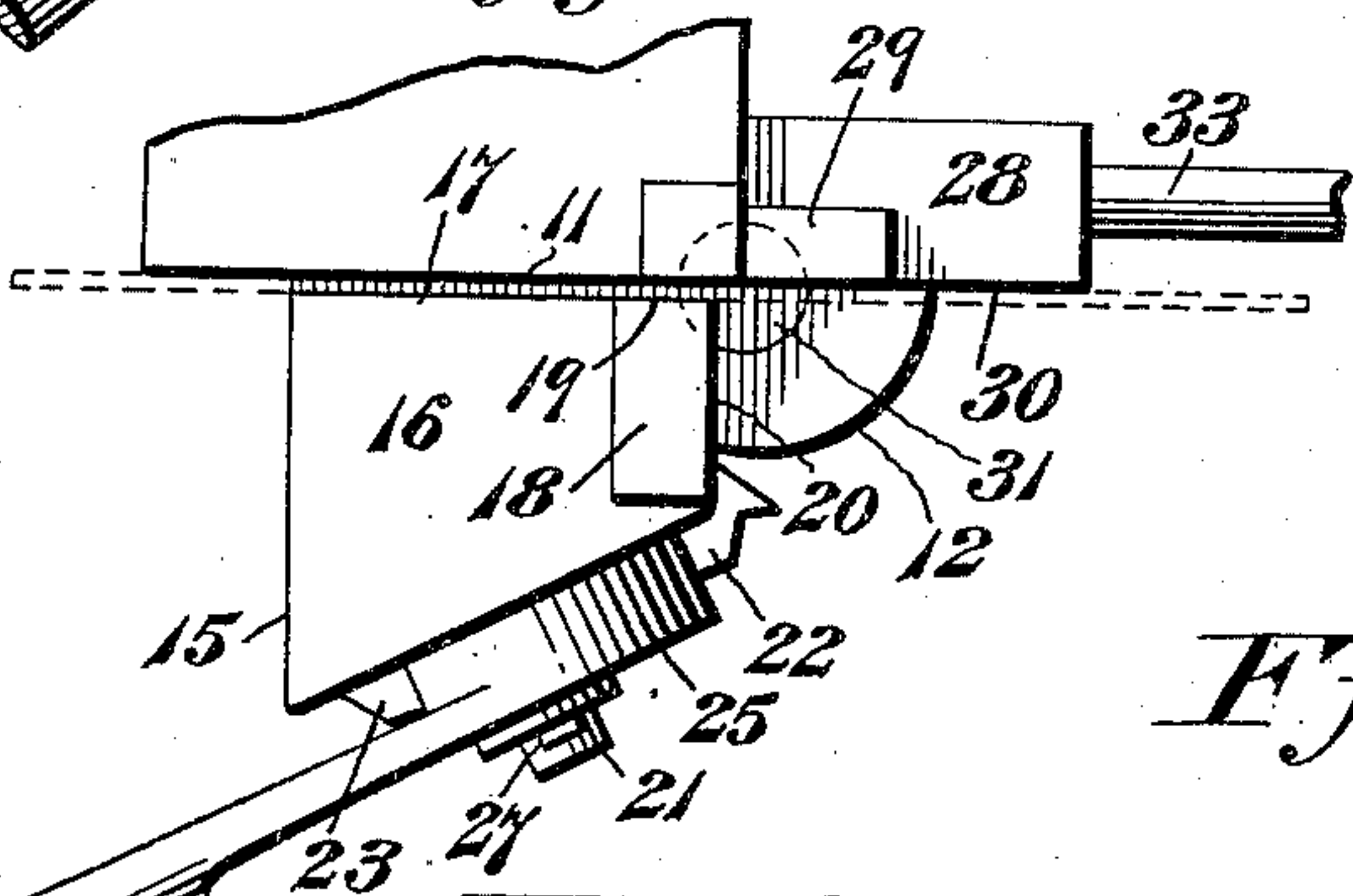
(Application filed Feb. 18, 1900.)

(No Model.)

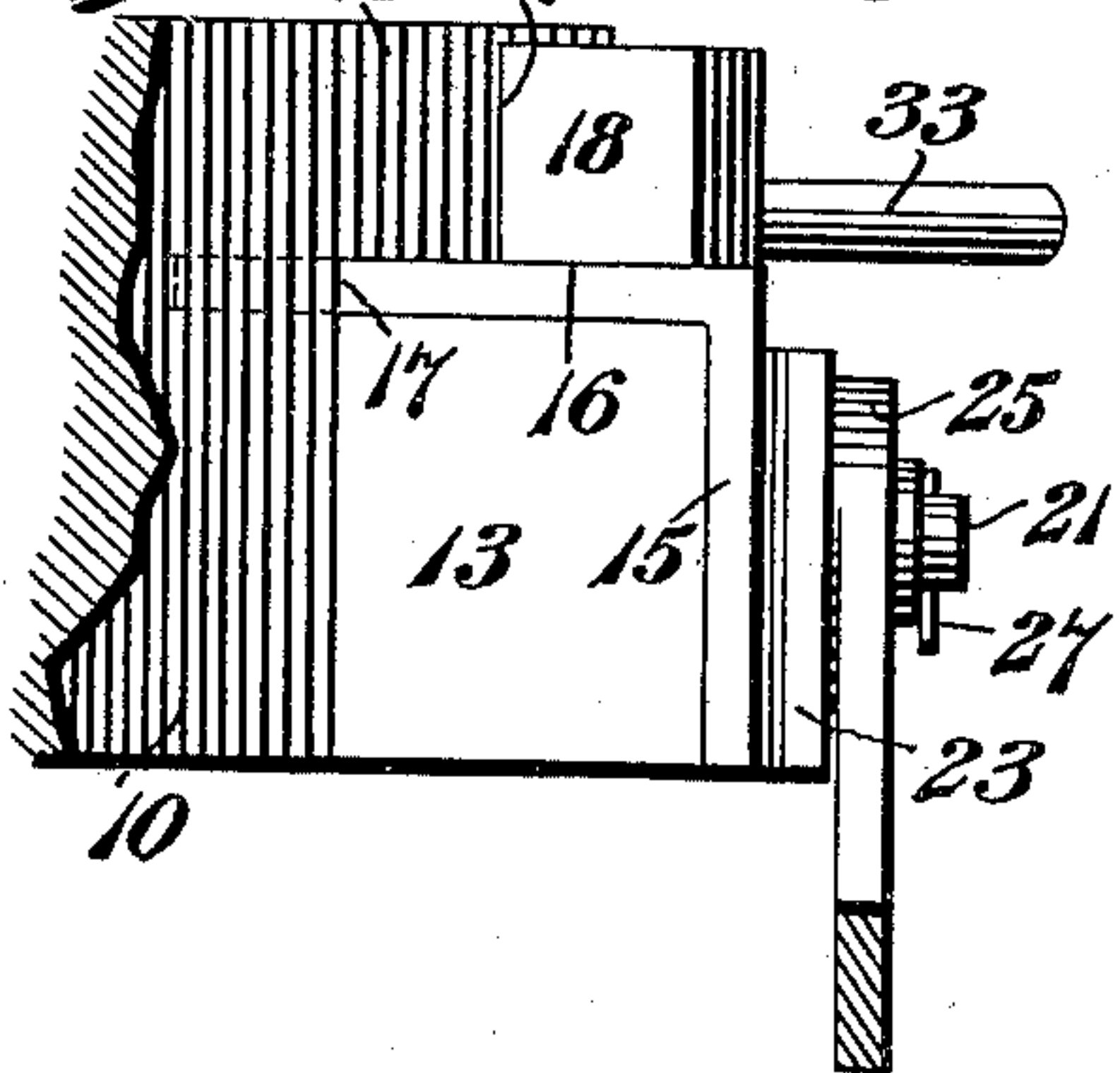
*Fig. 1.*



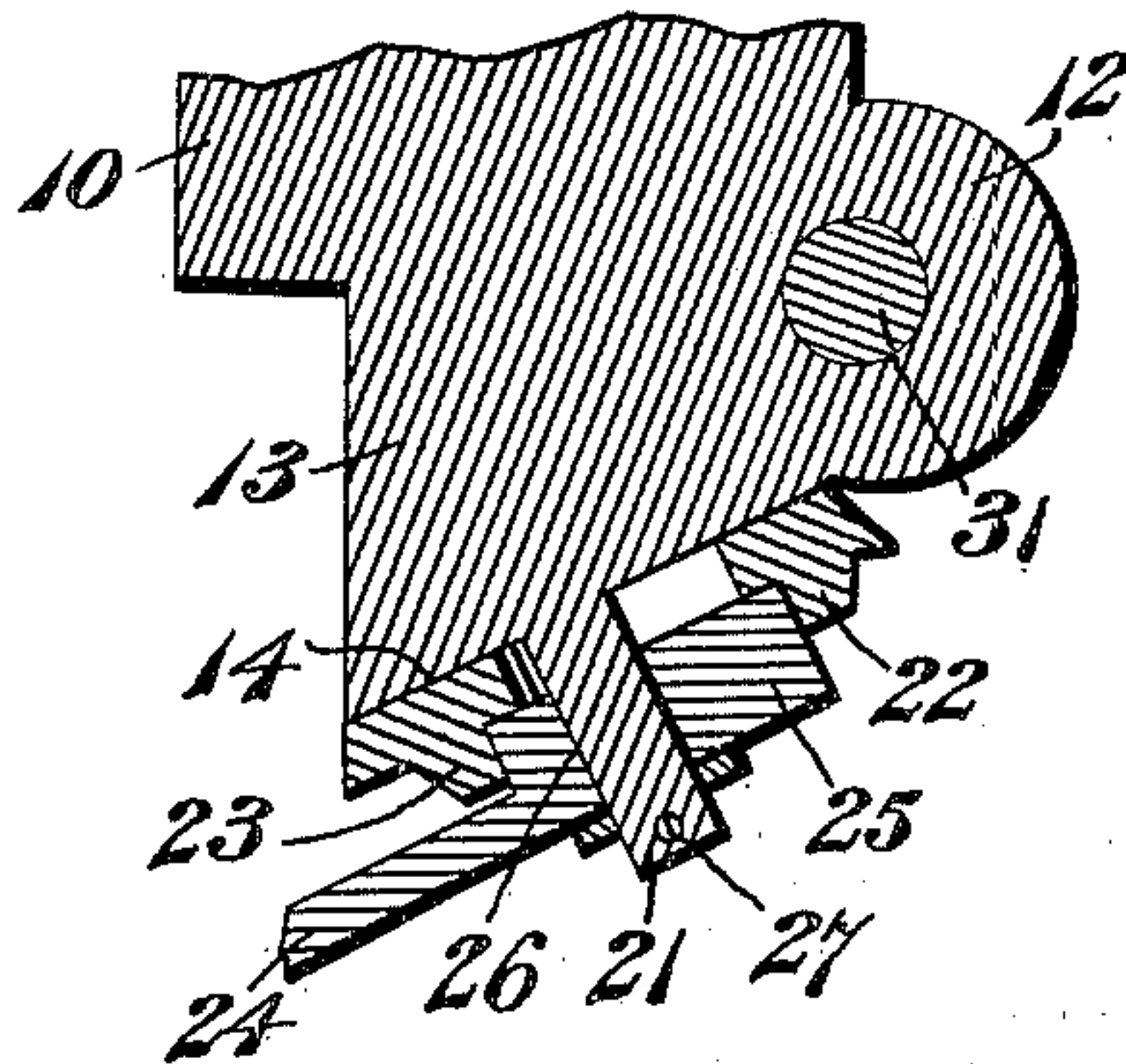
*Fig. 2.*



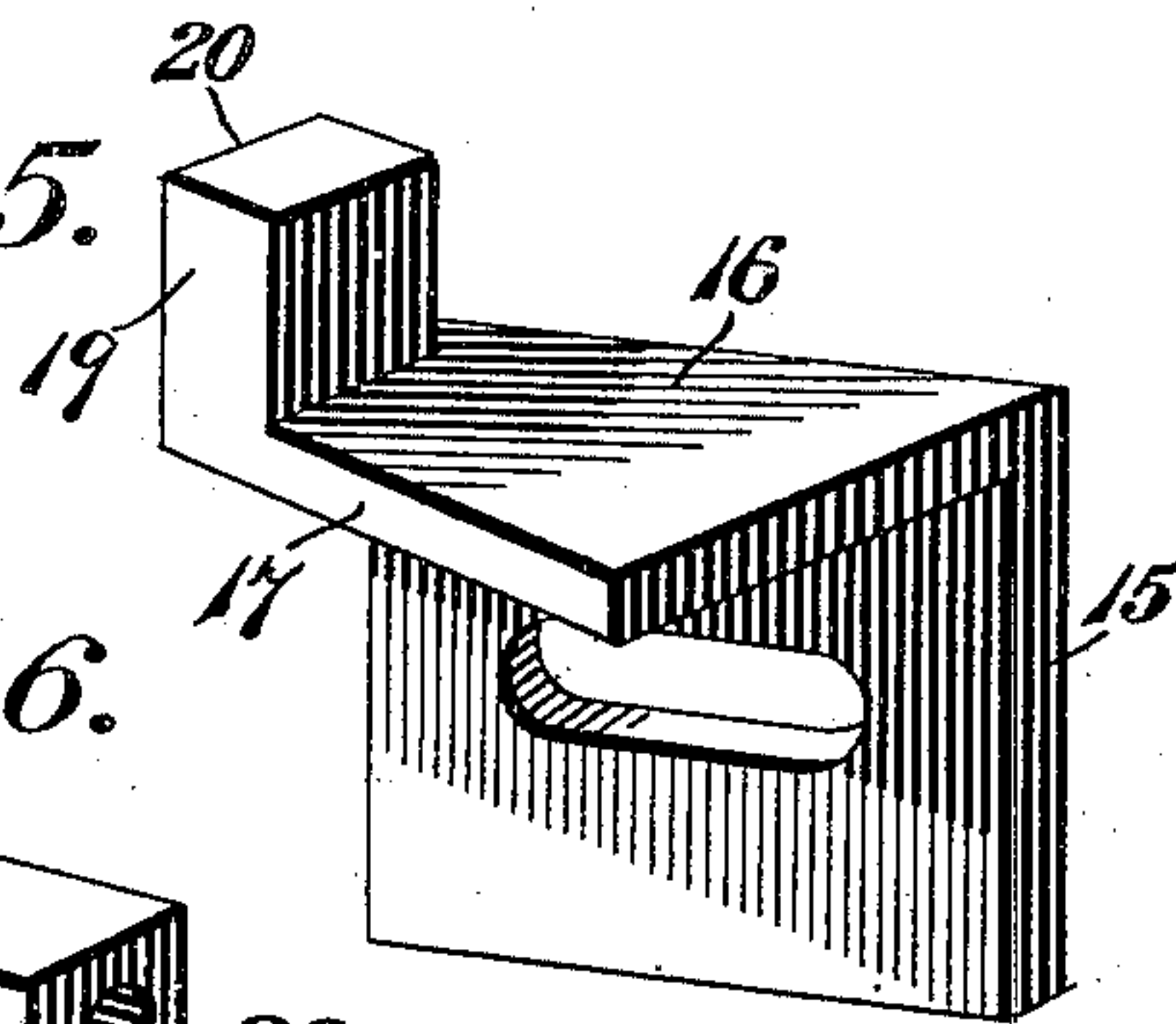
*Fig. 3.*



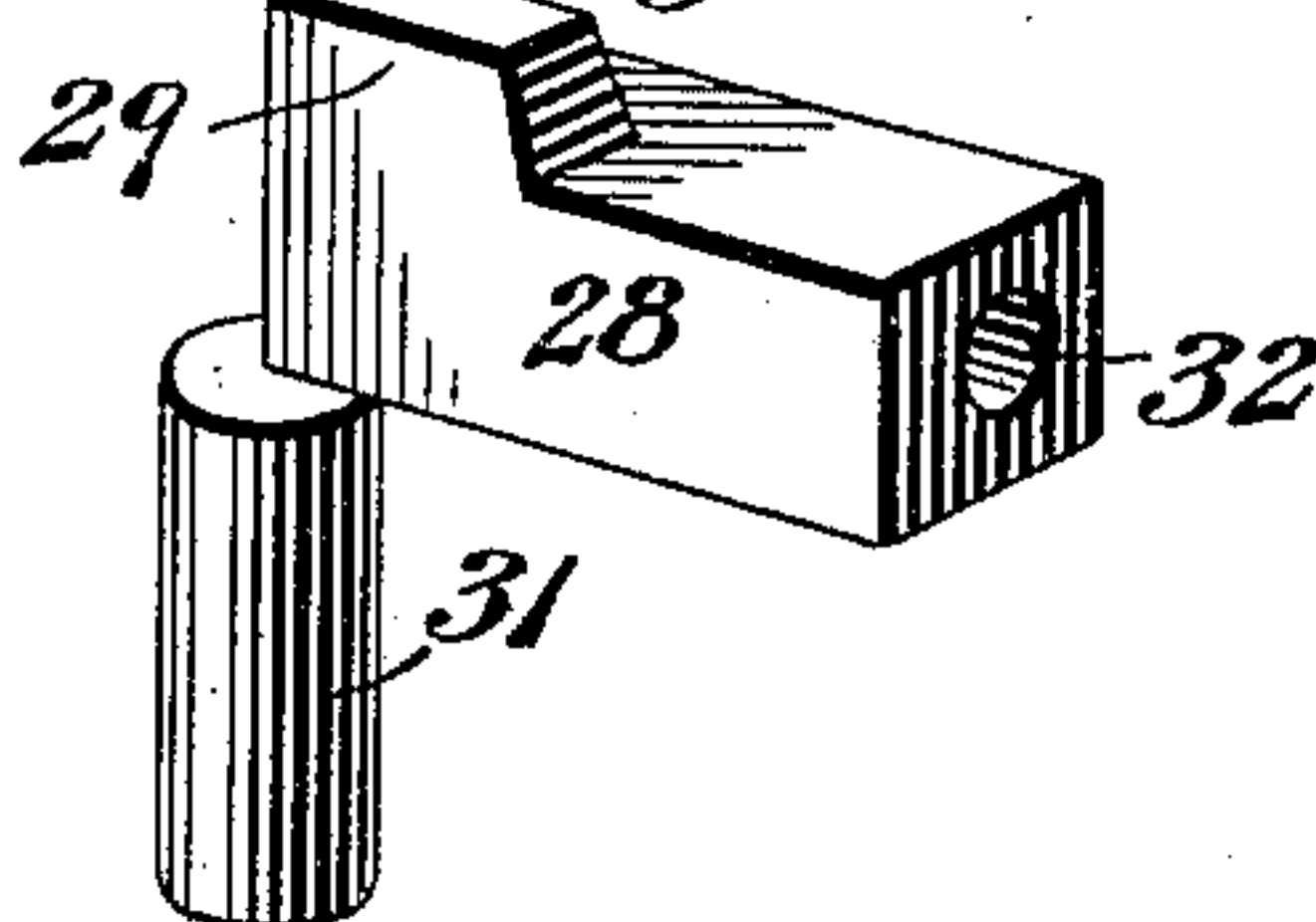
*Fig. 4.*



*Fig. 5.*



*Fig. 6.*



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# UNITED STATES PATENT OFFICE.

ROBERT BATES, OF GRAND RAPIDS, WISCONSIN.

## ANGLE-BENDING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 662,664, dated November 27, 1900.

Application filed February 16, 1900. Serial No. 5,483. (No model.)

*To all whom it may concern:*

Be it known that I, ROBERT BATES, a citizen of the United States, residing at Grand Rapids, in the county of Wood and State of Wisconsin, have invented a new and useful Angle-Bending Mechanism, of which the following is a specification.

My invention relates to a metal-working machine especially adapted to the work of bending metallic bars or rods to an angular condition; and the improvements of the present application may be embodied as a separate machine or as a part of a combination metal and wood working machine, the latter forming the subject-matter of a separate application filed by me of even date herewith.

One object of the present invention is the provision of a novel type of bending mechanism which shall be simple in construction and capable of easy operation to effect the gripping or clamping of the work and the bending thereof to an angular form.

A further object is the provision of means which by simple movement operates to adjust and clamp the gripping element into coöperative relation to a gripping-surface on a frame.

Further objects and advantages of this invention will appear in the course of the subjoined description, and the novelty in the construction and combination of parts will be pointed out in the claims.

In the drawings, Figure 1 is a perspective view of an angle-bending mechanism embodying the present improvements. Fig. 2 is a plan view thereof. Fig. 3 is an elevation of the same. Fig. 4 is a horizontal transverse sectional view taken in the plane of the line 4 4 of Fig. 1. Fig. 5 is a detail view of the gripper element. Fig. 6 is a like view of the bending-die.

The same numerals of reference are used to indicate like and corresponding parts in each of the several figures of the drawings.

The frame 10 may be of any suitable construction, and it is provided with a gripping-face 11, which is in opposing relation to a similar gripping-face on a gripper element presently described. This frame may be of any suitable construction when the gripper mechanism forming a part of the angle-bender is embodied in a separate machine; but in the event of such angle-bending mechanism form-

ing a part of the combination metal and wood working machine disclosed by my other application, to which reference has been made, then this frame 10 is formed by a part of the bed or framework adapted to the support of the several mechanisms which enter into the construction of such combination machine. This frame 10 is provided at one side of the gripping-face with a bearing 12, having a suitable socket for the reception of the pivotal post of the bending-die, and the frame is furthermore provided at a point below the gripping-faces with a short guide-post 13, the latter having an inclined face 14, which is disposed at an angle to the plane of the gripping-face 11.

One element of my improved angle-bending mechanism is a combined gripper and stationary die, (indicated by the numeral 15.) This element is provided with a flat top 16, and it is fitted on the guide-post 13, so that the vertical part of the gripper conforms to the position of the inclined face 14 of said post, while the top 16 of the gripper lies over and rests upon the upper flat face of the post. The inner face or edge 17 of the gripper is in opposing relation to the gripping-face 11 of the frame, and the gripper is furthermore provided with a bending-nose 18. The gripper has the top 16 and the bending-nose made or cast as an integral part thereof, and this bending-nose extends upwardly from the top of the gripper at the inner corner or angle thereof, said bending-nose having working faces 19 20 disposed at right angles one to the other, one of the gripping-faces being in the plane of the gripping-face 17. A stud 21 is secured firmly to or made an integral part of the guide-post 13, so as to extend outwardly from the inclined face 14 of said face, and this stud passes loosely through an opening in the vertical inclined part of the gripper. The gripper is furthermore provided with a pair of parallel flanges 22 23, which are made integral with the vertical inclined part of the gripper and disposed on opposite sides of the position occupied by the stud 21 on the proper assemblage of the gripper to the post. A lever 24 is provided with an eccentric head 25, which in turn is provided with an eye or opening 26, and this eccentric head is fitted loosely on the stud 21, so as to occupy a po-



sition between the flanges 22 23. The lever is held in position by a key or pin 27, which passes through the perforation in the stud 21, and the lever is thus loosely mounted on the stud for its eccentric head to impinge one or the other of the flanges on the gripper. By turning the lever in a downward direction the head 25 is caused to impinge against the flange 22, and thereby move the gripper in a direction for it to slide along the inclined face 14 of the guide-post, and this movement of the gripper makes the face 17 thereof move in parallel relation to the face 11 of the frame, whereby a rod or bar, which may be interposed between the gripper and the frame, is engaged by and held firmly between the faces 11 17 of the frame and gripper, respectively. In this position of the parts the lever operates to clamp the gripper immovably in place for properly holding the work during the bending operation; but a reverse movement of the lever causes the eccentric head to impinge the flange 23, thereby releasing the gripper and withdrawing the same from the work. It will be seen that a movement of the lever in one direction operates to shift the gripper into working position and to hold the same against movement, while a reverse movement of the lever releases the gripper and withdraws it from the work.

28 designates the bending-die, which is provided with an upstanding bending-nose 29 and a working face 30. This die is pivotally mounted on the frame at a point contiguous to the position occupied by the gripper when in its active position, and this pivotal mounting of the bending-die is preferably effected by providing the same at its inner angle or corner with a depending post 31, which fits in the socket of the lug 12. Said die is furthermore provided with a lever-socket 32, adapted to receive an insertible lever-arm 33.

In operation the bending-die occupies the position shown by Fig. 1 and the gripper-lever engages with the flange 23 to retract the gripper from the face 11 of the frame. The metallic bar or rod which is to be bent may easily be inserted between the face 11 of the frame and the faces 17 19 of the gripper, so that the rod or bar will lie adjacent to the face 30 of the bending-die. The lever 24 is now operated for its eccentric head to impinge the flange 22, and thereby shift the gripper inwardly toward the face 11. This movement of the gripper brings its faces 17 19 into position to engage the work, although the latter may be so narrow that the face 17 only of the gripper will bind against the work. The lever 24 holds the gripper firmly in place, so that it constitutes a stationary bending-die, and the lever-arm 33 is now operated to swing the die 28 toward the face 20 of the gripper. This bending-die 28 may be moved any suitable distance toward the gripper, according to the angle it is desired to give to the metallic bar or rod, and it is evident that by moving the die 28 a sufficient distance for

its face 30 to lie parallel with the face 20 of the gripper the rod or bar may be bent at a right angle. After the work shall have been bent the die 28 is reversed and the lever 24 is operated to release the gripper, after which the work may be easily removed from the bending mechanism.

Changes within the scope of the appended claims may be made in the form and proportion of some of the parts, while their essential features are retained and the spirit of the invention is embodied. Hence I do not desire to be limited to the precise form of all the parts as shown, reserving the right to vary therefrom.

Having thus described the invention, what I claim is—

1. A bending device comprising a pair of grippers having their faces in substantially parallel relation, one of said grippers being movable in a direction oblique to the face of the other gripper while maintaining the parallel relation of the faces.

2. A bending device comprising a pair of grippers having their faces in substantially parallel relation, and means for shifting one of the grippers in a direction oblique to the faces without disturbing the parallelism thereof.

3. In an angle-bending mechanism, the combination with a pair of grippers having parallel faces, one of said grippers being movable in a plane oblique to the face of the other gripper without disturbing the parallel relation of the gripper-faces, and a bending-die cooperating with said grippers.

4. In an angle-bending mechanism, the combination with a pair of grippers having parallel faces, one of said grippers being movable in a direction oblique to the face of the other gripper without disturbing the parallel relation of the faces, and a lever operatively connected with the movable gripper to shift and lock the same.

5. In an angle-bending mechanism, the combination with a pair of grippers having parallel faces, one of said grippers being fixed and the other movable in a plane oblique to the faces of the grippers without disturbing the parallel relation of said faces, means for locking the movable gripper, and a pivoted bending-die having its axis of movement located in the plane of the face of the stationary gripper.

6. In an angle-bending mechanism, the combination with a stationary gripper having a guide-post provided with a face extending in a plane oblique to the face of the gripper, a shiftable gripper mounted to slide upon the post in the direction of the oblique face thereof and having a gripping-face disposed parallel to the gripping-face of the fixed gripper, and means for shifting the movable gripper upon the post.

7. In an angle-bending mechanism, the combination with a fixed gripper and a stationary post having a face located in a plane oblique



to the face of the gripper, a movable gripper mounted upon the post and arranged to be shifted in the plane of the oblique face thereof, said movable gripper having a gripping-face retained constantly in parallel relation with the face of the stationary gripper, bearing-flanges extending from the movable gripper, an eccentric head arranged between said bearing-flanges, and a bending-die mounted to co-  
10 operate with the gripper.

8. In an angle-bending mechanism, the combination with a stationary gripper and a movable gripper having parallel gripping-faces, of a guide-post having a face disposed in a  
15 plane oblique with respect to the stationary

gripper and supporting the movable gripper for movement in a plane oblique to the gripping-faces, means for shifting and clamping the gripper, and a pivoted bending-die having its axis of movement located in the plane  
20 of the stationary gripping-face, and means for operating said die.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

ROBERT BATES.

Witnesses:

D. B. PHILLEO,  
F. J. WOOD.