

R. A. CARTER.

BENDING MACHINE.

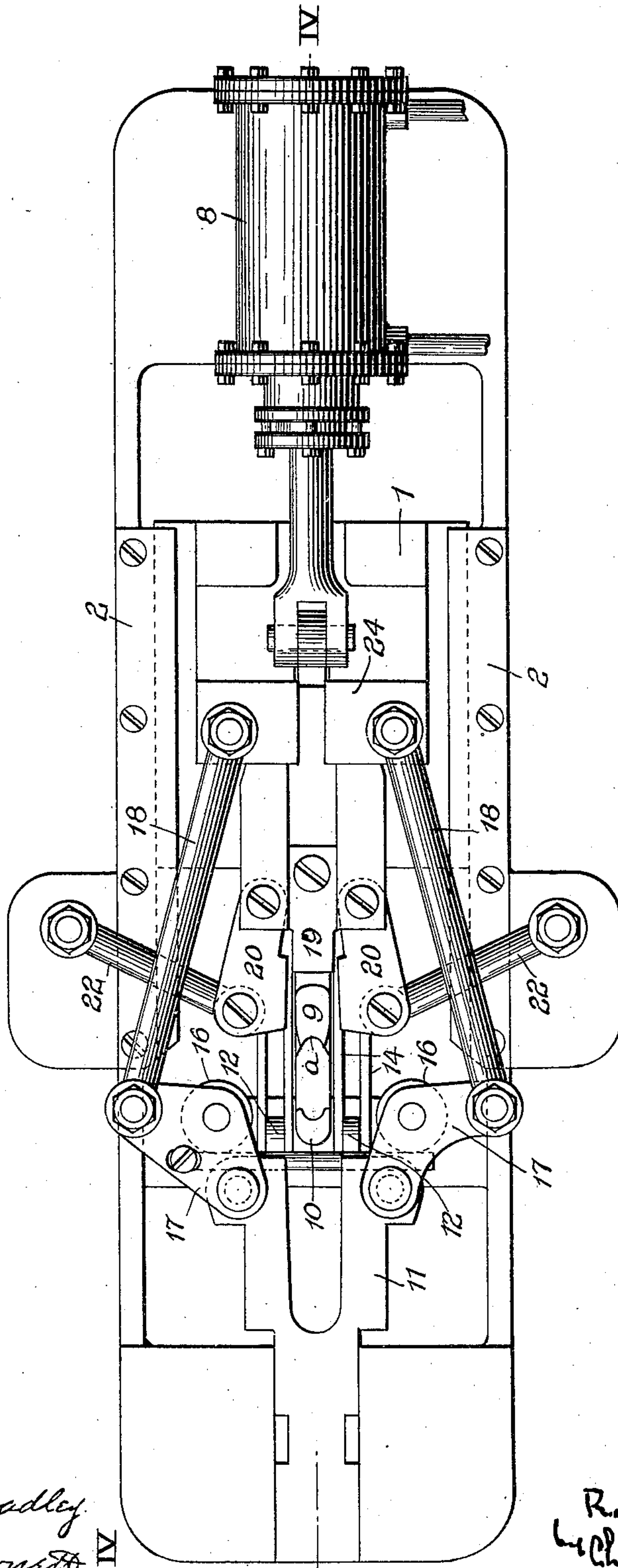
APPLICATION FILED AUG. 7, 1908.

938,556.

Patented Nov. 2, 1909.

4 SHEETS—SHEET 1.

FIG. 1.



WITNESSES:

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Charles Barnette

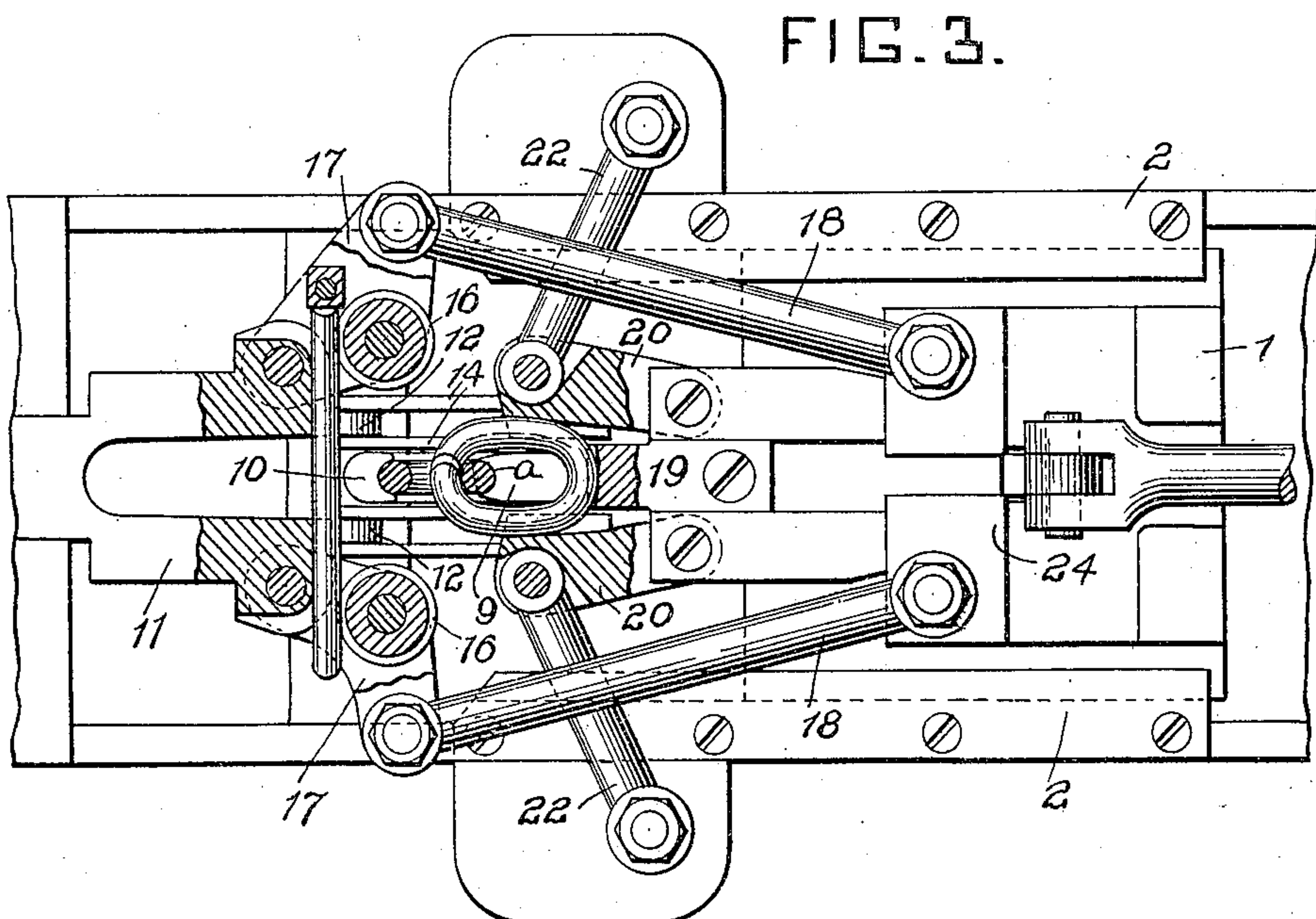
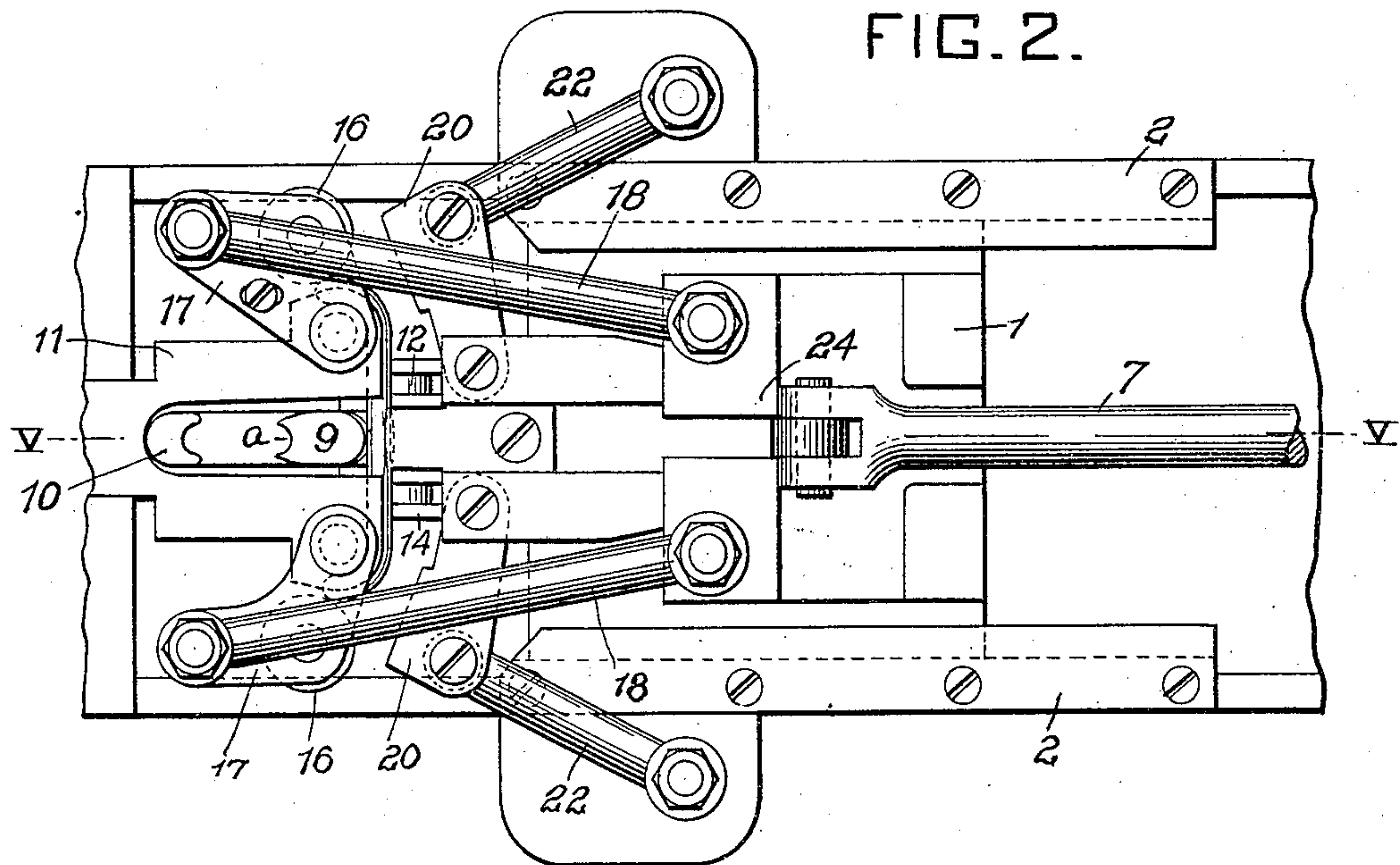
INVENTOR

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by Christopher & Christy, Attys

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4 SHEETS—SHEET 2.



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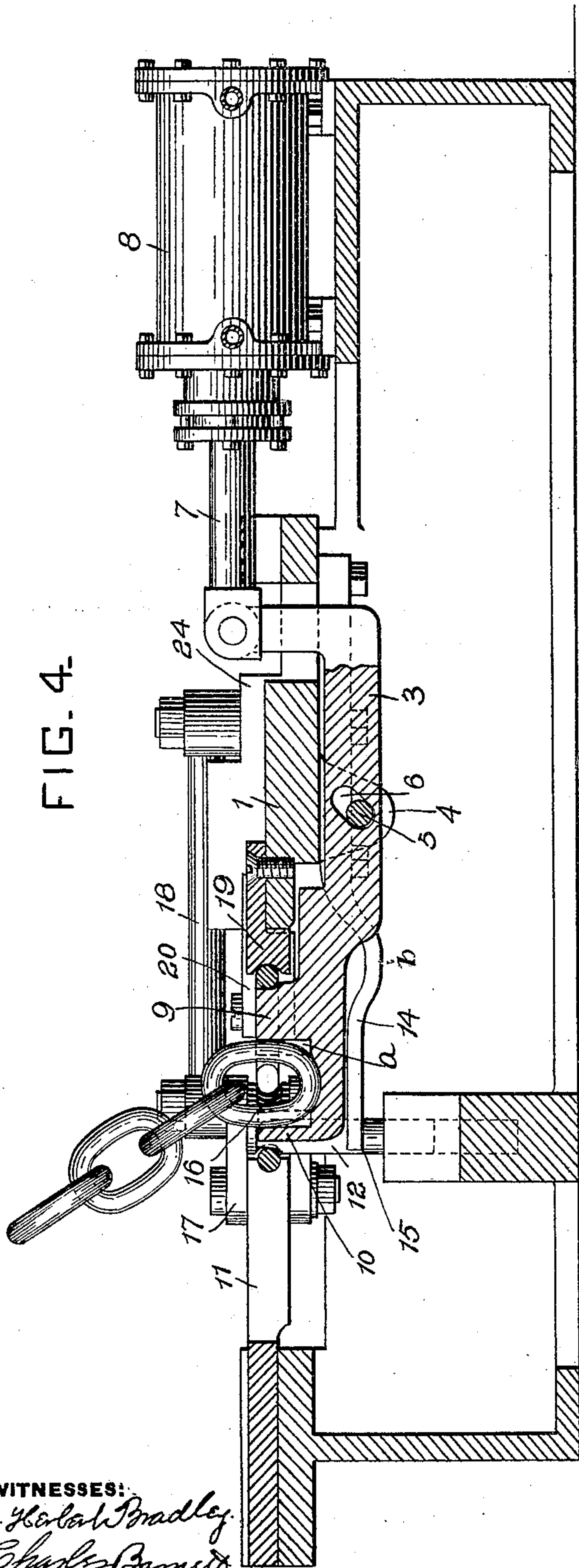
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4 SHEETS—SHEET 3.

FIG. 4.



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FIG. 6.

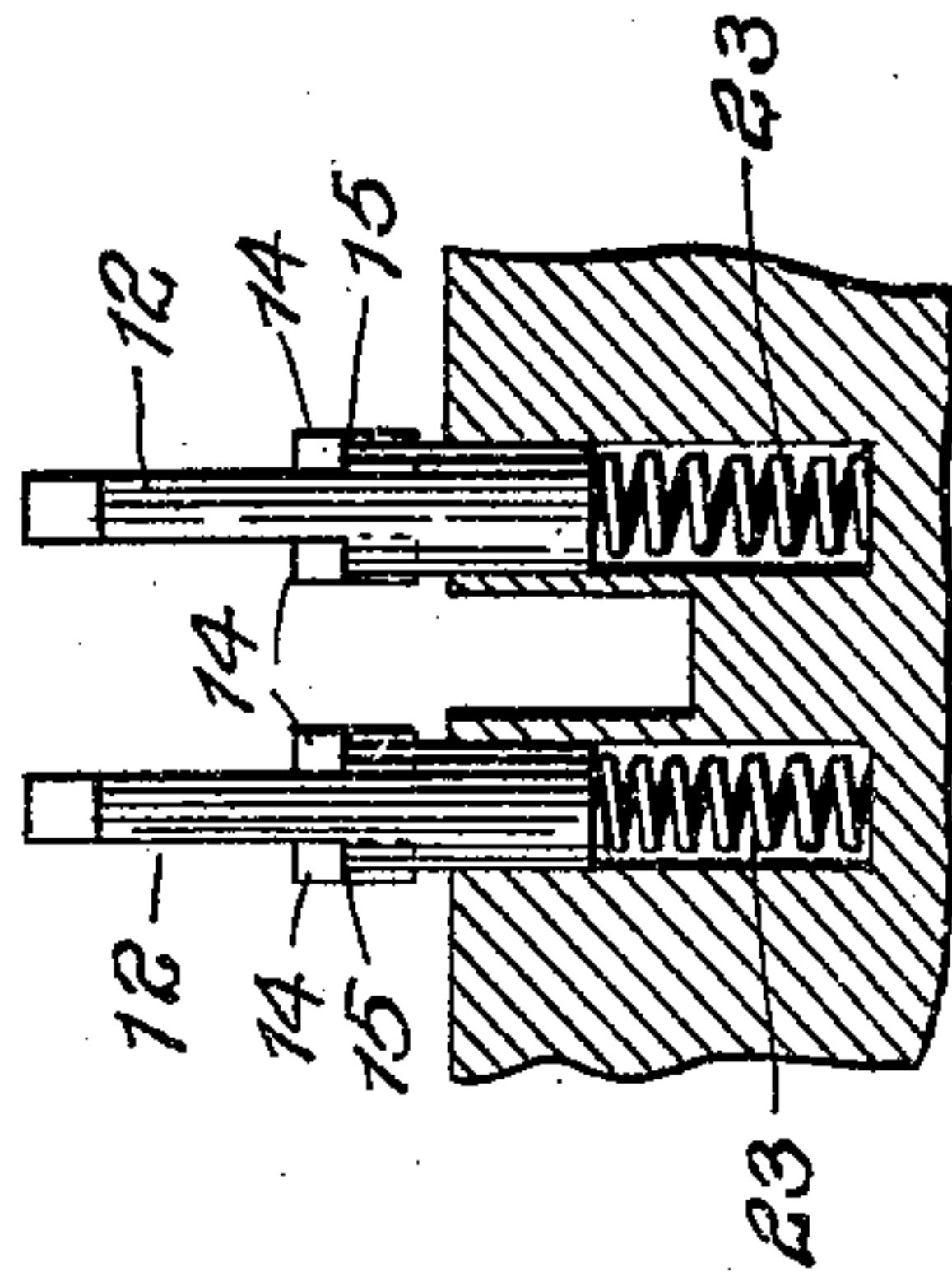
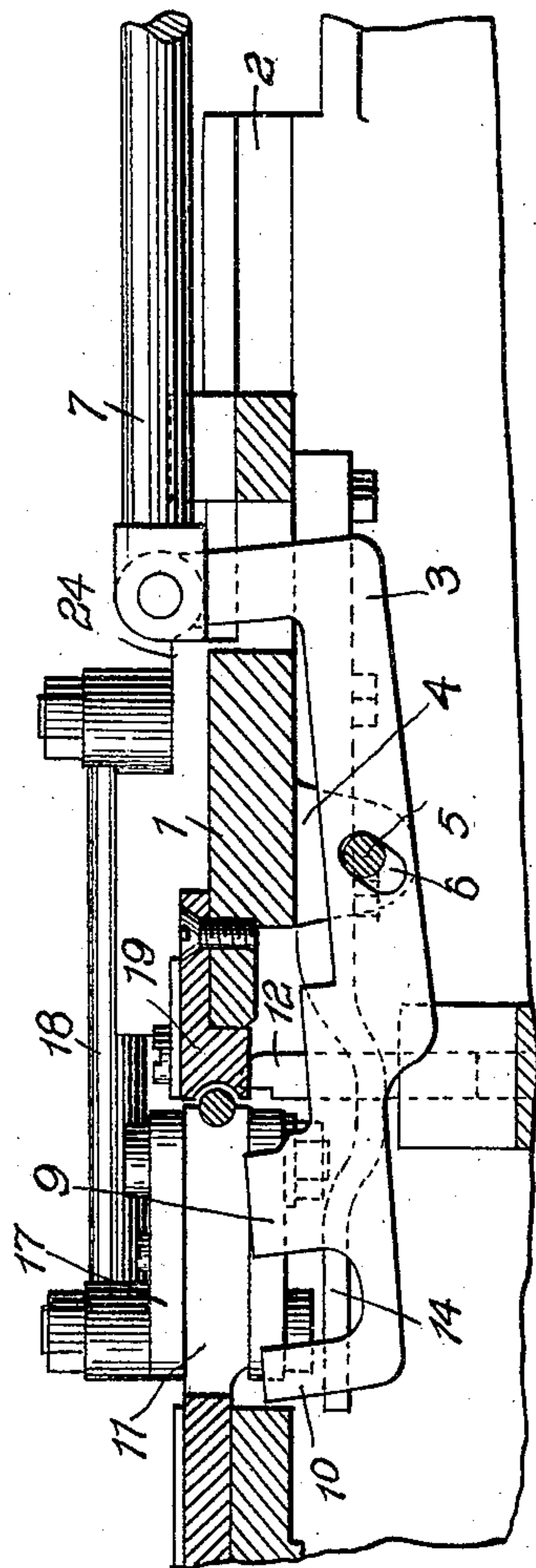


FIG. 5.



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4 SHEETS—SHEET 4.

FIG. 7.

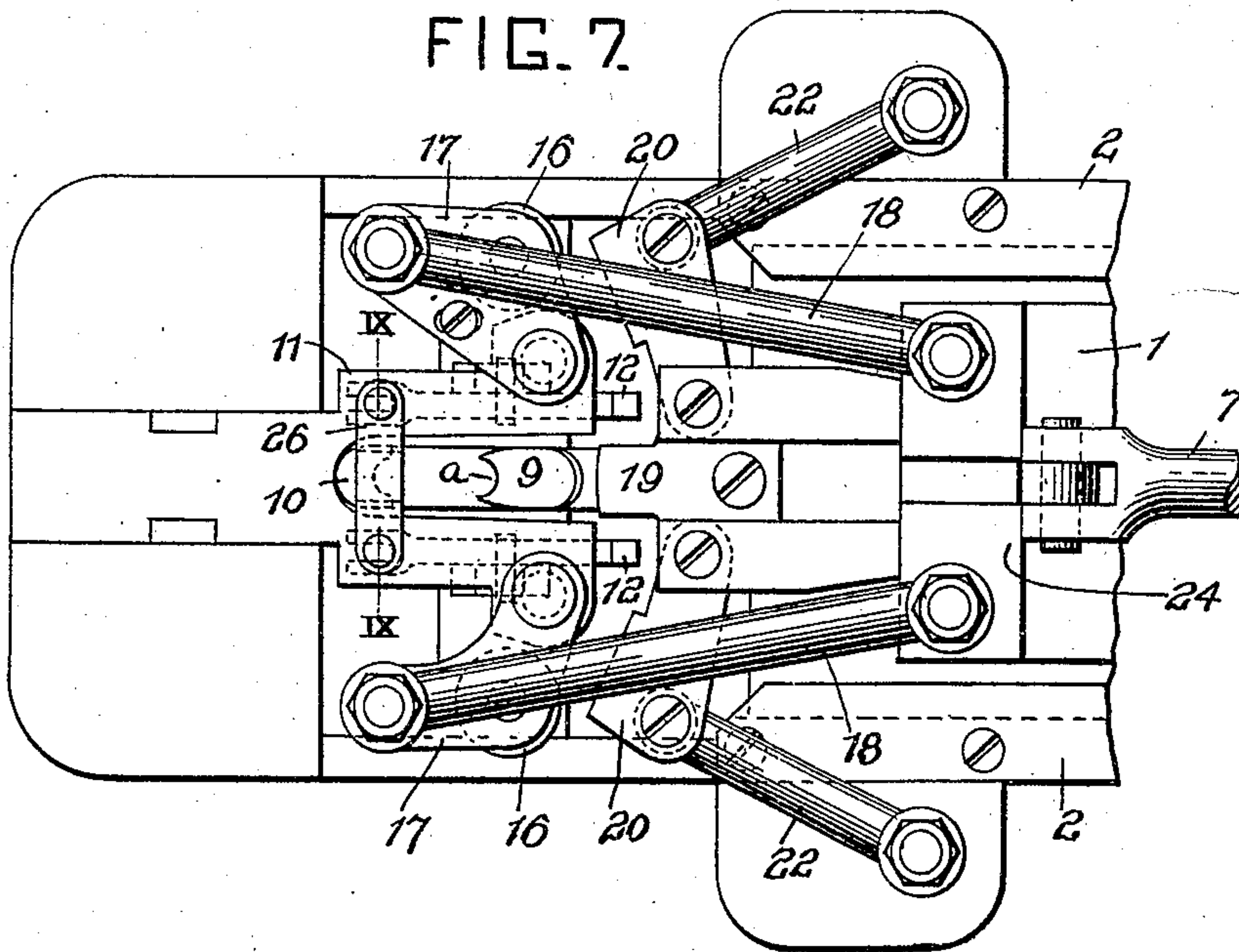


FIG. 8.

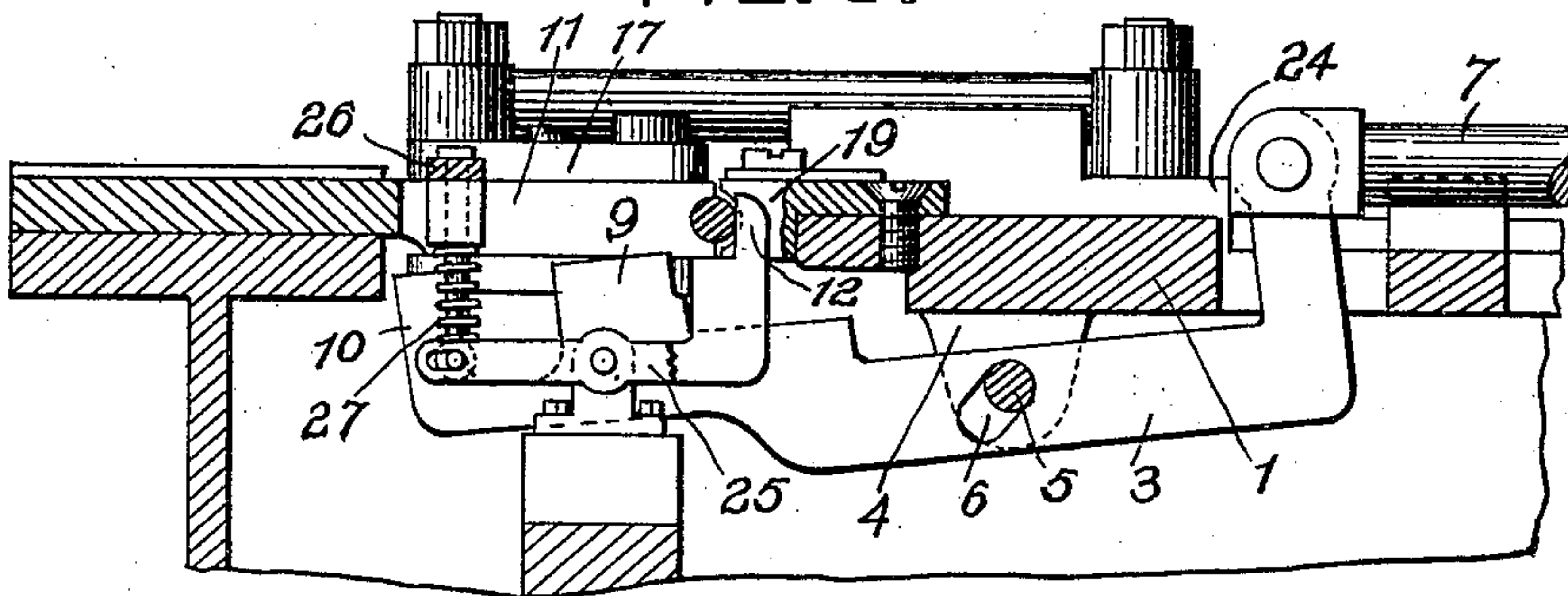
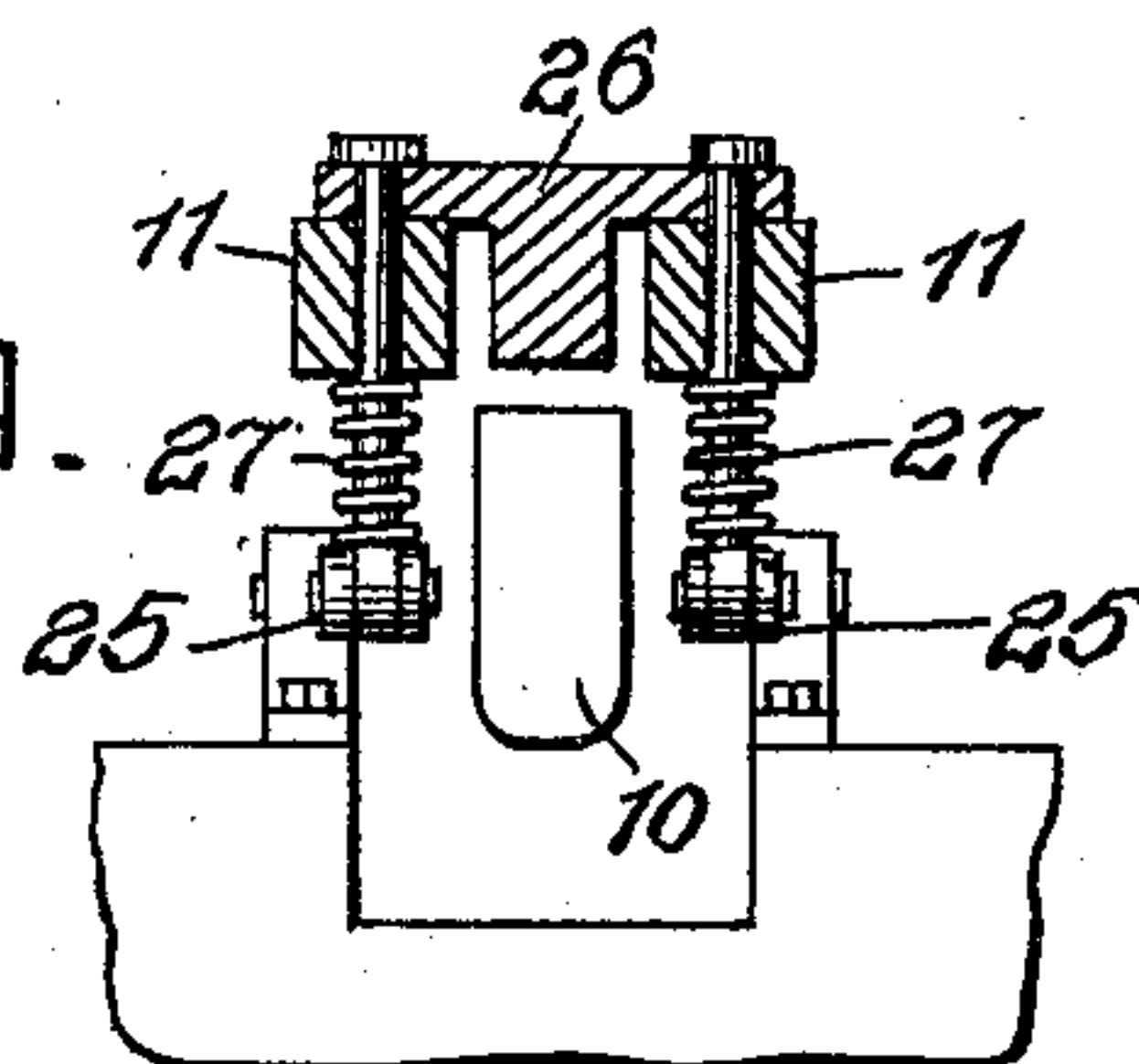


FIG. 9.



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UNITED STATES PATENT OFFICE.

ROBERT A. CARTER, OF PITTSBURG, PENNSYLVANIA.

BENDING-MACHINE.

938,556.

Specification of Letters Patent.

Patented Nov. 2, 1909.

Application filed August 7, 1908. Serial No. 447,421.

To all whom it may concern:

Be it known that I, ROBERT A. CARTER, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, a citizen of the United States, have invented or discovered certain new and useful Improvements in Bending-Machines, of which improvement the following is a specification.

The invention described herein relates to certain improvements in machines for bending sections of rods or blanks into link form and in such bending operation thread the link being bent through a previously formed link.

The invention is hereinafter more fully described and claimed.

In the accompanying drawings forming a part of this specification, Figure 1 is a top plan view of my improved machine showing the several parts of the mechanism in position for the feeding in of a blank or short section of rod; Fig. 2 is a similar view of the front portion of the machine showing the position of the parts after the ends of the blank have been bent; Fig. 3 is a top plan view partly in section, showing a completed link and also showing a blank fed in for the formation of the next link; Fig. 4 is a sectional elevation on a plane indicated by the line IV—IV Fig. 1; and Fig. 5 is a similar view of the front part of the machine the plane of section being indicated by the line V—V Fig. 2; Fig. 6 is a sectional detail view; Figs. 7 and 8 are plan and sections respectively illustrating a modification of certain parts of the machine; and Fig. 9 is a sectional view on a plane indicated by the line IX—IX Fig. 7.

In the practice of my invention a slide 1 is mounted in suitable ways 2 in the bed of the machine. A lever 3 is carried between lugs 4 on the under side of the bed 1, a pin 5 passing through such lugs and through an inclined slot 6 in the lever. An angular extension on one end of the lever is connected to a suitable power mechanism such for example as the piston 7 of the fluid pressure cylinder 8. On the forward end of the lever is formed an anvil 9 having a shape and transverse dimensions corresponding to the internal shape and dimensions of the link to be formed. The anvil or former is made shorter than the internal length of the link to be formed by an amount approximately equal to the diameter of the rod or bar from which the links are formed, and is provided

in its front end with a groove *a* for the reception of the side or leg of a completed link. The link is supported in proper relation to the link to be formed. A lug or post 10 on the lever 3 and suitably arranged with reference to the anvil, which together with the lug or post form a recess for the holding of a completed link in position that in the bending of a blank the ends of the latter will be pushed through the completed link. In the back and forth movements of the table or slide 1 and the lever carried thereby, the latter is moved into a recess formed in a bending block 11, across which the blank to be bent is fed by any suitable mechanism and held in position while its ends are being bent by means of fingers 12. These fingers in the construction shown in Figs. 1 to 6 inclusive are suitably supported in position to hold the blank within a horizontal groove formed in the bending block, during the bending of the ends of such blank. At the proper time these fingers are drawn out of engagement with the blank by means of rods 14 having cam-shaped portions *b* and carried by the head or slide and engaging shoulders 15 on the fingers.

The bending of the ends of the blank as shown in Fig. 2 is effected by rollers 16 or other suitable bearing surfaces carried by wings 17 pivoted to the bending block 11, the outer ends of these wings are connected by links 18 to the slide 1. After the bending of the ends of the link a pull is exerted by the power mechanism on the lever 3 thereby causing the anvil to rise up in the recess in the bending block 11 and its rear end to clamp the middle of the blank against an abutment 19. By the movement of the slide imparted thereto by the pull on the lever the blank will be carried toward the rear of the machine being clamped between the anvil and abutment, and during such rearward movement, bending arms 20 pivoted to the slide are forced in toward each other or toward the sides of the rearwardly moving anvil, so as to bend the blank around such anvil. The movement of the bending arms 20 is effected by means of links 22 pivotally connected to the outer ends of the arms and also to stationary parts of the machine.

In describing the operation of the machine it will be assumed that the parts are in the position shown in Fig. 1, and that a blank has been fed across the bending block 11 and

is held in the groove therein by the retaining fingers 12. The slide is now moved to the left in Fig. 1, movement being imparted to the slide through the medium of the lever 3, which at the beginning of such movement is tipped on its pivot and also caused to move down by reason of the inclined slot so that the anvil and the link holding lug or post on the front end of the lever will pass under the blank held against the bending block 11. As the slide continues to move to the left, the rollers 16 are shifted to the position shown in Fig. 2, thereby bending the ends on the link as shown. Any bending or flexure of the middle portion of the link during this operation, will be prevented by the fingers 12. As the slide reaches the limit of its movement to the left the cams on rods 14 will force down the fingers 12 against the tension of their supporting springs 23 so that the blank can be moved away from the bending block. On a reversal of the direction of movement, the lever is again tipped but in an opposite direction so as to bring the anvil and link supporting portion up to a horizontal position and in such upward movement clamp the middle of the blank between the rear end of the anvil and the abutment 19. As the slide continues its rearward movement the blank will be carried back and at the same time the wings 20 will be forced inwardly so as to engage the end portions of the blank and bend them around the anvil. Previous to the rearward movement of the lever and slide and the parts carried thereby, a previously formed link is inserted between the front end of the anvil and the retaining lug or post, so that as the ends which have been bent by the action of the rollers 16, are caused to overlap by the action of the arms 20, these ends pass through the previously formed link. At the completion of the movement of the slide to the right in Fig. 1 a new blank is fed in across the bending block and between it and the holding fingers 12 which will rise as soon as freed from the cam rods 14 by the rearward movement of the slide.

It is characteristic of my machine that the movement is imparted to the slide through the lever 3 in both directions. The forward movement is due to the bearing of the end of the piston rod against a shoulder or abutment 24 on the slide as shown in Fig. 2. While the rearward movement is imparted to the slide by this lever by reason of the bearing of the anvil against the blank and the latter against the abutment 19 secured to the slide.

In Figs. 7 and 8 I have shown a modification in the manner of withdrawing the holding finger 12. As there shown these fingers are formed on one end of the levers 25, pivotally mounted in the frame of the machine. The opposite ends of these levers are connected by pins to a bar 26 extending across the recess in the bending block 11. In this construction in the upward movement of the anvil and the retaining lug or post, the latter will strike this cross bar, and shift the levers so as to depress the levers 25 carrying the fingers, which are restored to operative position by springs 27, as soon as the lug or post 10 has passed from under the cross bar 26.

I claim herein as my invention:

1. In a bending machine the combination of a bending block, bending rollers movable around the corners of the bending block and movable fingers for holding the intermediate portion of the blank against the block during the bending of the ends of the blank.

2. In a bending machine the combination of a bending block having a recess therein, means for supporting a blank on the block across the recess, a reciprocating slide provided with an abutment, a former mounted on the slide, means for depressing the former below the position of the blank during the forward movement of the slide and for raising the former during the rearward movement of the slide.

3. In a bending machine, the combination of means for bending the ends of a blank, a former provided with means for so supporting a completed link that a portion thereof will be within the periphery of the former and means for bending the blank around the former and forcing the bent ends through the completed link.

4. In a bending machine, the combination of a slide provided with an abutment, a lever pivotally connected to the slide, a former carried by the lever means for depressing the front end of the lever on the forward movement and raising it during the backward movement of the slide, a recessed bending block extending rearward into the range of movement of the former and means for supporting a blank against the rear face of the bending block.

In testimony whereof, I have hereunto set my hand.

ROBERT A. CARTER.

Witnesses:

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CHARLES BARNETT.