

No. 667,777.

Patented Feb. 12, 1901.

F. M. ILER.
CRUSHING ROLLS.

(Application filed Dec. 17, 1898.)

(No Model.)

4 Sheets—Sheet 1.

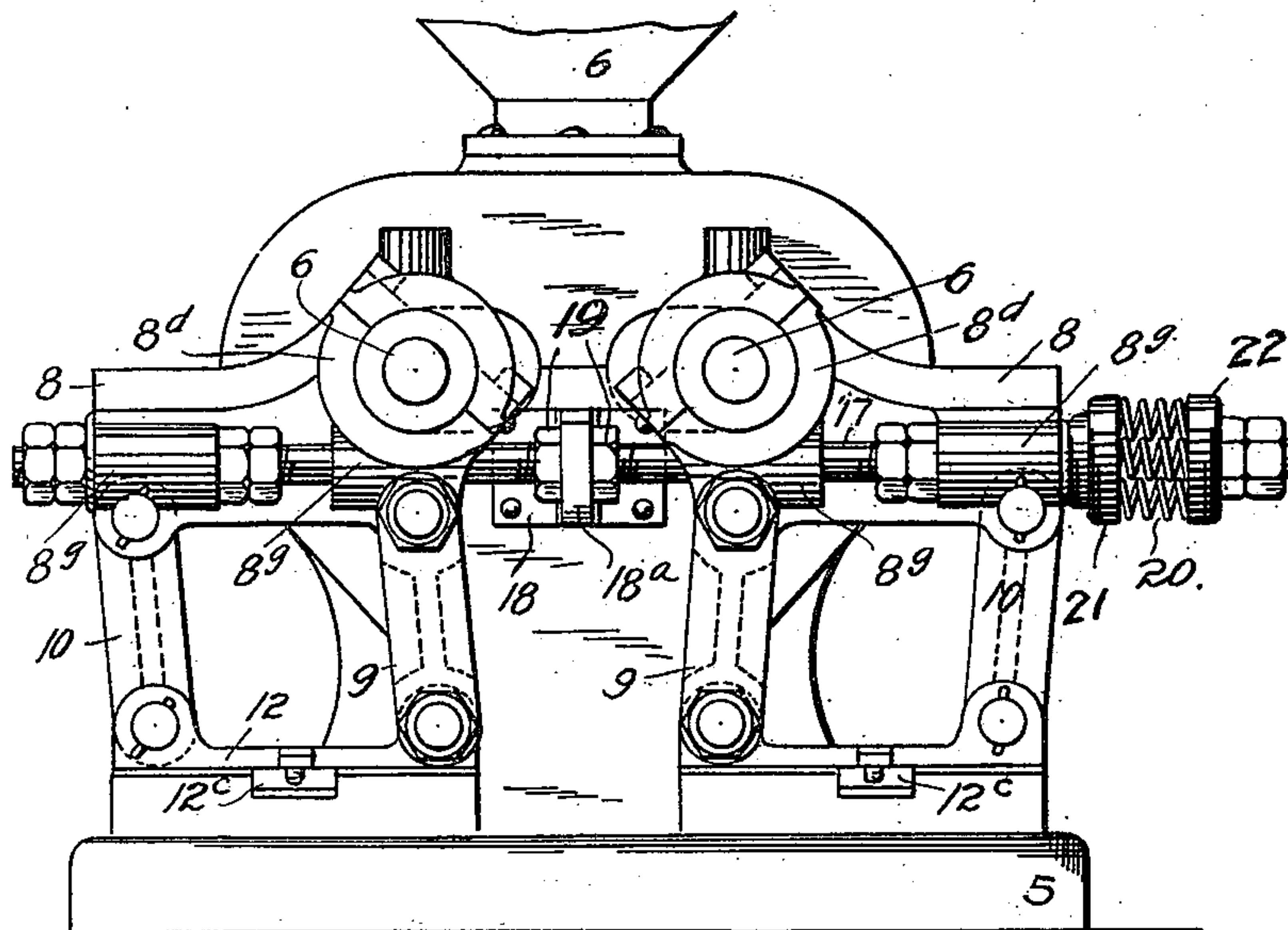


FIG. 1

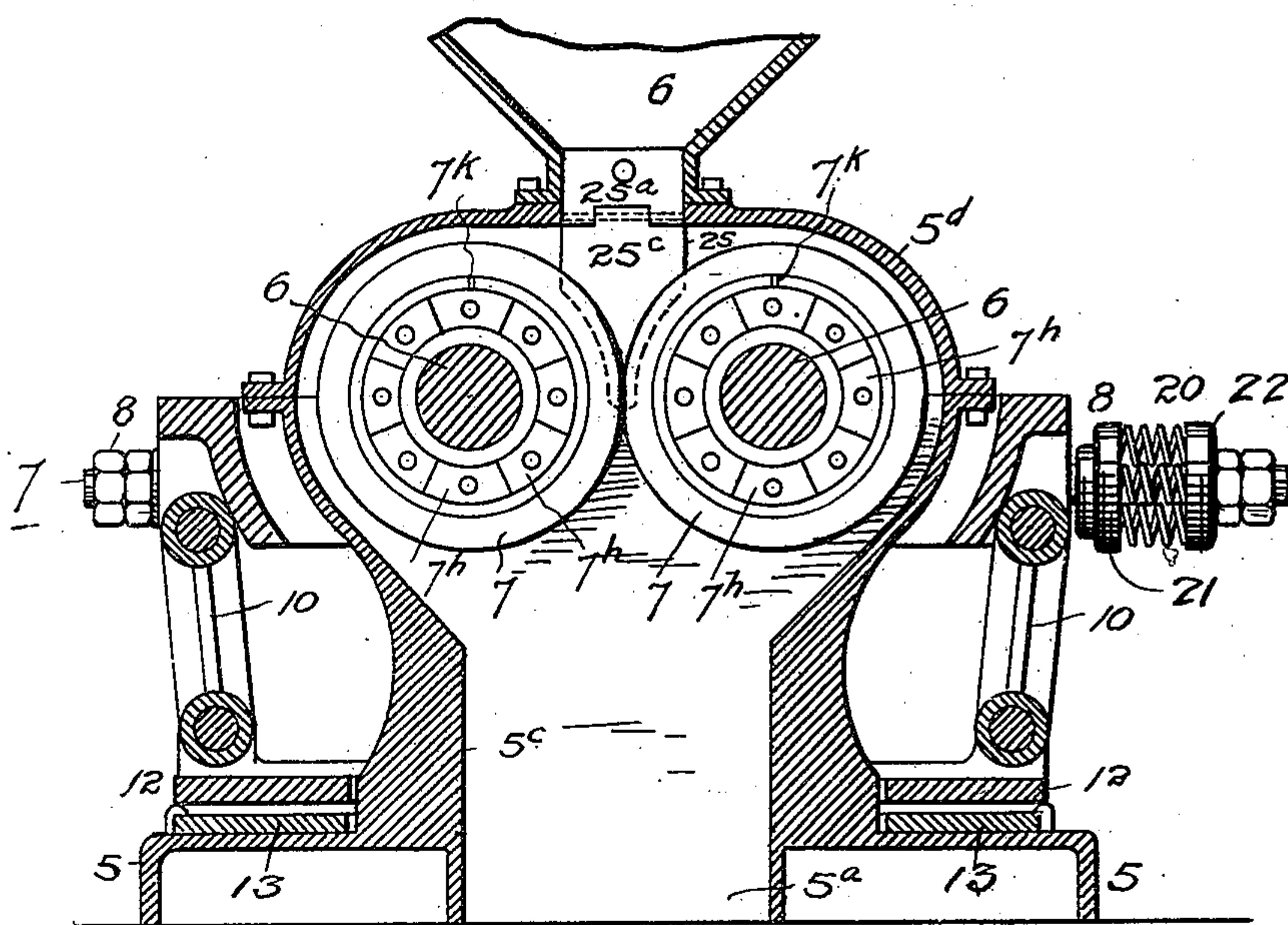


FIG. 2

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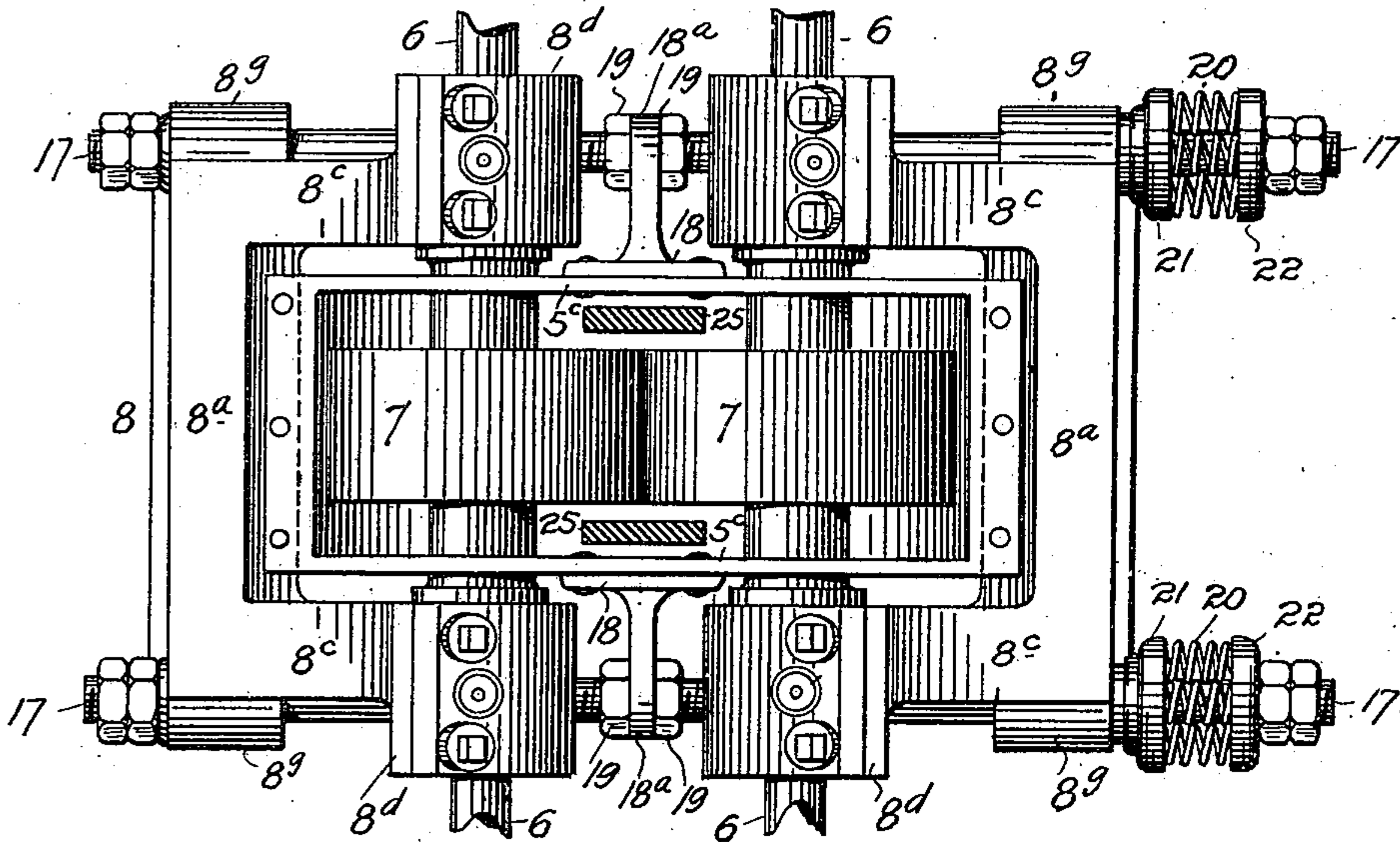


FIG. 3.

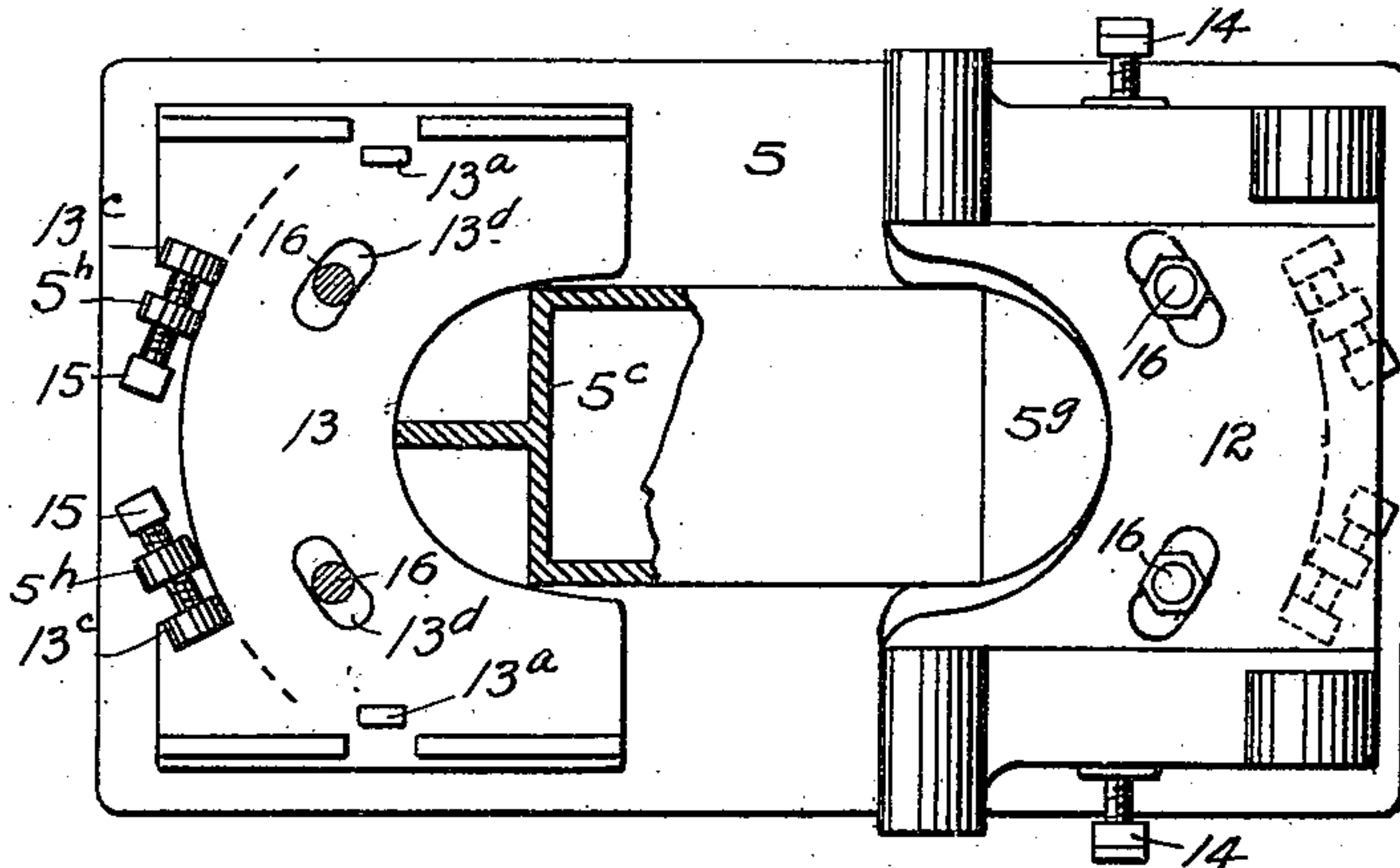


FIG. 4.

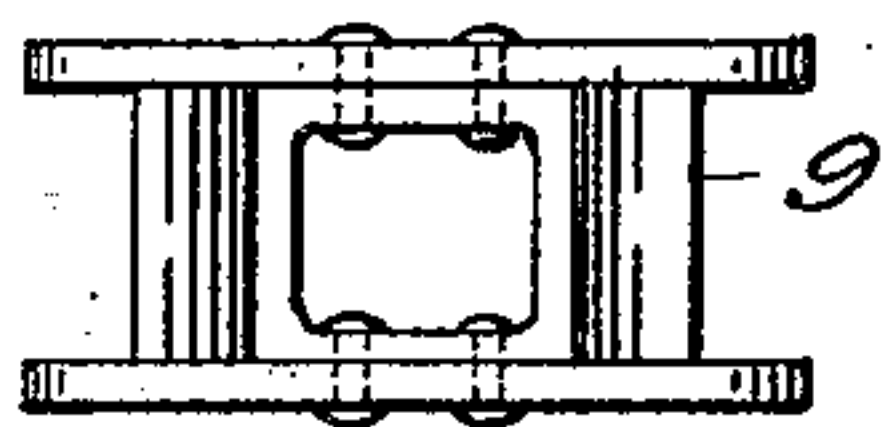


FIG. 5.

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4 Sheets—Sheet 3.

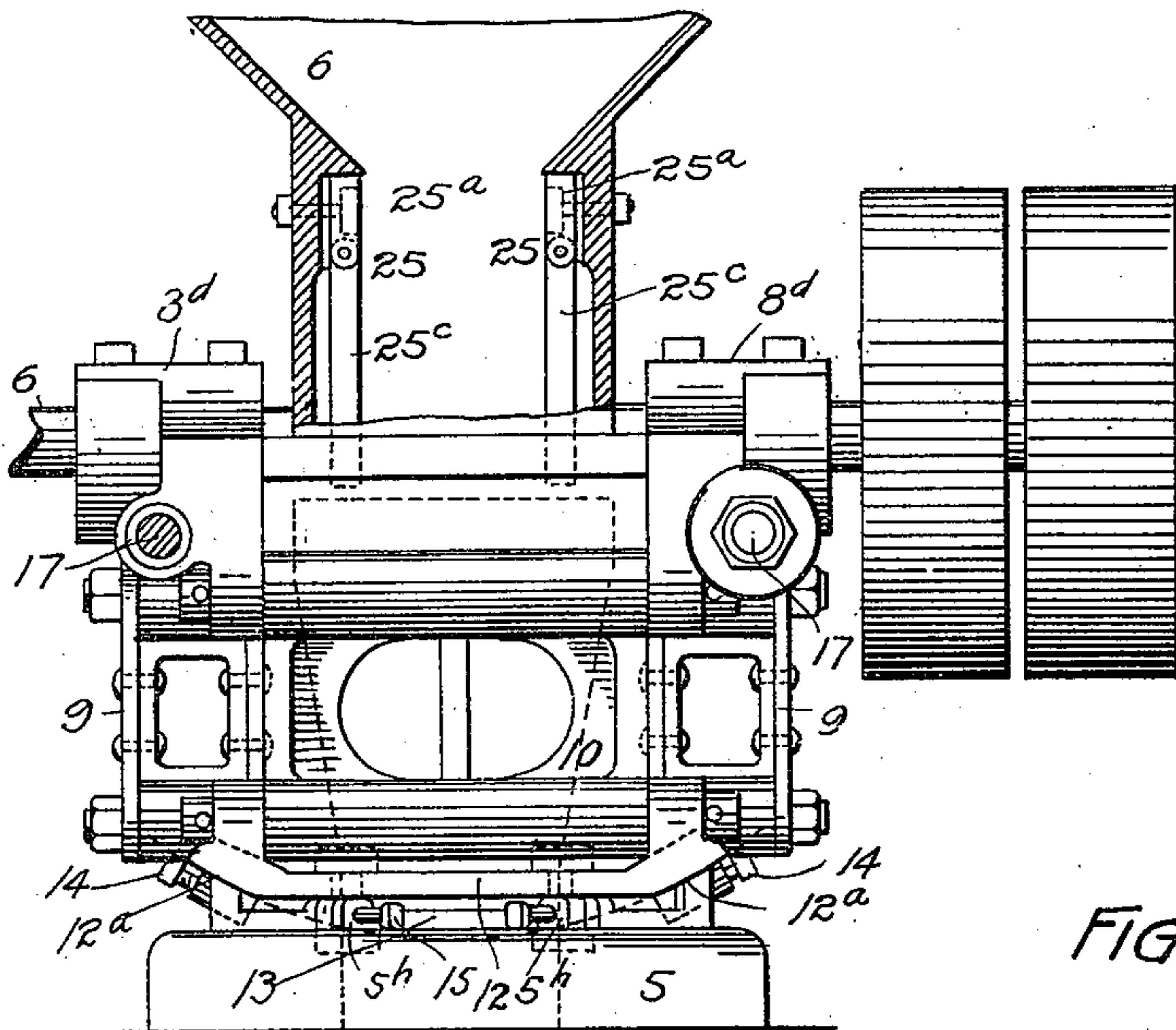


FIG. 6.

FIG. 8.

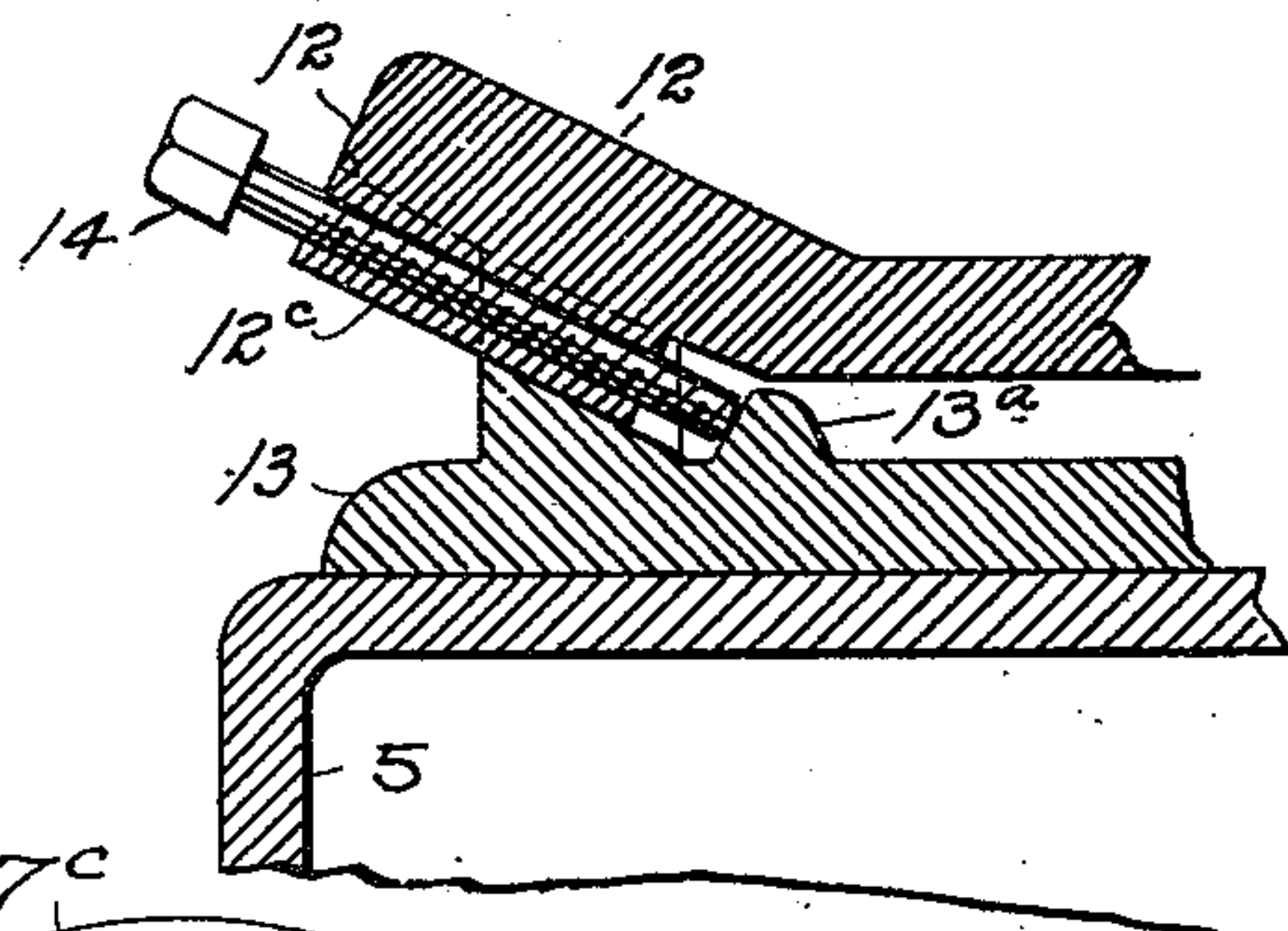
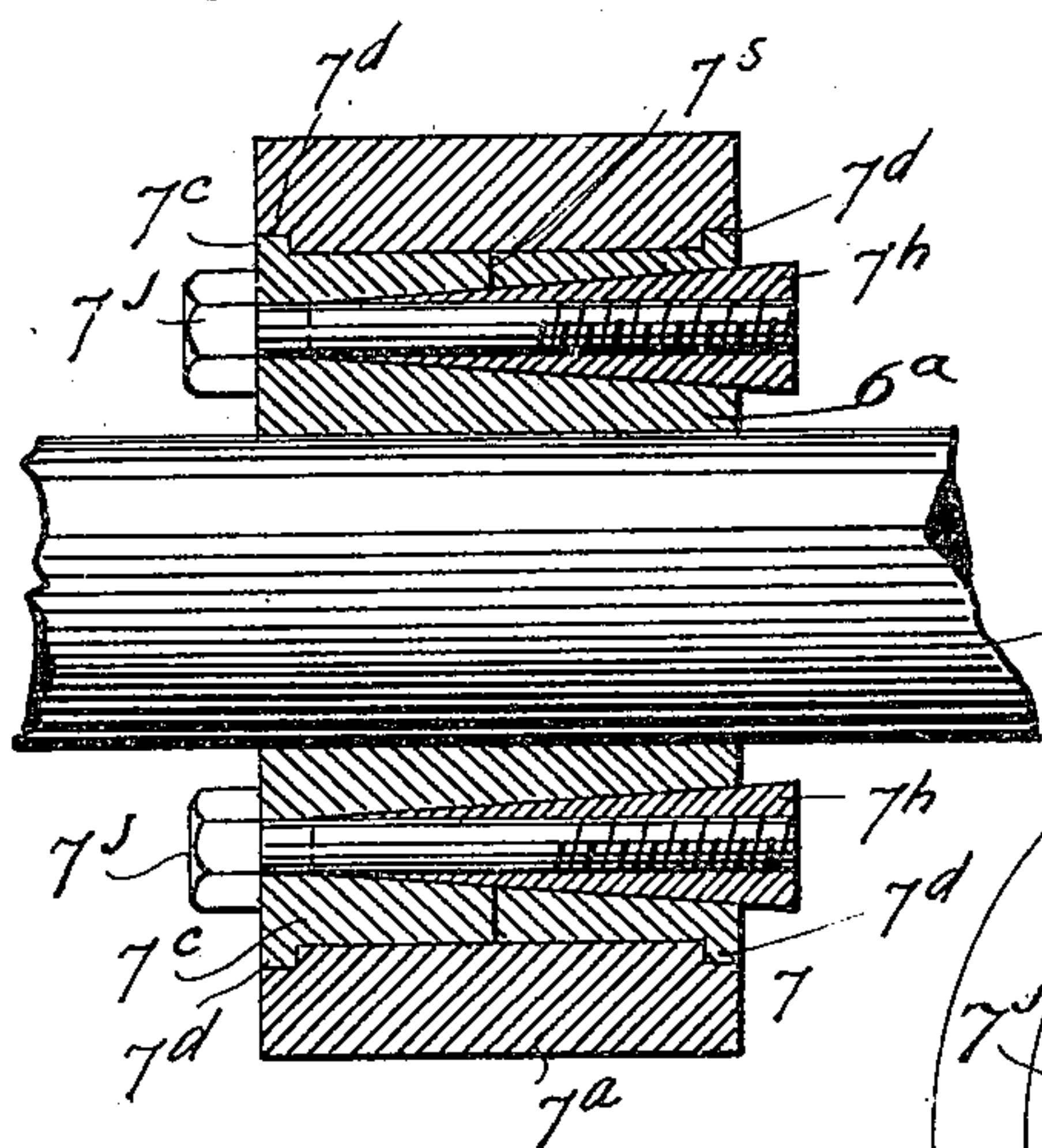
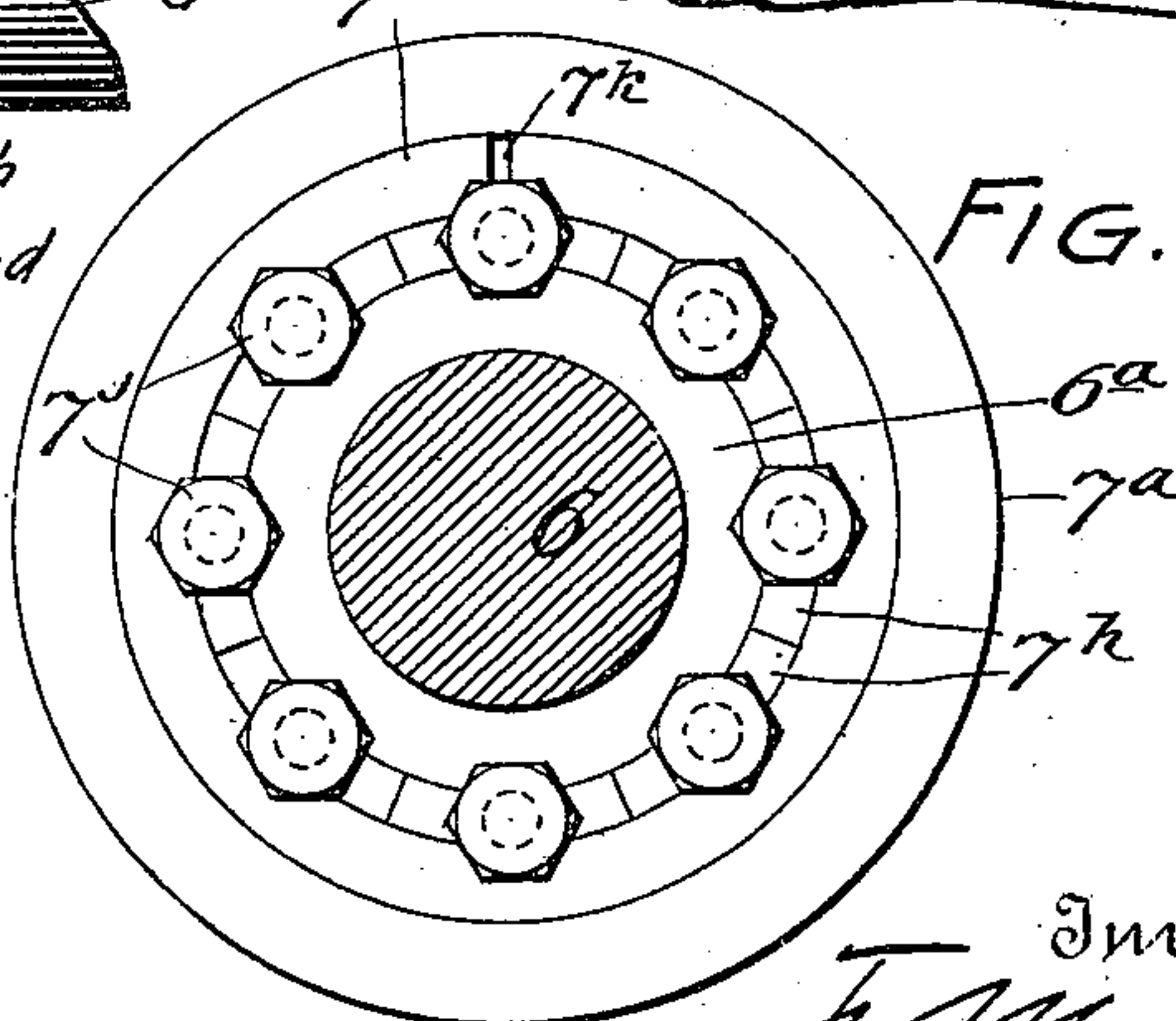


FIG. 7.

FIG. 11.



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4 Sheets—Sheet 4.

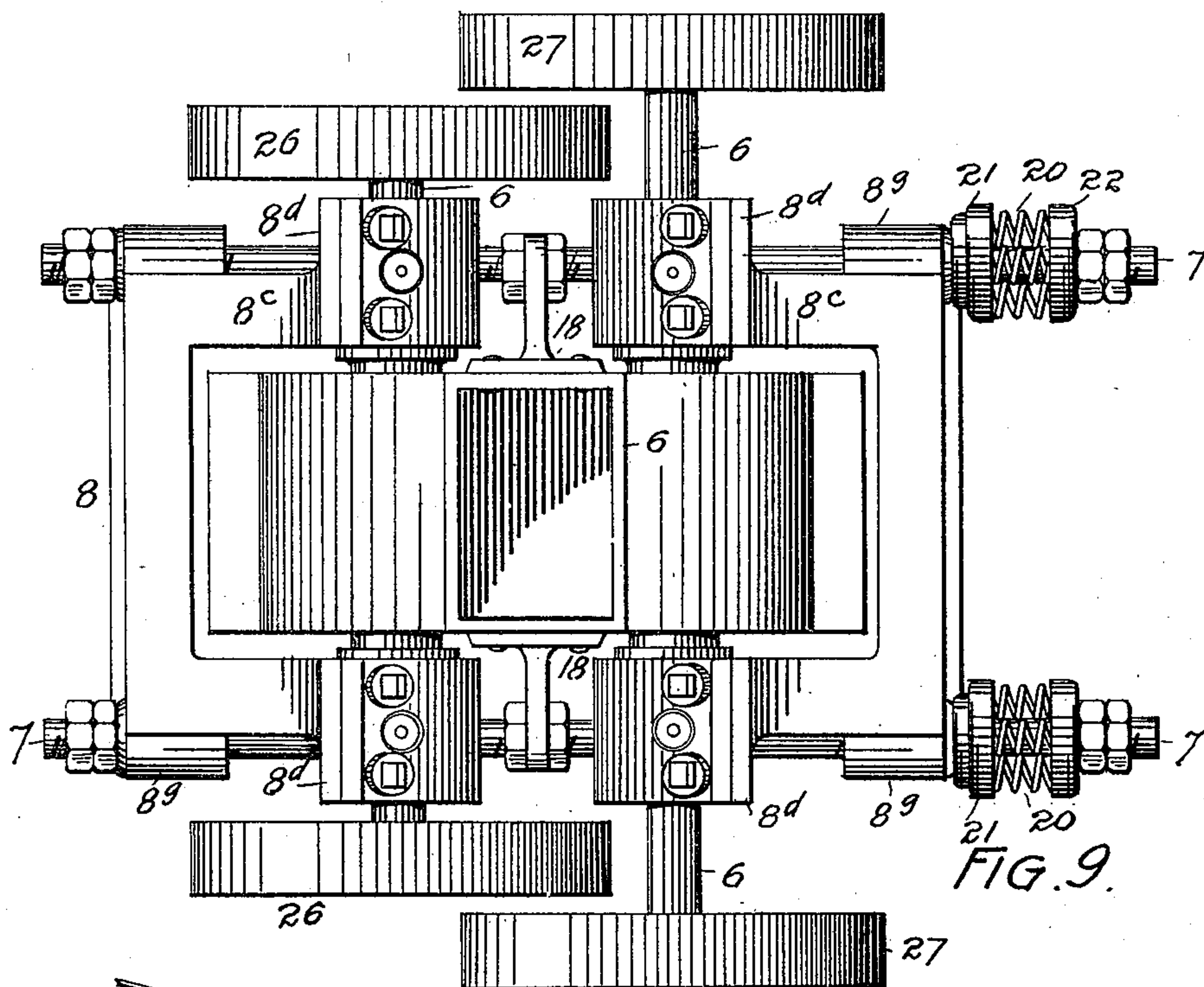


FIG. 9.

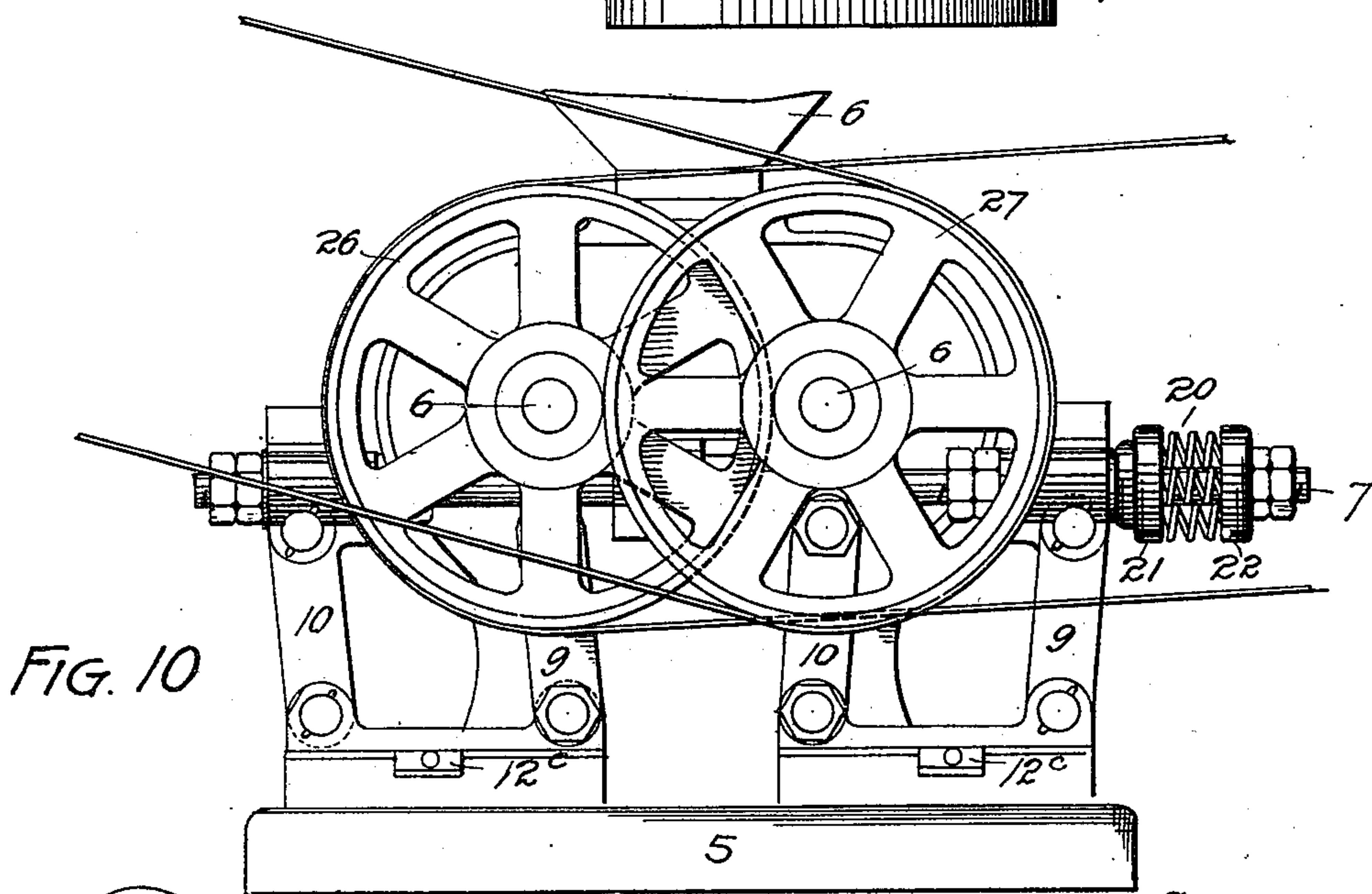


FIG. 10

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UNITED STATES PATENT OFFICE.

FRANKLIN M. ILER, OF DENVER, COLORADO.

CRUSHING-ROLLS.

SPECIFICATION forming part of Letters Patent No. 667,777, dated February 12, 1901.

Application filed December 17, 1898. Serial No. 699,534. (No model.)

To all whom it may concern:

Be it known that I, FRANKLIN M. ILER, a citizen of the United States of America, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Crushing-Rolls; and I 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 figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in crushing-rolls, my object being to overcome certain difficulties incident to the use of rolls as heretofore constructed; and to this end my invention consists of the features, arrangements, and combinations hereinafter described and claimed, all of which will be fully understood by reference to the accompanying drawings, in which is illustrated an embodiment thereof.

In the drawings, Figure 1 is a side elevation of my improved apparatus. Fig. 2 is a vertical longitudinal section taken through the same. Fig. 3 is a plan view of the mechanism. Fig. 4 is a detail view of the bed or base plate and the adjustable plates mounted thereon. At the right of this figure both adjustable plates are in position, while at the left the upper plate is removed. Fig. 5 is a detail view of one of the links employed for supporting the movable pillow-block. Fig. 6 is an end elevation of the apparatus, the hopper being shown in section to illustrate the cheek-plates. Fig. 7 is a fragmentary section taken through the bed and the adjustable plates mounted thereon. Fig. 8 is a longitudinal section taken through one of the rolls. Fig. 9 is a plan view of the apparatus, showing a novel arrangement of pulleys. Fig. 10 is a side view of the same, showing the belt arrangement.

Similar reference characters indicating corresponding parts in the views, let the numeral 5 designate the stationary bed, having a central opening 5^a and an upright housing 5^c surrounding this opening and formed integral with the bed. Upon the housing 5^c is mounted a detachable cap 5^d, secured by bolts passed

through flanges formed on the engaging parts. To this cap is attached the hopper 6.

The shafts 6 of the rolls 7 are journaled in pillow-blocks 8, which are yoke-shaped, each being composed of a transverse part 8^a and two arms 8^c, located on opposite sides of the housing and containing half-bearings 8^d, in which the shaft-journals are seated. To these half-bearings are applied the detachable parts of the journal-box. Hence both journals of each roll-shaft are journaled in an integral pillow-block. Each pillow-block is mounted on two side links 9, located on opposite sides of the housing, and an end link-plate 10, supporting the outer extremity of the pillow-block. The lower extremities of these links are supported by an adjustable plate 12, located at each end of the bed-plate, and its sides are curved on their inner surfaces, as shown at 12^a, and rest upon correspondingly-curved faces formed on an adjustable plate 13. The curve of the bearing-faces of the plates 12 and 13 lies in the arc of a circle whose center is the center of the adjacent roll. The plate 12 is adjustable for the purpose of regulating the position of the roll by means of set-bolts 14, which engage threaded openings formed in the plate 12, while their inner extremities bear against lugs 13^a, formed on the plate 13 underneath. Where the bolt-holes are formed, the plate 12 is reinforced by tongs 12^c, engaging counterpart grooves formed in the plate 13, thus preventing displacement of the upper plate. By means of this adjustment the axis of the roll and its shaft may be made to occupy a horizontal plane after the roll has become tilted by means of the unequal wear of the bushing in the journal-boxes without the delay of repairing these boxes. Also by means of this adjustment the axes of the rolls are kept in the same plane, which is necessary in order that the rolls may perfectly perform their function. It must be understood that each pillow-block 8 is mounted on an adjustable plate 12.

Mounted on the stationary bed and forming a support for each adjustable plate 12 is the adjustable plate 13, whose inner central portion is formed with a curved recess engaging a correspondingly-curved bearing 5^e, formed on the bed 5. The curve of this bear-

ing lies in the arc of a circle whose center is located directly below the center of the adjacent roll. This plate 13 is arranged to move horizontally or in the plane of the bed on this bearing for the purpose of maintaining the parallelism of the roll-axes when for any reason this has been destroyed, as by the unequal wear of the bushing in the roll-shaft journal-boxes. This movement or adjustment of the plate of course moves the entire superstructure—that is to say, the plate 12, the links 9 and 10, the pillow-block 8, and the roll mounted thereon. This adjustment is effected by means of set-bolts 15, threaded in lugs 5^h, fast on the base-plate and bearing against lugs 13^c, formed on the plate 13.

The plates 13 are connected with the base-plate by means of bolts 16, which pass through curved slots 13^d, formed in the plates 13. These bolts 16 also pass through elongated curved openings formed in the plate 12, the openings being large enough to permit the plate 12 to move freely in the performance of the function heretofore stated.

The tension of the rolls is maintained by means of rods 17, one being located on each side of the machine. Each of these rolls passes through a lug 18^a, formed integral with a bracket 18, attached to the housing 5^c. The rod is locked against movement in the lug by means of lock-nuts 19, screwed on the rod and engaging the lug on opposite sides. These rods also pass through guide-sleeves 8^e, formed on the pillow-block. The openings in these sleeves are considerably larger than the rods to permit the adjustment of the pillow-blocks and their connections, as heretofore explained. This is required for the reason that the lugs 18^a are fast on the stationary housing of the bed-plate and therefore cannot move with the pillow-block.

The springs 20 are located between washers 21 and 22, mounted on the rod. One of these washers bears against the pillow-block, while the other engages a nut secured on the rod.

Upon each roll-shaft 6 is formed a cone-shaped hub 6^a. (See Fig. 8.) Surrounding this hub and interposed between it and the shell or tire 7^a is an expansible two-part member 7^c, whose inner surface is cone-shaped, while its outer surface is cylindrical and provided with shoulders 7^d, which engage counterpart shoulders formed on the shell 7. Between the member 7^c and the hub 6^a of the shaft is located a series of wedge-shaped segments 7^h, whose inner and outer surfaces are inclined and curved to conform to the conical surface of the member 7^c and the hub 6^a, which they engage. Each segment 7^h is bored and threaded to receive an adjusting-bolt 7^j. By turning these bolts the member 7^c is expanded by opening a slit 7^k, formed therein on a line parallel with the axis of the roll. This expansion of the member 7^c will tighten the shell of the roll when for any reason this shell has become loose. The member 7^c is circumferentially divided, as shown at 7^a, and

the two parts are placed in position from opposite sides. The shoulders 7^d prevent the displacement of the shell or tire.

To the inside of the hopper are attached two cheek-plates 25, each consisting of two members 25^a and 25^c. The part 25^a is bolted to the sides of the hopper and the part 25^c is hinged to the part 25^a and normally hangs in a vertical position, engaging the ends of the rolls and guiding the material to the proper point between the rolls. These cheek-plate members 25^c are, however, adapted to swing outwardly to avoid breakage of the parts when anything is fed to the rolls which requires such movement. It sometimes happens that a piece of metal, as a tool, accidentally finds its way to the rolls and without an automatic adjusting device of this character would result in the breakage of the parts. The function of the hinge cheek-plates is to allow the metal part or device to escape without interfering with the normal working function of the rolls.

The pulleys on the two roll-shafts are arranged out of line with each other—that is to say, the two pulleys 26 on the one shaft are located in different vertical planes from the two pulleys 27 on the other shaft—and this difference in position is sufficient to allow the belts which operate the pulleys to pass each other going in opposite directions. The arrangement of the belts is such that they are connected with line-shafts oppositely located and the tendency of the bolts is to draw the rolls together or toward each other—that is to say, the belts connected with each line-shaft lead to the pulleys of the farther or more remote roll.

Having thus described my invention, what I claim is—

1. The combination with a stationary bed or frame, of the rolls and superstructure upon which the rolls are mounted, the two independently-adjustable plates forming the support for the superstructure the lower plate resting on the bed and being adjustable in the arc of a circle whose center is located directly beneath the center of the roll, the upper plate resting on the lower plate and being adjustable in an arc whose center is the center of the roll.

2. The combination with a bed-plate, of rolls, pillow-blocks in which the rolls are journaled, supporting-links pivotally connected at their upper extremities with the pillow-blocks, a plate with which the said links are connected at their lower extremities, the said plate having a portion of its under surface curved to conform to the arc of a circle struck from the center of the roll, a suitable support for the plate upon which correspondingly-curved faces are formed and suitable means for adjusting the plate, comprising set-bolts threaded in the plate and stationary stops against which the inner extremities of the bolts bear.

3. The combination with a stationary bed

or frame, the rolls, pillow-blocks in which the rolls are journaled, supporting-links pivotally connected with the pillow-blocks, a plate with which the lower extremities of the links
5 are pivotally connected, said plate being supported on the bed and adjustable in the arc of a circle whose center is located directly beneath the center of the roll, and means for adjusting said plate comprising set-bolts

threaded in lugs formed on the stationary base and whose inner extremities engage stops on the plate.

In testimony whereof I affix my signature in presence of two witnesses.

FRANKLIN M. ILER.

Witnesses:

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