

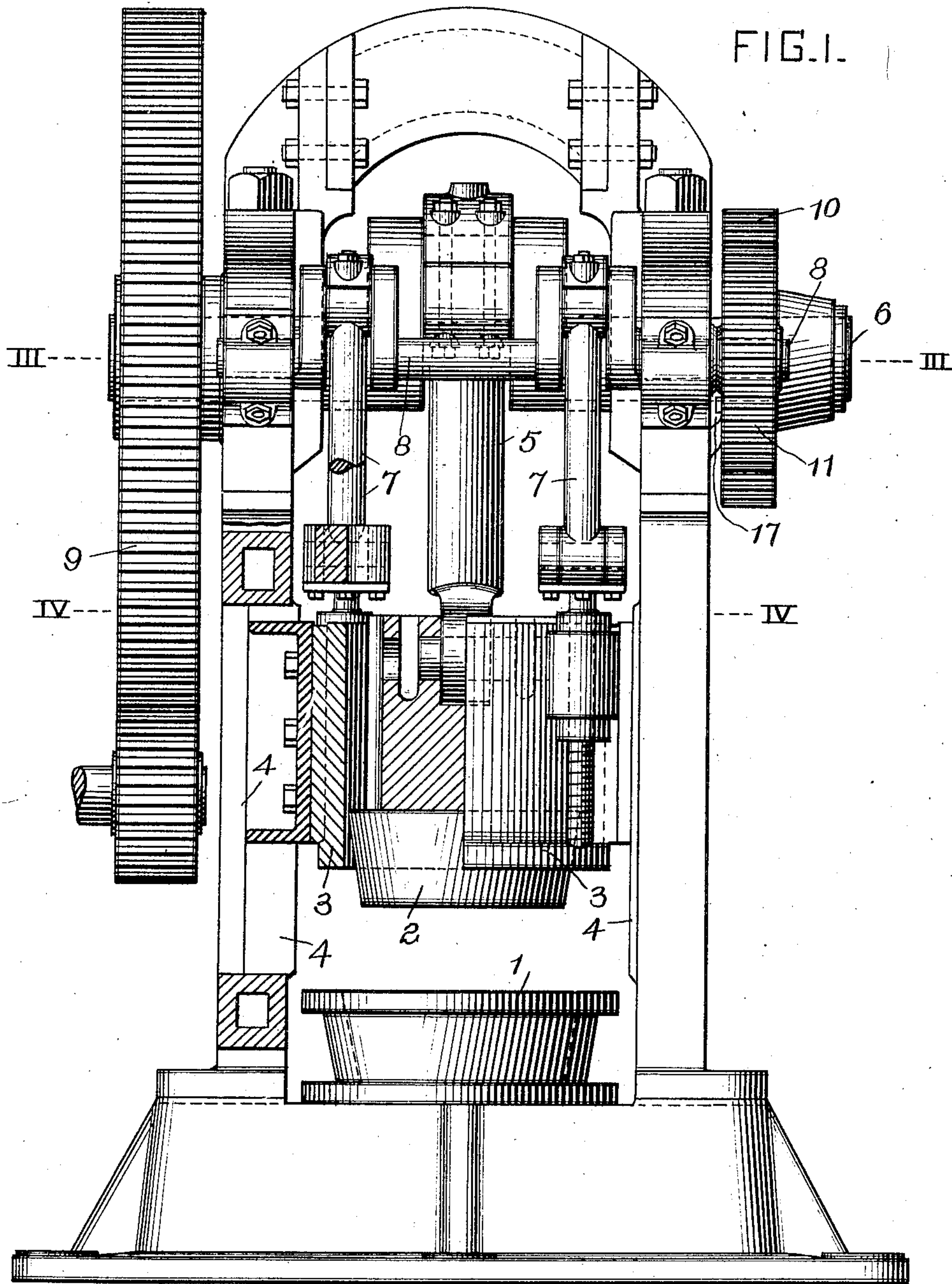
No. 789,883.

PATENTED MAY 16, 1905.

A. E. SAWERS.
PRESS.

APPLICATION FILED AUG. 29, 1904.

5 SHEETS—SHEET 1.



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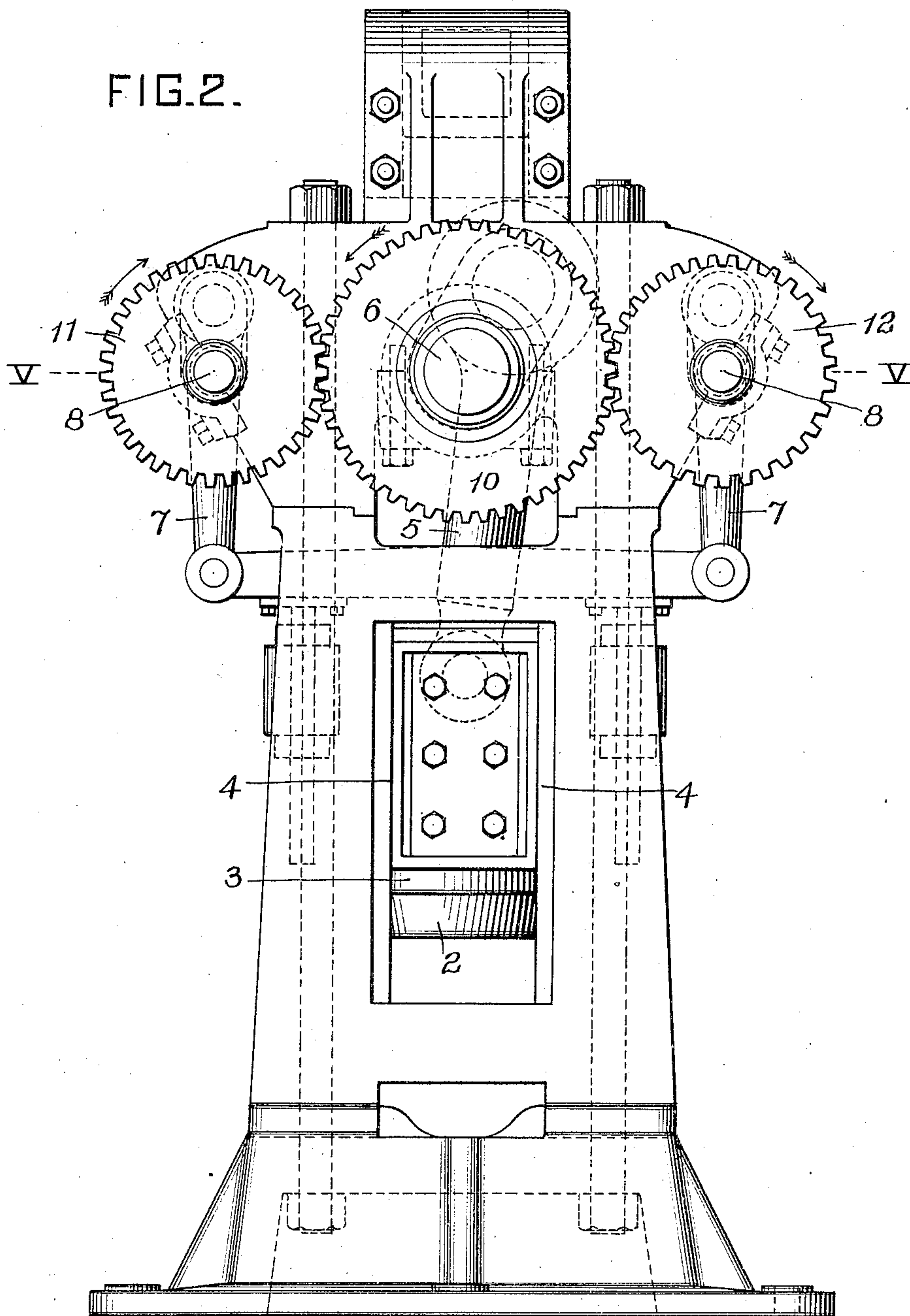
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6 SHEETS—SHEET 2.

FIG. 2.



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6 SHEETS—SHEET 3.

FIG. 3.

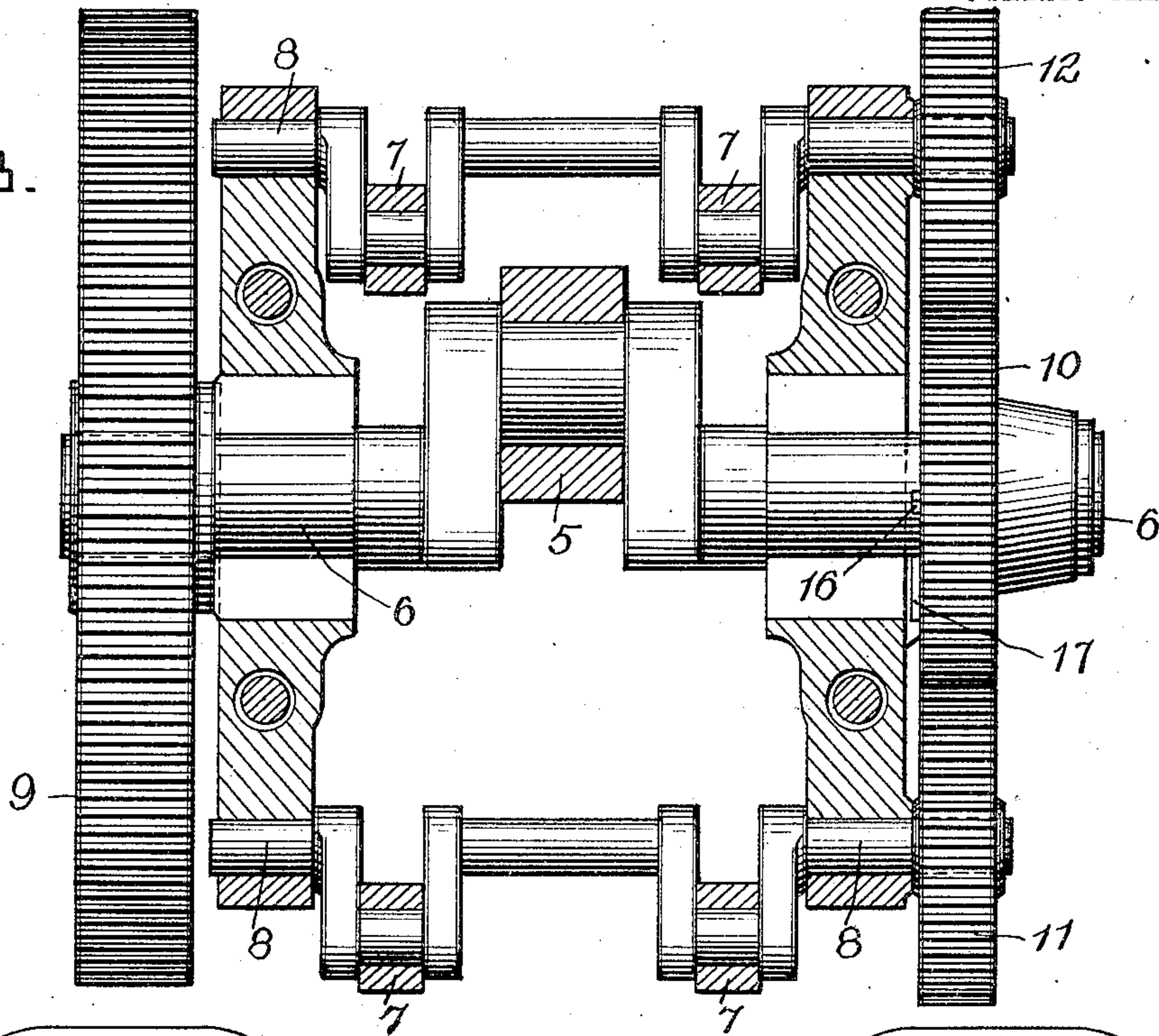
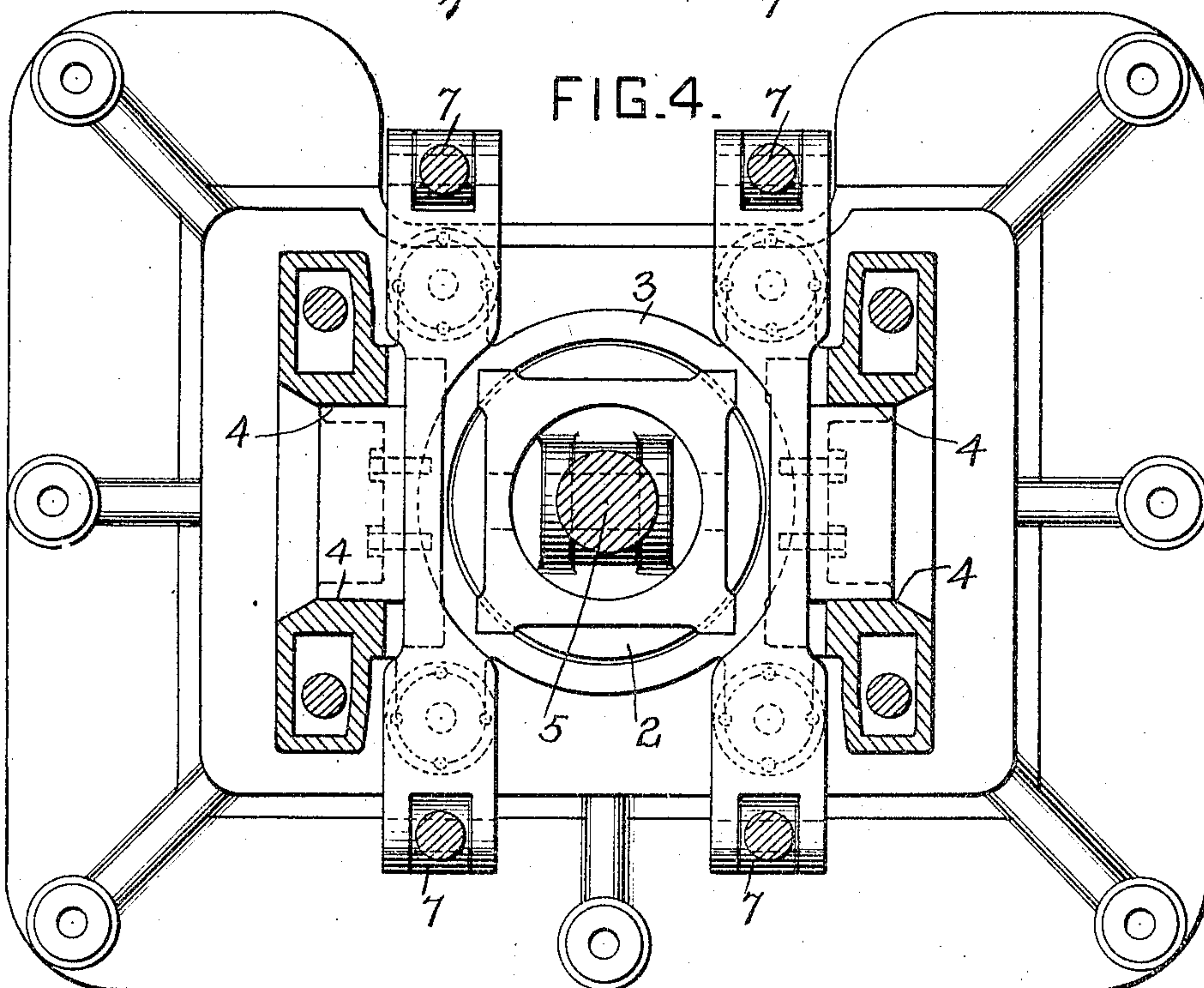


FIG. 4.



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5 SHEETS—SHEET 4.

FIG. 6.

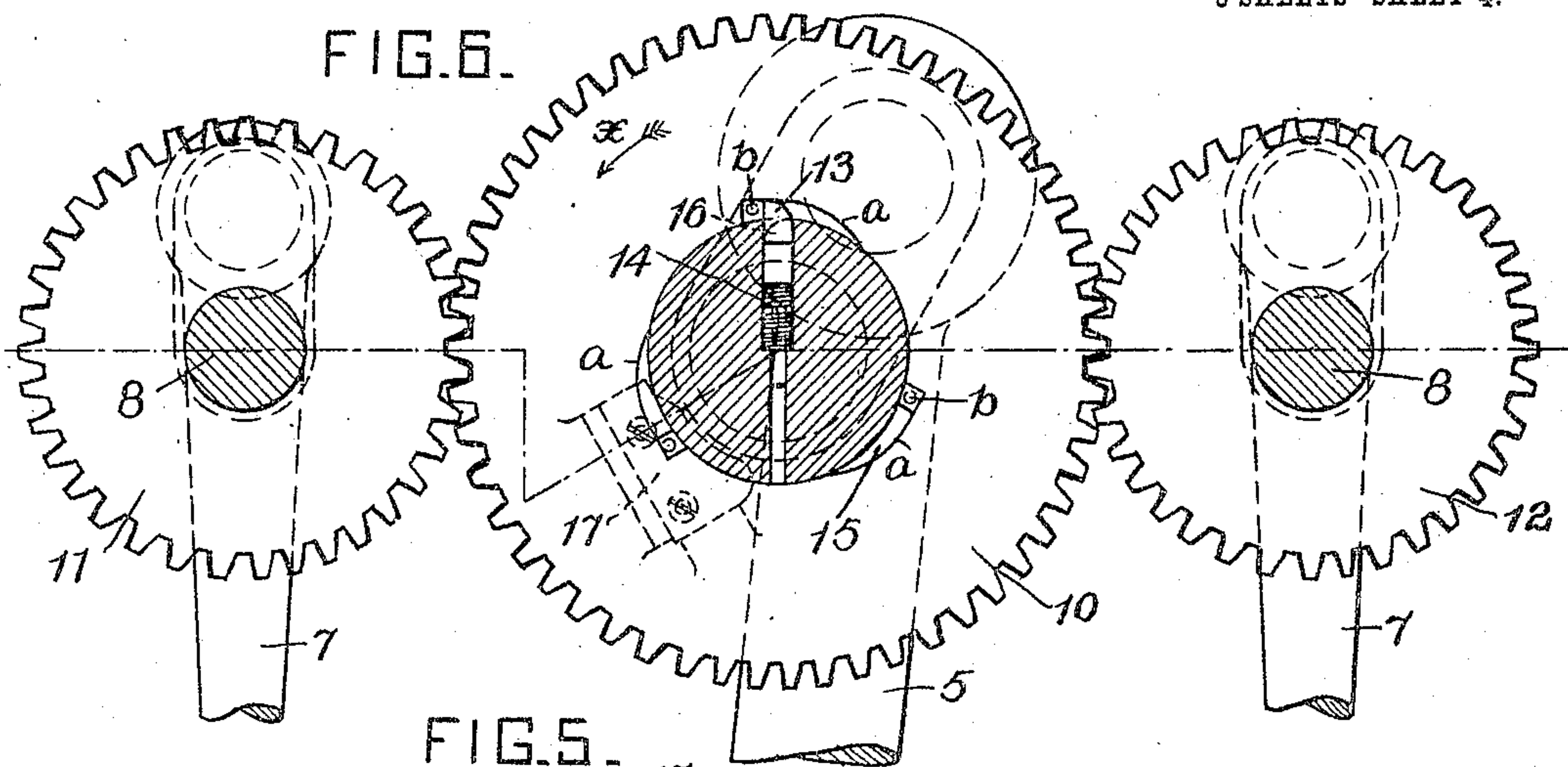


FIG. 5.

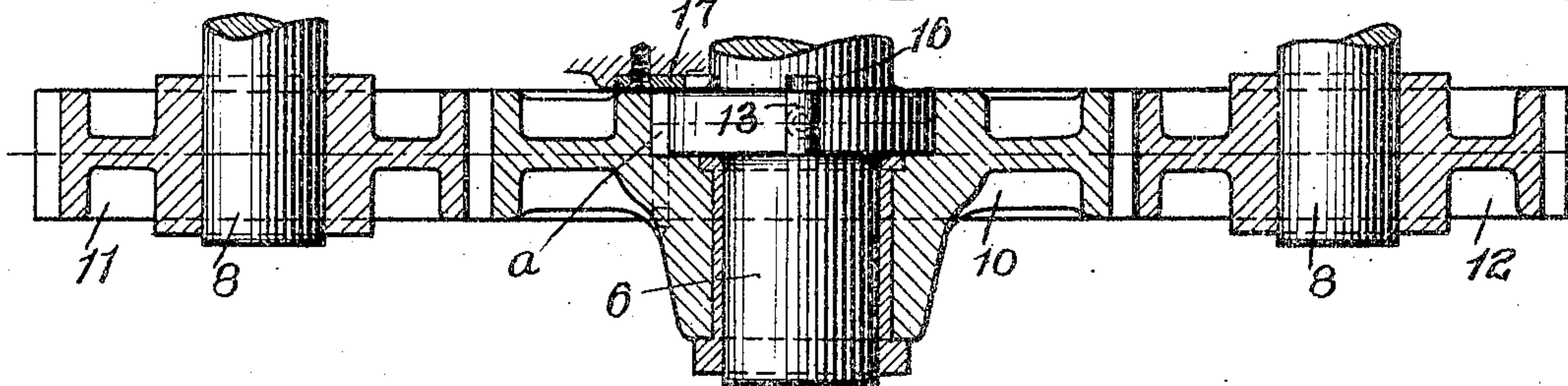


FIG. 7.

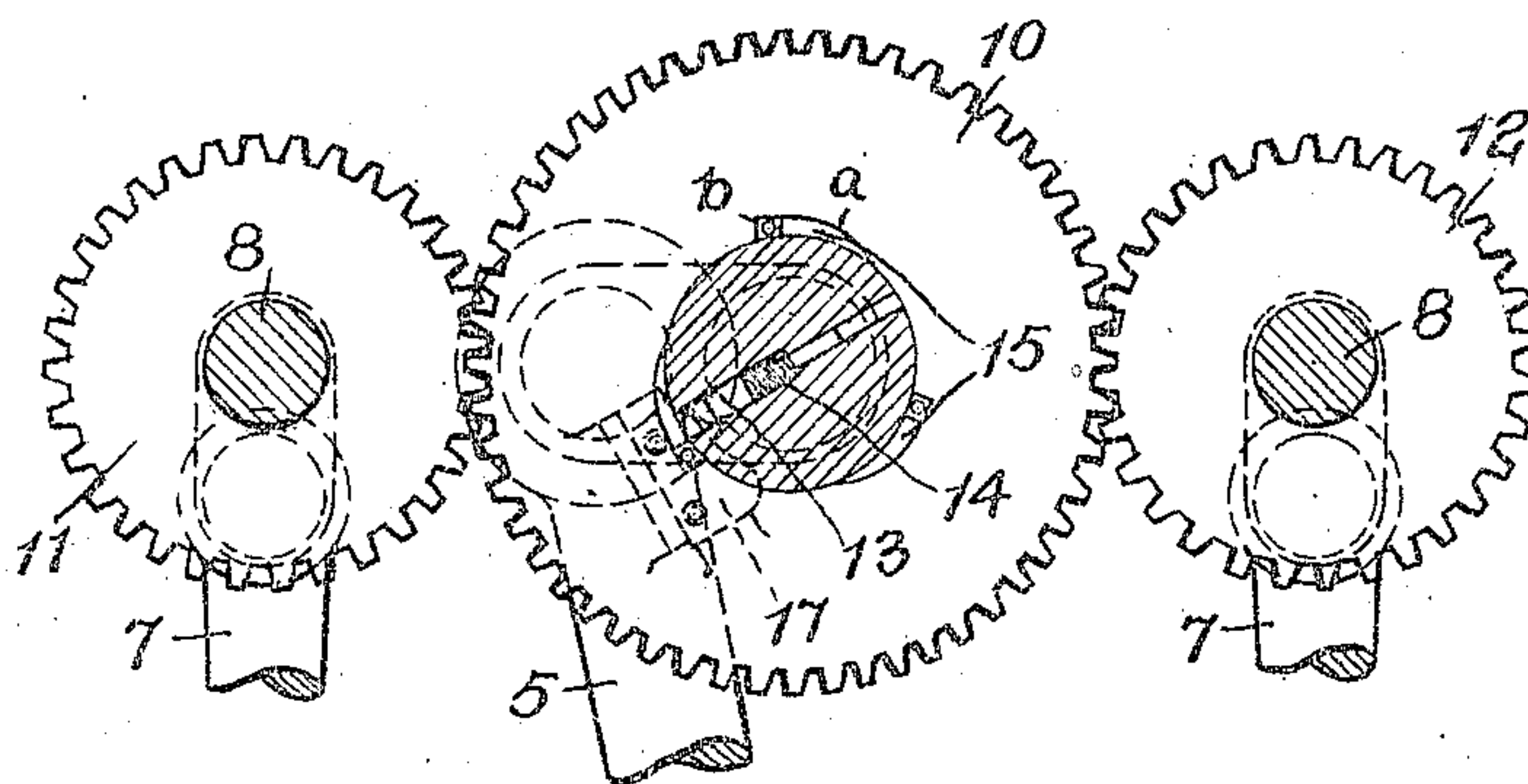
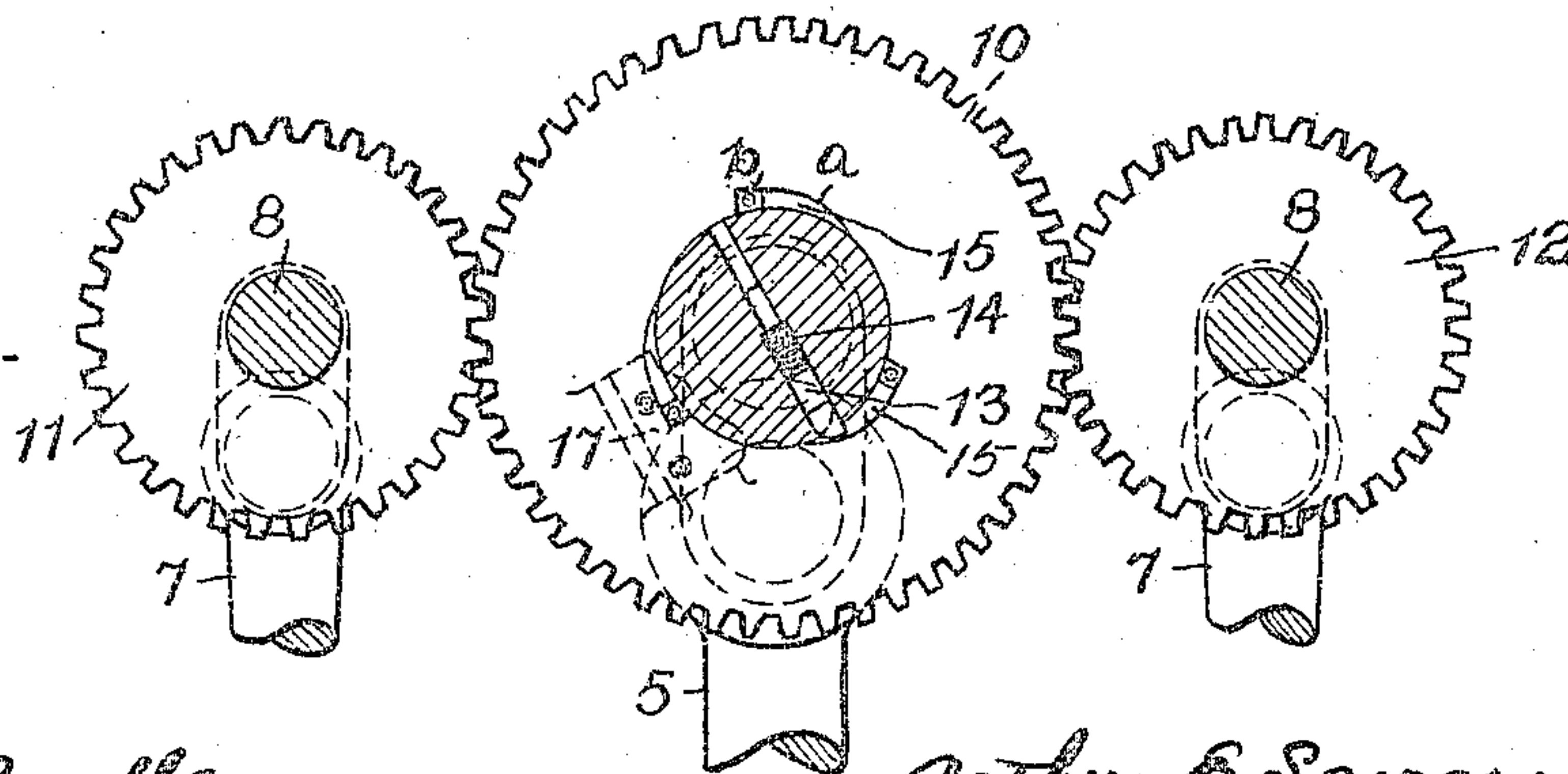


FIG. 8.



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5 SHEETS—SHEET 5.

FIG. 9.

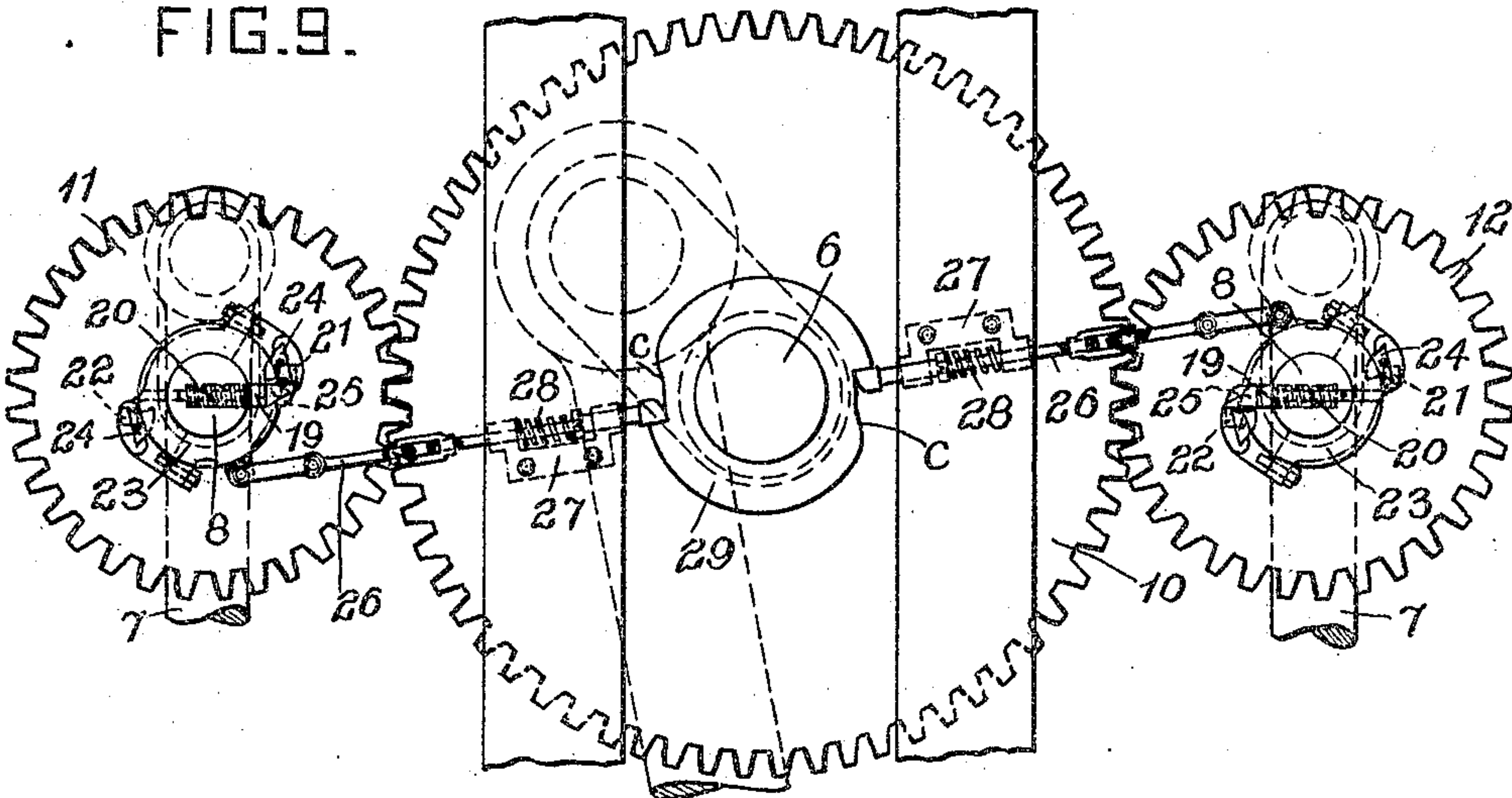


FIG. 10.

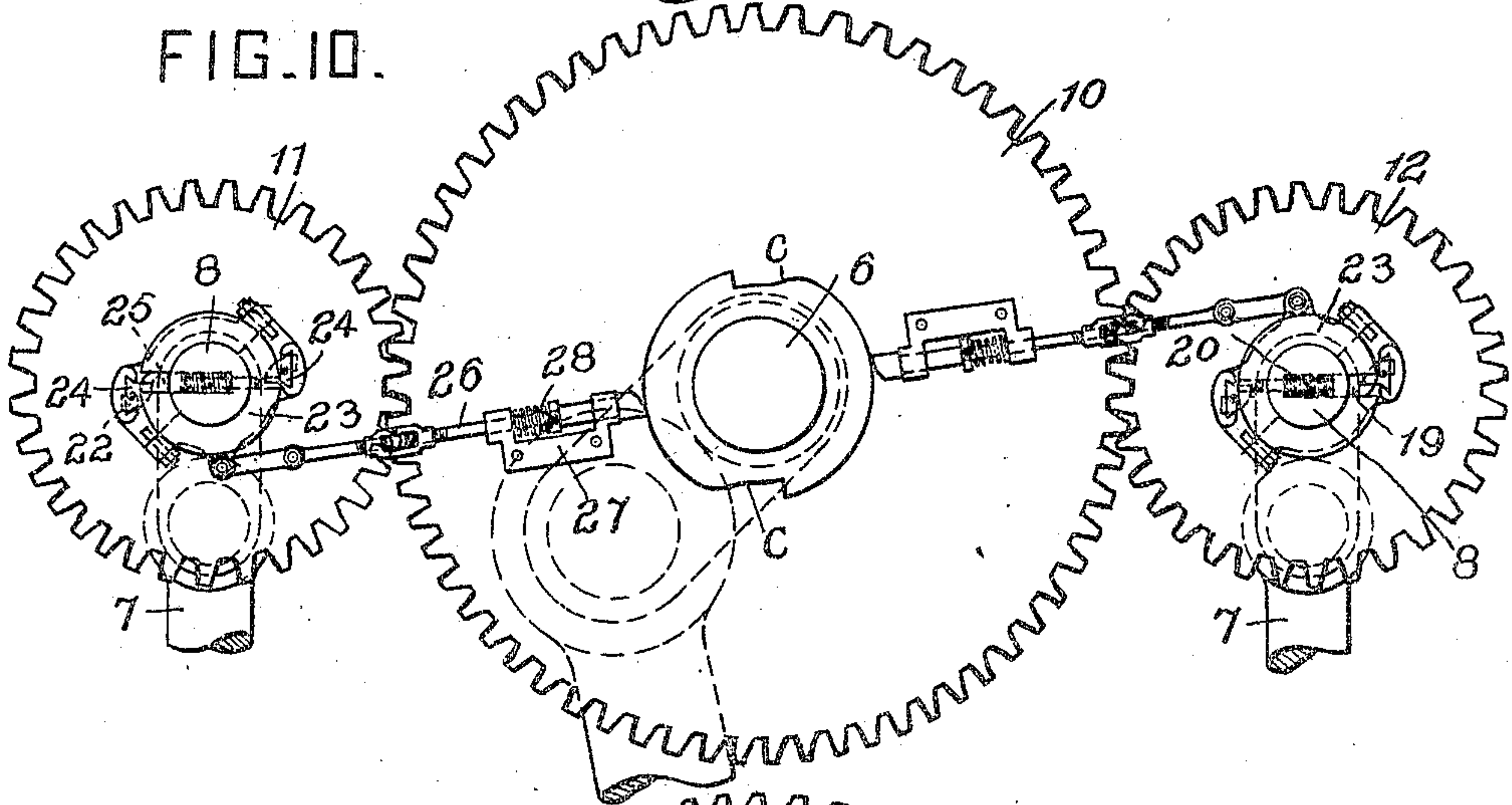
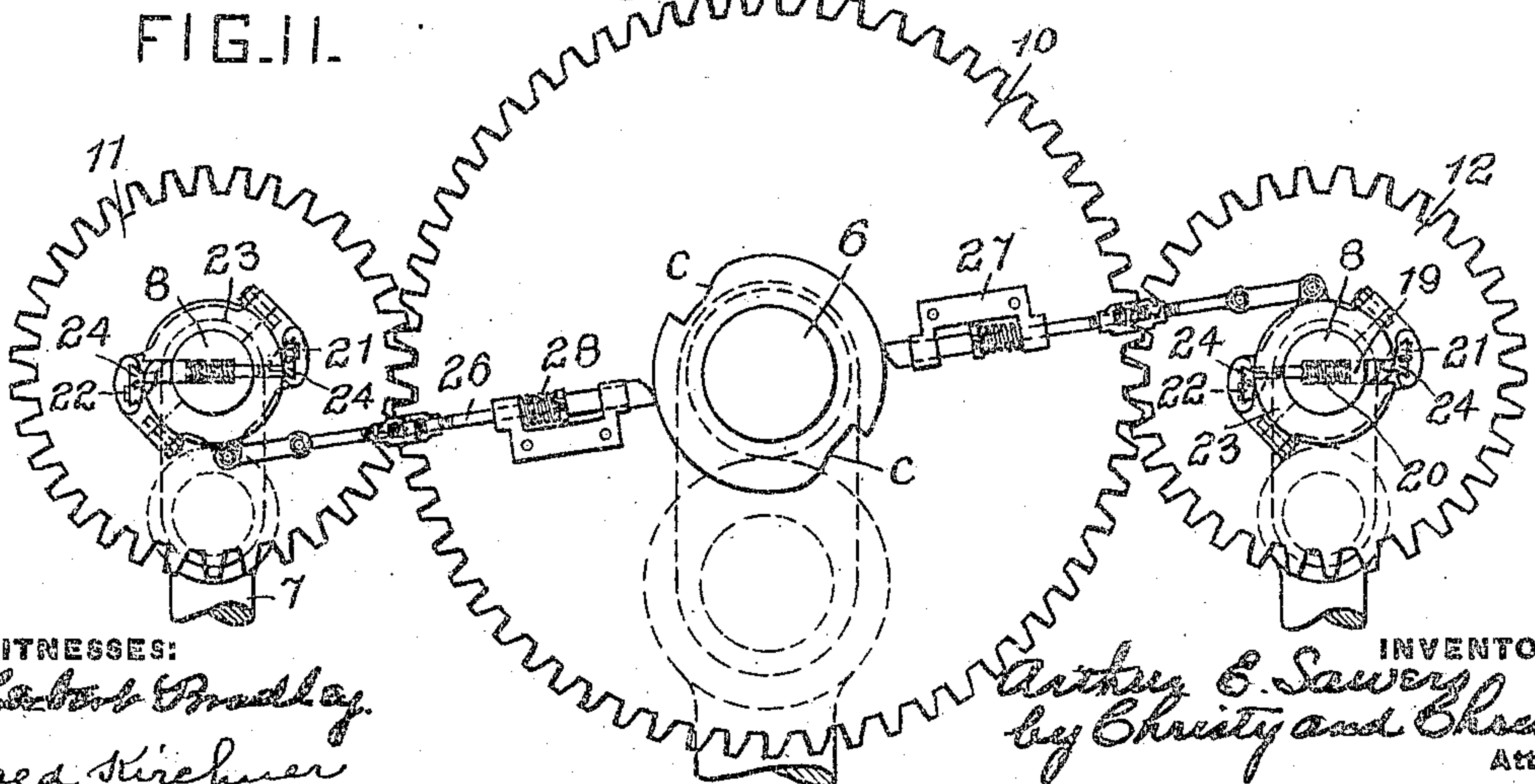


FIG. 11.



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PRESS.

SPECIFICATION forming part of Letters Patent No. 789,883, dated May 16, 1905.

Application filed August 29, 1904. Serial No. 222,594.

To all whom it may concern:

Be it known that I, ARTHUR E. SAWERS, a citizen of Great Britain, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented or discovered certain new and useful Improvements in Presses, of which improvement the following is a specification.

The invention described herein relates to certain improvements in presses wherein it is necessary or desirable that a portion of the material to be shaped, such as sheet metal, shall be gripped or held from movement while other portions are operated on to bring them to the desired shape.

The invention is especially applicable to machines for stamping sheet-metal vessels, such operation requiring the gripping of the periphery or other portion of the blank, while the shaping-plunger operates upon the ungripped portion or portions.

The invention has for its object a construction and combination of elements whereby the movable gripping member is operated by or from the main shaft which operates the shaping-plunger, prior to the operative movement of the shaping-plunger, is held stationary during the completion of the shaping stroke of the main plunger and released subsequent to or during the upper movement of the shaping-plunger.

The invention is hereinafter more fully described and claimed.

In the accompanying drawings, forming a part of this specification, Figure 1 is a view, partly in section and partly in elevation, of the sheet-metal press having my improvements applied thereto. Fig. 2 is a side elevation of the same. Fig. 3 is a sectional view of the plane indicated by the line III III, Fig. 1. Fig. 4 is a similar view on a plane indicated by the line IV IV, Fig. 1. Fig. 5 is a sectional view on a plane indicated by line V V, Fig. 2. Figs. 6, 7, and 8 are diagrammatic views illustrative of the operation of the mechanism for shifting the shaping or gripping plungers. Fig. 9 is a view similar to Fig. 6, illustrating a modification of my improvement. Figs. 10 and 11 are similar views showing the parts in different positions.

In the practice of my invention the press is provided, as is customary, with a female die 1, supported on a suitable bed or foundation, a male or shaping die 2, and a vertical gripping-die 3, which is arranged to move vertically in guides 4 on the frame of the machine. The main shaping-die 2 is guided by and operates within the gripping-die 3. The main die is connected by a pitman 5 to a crank-pin or eccentric on the main shaft 6. The gripping-die 3 is connected by pitmen 7, two or four in number, preferably the latter, to cranks or eccentrics on the secondary shafts 8. On the main shaft is secured a driving gear-wheel 9, connected directly or through suitable clutch mechanism to suitable power mechanism whereby the shaft may be driven continuously or under the control of the operator. The gear-wheel 10 is loosely mounted upon the main shaft 6, but is adapted to be connected thereto by a clutch mechanism of any suitable form of construction whereby the gear-wheel 10 may be connected and disconnected alternately with the shaft, as hereinafter described. This gear-wheel 10 intermeshes with the gear-wheels 11 and 12, keyed to the secondary shafts 8. The clutch mechanism should be so constructed that starting from normal positions of the crank-pins or eccentrics on the several shafts, such normal positions being indicated by dotted lines in Fig. 6—*i. e.*, with the crank-pins or eccentric on shafts 8 in a vertical plane passing through the axes of the shaft and above the same and with the crank-pin or highest point of eccentric on the main shaft to one side of the vertical plane passing through the axes of the shaft—the gear-wheel 10 will be locked to the main shaft. At the beginning of the movement of the main shaft from normal position the gear-wheel 10 will be locked to the main shaft, so as to rotate therewith and also to rotate the gear-wheels 11 and 12. When a dwell of the gripping-die equal to one-third of the time of the revolution of the main shaft is desired, the gear-wheels 10, 11, and 12 will be so proportioned that while the gear-wheel 10 is passing through an arc of one hundred and twenty degrees the gear-wheels 11 and 12 will pass through an arc of one hundred and eighty de-

grees, thereby bringing the crank-pins or the highest points of the eccentrics on secondary shafts below the secondary shafts and with their axes in vertical planes passing through
 5 axes of the secondary shafts or upon dead-centers. When the several crank-pins on the secondary shafts reach the position shown on dotted lines on Fig. 7, the clutch mechanism is released, so that thereafter the main shaft
 10 will rotate through an arc of one hundred and twenty degrees without rotating the secondary shafts, and during this movement the shaping of the article is effected. After the main crank-pin has completed the movement
 15 through this second arc of one hundred and twenty degrees the clutch mechanism is again so shifted as to lock the gear-wheel 10 to the main shaft, so that during the movement of the main crank-pin through the third arc of
 20 one hundred and twenty degrees the secondary shafts will be rotated through arcs of one hundred and eighty degrees and several crank-pins will be brought back to the initial point. A convenient construction of clutch mechanism
 25 for this purpose consists of a pin 13, arranged in a radial slot in the main shaft and adapted to be normally pressed forward by a spring 14. The inner periphery of the gear-wheel 10 is provided with recesses 15, having
 30 inclined faces *a* and a vertical wall or abutment *b* at the ends. As the shaft 6 rotates in the direction of the arrow *x* from initial position, the gear-wheels will be caused to rotate with it, the pin 13 being in engagement
 35 with the vertical wall of one of the recesses 15. As the shaft and gear-wheel approach the end of the first arc of one hundred and twenty degrees a projection 16 on the side of the pin 14 strikes against a cam-plate 17, secured to the frame of the machine, and forces
 40 the pin backward out of the recess 15 as the shaft and gear-wheel complete this movement through the first arc of one hundred and twenty degrees. By this movement of the
 45 pin the gear-wheel is released from the shaft, so that during the movement of the latter through the next arc of one hundred and twenty degrees no movement of the gear-wheel or the auxiliary shafts will take place.
 50 As the shaft approaches the completion of its movement through the second arc of one hundred and twenty degrees the pin will move out into the second recess 15 and on the completion of this second movement of the shaft
 55 strike against the vertical wall or abutment *b* in such recess. Thereafter the gear-wheel 10 will continue to rotate with the shaft through an arc of two hundred and forty degrees, when it will again be released by the cam-plate 17,
 60 and during this movement the secondary shafts will make a complete revolution.

In the construction shown in Figs. 9, 10, and 11 provision is made for a dwell of the gripping-dies during a rotation of the crank-
 65 pin on the main shaft through an arc of one

hundred and eighty degrees, and the gear-wheels 10, 11, and 12 are so proportioned that the gear-wheels 11 and 12 will make two revolutions to one revolution of the gear-wheel 10. A desirable construction for effecting the re-
 70 lease of the secondary shafts from driving connection with the main shaft at the desired instant consists of pins 19, arranged in radial slots in secondary shafts and adapted to be pressed outward by springs 20. When pro-
 75 jecting beyond the periphery of the secondary shafts, these pins will engage stops or abutments 21 and 22 on the gear-wheels 11 and 12 and cause the shafts to rotate with the gear-wheels. In order to release the pins
 80 from engagement with the stops or abutments, collars 23 are loosely mounted upon the secondary shafts and are provided with cam-plates 24, adapted to engage shoulders 25 on the pins and force the pins inwardly, when
 85 the collars are shifted, as hereinafter stated. Lugs on these collars are connected by pitmen to sliding rods 26, mounted on guides 27 on the frame of the machine. These sliding rods are normally pressed inwardly or toward the
 90 center of the main gear-wheel by springs 28. On the shaft 6 is secured a disk 29, having recesses provided with inclined faces *c*. As these recesses come into line with the sliding rods the latter will be forced inwardly by
 95 their springs, thereby shifting the collars 23, so that their cam-plates will move in such direction as to release the pins from the secondary shafts, so that they will be forced outwardly by the springs into engagement with
 100 the stop or abutment 21 on the gear-wheels 11 and 12. The parts are shown in Fig. 9 in a position with recesses in the disk 29 in line with the sliding rods, so that the latter will be free to be moved inwardly by their springs.
 105 By this inward movement of the sliding rods the cam-plates on the collars will be shifted away from the shoulder on the pins, so that the latter will be free to move outward into the path of movement of the abutments 21 on
 110 the gear-wheels 11 and 12. Thereafter the secondary shafts will rotate with the gear-wheels 11 and 12 through an arc of one hundred and eighty degrees, the main shaft or its crank-pin moving through an arc of ninety
 115 degrees at the same time. As the crank-pins on the secondary shafts reach their lower dead-centers the shoulders of the locking-pins will engage cam-plates on the collars, the latter having been shifted by the inclined walls of
 120 the recesses in the disk 29, forcing the pins inwardly, thereby releasing the secondary shafts from the gear-wheels 11 and 12. Thereafter and while the main shaft moves through
 125 another arc of ninety degrees or passes its lower dead-center, during which time the main plunger effects its desired function, the gear-wheels 11 and 12 will rotate loosely on the secondary shafts. As the main shaft completes its operative movement through the
 130

second arc of ninety degrees the recess in the disk 29 will come into line with the sliding rods, which have been previously forced out, so that said rods will again snap into the
5 recesses in the disk and the collars of the secondary shaft will be shifted to release locking-pins and permit them to engage the stops or abutments on the gear-wheels 11 and 12, which will thereafter drive the secondary
10 shafts until the latter make a movement through an arc of one hundred and eighty degrees, bringing their crank-pins to their upper dead-centers.

It is characteristic of my improvement that
15 the secondary shafts which shift from dead-center to dead-center while the plunger or shaping-die is moving down toward the matrix are held or remain in such position, thereby firmly locking the gripping-die during the
20 operation of the main die upon the metal and are then locked to the main-die-operating mechanism on its return or up stroke and shifted from lower to upper dead-center.

I claim herein as my invention—

25 1. A press having in combination gripping or holding members, a shaping-plunger, means for reciprocating the shaping-plunger, shafts operatively connected to the plunger means, and having points eccentric of their axes op-
30 eratively connected to one of the gripping members for reciprocating the latter, and means for releasing said shafts from their connection with the plunger-operating means, when the eccentric driving portions of the
35 shafts reach a dead-center, substantially as set forth.

2. A press having in combination gripping or holding members, a shaping-plunger, a power-shaft having a crank-pin or other eccentric portion connected to said plunger, 40 shafts having crank-pins or other eccentric portions connected to one of the gripping members, a separable connection between the plunger and gripper shafts, and automatic means for releasing the gripper-shafts as the
45 cranks reach a dead-center and restoring the connections between the gripper and plunger shafts as the crank-pin on the plunger-shaft passes the corresponding dead-center, substantially as set forth. 50

3. A press having in combination gripping or holding members, a shaping-plunger, a power-shaft having a crank-pin or other eccentric portion connected to the plunger, shafts having crank-pins or other eccentric 55 portions connected to one of the gripping members, intermeshing gear-wheels on said shafts, clutch mechanism separably connecting the gearing with the shafts consisting of a spring-actuated pin arranged transversely 60 of the shaft and normally projecting into engagement with the gear-wheel on said shaft, and means controlled by the plunger-shaft for shifting said pin out of engagement with the gear during a portion of the movement of 65 the plunger-shaft, substantially as set forth.

In testimony whereof I have hereunto set my hand.

ARTHUR E. SAWERS.

Witnesses:

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F. E. GATHER.