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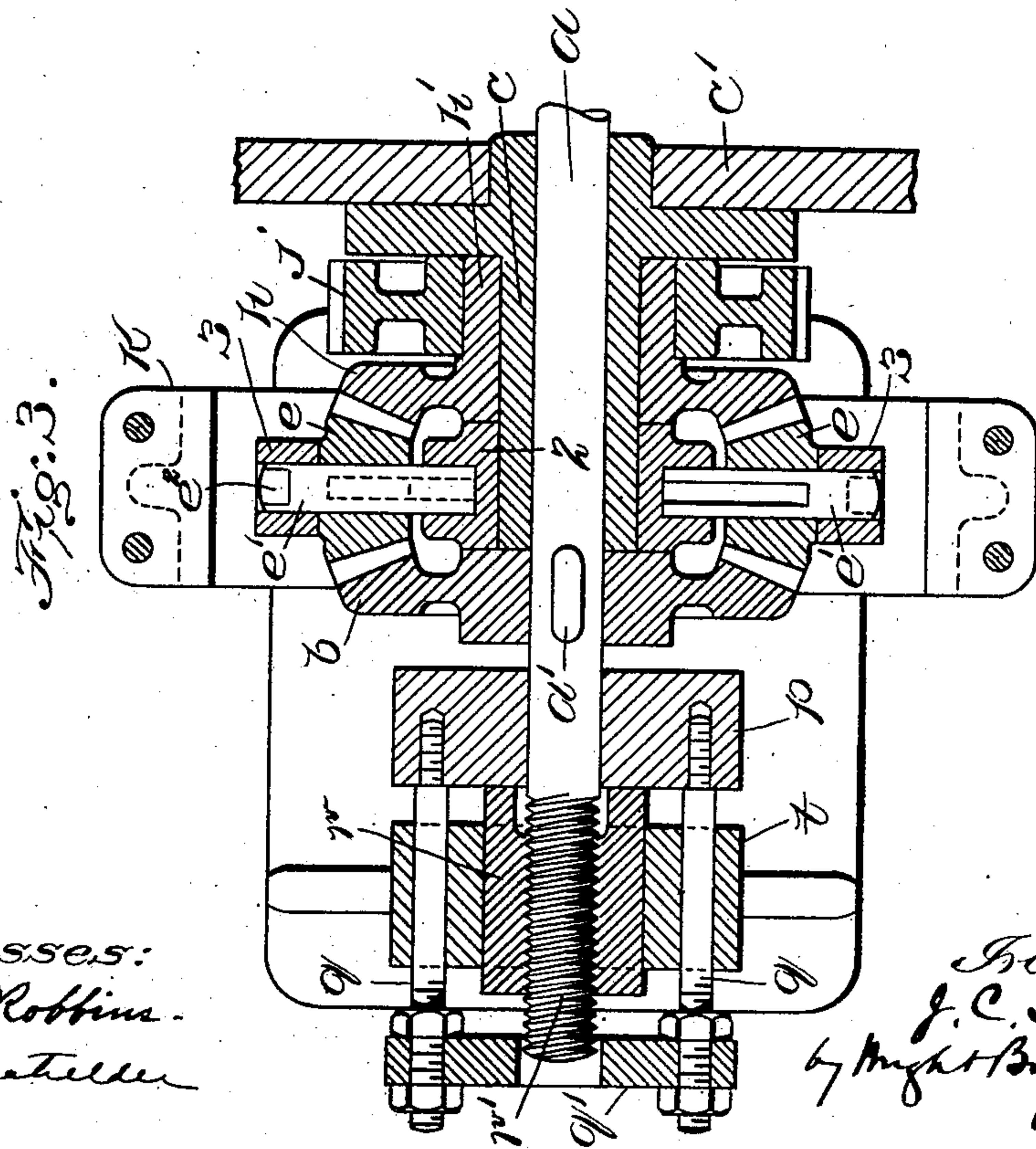
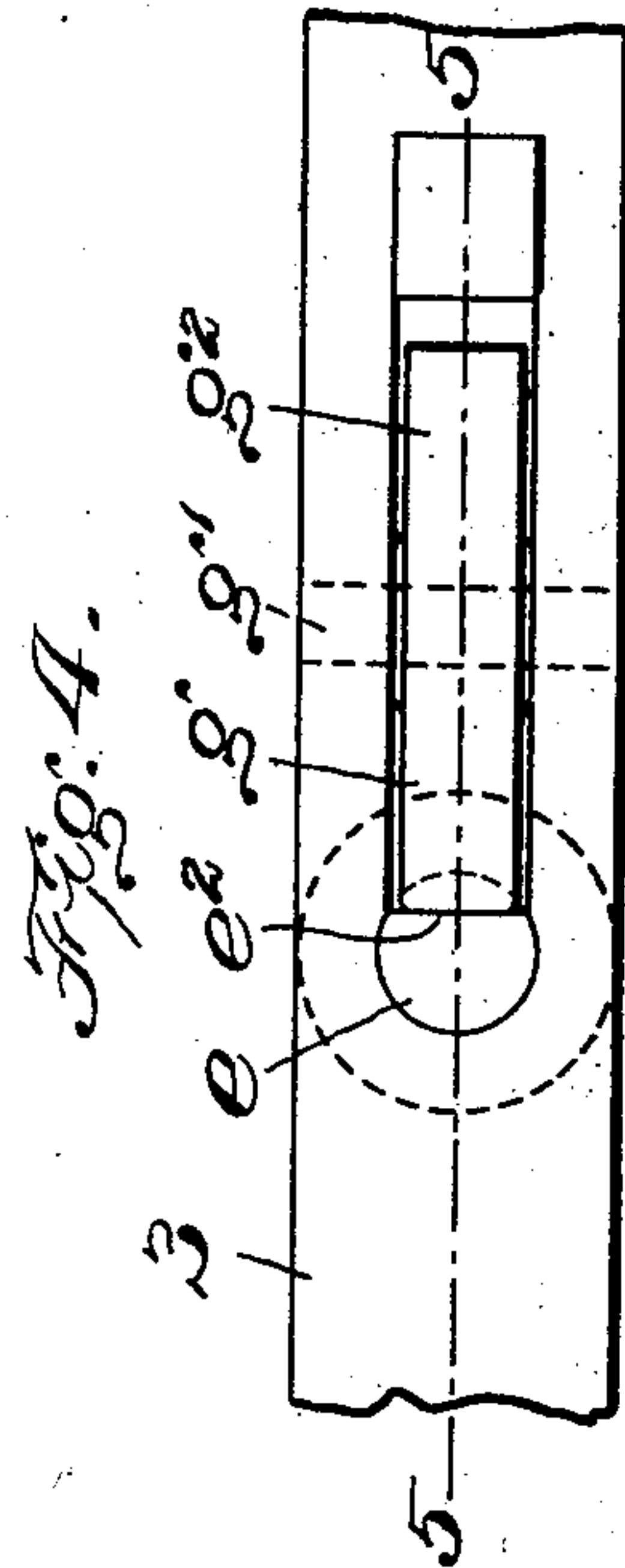
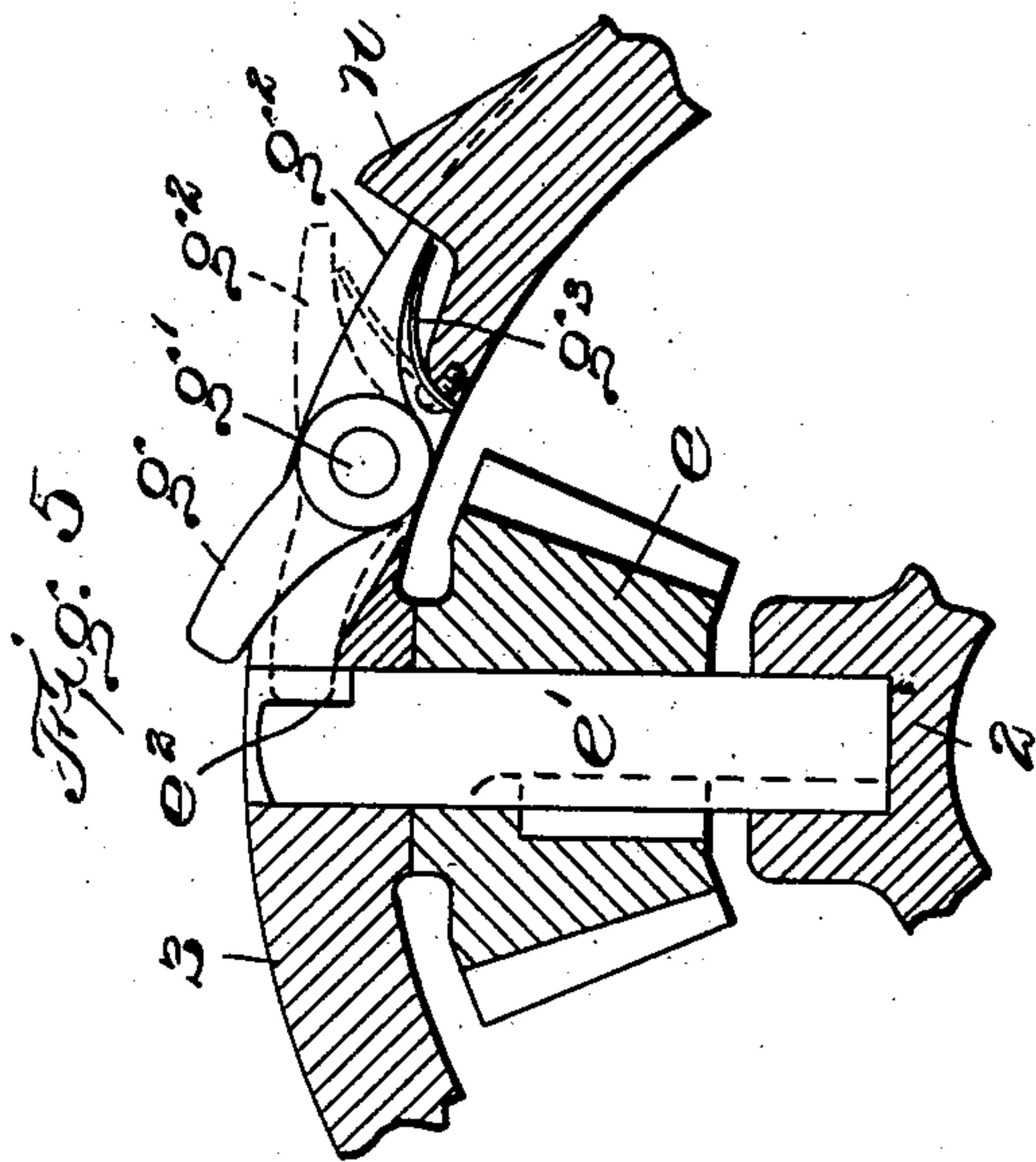
J. C. SCHAEFFLER.

## AUTOMATIC REVERSING MECHANISM.

APPLICATION FILED MAY 22, 1903.

NO MODEL.

2 SHEETS—SHEET 2.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

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## AUTOMATIC REVERSING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 747,649, dated December 22, 1903.

Application filed May 22, 1903. Serial No. 158,342. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH C. SCHAEFFLER, of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Automatic Reversing Mechanism, of which the following is a specification.

This invention has for its object to provide a simple, compact, and effective mechanism for automatically rotating an operating-shaft first in one direction and then in the opposite direction; and it consists in the improvements which I will now proceed to describe and claim.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents an end elevation of a reversing mechanism embodying my invention. Fig. 2 represents a section on line 2 2 of Fig. 1. Fig. 3 represents a section on line 3 3 of Fig. 1. Fig. 4 represents a plan view of a part of the mechanism. Fig. 5 represents a section on line 5 5 of Fig. 4.

The same reference characters indicate the same parts in all the figures.

In the drawings, *a* represents the operating-shaft to be rotated first in one direction for a predetermined period and then in the opposite direction for a corresponding period, said shaft imparting corresponding movements to a washing-machine cylinder or other part requiring to be rotated in different directions. To the operating-shaft *a* is affixed by a key or spline *a'* a bevel-gear *b*.

*c* represents a tubular bearing in which the shaft *a* is journaled, said bearing being supported by a standard *c'*.

An annular frame or cage is mounted to rotate loosely on the bearing *c*, said frame comprising an inner or hub portion 2, journaled on the bearing *c*, an outer or rim portion 3 concentric with the hub portion 2, and radial arms 4, connecting said hub and rim portions.

*e e* represent bevel-pinions located in two of the spaces between adjacent arms 4 and meshing with the bevel-gear *b*, said pinions being at opposite sides of the shaft *a*. The pinions *e e* are affixed to radial studs or shafts *e' e'*, the inner ends of which are journaled in bearings in the hub 2, while their outer ends are journaled in bearings in the rim 3.

The rim portion 3 is provided with two dogs

or locking members *g g*, located in openings formed for their reception in said rim and pivoted thereto at *g'*. Said dogs are formed to engage flat faces *e<sup>2</sup>*, formed on the studs *e'* for the purpose of locking said studs and the pinions *e* to the cage, the said dogs being movable so that they may be engaged with the studs *e*, as shown by dotted lines in Figs. 1 and 5, or disengaged therefrom, as shown in full lines in Fig. 5.

*h* represents a bevel-gear meshing with the pinions *e e* and located at the opposite side of said pinions from the gear *b*. The gear *h* has a hub *h'*, which is journaled on the bearing *c*. To said hub is rigidly affixed by a key or spline *i* a gear *j*, which is rotated continuously in one direction by a driving-gear (not shown) engaged therewith.

When the dogs *g g* are separated from the studs *e' e'*, the pinions *e e* are free to rotate independently, so that they are adapted to transmit from the continuously-rotating gear *h* a rotary movement in a direction opposite to that of the movement of said gear *h*, means being provided, as hereinafter described, for locking and preventing the rotation of the pinion-containing frame or cage when the pinions are free to rotate, so that when the conditions are as last stated the rotation of the gear *j* imparts an opposite rotation to the gear *b* and shaft *a*.

When the dogs *g g* are engaged with the studs *e' e'*, the frame or cage is released and permitted to rotate with the gear *j*, so that the gears *j* and *h*, the pinions *e e*, the pinion-containing frame or cage, the gear *b*, and the shaft *a* rotate as one part, the shaft *a* rotating in the same direction with the gear *j*.

The means for alternately locking and releasing the said frame or cage are as follows: *k* represents a fixed frame surrounding the cage and provided at opposite sides of the axis of the cage with guides *k' k'*.

*m m* represent sliding stops fitted to move in said guides and projecting inwardly, their inner portions being arranged to project into the path in which arms *g<sup>2</sup>* on the dogs *g* are normally held by springs *g<sup>3</sup>*, as shown by dotted lines in Fig. 5. The stops *m m* are moved back and forth by means hereinafter described, so that they are alternately in the path of the dog-arms *g<sup>2</sup>* and out of said path.

The cage is provided with two projections



$n\ n$  adjacent to the dogs  $g\ g$ , said projections being arranged to abut against the stops  $m\ m$  when the latter are in the path of the dog-arms  $g^2$ .

5 The stops  $m\ m$  are attached by studs  $o\ o$  with a cross-head  $p$ , which is adapted to slide on the shaft  $a$  and is provided with a yoke composed of rods  $q\ q$ , Fig. 3, and a cross-bar  $q'$ , the latter extending across the shaft  $a$ .

10  $r$  represents a nut which is engaged with a screw-thread  $r'$ , formed on the shaft  $a$ . The rotation of the shaft causes the nut  $r$  to move endwise between the cross-head  $b$  and the yoke cross-bar  $q'$ , the nut being prevented  
15 from rotating by a spline  $s$ , affixed to the bearing  $t$  and entering a groove in the nut.

Operation: Assuming that the gears  $j$  and  $h$  are continuously rotated in the direction indicated by the arrow in Fig. 1 and that the  
20 pinions  $e\ e$  are locked to the cage by the dogs  $g\ g$ , as shown in said figure, under these conditions the pinions, the cage, and the gear  $b$  move as one part, and the shaft  $a$  is rotated in the same direction. Assuming, further,  
25 that the stops  $m\ m$  are out of the path of the dog-arms  $g^2$  and projections  $n$ , as shown in Fig. 2, the described rotation of the shaft will cause the nut  $r$  to move in the direction of the arrow in Fig. 2, the nut bearing against  
30 the cross-head  $p$  and forcing it, with the stops  $m$ , in the same direction until the stops are within the path of the said dog-arms and projections. After the stops have entered the said path the rotation of the cage brings the  
35 dog-arms into contact with the stops (thus throwing out the dogs and releasing the pinions  $e\ e$ ) and immediately afterward brings the projections  $n\ n$  into contact with the stops, thus arresting the rotation of the cage.

40 This causes a reversal of the rotation of the gear  $b$  and shaft  $a$ , said reverse rotation causing the nut  $r$  to move in a direction opposite that indicated by the arrow in Fig. 2, and continuing until the nut bears on the cross-  
45 bar  $q'$  and moves the cross-bar, the cross-head  $p$ , and the stops  $m\ m$  in the direction required to remove the stops from the path of the dog-arms  $g^2$  and projections  $n$ . When the stops have been thus removed, the dogs  
50  $g$  are forced by the springs  $g^3$  into engagement with the faces  $e^2$  of the studs  $e'$ , thus again locking the pinions  $e$  and causing the cage and shaft to rotate in the direction first described.

55 The described mechanism is simple and compact in construction and reliable and efficient in operation. It is adapted for use in connection with various kinds of laundry machinery, such as washing and starching  
60 machines, but is not limited to such use and may be employed in various other relations.

I claim—

65 1. A reversing mechanism comprising an operating-shaft, a cage surrounding the shaft and rotatable independently thereof, rotary pinions mounted in said cage, gears at oppo-

site sides of and meshing with said pinions, one of said gears being affixed to the shaft and the other loose thereon, means for rotat-  
70 ing the loose gear in one direction, and mechanism operated by the rotation of the fixed gear and the shaft for alternately locking and releasing the cage and for alternately locking the pinions to and releasing them from the cage.

75 2. A reversing mechanism comprising an operating-shaft, a cage surrounding the shaft and rotatable independently thereof, said cage having pinion-locking members, rotary pinions mounted in said cage, gears at oppo-  
80 site sides of and meshing with said pinions, one of said gears being affixed to the shaft and the other loose thereon, means for rotating the loose gear in one direction, and mechanism operated by the rotation of the fixed  
85 gear and the shaft for alternately locking and releasing the cage, and for actuating said pinion-locking members.

3. A reversing mechanism comprising an operating-shaft, a cage surrounding the shaft  
90 and rotatable independently thereof, pinion-locking dogs pivoted to the cage and having arms normally projected from the periphery of the cage, projections on the cage adjacent to said arms, rotary pinions mounted in the  
95 cage and having locking members coöperating with said dogs, gears at opposite sides of and meshing with said pinions, one of said gears being affixed to the shaft and the other loose thereon, means for rotating the loose  
100 gear in one direction, stops movable into and out of the path of the arms and projections on the cage, and mechanism operated by the rotation of the fixed gear and the shaft for moving said stops.

105 4. A reversing mechanism comprising an operating-shaft, a cage surrounding the shaft and rotatable independently thereof, pinion-locking dogs pivoted to the cage and having arms normally projected from the periphery  
110 of the cage, projections on the cage adjacent to said arms, rotary pinions mounted in the cage and having locking members coöperating with said dogs, gears at opposite sides of and meshing with said pinions, one of said  
115 gears being affixed to the shaft and the other loose thereon, means for rotating the loose gear in one direction, stops movable into and out of the path of the arms and projections on the cage, a cross-head movable on the  
120 shaft and engaged with the stops, a cross-bar connected with the cross-head, and a nut located between the said cross-head and bar and engaged with a screw-thread on the shaft.

125 In testimony whereof I have affixed my signature in presence of two witnesses.

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Witnesses:

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