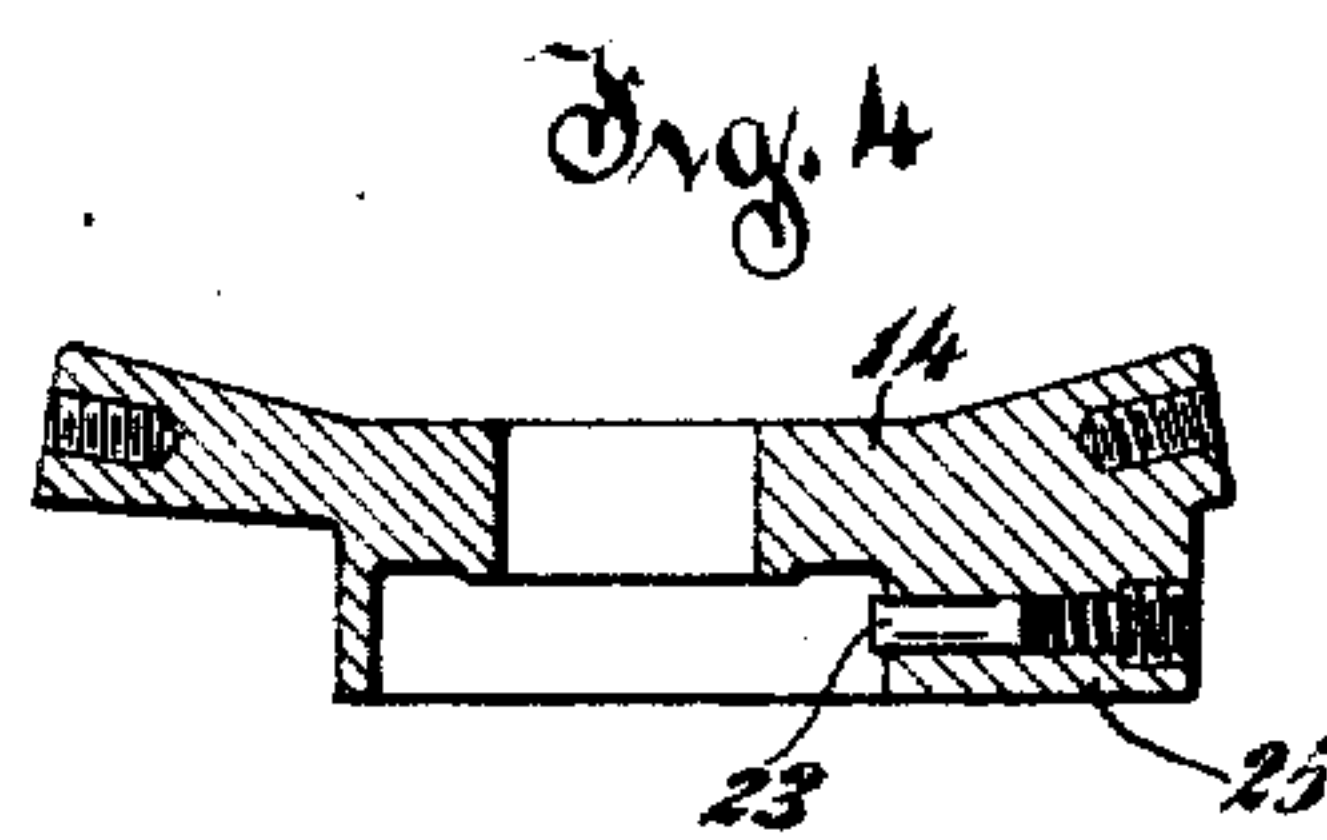
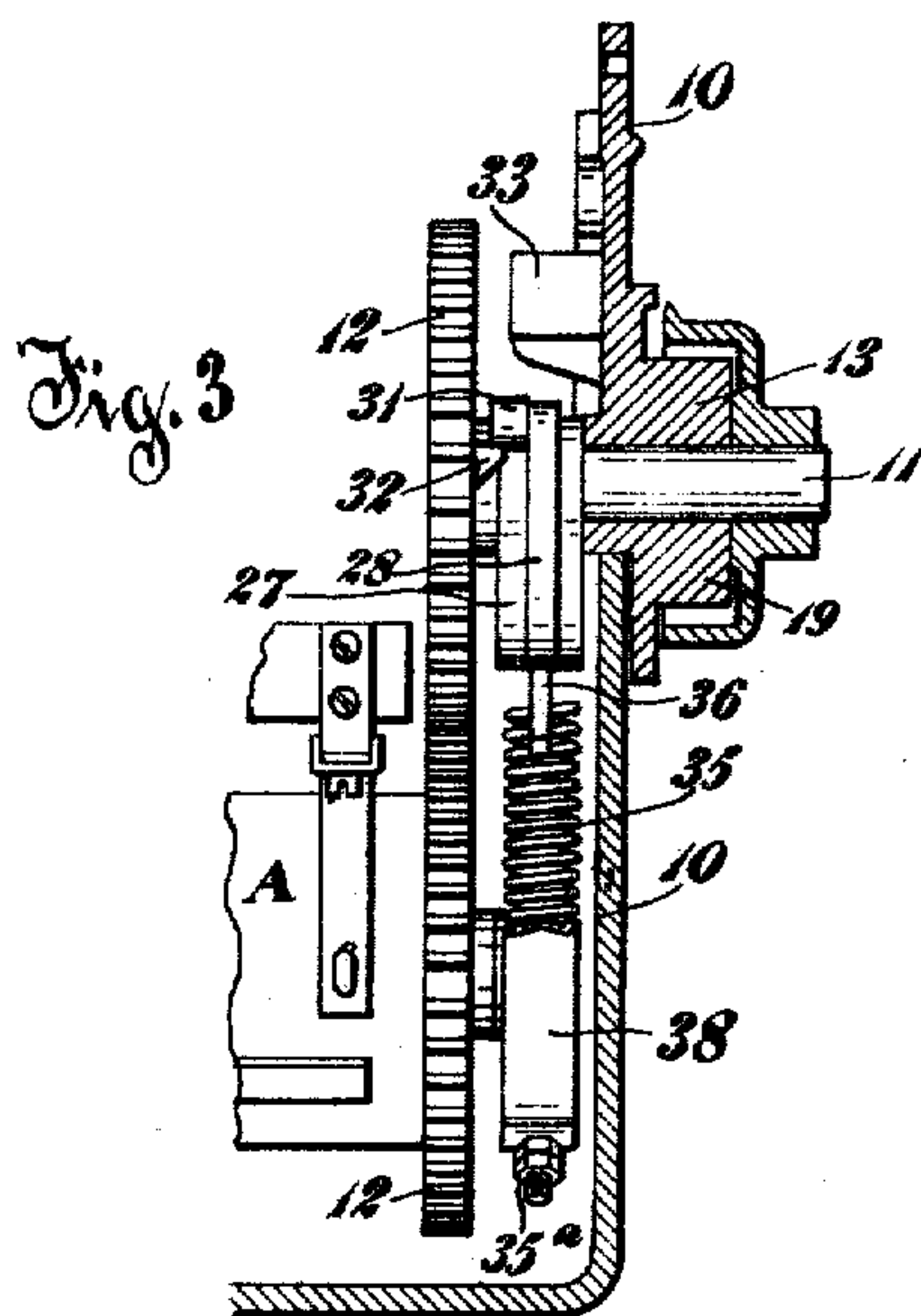
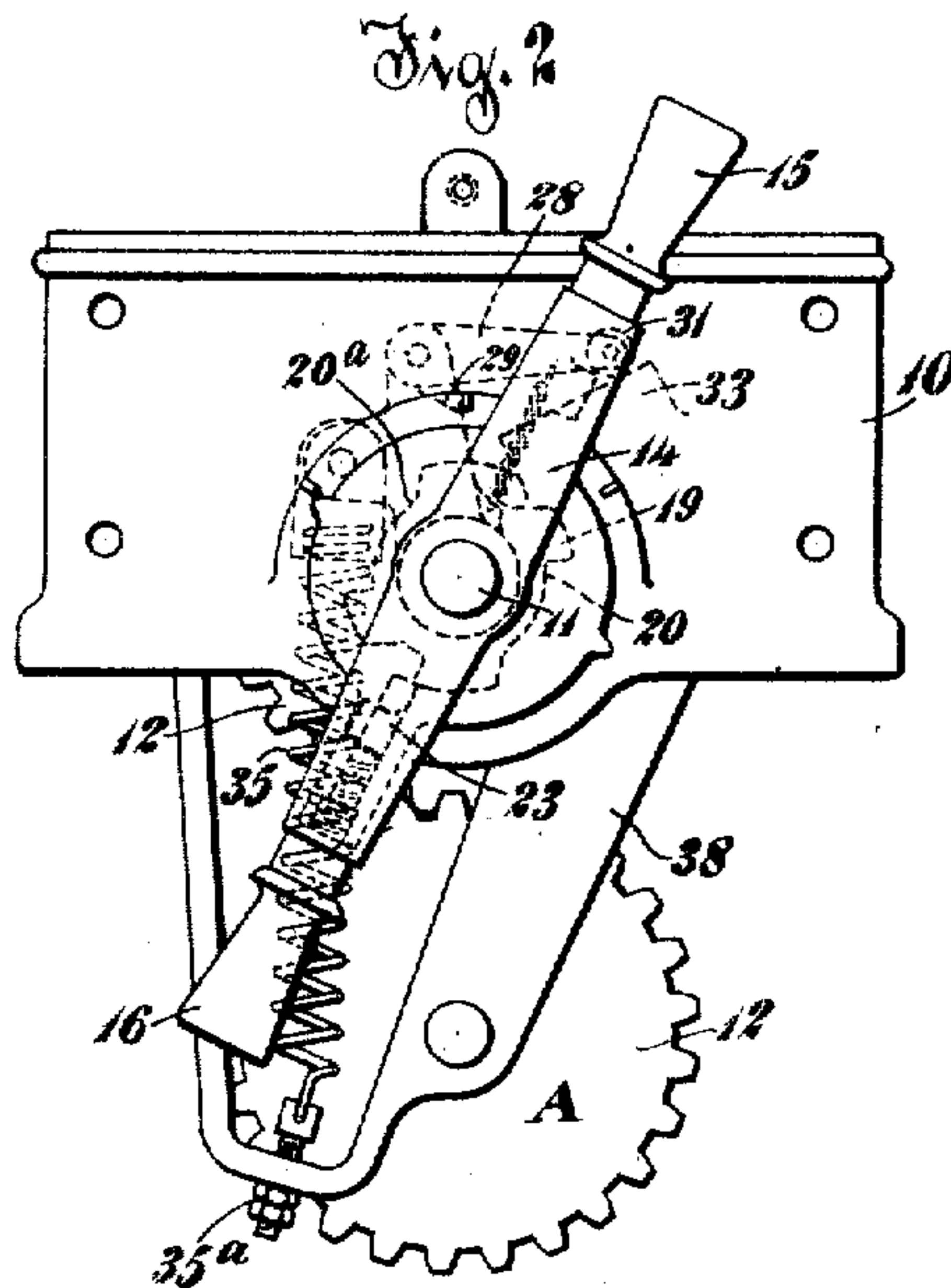
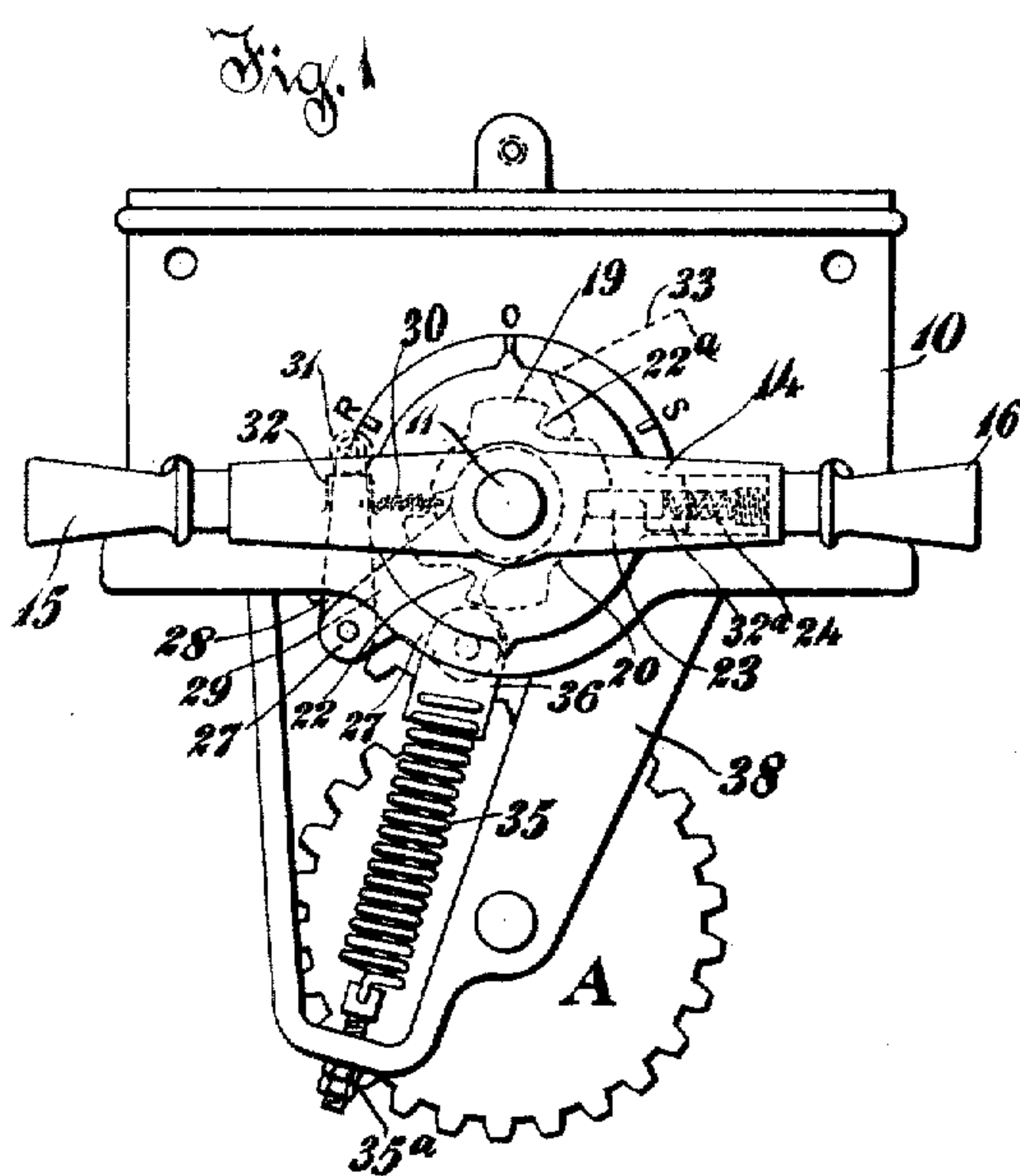


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MOTOR CONTROLLER.
APPLICATION FILED FEB. 29, 1908.

931,384.

Patented Aug. 17, 1909.



Witnesses

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MOTOR-CONTROLLER.

No. 931,384.

Specification of Letters Patent.

Patented Aug. 17, 1909.

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To all whom it may concern:

Be it known that I, HERBERT W. CHENEY, citizen of the United States, residing at Norwood, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Motor-Controllers, of which the following is a full, clear, and exact specification.

My invention relates to controllers for electric motors and particularly to fool-proof potential starters for induction motors.

In my Patent No. 864,446, granted August 27, 1907, there is described a potential starter for induction motors in which a rotatable drum coöperates with fixed contact fingers and is normally movable always in the same direction, means being provided whereby backward movement of the controller drum from off or running position is prevented and whereby the controller will be moved backward to off position if it is released in any starting position. With this controller it is impossible for an operator, how careless or inexperienced soever, to leave the controller in a starting position indefinitely instead of moving it to running position as soon as the motor has gained sufficient speed, and thus the autotransformer windings, which are in circuit only when the controller is in starting position and which are proportioned not to carry current continuously but only for the brief period during starting, are preserved from long continued currents. But in the device as originally constructed, the means tending to move the controller backward to off position when it is in starting position comprised a spring pressed arm which engaged a part movable with the controller drum from the time the latter left off position until it reached starting position, during this time tending to pull the controller drum backward to off position and until the arm itself struck a stop. When the controller reached the running position the arm was disengaged from the part with which it was previously in engagement and was moved back by a spring against said stop. The striking of the spring-pressed arm against the stop produced a considerable jar.

It is the object of my present invention to avoid this jar or shock, and this object I have obtained by doing away with the stop for the spring-pressed arm. Specifically, the spring, which is a tension spring, is allowed

to act until it is in line with the pivotal point of the arm.

The various novel features of my invention will appear hereinafter and will be particularly pointed out in the claims.

Figure 1 is a front elevation of the controller operating mechanism constructed in accordance with my invention, the parts being in off position and partly broken away; Fig. 2 is a somewhat similar view, showing the parts just before they reach the running position; Fig. 3 is a side elevation of the operating mechanism showing part of the controller, the controller casing and some of the other parts being in section; and Fig. 4 is a partial section through the operating handle.

Within the controller casing 10 is a controller drum A of any desired construction. The operating mechanism here shown is especially designed for controller drums having duplicate halves, which respectively coöperate with two diametrically opposite sets of contact fingers during one complete operation of the controller and with the opposite sets during the next complete operation thereof. Such a controller has duplicate off, starting, and running positions. The controller here shown passes through but one starting position between off and running positions, though any desired number of starting positions may be used. In the arrangement shown analogous positions are 180° apart. The particular construction and arrangement of the controlling drum, however, forms no part of my present invention and is applicable to controllers having one off and one running position with any desired number of starting positions between them.

The controlling drum A is driven from an operating shaft 11 in any desired manner, as through gears 12. The shaft 11 is journaled in a bearing 13, here shown as integral with the upper part of the frame 10. Mounted on the outer end of the shaft 11 is the operating handle 14, which is secured at its center to the shaft and is provided with two hand grips 15 and 16. As here shown the handle is horizontal when the controller is in off position. Integral with the frame 10 and surrounding the shaft 11 and bearing 13 is a notched ring 19, the notches of which are adapted to be engaged by a sliding pawl or plunger 23 pressed radially into engagement

therewith by a spring 24. The plunger 23 is mounted on an extension 25 from the handle 14, which also carries pointers to indicate the positions of the controller. In the ring 19 there is one pair of notches 20 and 20^a which extend from the off to the starting positions, and another pair of notches 22 and 22^a which mark the running position of the controller. The ring 19 is so constructed that ratchet teeth are formed between the various notches to prevent backward movement of the controller.

Loosely mounted on the shaft 11 is an arm 27, on the outer end of which a second arm 28 is pivoted and pressed inward against the stop 29 by means of the spring 30. The arm 28 carries at its free end a roller 31, which when the arm 28 is pulled inward is in the path of two lugs 32 and 32^a carried by the upper gear 12 but which can be pressed outward by a cam 33 on the casting 10 so that it will clear the lugs 32 and 32^a. An adjustable tension spring 35 is attached to a boss 36 on the arm 27 and tends to return said arm to the off position, the spring being in line with the pivotal point of the arm when the latter is in such off position. The fixed end of the spring 35 is attached by the adjusting screw 35^a to a bracket 38 extending downward from the casting 10 and also forming a bearing for the drum A.

When the controller is in off position O the parts are as shown in Fig. 1. By moving the handle 14 in a clockwise direction the controller drum A may be moved to starting position S, when the pawl 23 will strike the clockwise end of the notch 20 or 20^a so that the operator may feel when this starting position is reached. In this movement the lug 32, through the roller 31 and arms 28 and 27, has extended the spring 35 to some extent. If the operator should now release the handle, the spring 25 will contract and pull the drum back to off position, thus preventing the controller from being left without care in the starting position. But if the operator does not release the handle when the controller is in starting position, but after a sufficient time moves the controller farther in a clockwise direction, it will pass through the position shown in Fig. 2 into the running position R. The position indicated in Fig. 2 shows the parts just before the running position is reached. If the controller is released at any point until the position shown in Fig. 2 is reached, the spring 35 will move the controller back to the off position. As the controller approaches the running position, however, the roller 31 strikes the cam 33 and is moved outward as shown in Fig. 2 until it clears the lug 32, whereupon the spring 35 will pull the arms 27 and 28 and roller 31 back to the position shown in Fig. 1. These parts are actually moved farther counter-clockwise

than shown, but will return and pass repeatedly through the position shown in a gradually decreasing arc until they come to rest in the position shown with the center line of the spring 35 intersecting the axis of the shaft 11.

The pawl 23 and notch 21 or 21^a prevent backward or counter-clockwise movement of the drum from the running position. When it is desired to stop the motor the controller is moved farther in a clockwise direction to off position, when the plunger 23 drops into one of the notches 20 or 20^a and backward movement is again prevented. From this off position the operation above described may be repeated, though in this operation the controller drum and its operating parts are in diametrically opposite positions from those of the previous operation.

Many modifications in the precise arrangement shown and described may be made without departing from the spirit and scope of my invention and all such I aim to cover in the following claims.

What I claim as new is:—

1. A starting controller for electric motors, comprising fixed and movable members, a spring-pressed arm, means for carrying said arm out of its normal position as the movable member is moved from off position, and means for releasing said arm from said movable member when the latter approaches running position, said spring-pressed arm being constructed and arranged to return to and stop at its normal position by the action of its spring.

2. In a starting controller for electric motors, the combination of a rotatable drum having off, starting, and running positions; an arm which is spring-pressed toward a normal position when on either side of such position, and means whereby on movement of said drum between off and running positions said arm is moved out of its normal position and tends to return said drum to off position.

3. A controller for electric motors, comprising a rotatable drum having off, starting, and running positions, a spring which tends to move the controller back to off position when it is in a starting position, and means for releasing said drum from the spring when the running position is reached, said spring being arranged to return to and stop at its normal position by its own action.

4. In a controller for electric motors, the combination of a rotatable drum having off, starting, and running positions, and a spring-pressed arm through which the controller is biased to off position when in starting position but is unbiased when in running position, said spring-pressed arm being arranged when released to return to and stop at its normal position by the action of its spring.

5. In a controller for electric motors, the combination of a rotatable drum having off, starting, and running positions, an arm, means for carrying said arm out of its normal position by movement of said drum between off and running positions, means for releasing said arm from said drum when the latter reaches running position, and a spring which tends to return said arm to its normal position whenever it is in some other position and also acts as a buffer when the arm is returned to its normal position after having been released from said drum.

6. In a starting controller for electric motors, the combination of fixed and movable members, an arm, a helical spring attached to the arm, said arm and spring being normally in a position with the axis of the spring in line with the pivotal point of the arm, and means whereby said arm is forced out of said normal position as said movable member is moved from off position but is re-

leased to return to such normal position as said movable member approaches running position.

7. In a starting controller for electric motors, the combination of a rotatable drum, an arm acted on by a tension spring and normally in position with the axis of the tension spring intersecting the axis about which the arm turns, means whereby said drum as it is moved forward from off position displaces said arm and is thereby biased backward to off position, and means whereby said arm is disengaged from said drum when the latter reaches a predetermined position.

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

HERBERT W. CHENEY.

Witnesses:

GEO. B. SCHLEY,
FRED J. KINSEY.