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RATCHET-OPERATING MEANS

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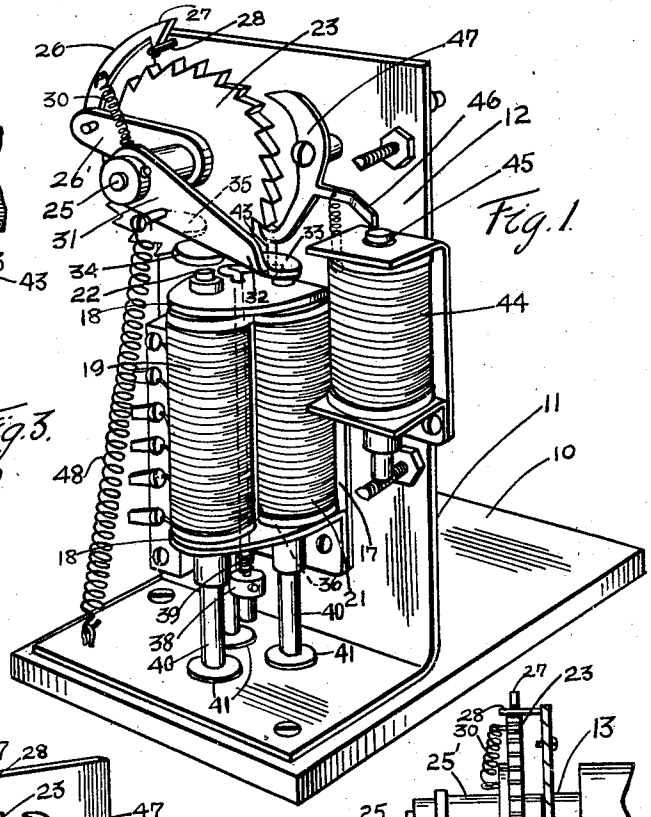


Fig. 1.

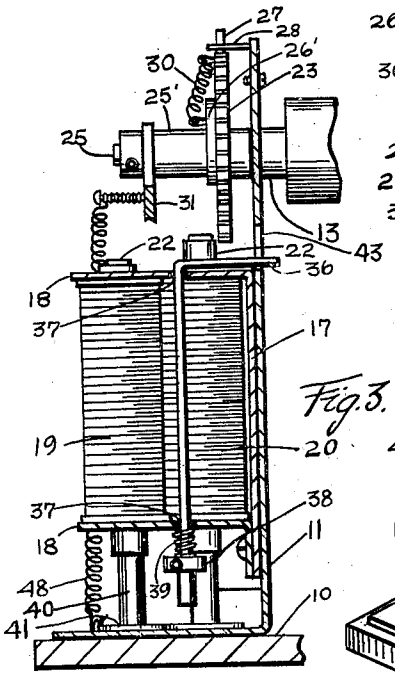


Fig. 3.

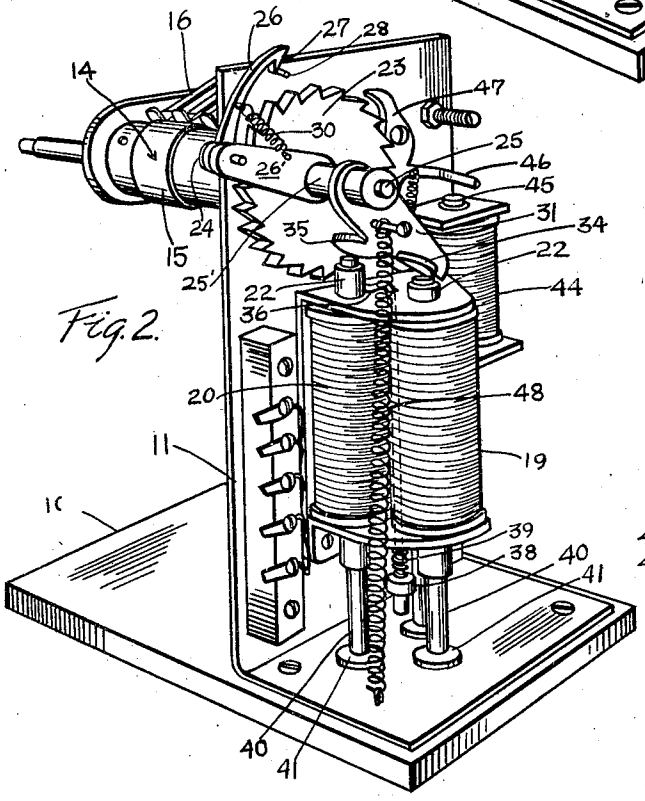


Fig. 2.

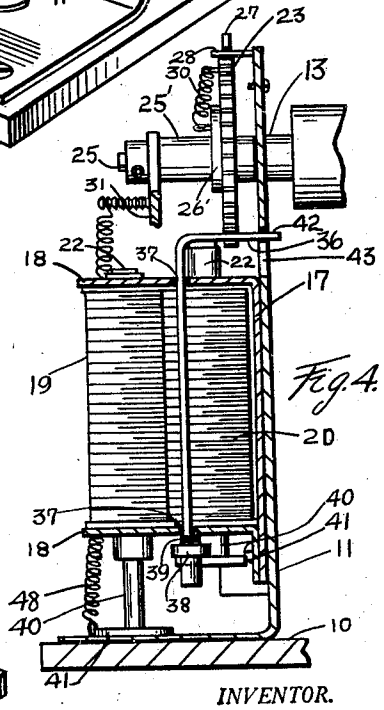


Fig. 4.

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RATCHET-OPERATING MEANS

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3 Claims. (Cl. 74—126)

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This invention relates to certain novel improvements in ratchet-operating means. More particularly the invention has for its principal object the provision of means operable by the ratchet-operating means for preventing retrograde or back-lash operation of the ratchet wheel.

The invention is especially useful in mechanisms which require a positive and limited step by step movement an operation which requires for its effective accomplishment the reduction of back-lashing to a minimum.

The mechanism to be hereinafter described has been shown in its application in association with a coin-changing mechanism, in which mechanism a conductor ring bearing shaft is rotated in step by step action into engagement with contact fingers controlling the circuit of the coin changer. It is customary to rotate this shaft by means of a ratchet wheel through the operation of solenoids. In the employment of solenoids for this purpose, it infrequently happens that due to the impingement of the push rods of the solenoids against the mechanism for rotating the ratchet wheel, there results what is known in the trade as "back-lashing" of the ratchet wheel, or, in other words, the ratchet wheel may have a tendency to rotate in a retroactive action to that intended. This invention has for its object the provision of means to prevent this back-lashing.

Other objects will appear hereinafter.

The invention consists in the novel combination and arrangement of parts to be hereinafter described and claimed.

The invention will be best understood by reference to the accompanying drawings showing the preferred form of construction, and in which:

Fig. 1 is a perspective view of a ratchet wheel having my invention associated therewith;

Fig. 2 is a perspective view similar to that shown in Fig. 1, taken at a different perspective angle;

Fig. 3 is a vertical sectional detail view of the invention; and

Fig. 4 is a sectional detail view similar to Fig. 1 showing the parts thereof in different operative relation with respect to each other.

The drawings illustrate the preferred form of construction by which the several objects of my invention are accomplished.

In this connection, for purposes of illustration I have shown a base plate 10 having a mounting bracket 11 associated therewith. This mounting bracket 11 may be connected to the base plate in any suitable manner. This mounting bracket 11 comprising an upstanding wall 12. Journalled

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through this wall 12 is a shaft 13 having connection with a suitable coin changing mechanism 14 which comprises a conductor ring 15 and contact fingers 16.

To this wall 12 there is secured in any suitable manner a support 17 substantially U-shaped and between the opposite limbs 18 of which are supported magnetic solenoids 19, 20 and 21. These solenoids each comprise a push rod 22, each push rod varying in length with respect to the other for reasons hereinafter set forth.

On the shaft 13 is a ratchet wheel 23. Projecting through the shaft 13 is a stud shaft 25. On this stud shaft 25 is a sleeve 25' rotatable independently of the shaft 25 and carrying an arm 26'. This arm 26' pivotally carries as at 24 a pawl 26, the beak 27 of which normally engages a pin 28 carried by the wall 12, whereby to support the pawl 26 from engagement with the ratchet wheel 23. This ratchet wheel 23 is carried by the shaft 13 and is rotatable therewith. The pawl 26 is normally urged into engagement with the pin 28 and with the teeth of the ratchet wheel 23 by a spring 30.

On the shaft 25 is an arm 31, and this arm 31, at its outer end portion 32, has a lateral extension 33. Inwardly of this extension 33 and extending in an opposite direction with respect thereto is a second extension 34, and inwardly of this second extension 34 and extending in opposite directions with respect thereto is a third extension 35. These extensions 33, 34, and 35 are disposed over the path of the solenoid push rods 22. The push rod of the solenoid 19, for the purposes of illustration, is shorter in length than the other two push rods, with the consequence that when the solenoid 19 is energized, the shaft will be rotated so as to bring the pawl 26 into engagement with the ratchet wheel 23 to move it a distance equivalent to one tooth of the ratchet wheel 23. As the push rod of the solenoid 20 is longer than the push rod of the solenoid 19, but shorter than the push rod of the solenoid 21, it is manifest that upon energization of the solenoid 20, the push rod 22 thereof, upon engagement with the adjacent extension 35, is arranged to engage the pawl 26 with the ratchet wheel 23, so as to move the ratchet wheel a distance equivalent to two teeth of the ratchet wheel. Upon energization of the solenoid 21, the push rod of which is longer than either of the push rods of the solenoids 19 and 20, when the pawl 26 is brought into engagement with the ratchet wheel 23, the ratchet wheel 23 will be rotated a distance equivalent to three teeth of the ratchet wheel.

To prevent any back-lashing or retroactive rotation of the ratchet wheel 23 in a direction opposite to that of its rotation by action of the pawl 26, there is arranged a latch bar 36 movable vertically through openings 37 provided in the portions 18 of the bracket 17. The lower end portion of this latch bar 36 carries an enlarged collar 38 between which and the adjacent portion 18 of the bracket 17 is a spring 39 which normally holds the latch bar 36 from engagement with the teeth of the ratchet 23. Each of the push rods 22 of the solenoids 19, 20 and 21 have their end portions 40 extending below the solenoids 19, 20 and 21, and these end portions carry enlarged discs 41 which are adapted to engage the collar 38 as shown in Fig. 4, and move the latch bar 36 in an elevated position with the horizontal portion 42 thereof into engagement with a tooth of the ratchet wheel 23. This horizontal portion 42 operates through an elongated slot 43 formed in the wall 12 (Fig. 4).

To complete the invention, I provide a reset coil 44 which includes a solenoid push rod 45 adapted to engage the arm 46 of an escapement pawl 47, the arrangement being such that when the ratchet 23 has been wound to a predetermined position against the action of the spring 48, upon energization of the reset coil 44, the escapement pawl will permit retroactive rotation of the ratchet 23 to its normal position.

As shown in Fig. 1, the arm 31 is normally held in position for engagement by the push rods 22, by a spring 48.

The arrangement is such that when one of the solenoids, for example, the solenoid 19, is energized, the push rod 22 thereof will move upwardly against the adjacent extension 34, and this engagement between the push rod 22 and the extension 34 will rock the shaft 25, disengaging the tip or beak 27 of the pawl 26 from the pin 28, allowing this pawl to drop into engagement with the ratchet wheel 23, and thus moving the ratchet wheel one step or a distance equivalent to one of the teeth of the ratchet. When this push rod 22 reaches its uppermost position with respect to the solenoid coil 19, the disc 41 thereof will engage the collar 38, move the latch bar 36 into latched engagement with the ratchet 23, and momentarily latch this ratchet wheel 23 against backlash or retroactive movement.

While I have illustrated and described the preferred form of construction for carrying my invention into effect, this is capable of variation and modification without departing from the spirit of the invention. I, therefore, do not wish to be limited to the precise details of construction set forth, but desire to avail myself of such variations and modifications as come within the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to protect by Letters Patent is:

1. Mechanism of the class described including a shaft, a ratchet wheel on the shaft for rotation therewith, a pawl movable into engagement with the ratchet wheel for rotating the latter step by step, means for moving the pawl into engagement with the rachet wheel, means operable by the pawl-moving means and operatively related to the ratchet wheel to latch the ratchet wheel against rotation in a direction opposite to the rotation thereof by the pawl, said pawl-moving means including a sleeve mounted on the shaft for independent rotation thereof, means pivotally connecting the pawl to the sleeve, an arm carried by the sleeve and having lateral extensions formed therein, and independently operated solenoids having push rods adapted to engage said extensions.

2. Mechanism of the class described including a shaft, a ratchet wheel on the shaft for rotation therewith, a pawl movable into engagement with the ratchet wheel for rotating the latter step by step, means for moving the pawl into engagement with the ratchet wheel, said pawl-moving means including a sleeve mounted on the shaft for independent rotation thereof, means pivotally connecting the pawl to the sleeve, an arm carried by the sleeve and having lateral extensions formed therein, independently operated solenoids having push rods adapted to engage said extensions, latch means for latching the ratchet wheel against rotation in a direction opposite to the direction of rotation of the ratchet wheel by the pawl, said latch means including an end portion having an enlarged collar, and disc elements carried by the push rods and adapted to engage said collar when said push rods are moved in one direction.

3. Mechanism of the class described for latching a ratchet wheel and a shaft against rotation in one direction and which shaft and ratchet wheel are rotated step by step in an opposite direction by solenoid actuating means, comprising a structure supporting said solenoid actuating means, a member carried by said structure and movable in the direction of its length by said solenoid actuating means and having an angled end portion adapted for engagement with the ratchet wheel to latch the ratchet wheel against rotation in a direction opposite to the rotation thereof by said solenoid actuating means and having an opposite end portion engageable by an element of said solenoid actuating means for moving said member in said direction with respect to its length to dispose the angled end portion into engagement with said ratchet wheel.

WALTER A. TRATSCH.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
475,399	Holt	May 24, 1892
1,104,464	Adams	July 21, 1914