

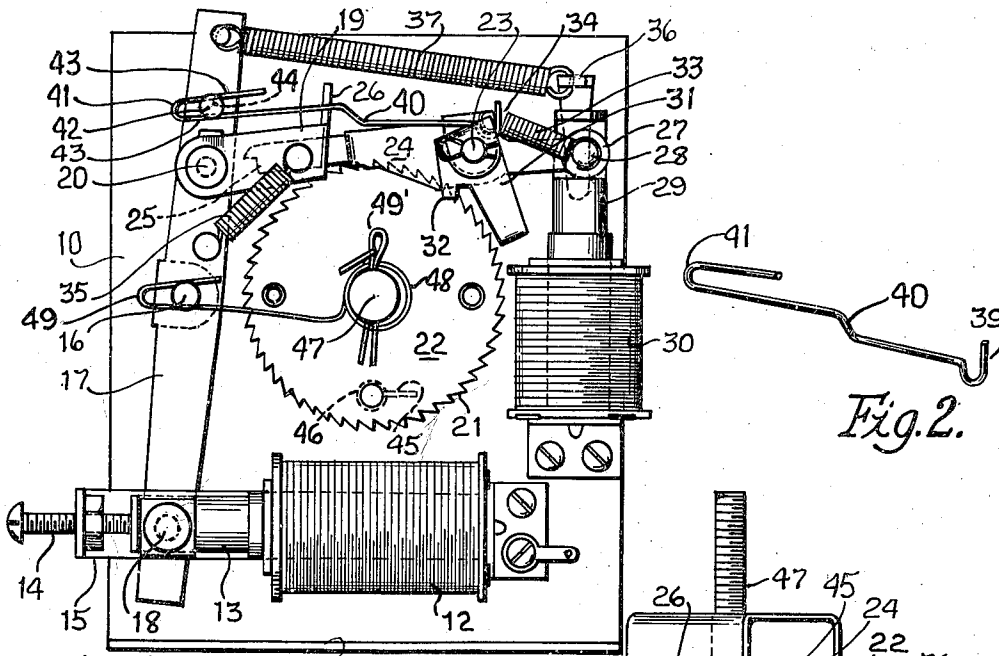
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RATCHET WHEEL STEP-UP DEVICE

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RATCHET WHEEL STEP-UP DEVICE

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This invention relates to certain new and useful improvements in ratchet wheel step-up devices and has for its principal object the provision of an improved construction of this character which will be highly efficient in use and economical in manufacture.

Among the several important objects of the invention is to provide an arrangement to permit the ratchet wheel to return to a starting or zero position.

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 side elevational view of a step-up device embodying the invention;

Fig. 2 is a perspective view of a releasing arm embodied in the invention;

Fig. 3 is a top plan view of the device illustrated in Fig. 1 and;

Fig. 4 is a side elevational view similar to Fig. 1 showing the parts in position to permit the ratchet wheel to return to starting or zero position.

The several objects of my invention are accomplished by the preferred form of construction shown in the accompanying drawings. In such drawings, I have illustrated a mounting plate 10 have a lateral flange 11 which facilitates attaching the plate to a suitable support (not shown).

This plate 10 adjacent its lower end portion carries a magnetic coil 12 including a solenoid plunger 13. This plunger 13 is limited in its outward movement from within the coil 12 by an adjustable screw 14 carried by a bracket 15 secured to the plate 10 by spot welding or the like.

Carried by the plate 10 is a pintle 16. Pivotaly carried by this pintle 16 is an arm 17. One end portion of the arm 17 is pivotally connected as at 18 to the plunger 13. Carried by the opposite end portion of the arm 17 is a step-up pawl 19. This step-up pawl 19 is pivotally connected to the arm 17 as at 20. The pawl 19 normally engages the teeth 21 of a ratchet wheel 22.

The plate 10 carries a lateral shaft 23. Pivotaly carried by this shaft 23 is a holding dog 24 which normally engages the teeth 21 of the ratchet wheel 22 to hold the ratchet against retroactive movement in a direction opposite to the movement of the ratchet wheel by the step-up pawl 19.

This holding dog 24 has an extension 25 which

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is adapted to engage beneath a finger 26 provided by the pawl 19 for reasons hereinafter more apparent. The holding dog 24 has an extension 27 which is pivotally connected as at 28 to a solenoid plunger 29 of a coil 30. This coil 30 is mounted on the plate 10.

Pivotaly mounted on the shaft 23 is an escapement dog 31. This escapement dog 31 has an extended portion 32 which is adapted to engage beneath the holding dog 24 to limit the pivotal movement of the escapement dog by the action of a spring 33 connected to the escapement dog as at 34 and to the pintle providing the connection between the extension 27 of the dog 24 and the plunger 29.

A spring 35 yieldably holds the step-up pawl 19 in engagement with the teeth 21 of the ratchet wheel 22.

A lateral finger 36 is provided by the plate 10 and to this finger is attached one end portion of a spring 37. The opposite end portion of the spring 37 is connected to the arm 17 and normally holds the plunger 13 in the position shown in Fig. 1.

The escapement dog 31 has connected thereto as at 38 one end portion 39 of a release arm 40. This arm 40 provides a loop 41 which embraces a pin 42 carried by the arm 17, the opposite portions 43 of this loop engaging in parallel grooves 44 formed in the pin 42.

Struck from the plate 10 is a stop finger 45 which cooperates with a stop pin 46 carried by the ratchet wheel 22. When this pin 46 is in bearing engagement with the finger 45, the ratchet wheel 22 is in starting or zero position.

To complete the invention, there is arranged upon the driven shaft 47 to which the ratchet wheel 22 is secured, a coil spring 48 one end of which is attached by the loop 49 to the pintle 16 and the opposite end to the shaft 47 as at 49'.

The driven shaft 47 may be connected to any suitable element to be driven thereby.

As heretofore stated, my invention has to do with returning the ratchet wheel 22 back to a starting or zero position, which position is determined by the engagement of the pin 46 with the stop finger 45.

Each time the coil 12 is energized, the arm 17 through the operation of the plunger 13 is pivoted to move the step-up pawl 19 in a direction to rotate the ratchet wheel 22 against the action of the spring 48, the holding dog 24 serving to hold the ratchet wheel against retroactive movement.

Each time the coil 30 is energized, the escape-

ment dog 31 is brought into engagement with the ratchet wheel 22 to cooperate with the holding dog 24 to permit the ratchet wheel 22 to rotate step by step under the action of the spring 48. When the plunger 29 moves within the coil 30, the holding dog 24 is moved in a clockwise direction bringing the extension 25 beneath the finger 26 to release the step-up pawl 19 from engagement with the ratchet wheel 22 to permit this last-stated movement of the ratchet wheel.

The operation of returning the ratchet wheel to zero or starting position is accomplished by the joint energization of both of the coils 12 and 30. When this takes place, the arm 17 is pivoted in an anticlockwise direction. This pivotal movement of the arm 17 bears the pin 42 against the end of the loop 41 to hold the escapement dog from movement of the plunger 29 within the coil 30.

The position of the parts, when both coils 12 and 30 are energized, is illustrated in Fig. 4. In such position of the parts, the pawl, the holding dog, and the escapement dog are disengaged from the ratchet wheel 22 when the ratchet wheel has returned, by action of the spring 48, from its zero position.

During the advance step-up of the ratchet wheel 22 by the step-up pawl 19, the pin 42 will move within the loop 41 but inasmuch as the holding dog is in engagement with the ratchet wheel 22 such wheel cannot rotate in an anticlockwise direction during this advance movement of the ratchet wheel 22.

By the foregoing construction, a simple and effective means is provided for resetting the ratchet wheel 22 to starting or zero position.

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. The combination with a step-up mechanism having a ratchet wheel, a spring for urging rotation of the ratchet wheel in one direction, a pivoted arm, a pawl pivotally carried by the arm for advancing the ratchet wheel step by step against the action of said spring, magnetic means for pivotally moving said arm, a holding dog for holding the wheel against rotation by said spring, an escapement dog for the wheel, the holding dog and pawl having interengageable parts for simultaneous disengagement from the ratchet wheel, magnetic means for moving the holding dog to simultaneously disengage the pawl and holding dog from the wheel by the action of said interengageable parts, of a member providing a connection between the escapement dog and the arm for effecting pivotal movement of the escapement dog from engagement with the wheel upon pivotal movement of the pawl and the holding dog from engagement with the wheel to permit rotation of the wheel under action of said spring.

2. The combination with a step-up mechanism having a ratchet wheel, a spring for urging rotation of the ratchet wheel in one direction, a pivoted arm, a pawl pivotally carried by the arm for advancing the ratchet wheel step by step

against the action of said spring, magnetic means for pivotally moving said arm, a holding dog for holding the wheel against rotation by said spring, an escapement dog for the wheel, the holding dog and pawl having interengageable parts for simultaneous disengagement from the ratchet wheel, magnetic means for moving the holding dog to simultaneously disengage the pawl and holding dog from the wheel by action of said interengageable parts, of a member having one end portion provided with an elongated loop, and an element carried by said arm and movable within said loop to engage the end of the loop upon pivotal movement of said arm in one direction by said first-mentioned magnetic means to pivot the escapement dog from engagement with the ratchet wheel upon simultaneous pivotal movement of the pawl and holding dog from engagement with the ratchet wheel by said second-mentioned magnetic means.

3. The combination with a step-up mechanism having a ratchet wheel, a spring for urging rotation of the ratchet wheel in one direction, a pivoted arm, a pawl pivotally carried by the arm for advancing the ratchet wheel step by step against the action of said spring, magnetic means for pivotally moving said arm, a holding dog for holding the wheel against rotation by said spring, an escapement dog for the wheel, the holding dog and pawl having interengageable parts for simultaneous disengagement from the ratchet wheel, magnetic means for moving the holding dog to simultaneously disengage the pawl and holding dog from the wheel by action of said interengageable parts, of a wire member having one end portion provided with an elongated loop, and a pin carried by said arm and movable within said loop to engage the end of the loop upon pivotal movement of said arm in one direction by said first-mentioned magnetic means to pivot the escapement dog from engagement with the ratchet wheel upon simultaneous pivotal movement of the pawl and holding dog from engagement with the ratchet wheel by said second-mentioned magnetic means.

4. The combination with a step-up mechanism having a ratchet wheel, a spring for urging rotation of the ratchet wheel in one direction, a pivoted arm, a pawl pivotally carried by the arm for advancing the ratchet wheel step by step against the action of said spring, magnetic means for pivotally moving said arm, a holding dog for holding the wheel against rotation by said spring, an escapement dog for the wheel, the holding dog and pawl having interengageable parts for simultaneous disengagement from the ratchet wheel, magnetic means for moving the holding dog to simultaneously disengage the pawl and holding dog from the wheel by action of said interengageable parts, of a member having one end portion provided with an elongated loop, an element carried by said arm and movable within said loop to engage the end of the loop upon pivotal movement of said arm in one direction by said first-mentioned magnetic means to pivot the escapement dog from engagement with the ratchet wheel upon simultaneous pivotal movement of the pawl and holding dog from engagement with the ratchet wheel by said second-mentioned magnetic means, said element being provided with opposite grooves, and opposite portions of said member providing said loop being slidably retained in said grooves.

5. The combination with a step-up mechanism in which there is a ratchet wheel, a spring for urging rotation of the ratchet wheel in one di-

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rection, a pivoted arm, a pawl pivotally carried by the arm for advancing the ratchet wheel step by step against the action of said spring, magnetic means for pivotally moving said arm, a holding dog for holding the wheel against rotation by said spring, an escapement dog for the wheel, the holding dog and pawl having interengageable parts for simultaneous disengagement from the ratchet wheel, magnetic means for moving the holding dog to simultaneously disengage the pawl and holding dog from the wheel by action of said interengageable parts, of a member having one end portion provided with an elongated loop, and a pin carried by said arm and movable within said loop to engage the end of the loop upon pivotal movement of said arm in one direction by said first-mentioned mag-

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netic means to pivot the escapement dog from engagement with the ratchet wheel upon simultaneous pivotal movement of the pawl and holding dog from engagement with the ratchet wheel by said second-mentioned magnetic means, said pin being provided with opposite grooves, and opposite portions of said member providing said loop being slidably retained in said grooves.

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REFERENCES CITED

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