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REWINDING MECHANISM FOR CLOCK SPRINGS

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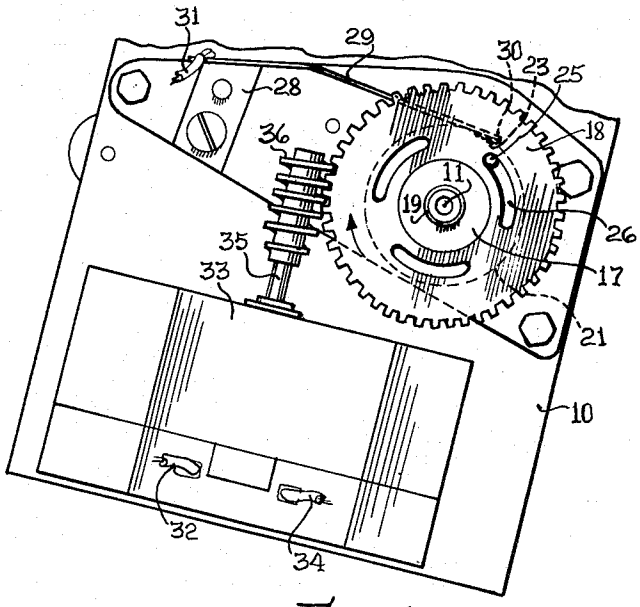


Fig. 1.

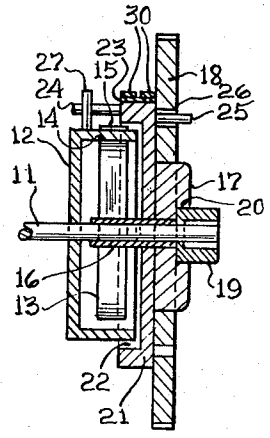


Fig. 2.

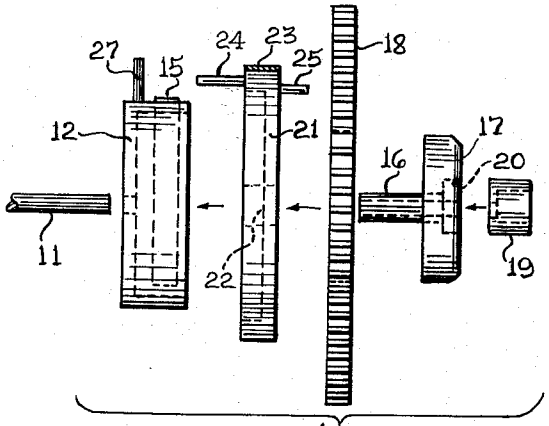


Fig. 3.

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REWINDING MECHANISM FOR CLOCK SPRINGS

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1 Claim. (Cl. 185—40)

This invention relates to new and useful improvements in a rewinding mechanism for clock springs and more particularly to a means for intermittently energizing a battery-powered motor through a novel switch arrangement for rewinding the power spring of the clock mechanism.

A principal object of our invention is the provision in a mechanism of this character of an arrangement of parts whereby a battery-powered motor will be intermittently energized through a switch arrangement which is actuated by the unwinding of the clock power spring, which switch action will cause the motor to be rendered inoperative after the power spring has been rewound to a predetermined tension.

A further object of our invention is the provision in a mechanism of this character of a novel switch mechanism for intermittently energizing the battery-powered motor.

Yet another object of our invention is the provision in a mechanism of this character of an arrangement of parts which will prevent the power spring from completely unwinding upon the failure of the battery-powered motor to perform its function of maintaining the tension of the spring between specific predetermined degrees.

An equally important object of our invention is the provision in a mechanism of this character of an arrangement of parts which is simple in construction, economical in manufacture, and which produces a clock mechanism which operates reliably and accurately.

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 fragmentary side elevational view showing our spring rewinding mechanism;

FIG. 2 is a fragmentary sectional detail view of our novel construction and switching arrangement;

FIG. 3 is a fragmentary explosive view showing certain parts of our invention.

In describing and illustrating our invention, reference will be omitted to the standard clock members such as the gear trains and associated parts that are well-known in the art and do not make up any portion of the present invention.

Extending through a back plate **10** of a clock body is a minute hand shaft **11**. This shaft has fixedly mounted thereon a cup-shaped disc **12**. Contained within the circular periphery of this disc **12** is the clock power spring **13**. This power spring **13** has one end inserted through a slot **14** formed in the periphery of the disc **12** and fixedly attached thereto as at **15**. This power spring **13** is coiled about an elongated sleeve **16** into which the free end of the minute shaft **11** freely projects. The inner coiled end of the spring **13** is fixedly attached in any approved manner to the exterior surface of the sleeve **16**.

The elongated sleeve **16** is a part of the bearing **17** upon which is fixedly mounted the gear wheel **18**. A thrust collar **19** is mounted in a circular opening **20** formed in the face of the bearing **17** as seen in FIGS. 2 and 3, and acts as a free bearing for the end of the shaft **11**.

Freely journaled on the sleeve **16** between the gear wheel

18 and the disc **12** is a contact drum **21**. One face of this drum **21** is hollowed out as at **22** and, as such, provides one side cover for the disc **12** and coil spring **13** when they are mounted in operative position with respect to each other as seen in FIG. 2. Secured to a portion of the periphery of the contact drum **21** is a segment of insulating material **23**, for purposes hereinafter made apparent.

The drum **21** has a drive pin **24** extending laterally therefrom in a plane parallel to the shaft **11** and in spaced relation to the periphery of the disc **12**. Extending laterally from the opposite side of the drum **21** is a safety finger **25**. This safety finger **25** freely projects through an arcuate slot **26** formed in the gear wheel **18**. The disc **12** is provided with a trip arm **27** extending from the peripheral edge thereof in a direction transversely to that of the drive pin **24** and is so arranged with respect thereto that during the rotation of the disc **12** by the unwinding action of the power spring **13**, it will engage and cause to move in the same direction the drive pin **24** and the contact drum **21**.

Carried by a suitable bracket **28** mounted on the back plate **10** of the clock body are switch arms **29** which have their free ends **30** riding on the peripheral edge of the contact drum **21**. These switch arms **29** are connected by a conduit **31** to one side of a battery (not shown). The other side of the battery is connected through a conduit **32** to one side of an electric motor **33** in turn connected by conduit **34** to a commutator type connection (not shown) of the contact drum **21**.

The motor **33** has a driven shaft **35** which in turn is provided with a worm type gear **36** which operatively meshes with the teeth of the gear wheel **18** as seen in FIG. 1.

In operation, the power spring **13** unwinds and causes the minute hand shaft **11** and the disc **12** to rotate in a clockwise direction as seen in FIG. 1. The switch arms **29** are normally at rest upon the segment of insulated material **23** carried by the contact drum **21**. In the course of the clockwise rotation of the disc **12**, the trip arm **27** will engage the drive pin **24** and cause the contact drum **21** to rotate in the direction of the arrow as seen in FIG. 1. The safety finger **25** will freely move in the slot **26** formed in the gear wheel **18**. When the contact drum **21** is thus rotated a sufficient distance, the segment of insulating material **23** will pass from beneath the ends **30** of the switch arms **29** and when the same engage the peripheral edge of the contact drum **21**, the motor **33** will be energized, causing through the worm gear **36** the clockwise rotation of the gear wheel **18**.

As the gear wheel **18** rotates, the end of the slot **26** will engage the safety finger **25** of the contact drum **21** and cause it to rotate in the same direction and at the same speed as the gear wheel **18**. This rotation continues until the ends **30** of the switch arms **29** again ride upon the insulated segment **23**, at which time the motor **33** is deenergized. The power spring **13** has in the meantime caused the disc **12** and the trip arm **27** to move to a position whereby it will be on the opposite side of the drive pin **24** as viewed in FIG. 2, and thus the disc **12** will be caused to rotate through a complete revolution before the trip arm **27** carried thereby again engages the drive pin **24**.

In the event that the foregoing described operation takes place but the battery is dead, the disc **12** will rotate together with the contact drum **21** until the safety finger **25** reaches the end or lowermost portion of the slot **26** as viewed in FIG. 1. At this point, as the gear wheel **18** is held against rotation through the inactive motor **33**, the clock will stop and the power spring **13** will not be permitted to completely unwind.

While we have illustrated and described the preferred form of construction for carrying our invention into effect,

this is capable of variation and modification without departing from the spirit of the invention. We, therefore, do not wish to be limited to the precise details of construction set forth, but desire to avail ourselves of such variations and modifications as come within the scope of the appended claim.

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

A rewind mechanism for a clock power spring including

(*a*) a spring driven shaft,

(*b*) a spring housing disc mounted on and rotatable with said shaft,

(*c*) an elongated sleeve freely journaled on said shaft and extending inwardly of said housing disc,

(*d*) a coiled power spring having one end connected to said sleeve and the other end connected to said disc for rotating said disc and said shaft in one direction as it unwinds,

(*e*) a battery powered electric motor having an energizing circuit for rewinding said spring,

(*f*) a gear wheel freely journaled on said sleeve and rotatable in one direction by said motor for rewinding said spring,

(*g*) a contact drum connected in circuit to the battery of said motor and freely rotatable on said sleeve between said gear wheel and said housing disc,

(*h*) a switch in the circuit to said motor adapted to engage said drum to complete the circuit for energizing said motor,

(*i*) means on said drum for preventing said switch from engaging said drum so as to complete the circuit to said motor,

(*j*) a trip arm on said disc for engaging said drum as it is rotated by said spring so as to initially rotate said drum in one direction about said sleeve and independently of said gear wheel so as to cause said preventing means to become ineffective to prevent said switch from engaging said drum to complete the circuit so as to energize said motor,

(*k*) said motor upon being energized rotating said gear wheel and said sleeve upon said shaft in said one direction for a predetermined period of time so as to rewind said power spring,

(*l*) said gear wheel having formed therein a slot through which projects a pin carried by said drum,

(*m*) said pin freely movable through said slot when said drum is initially rotated by said disc without imparting corresponding movement to said gear wheel or said sleeve,

(n) upon energization of the motor said gear wheel being rotated by said motor in said one direction will have one end of said slot engage said pin so as to cause continuous rotation of said contact drum with said gear wheel by said motor independently of rotation of said disc.

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