C. H. GILL.

AUTOMATIC WINDING MECHANISM FOR SPRINGS.

APPLICATION FILED JUNE 18, 1919.

1,332,870. Patented Mar. 2, 1920.

Fig. 1.

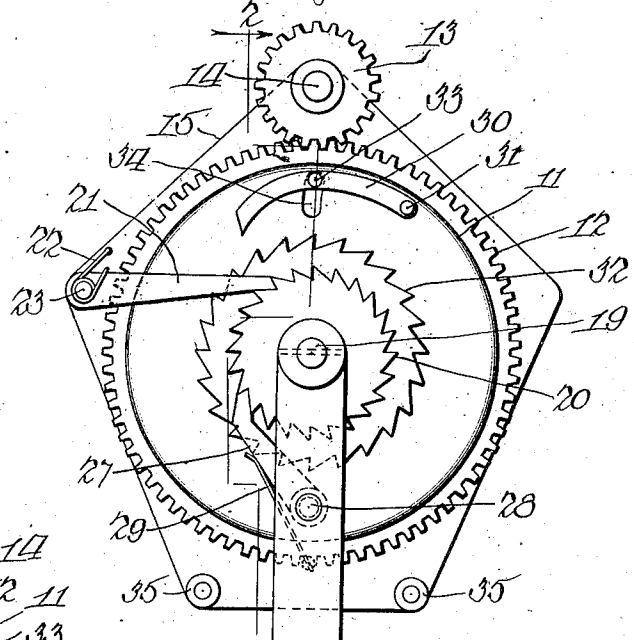


Fig. 2.

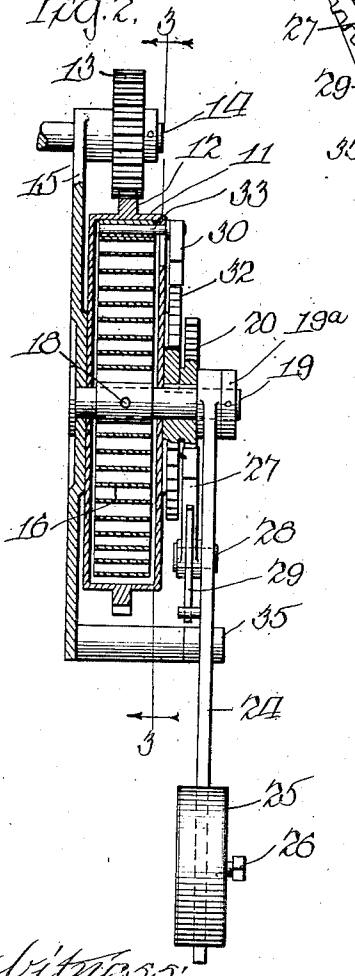
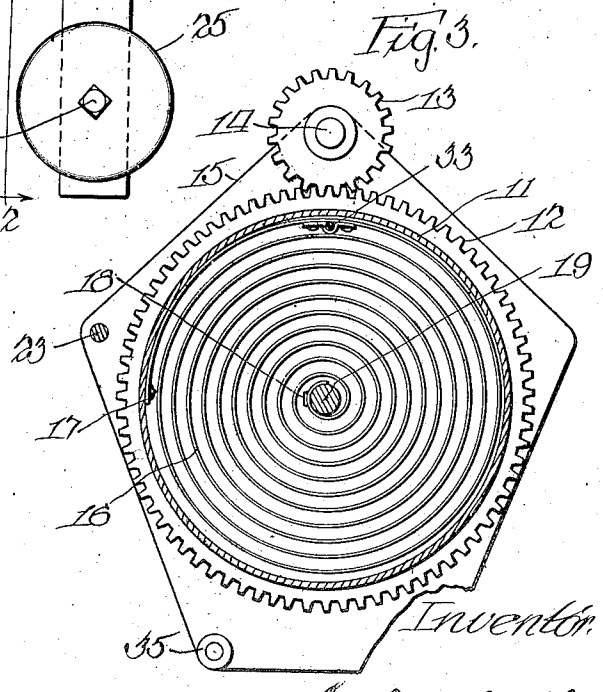


Fig. 3.



Witnesses:

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UNITED STATES PATENT OFFICE.

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AUTOMATIC WINDING MECHANISM FOR SPRINGS.

1,332,870. Specification of Letters Patent. Patented Mar. 2, 1920.

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To all whom it may concern:

Be it known that I, CHARLES H. GILL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Automatic Winding Mechanism for Springs, of which the following is a specification.

My invention relates to winding means for the springs of clocks or other spring driven mechanisms carried in or upon automobiles, vessels, aeroplanes or other movable vehicles; and the objects of my invention are, first, to provide means whereby the side sway or the variations in speed of moving vehicles may be utilized, through the principle of inertia, to provide power for winding springs; second, to provide means for applying the power thus obtained to wind said springs; and, third, to provide a means for locking the power furnishing means against operation when the spring is fully wound and for releasing it when the spring loses some of its tension.

I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a front elevation of my device, showing it applied to a spring barrel; Fig. 2 is a cross section on the line 2—2 of Fig. 1, looking in the direction indicated by the arrows; and Fig. 3 is a section on the line 3—3 of Fig. 2, looking in the direction indicated by the arrows.

Similar figures refer to similar parts throughout the several views.

A spring barrel 11 is supplied with spur gear teeth 12 on its periphery, these gear teeth 12 meshing with a pinion 13 on a shaft 14 journaled in the frame 15. The shaft 14, which is shown broken away in Fig. 2, may be operatively connected to whatever mechanism the spring is required to furnish driving power for.

A coil spring 16 has one end fixed by a pin 17 to the inside of the spring barrel 11 and its other end fixed by a pin 18 to the winding shaft 19. This winding shaft 19 is journaled in the frame 15 and the spring barrel 11 is rotatably mounted upon it.

A ratchet wheel 20 is fixed to the winding shaft 19 and is engaged by a pawl 21, pivoted on the frame 15 by the pin 23 and pressed by the spring 22, which has one end fixed to the frame 15 and is wound around the pin 23 with its free end bent over the pawl 21.

A pendulum 24 is pivotally mounted on the winding shaft 19 and is held in place by the ratchet wheel 20 and the collar 19^a, which is fixed to the winding shaft 19. The pendulum 24 carries a weight 25 near its lower end and this weight 25 is slidably mounted on the pendulum 24 and held in the desired position by a set screw 26.

A pawl 27 is pivoted on the pendulum 24 by means of a pin 28 and is pressed into engagement with the ratchet wheel 20 by a spring 29, fixed on the pendulum 24.

A pawl 30 is pivoted on the spring barrel 11 by means of a pin 31 and is adapted to engage a ratchet wheel 32 fixed on the winding shaft 19. The teeth of the ratchet wheel 32 are turned oppositely to those of the ratchet wheel 20.

The pawl 30 carries an extended pin 33 which extends within the spring barrel 11 through a slot 34 in the face of the spring barrel 11. This pin 33 extends between the outermost convolution of the coil spring 16 and the next inner convolution of said spring 16.

Stops 35 are fixed on the frame 15 and project in the path of swing of the pendulum 24 to limit its swing.

The position this device occupies upon a moving vehicle will determine whether its actuating power is obtained through the side sway of the vehicle or through the variations in speed occasioned by different motor impulses or by unevenness of the roadway.

In operation, the pendulum 24 will be caused to swing through the principle of inertia, whether this be in a fore and aft direction or in a side to side direction with reference to the vehicle carrying it, this depending upon the position of the device with reference to said vehicle. This, of course, assumes the vehicle to be moving, the device operating only when the vehicle is in motion.

The weight 25 carried by the pendulum 24 is sufficiently heavy to make the pendulum operative and may be adjusted to the proper position to most efficiently perform its office by being slid up or down on the pendulum 24 and fixed in position by means of the set screw 26. This weighted pendulum is free to swing in one direction, the pawl 27 then passing over the teeth of the ratchet wheel 20 which is held from being rotated in one direction by the pawl 21. On

the return swing of the pendulum 24, however, the pawl 27 carried by the pendulum 24 will engage the ratchet wheel 20 and cause partial rotation of the winding shaft 19. This operation is repeated over and over as new inertia impulses are given to the pendulum 24 and, consequently, the coil spring 16 is gradually wound up. This winding process will ordinarily be much more rapid than the unwinding of the spring 16 through rotation of the spring barrel 11 and, consequently, the spring 16 will soon be tightly wound. When this occurs, means must be provided to make the pendulum 24 inoperative as otherwise the continued winding impulses on an already tightly wound spring would cause the mechanism being driven by that spring to run fast or unevenly.

Hence, I provide a locking means consisting of the ratchet wheel 32 and the pawl 30. A pin 33 projects through a slot 34 in the face of the spring barrel 11 and is fixed to the pawl 30. This pin 33 extends inwardly and passes between the outermost convolution of the spring 16 and the next inner convolution. Since the spring 16 is wound from the center by the winding shaft 19, the various convolutions will tighten in their order with respect to the center. Hence, the outermost convolution will be the last to be drawn inward and it will carry the pin 33 and the pawl 30 with it toward the center, bringing the pawl 30 into locking engagement with the ratchet wheel 32 and preventing further winding. As the spring 19 unwinds through rotation of the spring barrel 11 the outermost convolution will be the first to return to its normal unwound position and will be followed by the next inner convolution, which will carry outward with it the pin 33 and pawl 30, thus releasing the ratchet wheel 32 and allowing the pendulum 24 to resume its swings under inertia impulses.

While I have described a particular embodiment of my invention, it will be evident that a great many departures from this construction might be made without departing from the spirit of my invention, and I, therefore, do not wish to be limited to the construction described.

I claim:

1. In automatic winding mechanism for springs, the combination of a spring, a winding shaft adapted to wind said spring, pendulum means for rotating said shaft in a winding direction, means adapted to prevent the turning of said shaft in the non-winding direction and locking means adapted to secure the said shaft against further rotation in the winding direction after the spring actuated by said shaft is wound to a predetermined degree of tightness.

2. In automatic winding mechanism for springs, the combination of a winding shaft adapted to wind a coil spring thereon, pendulum means adapted to rotate said shaft in a winding direction, a pawl so disposed as to prevent the rotation of said shaft in the non-winding direction and automatic locking means adapted to secure the said shaft against rotation in the winding direction when the said coil spring is wound to a given degree of tightness and to permit rotation of said shaft in the winding direction when the said coil spring becomes less tightly wound.

3. In automatic winding mechanism for springs, the combination of a winding shaft adapted to wind a coil spring thereon, a pendulum adapted to rotate said shaft in a winding direction when said pendulum is swung in one direction and to swing freely in the opposite direction without rotating the said shaft, a weight slidably mounted upon the said pendulum and adapted to adjust the degree of power exerted by said pendulum in its operative swing according to the distance of said weight from the axis of said pendulum, means for securing said weight upon said pendulum at any desired distance from the axis of said pendulum, a pawl so disposed as to prevent the rotation of said shaft in a non-winding direction and automatic locking means adapted to secure the said shaft against rotation in the winding direction when the said coil spring is wound to a predetermined degree of tightness and to permit rotation of said shaft in the winding direction when the said coil spring becomes less tightly wound.

CHARLES H. GILL.