

G. O'BRYAN.
 SPRING MOTOR.
 APPLICATION FILED DEC. 28, 1909.

1,040,742.

Patented Oct. 8, 1912.
 4 SHEETS—SHEET 1.

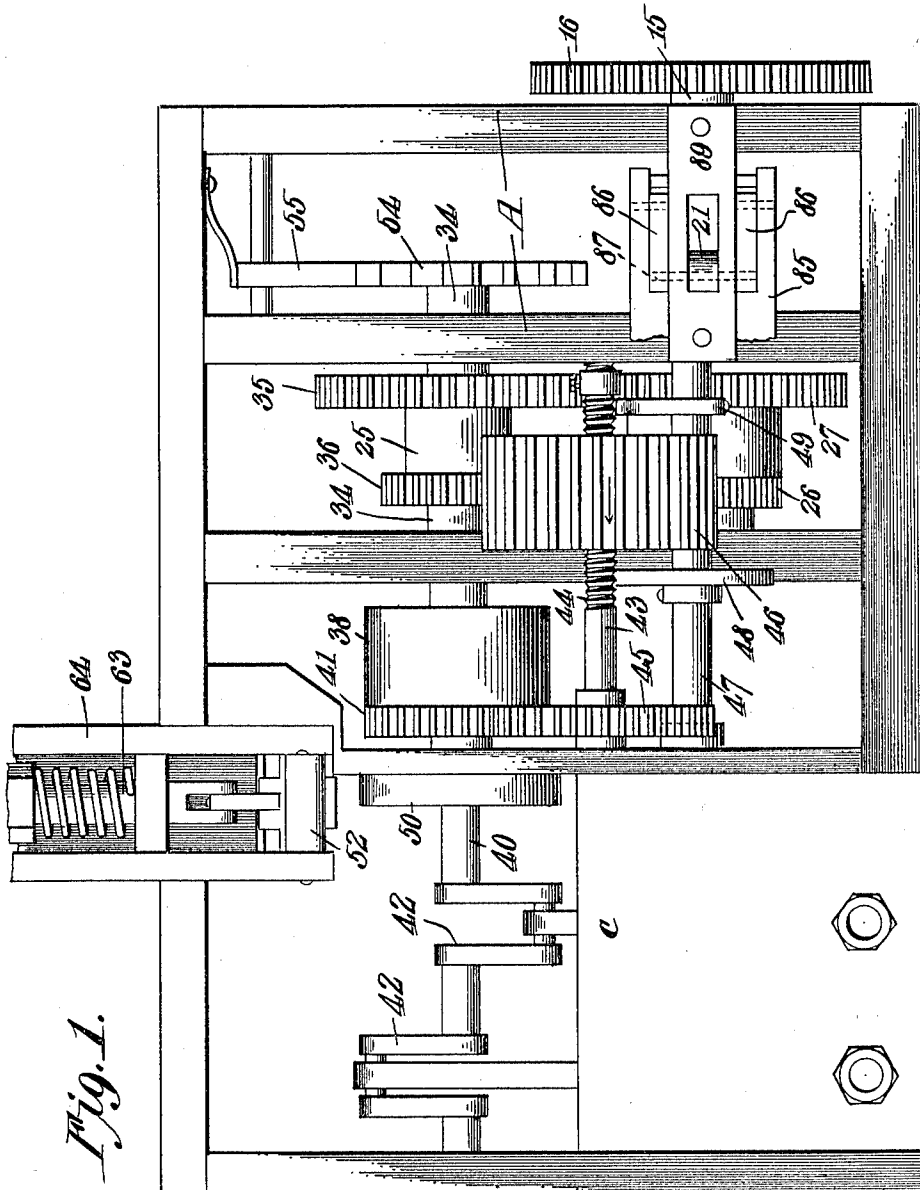


Fig. 1.

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Witnesses
 J. J. Fah.
 Wm. Bagger.

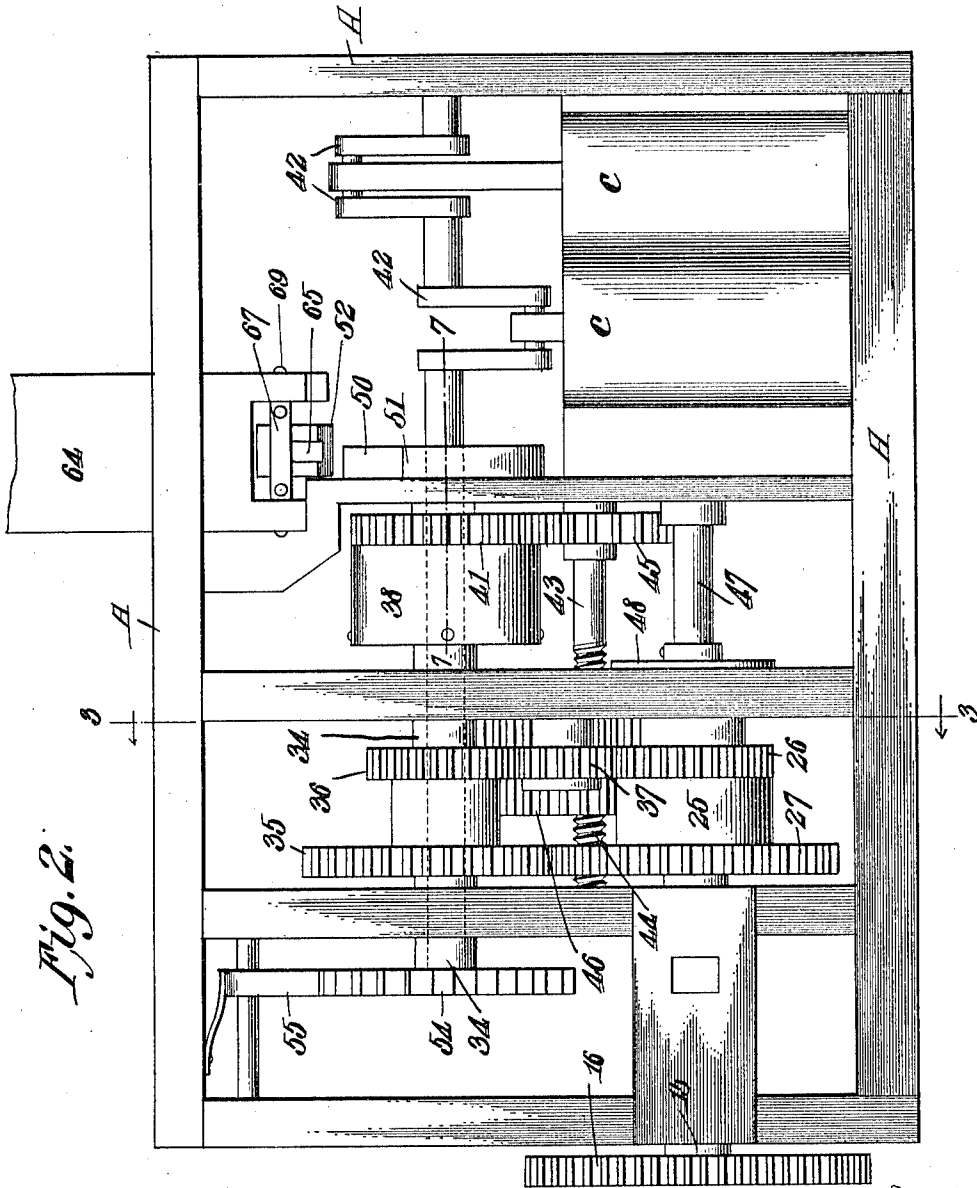
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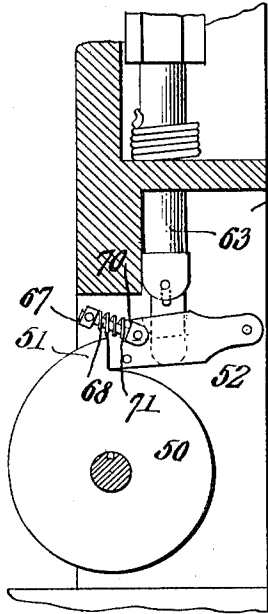


Fig. 10.

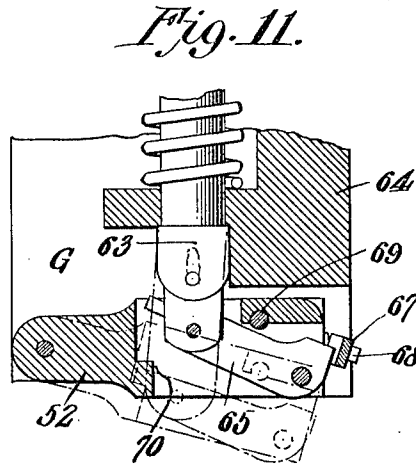


Fig. 11.

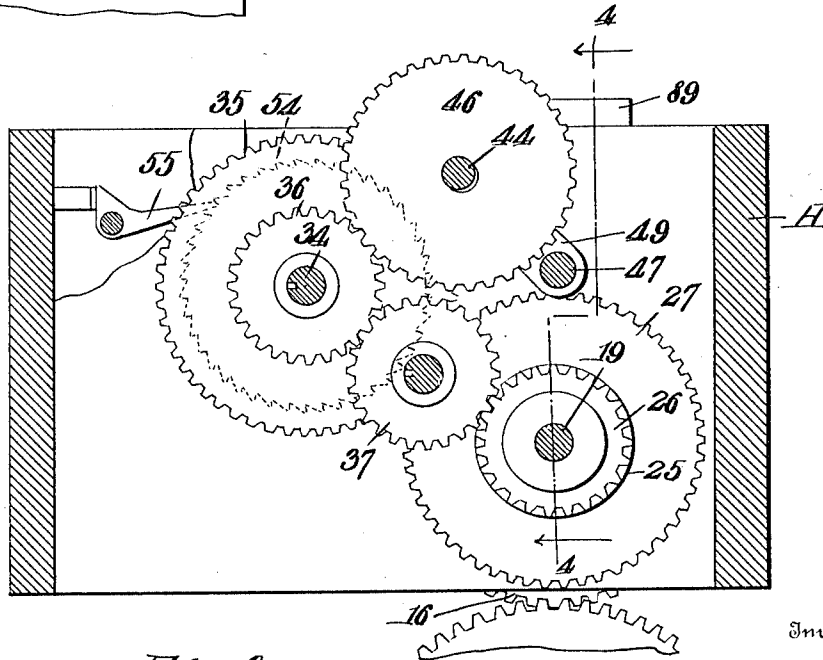


Fig. 3.

Witnesses
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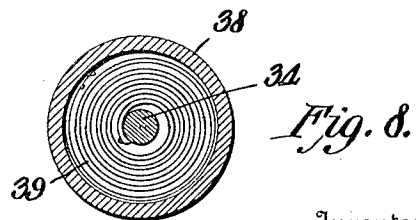
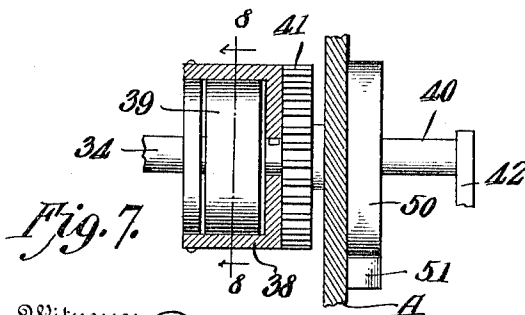
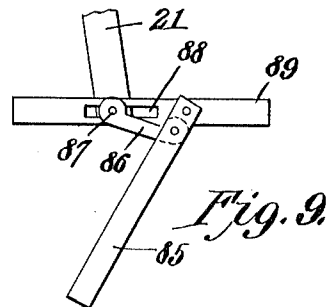
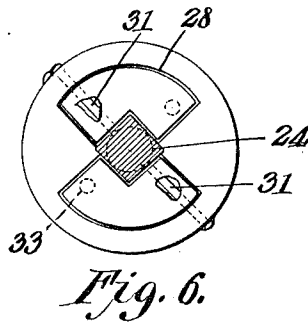
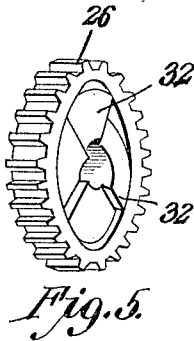
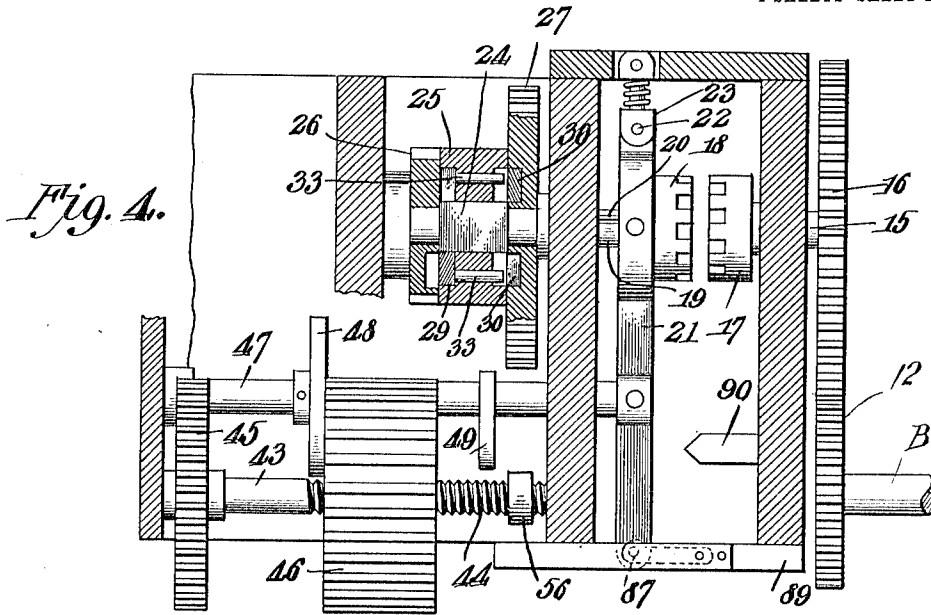
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UNITED STATES PATENT OFFICE.

GORY O'BRYAN, OF LOUISVILLE, KENTUCKY.

SPRING-MOTOR.

1,040,742.

Specification of Letters Patent.

Patented Oct. 8, 1912.

Application filed December 28, 1909. Serial No. 535,352.

To all whom it may concern:

Be it known that I, GORY O'BRYAN, a citizen of the United States of America, residing at Louisville, in the county of Jefferson and State of Kentucky, have invented new and useful Improvements in Spring-Motors, of which the following is a specification.

This invention relates to spring motors, and it has for its prime object to construct a simple and efficient motor device which may be readily applied to and used in connection with railroad cars for the purpose of operating an air compressor to furnish compressed air for actuating air brakes and for other purposes.

A further object of the invention is to provide simple and improved means whereby the main winding shaft of the motor will be operated by a power shaft, such as one of the axles of the car, regardless of the direction of rotation of such power shaft or axle.

A further object of the invention is to provide means whereby the driving connection between the power shaft or axle and the main winding shaft shall be automatically thrown into and out of gear at the proper times.

Still further objects of the invention are to simplify and improve the general construction and operation of a machine embodying the features hereinbefore referred to.

With these and other ends in view which will readily appear as the nature of the invention is better understood, the same consists in the improved construction and novel arrangement and combination of parts which will be hereinafter fully described and particularly pointed out in the claim.

In the accompanying drawings has been illustrated a simple and preferred form of the invention; it being, however, understood that no limitation is necessarily made to the precise structural details therein exhibited, but that changes, alterations and modifications within the scope of the invention may be resorted to when desired.

In the drawings,—Figure 1 is a top plan view of a device constructed in accordance with the principles of the invention. Fig. 2 is a bottom plan view of the same. Fig. 3 is a transverse sectional view taken on the plane indicated by the line 3—3 in Fig. 2. Fig. 4 is a sectional detail view taken substantially on the plane indicated by the

line 4—4 in Fig. 3 through the reversing clutch and related parts. Fig. 5 is a perspective detail view of one of the transmission gears forming part of the reversing clutch. Fig. 6 is a detail view in side elevation of the sleeve or collar carrying the pawls of the reversing clutch. Fig. 7 is a sectional detail view taken through the spring barrel and related parts. Fig. 8 is a sectional detail view of the spring barrel taken on the plane indicated by the line 8—8 in Fig. 7. Fig. 9 is a detail plan view of the clutch-operating lever. Fig. 10 is a detail view in elevation of the cam of the pump operating shaft, showing the stop member or governor in engagement therewith. Fig. 11 is a detail view in sectional elevation of the governor.

Corresponding parts in the several figures are denoted by like characters of reference.

The casing A of the improved spring motor mechanism is to be suitably supported for operation adjacent to the axle B of a car, it being, however, understood, that other motive power than that derived from the car axle may be utilized for the purpose of winding the motor spring. The casing is provided with bearings for a primary shaft which will be referred to as the main shaft 15 and which has been shown as being equipped with a pinion 16 meshing with a spur wheel 12 upon the axle or power shaft B as conventionally indicated in Fig. 4. The main shaft 15 carries a clutch member 17 adapted to coöperate with a mating clutch member 18 which is mounted slidably upon a shaft 19 with which said clutch member 18 is connected for rotation by means of a spline 20. The clutch member 18 is suitably connected with and carried by a shipping lever 21 which is fulcrumed at 22 upon a resiliently supported lug 23.

The shaft 19 has a squared portion or enlargement 24 carrying the sleeve or collar 25 which, in connection with gear wheels 26 and 27 mounted for rotation upon the shaft adjacent to said sleeve or collar, constitutes a device which may be briefly described as a reversing clutch. The sleeve or collar 25 is provided in its opposite sides or faces with recesses 28 for the accommodation of pawls 29 and 30, said pawls being supported pivotally upon pins 31 which are disposed almost radially to the shaft 19. The pawls 29 and 30 upon opposite sides of the sleeve 25 are faced in opposite directions and are

adapted to engage teeth or ratchets formed upon proximate gear wheels 26 and 27, one of which, 26, has been illustrated in Fig. 5, where the teeth or ratchets have been indicated at 32. Pins 33 extend transversely through the sleeve 25, said pins being parallel to the axis of the shaft 19, and said pins abutting upon the inner faces of the oppositely disposed pawls 29 and 30; thus, when the pawls at one side are pushed within their respective recesses 28, the pawls at the opposite side of the sleeve 25 will project beyond said recesses and will be in a position to engage the teeth of the proximate gear wheels 26 or 27, as the case may be, thus forcing such gear wheel to rotate with the shaft and with the sleeve 25; in Fig. 4 of the drawings the pawls 30 have been shown in active engagement with the gear wheel 27. It is obvious that when the direction of rotation of the shaft 19 is reversed, the pawls 30 will be forced in an inward direction, pressing against the pins 33, and forcing the pawls 29 at the opposite side of the sleeve 25 outward from the face of said sleeve and into active engagement with the gear wheel 26 which is now compelled to rotate with the shaft, while the gear wheel 27 remains idle. Thus it will be seen that by this simple mechanism the shaft 19 when rotated in one direction will cause the gear wheel 27 to rotate therewith, while the gear wheel 26 remains idle. A shaft 34 which may be appropriately designated as the "winding shaft" is supported for rotation in the frame A, and said shaft carries a spur wheel 35 meshing directly with the gear wheel 27, and the shaft also carries a gear wheel 36 which receives motion from the gear wheel 26 upon the shaft 19 through the medium of an interposed idler 37, so that the shaft 34 will be rotated in one direction without regard to the direction of rotation of the shaft 19 with which it is connected. The winding shaft 34 is extended into a spring barrel 38 containing a coiled spring 39, one end of which is connected with the spring barrel, while the opposite end of said spring is connected with the winding shaft 34 whereby the spring is wound within the barrel. It is desired to be understood that a plurality or battery of springs may be used if necessary or desirable in order to obtain sufficient power. The spring barrel 38 is supported upon a shaft 40 with which said spring barrel is securely connected for rotation, and said shaft carries a gear wheel 41 which has been shown as lying adjacent to the spring barrel with which it may be connected for rotation. It will be seen that when the winding shaft is rotated to place the spring 39 under tension, motion will be transmitted through said spring to the barrel 38, thus rotating the latter as well as the shaft 40. The shaft 40 is provided with

cranks 42 for the purpose of transmitting motion to air pumps or compressors conventionally indicated at C, which air pumps or compressors are in this manner actuated.

Suitably supported for rotation in the frame A is a shaft 43, a portion of which is screw threaded, as indicated at 44, said screw shaft being located in parallel relation to the winding shaft and provided with a spur wheel 45 meshing with the gear wheel 41 adjacent to and connected with the spring barrel.

46 designates a gear wheel having a wide broad face, the hub of said gear wheel constituting a nut, whereby it is mounted for travel upon the screw threaded portion of the shaft 43, said gear wheel being in mesh with the gear wheel 36 upon the winding shaft. Proportions are so calculated that when the winding shaft 34 is rotated and the spring barrel is rotated thereby through the action of the intervening spring, the stationary gear wheel 45 and the traveling gear wheel 46 upon the screw shaft will be rotated practically in unison therewith, slight variations in speed being permissible by the lateral movement of the gear wheel 46 upon the screw shaft. Should the rotation of the spring barrel (carried by the shaft 40) be suddenly checked, and the rotation of the winding shaft be continued, it is obvious that the spring would gradually become tightly wound in the barrel. The stoppage of the latter would stop the rotation of the screw shaft by the intermeshing gear wheels 41, 45 and the gear wheel 46 would now travel along the screw shaft in the direction indicated by an arrow in Fig. 1 of the drawings. This movement of the gear wheel 46 is utilized to actuate the clutch, whereby the winding mechanism is disconnected from the source of power by means which will now be described.

47 is a rod which is supported for sliding movement in the frame of the machine, said rod or slide carrying two stops 48 and 49 which are disposed in the path of the traveling gear wheel 46. The slide 47 is pivotally connected at one end with the shipping lever 21 carrying the clutch member 18, the arrangement being such that when the wheel 46 strikes the stop member 48 the clutch member 18 will be thrown out of engagement with the clutch member 17, thus stopping the winding mechanism. When, on the other hand, the wheel 46 engages the stop member 49, the shipping lever will be actuated to restore the clutch member 18 into engagement with the clutch member 17, and motion will be transmitted to the winding mechanism from the source of power.

The crank shaft 40 which operates the pumps or air compressors carries also a cam 50 having an eccentric tooth 51. G is a governor including a shoe or stop member 52

which may be disposed in the path of the eccentric tooth 51, thereby obstructing rotation of the shaft 40. When the rotation of the shaft is thus obstructed, the rotation of the screw shaft will be stopped, and the rotation of the winding shaft will continue, thus placing the motor spring 39 under high tension and causing the wheel 46 to travel in the direction of the arrow in Fig. 1, until the stop 48 is encountered, thus disconnecting the winding mechanism from the source of power. The parts will remain in this position as long as the governor shoe 52 obstructs the rotation of the shaft 40; when the governor shoe is withdrawn, the spring barrel will be rotated under the impulse of the power stored up in the spring, and the screw shaft 43 will be rotated with the effect of causing the wheel 46 to travel along said screw shaft in the direction of the stop 49 upon the slide 47 which will thus be actuated to reset the clutch member 18 in engagement with the clutch member 17, thus causing the winding mechanism to be again actuated from the source of power. The winding shaft 34 carries a ratchet wheel 54 engaged by a spring-actuated pawl 55 for the purpose of preventing reverse rotation of said winding shaft. The screw threaded portion 44 of the shaft 43 is also equipped with a stop 56 lying in the path of the wheel 46 to cause rotation of said shaft to begin practically simultaneously with the resetting of the clutch 17, 18, thereby avoiding danger of straining or injuring parts of the mechanism.

The shipping lever 21 may when desired be actuated by a hand lever 85 which is connected with said shipping lever by a link or links 86, said links being connected with the shipping lever by means of a pin 87 traveling in a guide slot 88 in a frame bar 89. The hand lever may be operated either directly or through the medium of ordinary

well known connecting means leading to a conveniently accessible point, but which it has not been deemed necessary to illustrate in the drawings. The frame A supports a bracket 90 which in the event of the clutch having been thrown out by means of the hand lever 85 will constitute a fulcrum for the shipping lever 21 to enable the latter to be actuated under such circumstances by the herein described means for automatically actuating said lever.

From the foregoing description taken in connection with the drawings hereto annexed, the operation and advantages of this invention will be readily understood by those skilled in the art to which it appertains.

Having thus described the invention, what is claimed as new, is:—

In a device of the character described, an operating shaft, driving means for said shaft including a spring barrel connected with the shaft, a winding shaft connected with the spring within the barrel, a pinion upon the operating shaft, a screw shaft having a gear wheel meshing with a pinion, a gear wheel having threaded engagement with the screw shaft, means for driving the winding shaft including a connecting clutch and a shipping lever for the same, means for actuating the shipping lever including a slide and stop members upon said slide disposed in the path of the gear wheel upon the screw shaft, a pinion upon the winding shaft meshing with the gear wheel upon the screw shaft, and governor means for obstructing the rotation of the operating shaft.

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

GORY O'BRYAN.

Witnesses:

M. E. HOLLIHAN,
T. J. O'BRYAN.