

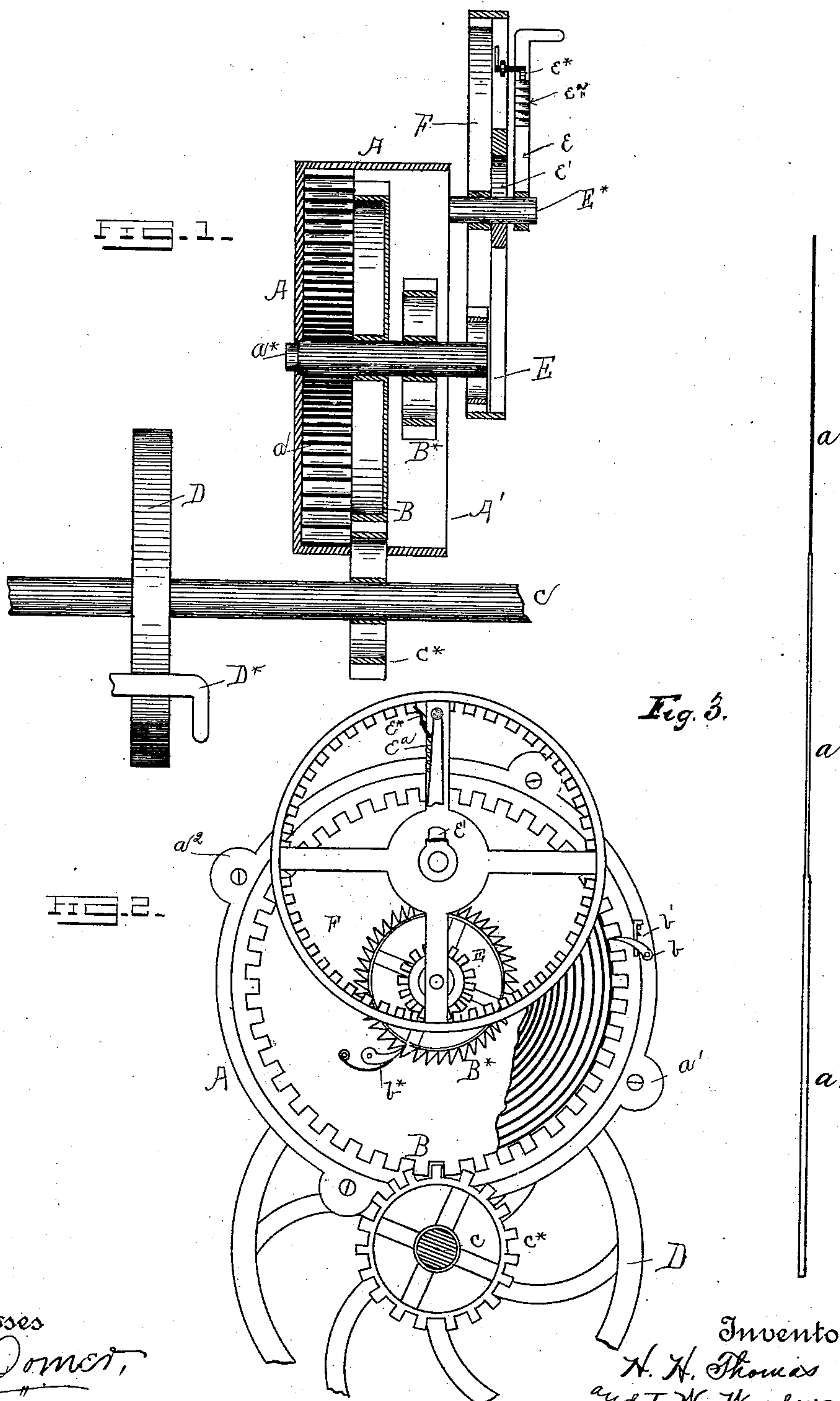
(No Model.)

H. H. THOMAS & J. W. WOODWARD.

## SPRING MOTOR.

No. 362,555.

Patented May 10, 1887.



## Witnesses

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# UNITED STATES PATENT OFFICE.

HENRY H. THOMAS AND JOSEPH W. WOODWARD, OF DAHLONEGA, GA.

## SPRING-MOTOR.

SPECIFICATION forming part of Letters Patent No. 362,555, dated May 10, 1887.

Application filed May 28, 1886. Serial No. 203,555. (No model.)

*To all whom it may concern:*

Be it known that we, HENRY H. THOMAS and JOSEPH W. WOODWARD, citizens of the United States, residing at Dahlonega, in the county of Lumpkin and State of Georgia, have invented certain new and useful Improvements in Spring-Motors; and we do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

Our invention relates to motors for driving light machinery—such as sewing-machines, jewelers' lathes, and other analogous small power machinery—and has for its object the provision of a simple, durable, and effective spring-motor power, which shall be adapted for use upon machines already built and in use without changing them in any material degree, and be capable of being rapidly and easily wound up, while the machinery to which it is connected is not affected by the winding, and when wound up the winding means can be readily thrown out of gear and remain motionless during the operative action of the device due to the recoil of the spring.

Our device is constructed of a very few, simple, strong, and durable parts, compactly placed together, so as to occupy no appreciable room, and be readily placed and secured upon a machine at any point. We also provide a knee-brake to check and control the action of the spring, so as to conserve the force in it when its expenditure would not only be idle, but might tend to damage the empty running machine.

The accompanying drawings illustrate what we consider the best means for carrying our invention into practice.

Figure 1 is a central section taken in the line of the main shaft. Fig. 2 is a face elevation. Fig. 3 is a view of the spring uncoiled, showing the different thicknesses.

Similar letters of reference indicate corresponding parts in all the figures where they occur.

A is the drum containing the spring  $a$ , fast at one end to the case of the drum and at the

other to the winding-post  $a^*$ . The drum has ears or projections  $a' a^2$ , for attaching it to the frame of the machinery to be driven. It also has a removable face or cover,  $A'$ , within the face or cover, and over the spring  $a$  is mounted the gear-wheel B, loose upon the winding-post  $a^*$ , and over said wheel B is mounted the ratchet wheel  $B^*$ , fast upon the winding-post, with a spring-actuated pawl,  $b^*$ , pivoted on the surface of wheel B and engaging ratchet-wheel  $B^*$ . By this arrangement the gear-wheel B is driven by the normal revolutions of the winding-post due to the recoil of the spring; but when the winding-post is turned in the opposite direction, as in winding up the spring to store power, it is apparent that the wheel B need not move, as the pawl will ride over the teeth on ratchet  $B^*$ .

It is desirable that the wheel B, which is the drive or master wheel of the structure, should not be turned when the winding operation is in progress, and for this purpose a detent-pawl or stop-latch,  $b$ , with a thumb slide,  $b'$ , for throwing it into and out of gear, is arranged at one side of wheel B. When the spring is recoiling and giving off the power stored in it, this detent will be withdrawn from the cogged periphery of wheel B; but in winding up the motor it will be brought into engagement again by the proper movement of the thumb-piece or slide  $b'$ . The pawl or detent  $b$  is pivoted to the drum or some other fixed part, and the slide  $b'$  also works in such fixed part.

Power is communicated from the master-wheel B to the machine-shaft C through the medium of the pinion  $c^x$ , which meshes into the cogged rim of wheel B, as shown. On the same shaft, C, is mounted the band-wheel D, which communicates motion to the working parts of a machine (not shown) by means of a band or strap or other communicating device in the ordinary manner.

A knee-brake,  $D^*$ , is applied to the wheel D to be operated by the workman at the machine to control the speed or stop the machine at the proper moment, thus conserving the motive force of the spring and preventing accident to the mechanism.

We have devised a powerful, speedy, and reliable means for winding, which is a very desirable and important adjunct to the ma-



chine, as above described. This attachment or adjunct consists of a pinion, E, fixed to the winding-post *a*, outside of the face-plate A', and an interiorly-cogged circle or rim, F, which can be made to engage or disengage the pinion E, and is provided with a hand-crank, *e*, for giving it revolution. The eye of this rim is an elongated slot, *e'*, as shown, and a spring-pawl, *e<sup>x</sup>*, on an arm of rim, F, engages a rack, *e<sup>a</sup>*, on the handle *e*, and holds the teeth of the rim in engagement with the pinion E and engages these parts while the handle is turned. By disengaging the pawl and rack the rim F will drop out of engagement with the spur. This disengagement can be effected by power applied by hand. Through this elongated eye the stud or center E<sup>x</sup> projects. This part E<sup>x</sup> is fixed to some stationary part, as plate A'. The end of the slot *e'*, in which the seat for the stud E<sup>x</sup> is made, is so located in the hub as to bring the rim F centrally upon said stud when seated, and at the same time cause it to make connection with the gear E. When thus placed, if the follower be pressed down, the rim will be held securely, and by turning the crank or handle *e* the motor will be wound up.

As soon as the motor is wound, it becomes desirable to disengage the winding device, and this is done by bringing the follower vertically over the stud E<sup>x</sup> and pushing it upward by the thumb, when the rim will drop down the distance the follower has been elevated, which is made sufficient to disengage the cogged rim from wheel or pinion E, so that when in action the power of the motor will not be expended in driving the winding device. It is apparent that a great acceleration of speed in winding is attained by the use of this rim.

We provide a novel spring for our motor. We make the spring of different thicknesses and temper at different points in its length, preferring to make three different thicknesses and different tempers in as many sections of the spring. For instance, we provide an inch-wide spring—say thirty (30) feet in length. For

the first ten (10) feet we make the spring one-sixteenth ( $\frac{1}{16}$ ) of an inch thick. For the next ten feet we make it one sixty-fourth ( $\frac{1}{64}$ ) part of an inch thicker, and for the last ten feet we make it one one-hundred-and-twenty-eighth ( $\frac{1}{128}$ ) part of an inch thicker still. This increase may be continued for any length of spring; but we prefer to divide it into three sections. We temper this spring first the full length of an even temper. On the second or middle section we then add about one-third more temper, and on the last section about two-thirds more than on the first section. This extra temper and thickness occurring in the center of the spring when wound renders the power of the spring uniform throughout. It will be understood, however, that we may use the ordinary spring, if desired.

Having thus described our invention, what we desire to claim and secure by Letters Patent is—

1. In a spring-motor, the combination of a winding-pinon, winding-rim for engaging it, and means, substantially as described, for throwing the said rim into and out of engagement with the pinion, as set forth.

2. In a spring-motor, the combination of a winding-pinon on the master-wheel shaft and an interiorly-cogged rim having an elongated eye, and means, substantially as described, for engaging and disengaging said rim with the pinion.

3. In a spring-motor, the combination of a pinion on the winding-post, an interiorly-cogged rim having an elongated eye, a spring-pawl on a part of the rim, and a rack on the crank for controlling the position of said rim upon the center, as set forth.

In testimony whereof we affix our signatures in presence of two witnesses.

HENRY H. THOMAS.  
JOSEPH W. WOODWARD.

Witnesses:  
WM. J. WORLEY,  
JOSEPH ALLEN.