(No Model.)

2 Sheets—Sheet 1.

W. HOWARD.

SPRING MOTOR.

No. 504,808. Patented Sept. 12. 1893.

Fig. 1.

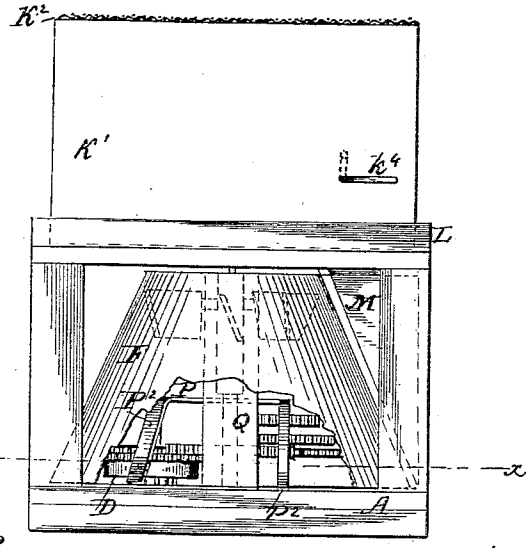


Fig. 2.

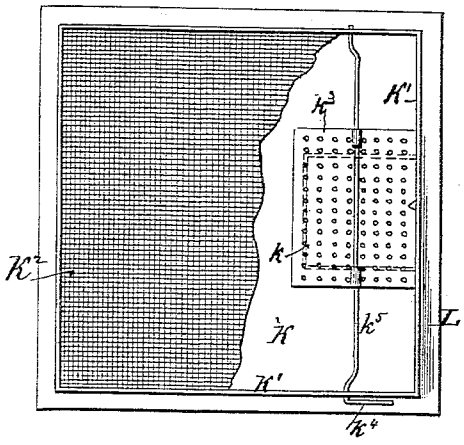


Fig. 3.

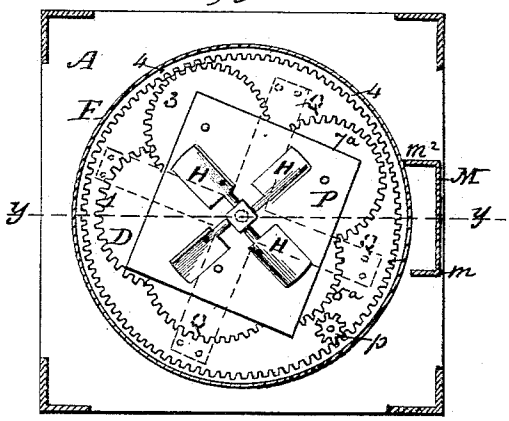


Fig. 6.

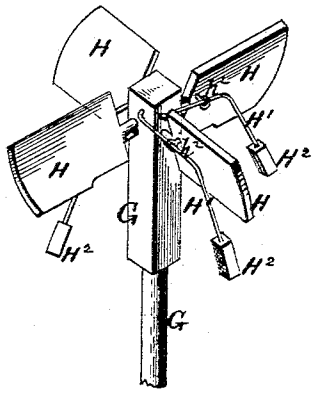
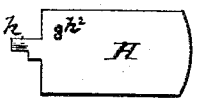


Fig. 7.



WITNESSES
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(No Model.)

2 Sheets—Sheet 2.

W. HOWARD.

SPRING MOTOR.

No. 504,808. Patented Sept. 12, 1893.

Fig. 4.

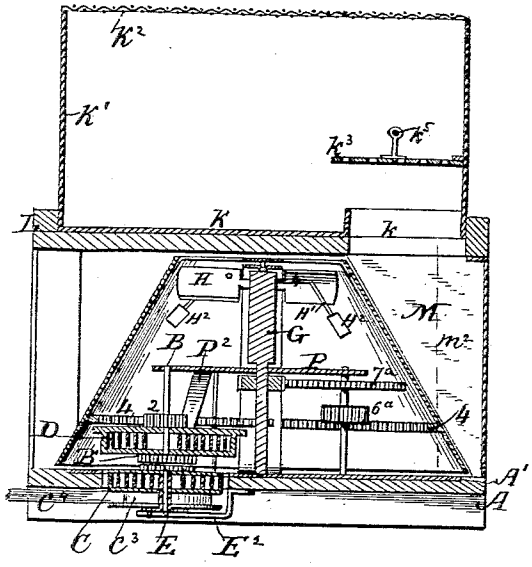


Fig. 5.

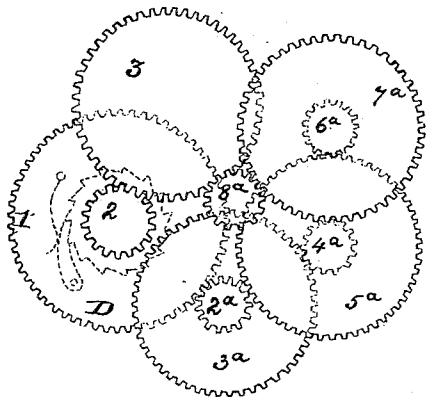


Fig. 8.

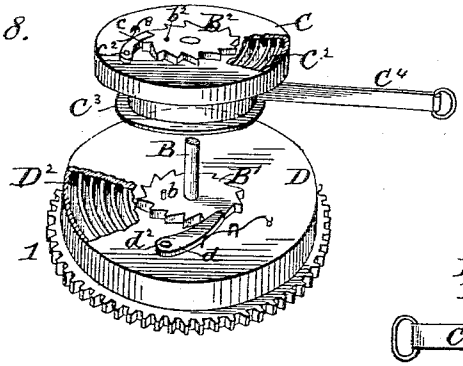


Fig. 9.

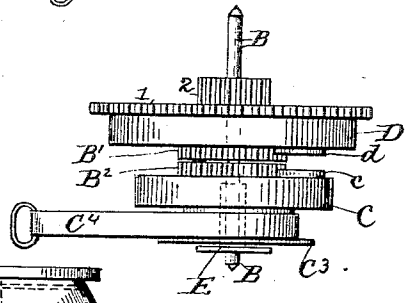
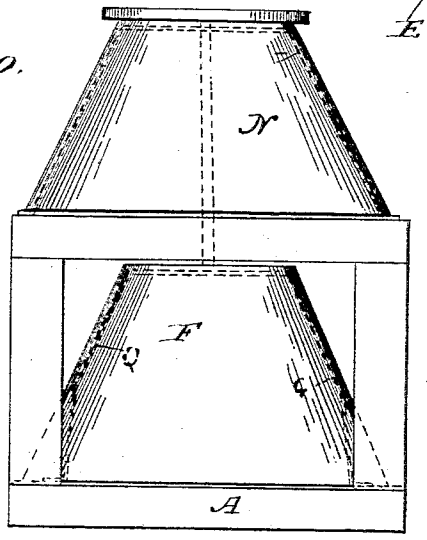


Fig. 10.



WITNESSES

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UNITED STATES PATENT OFFICE.

WALTER HOWARD, OF WASHINGTON, DISTRICT OF COLUMBIA.

SPRING-MOTOR.

SPECIFICATION forming part of Letters Patent No. 504,808, dated September 12, 1893.

Application filed June 30, 1893. Serial No. 479,303. (No model.)

To all whom it may concern:

Be it known that I, WALTER HOWARD, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Mechanical Spring-Motors, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to that class of motors in which a coil spring is the motive power; the object of the improvement being to obtain a simple device to wind the spring, in connection with means to either accelerate or retard the speed of the motor, said means consisting of blades or radial arms projecting from a hub driven by the motor, the acceleration of the speed being effected by moving the radial blades on their own axes so as to present their surfaces at less angles to the line of resistance of the atmosphere, and the retardation by causing them to present their surfaces at angles more nearly approaching right angles such adjustments being effected by means of weighted arms independently pivoted to the hub and engaging the respective blades, the arms, by means of such independent connection acting independently of each other, each on its own blade.

The invention will now be fully described and afterward particularly pointed out in the claims.

In the accompanying drawings Figure 1 is a view in elevation partly broken away, showing my improved motor applied to an insect trap. Fig. 2 is a top plan view of the same with a part of the wire netting of the top broken away. Fig. 3 is a horizontal section through Fig. 1 on the line $x\,x$ with speed governor retained in said figure. Fig. 4 is a vertical section through the device, on the line $y\,y$ of Fig. 3. Fig. 5 is a plan view of the train of gearing removed from the motor. Fig. 6 is a perspective view of the governor. Fig. 7 is a side elevation of one of the adjustable blades of said governor. Fig. 8 is a perspective view upside down of the motor spring and its gear carrying drum, and the winding spring and its drum having its top uppermost but removed from the motor. Fig. 9 is a side view of the parts shown in Fig. 8 said parts occupying relatively normal positions. Fig. 10 is a view in side elevation, of my improvements applied to a picture or merchandise exhibitor or advertising device.

Like letters and numerals mark the same parts in all the figures of the drawings.

Referring to the drawings by letter A is the base which supports the moving parts. It is made of wood, preferably, and has its top surface reinforced by a plate A′ in which the step bearings of the various shafts of the motor are formed. The plate A′ has in it an opening through which a shaft B passes, upon which shaft are mounted the winding spring drum C and the motor spring drum D. Upon this shaft B are two ratchet wheels B′ B^2 connected, so as to move together, by a pin b, projecting from the bottom face of the ratchet wheel B′, entering a correspondingly located perforation b^2 in the top face of the ratchet wheel B^2. In fact, the ratchet wheels B′ B^2 may constitute a single ratchet wheel of sufficient thickness to have in engagement with its teeth two spring-pawls. One of said pawls shown at d is pivoted at d^2 to the bottom face of the drum D of the motor-spring D^2, while a similar spring-pawl c is pivoted at c^2 to the top face of the drum C of the tape-winding spring C^2. The pawls $c\,d$ are of slightly less thickness than the ratchet gears B′ B^2 so that they can be made to pass over each other without interfering.

In the base A of the frame, and in the shafts bearing plate A′, on one side of its center, there is an opening large enough, not only for the passage of the motor shaft B, but also for the free passage of the drum C that carries secured to its under side a spool C^3, around which is wound a tape C^4 having one end secured thereto to rotate it in one direction and wind the light spring C^2, said spring being used simply to rewind the tape C^4 upon its spool when the operator releases it, the end of its pawl c sliding then against the teeth of the ratchet gear. When the operator pulls upon the tape C^4, he not only winds the light spring C^2 but at the same time winds at least in part, the motor spring D^2. When the operator releases the tape, the spring C^2 winds it again upon the spool, and a second (or third) pull completely winds the motor spring D^2, said result being caused by the pawls $c\,d$ in engagement with the ratchet wheel or ratchet wheels. In order to accomplish this operation

of winding; the outer end of the tape spring must be secured to the winding drum and the inner end to a stationary part. For this purpose I incase the lower portions of the shaft B in a sleeve E, which is secured by means of a flange at its outer end to a bracket E^2 in turn secured to the base board A. The sleeve E terminates inside the winding drum and the inner end of the tape spring is secured to it. Thus, when the tape is pulled, the winding drum is turned in a direction to cause the pawl *c* to engage with ratchet wheel B^2, which causes the shaft B to turn and wind the motor spring D^2. When the tape is released the action of the winding spring turns the drum in the opposite direction, the pawl *c* passing over the teeth of ratchet B^2 without turning the shaft.

The motor drum is formed as a gear wheel as at 1 and upon the upper part of the shaft B is a pinion 2 which engages a gear 3 which in turn engages and drives a gear 4 formed inside of a metallic box or cover F of the shape of a frustum of a cone, which covers all of the mechanism. The gear 1 before mentioned engages also a pinion 2^a on the same shaft with a gear wheel 3^a which drives a pinion 4^a on another shaft which carries a gear wheel 5^a. This engages and drives a pinion 6^a on whose shaft is a gear wheel 7^a meshing with a pinion 8^a on a central or governor shaft G. From this arrangement of gearing it will be seen that the conical frustum is driven at a very slow speed and the governor shaft at a high speed.

At H (Fig. 6) are the governor blades, which are exactly alike in construction. Each of them is provided with a stem *h* pivotally placed in a perforation in one side of the upper end of the governor shaft G so that the blade may turn readily upon its longitudinal axis. The upper end of the shaft G is squared, and on each side is pivotally mounted a rod H′ carrying a weight H^2. Each of these rods is passed through an eye or staple h^2 secured in one of the blades H above its pivoted line. When the governor shaft is moving at its normal speed the weights H^2 are at their lowest points and hold the blades in the position nearest to the horizontal, in which position they offer the least resistance to their passage through the atmosphere. When the speeds become greater than normal the weights H^2 will be carried out by centrifugal force and will swing upward and become raised causing their rods to turn the blades on their axes, nearer to a perpendicular position, in which position they will present the greater resistance to their passage through the atmosphere. The speed will thus be automatically regulated. Each blade, with its corresponding rod and weight, acts independently of all the rest so that should one or more become inoperative through any means, the others will not be prevented from performing their functions. The upper ends of the shafts of the train of gears are received in a horizontal plate P supported on legs P^2 that have their lower ends secured to the base A. The cone F is supported upon a frame Q having an X shaped top and divergent legs having their lower ends secured to the base A. An idle wheel *p* is placed in engagement with the internal gear 4 of the cone to maintain said gear 4 in engagement with the gear 3, said idle wheel *p* being placed diametrically opposite said gear 3.

The motor as thus described, will operate any mechanism requiring small power. In Figs. 1, 2 and 4 I show an insect trap with which I desire to operate it. In this structure, which I mount on top of the frame of my motor there is a box consisting of a bottom K, sides K′ and wire netting top K^2. In one side of the base there is a rectangular opening *k* to permit the insects to enter said box, and around said opening there is a vertical curbing to retain any dead insects in the bottom of the box and prevent them from being pushed off by live insects. Above the opening *k* and its curbing there is suspended horizontally a perforated plate k^3 to temporarily close the opening *k* while the box is taken away to drown or otherwise destroy the captive insects, said plate k^3 being operated by a handle k^4 on the end of its suspension rod k^5. The box rests upon a horizontal frame L that has therein a rectangular opening corresponding with the opening *k* of the box, and pendent from said frame L there is an inverted semi-pyramidal shield or insect guide M having three sides shown in Figs. 1 and 3. The side *m* is narrower than the side m^2 and permits the insects to enter between its edge and the cone F while the side m^3 lies substantially in contact with said cone and prevents the insects from passing beyond it. When in use the outer surface of the cone is covered with a cloth coated with sirup or other insect attracting substances.

In Fig. 10 a merchandise exhibitor N is shown mounted upon the upper end of a shaft secured to the top of the cone F.

Having now fully described my invention, I claim—

1. In a spring motor the combination of a casing, a gear internally secured thereto, a drum D connected by gearing with said internal gear and carrying a spring-pawl a shaft passing through said drum, a power-spring within said drum and having one end secured to said shaft and the other to the drum, and a ratchet wheel secured to the shaft, with a spool and a pawl-carrying drum C upon the same shaft, a stationary sleeve inclosing the lower end of said shaft, a tape wound upon said spool and a spring within the drum C substantially as described.

2. In a spring motor the combination of a drum D carrying a pawl upon its flat face and a gear on its periphery, a shaft passing through said drum, a power spring within said drum, a ratchet wheel secured to said shaft, a spool and pawl-carrying drum C upon the same shaft, a stationary sleeve E inclosing a por-

tion of said shaft, a tape wound upon said spool, and a light spring within the drum C substantially as described.

3. In a spring motor the combination of two drums loosely mounted upon a shaft and each carrying a spring pawl, springs wound in opposite directions within the drums, a ratchet wheel secured upon the shaft, a train of gears connected with one of the drums, a vertical shaft carrying one of the gears of the train and having a governor thereon consisting of radial blades H having one end pivoted to said shaft, each blade carrying a staple h^2 above its pivotal axis, a rod H' passing through said staple and having one end pivoted to the vertical shaft, and the other carrying a weight independent of the weights of the other radial blades substantially as described.

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

WALTER HOWARD.

Witnesses:
E. E. MASSON,
A. B. DEGGES.