

(No Model.)

R. B. FORBES & S. S. HOLLY.  
SPRING MOTOR.

No. 433,076.

Patented July 29, 1890.

FIG. 2--

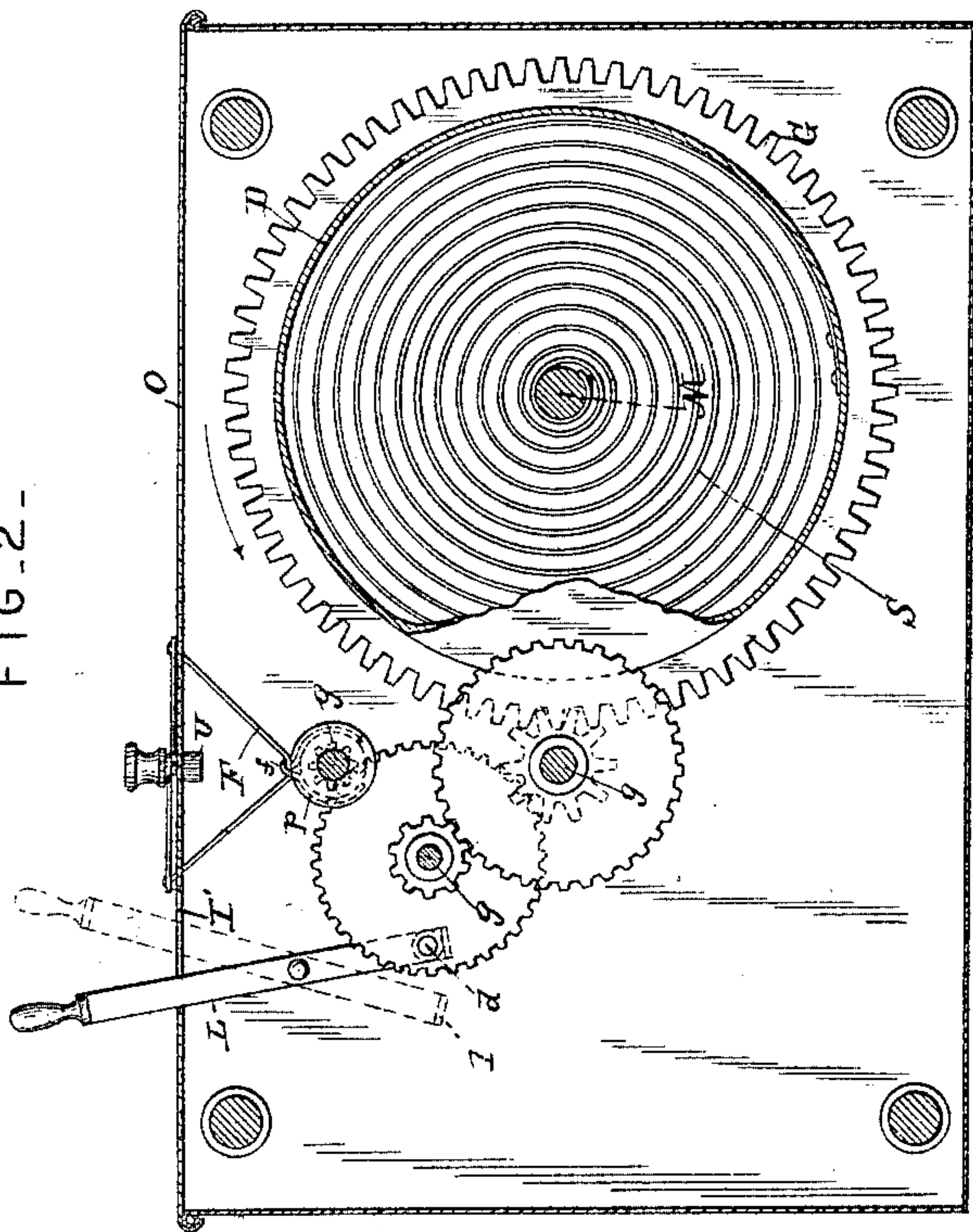


FIG. 1--

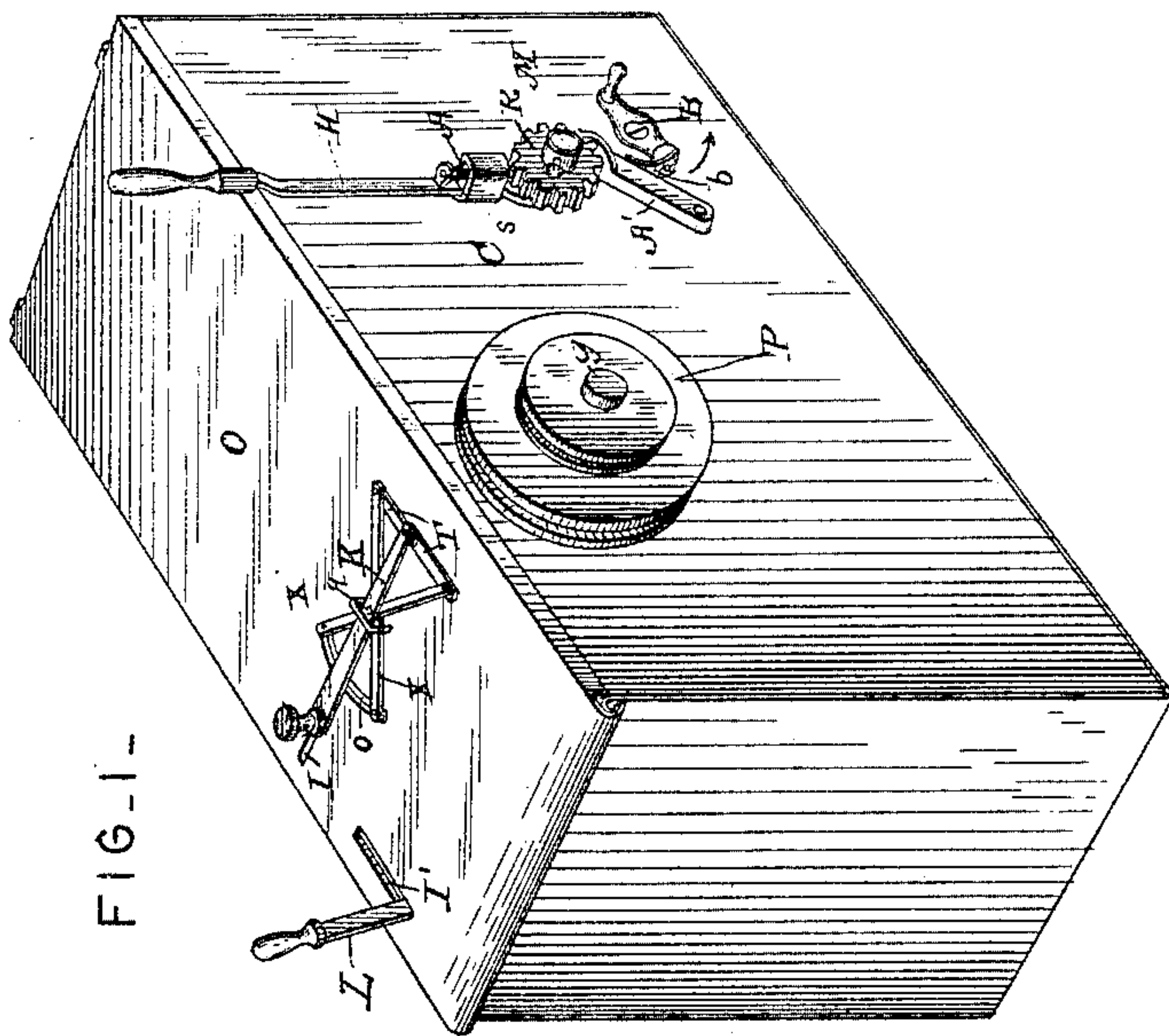


FIG. 6--

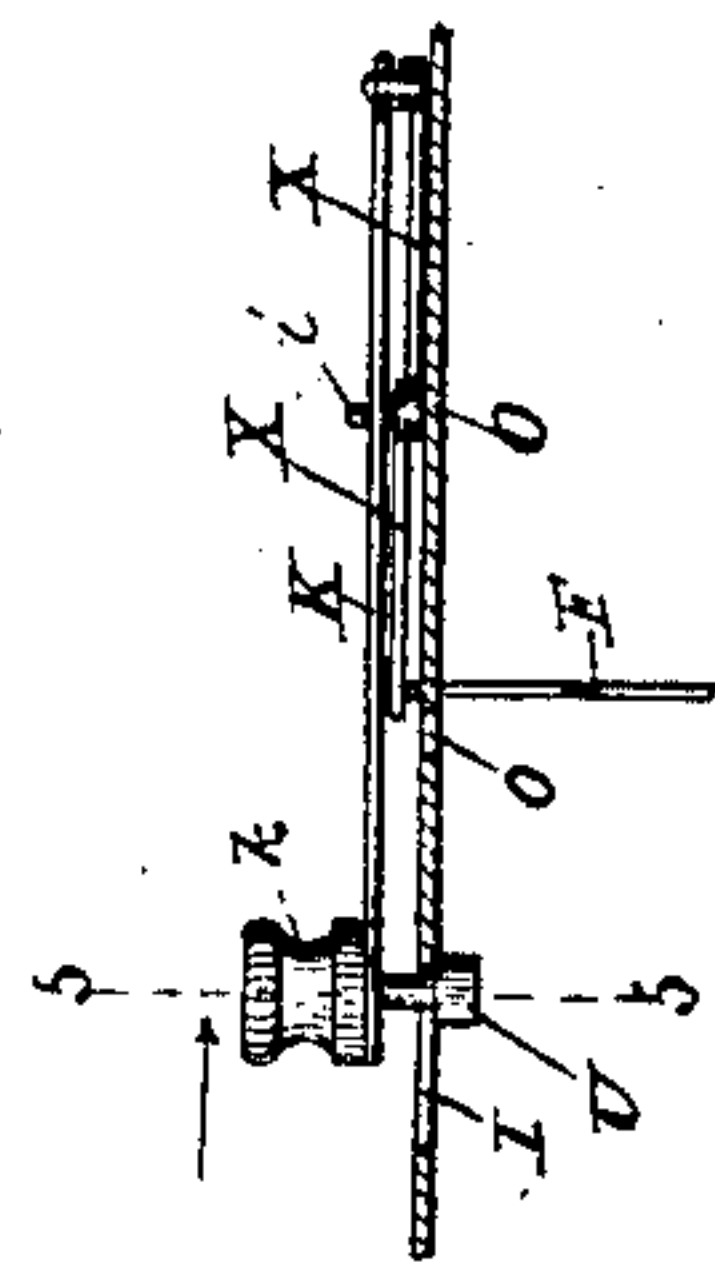


FIG. 5--

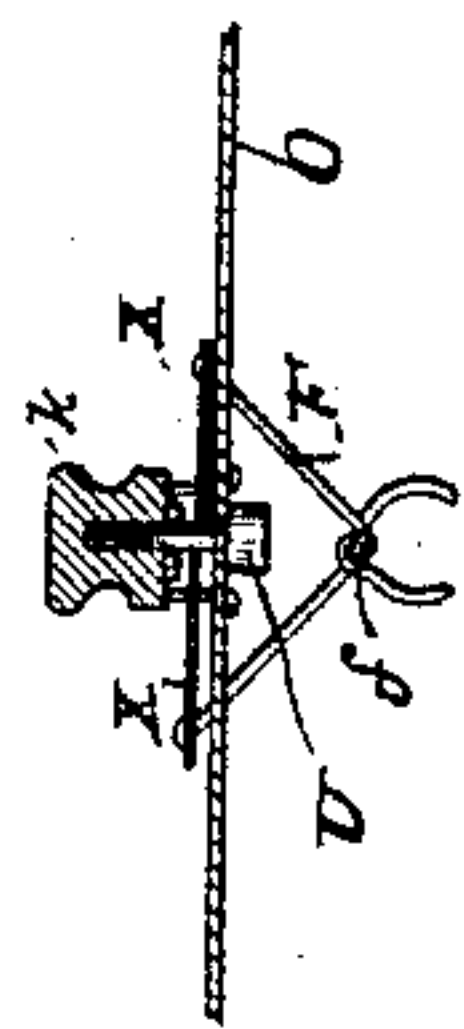


FIG. 4--

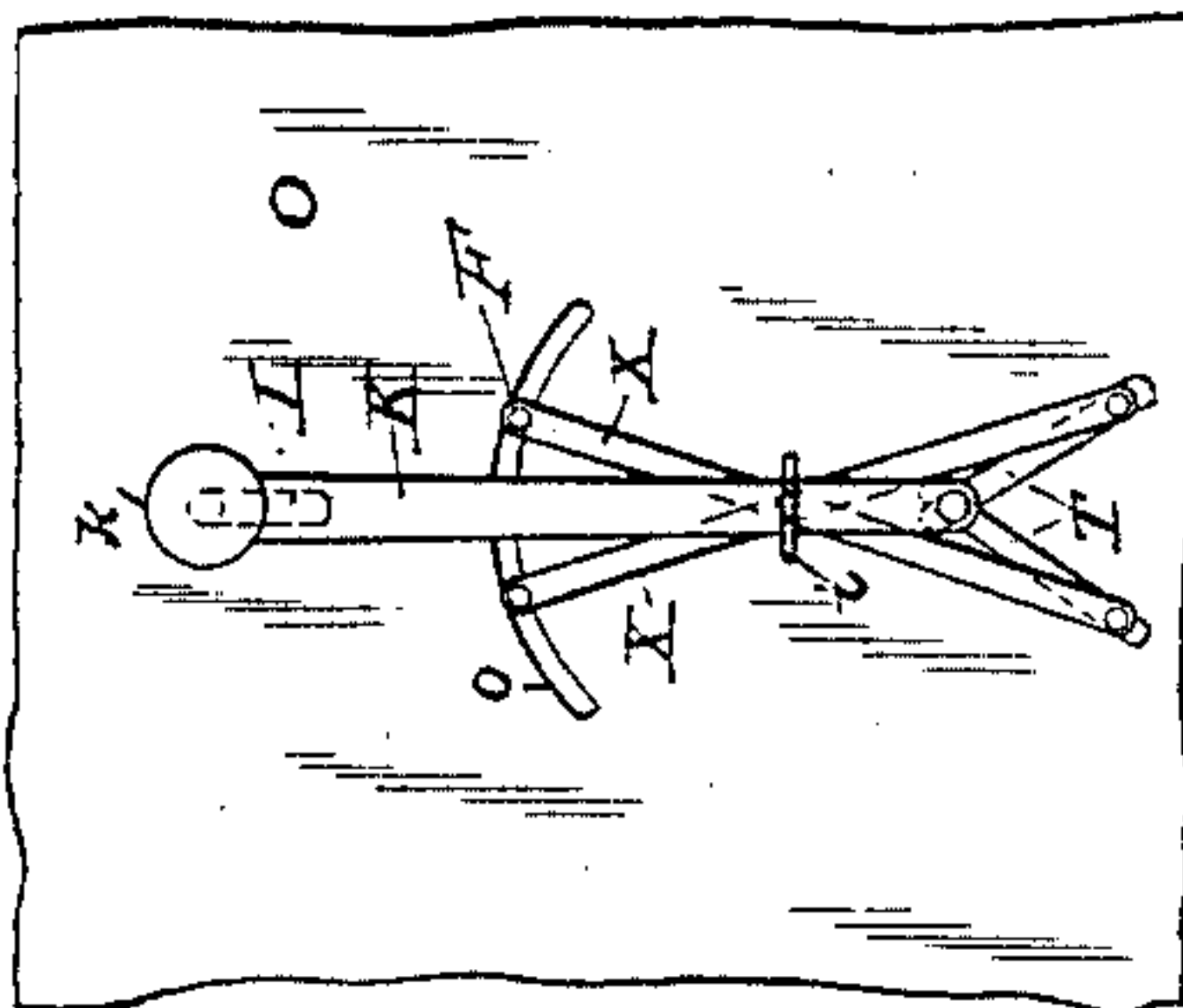
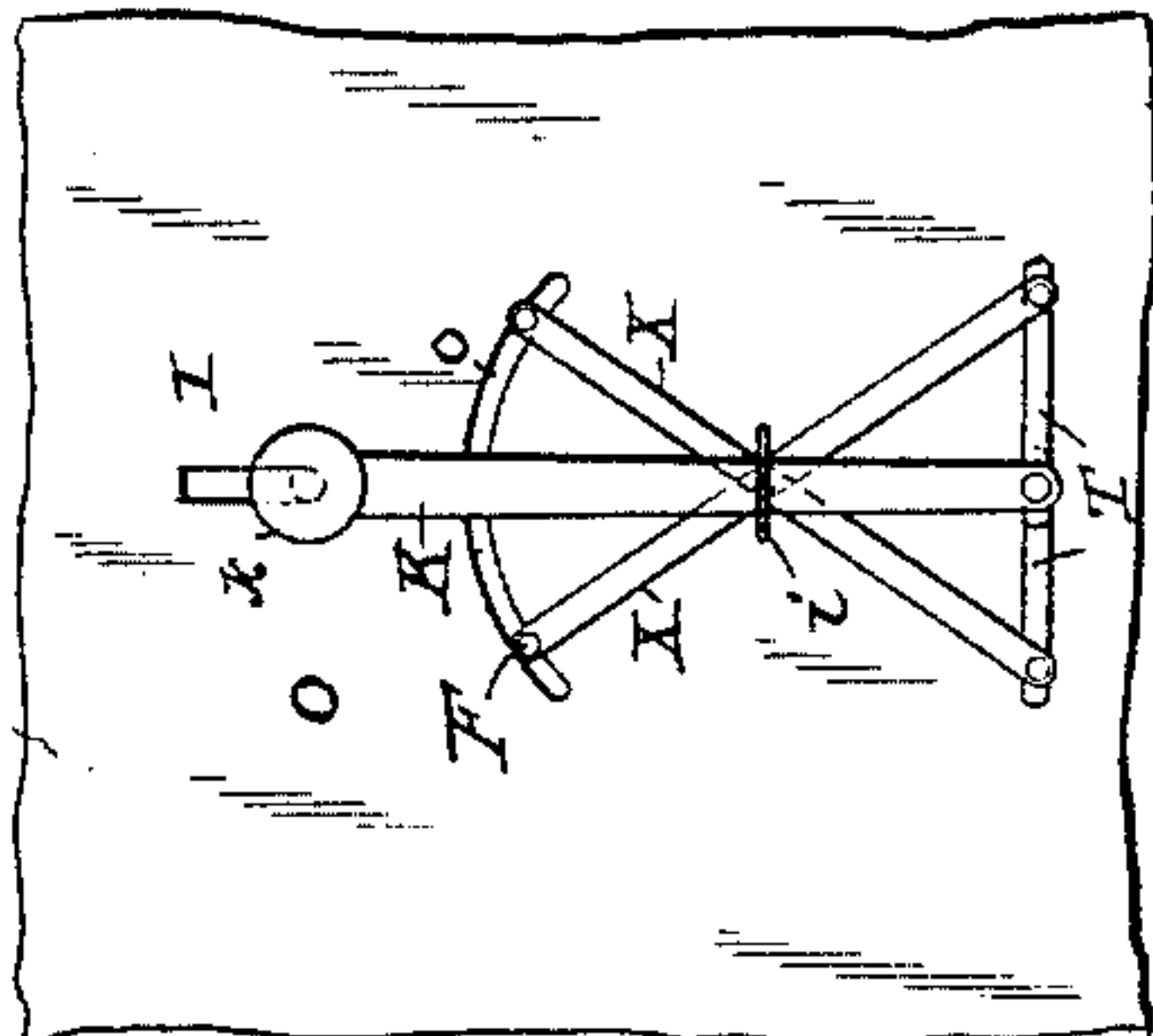


FIG. 3--



Witnesses

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# UNITED STATES PATENT OFFICE.

ROBERT B. FORBES AND SAMUEL S. HOLLY, OF HALE'S FORD, VIRGINIA.

## SPRING-MOTOR.

SPECIFICATION forming part of Letters Patent No. 433,076, dated July 29, 1890.

Application filed March 26, 1890. Serial No. 345,415. (No model.)

*To all whom it may concern:*

Be it known that we, ROBERT B. FORBES and SAMUEL S. HOLLY, citizens of the United States, residing at Hale's Ford, in the county of Franklin and State of Virginia, have invented a new and useful Spring-Motor, of which the following is a specification.

This invention relates to motors, and preferably to that class which are driven by the expansive force of one or more springs.

The object of the invention is to provide improved means for controlling the motion of such motor. This object we accomplish by the present invention, which consists of a ratchet-winding mechanism, a dead-stop, and a brake or friction stop, each of a specific construction, as set forth below, together with the preferred details and auxiliaries forming part of the whole, all as hereinafter more fully described, and set forth in the accompanying drawings, in which—

Figure 1 is a perspective view of this motor. Fig. 2 is a longitudinal vertical section thereof. Figs. 3 and 4 are plan views of the friction-stop in its operative and inoperative positions, respectively. Fig. 5 is a transverse section on the line 5 5 of Fig. 6. Fig. 6 is a longitudinal section of the brake-arm.

Referring to the said drawings, the letter D designates a drum, which is revolved in the present instance by a spiral spring S, connected at its ends to the interior of the drum and to the main driving-shaft M, although it will be understood that by a slight adaptation of parts this drum can be driven by a weight or weights. G is a gear upon the periphery of said drum, and g are a number of shafts carrying intermeshing gears, by means of which the rotary power from the drum is increased in speed considerably and finally transmitted to a rapidly-revolving drive-pulley P. From the latter belts may be led to any suitable source when it is desired to make use of the motor, as will be readily understood. One end of the main shaft M projects through the casing C of the motor and is provided with a ratchet-wheel R, and upon this shaft is loosely mounted one end of a handle H, carrying a pawl A, which is pressed normally into engagement with the teeth on said ratchet by a spring s, as shown.

At one side of the shaft a retaining-pawl A' is pivotally connected to the casing, and pivoted to the casing adjacent thereto is a button B, carrying a spring b in one end. When this button is turned so that the spring bears against the retaining-pawl, the latter will be engaged with the ratchet-wheel, and the handle can be operated to turn the wheel and the shaft, and consequently to impart tension to a spiral spring S, as shown in Fig. 1; but when the button is turned so as to disengage its spring from the retaining-pawl as soon as the handle is turned in the direction of the arrow said pawl will fall out of engagement with the ratchet and the device cannot be wound. It will also be understood from the above description and from the illustration that the button can be turned to adjust the tension of its spring when desired.

The shaft of the drive-pulley P carries a drum p at a suitable point within the casing, and brake or friction arms F embrace this drum. These arms are linked to each other above the drum, as shown at f, and their upper ends project through a curved slot o in the cover O of the casing and are linked to the ends of two levers X. Said cover is removable from the casing and detachably secured thereon in any suitable manner. The bodies of these levers are pivoted to the cover O, and to their other ends are pivoted the outer ends of a toggle-lever T.

The letter K designates a brake-rod which slides through an eye i above the pivot of the levers X, and one end of which is pivotally connected with the joint of the toggle-lever T. In the other end of the brake K is seated a screw U, whose body projects through a slot I in the cover, whose head moves below said slot, and whose upper end carries a knob k, as shown. The body of this screw moves loosely through the brake K, and it will therefore be understood that when the knob is screwed down onto the upper side of the brake the cover is clamped between the lower side thereof and the head of the screw, and the brake is therefore held at any desired position.

One of the wheels of the mechanism g carries a stud or pin d, and pivoted to the casing C is a lever L, having an L-shaped lower



end *l*, adapted to be moved into the path of the stud, whereby the rotation of the wheel that carries said stud, and consequently the movement of the motor, will be positively stopped. The upper end of the lever *L* projects through a slot *I'* in the cover *O* and is provided with a handle, as shown.

The handle *H* is oscillated to effect the winding of the springs (or the raising of the weights if they be used) in a manner which will be well understood, and this motor then commences to run. A belt is applied to the drive-pulley *P*, by which power is communicated to the machinery it is desired to operate. When it is desired to stop the motor, the handle of the lever *L* is moved to a position where its lower end or foot will stand in the path of the stud *d*, and the rotation of the gear carrying that stud, and consequently the movement of the motor, will be stopped. When, however, it is desired only to retard the speed with which the motor is running and the drive-pulley *P* revolving, the brake *K* is moved toward the inner end of the slot *I*. This motion opens the toggle-lever *T* and distends the levers *X* with constantly-increasing power as the arms of the toggle-lever approach a straight line. The friction-arms *F* are thereby separated at their upper ends, and their lower ends turn on their connecting-point *f* and are thrown against the opposite faces of the drum *p*. A slight friction is therefore imparted to this drum and its speed of rotation accordingly diminished.

The brake *K* can be held at any desired point and the amount of friction correspondingly maintained by the knob *k*, which is adjusted upon the screw *U* in the slot *I*, as above described. It will be understood, however, that when the brake is in its disengaged position, as shown in Fig. 4, or when it is at the other extreme of its movement, the use of these fastening devices is not absolutely necessary.

What we claim is—

1. The driving-shaft having a ratchet-wheel, the operating-handle mounted loosely on said shaft, and the pawl carried by said handle, in combination with a retaining-pawl pivoted below the wheel, a button pivoted alongside said retaining-pawl, and a spring carried by said button and adapted to throw the pawl into engagement with the ratchet, as and for the purpose set forth.

2. The revolving drum having a gear-wheel on its periphery and the shafts and gears driven thereby, one of the latter carrying a stud, in combination with a lever pivoted to the casing and having an L-shaped foot adapted to be moved into the path of said stud, as and for the purpose set forth.

3. In a motor, the combination, with the revolving drum and its winding mechanism located in a suitable casing, and the shafts and gears driven thereby, one of said shafts carrying a drive-pulley on the exterior of the casing, of a removable cover for said casing having a slot and a brake mechanism carried by said

cover and a stop mechanism projecting through said slot, all substantially as described.

4. The combination, with a pulley-shaft carrying a drum, and mechanism, substantially as described, for rotating said shaft, of friction-arms, their lower ends embracing said drum, their centers linked together, and their upper ends projecting through a slot in the cover of the casing, and means, substantially as described, for moving said upper ends simultaneously and oppositely within said slot, as set forth.

5. The combination, with a pulley-shaft carrying a drum, and mechanism, substantially as described, for rotating said shaft, of friction-arms, their lower ends embracing said drum, their centers linked together, and their upper ends projecting through a curved slot in the cover of the casing, levers pivoted to said upper ends and supported upon a common pivot, a toggle-lever connecting the other arms of the levers, and a brake-rod connected to the joint of said toggle-lever, substantially as described.

6. The combination, with a pulley-shaft carrying a drum, and mechanism, substantially as described, for rotating said shaft, of friction-arms, their lower ends embracing said drum, their centers linked together, and their upper ends projecting through a curved slot in the cover of the casing, levers pivoted to said upper ends and supported upon a common pivot, a toggle-lever connecting the other arms of said levers, an eye over said common pivot, a brake-rod connected to the joint of said toggle-lever and sliding through said eye, and means, substantially as described, for clamping the free end of the brake to the cover at any desired point, substantially as described.

7. The combination, with a pulley-shaft carrying a drum, and mechanism, substantially as described, for rotating said shaft, of friction-arms, their lower ends embracing said drum, their centers linked together, and their upper ends projecting through a curved slot in the cover of the casing, levers pivoted to said upper ends and supported upon a common pivot, a toggle-lever connecting the other arms of said levers, an eye over said common pivot, a brake-rod connected to the joint of said toggle-lever and sliding through said eye, a screw passing loosely through a slot in the cover and a hole in the free end of the brake, and a knob on the upper end of said screw, substantially as described.

8. The combination, with friction-arms and levers pivoted thereto and supported upon a common pivot, of a toggle-lever connecting the ends of the levers, a brake-rod pivoted to the joint of the toggle-lever, and means, substantially as described, for holding said brake and toggle-lever at any desired point, as set forth.

9. The combination, with friction-arms and levers pivoted thereto at one end, supported on a common pivot, and connected by a tog-



gle-lever at their other end, of an eye over  
said common pivot, a brake-rod connected to  
the joint of said toggle-lever and sliding  
through said eye, a screw passing loosely  
5 through a slot in the support and a hole in  
the free end of the brake, and a knob on the  
upper end of said screw, substantially as de-  
scribed.

10 10. The combination, with a toggle-lever  
and a sliding brake-rod connected to the joint  
thereof, of a screw passing loosely through a  
slot in the support and a hole in the free end  
of the brake, and a knob on the upper end  
of said screw, substantially as described.

15 11. The combination, with the cover hav-

ing a slot and the eye on said cover, of the  
brake-rod moving in line with said slot, a  
headed screw passing loosely upward through  
said slot and through a hole in the brake, and  
a threaded knob upon the head of said screw, 20  
substantially as described.

In testimony that we claim the foregoing as  
our own we have hereto affixed our signatures  
in presence of two witnesses.

ROBERT B. FORBES.  
SAMUEL S. HOLLY.

Witnesses:

JUBAL E. FERGUSON,  
JOHN T. SHAON.