(No Model.) 2 Sheets—Sheet 1.

J. S. LESTER.

MOTOR.

No. 419,051. Patented Jan. 7, 1890.

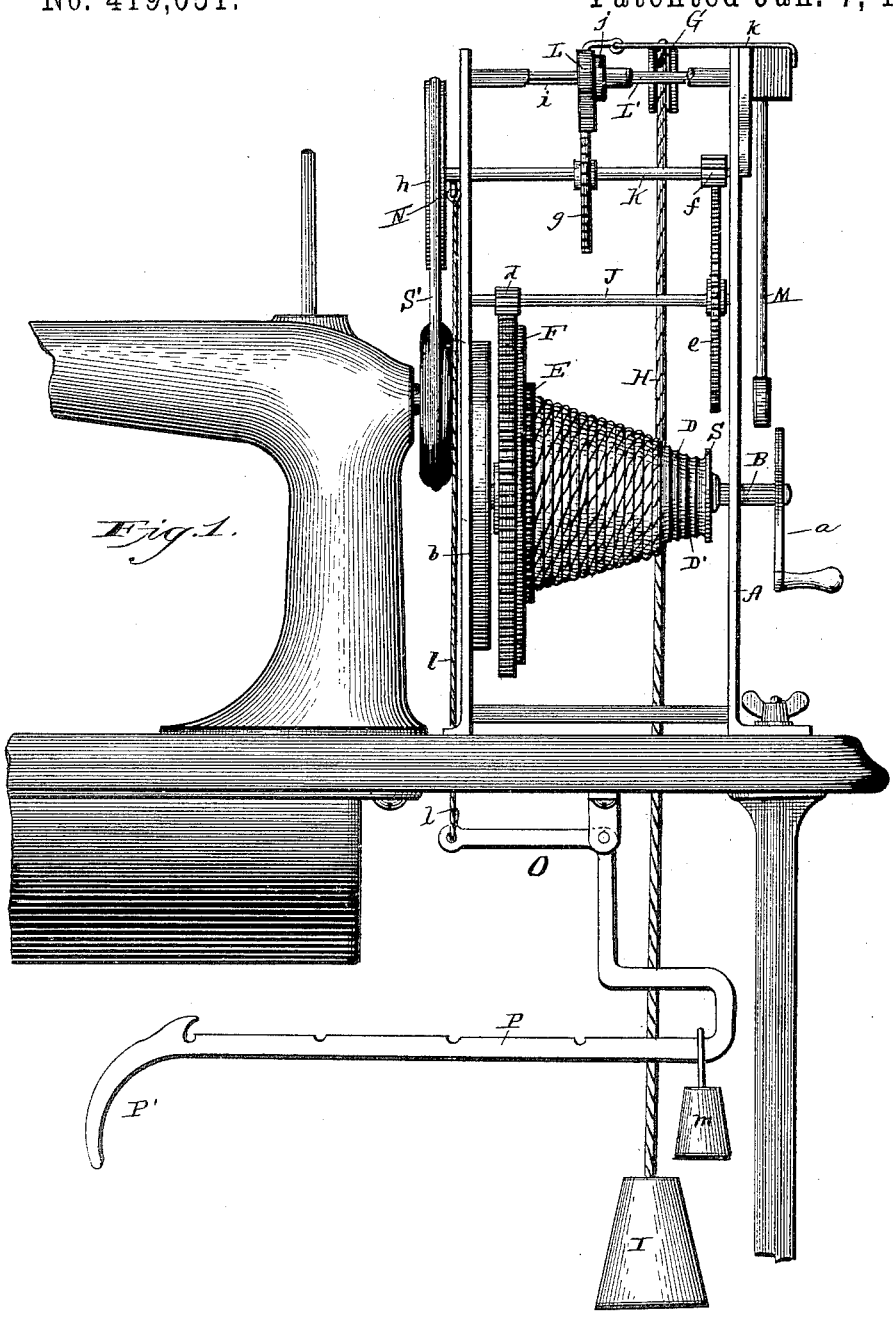

Fig. 1.

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

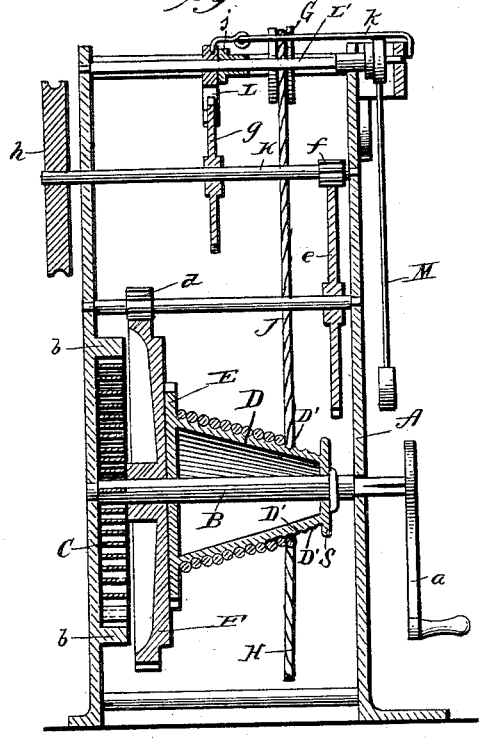


Fig. 3.

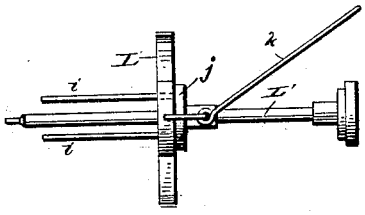


Fig. 4.

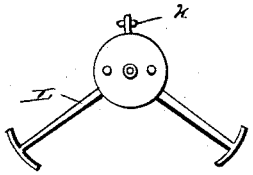


Fig. 5.

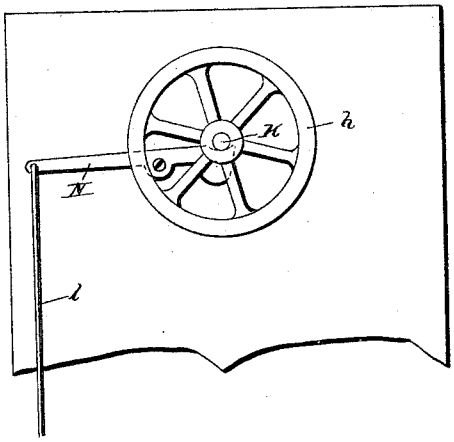
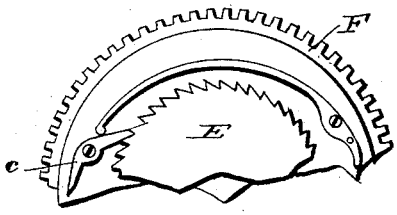


Fig. 6.



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UNITED STATES PATENT OFFICE.

JAMES S. LESTER, OF ATLANTA, GEORGIA.

MOTOR.

SPECIFICATION forming part of Letters Patent No. 419,051, dated January 7, 1890.

Application filed April 25, 1889. Serial No. 308,526. (No model.)

To all whom it may concern:

Be it known that I, JAMES S. LESTER, a citizen of the United States, residing at Atlanta, in the county of Fulton and State of Georgia, have invented certain new and useful Improvements in Motors, of which the following is a specification, reference being had therein to the accompanying drawings, in which—

Figure 1 represents a side elevation of my improved motor applied to a sewing-machine; Fig. 2, a vertical sectional view thereof; Fig. 3, a detail plan view of the sliding escapement device; Fig. 4, an end elevation of the same; Fig. 5, a detail of the brake mechanism; Fig. 6, a detail view of the ratchet device.

The invention relates to a combined weight and spring motor of extremely simple and practical construction, which may be successfully employed to run sewing-machines, fly or other fans, churns, and other apparatus where a constant, even, and continuous supply of power is required, as will be more fully hereinafter set forth.

The invention has for its object, mainly, to so combine the spring and weight powers that they will be both wound up at the same time and by the same operation, and when permitted to act upon the connected gearing they will act simultaneously, mutually assisting in producing the resultant power, the spring exerting its greatest force when first released after being wound up, and the weight and drum exerting their minimum of force when first started, the force of the former decreasing, as is evident, as it becomes unwound, and the force of the latter increasing in proportion as the weight falls, thus producing by these combined effects a steady and regular supply of power, the loss of one being compensated for by the increase in force of the other, until the motor is entirely run down, as will be more fully hereinafter set forth.

The invention also has other objects in view, which will fully appear in the course of this specification.

Referring to the accompanying drawings, A designates the frame of the motor, which may be any suitable size and shape. Journaled in the frame is a horizontal shaft B, the projecting end of which is squared for the application of a crank or other operating device *a*. Having one of its ends attached to the shaft and its other end to a suitable portion of the frame is a convolute spring C, which surrounds the shaft and is protected by an annular circular flange *b* upon the inner side of the frame. Mounted rigidly upon this shaft B is a cone-drum D, provided at its smaller end with an annular flange S and at its larger end with a ratchet-wheel E, the drum being, preferably, provided on its periphery with a helical groove D′, for the reception of the weight-cord.

Journaled loosely upon the shaft B, between the ratchet-wheel E and spring C, is a large spur-wheel F, which is provided on its face next to the ratchet-wheel with a spring-actuated pawl *c*, which constantly engages the teeth of the said ratchet-wheel. Connected to the larger end of the conical drum and passing over a grooved sliding pulley G, mounted upon a suitable shaft, is the weight-cord H, which is provided with a weight I at its free end.

Journaled in the frame is another shaft J, which is provided with a pinion *d* and a spur-wheel *e*, the former held in engagement with the driving spur-wheel F, and the latter with a pinion *f*, mounted or secured upon a shaft K, also journaled in the frame. This shaft K is also provided with an escapement-wheel *g* and driving-pulley *h*, the latter of which is, in the present instance, connected to the pulley of the sewing-machine by means of a suitable belt S′.

If desired, a regulating or governing device may be employed, as follows: Mounted loosely upon a suitable rock-shaft L′, journaled in the frame above the escapement-wheel, is an escapement-lever L, the ends of which alternately engage the teeth of the escapement-wheel in the usual manner, and prevent the same revolving too rapidly. Secured to one end of the said rock-shaft L′ is a pendulum M, which serves to govern the movement of the rock-shaft and escapement-lever.

To enable the escapement-lever to be disengaged from the escapement-wheel when it is desired to impart a rapid motion to the drive-pulley, I make it sliding by securing

two parallel horizontal rods *i* upon a rigid disk *j* on the rock-shaft, and passing said rods through holes in the escapement-lever. These stationary rods cause the escapement to rock with the shaft, but at the same time permit it to be moved along the same. To hold the escapement-lever against the stationary disk on the rock-shaft and into engagement with the escapement-wheel, I employ a hooked rod *k*, adapted to catch over one side of the frame A and being pivotally connected to the said escapement-lever, as shown in Figs. 1 and 2.

Pivoted upon the frame and adapted to bear upon the shaft or hub of the driving-pulley is a brake-lever N, which is connected to a pivoted angle-lever O below the machine-top by means of a suitable wire *l*. Connected to or formed integral with the lever O is a horizontal beam P, provided at its inner free end with a curved arm P′. The upper edge of the beam is notched at intervals for the reception of a sliding weight *m*.

The operator may by simply pressing with his knee upon the arm P′ regulate the speed of the motor, or completely stop it, if desired, as is evident. The sliding weight *m* may also be employed to regulate the pressure upon the brake-lever. The weight, when placed at the first notch, as shown in Fig. 1, exactly balances the beam and angle-lever, and therefore exerts no force upon the brake-lever; but when moved along the beam toward its free end will begin to exert a force upon the brake-lever until it reaches the last notch, where it exerts its maximum pressure. This sliding weight and notched beam may be used in addition to or in lieu of the escapement device for regulating the speed of the motor. By placing the sliding weight at the free end of the beam P the force exerted upon the brake-lever will be sufficient to stop the machine, and when moved back upon the beam the machine will instantly begin to run again.

The object of the ratchet device is to permit the cord to be wound up upon its drum without revolving the large spur-wheel, but cause the same to revolve with the drum when the latter is revolved in the other direction.

The object in mounting the pulley G loosely upon its shaft is to permit the same to slide back and forth as the cord is wound and unwound from the conical drum. By thus arranging the spring in combination with a conical drum and weight and cord the force or power of the motor will be the same from the time of starting until it is completely run down. It will be observed that inasmuch as the weight-cord is attached to the larger end of the cone-drum and is unwound from the smaller end thereof its minimum force will be exerted when it first begins to unwind, the force increasing until it is entirely unwound from the drum, whereas the greatest force of the spring is exerted when it first begins to operate and decreases until it is entirely unwound. Thus the decrease in power in one is compensated by the increase of force exerted by the other, the motor thereby producing a regular and constant supply of power.

Having thus fully described my invention, what I desire to claim as new and secure by Letters Patent is—

1. In a motor, the combination of the frame, a shaft B, journaled in the frame and carrying a conical drum D and a ratchet-wheel E, a spur-wheel F, mounted loosely upon the shaft B, alongside of the ratchet-wheel E, this spur-wheel being provided with a spring-actuated pawl held in engagement with the ratchet-wheel E, a convolute spring C, secured to the said shaft B and connected to the frame, a suitable train of gearing connected to the spur-wheel F, a sliding pulley G, mounted upon a shaft in the frame, and a cord H, connected to the larger end of the drum and unwound from its smaller end, this cord passing over the sliding pulley G and provided with a weight at its depending end, as and for the purpose set forth.

2. The combination, with the escapement-wheel *g* and means for operating it, a rock-shaft provided with a sliding escapement-lever L, and a pendulum attached to the said rock-shaft, substantially as described.

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

JAMES S. LESTER.

Witnesses:
W. R. BALDWIN,
H. P. HEVENOR.