(No Model.) 2 Sheets—Sheet 1.

A. D. SAUNDERS.

SPRING MOTOR.

No. 382,556. Patented May 8, 1888.

Fig. 1.

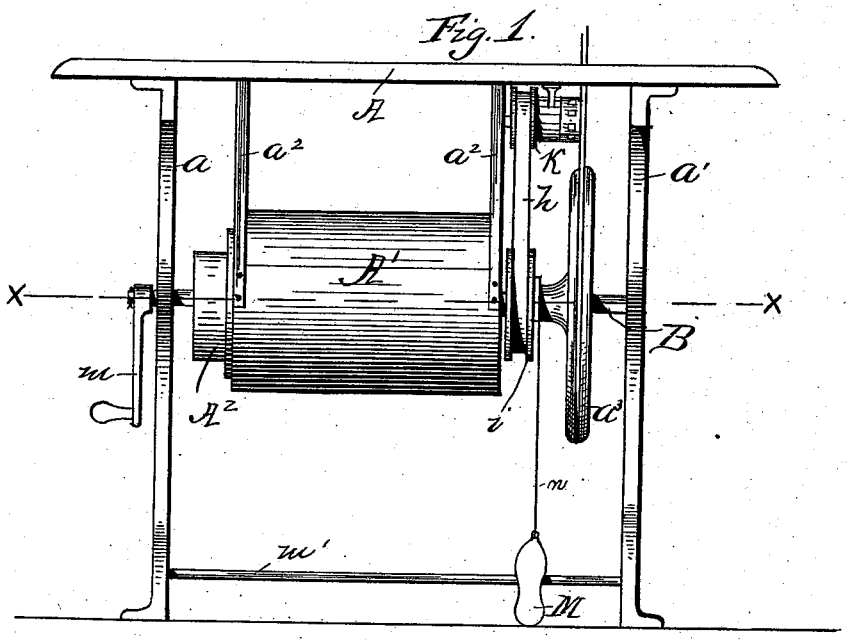
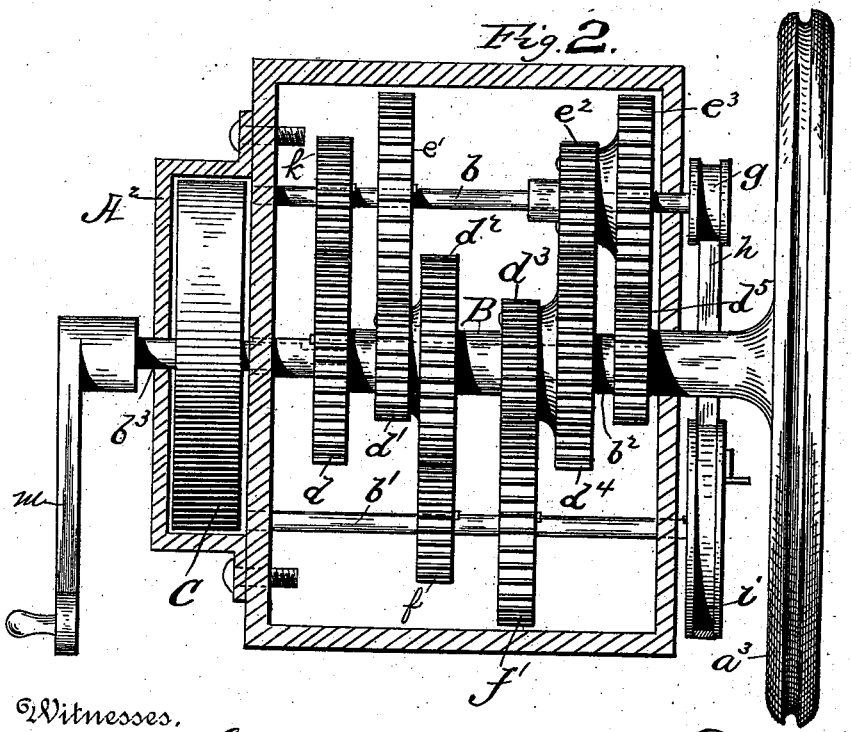


Fig. 2.



Witnesses.
J. B. McGirr.
H. E. Peck.

Inventor
Alfred D. Saunders.
By his Attorney
O. E. Duffy

N. PETERS, Photo-Lithographer, Washington, D. C.

(No Model.) 2 Sheets—Sheet 2.

A. D. SAUNDERS.

SPRING MOTOR.

No. 382,556. Patented May 8, 1888.

Fig. 3.

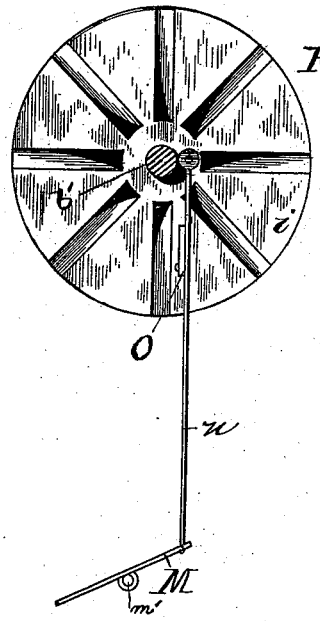


Fig. 4.

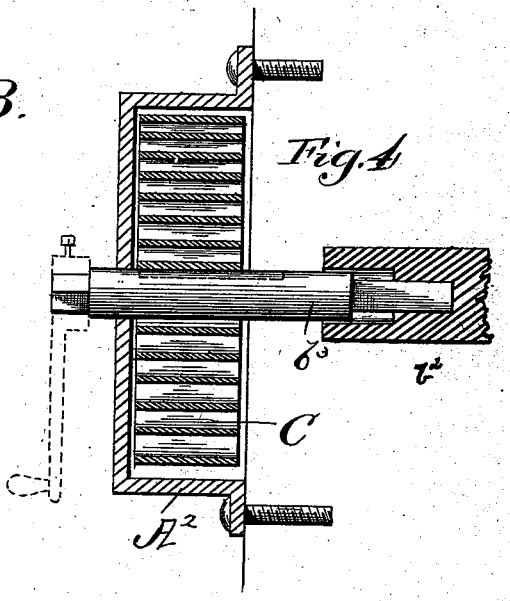


Fig. 5.

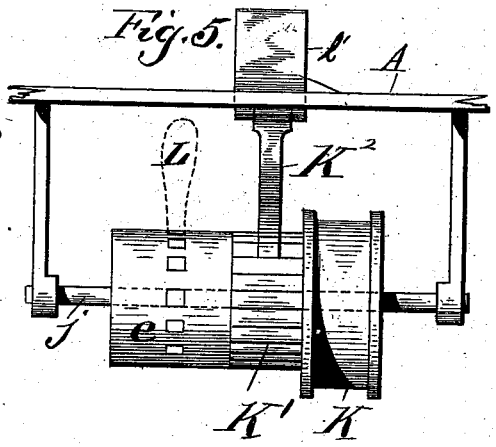


Fig. 6.

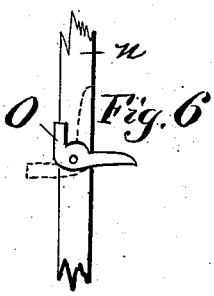


Fig. 7.

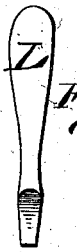
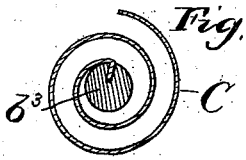


Fig. 8.



Witnesses

J. B. McGirr.

H. E. Peck.

Inventor

Alfred D. Saunders.

By his Attorney

O. E. Duff

UNITED STATES PATENT OFFICE.

ALFRED D. SAUNDERS, OF BROOKLYN, NEW YORK.

SPRING-MOTOR.

SPECIFICATION forming part of Letters Patent No. 382,556, dated May 8, 1888.

Application filed January 16, 1888. Serial No. 260,925. (No model.)

To all whom it may concern:

Be it known that I, ALFRED D. SAUNDERS, of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Spring-Motors; and I do hereby declare that the following is a full, clear, and exact description of the invention, which 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 of reference marked thereon, which form part of this specification.

My invention relates to an improvement in spring-motors especially adapted for furnishing the driving-power for light machinery—such as sewing-machines, &c.

The object of my invention is to provide an improved spring-motor especially adapted for driving sewing-machines or other light machinery, and which shall be compact, occupying an exceedingly small space, and which can be easily wound up, and will furnish an even, regular, and continuous motion; and a further object is to provide certain details of construction and arrangement of parts whereby the construction of the motor is greatly improved and its operation rendered more effective.

With these ends in view my invention consists in certain novel features of construction and combinations of parts, more fully described hereinafter, and particularly pointed out in the claims.

Referring to the accompanying drawings, Figure 1 is a view of my complete device attached to the frame-work of a sewing-machine. Fig. 2 is a horizontal section on line *x x* of Fig. 1, looking from the top. Fig. 3 is an end view of the brake wheel or pulley and the treadle and connecting-rod. Fig. 4 is a section through the actuating-spring and casing containing the same; also showing a portion of the shaft-sections, one of said sections being shown in cross-section and illustrating the clutch by which the said sections of the main shaft can be thrown in and out of gear with each other. Fig. 5 is a detail view of the brake-regulating device. Fig. 6 is a detail view of the locking or stopping latch. Fig. 7 is a detail view of the lever used in regulating the brake device; and Fig. 8 is a cross-section of the portion of the main driving-shaft to which the driving-spring is attached, illustrating a portion of the spring and the manner in which the same is attached to the shaft-section to allow the longitudinal movement of said section.

In the drawings, the reference-letter A represents the platform or table of a sewing-machine provided with the usual legs or standards, *a a'*.

A cylindrical casing or sheathing, A', is suspended a suitable distance beneath the table or platform A between the legs or standards by means of hangers a^2 a^2. A main driving-shaft, B, is journaled at its opposite ends in the standards *a a'* and extends centrally through the casing, and is provided preferably upon its right-hand portion near the standard *a'* with a fly or drive wheel, a^3, connected with the mechanism of the sewing-machine in any suitable manner, as by belting.

Two secondary or auxiliary shafts, *b b'*, are journaled in the casing A' upon each side of the driving-shaft B, and preferably in the same horizontal plane with said shaft, and upon the secondary shafts and on the driving-shaft are rigidly and loosely mounted a series of intermeshing gears, as hereinafter described.

A cylindrical box or casing, A^2, is secured upon the end of the casing A' next to the standard *a*, and in said box is located a strong steel clock-spring, C, secured at one end to the casing and at the opposite end to the shaft B. The shaft B is formed in two sections, b^2 b^3. The section b^2, which carries the fly-wheel and gearing, is preferably of a greater diameter than section b^3, and is provided in its joining end with a cylindrical recess or mortised-out portion of the same of a greater internal diameter than the diameter of the section b^3, and the inner end of said recess is made square or angular, as shown in Fig. 4, and the inner end of section b^3 is provided with a squared or angular end adapted to removably enter said squared recess in section b^2, and thus cause the sections to rotate together; but the section b^3 is mounted so as to have a limited longitudinal movement—*i. e.*, sufficient to allow the square end to be withdrawn from the square recess. Thus the section b^3 can be pulled outward and rotated by means of the crank or handle *m* upon its end to wind up the spring without rotating the other section and gearing.

The main driving-shaft section b^3 is rendered capable of its limited longitudinal movement preferably by means of a longitudinal slot in its periphery, in which one end of the spring C is confined. Thus when the section is pulled outwardly by means of the crank, so that the spring can be wound independently of the shaft-section b^2, the end of the spring slides in the groove, which should be of sufficient length to permit the desired longitudinal movement of the shaft-section.

A gear-wheel, d, is rigidly secured to the driving-shaft near the inner end of section b^2, and is adapted to mesh with a pinion, k, of a less diameter, secured to secondary shaft b. A gear-wheel, e', is secured to shaft b, and is adapted to mesh with a pinion, d', loosely mounted upon the driving-shaft, to which is secured a gear-wheel, d^2, also loosely mounted on the driving-shaft, and the driving-shaft is also provided with a similar pinion and gear-wheel, d^3 d^4, secured together and loosely mounted on said shaft, and with a pinion, d^5, also loosely mounted on said shaft. The gear-wheel d^2 meshes with pinion f, secured to secondary shaft b'. Pinion d^3 meshes with gear-wheel f', secured to shaft b'. Gear-wheel d^4 meshes with pinion e^2, loosely mounted on shaft b. Pinion d^5 meshes with gear-wheel e^3, secured to pinion e^2 and mounted loosely on shaft b. Thus it will be seen that the spring imparts to the driving-wheel a regular, continuous, and steady motion through the shafts and system of gearing.

The ends of the shafts b b' extend through one end of the casing A', and the secondary shaft b is provided upon its outer end with a pulley, g, loosely mounted on the same, and to the periphery of said pulley one end of a brake-strap, h, is secured. Upon the outer end of secondary shaft b' is rigidly secured a brake-pulley, i, provided with radially-extending slots in its outer side or face, Fig. 3, and with a grooved periphery which is adapted to receive the brake-strap h. A short shaft, j, is mounted in suitable hangers upon the under side of the platform or table of the machine above the brake-pulley, and on said shaft j is mounted a pulley, K, to which the upper opposite end of the brake-strap h is secured. A ratchet-wheel K' is also rigidly mounted on said shaft j, and a pawl, K^2, is pivoted at one side of an opening in the platform A, and is adapted to engage said ratchet-wheel and prevent it from rotating in one direction. A drum, e, is mounted on shaft j, and is provided with a series of openings around its periphery which are adapted to receive one end of a detachable brake-strap-operating lever, L, whereby the shaft j can be rotated, and with it the ratchet-wheel and pulley. Above the ratchet-wheel and pawl the platform is provided with an opening adapted to be normally closed by a hinged cover, l', whereby the operator can readily see that the brake-strap and attachments are working satisfactorily.

From the foregoing description it will be readily seen that the brake-strap h passes from pulley g over the under surface of the brake-pulley i, and from thence upwardly to pulley K, and that by turning the shaft j by means of the lever L the brake-strap can be made to bear with more or less pressure upon the surface of the brake-pulley, and thus the speed of the motor can be readily regulated or stopped.

A treadle, M, is journaled in the lower part of the frame, preferably upon a brace or rod, m', and said treadle is connected with the brake-pulley i by a connecting-rod, n, pivotally secured to the toe of the treadle at its lower end and at its upper end pivotally secured to the face of the brake-pulley at one side of its center, or eccentrically. A vertically-operating bell-crank or triangular-shaped locking-latch, O, is pivoted at its elbow to the connecting-rod n at a point opposite and a suitable distance from the slotted face of the brake-pulley, one of the arms of said latch forming a handle, while its other arm is adapted to enter a slot in the brake-pulley, and thus hold the mechanism of the motor from operation.

It will be readily seen that the speed of the motor at any particular point can be regulated or stopped by the pressure of the operator's foot upon the treadle. If it is desired to stop the operation of the motor and hold the gearing against rotation for any length of time, the revolution of the gearing can be gradually slowed up by the pressure of the foot upon the treadle, and when the operation has been sufficiently retarded the locking-latch can be swung around, so that an arm will fall into one of the slots in the brake-pulley, thus holding the motor from operating, and when it is desired to again start the operation the operator has simply to swing the latch vertically until its arm passes from engagement with the slot in the brake-pulley.

The operation of the device will be fully understood from the foregoing description and the drawings.

It is clearly evident that numerous slight changes might be made in the form and arrangement of the various parts described without departing from the spirit and scope of my invention; hence I do not wish to limit myself strictly to the precise construction set forth, but consider myself entitled to all such changes.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. The herein-described spring-motor, consisting, essentially, in the combination of a main driving-shaft provided upon one end with a hand-crank, a fly or driving wheel secured to said shaft near its opposite end and by which motion is imparted to the mechanism to be driven, a spring secured to the shaft at its end opposite the driving-wheel to actuate the shaft, a pair of secondary shafts journaled on opposite sides of the main shaft, a gear-wheel secured to the main shaft near the

end upon which the spring is secured, a pinion secured to one of the secondary shafts and meshing with the gear rigid on the main shaft, a gear-wheel secured to said secondary shaft, a gear-wheel and pinion secured together and loosely mounted on the main shaft, the pinion meshing with the gear-wheel on said secondary shaft, a pinion secured to the opposite secondary shaft and meshing with said gear-wheel loosely rotating on the main shaft, a gear-wheel rigidly mounted on said last-mentioned secondary shaft, and a train of intermeshing gearing loosely mounted on the main shaft and on each secondary shaft between the driving-wheel and the before-mentioned rigid gears, said train of loose gearing receiving motion from the gear-wheel rigidly secured to the last-mentioned secondary shaft, as set forth.

2. In a spring-motor, the combination of a main driving-shaft formed in two sections, one of said sections having a limited longitudinal movement, whereby said longitudinally-movable section can be rotated independently of the other section, a spring secured to the longitudinally-movable section, and a crank to operate said section gearing upon the other section, and a driving or fly wheel upon said section, substantially as described.

3. The combination, with the main shaft, of secondary shafts, gearing connecting said main shaft and secondary shafts, a brake-pulley upon one end of a secondary shaft and provided with radial slots in its face, a treadle, a rod connecting the treadle and brake-pulley, and a locking-latch adapted to enter one of said slots in the brake-pulley, substantially as described.

4. The combination, in a motor adapted to actuate a sewing-machine, of a main shaft, secondary shafts, gearing connecting said shafts, a brake-pulley upon one end of a secondary shaft, a shaft journaled on the under side of the machine-table, a pulley on said shaft, a brake-strap engaging the under face of the brake-pulley and passing upward and secured to the pulley beneath the machine-table, a ratchet-wheel on said shaft journaled to the machine-table, a pawl to hold the same, and a lever whereby said shaft can be rotated and the tension of the brake-strap on the brake-pulley regulated, substantially as described.

5. In a spring-motor, the combination, with the main driving-shaft, the spring to actuate the same, secondary shafts journaled upon each side of said main shaft, gearing connecting said main shaft and secondary shafts, a brake-pulley secured to the end of a secondary shaft, a brake-strap, a pulley to which one end of said strap is secured, and a pawl-and-ratchet mechanism to regulate the tension of said strap on the brake-pulley, substantially as described.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

ALFRED D. SAUNDERS.

Witnesses:
JULIUS SOLGER,
CHARLES M. WERLE.