(No Model.) 2 Sheets—Sheet 1.

J. M. BROSIUS.

MOTOR.

No. 382,865. Patented May 15, 1888.

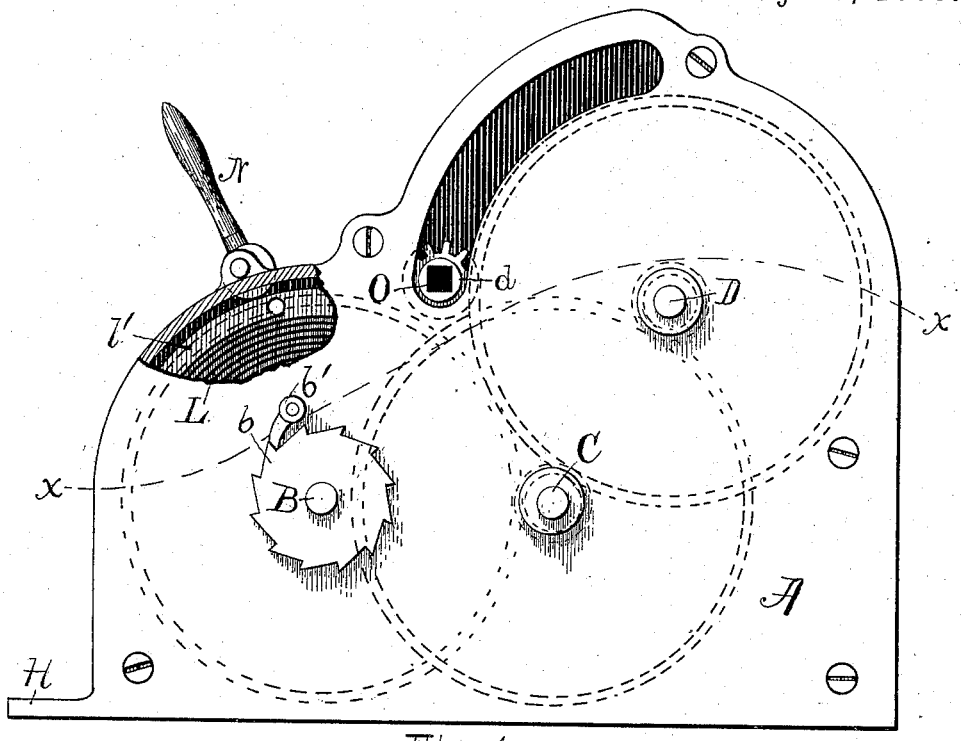

Fig. 1.

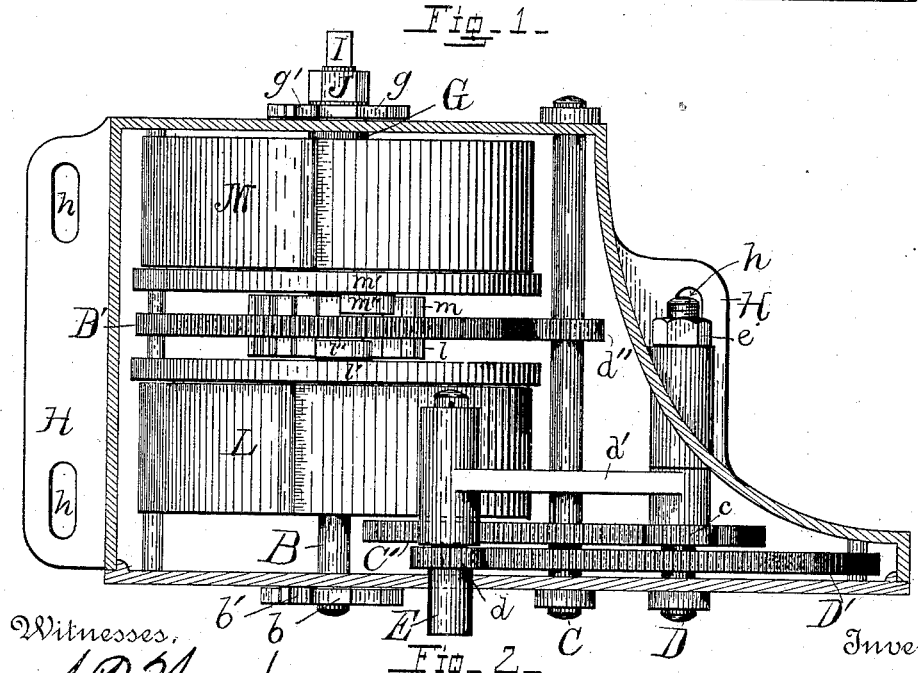

Fig. 2.

Witnesses.

A. P. Wood.

Ned. P. Wood.

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By his Attorney

Albert A. Wood

(No Model.) 2 Sheets—Sheet 2.

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No. 382,865. Patented May 15, 1888.

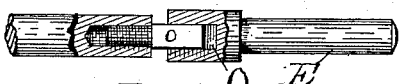


Fig. 4.

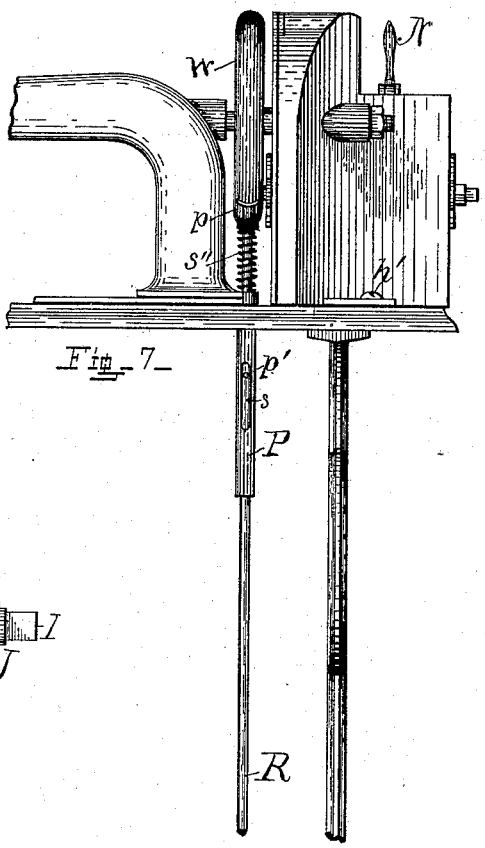


Fig. 7.

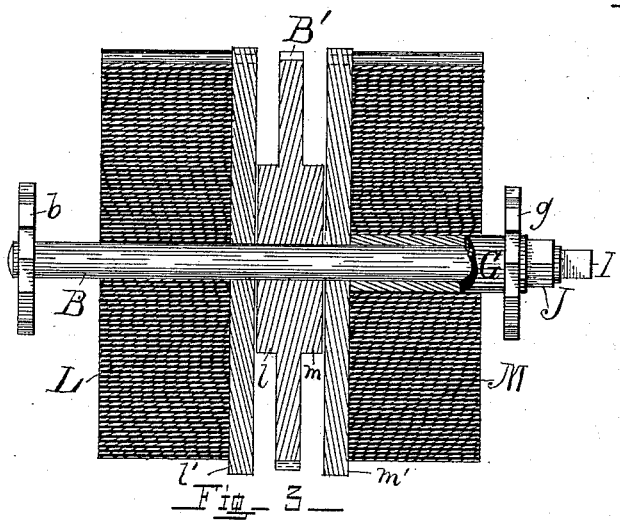


Fig. 3.

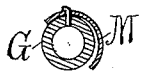
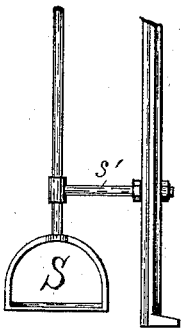


Fig. 6.



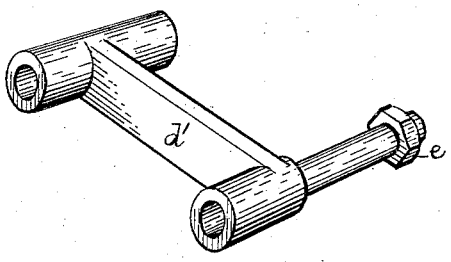


Fig. 5.

Witnesses.

A. C. Wood

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Inventor,

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By his Attorney

Albert A. Wood.

UNITED STATES PATENT OFFICE.

JOHN M. BROSIUS, OF ATLANTA, GEORGIA.

MOTOR.

SPECIFICATION forming part of Letters Patent No. 382,865, dated May 15, 1888.

Application filed December 19, 1887. Serial No. 258,401. (No model.)

To all whom it may concern:

Be it known that I, JOHN M. BROSIUS, a citizen of the United States, residing at Atlanta, in the county of Fulton and State of Georgia, have invented a new and useful Motor; and I do hereby 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 letters or figures of reference marked thereon, which form a part of this specification.

This invention relates to that class of motors in which a coil-spring is the motive power, the object being to so improve this class of motors as to obtain a more uniform power from them, and also a more economical device as regards the force required to wind it. As these motors have been heretofore constructed, a coil-spring of a given length and tension will overcome a given resistance in the driven machine until the tension becomes only equal to the resistance, which necessitates an excess and waste of force in the beginning of the spring's action in proportion to the length of time that it will run, which surplusage of force must be given to the spring in the process of winding it. It therefore follows that it is not practicable to adapt the spring, as heretofore used, to the driving of any machinery for a very long space of time. I overcome a great part of this difficulty by a novel arrangement of two or more springs and mechanism by which they may be used separately or collectively, by reason of which the surplusage of power in the beginning of the action of the spring and the winding force necessary to produce it are necessarily lessened. It follows, therefore, that a given force applied to the winding of the springs will, on account of its more economical use, drive more uniformly and for a greater length of time. The details of construction by which this result is accomplished, and the means by which the motor so constructed is connected to and disconnected from the driven machinery, will be hereinafter fully described, for which purpose it is shown in the accompanying drawings as attached to a sewing-machine and driving the same.

In the drawings, Figure 1 is a side elevation. Fig. 2 is a plan view, with the top of the casing removed, on the line x x, Fig. 1, showing the arrangement of most of the parts. Fig. 3 is a section passing through the center of the spring-shaft, showing the springs and disks to which they are attached and the gear in section; also showing the sleeve, partly in section, to which one spring is attached, the shaft to which the other spring is attached, the ratchets that resist the backward thrust of the springs, and the seats on the sleeve and shaft, by means of which a key may be seated on either and the springs separately wound. Fig. 4 is a view of the coupling, by means of which the driven machine is coupled to the pinion-shaft of the motor. Fig. 5 shows in perspective the arm that carries the pinion-shaft. Fig. 6 shows the attachment of the inner end of the spring on the sleeve. The other spring should be attached to the shaft in the same manner. Fig. 7 is an end view of the motor attached to a sewing-machine on a table, and shows the friction-brake by which the speed is regulated.

In the figures, like reference-marks indicating corresponding parts in the several views, A is a box-shaped support for the main or spring shaft B, the intermediate shafts, C and D, the supporting-arm d' of the pinion-shaft E, the pawl b' of the ratchet b on the shaft B, and the pawl g' of the ratchet g on the sleeve G. The support A is also provided with horizontal bottom flanges, H, having slots h for attachment to a table and for adjustment, all of which will be hereinafter fully described.

To the sleeve G is attached the inner end of a coiled spring, m, in any desirable way, one of which is shown in Fig. 6, the outer end being attached to a stud in the disk m'. The inner end of the coil-spring L is attached in the same way to the shaft B and the outer end to the disk l'. The disks l' and m' run loosely on the shaft B, on which also runs loosely the spur-gear B', on each side of which are ratchets l and m. On the disks l' and m', Fig. 2, are shown pawls l'' and m'', that engage with the ratchets l and m.

In Figs. 1 and 7 are shown levers N, on the bottom end of each of which is an eccentric cam, which, by frictional contact, will prevent the forward movement of the disks l' and m'. Only the cam that operates on the disk l' shows in Fig. 1; but the disk m', being exactly like

the disk l' in all respects and performing the same functions, must also be provided with the cam-lever, as shown in Fig. 7.

The ratchet b on the shaft and the pawl b' on the casing A and the ratchet g on the sleeve G and pawl g' on the casing A prevent the shaft B and sleeve G from being turned backwardly by the backward thrust of the springs on their being wound up, and cams pressing on the periphery of the disks l' and m' prevent the forward movement of these disks. The shaft B passes through the sleeve G, and the seats I on the shaft and J on the sleeve for the winding-key are both on the same side of the machine.

The gear B' being connected to the driven machine by mechanism the preferred form of which is shown and will be hereinafter described, and the springs being wound up and one of the cam-brakes—for instance, the one pressing on the disk l'—being released by turning back its lever, the spring L will carry forward the machine until it shall have exhausted so much of its strength as to be unable to carry it forward farther at the desired speed, when the brake should be again applied to the disk of that spring and the brake on the disk of the spring M be released. This change from one spring to another may be made as above indicated, or the brake-disk on the spring M may be released before the other is applied. Assuming that each of the springs is of the capacity of those used in a spring-motor using but one spring, they will of course perform twice the amount of work, and would require a smaller expenditure of force in winding than would a single spring having a capacity equal to both. As ordinarily used, the available force of a coil-spring is only so much as it can furnish throughout the time it is required to act. It is therefore economy, as regards the force required to wind it, to use two springs of moderate length instead of only one of so great a length and strength as to equal both, on account of the very great surplusage of power that it is necessary to store in the single spring, as the first half of the work may be performed by one of two springs with a surplus of force only equal to that expended in the last half of the work as done by the single or by the double springs used alternately.

After the second spring shall have been applied, as above described, and exhausted its available force, the force remaining in the spring first used may be added to it by releasing the brake on the disk of that spring, which will combine the otherwise unavailable force of the two springs and carry the machine for an additional space of time. By using the springs, as above described, alternately and then together nearly all of the force used in winding them is available and will drive the machinery very much longer—approximately estimated at three times the length of time that a single spring of the capacity of each would drive it.

The mechanism by means of which the power is transmitted from the spur-gear B to the driven machine consists of any reasonable system of gearing that will produce in the pinion-shaft E the required speed; but I prefer, for driving sewing-machines, the pinion d'' and the spur-gear C' on the shaft C, the pinion c and the spur-gear D' on the shaft D, and the pinion d on the shaft E. The shaft E, Figs. 1 and 4, has in its outer end an aperture, O, preferably square, and the sewing-machine shaft has fastened into it or made integral with it an end, o, that will enter into and fit the opening in the shaft E for the purpose of making a coupling with it. In order to adjust the shaft E to a height that will coincide with the sewing-machine shaft, the shaft E is journaled in the arm d', Figs. 2 and 5, which is journaled on the shaft D, from which the shaft E is driven, for the purpose of keeping the gearing in mesh by keeping a uniform distance between the two shafts. The casing is slotted to permit the adjustment of arm d' and shaft E to different heights. The arm d'_1 after being adjusted to the required height, may be fastened by the nut e. The slots h in the flanges H, Figs. 2 and 7, receive screws h', that pass into the table and hold the motor down in place. These slots also allow of the motor being moved and disconnected from the machine driven without taking it from the table, the brakes being first applied to the disks l' and m' for the purpose of preventing the motor from running when so disconnected.

To regulate the speed of the sewing-machine and to stop it temporarily, a friction-brake is applied as follows: Into the table is inserted a pipe, P, having a slot, s. Through the pipe passes the rod R, having the guide s' near and the stirrup S at the bottom. At the top of the plate is the shoe or friction-plate, p, made to conform to the shape of the balance-wheel W, and between it and the table is the spiral spring s''. To prevent oscillation of the rod, I place the pin p' through it and entering the slot s in the pipe.

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

1. In a spring-motor, the shaft E, the springs and gearing to drive said shaft, and a second shaft provided with a wheel, in combination with the speed-regulating mechanism consisting of the pipe P, the friction-plate p, bearing on said wheel, the spring s'', and the rod R, provided with the stirrup S, for the purpose set forth.

2. In a spring-motor, the combination of the shaft B, the sleeve G, said shaft and sleeve provided, respectively, with the seats I and J for the winding-key, the ratchets b and g, pawls b' and g', the springs L and M, the ratchets l and m, the pawls l'' and m'', and the brakes by which the action of the springs may be stopped, substantially as shown and described.

3. In a spring-motor, the shaft E and the mechanism for driving the same, in combination with the arm d', journaled on the shaft

D and adapted to permit the variation of the height of shaft E, the nut *e*, and the slotted casing for allowing the adjustment of said shaft E, substantially as set forth.

4. In a sewing-machine motor, the combination of the spring-driven gearing, the arm *d'*, the pinion-shaft E, the socket-coupling connecting the pinion-shaft and the sewing-machine shaft, and the casing having slots *h* and screws *h'*, for the purpose specified.

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

JOHN M. BROSIUS.

Witnesses:
A. P. WOOD,
NED P. WOOD.