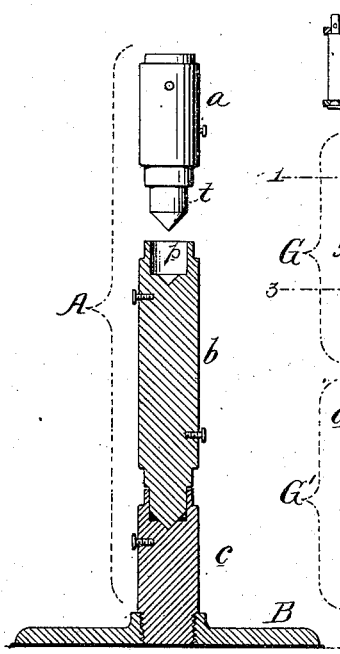
J. B. POWELL.
Spring-Motor.

No. 219,015. Patented Aug. 26, 1879.

FIG. 1

FIG. 3.



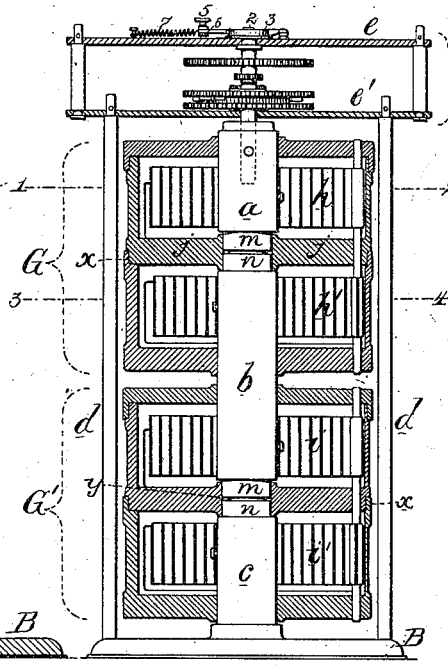


FIG. 2.

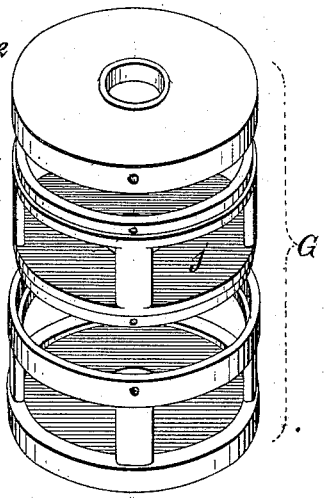


FIG. 6.

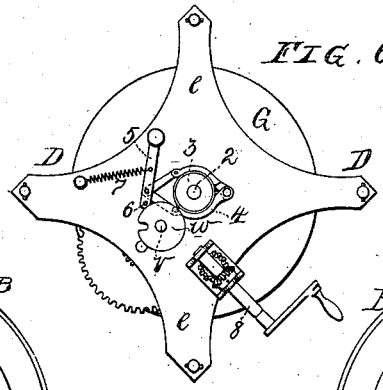


FIG. 4.

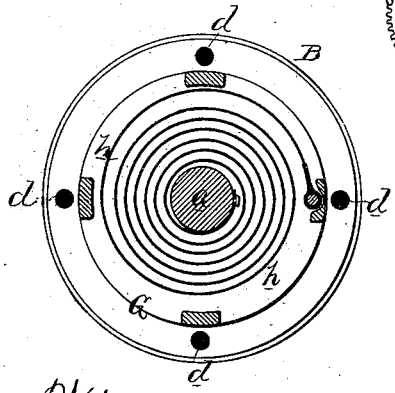
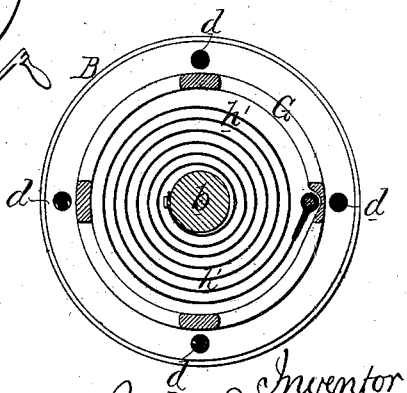


FIG. 5.



Witnesses
Alexander Patterson
Harry Smith

Inventor
John B. Powell
by his Attorneys
Howson & Sons

UNITED STATES PATENT OFFICE.

JOHN B. POWELL, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF ONE-HALF HIS RIGHT TO J. C. SHERBORNE, OF SAME PLACE; SAID POWELL AND SHERBORNE ASSIGNORS OF ONE-SIXTH THEIR RIGHT TO JAMES H. HARPER, OF SAME PLACE.

IMPROVEMENT IN SPRING-MOTORS.

Specification forming part of Letters Patent No. **219,015**, dated August 26, 1879; application filed August 2, 1879.

To all whom it may concern:

Be it known that I, JOHN B. POWELL, of Philadelphia, Pennsylvania, have invented a new and useful Improvement in Spring-Motors, of which the following is a specification.

My invention relates to improvements in spring-motors, in which a number of barrels and springs and arbors or shafts are so combined that the measure of power obtained from the whole of the springs is equivalent to that derived from one spring only, while the continuance of the power obtained is proportionate to the number of springs used, my invention being more specially directed to improvements in the spring-motor for which Letters Patent No. 176,203 were granted to the Shive Governor Company, April 19, 1876, as the assignees of D. Shive.

The main object of my improvements is to diminish the friction which has hitherto detracted seriously from spring-motors, and to overcome sundry practical defects in the Shive machine.

These objects I attain in the manner which I will now proceed to describe, reference being had to the accompanying drawings, in which—

Figure 1 is a front view of the motor, the barrels and springs being in section; Fig. 2, a detached perspective view of the barrels; Fig. 3, a detached view of the central arbor or sectional shaft, partly in section; Fig. 4, a sectional plan on the line 1 2, Fig. 1; Fig. 5, a sectional plan on the line 3 4, Fig. 1; and Fig. 6, a top view of the motor.

A is the central shaft, made in three sections, *a*, *b*, and *c*, the last of which is secured to the base B, and from the latter extend pillars *d*, four in the present instance, for supporting the frame D, which, preferably, consists of two plates, *e e'*, securely fastened together and to the pillars.

There are in the present motor two barrels, G' G', the former containing two springs, *h h'*, and the latter two similar springs, *i i'*. These two barrels are snugly fitted to and arranged to turn on the sectional shaft independently of each other, the sections *a* and *b* of the shaft being also arranged to turn independently of each other, the lower end of the section *a* fitting into a socket in the section *b*, and the lower end of the latter in a socket in the fixed section *c*.

The inner end of the coiled spring *h* of the upper barrel is secured to the section *a* of the sectional shaft, and its outer end to the barrel, which is connected to the section *b* of the shaft by the coiled spring *h'*, the latter being connected to the section *b* of the shaft, and this section being connected by the coiled spring *i* to the lower barrel, which is connected to the fixed section *c* of the shaft by the coiled spring *i'*. The two springs in each barrel are coiled in the reverse order. (Shown in Figs. 4 and 5.)

The above description, as far as the barrels, springs, and sectional shaft are concerned, will apply to the device shown in the aforesaid Patent No. 176,203, and the action of the springs and shafts will be the same as in said patented machine—that is, after all the springs have been wound up, the measure of power imparted to the section *a* of the shaft will be equivalent to that due to the recoil of one spring only, while the continuity of the power will be proportionate to the number of springs employed.

There are important departures, however, in my improved motor from that described in the said patent, as well as several improvements, all of which I will now proceed to describe. The most important of these is the placing of the central sectional shaft in a vertical position and causing the barrels to revolve horizontally.

It will be noticed, on referring to the said Patent No. 176,203, that the sectional shaft is horizontal, and that, being in sections, there must necessarily be great friction where one section turns in the other, as well as where the barrels turn on the shaft, owing to the weight of the barrels and springs and the tendency of the shaft to sag under this weight. This defect is common to other spring-motors of the class to which my invention relates, and is overcome by placing the barrels above each other in the manner illustrated.

Another important feature of my invention is the mode of fitting the barrel to two sec-

tions of the central shaft in such a manner as to maintain them in proper line with each other.

It will be seen that each barrel is made in two parts, snugly fitted together at *x*, Fig. 1, and that a disk, *j*, extends across and forms a part of the upper half; or arms may take the place of the disk, providing there be a central hub, forming the bearings of the journal *m* of the upper section, *a*, of the shaft, and the journal *n* of the section *b*.

It will thus be seen that each barrel has three lateral bearings on the sectional shaft—one at the top on the section *a*, one at the bottom on the section *b*, and an intermediate bearing common to both shafts—a plan which insures the maintenance of the two sections of the shaft always in proper line with each other.

It may be remarked here that the barrel is made in two parts for the purpose of fitting it and the sectional shaft to each other, and that when the motor has been put together the two parts are essentially one barrel.

Each barrel is supported by a shoulder on the sectional shaft—the barrel G by the shoulder formed in making the journal *n* on the section *b*, and the lower barrel by a shoulder formed on the fixed section *c*. The barrels are thus maintained at a short distance apart from each other, and friction, which would be caused by one barrel bearing on the other, is obviated.

On referring to Fig. 3, it will be seen that the recess in the top of the section *b* of the shaft has at the bottom a central conical recess for receiving the conical end of the section *a*, this recess being of such limited dimensions that, when the reduced portion *t* of the section *a* is in the recess in the socket, there will be a small annular chamber for maintaining a sufficient supply of oil to keep the conical bearing in a proper lubricated condition.

It will be understood that the reduced portion *t* of the section *a* fits snugly in the recess or socket *p* of the section *b*, so as to aid the barrel in maintaining the two sections in proper line with each other.

Precisely the same arrangement is observed in adapting the lower portion of the section *b* to the socket in the top of the fixed journal *c*, as will be seen on referring to the lower portion of Fig. 3, where the annular oil-receptacle is shown in black.

A passage (indicated by a dotted line, *y*, in Fig. 1) may be made in each barrel, through which to convey oil to the journals *m* and *n* of the sections, the oil finding its way to the socket and to the oil-receptacle therein.

The motor is a self-contained machine, the base, which supports the shaft and barrels, also supporting the frame D, which carries the multiplying-gear; hence the machine is adapted for ready application to any purpose where comparatively small but long-continued power is required—as, for instance, the driving of a sewing-machine.

It will not be necessary to describe minutely the train of multiplying-wheels which I have adopted and partly shown in the drawings, for different systems of gearing may be employed without departing from the main feature of my invention. It will suffice to observe that the motion communicated to the section *a* of the shaft by the recoil of the springs is transmitted by multiplying-gear to the vertical spindle *v*, Fig. 6, which has its bearings in the frame D, and which is furnished with a disk, *w*, having a slot for receiving the pin through which a Singer sewing-machine is operated.

The motor may be so placed beneath the table of the sewing-machine that the latter can be turned up on its hinges as usual, and when turned down its pin will at once enter the slot of the disk *w*, the motor being then started without any further adjustment.

The spindle 2, which is secured to and projects through the frame D from the section *a* of the central shaft, is furnished with a friction-disk, 3, to which are adapted two segmental friction-arms, 4, pivoted to the frame and connected by links to the arm 5, pivoted to the frame at 6, and connected thereto by a spring, 7, the tendency of which is to act on the arm 5, so as to cause the segmental arms to embrace the friction-disk and stop the motor.

This device is preferably used when the motor is applied to a sewing-machine, the outer end of the arm 5 being so connected to the treadle that as long as the operator's foot is pressed on the latter the springs of the motor will be free to recoil, the release of the treadle resulting in the application of the friction-arms to the disk by the spring 7.

The winding-up device (shown in Fig. 6) consists of a shaft, 8, provided with a detachable handle, and geared to the spindle of one of the wheels of the train by bevel-wheels, a suitable ratchet being used in connection with the device, as in other spring-motors.

It should be understood, however, that I do not desire to restrict myself to this winding mechanism.

Although two barrels, each containing two springs, are shown, a machine with a single barrel may be constructed for uses in which long-continued movement is not required, the number of barrels being increased as the desired length of time during which the motor has to operate without being wound up may suggest.

In some cases the motor may consist of an upper barrel, G, containing two springs, and the upper portion of the barrel G′, containing a single spring, in which case the said upper portion of the lower barrel must be secured to the base of the machine, the lower end of the section *b* of the shaft turning on the said base.

I claim as my invention—

1. The combination, in a spring-motor, of a vertical shaft made in sections, arranged to turn independently of each other, with a barrel containing two springs and presenting a

central lateral bearing common to the journals of two sections of the shaft, all substantially as described.

2. The combination, in a spring-motor, of two or more barrels, each containing springs, with a vertical shaft made in sections, and having shoulders by which the barrels are supported independently of each other on the said shaft, substantially as described.

3. The combination, in a spring-motor, of a barrel containing two springs and made in two parts with a vertical shaft made in sections, and having journals *m n*, the bearings of which are in the upper part of the barrel, substantially as described.

4. The combination of a series of barrels, each containing two springs, with a vertical shaft made in sections, the lowest of which is fixed to or forms a part of the base B of the motor, substantially as specified.

5. A spring-motor in which are combined the following elements, namely: a series of barrels containing springs, a sectional vertical shaft, a base for supporting the said barrels and shaft, and a frame carrying a train of multiplying-wheels and secured to the base, all substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN B. POWELL.

Witnesses:

ALEXANDER PATTERSON,

HARRY SMITH.