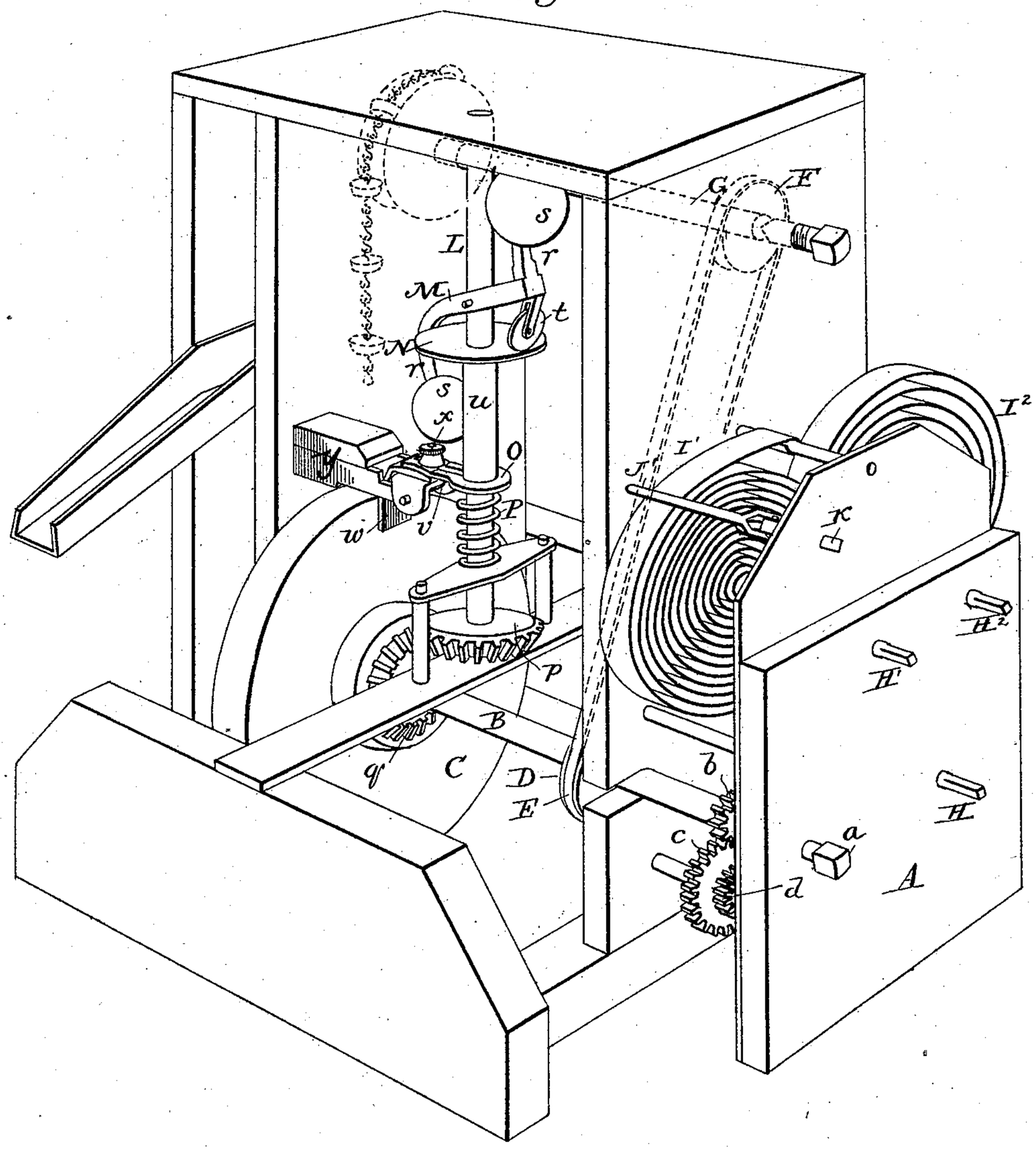
(No Model.) 2 Sheets—Sheet 1.

A. F. GEORGE.

SPRING MOTOR.

No. 370,779. Patented Oct. 4, 1887.

Fig. 1.



Witnesses
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(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

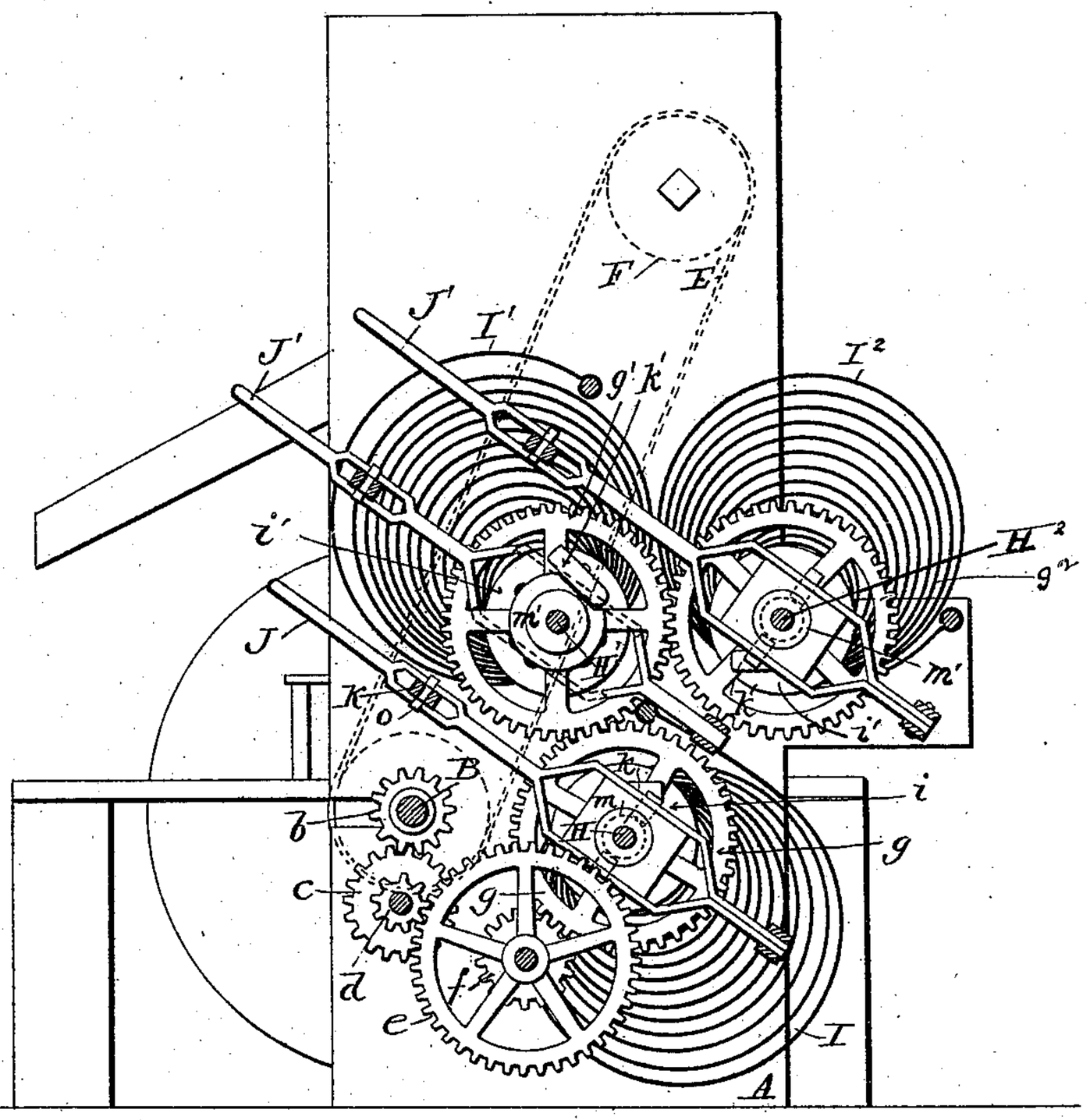


Fig. 4.

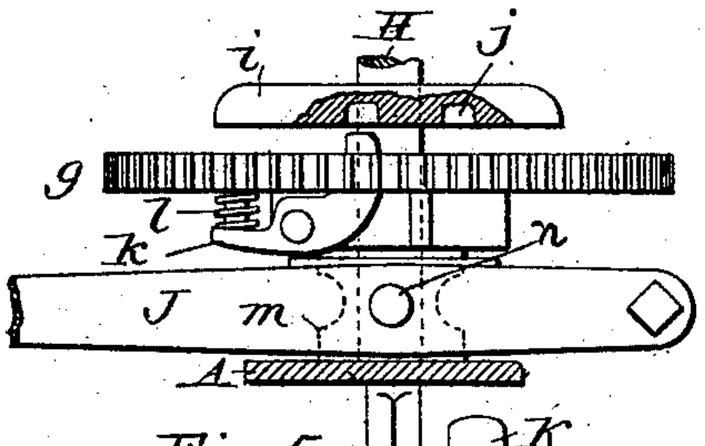
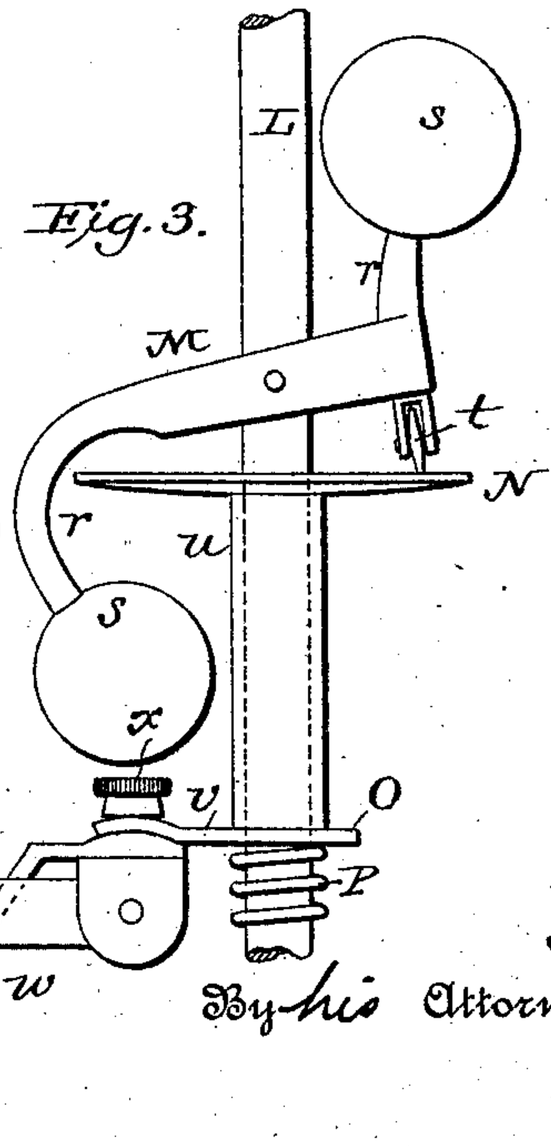


Fig. 5.

Fig. 3.



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UNITED STATES PATENT OFFICE.

ALBERT F. GEORGE, OF WASHBURN, MISSOURI.

SPRING-MOTOR.

SPECIFICATION forming part of Letters Patent No. 370,779, dated October 4, 1887.

Application filed April 23, 1887. Serial No. 235,887. (No model.)

To all whom it may concern:

Be it known that I, ALBERT F. GEORGE, of Washburn, in the county of Barry and State of Missouri, have invented certain new and useful Improvements in Spring-Motors, of which the following is a specification.

My invention relates to that class of motors in which the power of springs is utilized for setting in motion a shaft from which other machinery may be driven by belt, gearing, or other connection.

The invention consists in various features and details of construction, hereinafter set forth, whereby I am enabled to use the springs singly, jointly, or successively at will.

In the accompanying drawings, Figure 1 is a perspective view of my improved motor. Fig. 2 is a side elevation of the same with the front frame or plate of the spring-case removed to show the gearing and springs, and Fig. 3 is an enlarged view of the brake and governor; Figs. 4 and 5, detail views of the winding-pawl and shipping-lever.

The purpose of my invention is to produce a cheap and simple motor by which manual labor, performed in comparatively short time, may be stored up and utilized for driving machinery, pumping water, and performing various kinds of work requiring long-continuing motion.

With this object in view I construct my motor in the manner illustrated in the drawings, in which—

A indicates a frame-work, which may be of wood or metal, or of the two combined, in which frame is mounted a horizontal shaft, B, carrying a balance-wheel, C, and a band-wheel or pulley, D, from which motion is transmitted by a belt, E, to a pulley, F, on the driven shaft G.

Shaft G may represent the main shaft of any piece of machinery to be driven—as, for instance, a grinding-mill, feed-cutter, or the like; or it may be the wheel-shaft of a chain-pump, as indicated in Fig. 1, this being taken merely as a convenient illustration of the application and use of the machine.

To insure nicety of adjustment and ease of running, the shaft B may be carried on centers *a a*, as shown, though for larger machines journals and boxes will be found advisable. This shaft is furnished with a pinion, *b*, which receives motion through a train of gear-wheels, *c d e f*, from a gear-wheel, *g*, mounted loosely upon a shaft, H. This shaft H constitutes the winding-arbor of a strong spiral or volute spring, I, one end of which is made fast to the frame A and the other end of which is attached to the shaft H.

Keyed or otherwise made fast upon shaft H is a disk, *i*, the face of which is provided with a notch or recess, *j*, to receive the point or fore end of a pawl, *k*, (one or more,) carried by wheel *g*, and pressed toward the disk *i* by a spring, *l*. The pawl *k* thus serves the purpose of the ordinary click or dog of a watch or clock, but is of course made heavy and strong in proportion to the strain it is to withstand. The end of the shaft H projects outward through frame A, and is squared to receive a key or winch, by which to turn it and wind the spring. As the spring is wound, it is prevented by the dog or pawl *k* from unwinding, except as it carries with it the wheel *g*, in which the pawl is mounted. The rotation of this wheel gives motion through the train of gear *f e d c b* to shaft B, from which motion is conveyed in any convenient manner to the machinery to be driven, as above explained.

In order to develop sufficient force, and to maintain such force for a considerable length of time, I provide a series of springs, I′ I², &c., the number depending upon the purposes for which the motor is intended, said springs being mounted and arranged in the same manner as spring I, and being each provided with a winding-shaft, H′, a notched disk, *i′*, and a gear-wheel, *g′ g²*, &c., carrying a pawl or dog, *k′*, to enter the notches *j′* of the respective disks *i′*. The several wheels *g g²* are of the same size and number of teeth as wheel *g′*, and are arranged about and in mesh therewith, so that when their springs are wound they may act in concert with wheel *g* and its spring, and so give to each spring its proper share of the work, thus insuring uniform action and equal unwinding of the several springs.

If it be desired to employ only a portion of the springs, only such springs as are needed will be wound, in which case the wheels *g g′*, &c., of the springs wound will rotate, and will give motion to such other of the wheels *g′* as are not driven by their own springs, the

pawls or dogs of such latter wheels riding freely backward over the notched disks with which they engage at other times. The pawls in thus moving over the disks and dropping into the notches produce a considerable amount of noise, which in some places would be highly objectionable, and I therefore provide means whereby such of the wheels *g'* as are not for the time assisting in driving the shaft B may be thrown out of mesh with the wheel *g*, and thus prevented from producing the noise referred to. This end I attain by providing the wheels *g* each with a circumferentially-grooved hub, *m*, to receive the pin *n* of a shifting-lever, J, pivoted to the framing A and serving, when moved in one or the other direction, to throw its wheel toward or from the disk *i*, with which it cooperates, so that the pawl or dog *k'* thereof may engage with or be withdrawn beyond the reach of the disk, as desired. The shifting-lever moves over a guide-bar, K, and may be provided with any convenient locking device to hold it at the desired adjustment. In the drawings the guide-bar is shown provided with a series of holes to receive a pin, *o*, which, being inserted by the side of the lever, holds it at one or the other extreme of its movement and retains its wheel in or out of engagement with the disk, as required.

It is of course to be understood that the frame-work may be varied as desired, or as the necessities of the case may dictate; that the shifting-lever may be of any usual form and arrangement; that different locking devices may be employed; that the precise form and arrangement of pawl or dog and ratchet or disk is unimportant, and that the gear-train may be varied as desired, these being mere matters of detail heretofore embodied in a great variety of forms in various classes of machinery.

It is apparent that when tightly wound the springs will drive the shaft B with greater force and speed than when partially unwound, unless provision be made to prevent such action and render the motion of the shaft uniform; hence I provide the machine with a brake and with a centrifugal governor for controlling the action of the brake. This brake and governor will be better understood upon referring to Figs. 1 and 3, in which L indicates a vertical shaft provided with a bevel-pinion, *p*, which receives rotary motion through a like pinion, *q*, on shaft B.

Pivotally attached to shaft L is a yoke, M, having two arms, *r r*, one above and the other below the horizontal plane of its pivot, said arms being each provided with a ball or weight, *s*, as shown. The under side of the yoke M carries a roller, *t*, which bears upon and travels over the face of a disk, N, carried by a sleeve, *u*, which rests at its lower end upon one arm of a lever-brake, O, the other arm of which bears against the side face of balance-wheel C and tends to retard its motion, the brake-lever being pivoted in a bracket or supporting-arm, *y*, attached to the frame of the machine. The brake-lever and the sleeve and disk are held up against the depressing force of the roller by means of a spring, P, encircling shaft L, but which spring is compressed, through the depressing action of the roller, when the speed of the machine unduly increases, and the centrifugal action of the governor consequently becomes sufficiently strong to overcome the strength of the spring. When this occurs, the brake is forced against the face of wheel C, the pressure thereon being directly proportionate to the speed of the motor.

In some cases it is desirable to utilize to the fullest extent the power of the springs, and uniformity of speed is unimportant. To provide for such cases and prevent the application of the brake, as well as to vary the force of the brake in other cases, the brake-lever O is made in two sections, *v* and *w*, one slotted and secured to the other by means of a set-screw, *x*, as shown in Fig. 3. By means of this adjustable connection the position of the brake relative to the wheel and governor may be varied, so that the application of the brake to the wheel shall occur upon a greater or less variation of the governor, as required—that is to say, the arm *v* being held at a given point by the spring and the sleeve when the motor is not in action, the distance of arm *w* from the side face of wheel C may be varied by loosening the set-screw *x* and tipping arm *w* upon its pivot, the screw being then tightened again to preserve the new adjustment. By thus tipping the part *w* the relative positions of parts *v* and *w*, or the angle at which they stand to each other, are changed, and if the arm *w* be thrown farther away from the wheel a higher speed of the motor, and consequently greater outward movement of the balls *s* and greater depression of the disk, sleeve, and brake-arm *v*, will be required to carry the brake shoe or arm *w* into contact with the wheel. If the adjustment of part *w* be toward the wheel, the brake will be applied while the motor is running at a lower rate of speed than previously.

I am aware that spring-motors have hitherto been made in a variety of forms, and that in some cases they have been furnished with a brake controlled by a governor receiving motion from the driving-shaft of the motor, and hence I do not broadly claim these features.

Having thus described my invention, what I claim is—

1. The herein-described motor, consisting of frame A, shaft B, shafts H H' H², wheels *g g' g²*, gearing connecting wheel *g* and shaft B, springs I I' I², applied to and serving to rotate the several shafts, and shifting-levers applied to wheels *g' g²*, whereby said wheels may be connected with and disconnected from each other and with and from wheel *g* at will.

2. In combination with a motor and with a wheel, C, thereof, a lever pivoted at a point between its ends and provided with a shoe at one end to bear upon the wheel, a spring bear-

ing against the opposite end of the lever and serving to hold the shoe away from the wheel, and a weighted yoke pivoted to a rotating spindle of the motor and serving to depress the brake-lever when the speed of the motor is increased.

3. In combination with shaft B and wheel C of a motor, shaft L, geared to shaft B, weighted yoke M, pivoted to shaft L, and provided with roller *t*, sleeve *u*, provided with disk N, brake-lever O, extending beneath sleeve *u*, and spring P beneath the lever O, and serving to hold the same and the disk N against the action of the weighted yoke M.

ALBERT F. GEORGE.

Witnesses:
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JAMES W. GEORGE.