No. 672,089. Patented Apr. 16, 1901.

W. J. BRITTAIN.

SPRING MOTOR.

(Application filed May 17, 1900.)

(No Model.) 2 Sheets—Sheet 1.

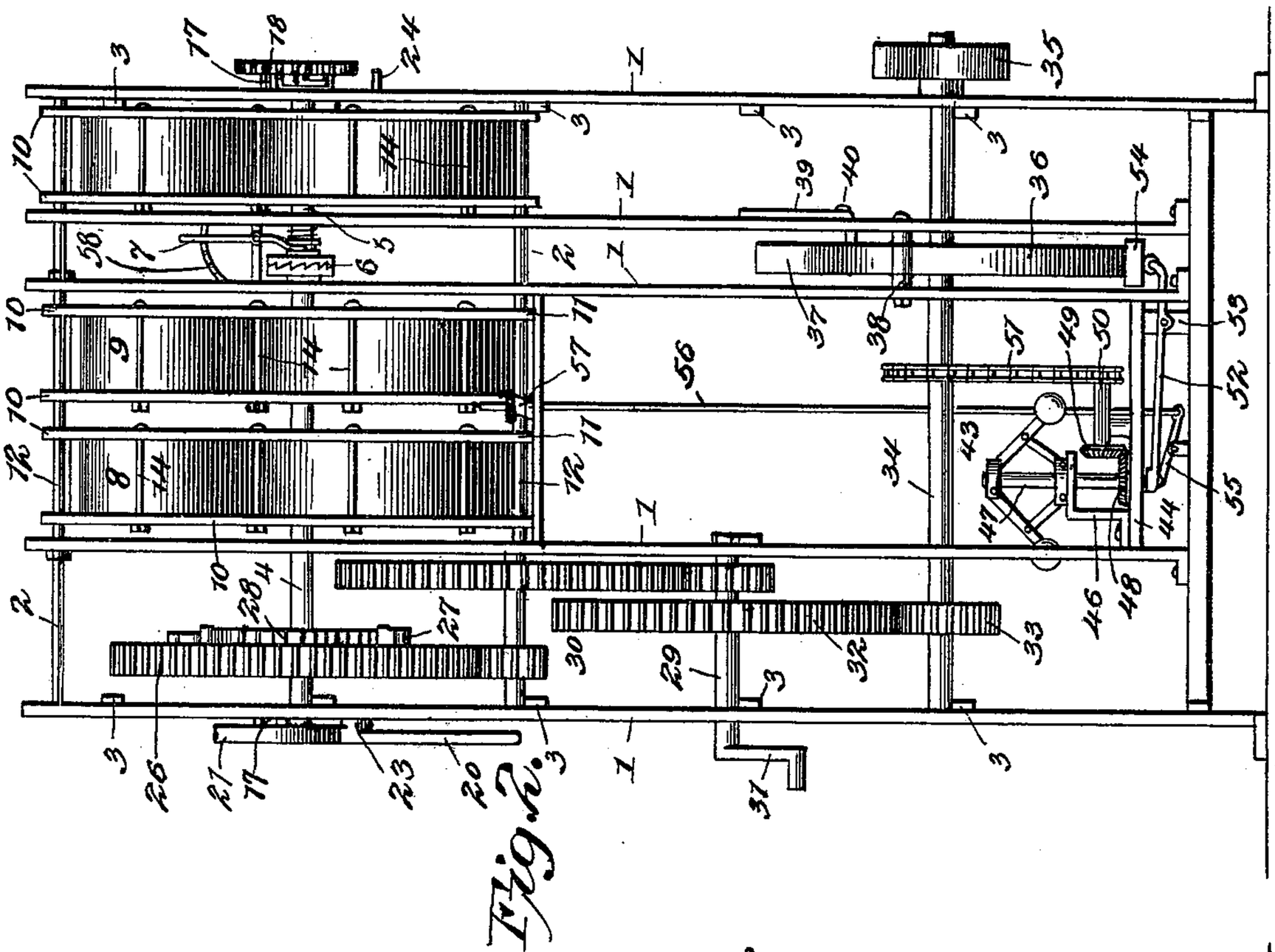

Fig. 2.

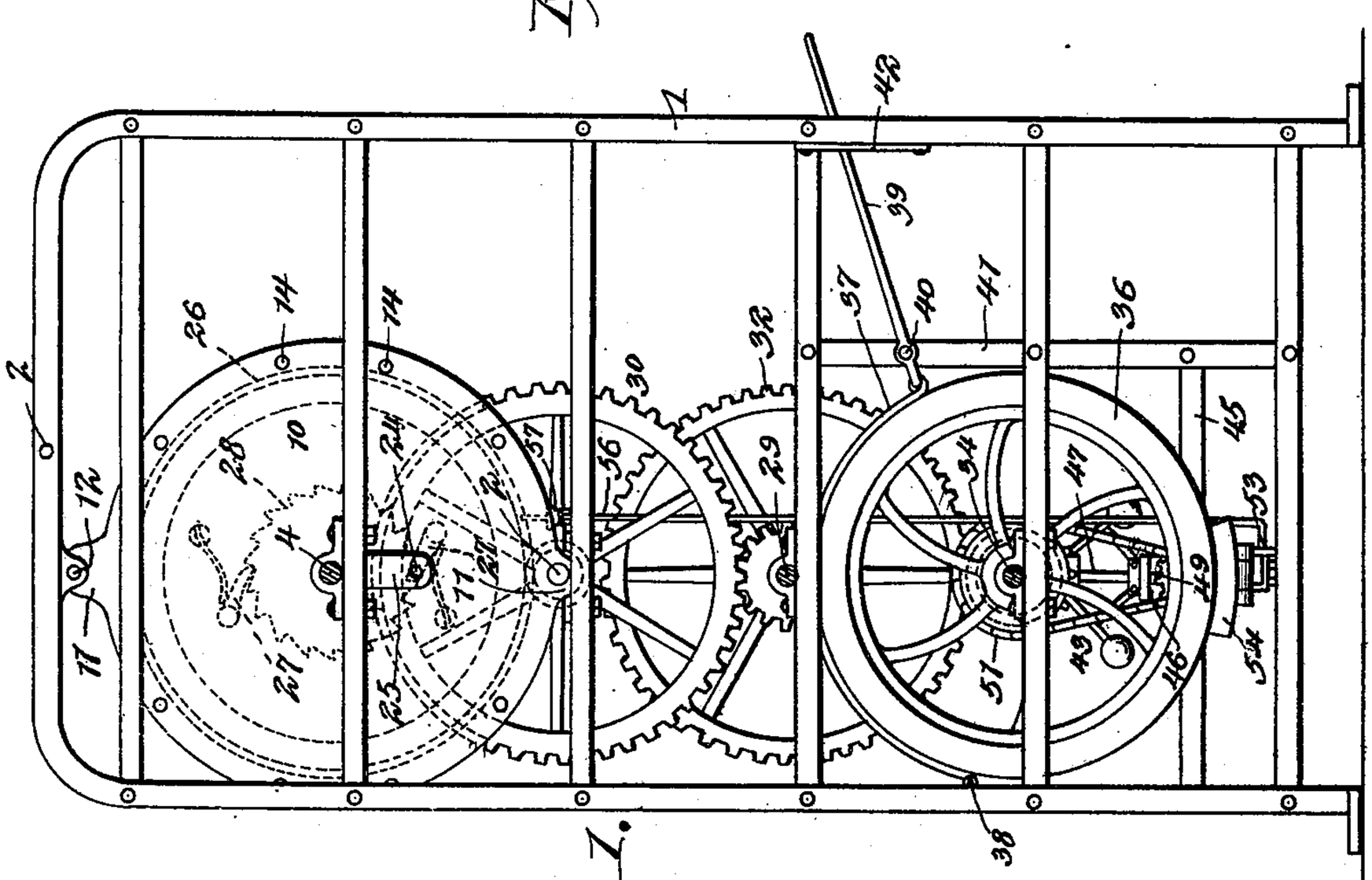

Fig. 1.

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(No Model.) 2 Sheets—Sheet 2.

Fig. 5.

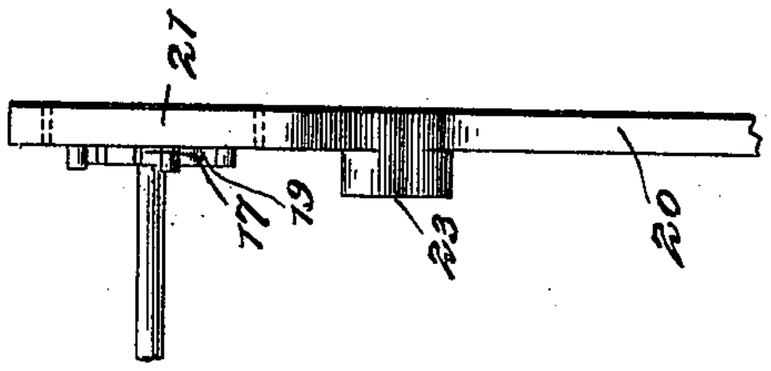

Fig. 6.

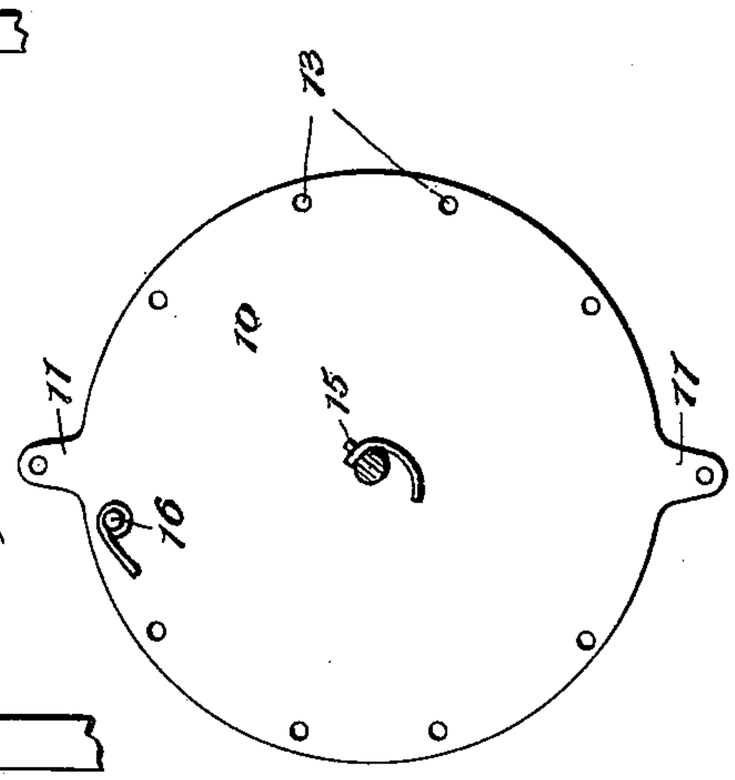

Fig. 4.

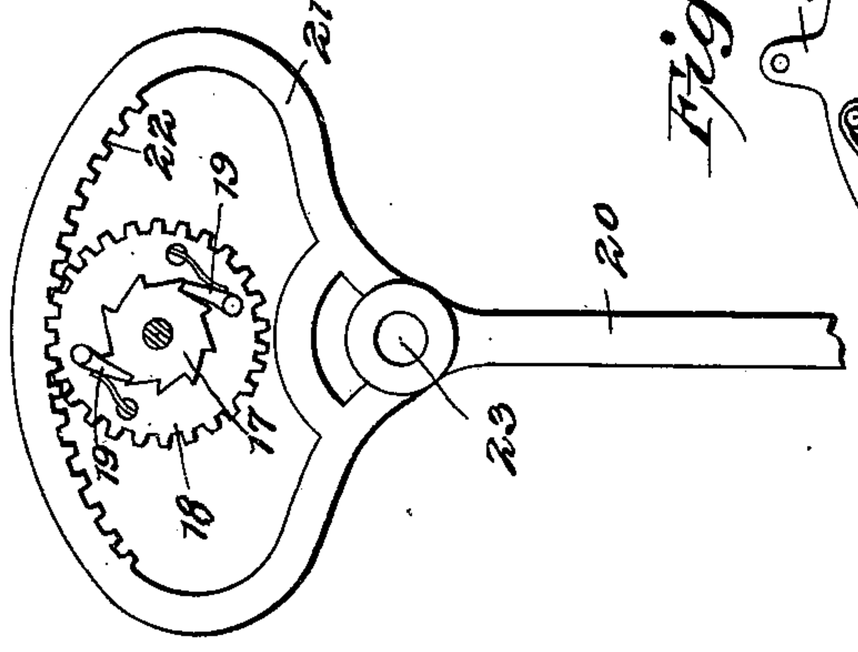

Fig. 3.

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UNITED STATES PATENT OFFICE.

WILLIAM J. BRITTAIN, OF NEODESHA, KANSAS.

SPRING-MOTOR.

SPECIFICATION forming part of Letters Patent No. 672,089, dated April 16, 1901.

Application filed May 17, 1900. Serial No. 17,046. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM J. BRITTAIN, a citizen of the United States, residing at Neodesha, in the county of Wilson and State of Kansas, have invented a new and useful Spring-Motor, of which the following is a specification.

This invention relates to motors, and has for its object to provide an improved spring-actuated device of this character which is especially designed for operating pumps, washing-machines, churns, corn-shellers, and similar light machines and also to provide an improved means for regulating the speed of the device. It is furthermore designed to compactly arrange the parts of the device upon an improved form of supporting-frame and to provide means for coupling additional springs to the driving-shaft, so as to conveniently vary the power of the motor.

With these and other objects in view the present invention consists in the combination and arrangement of parts, as will be hereinafter more fully described, shown in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that changes in the form, proportion, size, and minor details may be made within the scope of the claims without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings, Figure 1 is a side elevation of a spring-motor constructed and arranged in accordance with the present invention. Fig. 2 is an end view thereof. Fig. 3 is an elevation of the opposite side of the device. Figs. 4 and 5 are detail views of the winding device. Fig. 6 is a detail view of one end of one of the boxes or casings for the power-springs.

Corresponding parts in the several figures of the drawings are designated by like characters of reference.

Referring to the accompanying drawings, it will be seen that the supporting-frame is formed by means of a plurality of inverted substantially U-shaped frame-sections 1, which are connected by means of suitable transverse bars or rods 2, so that the respective frame-sections may be maintained at predetermined relative positions. The sides of each frame-section are furthermore braced by means of transverse brace-bars 3.

Near the top of the supporting-frame and adjacent to one end thereof there is provided a driving-shaft which is formed in two sections 4 and 5, which are journaled upon certain of the transverse brace-bars 3. The drive-shaft section 4 is the longer and is adjustably connected to the shorter section by means of a suitable clutch 6, which has an operating-lever 7, that is fulcrumed upon the frame, so that the shaft-sections may be conveniently coupled and uncoupled as circumstances may require.

Located substantially midway between the opposite sides of the frame and operatively connected to the shaft-section 4 is a pair of drive-springs 8 and 9, which are housed within separate boxes or casings formed by the opposite disk-like heads 10, one of which has been shown in detail in Fig. 6 of the drawings. Each head is in the form of a circular plate, having outwardly-directed perforate ears 11, located, preferably, diametrically opposite each other and designed for the reception of the respective rods or bolts 12, whereby the heads may be fixedly connected to the frame. Each pair of heads is provided with a marginal series of corresponding perforations 13 for the reception of connecting-bolts 14, which lie at the outer sides of the coiled springs, so as to prevent displacement thereof. The inner end of each coiled spring is provided with a perforation for the reception of a radial pin 15, projecting from the shaft, so as to form a fixed connection between the latter and the spring, while the opposite end of the latter is fixedly connected to an inwardly-directed lateral pin 16, formed upon the inner side of one of the heads and adjacent to the marginal series of perforations. By this arrangement the outer ends of the springs are fixed, and by turning the driving-shaft in a reverse direction the inner portion of the springs may be wound upon the shaft, as will be understood. All of the springs are duplicates in construction and arrangement, and it will now be understood that the power of the motor may be varied, by operation of the clutch, to couple or uncouple one or more additional springs to the drive-shaft.

To wind the springs, the outer end of each drive-shaft is provided with a fixed ratchet-wheel 17, as best shown in Fig. 4, and upon the outer side of this wheel these is provided a loosely-rotatable pinion or gear 18, carrying spring-actuated pawls or ratchet-dogs 19 for engagement with the ratchet-disk, so as to lock the pinion to the shaft in one direction of movement of the said pinion. The pinion is driven by means of a winding-lever 20, which is provided with a transverse loop-shaped or skeleton segmental head 21, the inner margin of the outer side of which is provided with gear-teeth 22, so as to form a segmental rack in mesh with the pinion. Intermediate of the ends of the lever there is provided a circular pivotal or fulcrum opening 23 for the reception of a fixed fulcrum or pivotal pin 24, carried by a hanger or strap 25, which is pendent from that cross-brace 3 which is at the adjacent end of the shaft. When the winding-lever is mounted upon the fulcrum-pin, the segmental rack is in mesh with the pinion, and by rocking the lever the pinion may be operated to turn the driving-shaft in a reverse direction, so as to wind the springs. The shaft-sections are independent by means of the clutch and have independent winding-pinions, while the winding-lever is removable and may therefore be applied to either shaft for independently winding the separate springs. It is also designed to entirely remove the winding-lever when the motor is in operation.

Loosely mounted upon the drive-shaft is a master-gear 26, which is located between the outer end of the shaft and the adjacent spring and is provided upon its inner face with the spring-actuated ratchet-dogs 27 for engagement with a ratchet-disk 28, fixed to the shaft, so that the latter may turn freely within the master-gear in a reverse direction, and the gear is locked therewith to be turned by a forward rotation of the shaft. At a suitable distance below the drive-shaft there is mounted a transverse power-shaft 29, which is operatively connected to the master-gear by means of a suitable train of gears 30 and is provided at its outer end with a crank 31 or other suitable means for transferring motion from the power-shaft. This power-shaft is also provided with a large gear 32, which is in mesh with a smaller gear 33, carried by a speed-shaft 34, mounted below the power-shaft and provided with a pulley 35, which is located upon the outer side of the frame and opposite the crank 31. The purpose of this speed-shaft is to provide power for such machines as may require very high speed, while the crank is especially designed for operating a pump or a churn wherein a vertically-reciprocating motion is necessary.

To start and stop the motor, there is provided a brake-wheel 36, which is fixedly mounted upon the speed-shaft. Embracing the upper portion of the periphery of this wheel there is provided a brake-band 37, which has one end fixedly connected to the supporting-frame by means of a transverse pin or rod 38, while its opposite free end is connected to one end of an operating-lever 39, which is fulcrumed intermediate of its ends, as at 40, upon an upright bar 41, which is secured to the adjacent transverse brace-bars 3. To apply the brake, the free end of the lever is elevated, so as to bind the band upon the periphery of the brake-wheel. A suitable vertical rack 42 is provided upon the adjacent upright and is designed to be engaged by the lever, so that the latter may be held in any desired position. It will be understood that during the winding of the springs the brake is applied, so as to prevent unwinding of the springs during a reverse movement of the winding-lever, and the motor may be conveniently started and stopped by the proper manipulation of the brake-lever.

The speed of the motor is regulated by means of a centrifugal governor 43, which is mounted below the speed-shaft upon suitable frame-bars 44 and 45, which are supported by the adjacent frame-sections. Extending upwardly from the bar 44 is a substantially L-shaped bracket 46, which supports the thrust-shaft 47 of the governor. This thrust-shaft is slidably received through an opening in the frame-bar 44 and is provided with a beveled gear 48, which is splined upon the thrust-shaft, so that the latter may slide freely through the gear and the latter and the shaft rotate together. In mesh with the gear 48 is a vertically-disposed beveled gear 49, which is carried by the adjacent end of a horizontal stub-shaft 50, that is supported upon the frame-bar 44. This stub-shaft is driven from the speed-shaft by means of any suitable gearing, such as a sprocket-chain 51, running over suitable sprocket-wheels upon the two shafts. A lever 52 is disposed longitudinally beneath the frame-bar 44 and is fulcrumed intermediate of its ends upon a bracket 53, which is pendent from the frame-bar. The inner and longer end of this lever is located in the path of the downward movement of the lower end of the thrust-shaft 47, so that when the speed of the motor reaches a predetermined degree the governor will have moved the thrust-shaft downwardly into engagement with the adjacent end of the lever, so as to depress the same, and thereby elevate the opposite end, which is provided with a brake-shoe 54 for frictional engagement with the lower portion of the periphery of the brake-wheel, whereby the motion of the motor will be retarded.

In order that the governor-brake may be applied at different degrees of speed, there is provided a short lever 55, which is fulcrumed intermediate of its ends upon the frame and below the brake-lever 52, and one end of the lever 55 is connected with the inner end of the lever 52. To the opposite end of the adjusting-lever there is connected an upright

flexible connection, such as a wire or cable 56, which passes upwardly to the upper portion of the frame, where it is screw-threaded and passed through a suitable adjusting-nut 57, carried by the frame, so that by operation of the nut the connection 56 may be moved longitudinally in opposite directions, thereby operating the lever 55 to raise or lower the inner end of the brake-lever 52. By this means the brake-shoe 54 may be adjusted to remain at a greater or less distance from the brake-wheel, and the inner end of the brake-lever may likewise be held at any desired distance from the thrust-shaft in order that the brake may be applied only at a greater or less speed of the motor. The connection 56 between the adjusting-lever and the adjusting-nut should be flexible in order that it may bend to permit of the movement of the adjusting-lever caused by the action of the thrust-shaft. By operating the adjusting-nut 57, so as to draw the flexible connection 56 upwardly, the free end of the brake-lever 52 will be drawn downwardly from the lower end of the thrust-shaft of the governor, so that said thrust-shaft must move a greater distance than formerly to strike the brake-lever, and thereby apply the brake, whereby it is necessary for the machine to attain a greater speed before the governor can act upon the brake-lever.

As indicated in Fig. 2 of the drawings, the clutch 6 is in the form of a ratchet, so that the shaft-section 5 may be turned rearwardly to wind the spring without also turning the other shaft-section, and when in operation the clutch members are interlocked, so as to obtain the power of the additional spring. When the spring is not in use, the clutch-sections may be separated by means of the lever 7, and the latter may be held at any adjustment by means of the rack 58, carried by the frame of the motor.

What is claimed is—

1. In a spring-motor, the combination with a supporting-frame, of a spring-actuated drive-shaft, means for transferring power therefrom, a governor in operative relation to the drive-shaft, a brake-wheel, a brake-lever in operative relation to the governor, and also provided with a brake-shoe for frictional engagement with the brake-wheel, an intermediately-fulcrumed adjusting-lever mounted independently of the brake-lever and its connection with the governor, and having one end in connection with the brake-lever, an adjusting device carried by the frame, and a flexible connection between the adjusting-lever and the adjusting device.

2. In a spring-motor, the combination with a supporting-frame, of a spring-actuated drive-shaft, means for transferring power therefrom, a governor in operative relation to the drive-shaft, a brake-wheel, a brake-lever in operative relation to the governor, and having a brake-shoe for frictional engagement with the brake-wheel, an adjusting-lever mounted independently of the brake-lever and its connection with the governor, and having one end in connection with the brake-lever, a flexible cable secured to the adjusting-lever, and having a screw-threaded part, and an adjusting-nut mounted upon the supporting-frame and adjustably receiving the screw-threaded part of the cable.

3. In a spring-motor, the combination with a supporting-frame, of a spring-actuated driving-shaft, means for transferring motion therefrom, a brake-wheel, a governor in operative relation to the drive-shaft, a brake-lever fulcrumed intermediate of its ends upon the frame, a brake-shoe carried at one end of the lever and normally out of engagement with the brake-wheel, an operative connection between the opposite free end of the brake-lever and the governor, an adjusting-lever fulcrumed intermediate of its ends upon the frame, and having one end in operative engagement with the free end of the brake-lever, a flexible wire connected to the opposite end of the adjusting-lever, and an adjusting-nut carried by the frame and adjustably receiving a screw-threaded portion of the wire.

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

WILLIAM J. BRITTAIN.

Witnesses:
I. B. MORGAN,
J. W. BRADY.