No. 667,215. Patented Feb. 5, 1901.

O. A. GILBERT.

SPRING MOTOR.

(Application filed Feb. 17, 1900.)

(No Model.)

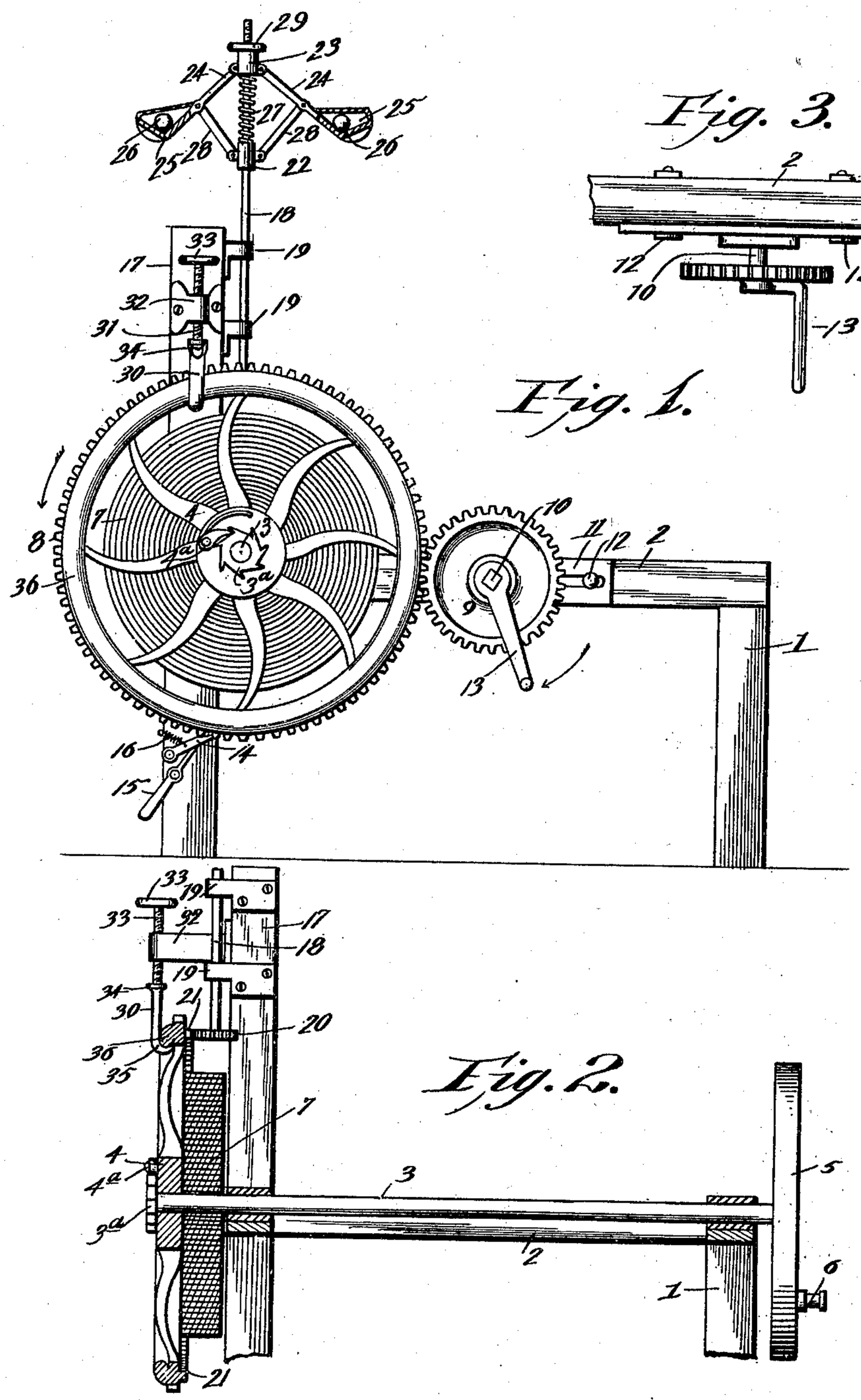

Fig. 3.

Fig. 1.

Fig. 2.

Witnesses
C. W. Walker.
O. F. Lepard.

Oscar A Gilbert Inventor

By his Attorneys,

C. A. Snow & Co.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

OSCAR A. GILBERT, OF FLOYD, WISCONSIN.

SPRING-MOTOR.

SPECIFICATION forming part of Letters Patent No. 667,215, dated February 5, 1901.

Application filed February 17, 1900. Serial No. 5,616. (No model.)

To all whom it may concern:

Be it known that I, OSCAR A. GILBERT, a citizen of the United States, residing at Floyd, in the county of Dane and State of Wisconsin, have invented a new and useful Spring-Motor, of which the following is a specification.

This invention relates to spring-motors, and has for one object to provide an improved device of this character for supplying power for any desired purpose. It is furthermore designed to provide an improved arrangement of governor and brake devices which are applied to the fly-wheel of the motor in a position for convenient adjustment to control the speed of the motor, and, finally, to provide an adjustable winding device which may be thrown out of operative connection with the motor, so as to remain inactive during the operation of the latter.

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 in accordance with the present invention. Fig. 2 is an enlarged transverse sectional view thereof. Fig. 3 is a detail plan view of the winding device.

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

In carrying out the present invention I provide a frame comprising uprights or corner-posts 1 and the cross-bars 2, connecting the uprights and completing the frame for supporting the operating parts of the motor.

Mounted transversely of the frame and adjacent to one end thereof is a power-shaft 3, the opposite ends of which project at opposite sides of the frame and are provided, respectively, with the fly-wheel 4 and the drive-wheel 5, which latter may be provided with a wrist-pin 6 for connection with a suitable connecting-rod, or it may be a sprocket-wheel for driving a sprocket chain or belt, as may be desired or convenient. The fly-wheel 4 is mounted to turn loosely upon the shaft in a direction opposite to that of the hands of a clock, as indicated by the arrow in Fig. 1 of the drawings, and is locked with the shaft for motion in the opposite direction by means of a ratchet-pawl 4^a, carried by the outer end of the hub of the fly-wheel, and a fixed ratchet-wheel 3^a upon the outer end of the shaft.

Located between the fly-wheel or master-gear 4 and the adjacent side of the supporting-frame is a coiled power-spring 7, which has its opposite ends connected to the fly-wheel and the frame of the motor, respectively. This master-gear is provided with a peripheral series of gear-teeth 8 to mesh with the teeth of a smaller winding-gear 9, which is located in rear of the master-gear and mounted upon the frame. The stub-shaft 10 of the winding-gear is carried by a slidable bearing-plate 11, which is slotted longitudinally and provided with fastenings 12, which extend through the slotted portions of the plate to slidably secure the latter to the frame. Any suitable operating crank or handle 13 may be removably fitted to the outer end of the stub-shaft, so as to provide means for conveniently winding the power-spring upon the power-shaft. It will be understood that the bearing-plate 11 is adjustable toward and away from the master-gear, so that the winding-gear may be brought into mesh with the master-gear to wind up the spring and also moved out of operative connection therewith, so as to remain inactive, when the motor is in operation.

A pawl 14 is mounted upon the upright which is adjacent to the master-gear and also located below the latter, so as to engage the toothed periphery thereof. This pawl is normally held in engagement with the master-gear by means of a weighted gravity-detent 15, which is pivoted intermediate of its ends to the adjacent upright, so that its upper light end is in frictional engagement with the under side of the pawl and is designed to be disengaged therefrom by raising the weighted end of the detent, so that the spring 16 may urge the pawl away from the master-gear during the operation of the motor.

The upright or end post which is adjacent to the master-gear is provided with an extension 17, which projects a suitable distance above the master-gear, so as to carry an upright governor-shaft 18, which is mounted in suitable bearing-brackets 19, carried by the post, and is provided at its lower end with a pinion 20, which is in mesh with a laterally-disposed series of marginal gear-teeth 21, provided upon the adjacent side of the master-gear and which project outwardly in planes substantially at right angles to that of the master-gear or fly-wheel. The governor-shaft extends above the upper end of the post or upright 17 and is provided with a centrifugal governing device comprising a fixed sleeve or collar 22, and a superposed movable sleeve 23, which is slidable upon the governor-shaft and provided with a pair of diametrically opposite radial arms 24, which have their inner ends pivotally connected to the slidable sleeve. The outer ends of these arms are provided with hollow casings 25 to loosely contain the balls 26. Interposed between the opposite sleeves, embracing the shaft and bearing in opposite directions against said sleeves, is a coiled spring 27 to normally urge the slidable sleeve upwardly and away from the fixed sleeve. The radial arms are connected to the fixed sleeve by means of links 28, which have their opposite ends pivoted to the sleeve and to intermediate points of the arms, respectively. The upper extremity of the governor-shaft extends above the upper limit of the slidable sleeve 23 and is screw-threaded to receive a suitable nut 29, which is designed to form an adjustable stop for adjusting the limit of the movement of the sliding sleeve. By reason of this arrangement the governor-shaft is operated through the pinion 20, which is in mesh with the master-gear, whereby the radial governor-arms are elevated by centrifugal force against the tension of the spring 27 to govern the operation of the motor and insure a steady movement thereof in the manner of any ordinary governor. It will be understood that the governor acts merely in the capacity of a fly-wheel, as the arms 24 form fans to retard the motion of the motor when it is first started and when friction is suddenly removed therefrom.

In order that the speed of the motor may be controlled, there is provided a hook-shaped brake-arm or friction-clutch 30, which has a screw-threaded shank or stem 31, carried by a bracket 32, fixed to the upright 17. The upper end of the screw-threaded shank of the brake-arm is provided with a suitable handle 33, whereby the shank may be turned to feed the latter longitudinally through the screw-threaded opening in the bracket which receives said shank. It will of course be understood that the brake-arm has a swiveled connection 34 with the shank, so that the same may turn independently of the latter when it is desired to longitudinally adjust the device. As best shown in Fig. 2 of the drawings, the brake or clutch arm is located at the outer side of the master-gear, and the hook 35 at the lower extremity of the arm is designed to frictionally embrace the rounded laterally-projecting flange 36, which extends entirely around the master-gear and upon the outer side thereof. By this arrangement the brake-arm may be adjusted to frictionally bind upon the master-gear to any desired extent, so that the motor may run slow or fast, as may be desired, and may also be entirely stopped, as will be readily understood. It will also be observed that the brake and the governor-shaft are in engagement with opposite sides of the fly-wheel, so as to brace the latter in opposite directions, and thereby prevent twisting of the wheel by the action of either the brake or the governor.

In the operation of the motor the winding-gear is turned by means of the crank or handle 13 in a direction to the right or to the movement of the hands of a clock, thereby turning the master-gear in the opposite direction to wind up the power-spring. It will now be apparent that the pawl or ratchet device 14 is designed to prevent backward rotation of the power-shaft and master-gear during the winding of the spring. After the spring has been wound up the brake-arm 30 is adjusted so as to bind the brake-shoe 35 against the flange 36 of the master-gear, so as to hold the latter against turning, whereby the winding device may be disengaged from the master-gear and the pawl 14 may be thrown out of engagement therewith, when the motor is in readiness to be thrown into operation by releasing the brake-shoe 35 from the master-gear.

It will now be understood that the fly-wheel is loosely mounted upon the power-shaft, so as to turn to the left thereon in winding up the spring without turning the shaft, while it is interlocked with the latter by means of the ratchet device to impart motion to said shaft when the fly-wheel is being turned to the right under the influence of the unwinding-spring.

From the foregoing description it will be seen that the present invention provides an exceedingly simple and inexpensive device, in which the parts are compactly assembled, so as to take up comparatively small space, and the parts are in position for convenient access, so that the motor may be under complete control of the attendant. Moreover, the winding device may be thrown out of operative connection with the master-gear, so as to rid the motor of the unnecessary friction of such winding device when the motor is in operation.

What is claimed is—

1. In a motor, a spring-actuated power-shaft, a fly-wheel carried thereby, a governor, having a shaft, which is in engagement with and driven by one side of the fly-wheel, and

a brake in frictional engagement with the opposite side of the wheel, the governor-shaft and the brake forming opposite braces for the wheel, whereby the latter is prevented from being twisted by the action of either the brake or the governor-shaft.

2. In a motor, the combination with a supporting-frame, having an upright extending above the top thereof, of a power-shaft mounted upon the frame and adjacent to the upright, a fly-wheel carried by the shaft and located adjacent to the upright, and also provided with a lateral series of gear-teeth, and a lateral marginal brake-flange upon the opposite side of the fly-wheel, an upright governor-shaft mounted upon the upright, and provided with a pinion in engagement with the lateral series of gear-teeth, a bracket projecting from the upright and laterally across the peripheral edge of the fly-wheel, a screw-threaded shank or stem projecting in opposite directions through a screw-threaded opening in the bracket, a hook-shaped brake-arm located upon the opposite side of the fly-wheel, and a swiveled connection between the adjusting-stem and the brake-arm, the latter being in frictional engagement with the brake-flange, and the governor-shaft and the brake-arm forming opposite braces to prevent twisting of the fly-wheel.

3. In a motor, a spring-actuated power-shaft, a fly-wheel carried thereby, and a pawl for engagement with the fly-wheel, a spring to urge the pawl out of engagement with the fly-wheel, and a gravity-detent in operative relation to the pawl for normally holding the latter in engagement with the fly-wheel.

4. In a motor, a spring-actuated power-shaft, having a fly-wheel connected thereto, a winding-gear adjustable into and out of engagement with the fly-wheel, a ratchet mechanism for engagement with the fly-wheel to prevent backward rotation of the power-shaft during the winding operation, and a brake device in frictional engagement with the fly-wheel to hold the latter when the winding and ratchet devices have been disengaged from the fly-wheel.

5. In a motor, a supporting-frame, a power-shaft mounted thereon, a fly-wheel mounted to turn loosely in one direction upon the shaft, a ratchet device for interlocking the wheel and the shaft in the opposite direction of the wheel, a coiled spring having its opposite ends connected respectively to the frame and the fly-wheel, a brake for frictional engagement with the fly-wheel, a ratchet device carried by the frame to prevent backward turning of the wheel during the winding of the spring, and which is out of engagement with said wheel when the motor is in operation, and a winding device adjustable into and out of engagement with the fly-wheel.

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

OSCAR A. GILBERT.

Witnesses:
G. J. CORSCOT,
O. H. ST. G. ANSON.