B. F. HUTCHES, JR.

SPEED REGULATOR FOR ELECTROMOTORS.

APPLICATION FILED MAR. 2, 1910.

1,014,707. Patented Jan. 16, 1912.

Fig. 1.

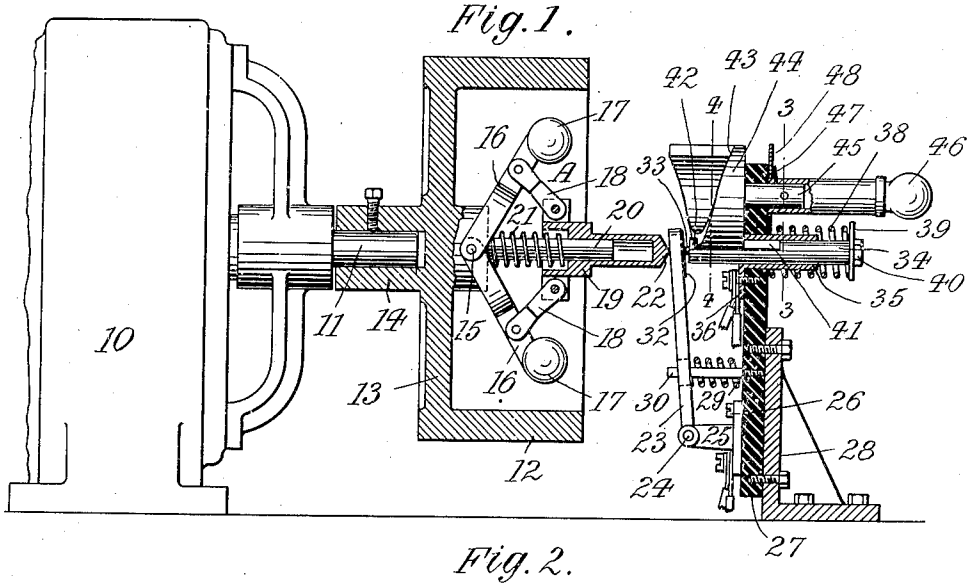


Fig. 2.

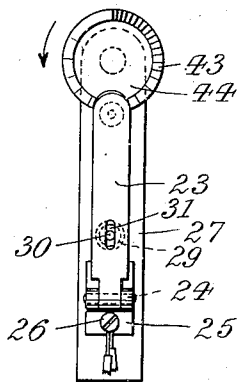


Fig. 3.

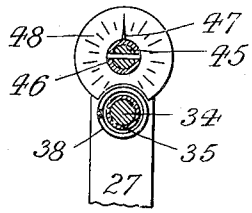


Fig. 4.

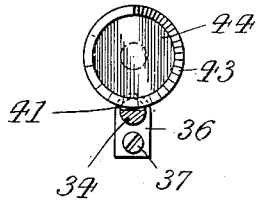
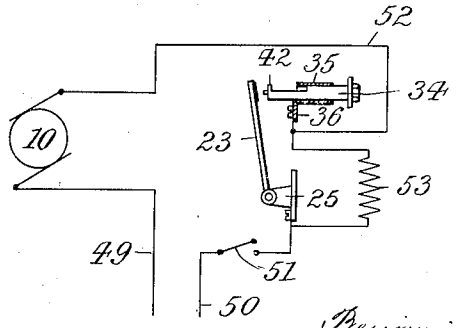


Fig. 5.



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SPEED-REGULATOR FOR ELECTROMOTORS.

1,014,707. Specification of Letters Patent. Patented Jan. 16, 1912.

Application filed March 2, 1910. Serial No. 546,808.

To all whom it may concern:

Be it known that I, BENJAMIN F. HUTCHES, Jr., a citizen of the United States, residing at Allendale, county of Bergen, State of New Jersey, have invented new and useful Improvements in Speed-Regulators for Electromotors, of which the following is a specification.

This invention relates to a regulator of novel construction for controlling the speed of electromotors and for maintaining such speed after the regulator has been set. With my regulator the electromotor cannot exceed said speed even if the voltage of the current should rise, or if the load of the electromotor should be decreased to any extent desired. In this way an undesirable acceleration of the motor is prevented, which would tend to unfavorably influence the mechanism or machinery to which the electromotor is connected.

In the accompanying drawing: Figure 1 is a sectional elevation of my improved speed regulator, showing it applied to an electromotor; Fig. 2 an inner view of the contact members and coöperating parts; Fig. 3 a vertical section on line 3—3, Fig. 1; Fig. 4 a similar section on line 4—4, Fig. 1, showing the spiral cup in view, and Fig. 5 a wiring diagram.

The numeral 10 indicates an electromotor which may be either a continuous current motor or an alternating current motor. For controlling the speed of motor 10, a centrifugal governor A, is provided, which is operatively connected to and rotates with the shaft 11 of said motor. Governor A, may be of any suitable construction, it being shown to be inclosed within the rim 12 of a fly wheel 13, the hub 14 of which is secured to shaft 11. To hub 14 are pivoted, at 15, the arms 16 which carry the balls 17. Arms 16 are, by links 18, connected to a sleeve 19 which is slidably mounted upon a pin 20 extending outwardly from hub 14, a coiled spring 21 being interposed between said sleeve and hub. The pointed outer end 22 of sleeve 19 is adapted to impinge against a lever 23 which is hinged at 24 to a bearing 25 and constitutes a movable contact member. Bearing 25 is, by screws 26, secured to an upright plate 27 made of insulating material and secured to a bracket 28. Lever 23 is held in permanent engagement with sleeve 19 by a spring 29 interposed between said lever and plate 27. This spring is coiled around a pin 30 secured to plate 27 and passing through a slot 31 of lever 23. At its outer face, lever 23 carries a contact plate 32 which is adapted to engage a contact-pin 33 protruding from a plunger 34 that constitutes an adjustable contact member. Plunger 34 is telescoped by a tube 35 fitted into a corresponding perforation of plate 27 and having a flange 36 which is secured to said plate by a screw 37. A coiled spring 38 interposed between plate 27 and a disk 39, secured to the outer end of plunger 34 by screw 40, tends to draw the plunger outward. Plunger 34 is partly cut away, as at 41, thereby forming a radial finger or abutment 42 at the inner end of said plunger. This finger is, by spring 38, held in engagement with the spiral or cam-shaped rim 43 of a rotatable cup 44 provided with an outwardly extending stem 45 which passes loosely through a corresponding perforation of plate 27 and carries at its free end handle 46. A pointer 47 is secured to handle 46 and plays over a dial 48 which indicates the number of revolutions per minute of the electromotor.

The tension of springs 21, 29, is such, that when the motor is at rest, the action of spring 21 will overcome that of spring 29. In this way, sleeve 19 forces lever 23 into contact with pin 33 of plunger 34, while the finger 42 of the latter rests against rim 43. By turning cup 44 in the direction of the arrow, (Fig. 2), plunger 34 is moved inward to correspondingly advance sleeve 19 toward hub 14, thus swinging balls 17 outward. When cup 44 is turned in the opposite direction, spring 38 will cause plunger 34 to recede, in which movement lever 23 and sleeve 19 will participate owing to the action of spring 21. In this way, balls 17 will be swung inward, as will be readily understood.

It will be seen that if, during the operation of the motor, the speed of the shaft is lower than that which corresponds to the divergence to which balls 17 have been set by spiral cup 44, spring 21, in pressing against sleeve 19, will maintain the proper contact between lever 23 and plunger 34. But as soon as the speed of shaft 11 rises to such a degree as will withdraw sleeve 19 from lever 23, through the increased divergence of balls 17, spring 29 will tilt said lever inward to break its contact with plunger 34. The scale of dial 48 is so computed

that its numerals indicate the number of rotations which are attained by shaft 11 immediately before contact is interrupted between parts 23, 34, owing to the withdrawal of sleeve 19.

In use, one pole of a suitable source of electricity is, by wire 49, connected to electromotor 10, while its other pole is, by wire 50, connected to bearing 25, a switch 51 being provided in one of said wires. Tube 35 is, by wire 52, connected with electromotor 10. After pointer 47 has been set to the speed desired, switch 51 is closed to start the motor, the current flowing from the source of electricity through wire 50, bearing 25, lever 23, plunger 34, tube 35, wire 52, electromotor 10 and wire 49, back to said source. As soon as the electromotor attains a speed exceeding that to which it has been set, sleeve 19 will be withdrawn from lever 23, to permit spring 29 to break the contact between said lever and plunger 34. In this way the electric current previously flowing through the electromotor will be interrupted, so that the speed thereof will decrease until contact is again established between lever 23 and plunger 34, thus giving a new impulse to the motor. By properly dimensioning fly wheel 13, any undue fluctuation of the number of revolutions may be avoided.

In order to minimize the sparks which occur during the opening of the circuit, a resistance 53 is permanently interpolated between parts 25, 35, which resistance should be comparatively high to avoid waste of electric energy. If the contact is broken between parts 23, 34, the opening or extra current thus produced will find its way through said resistance.

It will be seen that by the construction described, the speed of the electromotor can be diminished to any extent desired without the use of a resistance. In this way loss of energy is obviated and a diminution of power is avoided. Furthermore, by dispensing with the speed reducing gearing heretofore generally used, a practically noiseless working of the motor is insured.

I claim:

1. In a device of the character described, a governor operable by an electromotor-shaft, an axially movable plunger constituting a contact-member, a cam operably connected to the plunger, a spring-influenced contact-lever adapted to be advanced into engagement with the plunger by the governor, and an electromotor-circuit controlled by the plunger and lever.

2. In a device of the character described, a governor operable by an electromotor-shaft, an axially movable recessed plunger constituting a contact-member, a cam engaging the plunger-recess, a spring-influenced contact-lever adapted to be advanced into engagement with the plunger by the governor, and an electromotor-circuit controlled by the plunger and lever.

3. In a device of the character described, a governor operable by an electromotor-shaft, an axially movable recessed plunger constituting a contact-member, a cam engaging the plunger-recess, a spring-influenced contact-lever adapted to be advanced into engagement with the plunger by the governor, an electromotor-circuit controlled by the plunger and lever, and a speed-indicator coacting with the cam.

4. In a device of the character described, a governor operable by an electromotor-shaft, an axially movable recessed plunger constituting a contact-member, a cam engaging the plunger-recess, a spring-influenced contact-lever adapted to be advanced into engagement with the plunger by the governor, an electromotor-circuit controlled by the plunger and lever, a resistance permanently interpolated between the plunger and lever, and a speed-indicator coacting with the cam.

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