R. EISENMANN.

DEVICE FOR REGULATING AND MAINTAINING CONSTANT THE SPEED OF MOTORS.

APPLICATION FILED DEC. 29, 1914.

1,350,214. **Patented Aug. 17, 1920.**

2 SHEETS—SHEET 1.

Fig. 1.

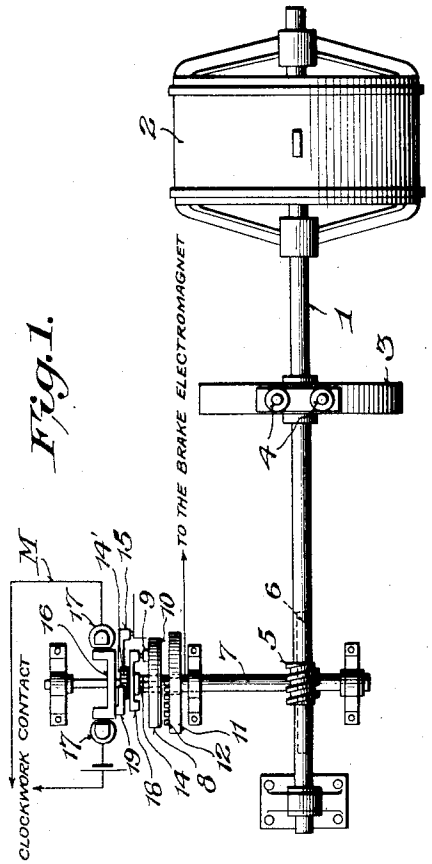


Fig. 2.

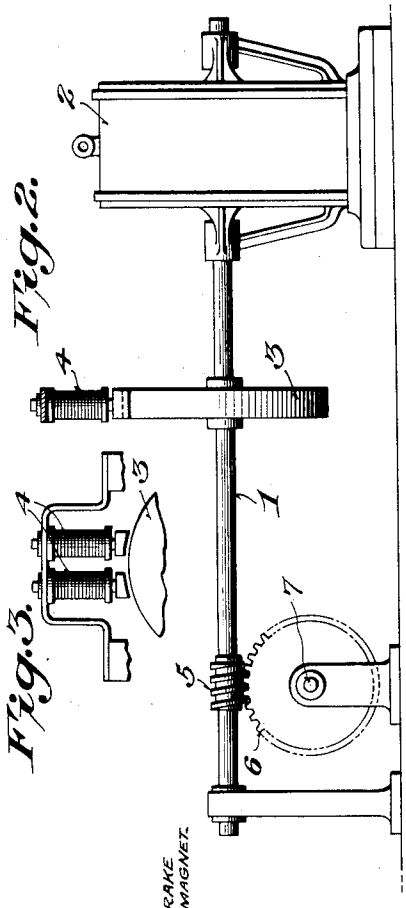


Fig. 3.

Fig. 4.

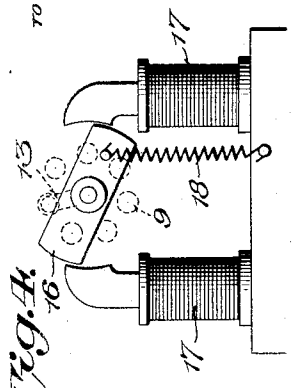


Fig. 5.

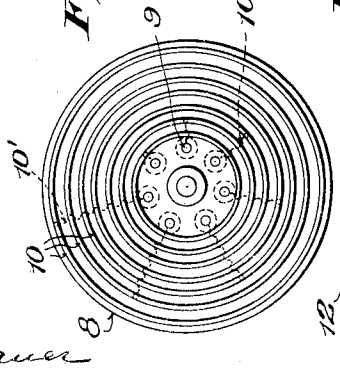
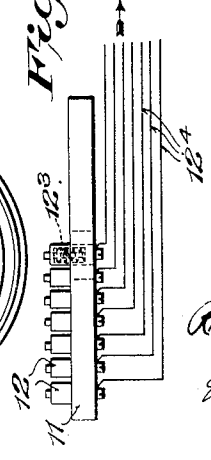


Fig. 6.



Witness

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2 SHEETS—SHEET 2.

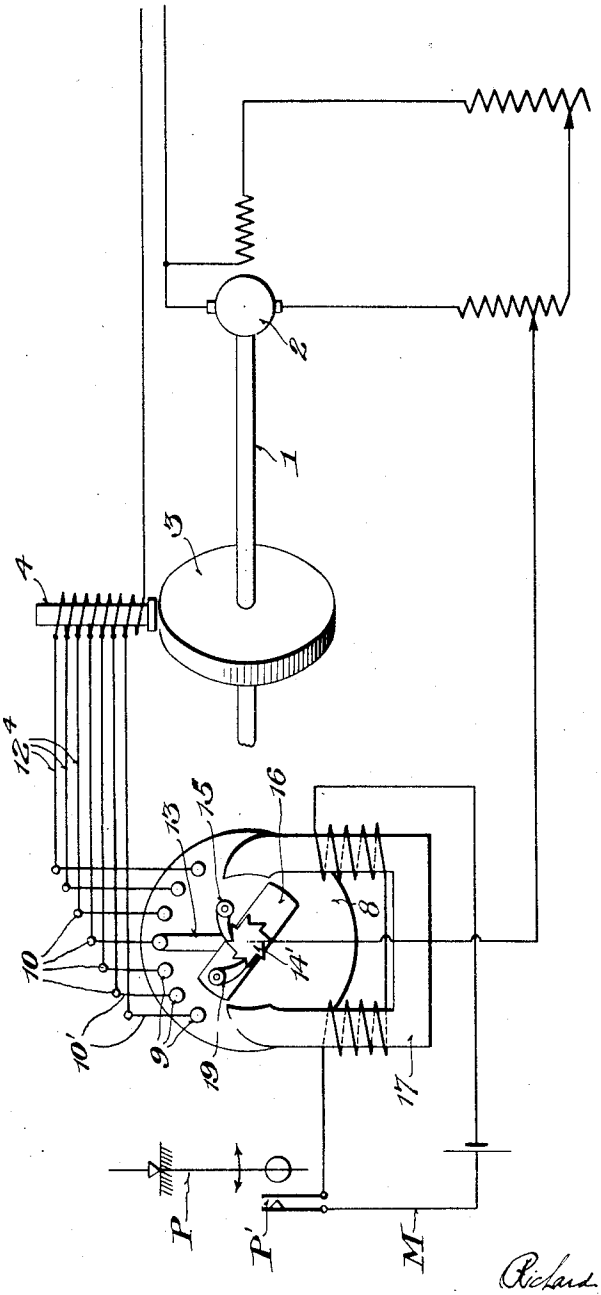


Fig. 7.

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UNITED STATES PATENT OFFICE.

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DEVICE FOR REGULATING AND MAINTAINING CONSTANT THE SPEED OF MOTORS.

1,350,214. Specification of Letters Patent. Patented Aug. 17, 1920.

Application filed December 29, 1914. Serial No. 879,598.

To all whom it may concern:

Be it known that I, RICHARD EISENMANN, a subject of the King of Prussia and Emperor of Germany, and a resident of the city of Berlin, Germany, have invented certain new and useful Improvements in Devices for Regulating and Maintaining Constant the Speed of Motors, of which the following is a specification.

The present invention contemplates an improved device for regulating and maintaining constant the number of rotations of a motor. According to the invention, a brake is associated with the motor shaft, and is controlled electro-magnetically through the agency of suitable clockwork which is utilized to constantly impart to the movable element of a controller the same number of rotations as that which the motor is to make, the arrangement being such that the braking action is automatically increased when the motor commences running too rapidly, and is decreased when its speed is too low.

The accompanying drawing shows one example of a construction embodying the principle of the invention. Figure 1 is a plan and Fig. 2 is an elevation of the device; Fig. 3 is an end view of the brake magnet; Fig. 4 is a view of the electromagnet for actuating the contact arm; Fig. 5 is an enlarged end view of the contact disk looking in the direction of the arrow shown in Fig. 1; Fig. 6 is an enlarged view looking down upon the counter-plate of the contact disk; and Fig. 7 is a diagram of the wiring.

As may be seen, there is mounted on the shaft 1 of the motor 2, a disk 3, opposite whose circumference a suitable electromagnet 4 is rigidly mounted.

The motor shaft 1 drives, by means of suitable gears 5 and 6, a second shaft 7, which is disposed at right angles to it, the arrangement being such that the driven shaft 7 turns considerably slower than the drive shaft 1. Upon this shaft 7 there is rigidly mounted a contact disk 8, upon one end side of which there is arranged a circular series of contacts 9, as shown in dotted lines in Figs. 4 and 5, these contacts being preferably yielding. The contact disk 8 is preferably constructed entirely of insulating material, and may have embedded therein on the opposite side from the contacts 9, a series of concentric slip rings 10 of brass or the like, each of which is connected by a conducting wire 10′ with a contact 9, the number of rings corresponding with the number of contacts. The showing of the contacts and slip rings is conventional only, and forms no part of the invention. Opposite the side of the contact disk 8 carrying the rings 10, there is rigidly mounted a counter-plate 11, upon which is provided a series of contacts 12, corresponding in number to that of the rings 10 and contacts 9; in the present instance, seven. The shaft 7 is rotatable with relation to the stationary plate 11, and may either pass loosely through an opening in said plate, or may be journaled in it.

The contacts 12 are likewise yielding, and their precise structure is not involved in the invention; but they preferably have the same construction as the contacts 9. The contacts 12 are so arranged on the plate 11 that they will travel along the contact rings 10 of the disk 8, (see Figs. 5 and 6), and each of these contacts is connected by a wire 12^4 with one section of the winding of the brake magnet 4. The number of windings of this section of the magnet is variable, so that, according as the current is conducted through a larger or smaller number of windings, the magnetic action on the brake disk 3 of the drive shaft 1 is greater or less. The magnet 4 is rigid, and between its poles and the disk 3 there is only a small space, (Fig. 3), through which the magnetic currents act on the disk 3 and, since the latter is mounted rigidly on the drive shaft, may cause an acceleration or retarding of the same.

Opposite the side of the contact disk 8 carrying the contacts 9, there is arranged a contact arm 13, which may be mounted on a shaft 14, loosely journaled at one end in a bearing seat formed in the adjacent terminal of the shaft 7, (Fig. 1), so as not to turn with it. To the contact arm 13, there is rigidly connected a ratchet wheel 14, driven by a pawl 19, which is mounted on the oscillating armature 16 of an electromagnet 17.

The circuit M of the electromagnet 17 may be closed at uniform periods in any desired manner; for example, by a clockwork device P, which, during its operation, periodically actuates a suitable contact P′. The magnet circuit is thus closed, in consequence of the action of the clockwork, at absolutely uniform intervals of time; and at each such closure, the elec-

tromagnet 17 is energized, and, in turn, attracts the armature 16, which latter is caused to swing in a counterclockwise direction and, by means of the pawl 19, rotates the ratchet wheel 14′ forward one tooth or step. The reverse or return rotation of the armature to normal position is effected by a spring 18, whose specific showing is likewise conventional, only a suitable check 15 being utilized to prevent backward movement of the ratchet wheel. As the current impulses that energize the electromagnet 17 succeed each other very rapidly, it follows that a continuous actuation of the ratchet wheel 14′ is effected and, in consequence, a continuous rotation of the contact arm 13 rigidly connected with said ratchet, which always produces an even number of rotations owing to its being driven by the clockwork. The whole arrangement is such therefore, that the number of rotations of the contact arm 13 corresponds to the desired number of rotations of the drive shaft.

If, for example, in case the motor runs more rapidly, there occurs an angular displacement of the contact disk 8, with relation to the contact arm 13, which results in the latter coming into engagement with another contact on the disk 8, which is connected with a correspondingly larger section of winding of the electromagnet 4, greater magnetic force is then exerted on the brake disk 3, and the motion of the motor is retarded, whereupon the contact arm and the contact disk resume their original positions. When the motor runs more slowly, the proceeding is the reverse of that described, the force imposed upon the brake disk being decreased.

I claim:

1. The combination, with an electric motor and its shaft; of a controller for accurately maintaining constant the number of revolutions of the motor shaft, comprising a contact arm, means for continuously rotating said arm at a constant, predetermined speed, a disk constantly driven by the motor at a speed which is directly proportional to that of the motor, said disk being provided with a plurality of contacts with which the contact arm co-acts, and a brake magnet having sectional windings operatively associated with the motor shaft to act thereon, said contact arm in moving over said contacts supplying currents of varying intensities to the sections of the magnet so as to exert accordant braking actions on the motor shaft.

2. The combination, with an electric motor and its shaft; of a controller for accurately maintaining constant the number of revolutions of the motor shaft, comprising a contact arm, means for continuously rotating said arm at a constant, predetermined speed, a disk provided with a plurality of contacts with which the contact arm co-acts, means directly connecting the motor shaft with the contact disk to constantly drive the latter at a speed which is directly proportional to that of the motor, a brake disk fixed to the motor shaft, and a brake magnet having sectional windings operatively associated with the brake disk to act thereon, said contact arm in moving over said contacts supplying currents of varying intensities to the sections of the magnet so as to exert accordant braking actions on the brake disk.

3. The combination, with an electric motor and its shaft; of a controller for accurately maintaining constant the number of revolutions of the motor shaft, comprising a contact arm, a ratchet wheel connected to said arm, an electro magnet having an oscillating armature, a pawl carried by said armature for driving said ratchet wheel and contact arm, an electric circuit wherein said magnet is included having a clock-work-driven circuit closer whereby said contact arm is continuously rotated at a constant, predetermined speed, a disk constantly driven by the motor at a speed which is directly proportional to that of the motor, said disk being provided with a plurality of contacts with which the contact arm co-acts, a brake disk fixed to the motor shaft, and a brake magnet having sectional windings operatively associated with the brake disk to act immediately thereon, said contact arm in moving over said contacts supplying currents of varying intensities to the sections of the brake magnet so as to exert accordant braking actions on the brake disk.

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