J. E. RETTIG.

ELECTRIC GOVERNOR FOR MOTORS, CLOCKS, &c.

No. 185,047. Patented Dec. 5, 1876.

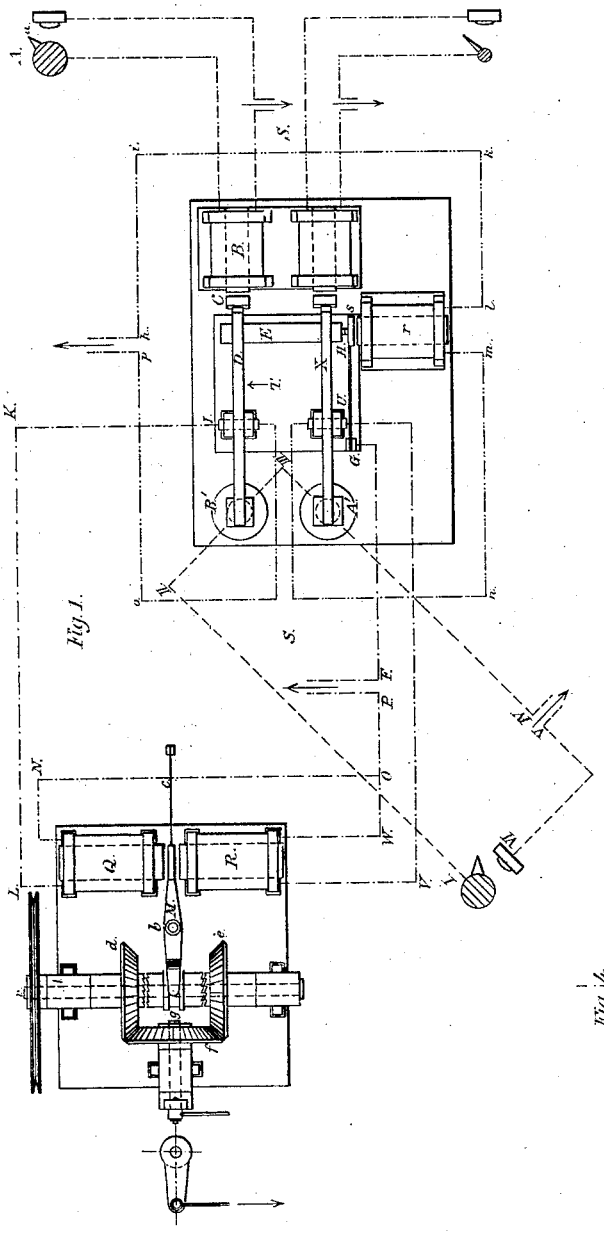

Fig. 1.

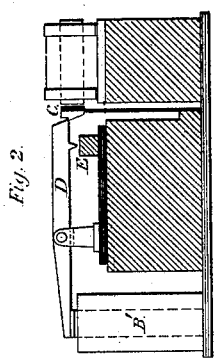

Fig. 2.

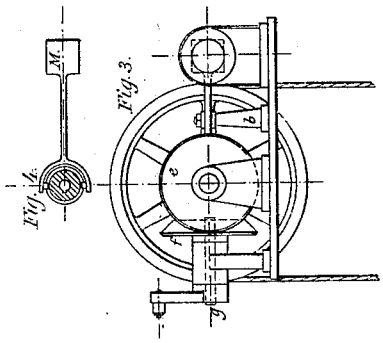

Fig. 3.

Fig. 4.

Witnesses

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UNITED STATES PATENT OFFICE.

JULIUS E. RETTIG, OF WASHINGTON, DISTRICT OF COLUMBIA.

IMPROVEMENT IN ELECTRIC GOVERNORS FOR MOTORS, CLOCKS, &c.

Specification forming part of Letters Patent No. **185,047**, dated December 5, 1876; application filed May 9, 1876.

To all whom it may concern:

Be it known that I, JULIUS E. RETTIG, of the city of Washington, District of Columbia, have invented a governor with an arrangement of parts which, in connection with a clock-work, will regulate the speed of any motor, watches, chronometers, &c., of which the following is a specification:

The object of my invention is to compel a motor subjected to a variable load to run uniformly at the speed for which it was constructed, or, in other words, to make a certain number of revolutions in each succeeding minute. To obtain this, however, from a motor, two main points are to be considered: first, it is necessary that an instrument which keeps uniformly the required speed—as, for instance, a clock-work or a chronometer—should exert an effect on the motor; second, it is necessary that the force which drives the motor should be increased or decreased in the same proportion as the load which the motor drives is diminished or augmented. This is usually effected by regulating the motor-force by means of valves or expansion-gear.

The arrangement which I have invented makes the second requisite dependent on the first, and this is illustrated by the accompanying drawing.

This invention consists in connecting a motor with an adjusted clock by electric circuits, electro-magnets, and one or more pivoted levers, which by their action, due to the speed of the motor or that of the clock, will cause a clutch arrangement, by a lever or screw, to act upon the admission-valve or expansion-gear of a motor, so as to compel the motor to run precisely the same number of revolutions per minute as the clock makes electric contacts.

Figure 1 shows my invention in plan as connected to the shaft of a motor. Fig. 2 shows a sectional elevation on line S S. Fig. 3 shows an elevation of a combination of wheels, by which the valve of the motor is operated, the power required to operate it being derived from the motor itself. Fig. 4 shows the elevation of the lever M, and a section through the clutch, to show its connection with the shaft *v*.

In Fig. 1, A represents the shaft of a motor, which, by means of a metallic point, *a*, will close for an instant, after each revolution, an electric circuit, and thereby cause the electro-magnet B to attract the armature C, which supports one end of the lever D. This lever will be pressed down on the brass block E by its own weight, or by the action of a spring, and will close an electric circuit, F G H I K L N O P, in order to produce an electro-magnet at Q, which will attract the lever M. In the same manner as the lever M is attracted by the electro-magnet Q, it will be attracted by the electro-magnet R and the electric circuit F G H U V W P, which is closed by the lever X, through the action of a clock or a chronometer, which will close and open again an electric circuit once during the time of one revolution of the motor-shaft, and thereby removes the support of the lever X. The lever M on the fulcrum *b* is provided at one end with a spring, *c*, which maintains it in a central position between the two electro-magnets Q and R. The other end of the lever is connected with a clutch, which, in gear with either of the miter-wheels *d* or *e*, will cause the third wheel *f* to revolve in one or the other direction. The motion of the shaft *v*, connected with the clutch by a feather, and on which both wheels *d* and *e* are loose, is taken from the motor by a belt and pulley. The shaft *g* of the wheel *f* will operate the admission-valve or the expansion-gear of the motor, causing an increase or diminution of the driving force, according to the direction in which the wheel *f* revolves. Suppose, now, the motor is running faster than the clock-work; it will then close the electric circuit F G H I K L N O P sooner than the clock-work, and consequently attract the lever M by the electro-magnet Q, thereby decreasing the driving force, and the motor must run slower. Should, on the contrary, the motor run slower than the clock-work, the latter will close the electric circuit F G H U V W O P sooner than the motor, and the lever M will be attracted by the electro-magnet R, which will cause an augmentation of the driving force, thereby increasing the speed of the motor. If, however, the clock-work and the motor are running at the same speed, the levers D and X will both drop at once on the brass block E, thereby

closing the electric circuit *h i k l m n o p*, which produces an electro magnet at *r*. The armature *s* will be attracted, and this effects the breaking of the first circuit F P.

It will be readily understood that now no action will take place to change the driving force of the motor, which therefore will continue to run at the same speed as the clock-work, until a change in the load or a change in the driving force occurs. The levers D and X, which are in contact with the brass block E after their action, are lifted up again by the electro-magnets A′ and B′, which will act as soon as a metallic point fixed at a convenient place on the motor-shaft closes the electric circuit I II III IV V VI, in a similar manner as shown in Fig. 1, A.

My invention, as described, will therefore measure the difference in time between one revolution of the motor and the time in which the clock will make one electric contact, and acts during this difference on the driving force of the motor, thus compelling the motor to run at the same speed as the clock.

This invention may be also applied for regulating the speed of clocks, chronometers, or watches by a standard clock. In this application, however, the watch or chronometer to be regulated takes the place of the motor, from which, of course, no power can be derived to move the clutching arrangement, and therefore the pulley on the shaft *v* must be driven by any other motor—for instance, by a clock-work. The crank on the shaft *g* will, in this case, act upon the adjusting lever or screw of the watch or chronometer to be regulated.

I claim as my invention—

1. The combination of one or more pivoted levers, D and X, which are disengaged by electro-magnets, the circuits to which are closed by the motion of the motor or clock, thereby causing one or more electro-magnets, Q and R, to act upon a lever, M, of a clutch arrangement, which, by its connection, will act upon the admission-valve or expansion-gear of the motor, all as specified.

2. The method herein described of breaking the current F P, consisting in the introduction of the electro-magnet *r*, and the closing of the electric circuit *h i k l m n o p* by the pivoted levers D and X.

3. The devices herein described for breaking the contact of the pivoted levers D and X and the brass block E, consisting of an electric circuit, I II III IV V VI, and one or more electro-magnets, A′ B′, the circuit to which is closed by the motion of the motor-shaft.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JULIUS E. RETTIG.

Witnesses:
PAUL J. PELZ,
FERDINAND L. THEILKUHL.