(No Model.)

J. B. CURRIER & D. H. RICE.

ELECTRIC GOVERNOR FOR SIGNALING CIRCUITS.

No. 491,532. Patented Feb. 14, 1893.

Fig. 1.

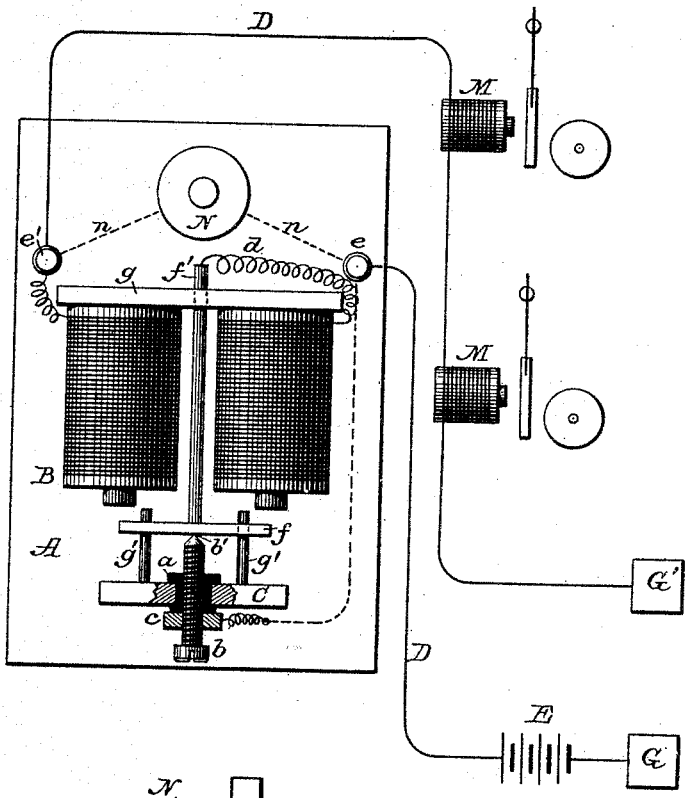
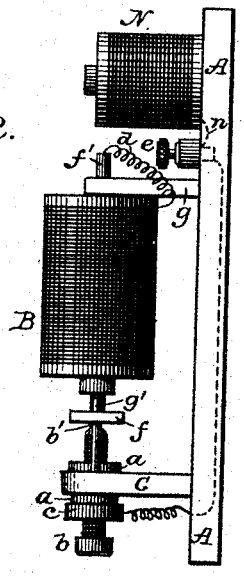


Fig. 2.



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ELECTRIC GOVERNOR FOR SIGNALING-CIRCUITS.

SPECIFICATION forming part of Letters Patent No. 491,532, dated February 14, 1893.

Application filed December 1, 1882. Serial No. 78,141. (No model.)

To all whom it may concern:

Be it known that we, JACOB B. CURRIER and DAVID HALL RICE, of the city of Lowell, in the county of Middlesex and State of Massachusetts, have invented a new and useful Improvement in Electric Governors, of which the following is a specification.

Our invention relates to the class of electric governors shown and described in the application of Jacob B. Currier Serial No. 47,978 filed December 15, 1881, and in which the current passing through the magnet of the governor interposes in the circuit an air bridge through which the electricity is obliged to pass after the line and magnets thereon are energized with a certain amount of the electric current necessary to enable them to do their work; this air bridge being varied by the power of the magnet to present a greater or less resistance and keep the current within a certain maximum limit, and our invention consists in interposing in the circuit a resistance bridge around the governor, by which means we keep the governor more steady in its operation, and enable it to interpose an air bridge of greater resistance without breaking the circuit, all substantially as hereinafter described.

It has been well known that when two points of a circuit are in electrical contact, and are capable of being withdrawn from each other, if one is withdrawn slightly the electrical current still continues to pass for an appreciable time, as is seen in the case of a circuit breaker making and breaking the circuit three hundred and sixty thousand times per minute, where the continued passage of the electric current, after the actual breaking of the contact affects the time of the latter perceptibly. Scientists have suggested that the spark caused by the breaking of the circuit affords a medium for this passage of the current through space. The electric governor of Mr. Currier referred to was constructed to render the resistance of this space available, and never allow its contact points to recede from each other so far as to entirely interrupt the passage of the electric current, so as to interrupt or break up the action of the make and break caller circuit breaker employed with the Currier bells and it was found capable of doing this within certain limits. If, however, battery power beyond a certain amount was used, and the governor was required to cut out a large excess of it, the mere momentum given to the governor magnet armature was such that it continued to rise too far and actually broke the circuit entirely, and this at once caused the Currier bell in the circuit being rung to stop, as the rise and fall of the governor armature were necessarily different from that of the circuit breaking caller, and consequently disturbed the synchronous action of the vibrating current on the bell hammer. Besides this the armature with a strong excess of current when it did not actually break the circuit had a movement up and down (owing to its mere momentum) above and below the space within which the magnet would otherwise have kept it but for its constantly being carried past this space upward and downward by this momentum.

Our invention is intended to overcome these difficulties, and give the governor a wide range of resistance in circuit with a steadier operation.

In the drawings: Figure 1. is a plan view of a governor provided with our improvement and connected circuit of bells. Fig. 2. is a side view of the governor.

A is the base board of the governor made of wood or other non-conducting material.

B is the governor magnet attached to the base board.

C is a bracket attached to the base board in which a tube of insulating material *a* is secured having a screw threaded hole through its center.

b is a screw of metal fitting the hole in *a*.

c is a metallic nut on the screw below the insulating tube *a* to bind the screw in place and to which the screw cup *e* is connected electrically; from *e* the line D passes through battery E to ground G.

f is the armature of the governor magnet to which is firmly attached the rod *f'* extending through a hole in the bracket, *g*, in which it plays up and down freely. From the bracket C two pins *g' g'* project upward through holes in the armature *f* so that the armature can freely work up and down upon them, the pins *g' g'* and rod *f'* forming guides to keep the armature in position. The point *b'* of the screw *b* comes against the center of the armature on the under side and sustains it in elec-

trical contact with the screw. From the upper end of the rod f' the wire d leads to one terminal of the magnet and the other terminal of the magnet coil is connected to the screw cup e' as shown. From the screw cup e' the line D leads through the bell magnets M. M. to the ground G'. So far the governor is substantially the same as that of Mr. Currier referred to.

Our improvement consists of inserting between the screw cups e e' a resistance bridge N. electrically connecting them together, which, in this instance, is shown in the form of a coil of wire, or spool, having its opposite ends n n electrically connected to the screw cups e e'. This resistance bridge N must be of the maximum amount of resistance which it is desired to put into the line by the governor and it may be made of other materials than the wire described which will present the required resistance to the electric current passing through it.

The operation of the invention is as follows: Suppose it is desired to energize the magnets M. M. with a given amount of the electric current and no more. The screw b is elevated or depressed until it is found that the armature f does not begin to be raised from the contact point b' by any less amount of the electric current. If now the battery be made to send over the circuit D any greater amount of the electric current than the governor is thus set for, the excess of current will at once cause the magnet B to raise the armature f slightly and a sufficient distance to interpose the required resistance to prevent the magnet M from being saturated with more electricity than desired, when the armature f will be kept with comparative steadiness within the limits where it interposes the necessary amount of resistance and the electricity will be seen passing in the form of a continuous spark from the contact b' to the armature f.

For some cause which we do not attempt to explain the resistance bridge N is found to steady the armature in its position and prevent its rising so high as to break the passage of electricity between the point b' and the armature f when quite powerful currents of electricity are used. It is obvious that the regulator will therefore automatically interpose resistance in the circuit to any desired degree between the difference of resistance of the governor magnet B and the bridge N, as the screw b is set.

We purpose to use this invention in operating the well known Currier individual bell, to prevent an excess of electrical current from passing through the bell magnets M M, the bells to be operated in the usual and well-known manner; but it is susceptible of use in many other situations. By the use of the resistance bridge N. we effectually prevent the governor from breaking the circuit too far and thus stopping the ringing of the bell when electric currents of more than a certain power are used.

What we claim as new and of our invention is:

1. The combination of the electric circuit, the magnet, B, located in said circuit, its armature, f, arranged to be drawn toward the magnet and increase the resistance by an excess of the electric current, the contact point, b, arranged in the circuit to support said armature, and the resistance bridge, N, arranged to shunt a portion of the electric current around said magnet and armature, substantially as described.

2. The combination of the electric circuit, the magnet B located therein, its armature, f, arranged to be drawn toward it by an excess of the electric current, the adjustable contact point, b, arranged to support the magnet, and the resistance bridge, N, arranged to shunt a portion of the electric current around said magnet, substantially as described.

3. The combination of the electric circuit, a magnet, M, located therein and provided with a vibrating armature arranged to be actuated by a vibratory electric current, the magnet, B, located in said circuit, its armature, f, arranged to be drawn toward the magnet and increase the resistance by an excess of the electric current, the contact point, b, arranged in the circuit to support said armature, and the resistance bridge, N, arranged to shunt a portion of the electric current around said magnet and armature, substantially as described.

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Witnesses:
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