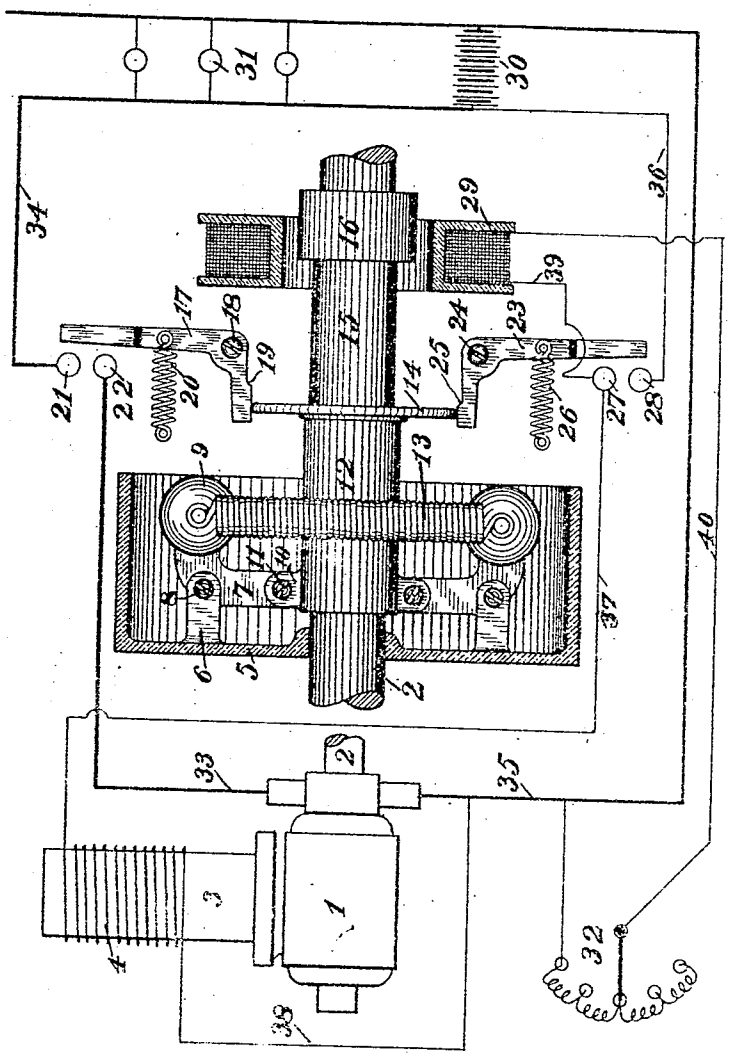
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No. 646,068. Patented Mar. 27, 1900.

J. L. CREVELING.

ELECTRIC SWITCH.

(No Model.) (Application filed June 10, 1899.)



Witnesses:
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UNITED STATES PATENT OFFICE.

JOHN L. CREVELING, OF NEW YORK, N. Y.

ELECTRIC SWITCH.

SPECIFICATION forming part of Letters Patent No. 646,068, dated March 27, 1900.

Application filed June 10, 1899. Serial No. 720,022. (No model.)

To all whom it may concern:

Be it known that I, JOHN L. CREVELING, a citizen of the United States, residing in New York, county of New York, State of New York, have invented a new and useful Improvement in Electric Switches, of which the following is a specification, reference being had to the accompanying drawing, forming a part thereof.

My invention pertains to that class of switches in which the action of centrifugal force is caused to make and break the circuit between a generator and a storage battery and comprehends means whereby the speed at which said circuit shall be made or broken may be adjusted.

In the drawing, 1 represents the armature, 2 the armature-shaft, 3 a core of the field-magnet, and 4 the field-energizing coil, of a dynamo or generator or any suitable type.

5 indicates a metal shell mounted upon the shaft 2, revolving therewith and carrying the lugs 6, to which are pivotally attached the arms 7, as by the screws 8. At one extremity of each of the arms 7 is placed the weight or ball 9, while the other extremity of the arm is attached to the boss 10 of the sleeve 12, as by the screw 11. The sleeve 12 fits loosely upon the shaft 2 and is so arranged that the tension of the springs 13 tends to hold the sleeve in the position shown in the drawing, while the action of centrifugal force upon the weights tends to slide the sleeve 12 along the shaft 2.

14 is a flange or disk attached to the sleeve 12, and 15 is an extension of this sleeve which is made of a non-magnetic metal.

16 represents an iron sleeve attached to the extension 15.

17 is a switch-lever pivotally supported, as by the screw 18, and provided with the shoulder 19. The spring 20 is so arranged as to cause this lever 17 to establish electrical connection between the terminals 21 and 22 when centrifugal force shall have caused the disk 14 to have passed beyond the shoulder 19. The switch-lever 23, supported as by the screw 24 and having shoulder 25, is caused by the spring 26 to make connection between 27 and 28 when the disk 14 shall have passed the shoulder 25. This switch is set to operate at a lower speed than switch causing connection between 21 and 22.

29 represents an electromagnet or solenoid, the action of which is to attract the core 16 in such manner as to oppose the action of centrifugal force upon the balls 9, which tends to slide 16 along the shaft.

30 represents a storage battery or accumulator, and 31 lamps or other translating devices.

32 is a variable resistance in circuit with the magnet 29, by which the force opposing the action of centrifugal force may be adjusted.

The practical operation of my improved switch is substantially as follows, starting with the dynamo-armature at rest and the switch in the position indicated in the drawing: Under these conditions the dynamo will of course generate no current, and the connections between 21 and 22 and between 27 and 28 being broken no current from the battery will flow through the generator. If the armature 1 start to rotate, the action of centrifugal force upon the balls 9 will tend to slide the sleeve 12 along the shaft 2, and when the speed is sufficient to cause the disk 14 to pass the shoulder 25 the spring 26 will cause the lever 23 to make connection between 27 and 28, and current will flow from the battery through the wire 36, switch 23 27 28, wire 37, field-coil 4, wire 38, wire 35, and thence to battery 30, thus exciting the field of the generator. The closing of this switch will also allow current from the battery to flow through the wire 39, coil 29, wire 40, resistance 32, and thence to the battery through wire 35. The current flowing through 29 will attract the core 16, and thus oppose the action of centrifugal force tending to slide the sleeve 12 along the shaft, and by means of the variable resistance 32 this opposing force may be varied, and thus the speed at which the flange 14 shall pass the shoulder 19 may be adjusted. Should this speed now be reached, the switch-lever 17 will connect 21 with 22, and if this switch be adjusted to close at such speed as to cause the generator to have an electromotive force in excess of the battery current will flow from the generator to the wire 33, switch 17, 21, and 22, and wire 34 to the battery and lamps, from which return to the generator is made through the wire 35. Should the armature continue to revolve at or above this speed, the generator will continue to supply

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current to the battery and lamps; but should the speed fall the action of the springs 13 and magnet 29 will cause the contact through 17, 21, and 22 to be broken at a predetermined speed, which may be regulated by the resistance 32. It is desirable, ordinarily, to break this contact when the speed of the armature is such that the electromotive force of the generator and the battery are about equal, and it is obvious that this may be accomplished by properly adjusting the resistance 32. Furthermore, the speed at which the connection between the generator and battery shall be made or broken may be made to vary somewhat in accordance with the voltage of the battery, inasmuch as the current used for exciting the magnet 29 is taken from the battery to be charged. If the speed of the armature fall until quite low, the switch 23 27 28 will open and no current will be wasted by flowing through the coils of the machine and the magnet 29. Should the speed again increase, the operation may be determined from the above.

It is obvious that many changes may be made in the apparatus above described and shown in the drawing without departing from the spirit of my invention, which is, broadly, an electromagnetic means for adjusting the speed at which a centrifugally-actuated switch may be operated. Therefore I do not wish in any way to limit myself to the particular construction shown, which is merely an example of one form of apparatus embodying my invention.

Having thus described my invention, what I consider as novel, and desire to secure by Letters Patent, is as set forth in the following claims:

1. The combination with a dynamo and storage battery to be charged thereby, in circuit with a centrifugally-actuated switch adapted to close and open said circuit, of means for adjusting the speed at which said switch shall close and open the circuit, said means comprising an electromagnet in a derived circuit from the battery to be charged, substantially as set forth.

2. The combination with a dynamo or generator, a storage battery and a centrifugally-actuated switch in circuit therewith, of means for adjusting the operation of said switch, said means comprising an electromagnet deriving current from the storage battery and means of adjusting the effect produced by said magnet, substantially as described.

In testimony of all which I have hereunto subscribed my name.

JOHN L. CREVELING.

Witnesses:
H. G. DARWIN,
ELMER E. ALLBEE.