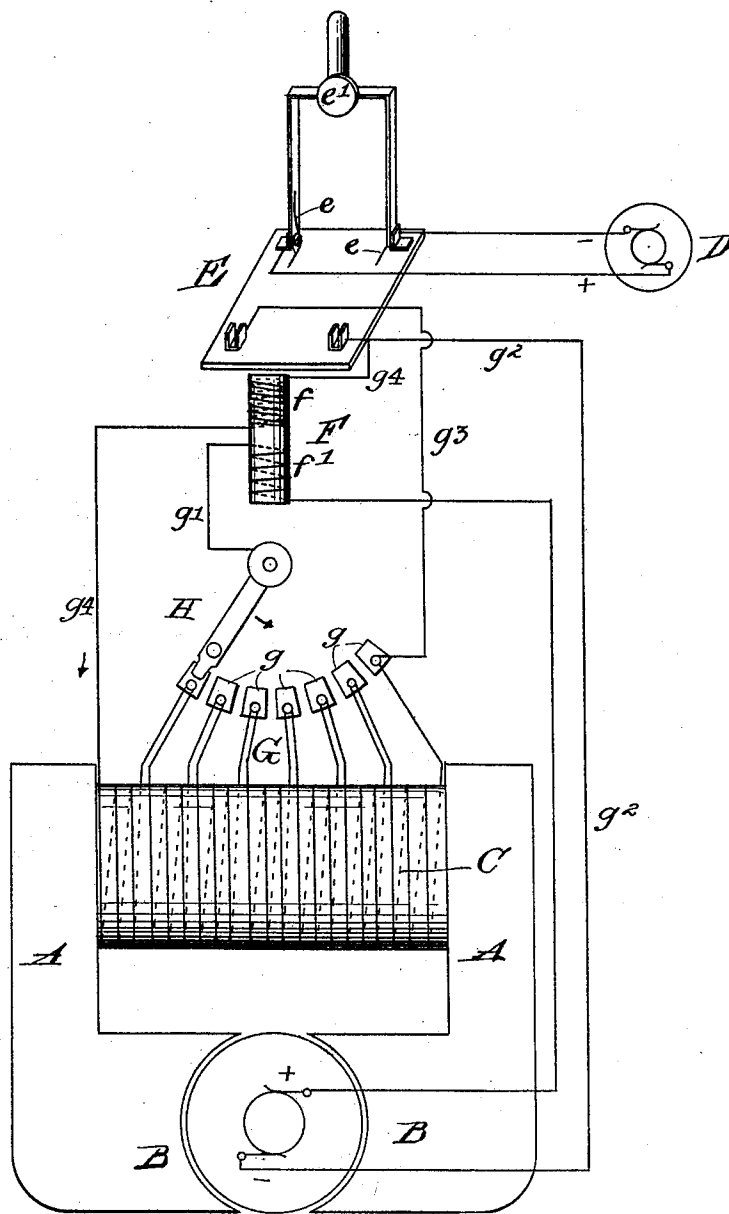


(No Model.)

W. R. POLK, Jr.
SAFETY ELECTRIC MOTOR.

No. 544,118.

Patented Aug. 6, 1895.



WITNESSES.

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WILLIAM R. POLK, JR., OF ATLANTA, GEORGIA.

SAFETY ELECTRIC MOTOR.

SPECIFICATION forming part of Letters Patent No. 544,118, dated August 6, 1895.

Application filed February 20, 1894. Renewed December 24, 1894. Serial No. 532,893. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM R. POLK, JR., a citizen of the United States, and a resident of Atlanta, in the county of Fulton, State of Georgia, have invented certain new and useful Improvements in Safety Appliances for Electromotors; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This invention is illustrated in the accompanying drawings, which are diagrammatical in form.

This device is for the purpose of preventing the burning out of motors by an excessive current by automatically cutting off the current upon its exceeding a predetermined safe point; also to utilize part of the coils of the field-magnet for the variable resistance in the armature-circuit.

A, B, and C are respectively the field-magnet pole-piece, the coil adapted to use for exciting same, and the armature of an electric motor such as now commonly in use.

D is the generator—the current source—and E is a double-pole switch, the lever of which is spring-pressed into open position by springs *e* and carries an armature *e'* of iron on its free end, which is adapted to be held by the magnet F when same is excited. The coils of this magnet consist of two oppositely-wound coils *f* and *f'*, differentiated in number of turns per coil and proportioned, respectively, as the desired difference in magnetic force or the safe electrical capacity of the field-magnet and the armature or their coils. The coil *f* of the magnet F is included in the field-magnet circuit and the coil *f'* is included in the armature-circuit. Loops G are taken from the field-magnet coils or connected thereto, and a block *g* is included in each loop, which blocks are arranged in semi-circular form, so that they may be successively traversed by the brush-lever H, which is pivotally set and is connected to the armature-circuit, a wire *g'* leading from said lever to the coil *f'*, thence to the plus-brush of the

motor, the wire *g*² leading from the armature to the minus side of the switch E. A wire *g*³ leads from the plus side of the switch E to one of the end blocks *g*, which is connected to one end of the field-magnet coils, and a wire *g*⁴ leads to the coil *f* from the other end of said field-magnet coil and from said coil *f* to the minus side of the switch E. A movement of the lever H in the direction of the arrow thereon cuts out of the armature-circuit part of the field-magnet coils and so applies to the armature more and more current as each block *g* is passed until the said lever reaches the extreme limit of its movement, when direct connection is made between the wires *g'* and *g*³ and all of the resistance afforded by the field-magnet coils cut from the armature-circuit, whereupon the device is in full running position.

By means of the differential opposite winding of the magnet F the same is excited in one direction by the field-magnet current and partially (only) neutralized by the proper armature-current. Should the current through the armature become so great from overload or other cause as to excite the said magnet in the opposite direction to the same density as the field-magnet current does in its direction, the neutralization by the oppositely-acting magnetic forces will obviously become so great that the armature on the lever of the double-pole switch will be released and said lever fly back to its open position, thereby cutting off the current.

This device is also applicable to generators.

While the invention has been described as being particularly applied to a shunt-wound motor or dynamo, it can be applied either to a series or to a compound-wound motor or dynamo. It also may be used to control a current passing through any main circuit, the coil operating on the common magnetic core to hold the switch in an operative position being included in any suitable shunt-circuit, and the coil exciting the common core in an opposite direction being included in the main circuit.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In an electric motor, a field-magnet con-

sisting of pole-pieces, an exciting coil therefor, a switch having a lever spring-pressed to an open position, a magnet core in the line of motion thereof so situated as to be contacted
5 with by said lever when the same is in closed position, a coil thereon connected terminally with a line bearing a practically constant current and an oppositely wound coil thereon in series with the armature coil substantially as
10 and for the purpose specified.

2. In an electro-magnetic switch, the combination of the motor, the main circuit leading to and from the same, the spring pressed lever or switch controlling the same, the magnetic core, when suitably magnetized, adapted
15 to hold the lever or switch against the action of the spring to close the main circuit, the coil surrounding the said core to magnetize the same to so hold the lever or switch, the
20 said coil being interposed in the shunt circuit of the motor, and the oppositely wound coil surrounding the said core to neutralize the action of the first mentioned coil, the neutral-

izing coil being interposed in the armature circuit of the motor, substantially as described. 25

3. In an electro-magnetic switch, the combination of an electric circuit, the spring pressed lever or switch controlling the same, the magnetic core, when suitably magnetized, adapted to hold the lever or switch against
30 the action of the spring to close the said circuit, the coil surrounding the said core to magnetize the same to so hold the lever or switch, the said coil being interposed in a circuit having a constant resistance, and the oppositely wound coil surrounding the said core
35 to neutralize the action of the first mentioned coil, the neutralizing coil being interposed in a circuit having a variable resistance, substantially as described. 40

In testimony whereof I hereunto affix my signature in presence of two witnesses.

WM. R. POLK, JR.

Witnesses:

ALBERT P. WOOD,
S. M. WOOD.