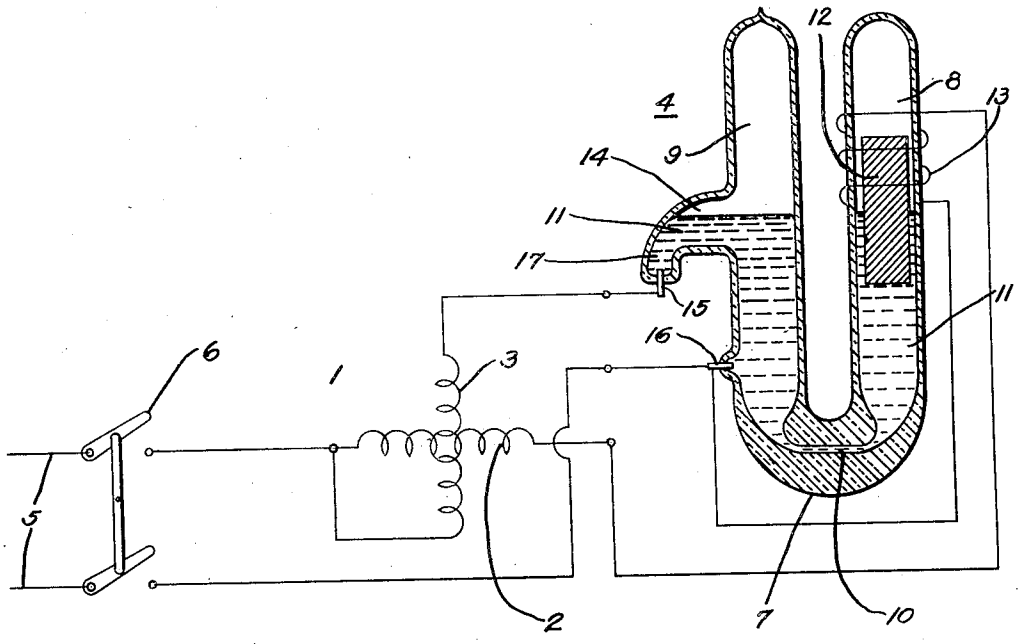
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O. S. JENNINGS

MOTOR STARTING SWITCH

Filed July 20, 1923




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Patented Dec. 29, 1925. 1,567,598

# UNITED STATES PATENT OFFICE.

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## MOTOR-STARTING SWITCH.

Application filed July 20, 1923. Serial No. 652,673.

*To all whom it may concern:*

Be it known that I, OLIVER S. JENNINGS, a citizen of the United States, and a resident of Wilkinsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Motor-Starting Switches, of which the following is a specification.

My invention relates to switches and, more particularly, to that type used for controlling the circuits of electric motors during the starting operation.

One object of my invention is to provide a motor-starting switch in which the separating contact surfaces are sealed from the air.

Another object of my invention is to provide a motor-starting switch which is of simple, unitary construction.

In certain types of motors, it is customary practice to provide starting and running windings which operate successively during the starting of such motors in order that they may be brought up to their normal speeds and operating conditions of voltage and current consumption. I propose to automatically accomplish the transition from the starting winding to the running winding by regulating the level of a conducting fluid between the several terminals of certain coils.

The single figure of the drawing is a diagrammatic view of apparatus and circuits embodying my invention, my improved switch being shown in vertical section.

In the preferred form of my invention, an electrical translating device 1, such as a motor, comprises a running winding 2 and a starting winding 3, together with a switch 4. A supply circuit 5 is arranged for connection to the motor 1 by means of a switch 6.

The switch 4 comprises a glass housing or container 7 of U-shape, the two legs 8 and 9 thereof being connected by a passage 10 of reduced cross-sectional area. A suitable conducting fluid 11, such as mercury, is contained in the chamber formed by the housing 7. In the leg 8, there is placed a float 12 of suitable magnetic material, such as iron. A coil 13 is mounted exteriorly of the leg 8 in such position that the float 12 acts as the armature member therefor. The coil 13 is connected in series with the running winding 2 of the motor 1.

The leg 9 is provided with an extended portion 14, in which a terminal member 15 is inserted in such manner as to make electrical contact with the conducting fluid 11. Another terminal member 16 is inserted in the walls of the leg 9 at a lower level. The terminal members 15 and 16 are in circuit with the starting winding 3. A portion 17 of the bottom wall of the extension 14 projects upwardly between the terminal members 15 and 16.

In the operation of a motor equipped with my improved starting switch, the switch 6 is first closed, whereupon a heavy rush of current traverses both the starting winding 3 and the running winding 2. The coil 13 is thereupon energized and its armature member 12 is drawn upwardly with a corresponding lowering of the fluid level in the leg 8. As the level of the fluid in the leg 8 recedes, a movement of the fluid from the leg 9 through the restricted portion 10 to the leg 8 takes place, this movement continuing until the fluid 11 has again reached the same level in both legs.

After a given period, depending upon the predetermined relation between the coil 13 and its armature member 12, together with the cross-sectional area of the section 10, a sufficient amount of the fluid 11 moves from the leg 9 into the leg 8 such that the fluid 11 recedes below the bottom wall 17 of the extension 14. Electrical connection between terminal members 15 and 16 is thereupon broken, and the starting winding 3 becomes inoperative.

The motor 1 then continues to operate with the running winding 2, and the float member 12 is held in its upper position until the switch 6 is operated.

In the event of voltage failure or the opening of the circuit 5 by means of the switch 6, the coil 13 becomes de-energized allowing its armature member 12 to drop further into the fluid 11 in the leg 8. The fluid level in the leg 8 thereupon rises higher than the fluid level in the leg 9 and a return movement of the fluid takes place, which, after a predetermined period, again closes the contact between the terminal members 15 and 16. This operation places the

several parts of the switch in position for successive operations, as is shown in the accompanying drawing. It will thus be seen that my switch is entirely automatic in its operation, and that it resets itself.

I do not wish to be restricted to the specific circuit connections or arrangement of parts herein set forth, as various modifications thereof may be effected within the spirit and scope of my invention. I desire, therefore, that only such limitations shall be imposed as are indicated in the appended claims.

I claim as my invention:

1. The combination with an electric device having a running winding and a starting winding normally connected in parallel, of a fluid switch normally closing the circuit through the starting winding and an electromagnet connected in the circuit for actuating the fluid to open the circuit through the starting winding, and means for regulating the movement of the fluid.

2. The combination with an electric device having a running winding and a starting winding normally connected in parallel, of a switch for controlling the circuit through the starting winding having a pair of separate terminals normally connected by fluid, an electromagnet for actuating the fluid adapted to cause the fluid to disengage from the terminals when energized, and means for controlling the movement of the fluid.

In testimony whereof, I have hereunto subscribed my name this 12th day of July 1923.

OLIVER S. JENNINGS.