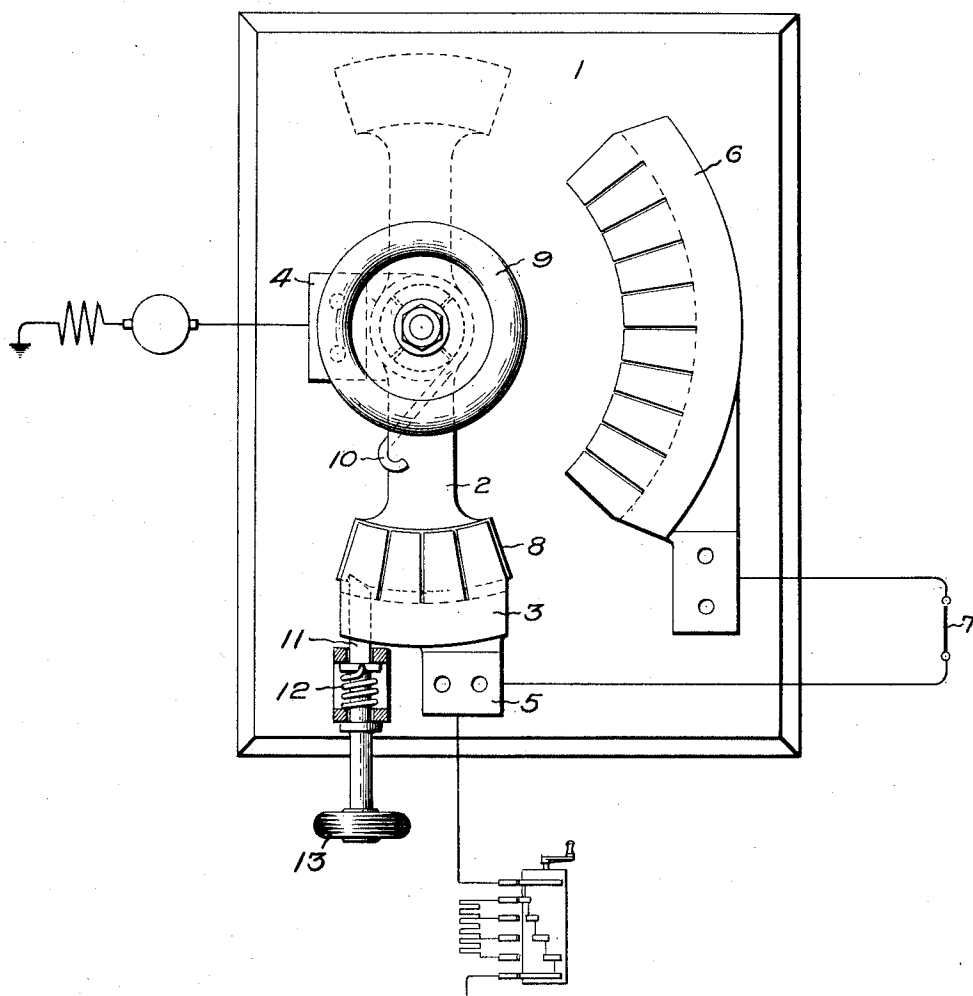


O. K. KJOLSETH.
 SWITCH DEVICE.
 APPLICATION FILED AUG. 1, 1905.

1,010,640.

Patented Dec. 5, 1911.



Witnesses:
 Marcus L. Byng.
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 by Albert B. Davis
 Att'y.

UNITED STATES PATENT OFFICE.

OLE K. KJOLSETH, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

SWITCH DEVICE.

1,010,640.

Specification of Letters Patent.

Patented Dec. 5, 1911.

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To all whom it may concern:

Be it known that I, OLE K. KJOLSETH, a citizen of Norway, residing at Schenectady, county of Schenectady, and State of New York, have invented certain new and useful Improvements in Switch Devices, of which the following is a specification.

The present invention relates to electric switches and more particularly to means for protecting the switch contacts from injury through arcing when the switch is opened.

There are instances in which a switch is placed in a circuit for use only in disconnecting the circuit from the source of current supply when no current is flowing or in case of emergency, only, when the circuit is energized. For example, in electric locomotives and the like, the main switch is not operated except after the local circuit has been interrupted at the controller, unless the controller fails to act properly when, of course, the switch must be opened while current is flowing through it. It is evident that should the main motor circuit remain complete after the controller has been brought to its "off" position, the main switch might be required to interrupt a comparatively heavy current flow at the expense of injury to the switch due to severe arcing. It has been proposed to permanently connect fuses in shunt to such switches in such a manner that the actual interruption of the circuit must be effected by the fuse. In this latter case, the circuit will not be completely broken, however, unless the current flowing is sufficient to blow the fuse. Thus, if a defect in the controller is such that only a high resistance control circuit remains after the controller has been returned to its "off" position, the current passing through this circuit and through the main switch may be too small to blow a fuse designed to produce the proper results under heavy currents.

The object of the present invention is to so construct and arrange the parts of a switch and its protective device that a circuit in which the switch is placed may be interrupted with certainty without causing injurious arcing at the switch contacts, and independently of the value of the current flowing in this circuit.

To the above ends, the present invention consists of a switch and a fuse so constructed and arranged, that normally, when the switch is closed, the fuse is entirely out of circuit

but is placed in series with the switch contacts for a definite period as the switch is opened; the circuit being finally broken by the switch. Thereby, the fuse is given ample time, prior to complete opening of the switch, to effect an interruption of the circuit when the current is such that the switch requires protection; and the circuit is positively interrupted by the switch itself, provided no current or only a small current is flowing.

In the accompanying drawing, there is disclosed a preferred form of the present invention.

Reference being had to the drawing, 1 indicates a base or support of insulating material upon which is pivotally mounted the switch arm 2.

3 is a contact member fixedly secured to the support and arranged to cooperate with the member 2 to complete a connection between the terminals 4 and 5.

6 is an additional or auxiliary fixed contact member, separated from the member 3 and arranged within the path of movement of the arm 2. The members 3 and 6 are placed in electrical connection with each other through the low-capacity fuse 7. It will be seen that as switch arm 2 is moved from the position shown in full lines to the position shown in dotted lines, the contact 8 at the end of the arm will first bridge the gap between the main contact 3 and the auxiliary contact 6, connecting the fuse 7 in shunt with the contact 8. Then, as the contact 8 leaves contact 3, the entire current is free to flow from terminal 4 to terminal 5 by way of switch members 2 and 6 and fuse 7 without having been interrupted. The contact member 6 is made elongated in order that the current may flow through the fuse for a considerable period of time before the contact 8 finally passes out of engagement therewith. During this period the fuse may blow, provided the current flowing is considerable. If, however, only a small current is flowing, the fuse will not blow and the circuit will ultimately be interrupted by the switch itself on contact 8 leaving contact 6; this interruption being accomplished without objectionable arcing, by reason of the smallness of the current.

The switch arm may be controlled in any suitable or desired manner, as for instance, a handle 9 may be employed for operating it

to its open and to its closed positions. Since it is desirable to have the switch arranged so as to require but little effort upon the part of the operator to open it in emergencies, I have provided a spring 10, arranged to be placed under tension when the switch is closed and to open switch when free to do so. Normally, the switch arm is locked against the tension of the spring by means of a catch 11, held in its operative position by a spring 12. A button or handle 13 on the catch enables the operator to quickly withdraw it in order to release the switch arm. The throw of the switch arm motor may be through any desired angle and the angular length of the contact 6 may be varied in order to insure the elapse of sufficient time for the fuse to blow before the circuit is interrupted by the switch itself.

Although I have illustrated and described the present invention in the best form now known to me, I do not desire to limit it to the particular form shown, except as indicated specifically in the appended claims.

What I claim as new, and desire to secure by Letters Patent of the United States, is,—

1. A switch, a fuse which is out of circuit when the switch is closed having less than normal current carrying capacity, and means associated with said switch for connecting said fuse in circuit with one member of the switch while the latter is opening.

2. A switch, a fuse which is normally out of circuit with the switch having less than normal current carrying capacity, and means associated with said switch for connecting said fuse first in shunt with the switch and then in series with one element thereof while the switch is opening.

3. A switch comprising a movable contact member, a main fixed contact member, an auxiliary fixed contact member, and a low-capacity protective fuse for said switch ex-

tending between said fixed contact members, the said movable switch member being arranged to bridge said fixed members during a portion of the opening movement of said movable member.

4. A switch comprising a movable contact member, a main fixed contact member, an auxiliary fixed contact member, and a low-capacity protective fuse for said switch extending between said fixed contact members, the said movable switch member being arranged to bridge said fixed members during a portion of its opening movement and to break engagement with said auxiliary member at the end of its opening movement.

5. A switch comprising a movable contact member, a main fixed contact member, an elongated auxiliary contact member, and a low-capacity protective fuse for said switch connected between said fixed contact members, the said movable contact member being arranged to bridge said fixed contact members and then to traverse the said auxiliary contact upon moving to its open position.

6. A switch comprising a movable contact member, a main fixed contact member, an auxiliary fixed contact member, a low-capacity protective fuse for said switch extending between said fixed contact members, the said movable switch member being arranged to bridge said fixed members during its opening movement and to break engagement with said auxiliary member at the end of its opening movement, a spring for actuating said movable member to its open position, and means for locking said movable member against the tension of said spring.

In witness whereof, I have hereunto set my hand this 31st day of July, 1905.

OLE K. KJOLSETH.

Witnesses:

BENJAMIN B. HULL,
HELENA SHIELDS.