

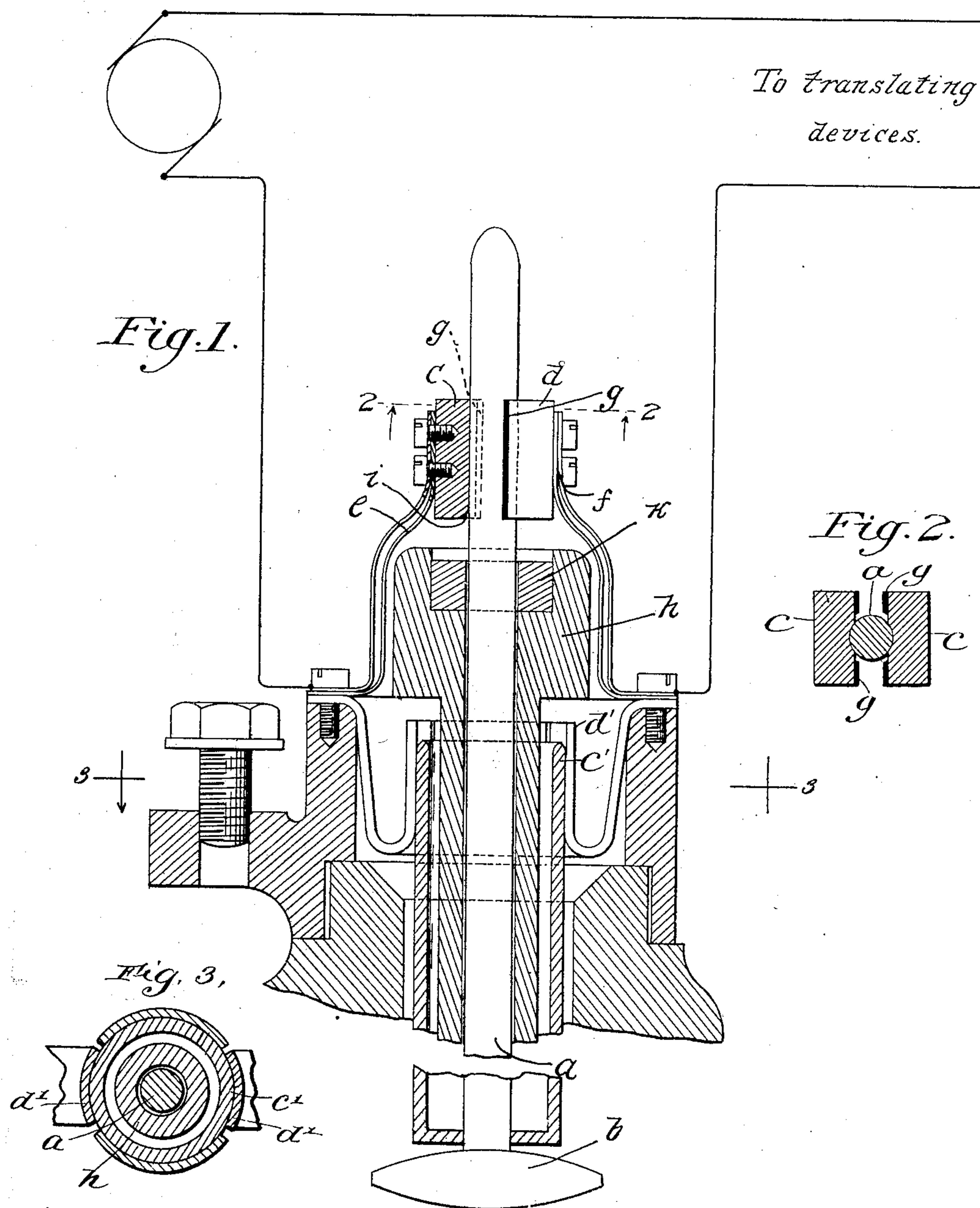
No. 704,202.

Patented July 8, 1902.

C. MICHALKE.  
SWITCHING APPARATUS.

(Application filed Nov. 18, 1899.)

(No Model.)



Witnesses:  
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# UNITED STATES PATENT OFFICE.

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## SWITCHING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 704,202, dated July 8, 1902.

Application filed November 18, 1899. Serial No. 737,447. (No model.)

*To all whom it may concern:*

Be it known that I, CARL MICHALKE, a subject of the Emperor of Germany, residing at Charlottenburg, Germany, have invented a certain new and useful Improvement in Switching Apparatus, (Case No. 290,) of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to switching apparatus, and more particularly to that class of switching apparatus employing a longitudinally-movable switch member for opening and closing a circuit and a tube inclosing the said switch member, within which the longitudinal member may be drawn for the purpose of extinguishing the arc occurring between the said member and the switching part or parts engaging the same. The tube or sleeve inclosing the longitudinally-movable switch member is preferably made of insulating material. In switches of this class as heretofore constructed the material of which the tube is composed was likely to be injured or destroyed by excessive heat due to the arcs formed in the operation of the switch.

My invention has for its object the provision of means whereby the heat due to the arcs may be readily dissipated; and it consists in its preferred embodiment of a body of material, preferably metal, associated with the sleeve and adapted rapidly to radiate the heat. This body of metal is preferably in the form of a ring surrounding a longitudinally-acting switch member, this ring being seated in a recess provided at the mouth of the tube and thoroughly insulated from all current-conducting parts.

I will explain my invention more particularly by reference to the accompanying drawings, illustrating the preferred embodiment thereof, in which—

Figure 1 is a longitudinal view of the switch, partially in section, the circuit connections being indicated diagrammatically; and Fig. 2 is a cross-sectional view on line 2 2 of Fig.

1. Fig. 3 is a sectional view of the contact-springs on line 3 3 of Fig. 1.

Like letters of reference indicate similar parts in the three figures.

The longitudinally-acting member or plunger *a* is preferably a solid rod of metal, preferably of circular cross-section, an operating-handle *b* being located upon one end of the rod, the other end of the rod being tapered, as indicated, to enable the same to be readily guided between the metallic blocks *c d*, forming supplemental terminals of the circuit that is to be opened and closed by the switch, the main circuit being preferably under the control of main switch portions *c' d'*. The supplemental terminals or metallic blocks *c d* are adapted to open the circuit after the circuit has been opened through the main contact-terminals *c' d'*. The metallic blocks *c d* are mounted upon spring-supports *e f*, which tend to cause the metallic blocks to approach each other, but which are prevented from coming into electrical contact when the rod *a* is withdrawn by the faces *g* of insulating material carried upon the opposed plane faces of the contact-blocks. These contact-blocks are provided with opposed curved recesses extending longitudinally of the rod *a* and adapted to fit the same. The rod *a* is guided in its longitudinal movement by means of a sleeve *h*, having a bore slightly larger than the diameter of the rod. Those portions of the recesses in the blocks *c d* are preferably curved outwardly at *i* to guide the rod *a* into engagement with the blocks *c d*. The tube *h* is usually constructed of such insulating material that is not capable of withstanding the high heat due to the arcs established between the metallic parts *a, c*, and *d* upon the withdrawal of the part *a* from its engagement with the parts *c* and *d* without marked deterioration. The end of the tube or sleeve directly opposed to the blocks *c d* is that portion which is harmfully affected by the excessive heat, as the arcs between the rod *a* and the blocks *c d* are frequently not extinguished until that end of the rod *a* which engages the blocks *c d* has been drawn entirely



within the incasing sleeve. In practicing my invention I preferably enlarge the end of the sleeve opposed to the blocks *c d* and provide in the end face of the sleeve opposing the blocks *c d* an annular recess, forming a continuation of the bore of the sleeve, in which a ring *k*, preferably circular and composed, preferably, of metal, is placed, the bore of this ring being alined with the bore of the incasing sleeve, the ring serving to radiate and dissipate the heat before it reaches the more sensitive insulating material of the sleeve. It will be unnecessary to describe the remaining circuit connections, as the drawings clearly indicate the same.

I preferably employ two terminal blocks *c d*, rod *a* not constituting a terminal, but acting merely to make electrical connection between the blocks *c d*. I do not wish to be limited to this precise arrangement, however.

It is obvious that changes may readily be made in the embodiment of the invention herein shown and described without departing from the spirit of the invention, and I do not, therefore, wish to be limited to the precise construction shown; but,

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

1. In a switch, the combination with a member *a*, of contact means acting therewith for controlling the continuity of a circuit, the said member being movable longitudinally with relation to the contact means, a sleeve surrounding the contact member *a*, said member being also movable longitudinally with relation to the said sleeve to enable the contact member to be drawn within the sleeve to extinguish arcs formed in the operation of the switch, and supplemental means associated with the said sleeve for radiating the heat due to the arcs to prevent the heat from injuriously affecting the sleeve, substantially as described.

2. In a switch, the combination with a metallic member *a*, of metallic contact means acting therewith for controlling the continuity of a circuit, the said member being movable longitudinally with relation to the contact means, a sleeve of insulating material surrounding the contact member *a*, the said member being also movable longitudinally with relation to said sleeve to enable the contact member to be drawn within the sleeve to extinguish arcs formed in the operation of the switch, and a body of metal surrounding the said member and interposed between the same and the sleeve for radiating and dissipating the heat to prevent the same from injuring the sleeve, substantially as described.

3. In a switch, the combination with a longitudinally-movable metallic rod *a*, of metallic contact means, a sleeve of insulating material inclosing the rod, and a metallic ring also inclosing the rod, interposed between the same and the said sleeve and located near

the end of the said sleeve contiguous to the said contact means, substantially as described.

4. In a switch, the combination with a longitudinally-movable metallic rod *a*, of contact means, the said rod by its longitudinal movement being adapted to be engaged and removed from engagement with the said contact means, a sleeve surrounding the said rod and having an end opposed to the said contact means, and a heat-radiating device interposed between the said contact means and the said sleeve to prevent heat from injuring the sleeve, substantially as described.

5. In a switch, the combination with a longitudinally-movable metallic rod *a*, of contact means, the rod by its longitudinal movement being adapted to be engaged and removed from engagement with the said contact means, a sleeve of insulating material surrounding the said rod and having an end opposed to the said contact means, and a body of metal interposed between the said contact means and the said sleeve to prevent heat from injuring the sleeve, substantially as described.

6. In a switch, the combination with a longitudinally-movable metallic rod *a*, of contact means, the rod by its longitudinal movement being adapted to be engaged and removed from engagement with the said contact means, a sleeve of insulating material surrounding the said rod and having an end opposed to the said contact means, a recess being provided in the said end, and a metallic body contained within the said recess placed adjacent to the said rod, adapted to prevent heat due to arcing from injuring the sleeve, substantially as described.

7. In a switch, the combination with main switch portions, of a rod movable with one of the aforesaid main switch portions, supplemental metallic contact means, the said rod and supplemental metallic contact means serving to open the circuit after the main switch portions have been separated, a sleeve of insulating material inclosing the rod, and means interposed between the rod and said sleeve for preventing the heat due to arcing from injuring the sleeve, substantially as described.

8. In a switch, the combination with main switch portions, of a longitudinally-movable metallic rod, metallic contact means, the said rod and metallic contact means serving to open the circuit after the main switch portions have been separated, a sleeve of insulating material inclosing the rod, and means interposed between the rod and the said sleeve for preventing the heat due to arcing from injuring the sleeve, substantially as described.

In witness whereof I hereunto subscribe my name this 13th day of October, A. D. 1899.

CARL MICHALKE.

Witnesses:

WOLDEMAR HAUPT,  
HENRY HASPER.