W. R. McRAE & R. RUSSELL.

DIVISION PIECE OR PARTITION FOR A CONTROLLER ARC DEFLECTOR, CIRCUIT BREAKER, AND THE LIKE.

APPLICATION FILED MAY 7, 1915. RENEWED SEPT. 22, 1917.

1,244,224.

Patented Oct. 23, 1917.

2 SHEETS—SHEET 1.

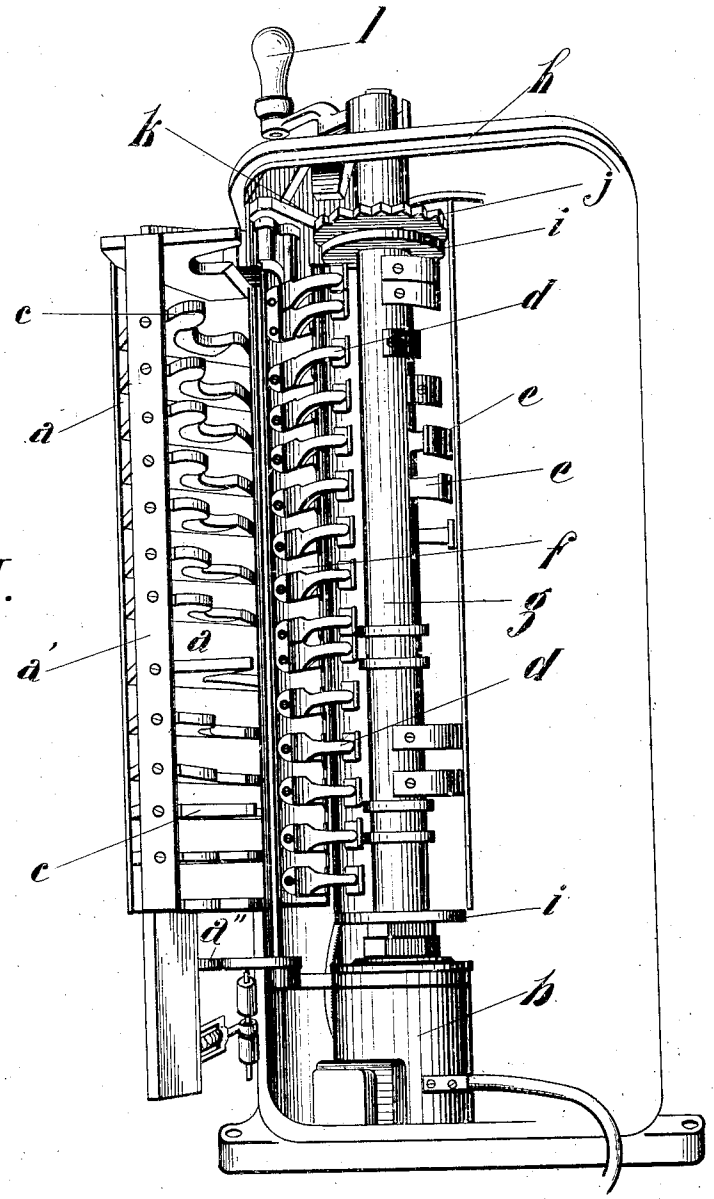


FIG. I.

INVENTORS.

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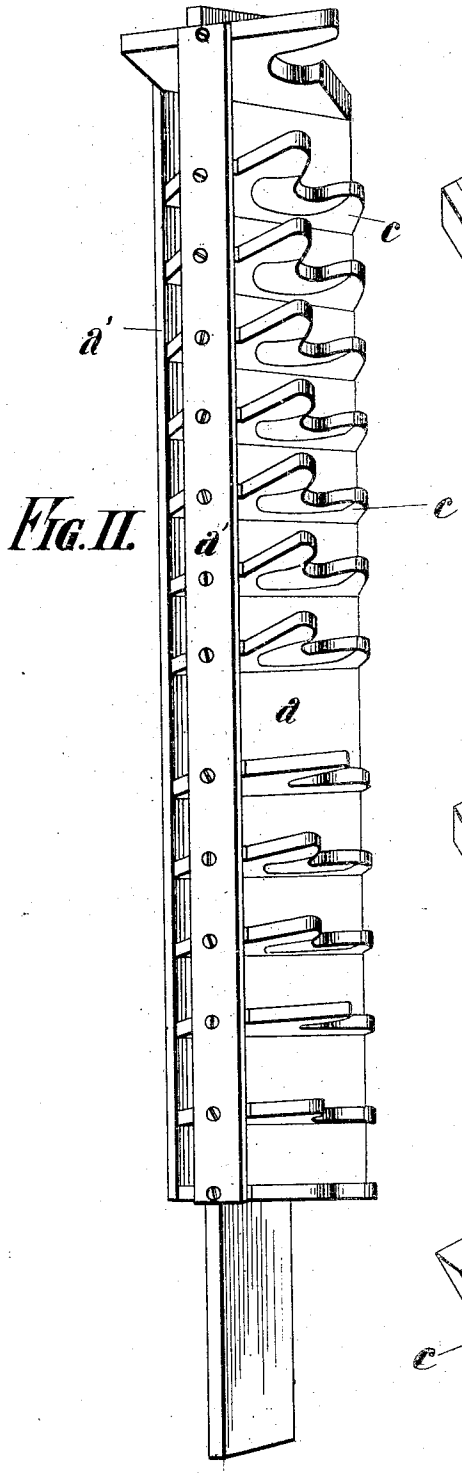


FIG. II.

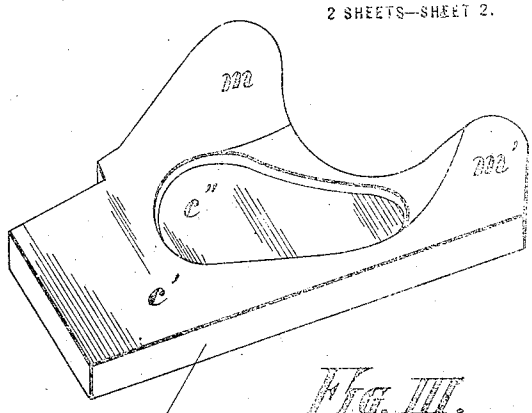
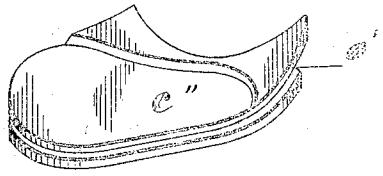


FIG. III.



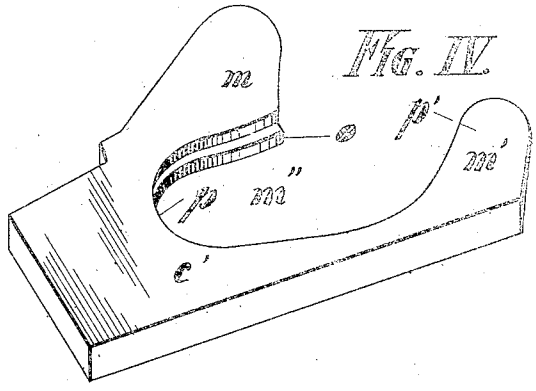


FIG. IV.

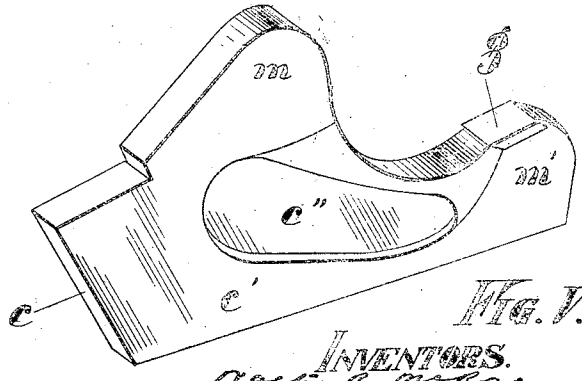


FIG. V.

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UNITED STATES PATENT OFFICE.

WALTER ROBERTSON McRAE AND RICHARD RUSSELL, OF TORONTO, ONTARIO, CANADA.

DIVISION-PIECE OR PARTITION FOR A CONTROLLER ARC-DEFLECTOR, CIRCUIT-BREAKER, AND THE LIKE.

1,244,224. Specification of Letters Patent. Patented Oct. 23, 1917.

Application filed May 7, 1915, Serial No. 26,667. Renewed September 22, 1917. Serial No. 192,832.

To all whom it may concern:

Be it known that we, WALTER ROBERTSON McRAE and RICHARD RUSSELL, both of the city of Toronto, in the county of York and Province of Ontario, Dominion of Canada, have invented a certain new and useful Improvement in a Division-Piece or Partition for a Controller Arc-Deflector, Circuit-Breaker, and the like; and we hereby declare that the following is a full, clear, and exact description of the same.

This invention, relating to division pieces for use in connection with controller arc deflectors, circuit breakers, and other electrical apparatus, in which such division pieces are subject to burning or erosion—particularly resulting from the arc caused by the opening or breaking of the circuit, will hereinafter be described in connection with a controller for an electric motor for the purpose of explaining its use and advantages.

A controller for an electric motor, in which the circuit for the current is open and closed by a series of contact segments moved into and out of engagement with a series of contact fingers, is arranged in sections with the contact segments and fingers of each section separated by division pieces or partitions from those of the adjacent sections to prevent the arc from spreading, these division pieces or partitions being connected to a framework of fire-proof insulation mounted on the pole-piece of the magnet blow-out coil, which establishes a magnetic flux through them to draw the arc away from the contact segments and fingers during the breaking of the circuit.

The continual drawing of the arc from the contact segments and fingers results in a burning away or erosion occurring at that part of each division piece or partition opposed to the arc, which, in the course of time, has to be removed and replaced by another.

As these division pieces or partitions are comparatively expensive, on account of the relatively large number used in each controller and the charge for labor incident to their removal and replacement, owing to their fixed attachment to the gate or framework, the cost of repairs annually amounts to a considerable sum, regardless of the inconvenience resulting from the controller being out of use during the repair period or periods.

One of the objects of the invention, therefore, is to so construct the division pieces or partitions that a considerable percentage of the cost of these repairs and the time during which the controller or other electrical apparatus is out of use can be eliminated, and this is attained by making each division piece or partition in two parts, one—which is not subject to comparatively rapid erosion—being relatively fixed, for instance, in the controller, and the other—which is subject to comparatively rapid erosion—being separably secured to the fixed one, so that the burnt-out part can be removed and replaced without disturbing the original installation, a further object of the invention being to so construct these parts that the separable one can be quickly and easily removed and replaced, and the fixed one will securely hold it in its set position until it is manually removed, the separable part being so located that it will be exposed to the full burning or erosive action of the arc, as hereinafter set forth and particularly pointed out in the claims.

In the drawings:—

Figure 1, is a perspective view of a controller, with part of the casing removed, and the controller arc deflector opened;

Fig. 2, is a perspective view of the arc deflector showing the division pieces or partitions for isolating each section of the controller from the adjacent sections;

Fig. 3, is a detail view of one of these division pieces or partitions with its parts assembled;

Fig. 4, is a perspective view of one of the division pieces with its parts separated; and,

Fig. 5, is a detail view of a modification of the construction shown in Fig. 3.

Like characters of reference refer to like parts throughout the specification and drawings.

The controller arc deflector *a*, comprising a framework *a'* of insulation, mounted on the hinged pole-piece *a''* of the controller blow-out magnet *b*, is provided with a series of division pieces or partitions *c* for isolating the contact fingers *d* and contact segments *e* of each section of the controller from those of the adjacent sections, the contact fingers being attached to the controller contact board *f*, and the contact segments *e* being carried by the controller cylinder *g* which turns in bearings mounted on the con-

troller frame h and carries at the top and bottom insulation disks i of large diameter to prevent the leakage of current to the frame.

Above the top insulation disk is a star wheel j and check pawl k for momentarily checking the rotation of the controller cylinder as each step of the switching connection is accomplished during the operation of the controller handle l. When the controller arc deflector is in its closed position, the division pieces or partitions c isolate the contact segments and fingers of each section of the controller from those of the adjacent sections for the purpose of preventing the spreading of the arc from one section to either of the adjacent sections when the contact is broken.

A strong magnetic flux is maintained by the blow-out magnet b through the arc deflector a for the purpose of extinguishing the arcs formed when the contacts between the segments and fingers are broken, these arcs being drawn to the division pieces or partitions, with the result that these division pieces or partitions will, in the course of time, be completely burned through at places in line with the arcs.

As shown in Figs. 1 and 2, the division pieces or partitions c are screwed to the framework a', and heretofore, when one of them was burned out, it was necessary to remove all the screws securing it to the framework and then replace them, the removal and replacement of the screws not only taking time, but also resulting in the wearing away of the framework, and in addition to this it has been necessary to replace each burned-out or worn-away division piece or partition by a new one which, together with the charge for the labor in the removal and replacement, has added materially to the expense in connection with the upkeep of the controller.

In Figs. 3, 4 and 5, we have shown the division piece or partition c as consisting of a member c' to be permanently fastened to the framework a' of the arc deflector a and a separable member c'' to be removably held by the fixed member c', the division piece, or at least the separable member c'', being preferably of dielectric strength, permitting of the magnetic flux from the blow-out magnet coil and having high resistivity to the flow of the direct current and to the arc.

As shown in Fig. 4, the fixed member c' is formed with two stationary jaws m, m' partly inclosing an alcove m'', the separable member c'' being of corresponding shape and dimensions to the alcove, so that when contained therein, it will complete the construction of the division piece or partition.

As shown in Fig. 4, the alcove m'' is formed with a tongue o, and the separable member c'' is formed with a groove o', which receives the tongue when the fixed and separable members are assembled, the tongue and groove formation preventing the lateral movement of the separable member, and the stationary jaws m, m' preventing its transverse and lengthwise movements.

As shown in Figs. 3 and 4, the inner end p and the outer end p' of the alcove are rounded or curved and the curvature of these ends is preferably described from the same center, but with different radii, so that the separable member during its removal and replacement, must turn in a curved path, as indicated by arrow in Fig. 3.

By this construction, the jaw m forms an abutment to prevent movement of the separable member transversely of the division piece or partition when contained within the alcove, the jaw m' preventing the movement of the separable member lengthwise of the division piece or partition.

In Fig. 5, the relatively fixed member is shown to be provided with a stop q which can be moved into position to engage the separable member when contained in the alcove, and prevent its turning movement until the stop has been displaced from its engaging position.

In the general construction of the division piece or partition, the separable member is located in line with the arc, so that when burned out or eaten away, it can be quickly removed and replaced without disturbing the original installation of the relatively fixed member.

It is possible to make various modifications, within the scope of the appended claims, of the division piece and the means whereby its fixed and separable members are secured in their assembled position, and it is possible to use it not only in connection with controller arc deflectors, but also in connection with circuit breakers and other electrical apparatus, where the parts are subject to burning or erosive action.

Having thus fully described the nature of our invention, what we claim as new and desire to secure by Letters Patent, is:—

1. An insulation division piece or partition comprising a relatively fixed part formed with two stationary jaws partly inclosing an alcove, a separable part contained in said alcove and removably held therein by said jaws, and means for preventing the inadvertent removal of the separable part from the relatively fixed part.

2. An insulation division piece or partition comprising a relatively fixed part having an alcove therein, two jaws partly inclosing the alcove, and a separable part contained in said alcove and removably held therein, one of said parts being formed with a tongue and the other with a groove to receive said tongue, and means for preventing the inadvertent removal of the separable part from the relatively fixed part.

3. An insulation division piece or partition comprising a relatively fixed part having an alcove therein and two jaws partly inclosing the alcove, and a separable part contained in said alcove and removably held therein, one of said parts being formed with a tongue and the other with a groove to receive said tongue, said tongue and groove preventing the lateral movement and the jaws preventing the lengthwise movement of the separable part.

4. An insulation division piece or partition comprising a relatively fixed part having an alcove therein, two jaws partly inclosing the alcove, and a separable part contained in said alcove and removably held therein by said jaws, the inner and outer ends of the alcove being curved, the curvature of these ends being described from the same center but with different radii, so that the separable member during its removal and replacement must turn in a curved path, and means for preventing the inadvertent removal of the separable part from the relatively fixed part.

5. An insulation division piece or partition comprising a relatively fixed part having an alcove therein, two jaws partly inclosing the alcove, and a separable part contained in said alcove and removably held therein by said jaws, the inner and outer ends of the alcove being curved, the curvature of these ends being described from the same center but with different radii, so that the separable member during its removal and replacement must turn in a curved path, and one of said jaws forming an abutment to prevent movement of the separable member transversely of the division piece when contained in the alcove, the other jaw preventing the movement of the separable member lengthwise of the division piece, and means for preventing the inadvertent removal of the separable part from the relatively fixed part.

6. An insulation division piece or partition comprising a relatively fixed part having an alcove therein and two jaws partly inclosing the alcove, a separable part contained in said alcove and removably held therein by said jaws, and a stop which can be moved into position to engage the separable member when contained in its alcove.

Toronto, April 21st, 1915.

WALTER ROBERTSON McRAE.
RICHARD RUSSELL.

Signed in the presence of—
CHAS. H. RICHES,
EDWARD H. BERNSTEIN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."