April 27, 1926.

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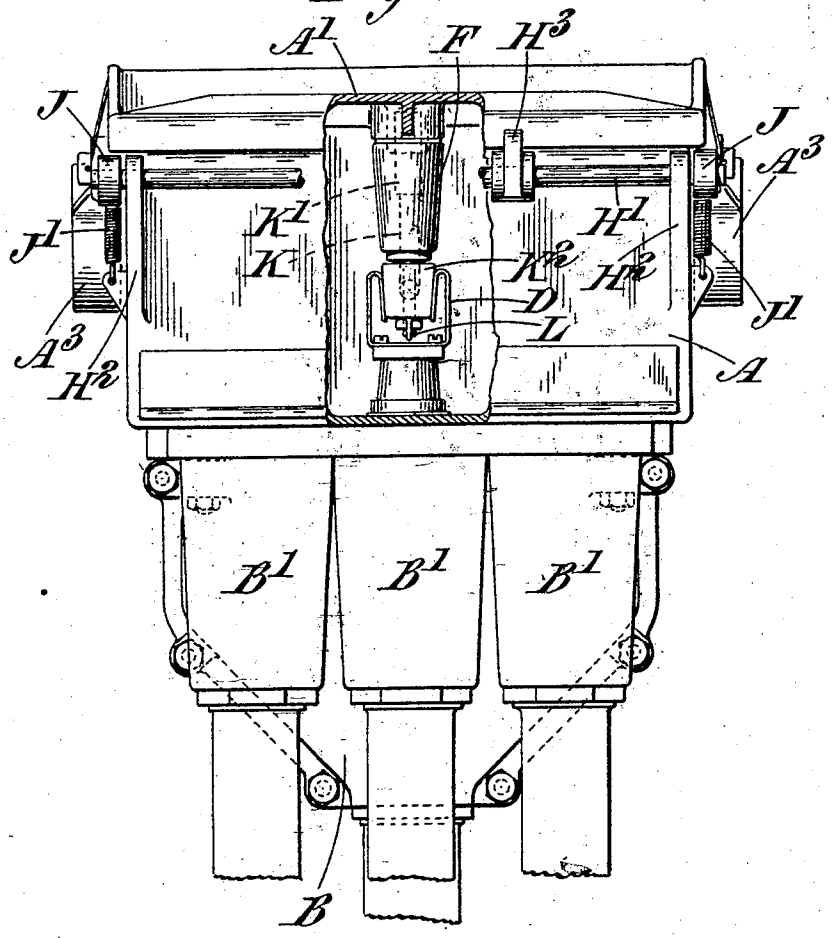
R. W. GREGORY

ELECTRIC SWITCH FUSE

Filed March 6, 1923

2 Sheets-Sheet 1

Fig. 1.



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Fig. 3.

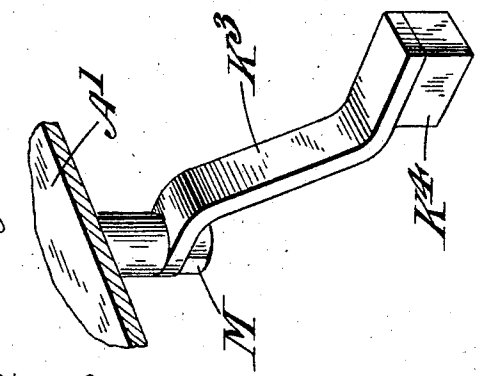
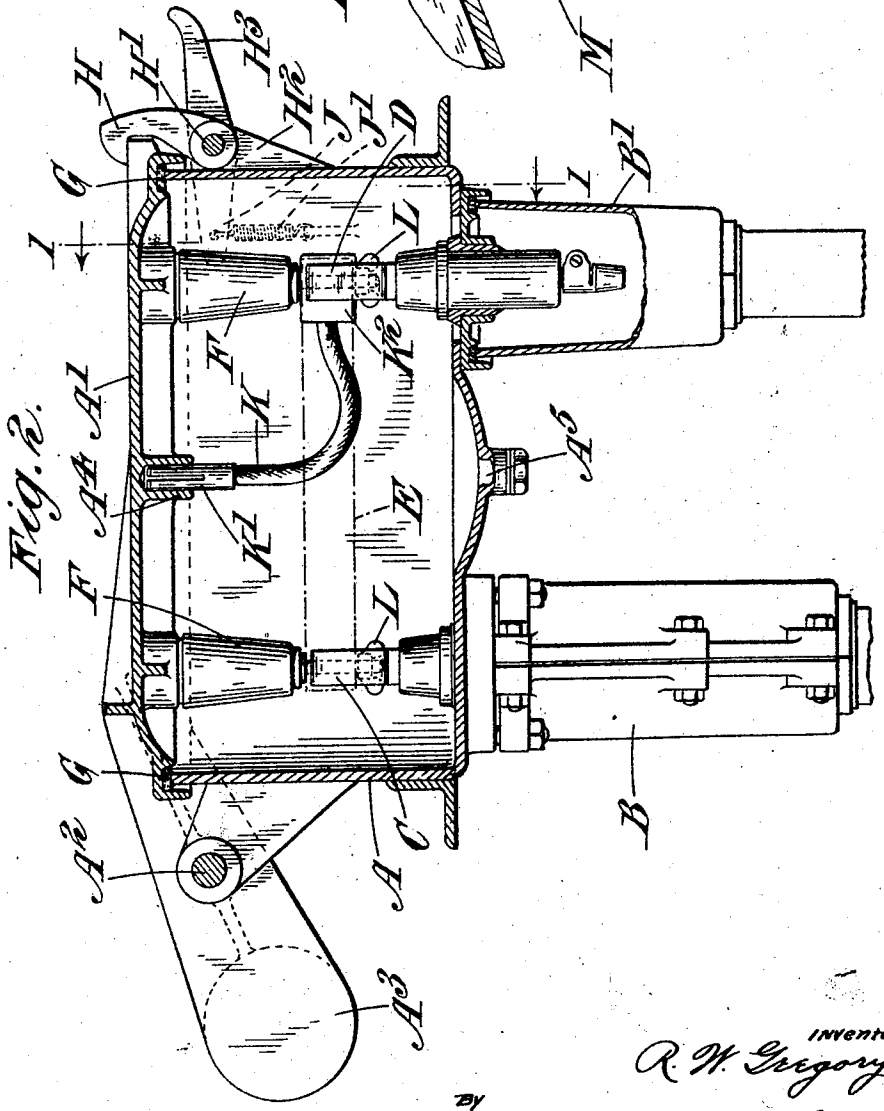


Fig. 2.



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Patented Apr. 27, 1926. 1,582,215

UNITED STATES PATENT OFFICE.

RICHARD WALTER GREGORY, OF HEXHAM-ON-TYNE, ENGLAND, ASSIGNOR TO ELECTRICAL IMPROVEMENTS LIMITED, OF NEWCASTLE-UPON-TYNE, ENGLAND.

ELECTRIC SWITCH FUSE.

Application filed March 6, 1923. Serial No. 623,267.

To all whom it may concern:

Be it known that I, RICHARD WALTER GREGORY, a subject of the King of England, and residing at Hexham-on-Tyne, Northumberland, England, have invented certain new and useful Improvements in Electric Switch Fuses, of which the following is a specification.

This invention relates to electric switch-fuses and has particular reference to those of the type intended for use on high voltage systems such switch-fuses usually being iron-clad and operating under oil.

The primary object of the present invention is the construction of a simple and cheap form of switch-fuse having convenient and safe means for isolating a protected circuit and for the efficient earthing of any of the contacts when that is desirable, and suitable generally for use out-of-doors for instance outside a consumer's premises.

A switch-fuse according to this invention comprises a box-like metal casing adapted to contain oil and carrying, in a well known way, a detachable fuse on the inside of the lid. In the body of the box are the fixed switch contacts and terminals for incoming and outgoing cables which enter and leave through suitable insulators or sealing boxes. In combination with the lid which, as hereinafter described can open to give access to the fuse at a safe distance from the fixed contacts, is an earthing connection so arranged that when the lid is open the earthing connection can be adjusted so that on closing the lid a selected contact or terminal in the box is efficiently earthed. This earthing connection may be flexible and provided at one end with a plug fitting into a socket on the inside of the lid and at the other end with a member which can fit into or be attached to one of the fuse carriers. Or again the earthing connection may take the form of a metal strip or lug adjustably secured as by a screw stud to the inside of the lid and so shaped that when the lid is closed the end of the strip or lug makes earthing connection with a selected fixed contact or terminal.

The box is normally fixed on standards or brackets in a horizontal position and its lid is provided with a counter-weight or spring so that it opens automatically to give a quick break when a retaining catch is released. This catch is conveniently operated by a lever having one or more projections or lugs which, when the lever is moved to release the catch, exert pressure on the underside of the lid to overcome the friction caused by the grip of the switch contacts and thus assist the initial stages of the opening movement of the lid.

The lid is preferably arranged so that it can swing right back away from the box so that the fuse or fuses carried by it are easily accessible without any danger of accidental handling of or contact with the live contacts inside the box. Thus the fuses can be removed and replaced and the earthing connection adjusted in safety.

The lid of the box may have a recess or groove round its inner edge with a packing or gasket to make a watertight and weatherproof connection with the edge of the body of the box and the retaining catch and its lever may be so constructed that pressure is exerted on the lid to keep it tightly closed. The bottom of the box may be provided with a drain plug or sump for the withdrawal of the oil.

The contacts and terminals within the box will vary according to the particular circumstances in which the switch-fuse is to be used. For instance in a simple form the box would be provided with a leading-in or sealing chamber for a three-phase cable and arranged so that each phase conductor is connected through a switch-fuse to one of three cables leading out from the box. Again arrangements may be made for the incoming connections in the box to be connected as a loop on a main cable. When rather more elaborate distributing arrangements are required several boxes may be grouped together as a kind of sub-station unit with appropriate arrangements for the incoming and outgoing cables and for connections between one box and the other.

In the accompanying drawings,

Figure 1 is an elevation partly in section on the line 1—1 of Figure 2 of one construction of switch-fuse according to this invention,

Figure 2 is a central transverse section with portions in elevation, and

Figure 3 is a perspective view of an alternative form of earthing connection.

The box or casing A is in the example illustrated provided with a leading-in or sealing chamber B for a three-phase cable.

Within the box are three sets of fixed contacts C and D the contacts C being connected severally to the phase conductors of the cable entering through the box B and the contacts D being connected to separate outgoing cables passing through boxes B'. Each pair of contacts C D is intended to receive the ends of a switch-fuse E mounted on insulators F carried on the underside of the lid A' of the box.

The lid is hinged or pivoted as at A^2 (Figure 2) and is provided with counterweights A^3 which tend to open the lid automatically. The lid A' is provided with packing or a gasket as at G and is normally held down tightly on the edge of the box A by a retaining catch H mounted on a spindle H' rotatable in brackets H^2 on the front of the box. At the ends of the spindle H' are lugs or projections J which when the spindle H' is rocked to release the catch H from engagement with the lid A', exert an upward pressure against the flange of the lid on each side and assist the initial opening movement of the lid. The rocking of the spindle H' for these purposes can be brought about by means of an arm H^3 which can be pulled down say by means of a hook. Each of the lugs J is provided with a spring J' which tends to keep the spindle H' and the parts mounted on it in the positions indicated in Figures 1 and 2.

In order that any desired contact in the box may be earthed a connection K (Figure 2) is provided having at one end a plug K' which can be inserted in a socket A^4 in the lid A' and at the other end a block or contact piece K^2 similar in shape to the end of the fuse normally carreed by the insulators F. In the example illustrated the fuses are normally held in place by fly nuts L and when it is desired to earth any particular terminal C or D the fuse which normally connects that terminal with its fellow is taken out and the block K^2 of the earthing connection fixed in the place normally occupied by one of the fuse end blocks on an insulator F. Thus when the lid is closed the desired terminal C or D is earthed effectually by the block K^2 entering it. In Figures 1 and 2 only one earthing connection and socket are shown but it will be understood that there may be a separate earthing connection for each switch-fuse.

Instead of the flexible earthing connection K, K', K^2, a metal strip or lug K^3 having a contact block K^4 secured to or integral with it as shown in Figure 3, may be employed. This is adjustably secured by a nut or stud as shown at M to the inside of the lid A' and the block K^4 is so shaped that when the lid is closed after removal of the fuse and adjustment of the earthing connection, good earthing contact is made with the selected contact C or D which is entered by the block K^4.

When there are two or more fuses in a box and earthing connections of the type shown in Figure 3 are used, there may be a separate earthing connection for each pair of terminals C and D.

At the bottom of the box A a sump or drain cock A^5 is provided.

As will be seen from the drawings the counterweights A^3 are placed outside the box so that the lid may be swung right back when the fuses have to be inspected or replaced or arrangements made for earthing the fixed contacts.

It is to be understood that the details of construction are merely given by way of example and may be varied without departing from the spirit of this invention. For instance the function of the counterweights A^3 might be fulfilled by a spring.

What I claim as my invention and desire to secure by Letters Patent is:—

1. In a switch-fuse the combination of a box, a lid to said box, a fuse removably carried on the inside of said lid, contacts in the box so disposed that the fuse normally makes connection with them when the lid is closed, and an earthing connection adapted to be so disposed on the inside of the lid when it is open that when the lid is closed a selected contact in the box is earthed.

2. In a switch-fuse the combination of a box, a lid to said box, insulated carriers for a fuse mounted on the inside of said lid, a fuse removably mounted in said carriers, contacts in the box cooperating with the fuse, and a flexible earthing connection adapted to connect the lid and a fuse carrier after the fuse has been removed so that when the lid is closed a selected contact or terminal in the box is earthed.

In testimony whereof I have signed my name to this specification.

RICHARD WALTER GREGORY.