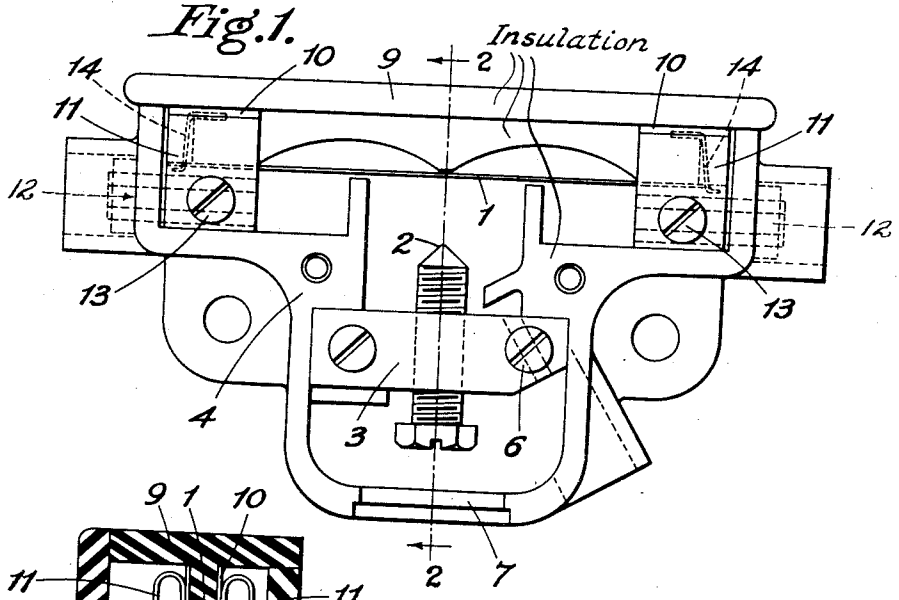
Nov. 16, 1937. E. A. SANDERS 2,099,500

SAFETY FUSE

Filed Feb. 24, 1936

Fig.1.



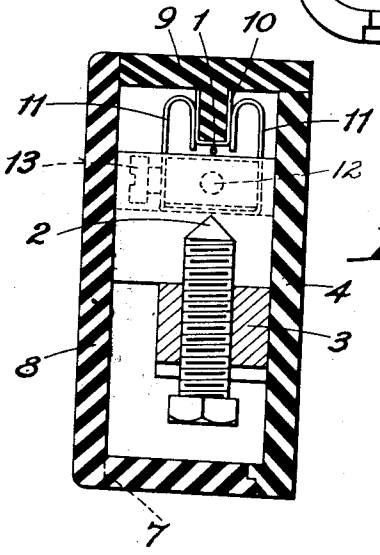
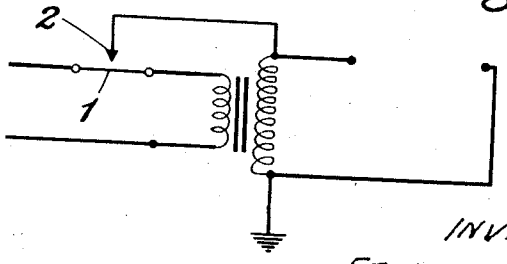


Fig.2.

Fig.3.



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SAFETY FUSE

Edward Albert Sanders, Bath, England

Application February 24, 1936, Serial No. 65,517
In Great Britain May 15, 1935

2 Claims. (Cl. 200—117)

This invention relates to a protective device for electric transformers, more especially, but not exclusively, for transformers supplying neon tube from electricity supplies.

The object of the invention is to provide a simple protective device which will operate automatically upon interruption of the secondary circuit of a transformer to open the primary circuit thereof.

According to the invention, the rise of voltage produced across the secondary winding of a transformer when an interruption of the secondary circuit occurs is utilized to operate a circuit breaking device connected in the primary circuit, and thereby to disconnect the primary circuit from the power supply.

The circuit breaking device takes the form of a fusible element connected in the primary circuit, the secondary winding of the transformer being connected to an electrode disposed near to the fusible element, the gap between the electrode and fusible element being so adjusted that an arc is produced when the secondary circuit is interrupted. The production of this arc results in rupture of the fusible element, whereby the transformer is automatically disconnected from the power supply.

An example of the invention is illustrated in the accompanying drawing in which:—

Figure 1 is a front elevation of the protective device proper, the front cover being removed to show the interior,

Figure 2 is a section on the line 2—2 of Figure 1, and

Figure 3 is a diagram showing the connection between the protective device and the transformer to be protected.

The protective device consists essentially of a fusible element shown at 1 in the drawing and an electrode, shown at 2, enclosed in the casing of the fusible element and arranged so that the electrode 2 is normally insulated from the fusible element 1 but so that a spark or arc can jump across the gap between the electrode and the fusible element when potential difference between these parts reaches a certain value.

As shown in the drawing, the electrode 2 takes the form of a pin or bolt screwed through a tapped hole in a metal block 3 fixed in the casing 4 through which a connecting wire can be introduced into the casing to be connected to the block by means of a binding screw 6. The electrode 2 is coned or pointed as shown at the end adjacent the fusible element 1 and the gap between the fusible element and this coned or pointed end can be adjusted by rotating the electrode 2. To facilitate this adjustment, the wall of the casing is cut away as shown at 7 so that when the cover part 8 of the casing is removed a screw driver or other suitable tool can be applied to the electrode 2 for the purpose of adjusting the same.

The fusible element 1 is carried by a member 9 which can be detached from the casing 4 to facilitate renewal of the fusible element. Two contact plates 10 fixed to the ends of the member 9 are arranged so that, when the member 9 is inserted into the space provided for it in the casing 4, each of the contact plates 10 engages in a spring contact plate 11 fixed to the casing 4. Openings 12 are provided in the casing 4 to receive connecting wires for the spring contact plates 11 which are provided with suitable binding screws 13 for attaching the ends of the connecting wires to the plates 11.

The fusible element may consist of a length of tin or copper wire or any usual fuse wire. In order to tension this fuse wire and hold it straight, light springy metal arms 14, which may be made of wire, are fixed to the ends of the member 9 adjacent the contact plates 10. The ends of the fuse wires are passed round the free ends of the arms 14 and attached to the plates 10 by clips, screws or any suitable means (not shown), the wire being drawn tight enough to strain the arms 14 so that the wire is held in tension by the arms.

As shown in Figure 3, the fusible element 1 is connected in circuit with the primary winding of the transformer. The electrode 2 is connected to one end of the secondary winding of the transformer and if desired a return connection may be provided between the opposite end of the secondary winding and a convenient point in the primary circuit. If the primary and secondary windings are earthed or if the transformer is an auto-transformer no special return connection will be required.

The gap between the electrode 2 and the fusible element 1 is adjusted so that when the secondary circuit is interrupted, the rise of voltage produced in the windings of the transformer causes an arc to be produced between the electrode and the fusible element 1. The production of this arc results in rupture of the fusible element, whereby the transformer is automatically disconnected from the power supply. The invention is particularly intended to be applied to transformers supplying high tension apparatus from relatively low voltage power mains. It may, however, be

applied to power transmissions and other transformers in any system in which isolation of the transformer upon interruption of the secondary circuit is desirable. Obviously the fusible element 1 will fuse when the primary current becomes excessive and can thus be arranged to isolate the transformer automatically in the event of a short circuit.

I claim:—

1. A protective device for a transformer having a primary circuit and a secondary circuit, said device comprising a casing of insulating material open at one side, a pair of spaced apart spring contact clips fastened within said casing for connection in the secondary circuit of the transformer, a removable cover for the open side of said casing, a rib extending inwardly from said cover, spaced contacts carried by said rib and cooperating with the spring contacts within the casing to hold the cover normally closed, a pair of spring arms carried by said rib, a fusible element extending between said spring arms and maintained tensioned and in contact with said rib carried contacts by said arms, and an electrode mounted within said casing in spaced relationship to said fusible element and for connection with the primary circuit of the transformer.

2. A protective device for a transformer having a primary circuit and a secondary circuit, said device comprising a casing of insulating material having an open side, a pair of spaced apart contacts within said casing for connection in the secondary circuit of the transformer, a removable cover for the open side of said casing, a pair of contacts carried by said cover and engaging said first mentioned contacts, respectively, a fusible element extending between said cover carried contacts, spring means carried by the cover maintaining said fusible element tensioned and in engagement with said cover carried contact, and an electrode within the casing for connection with the primary circuit of the transformer, said electrode being disposed in spaced relationship to said fusible element.

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