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J. F. KAIN ET AL

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TERMINAL ENCLOSURE

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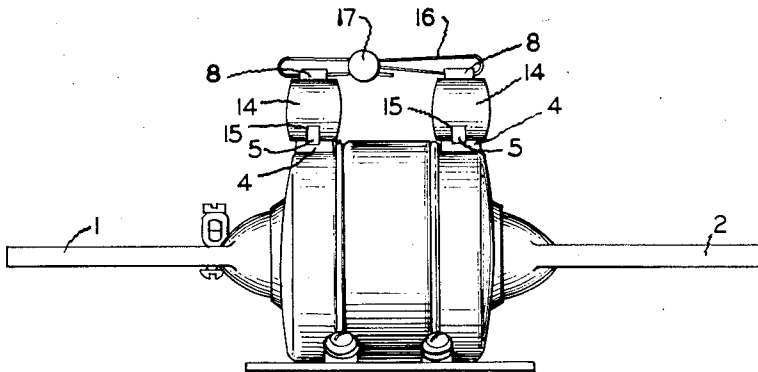


Fig. 1

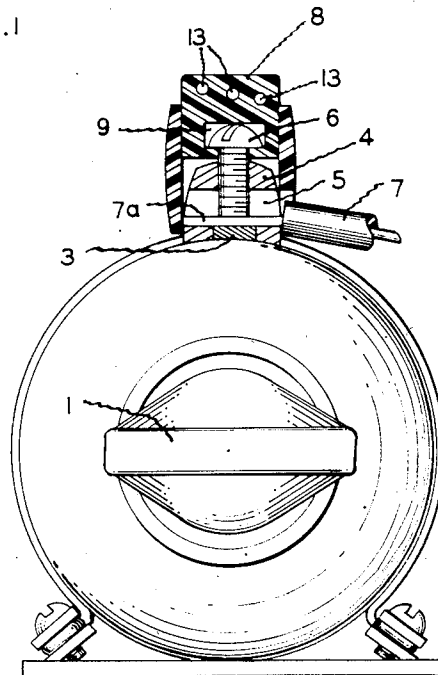


Fig. 2

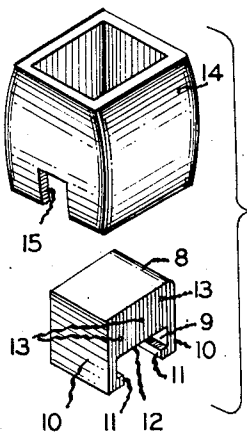


Fig. 3

Inventors:

John F. Kain
Carl W. Pinkham

by *Richard E. Horley*
Their Attorney

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John F. Kain, Marblehead, and Carl W. Pinkham, Reading, Mass., assignors to General Electric Company, a corporation of New York

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5 Claims. (Cl. 174-138)

This invention relates to instrument transformers and has particular application to terminal enclosures therefor.

As is well known, it has long been a practice to provide terminal enclosure means for instrument transformers, particularly current transformers, in order to prevent unauthorized access to the transformer terminals. Enclosure means for instrument transformer terminals are desirable not only from the standpoint of preventing tampering with the electrical connections but also for safety considerations since such enclosure means serve also to minimize the possibility of an inadvertent touching of the terminals.

In the past, such enclosure means have generally comprised a single member formed of an insulating material and adapted to enclose both of the secondary terminals of the transformer. In order to enclose both of the secondary terminals, such a single enclosure member must be relatively bulky and, in the case of the smaller transformers, the enclosure device leaves little, and in some cases insufficient, space on the transformer casing for the listing of certain critical information such as ratings and the like.

On the other hand, in the case of the larger transformers where the terminals are in many cases relatively far apart, the single enclosing piece tends to be bulky and complicated and involves an appreciable waste of insulating material.

In view of the foregoing and other considerations, it is one object of this invention to provide an improved terminal enclosure arrangement for an instrument transformer, which improved arrangement permits separate enclosure means to be employed for each of the transformer terminals.

It is another object of this invention to provide an improved low cost terminal enclosure for a terminal of an instrument transformer which improved enclosure is of rugged construction and simple to assemble and disassemble.

Briefly described, this invention contemplates, in accordance with one embodiment thereof, the provision of an insulating member which may be referred to as a terminal cap, having an aperture therein adapted to fit over the head of the terminal screw on one of the transformer terminals. Extending along the opposite sides of the aperture are a pair of inwardly extending portions, which may be in the form of runners and which are adapted to extend beneath and engage the underside of the terminal screw. An electrically insulating sleeve is provided and is formed so as to be slipped over the first member so that a portion of the first member protrudes through the open end of the sleeve.

A series of apertures is provided on that portion of the terminal cap which protrudes from the sleeve so that a wire may be passed through one of the apertures and provided with a coded seal to prevent disassembly as will be hereinafter described. The advantages derived from the provision of a plurality of apertures in the cap member will also be set forth in more detail in the following description.

Other objects and advantages of this invention will be

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apparent from the following description taken in connection with the accompanying drawing, and its scope will be pointed out in the appended claims.

Referring to the drawing, Fig. 1 is a side view of a current transformer embodying this invention; Fig. 2 is an enlarged end view of the transformer of Fig. 1 showing one of the terminal enclosures in cross section; while Fig. 3 is an exploded view of the terminal enclosure arrangement shown in the assembled view of Figs. 1 and 2.

Referring now to Figs. 1 and 2, there is shown a current transformer having primary terminals 1 and 2 adapted to be connected in series with a current to be measured. The secondary terminals 3, shown in Fig. 2, are embedded in a pair of insulating terminal posts 4 and are accessible for connection purposes through a pair of apertures 5. A pair of terminal screws 6 are threaded into the posts 4 as shown in Figs. 1 and 2 and after insertion of terminal leads 7 as shown in Fig. 2, the screws are tightened down on the uninsulated portion 7a thereof to firmly secure the leads in place.

Referring now to the terminal enclosure means of this invention as embodied in one form thereof in the transformer illustrated in the drawing, there is provided for each terminal a first enclosure member 8, which may be described as a cap and which is formed of any suitable insulating material such as, for instance, a molded plastic. As shown in Figs. 2 and 3, the cap 8 is provided with a recessed or channel shaped portion 9 which, in forming a pair of walls 10, results in a substantially U-shape.

Running along opposite sides of the recess 9 are a pair of inwardly extending portions 11 which are adapted to extend beneath and engage the underside of the terminal screws 6 as shown in Fig. 2. The inwardly extending portions 11 may be conveniently formed as runners as shown in the drawing or they may be formed in any other suitable shape so long as they are capable of extending beneath the heads of the terminal screws 6 so as to prevent withdrawal of the cap 8 along the axis of the screw. The spacing between the inwardly extending portions 11 and the top surface 12 of the channel 9 is such that a fairly snug fit is obtained along this dimension with the head of the terminal screw, as will be apparent from the illustration of Fig. 2. A series of apertures 13 are provided in the cap 8 as shown in Figs. 2 and 3, the purpose of which will be herein-after set forth.

A sleeve or substantially tubularly shaped member 14, which is best seen in the exploded view of Fig. 3, is formed of an insulating material, such as a moldable plastic, and is shaped so as to fit over the cap 8 as shown in Figs. 1 and 2. In the present embodiment, the sleeve 14 is substantially rectangular in cross section in order to conform to the cross sectional shape of the cap 8 but it will be understood that the cross sectional shape of both the cap 8 and the sleeve 14 may be varied from that shown without departing from the basic concept of this invention.

The terminal enclosure arrangement illustrated would be assembled under normal circumstances by first bringing the cap 8 into engagement with one of the terminal screws 6 in the manner illustrated in Fig. 2 after the screw had been tightened down to secure the lead 7 in place. The tubular member or sleeve 14 is then slipped over the cap 8 and forced down into engagement with the sloping surfaces of the terminal post 4 such that the upper portion of the cap 8 protrudes through the sleeve as shown. The sleeve 14 is provided with a slot 15 therein in order to permit the terminal lead 7 to pass therethrough.

The dimensioning of the elements is such that a portion of the cap 8 protrudes from the sleeve 14 as shown in Figs. 1 and 2, the amount by which the cap protrudes depending upon the thickness of the lead terminal 7a which in turn determines the ultimate position of the terminal screw 6. Since the cap 8 may protrude by varying amounts depending upon the thickness of the lead terminals, the apertures 13 are graduated to correspond to different amounts of protrusion so as to permit a wire 16 to be slipped through the aperture which is closest to the top of the sleeve 14, thus providing a snug fit and minimizing longitudinal movement of the sleeve.

The wire 16 is passed through one aperture in each of the caps 8 on the two terminals as shown in Fig. 1 and then looped back through a lead sealing member 17 which is flattened out and impressed with a seal by means of a special pliers or similar tool. Thus access can not be gained to either of the terminals without first breaking the seal 17 and removing the wire 16. It will be seen that with the terminal enclosures in place as shown, all of the uninsulated portions of the terminals and corresponding leads 7 are completely covered and thus made inaccessible except upon removal of the respective enclosing assemblies.

As has already been pointed out, the cap 8 and the sleeve 14 may be modified in shape from the particular elements shown so long as the cap 8 is provided with a cavity adapted to slip laterally over a flange such as the head of a screw together with inwardly extending portions for engaging the underside of the flange or screw head, and the hollow sleeve is formed such that it can be slipped over the cap in telescoping relationship thereto. It will be realized that flange means other than the head of a terminal screw may be provided as a part of the terminal structure although normally this would be considered less desirable where a flanged fastener, such as a screw, is available as part of the terminal assembly.

What we claim as new and desire to secure by Letters Patent of the United States is:

1. Terminal enclosure means comprising a first enclosure member of insulating material having a recess therein adapted to fit over a flange member on said terminal, inwardly extending portions on the opposite sides of said recess positioned so as to extend beneath said flange member when said recess is brought into engagement therewith and thereby prevent withdrawal of said first member transversely to said flange, a second enclosure member having an aperture extending therethrough so as to permit said second member to be moved over said first member into telescoping relationship therewith in a manner such that removal of said first member by withdrawal of said inwardly extending portions from beneath said flange member is prevented, and means for limiting relative movement between said first and second members in a direction transverse to said flange and thereby secure said second member from removal from telescoping relationship with said first member.

2. Terminal enclosure means comprising an insulating cap having a recess therein adapted to receive the flange portion of a flanged fastener, inwardly extending portions on the opposite sides of said recess positioned so as to extend beneath and engage the underside of the flange portion of said fastener and thereby prevent the withdrawal of said cap along the axis of said fastener, a sleeve member of insulating material formed so as to fit over said cap in telescoping relationship thereto such that a portion of said cap protrudes from said sleeve and removal of said cap by withdrawal of said inwardly extending portions from engagement with the underside of said flange portion is prevented, and means engageable with said protruding portion of said cap and said sleeve for securing said sleeve against withdrawal from telescoping relationship with said cap.

3. Terminal enclosure means for an instrument transformer comprising an insulating cap having a recess adapted to receive a flanged portion of a flanged fastener, said recess being open on at least one side thereof to permit engagement of said recess with said flanged portion by movement of said cap in a direction substantially perpendicular to the axis of said fastener, inwardly extending portions on opposite sides of said recess positioned so as to extend beneath and engage the underside of said flanged portion when said recess is moved into engagement therewith and thereby prevent withdrawal of said cap along the axis of said fastener, a sleeve member of electrically insulating material adapted to fit over said cap in telescoping relationship thereto so as to close said one side of said recess to prevent removal of said flanged portion from said recess by movement of said cap in a direction perpendicular to the axis of said fastener and permit a portion of said cap to protrude therefrom, and at least one aperture extending through the protruding portion of said cap transversely to said sleeve and adapted to receive a wire for preventing removal of said sleeve from said cap.

4. Terminal enclosure means for an instrument transformer comprising an electrically insulating cap having a channel portion extending transversely therethrough and adapted to fit over the flange portion of a flanged fastener, inwardly extending portions running along opposite sides of said channel and positioned to engage the underside of said flange portion when said channel portion is moved laterally into engagement therewith, said inwardly extending portions being thereby capable of preventing withdrawal of said cap along the axis of said fastener, a sleeve member of electrically insulating material adapted to fit over said cap in telescoping relationship thereto so as to close the ends of said channel portion to prevent removal of said flange portion from said channel by movement of said cap laterally and permit a portion of said cap to protrude from the end thereof, and at least one aperture extending through the protruding portion of said cap transversely to said sleeve and adapted to receive a wire for preventing removal of said sleeve from said cap.

5. In a current transformer of the type having secondary terminals including terminal screws for securing electrical leads thereto, a terminal enclosure adapted to be secured separately to one of said terminals, said enclosure comprising an electrically insulating cap having a channel extending transversely therethrough and adapted to receive the head portion of a terminal screw, inwardly extending runners positioned along opposite sides of said channel and running longitudinally therewith so as to be engageable with the underside of the head portion of a terminal screw when said channel portion is moved laterally into engagement therewith, said inwardly extending runners being thereby capable of preventing withdrawal of said cap along the axis of said terminal screw, a sleeve member of electrically insulating material adapted to fit over said cap in telescoping relationship thereto so as to close the ends of said channel to prevent removal of said head portion of said screw from said channel by movement of said cap laterally and allow a portion of said cap to protrude from the end thereof, a plurality of apertures extending through said cap transversely to said sleeve, said apertures being positioned so as to correspond to different levels of protrusion of said cap from said sleeve, whereby a wire may be passed through the one of said apertures in the protruding portion of said cap next adjacent the end of said sleeve to secure said sleeve against removal from said cap.

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