

# United States Patent

III 3,582,852

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|------|-----------|---------------------------------------------------------------------------------|
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| [21] | Appl. No. | <b>013,314</b>                                                                  |
| [22] | Filed     | <b>Feb. 24, 1970</b>                                                            |
| [45] | Patented  | <b>June 1, 1971</b>                                                             |
| [73] | Assignee  | <b>General Electric Company</b>                                                 |

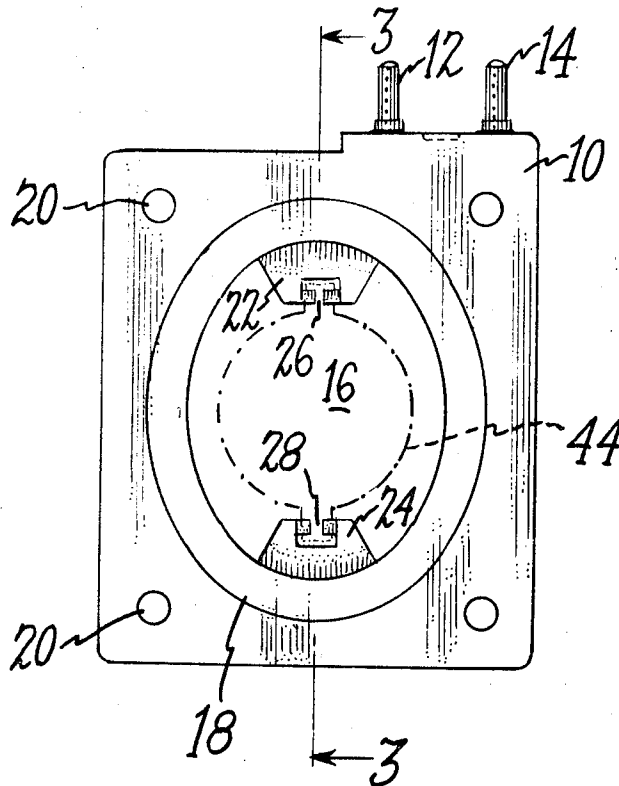
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|           | <b>UNITED STATES PATENTS</b> |                      |          |
| 3,205,386 | 9/1965                       | Henschke et al. .... | 336/198X |
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| 234,833   | 7/1964                       | Austria .....        | 336/198  |
| 59,864    | 1/1968                       | Germany .....        | 336/208  |
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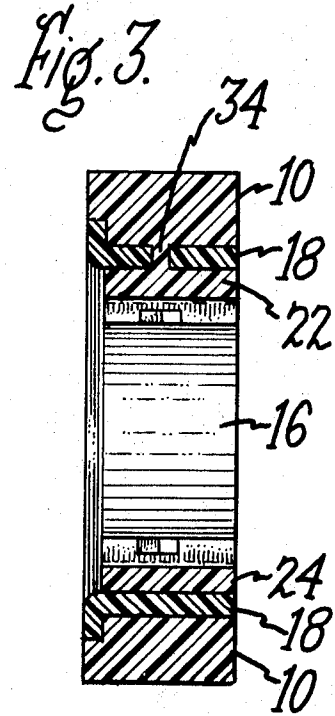
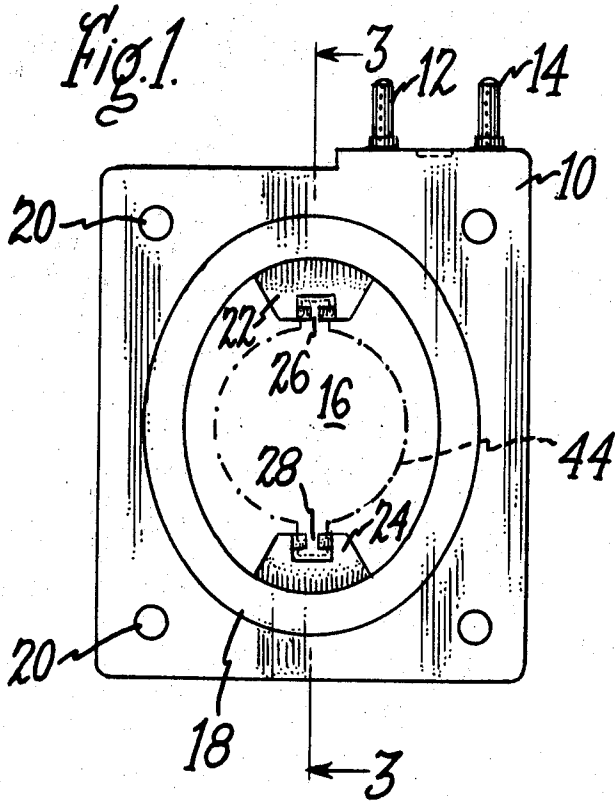
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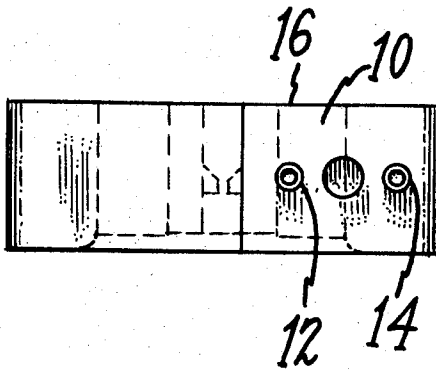
- [54] WINDOW-TYPE CURRENT TRANSFORMER  
HAVING MEANS FOR MOUNTING ON A PRIMARY  
BAR**  
**5 Claims, 6 Drawing Figs.**
- [52] U.S. Cl..... 336/174,  
336/208**
- [51] Int. Cl..... H01f 27/30,  
H01f 40/06**
- [50] Field of Search..... 336/198,  
208, 173, 174, 175; 174/157, 171**

**ABSTRACT:** A window-type current transformer in which a pair of plastic locating members are molded in the window opening and have channels to receive and hold a rectangular primary conductor. The plastic locating members are especially adapted to fit the secondary bushing blades of pad mounted transformers. The plastic members may be removed so that the current transformer may be used with other primary conductors, such as insulated cables.

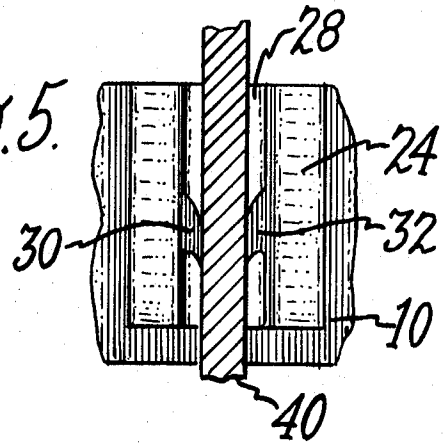




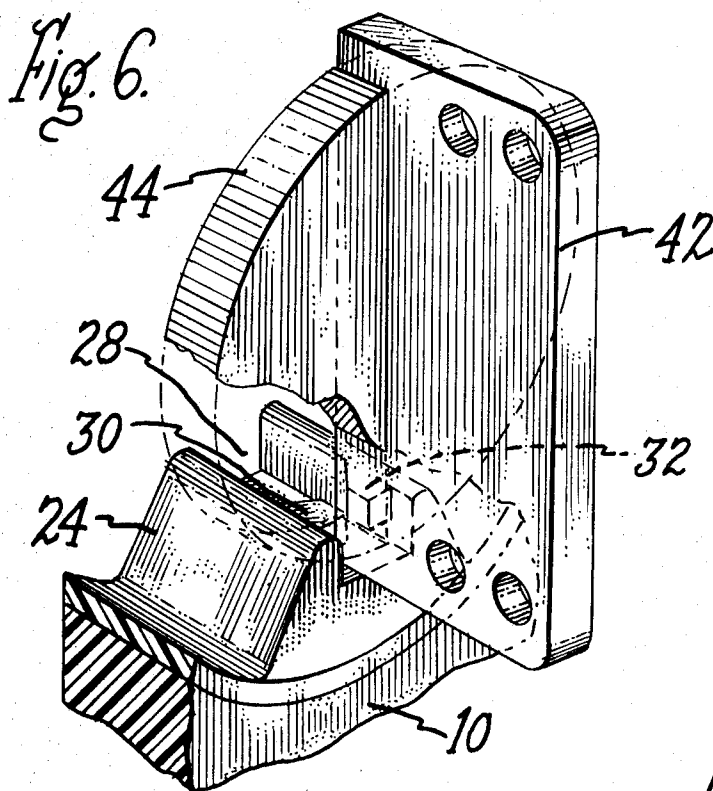
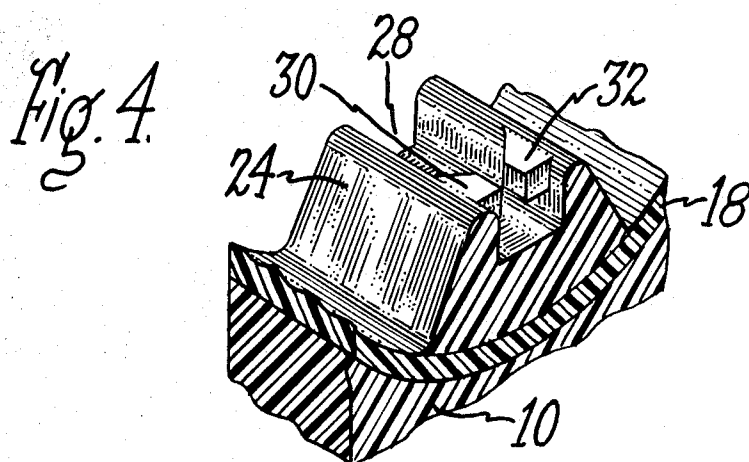
*Fig. 2.*



*Fig. 5.*



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# WINDOW-TYPE CURRENT TRANSFORMER HAVING MEANS FOR MOUNTING ON A PRIMARY BAR

## BACKGROUND OF THE INVENTION

This invention relates to window-type current transformers and more particularly to window-type current transformers having means in the window to mount the current transformer on a primary bar passing through the window opening.

As is well known to those skilled in the current transformer field, current transformers designed to operate with one primary turn are usually of two types, either a window-type transformer or a primary bar transformer. In the window-type construction, no primary is supplied by the manufacturer. A line conductor which passes through the window opening of the transformer serves as the primary. In the bar-type current transformers, a primary bar is included and mounted in the window of the current transformer. In normal practice, this primary bar is connected to energized conductors.

As is well understood, current transformers are used to transform large line current to relatively small currents which can then be metered in standard metering equipment, for measuring the current in the line. The particular type of current transformer used will depend on the type of installation to which it is to be connected. When a bar-type transformer is used, it is normally necessary to properly orient the bar to the various primary connections of the particular installation. This often requires the placement of the transformer at angles to the actual position of the mounting plate, which is normally provided with the bar-type current transformer. A removable bar for current transformers has been proposed, as is set forth in U.S. Pat. No. 3,264,591. This allows for use of the transformer either as a window-type or as a bar-type and further allows any desired orientation of the bar with respect to the primary connections.

While the transformer disclosed in U.S. Pat. No. 3,264,591 has proved very effective in meeting the needs of the industry, it has not solved all of window-type, bar-type problems found in the current transformer field. Often it is desired to mount a current transformer directly on the secondary of distribution transformers, for example, pad mounted distribution transformers or subsurface distribution transformers. If a bar-type current transformer is used, it is necessary to connect the primary bar to the secondary blade of the transformer. Of course, when a three-phase system is used, it is necessary to connect a current transformer to the secondary blade of each phase. When a window-type current transformer is used, it is necessary to provide some type of mounting means to secure the current transformer in place on the transformer over the secondary bushing or terminal blade. There is presently a need to provide a window-type current transformer which can be mounted on a secondary bushing or blade of a distribution transformer and securely held in place without external mounting means.

It is, therefore, one object of this invention to provide a window-type current transformer that may be readily secured to the secondary bushing or blade of a distribution transformer without external mounting means.

A further object of this invention is to provide a window-type current transformer that has securing means in the window opening of the current transformer for securing such transformer to a secondary bushing or blade of a distribution transformer.

A still further object of this invention is to provide a window-type current transformer in which insulated members are provided in the window opening and incorporate means to secure or locate the current transformer on a rectangular conductor.

## SUMMARY OF THE INVENTION

Briefly, in one form, this invention comprises a window-type current transformer in which a pair of insulated members are provided on diametrically opposite sides of the window opening. The insulated members are provided with means to locate

or secure the current transformer in a desired position on a rectangular conductor.

The invention which is sought to be protected will be particularly pointed out and distinctly claimed in the claims appended hereto. However, it is believed that this invention and the manner in which its various objects and advantages are obtained as well as other objects and advantages thereof will be more clearly understood by reference to the following detailed description of a preferred embodiment thereof, particularly when considered in the light of the accompanying drawing.

## BRIEF DESCRIPTION OF DRAWING

FIG. 1 is a front view of a window-type current transformer according to a preferred embodiment of this invention;

FIG. 2 is a top view of the current transformer of FIG. 1;

FIG. 3 is a sectional view taken on the line 3-3 of FIG. 1 and showing in a portion thereof a second embodiment of the invention;

FIG. 4 is a fragmentary, perspective, sectional view on an enlarged scale, of a portion of the current transformer showing a preferred form of this invention in greater detail;

FIG. 5 is a fragmentary view showing a rectangular conductor in the window opening secured thereto according to the preferred embodiment of this invention; and

FIG. 6 is a fragmentary, perspective, sectional view, on an enlarged scale, similar to FIG. 4, showing the current transformer mounted on a secondary blade of a distribution transformer.

## DESCRIPTION OF PREFERRED EMBODIMENT

This invention in a preferred form comprises a window-type current transformer having means in the window opening to secure or position the current transformer on a rectangular conductor. As is shown in the drawing, the current transformer comprises a body or casing 10 molded of a plastic insulation material, such as, for example, Butyl. Within body 10 is the usual core and secondary winding (not shown), the secondary being connected to secondary terminals 12 and 14 as is well understood. A window opening 16 is provided for receiving a primary conductor. In the preferred form shown, a hard plastic tube 18, such as nylon or the like, is provided in the window opening. Also shown in FIG. 1 are a plurality of mounting holes 20 which may be used to mount the transformer in any desired manner as is well understood by those skilled in this art.

The securing means according to the preferred form of this invention are shown in FIG. 1 as a pair of insulating members 22 and 24 which are provided at diametrically opposite sides of the window opening 16. Insulated members 22 and 24 are molded or otherwise produced of a plastic insulating material, for example, the Butyl material used to mold body 10. The members 22 and 24 are preferably wedge-shaped, as shown, and have slots or channels 26 and 28, respectively, at the free or apex end of the wedge, running the entire length of the securing members 22 and 24.

The preferred form of securing means is best shown in FIG. 4, which is a fragmentary perspective view of insulated securing member 24. As there shown, securing member 24 extends substantially the entire length of window 16 and is bonded to plastic tube 18. The channel 28 at the apex of securing member 24 extends the entire length of member 24. In order to axially position the transformer on a rectangular conductor, a pair of teeth or projections 30,32 are molded in the channel 28 on opposite sidewalls as shown. In the preferred form shown, the teeth or projections 30,32 have a flat edge on one side substantially perpendicular to the wall of channel 28 and a sloping edge on the other side making an oblique angle with the wall of channel 28. As will be understood, when the projections 30,32 are of flexible material, a rectangular conductor, such as rectangular conductor 40 shown in FIG. 5, inserted into channel 28 will cause the teeth 30,32 to flex towards the sidewalls of channel 28, as shown, thus securely

gripping the conductor 40 therebetween. As will of course be obvious to those skilled in the art, the current transformer may be readily placed over the secondary bushing of a distribution transformer and the blade of the secondary bushing will readily fit within channels 26,28 of securing members 22,24 and will be locked therein by use of teeth 30,32. In this manner, the current transformer of this invention may be readily mounted on the secondary bushing of a distribution transformer without the need of any external securing means.

FIG. 6 is a fragmentary, sectional view showing the current transformer mounted on the secondary blade of a distribution transformer. As shown in FIG. 6, the secondary blade 42 of a distribution transformer (not shown) has a cylindrical portion 44, which is secured to the distribution transformer in any well-known manner. Cylindrical portion 44 is smaller in diameter than window opening 16, as indicated by phantom lines in FIG. 1. The blade 42 slides through slots or channels 26,28 as shown by channel 28 in FIG. 6. In the embodiment shown in FIG. 6, the blade 42 passes almost completely through channel 28, allowing teeth or projections 30,32 to close behind blade 42, preventing the current transformer from moving forward, off the blade 42. Of course, as will be understood, the current transformer will rest against the face of the distribution transformer, when placed on blade 42 in the manner shown in FIG. 6.

In the preferred form of this invention, the insulated securing members 22,24 are bonded to the plastic tube 18. As will be understood, members 22,24 can be molded in place, molded separately, or otherwise produced, such as by casting, extruding, or the like. If it is desired to use the transformer with a round conductor, the securing members 22,24 may be readily removed, for example, by means of a blade, moved between the securing members 22,24 and the plastic tube 18. In another form, the securing members 22,24 may be molded at the same time as the body 10 by providing an opening, such as 34 in tube 18, (see FIG. 3) whereby the material of body 10 will flow through opening 34 to mold the securing members 22 and 24. Of course, the securing members in this form could still be readily removed, if desired.

While there has been shown and described the present preferred embodiment thereof, it will be readily understood by those skilled in the art that various changes may be made in the constructional details. For example, it will be apparent that it is not necessary that the tube 18 be provided and it will be readily apparent that the securing means 22,24 may be molded directly with body 10 without using an insulated hard tube therebetween, if desired. It will also be apparent that various shapes of teeth and the number of teeth may be altered as desired. In some constructions, the teeth or projections may be eliminated. It will be apparent to those skilled in the art that these and other constructional changes may be made without departing from the spirit and scope of this invention.

What we claim as new and which it is desired to secure by Letters Patent of United States is:

1. A window-type current transformer having securing means in the window opening comprising:

- a current transformer having a window opening therein;
- a pair of insulated members bonded to diametrically opposite sides of said window opening;
- each of said insulated members having a channel therein extending parallel to the axis of said window opening.

2. A window-type current transformer as claimed in claim 1 in which said insulated members are substantially wedge-shaped and said channels are formed in the apex of said wedge-shaped members.

3. A window-type current transformer as claimed in claim 1 in which teeth are formed in said channels.

4. A window-type current transformer as claimed in claim 3 in which said teeth are formed on opposite sidewalls of each of said channels, said teeth being formed with one edge perpendicular to said channel walls and another edge sloped to form an obtuse angle with said channel walls.

5. A window-type current transformer as claimed in claim 1 in which a hard plastic tube is mounted in the window opening and said pair of insulated members are bonded to said plastic tube.

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