

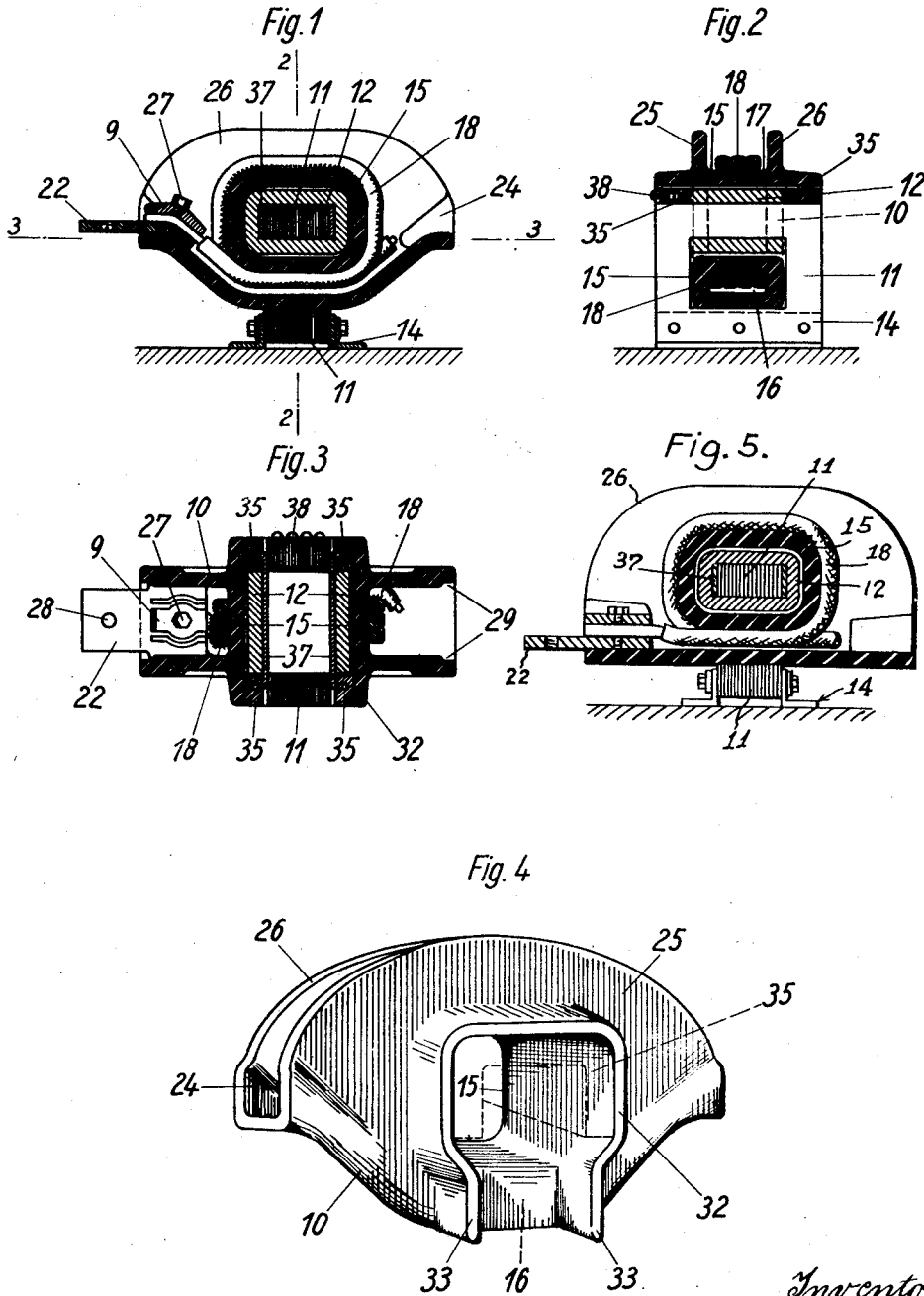
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H. KLEMM

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CURRENT TRANSFORMER

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Inventor:
Hans Klemm
by Huichattin
Atty.

UNITED STATES PATENT OFFICE

HANS KLEMM, OF DRESDEN, GERMANY, ASSIGNOR TO THE FIRM KOCH & STERZEL
AKTIENGESELLSCHAFT, OF DRESDEN, GERMANY

CURRENT TRANSFORMER

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My invention relates to current transformers of the type in which a tunnel or transverse passage is provided in the insulator casing which tunnel houses the secondary coil and the iron core, while the primary coil is wound on the outside of the tunnel.

It is an object of my invention to improve a transformer having an insulator of the kind described, with a view to reducing its cost and facilitating its manufacture.

To this end I so arrange the tunnel with respect to the casing of the insulator, that the primary coil is only partly concealed in the space between the tunnel and the casing, but otherwise exposed.

Heretofore insulators of the type referred to were designed with the casing surrounding the tunnel on all sides so that it was necessary to insert the ends of the primary coil through tubular extensions at either end of a double-ended transformer casing, or, in a pot-shaped transformer, through the neck of the casing. It will be understood that the winding of the primary coil is not quite an easy matter in the double-ended transformer and becomes rather difficult in the pot-shaped transformer in which the two parallel passages, which extend between either side of the tunnel and the walls of the casing, are connected by a third passage at right angles thereto between the lower wall of the tunnel and the bottom of the pot-shaped casing, and the primary coil must be threaded through the long neck of the pot and through the third passage. This complicated system of winding and, in addition, the complicated form of the insulator, particularly in the pot-shaped transformer, render the otherwise excellent transformers of this type rather expensive.

According to my invention this drawback is eliminated by the novel design of the transformer casing. The casing is designed like the lower part of a pot-shaped casing, with a passage for the reception of the primary coil between the bottom and the adjacent wall of the tunnel, but otherwise the casing is open and shaped like a channel so that the primary coil is exposed except in the passage, and is readily threaded through the passage.

This design also obviates the necessity of

making an opening in the iron core at either side of the tunnel for the primary coil in addition to the central opening. In the present instance the iron core requires only a central opening for the reception of the lower part of the primary coil.

Material is saved in the casing and in the transformer core as the core has one shank less than the usual shell core. The winding of the primary coil is facilitated as it requires threading through one passage only, and the cost of its manufacture is further reduced by the facilitated winding.

In the drawings affixed to this specification and forming part thereof a transformer embodying my invention is illustrated diagrammatically by way of example.

In the drawings

Fig. 1 is a section of the transformer at right angles to its coils,

Fig. 2 is a section on the line 2—2 in Fig. 1,

Fig. 3 is partly a plan view, and partly a section on the line 3—3 in Fig. 1,

Fig. 4 is a perspective illustration of the transformer casing, and

Fig. 5 is a section of a modified embodiment of a transformer similar to that shown in Fig. 1.

Referring now to the drawings, 10 is the casing of the insulator which is built up from a substantially trough-shaped bottom, two vertical flanges 25 and 26 extending upwardly from either side of the bottom, and a tunnel 15 extending transversely between the two flanges 25 and 26, with its lower wall and the bottom making up a passage for the reception of the primary coil. The walls of the tunnel are extended beyond the outer faces of either flange 25, 26 at 32, 32, for a purpose which will be described below. The extensions 32 are pitched apart for the width of the secondary coil 12. In this manner, a substantially rectangular passage 16 is formed in the casing between its bottom and the lower wall of the tunnel, but otherwise the walls of the tunnel are freely accessible.

11 is the iron transformer core which, as will appear from Fig. 2, is rectangular with a rectangular hole. The two horizontal shanks of the iron core extend in parallel

above the lower wall of the tunnel 15 and below the lower wall of the bottom of the casing 10, respectively. Its vertical shanks extend downwardly on the outer sides of the casing 10 and the extensions 32 of the tunnel are provided with vertical flanges 33, Fig. 4, which are pitched apart a shorter distance than the extensions 32, so as to hug the vertical shanks of the iron core.

11 is the iron core on which is wound the secondary coil 12 within the tunnel 15, and 18 is the primary coil which is wound on the outside of the tunnel 15. It will appear from Fig. 1 that the primary coil 18 is exposed throughout its length except for the short passage 16. The walls of the casing 10 adjacent the passage 16 are inclined so as to make up a sort of funnel at either side of the passage with the adjacent vertical walls of the tunnel 15 which facilitates the threading of the windings of the primary coil. Instead of being inclined at both ends as shown in Fig. 1, the bottom of the casing might be flat and extending throughout in parallel to the lower wall of the tunnel, as shown in Fig. 5. Whether the bottom is made inclined or flat, depends on the distance of the high-voltage parts of the transformer from ground.

22 is one of the connections for one end of the primary coil 18 and 24, 24 are grooves in the vertical flanges 25 and 26 of the casing 10 for the reception of the connections 22. 27 is a screw for securing the end of the coil to the connection, 9 being a presser plate or washer inserted below the head of the screw. It is obvious that the arrangement of the connections 22 is facilitated by providing a flat bottom as shown in Fig. 5. In any case, I may secure the connections reliably in the casing 10 without breaking through its walls for connecting screws. 28 is a hole in the connection 22 for a binding post, not shown, by which the transformer is connected to the system.

The connection 22 for the other end of the coil has been omitted in Fig. 1 in order to show one of the grooves 24.

As mentioned, the pitch of the vertical flanges 33, 33 is equal to the width of the vertical shanks of the iron core 11, while that of the upper extensions 32, 32 is equal to the width of the secondary coil 12. This coil, however, extends only as far as the gap between the vertical shanks of the iron core, and 35 are U-shaped shims which are inserted between the extensions 32 and the core so as to abut against the outer ends of the secondary coil 12, as best seen in Fig. 3. The position of one of the shims is indicated in dotted lines in Fig. 4. The shims are preferably made of insulating material. Their object is to hold the secondary coil 12 assembled against outwardly directed short-circuiting forces. Brackets 37 are inserted in slots in the inner faces of the shims 35

with their hooked ends. In this manner the shims and the windings of the secondary coil 12 are firmly held. One of the shims 35 supports the binding posts 38 for the secondary coil, as shown in Figs. 2 and 3.

A particular advantage of the present invention are the long creeping paths constituted by the long flanges 25, 26, the extension 32, 33 and the funnel-shaped or parallel interstices formed at the ends of the passage by the upwardly inclined or parallel ends of the bottom. In addition, the threading of the primary coil 18 about the tunnel 15 is much facilitated, as mentioned.

14 are angle sections secured to the lower end of the iron core 11 as shown in Fig. 14 for securing the transformer to any suitable bracket. When arranged as illustrated in Fig. 1, that is, with the open side of the casing 10 extending upwardly, it is preferable to place a hood, not shown, on the transformer as a protection against dust. When the insulator is suspended from a ceiling or the like such protection is not required.

The novel insulator is particularly suitable in connection with a switching plant in which it replaces a supporting insulator.

I wish it to be understood that I do not desire to be limited to the exact details of construction shown and described for obvious modifications will occur to a person skilled in the art.

In the claims affixed to this specification no selection of any particular modification of the invention is intended to the exclusion of other modifications thereof and the right to subsequently make claim to any modification not covered by these claims is expressly reserved.

I claim:—

1. A current transformer having a casing and a tunnel in said casing for the reception of the secondary coil and the iron core of said transformer, and for winding the primary coil on the outside of said tunnel, and a channel being formed by the lower wall of said tunnel and said casing and adapted to receive the lower portion of said primary coil.

2. A current transformer having a casing, said casing comprising a tunnel for the reception of the secondary coil and the iron core of said transformer and supporting its primary coil, a bottom portion extending in parallel to the lower wall of said tunnel, and a pair of flanges extending upwardly from said bottom portion and connected with the ends of said tunnel.

3. A current transformer having a casing, said casing comprising a tunnel for the reception of the secondary coil and the iron core of said transformer and for supporting its primary coil, a bottom portion extending in parallel to the lower wall of said tunnel and having upwardly inclined extensions at either end of said parallel portion, and a pair

of flanges extending upwardly from said bottom portion and connected with the ends of said tunnel.

said casing comprising a tunnel for the reception of the secondary coil and the iron core of said transformer and for supporting its primary coil, a bottom portion extending in parallel to the lower wall of said tunnel, and a pair of flanges extending upwardly from said bottom portion connected with the ends of said tunnel, and grooves for the reception of connections at the ends of said primary coil.

In testimony whereof I affix my signature.

HANS KLEMM.

4. A current transformer having a casing, said casing comprising a tunnel for the reception of the secondary coil and the iron core of said transformer and for supporting its primary coil, a bottom portion extending in parallel to the lower wall of said tunnel, a pair of flanges extending upwardly from said bottom portion and connected with the ends of said tunnel, and extensions of the upper and side walls of said tunnel extending beyond the outer faces of said flanges.

5. A current transformer having a casing, said casing comprising a tunnel for the reception of the secondary coil and the iron core of said transformer and for supporting its primary coil, a bottom portion extending in parallel to the lower wall of said tunnel, a pair of flanges extending upwardly from said bottom portion and connected with the ends of said tunnel, extensions of the upper and side walls of said tunnel extending beyond the outer faces of said flanges and pitched apart for the width of said secondary coil, and downwardly extending flanges on said extension pitched apart for the width of said iron core.

6. A current transformer having a casing, said casing comprising a tunnel for the reception of the secondary coil and the iron core of said transformer and for supporting its primary coil, a bottom portion extending in parallel to the lower wall of said tunnel, a pair of flanges extending upwardly from said bottom portion and connected with the ends of said tunnel, extensions of the upper and side walls of said tunnel extending beyond the outer faces of said flanges and pitched apart for the width of said secondary coil, downwardly extending flanges on said extension pitched apart for the width of said iron core, and shims inserted within said extensions and abutted against the outer ends of said secondary coil.

7. A current transformer having a casing, said casing comprising a tunnel for the reception of the secondary coil and the iron core of said transformer and for supporting its primary coil, a bottom portion extending in parallel to the lower wall of said tunnel, a pair of flanges extending upwardly from said bottom portion and connected with the ends of said tunnel, extensions of the upper and side walls of said tunnel extending beyond the outer faces of said flanges and pitched apart for the width of said secondary coil, downwardly extending flanges on said extension pitched apart for the width of said iron core, shims inserted within said extensions and abutted against the outer end of said secondary coil, and stays extending between said shims.

8. A current transformer having a casing,

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