Jan. 27, 1925. 1,524,591

A. B. STARR

TRANSFORMER

Filed Feb. 7, 1924

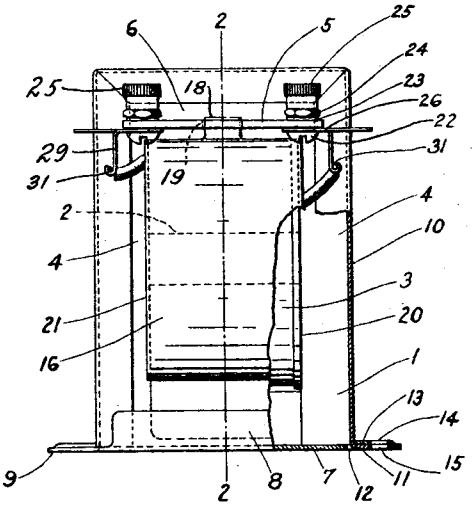


Fig. 1.

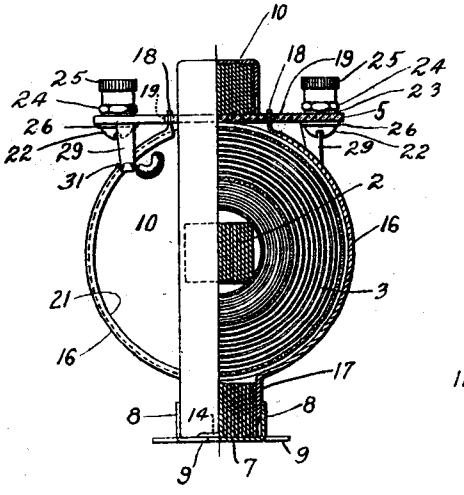


Fig. 2.

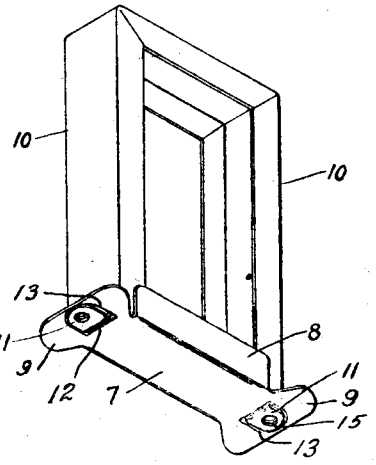


Fig. 3.

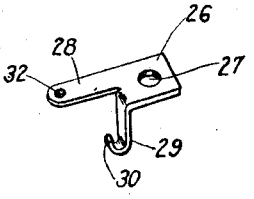


Fig. 4.

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UNITED STATES PATENT OFFICE.

ALDEN B. STARR, OF BROOKLYN, NEW YORK, ASSIGNOR TO A. B. STARR EQUIPMENT CORPORATION, A CORPORATION OF NEW YORK.

TRANSFORMER.

Application field February 7, 1924. Serial No. 691,109.

To all whom it may concern:

Be it known that I, ALDEN B. STARR, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Transformers, of which the following is a full, clear, and exact description.

This invention relates to electrical transformers and particularly to the type known as shielded transformers. An object of the invention is to provide an improved transformer of this type, in which the shielding is simplified in constructon and assembly, and made more durable and attractive in appearance. A further object is to provide an improved transformer, to the coil leads of which the circuit wires may be connected by temporary or soldered connections in a simple manner. Other objects and advantages will be apparent from the following description of an embodiment of the invention, and the novel features thereof will be particularly pointed out hereinafter in claims.

In the accompanying drawing:

Fig. 1 is an elevation of a transformer constructed in accordance with this invention, with a portion of the shielding broken away to better show its construction;

Fig. 2 is an end elevation of the same, looking from the left in Figure 1, one half of the elevation being a transverse section taken through the center of the transformer approximately along the line 2—2 of Figure 1;

Fig. 3 is a perspective of the peripheral shielding of the core, detached from the transformer; and

Fig. 4 is a perspective of one of the terminal clips used on the terminal board of the transformer.

In the illustrated embodiment of the invention the transformer comprises a laminated, closed loop core 1 having an intermediate cross arm 2 upon which the coils 3 are mounted between the side arms 4 of the core. A contact terminal board 5 is confined against the upper end cross arm 6 of the core by the coils 3, the terminal board having notches in each side which embrace the side arms 4 of the core so as to prevent displacement from its position between the upper end cross arm of the core and the coil.

A channel base 7 of stamped sheet metal has side flanges 8 turned upwardly therefrom at the sides to form the channel, and having flat end terminals 9 by which it may be anchored to a suitable supporting surface or object. The transformer core is supported in the channel of the base between the side arms 8 thereof. A channel frame 10 of stamped sheet metal in bent into the form of a U-shape so as to run along and embrace the side arms and upper end cross arm of the core, and the free ends of the frame fit between the flanges 8 of the channel base.

The lower ends of the frame 10 are provided with tongues 11 which pass through apertures or slots 12 in the bottom of the channel base, the tongues then being bent outwardly beneath the flat ends 9 of the base. The ends 9 of the base are preferably provided with upwardly struck recesses 13 (see Figures 1 and 3) in their lower faces, into which the tongues 11 may be bent so as not to project beneath the bottom face of the base. The ends 9 are provided with apertures 14 through which suitable anchoring means may be passed for securing the transformer to a surface or object, and the bent over tongues 11 are provided with apertures 15 aligned with the apertures 14 so that the securing means for anchoring the transformer in position will pass both through the tongues and the base.

Side protecting members 16 are inserted at their lower ends 17, between the core and a flange 8 of the base, and at their upper ends are each provided with a tongue 18 which is adapted to extend through an aperture 19 in the terminal contact board 5. The protecting members extend peripherally around the exposed curved sides of the coils, and are preferably made of sheet metal. The apertures 19 through which the tongues 18 pass are preferably placed forwardly or outwardly away from the core and peripheral shielding frame 10, so that an electrical contact between the protectors and the core or the shielding frame 10 will be prevented (see Figure 2).

Suitable discs 20 are provided upon the intermediate cross arm 2 of the core so as to abut and cover the ends of the coils 3, and the side protectors 16 are provided along their side edges with inturned flanges 21 which extend over the periphery of the

discs 20 and slightly along the outer faces thereof, so as to confine the discs at their periphery against the coils. These discs 20 are preferably made of insulating material, such as fibre board, but various other materials may be used successfully.

Binding posts or screws 22 pass upwardly through the terminal board 5, adjacent the corners thereof, and upon their upper ends carry lock washers 23 and lock nuts 24, as well as clamping nuts 25. Terminal clips 26 are confined to the terminal board by the screws 22, the screws passing through apertures 27 of the clips. Each terminal clip is provided with integral arms 28 and 29 extending therefrom, preferably in different angular directions, so that conductors may be readily soldered thereto.

The arm 29 of each clip preferably depends from the terminal board when the clip is secured thereto, and may have a backwardly turned flange 30 forming, with the arm, a groove in which the end of a coil lead or conductor 31 may be soldered. The conductor wires or coil leads 31 may pass through suitable apertures in the end disc 20 to the coils. The arm 28 of each clip may be provided at its outer end with an aperture 32 or with a flange into which one or more circuit wires may be locked and soldered and thus establish good electrical connections between the circuit wires and coil leads, which will not be dependent for their continuance upon nuts or spring clamps and the like.

Heretofore, it has been customary to solder the coil leads directly to the heads of the binding posts or screws 22, but this has been objectionable in many cases owing to the fact that the coil leads frequently become detached or broken therefrom by reason of the turning of the screw while the clamping nuts are being tightened or loosened. With this improved arrangement and construction, the continuance of the electric circuit between the circuit wires and the coil leads will not be dependent upon clamping nuts, and there will be no danger of the coil leads becoming broken off when the clamping nuts are being manipulated. Furthermore, with the clamping nuts, temporary circuit connections may be established, such as for experimental purposes or testing, and when a permanent connection is desired the circuit wires may be soldered to the terminal clips as before described.

The closed core is sectional so that it may be assembled about the coils after the latter have been wound with the terminal board between the coil and the upper cross arm and with the end discs 20 at the ends of the coils upon the intermediate cross arm 2. The peripheral shield frame 10 is then passed over the side arms and upper cross arm of the core, and the side protectors 16 are applied to the coil with their tongues 18 extending through the apertures 19 of the terminal board and with their ends 17 lying flat against the lower cross arm of the core. Then the channel base 7 is applied to the bottom of the transformer to embrace the lower ends of the side protectors and the frame 10 with the tongues 11 of the frame 10 passing through the apertures 12 in the base, after which the tongues are bent over into the recesses 13 to complete the assembly, except for the soldering of the coil leads to the terminal clips and the securing of the terminal clips to the terminal board.

With this construction there will be no possibility of closed circuits for the eddy currents that may be induced by stray magnetic flux, in the protectors 16, since the upper ends of the protectors are spaced from the core, and the fibre or insulating discs 20 at the ends of the coils effectively protect the coils and do not form a closed circuit for the eddy currents between the side protector members 16. With the particular construction described hereinbefore and illustrated, the assembly of the complete transformer is greatly simplified, and the shielding of the transformer is simple, durable and attractive in appearance. The securing members which are passed through the channel base for anchoring the transformer, also serve to effectively anchor the channel base and the peripheral shielding frame 10 together and to the transformer.

It will be obvious that various changes in the details, materials, and arrangements of parts, herein described and illustrated for the purpose of explaining the nature of the invention, may be made by those skilled in the art within the principle and scope of the invention as expressed in the appended claims.

I claim:

1. In a transformer having a core in the form of a closed loop with an intermediate cross arm upon which the coils are mounted between the side arms, a channel base of stamped sheet metal, in the channel of which the transformer rests, and a channel frame of bent stamped sheet metal running around and embracing the upper end and side arms of the core and having tongues passing through the channel base and bent over thereon to form an interlock between them.

2. In a transformer having a core in the form of a closed loop with an intermediate cross arm upon which the coils are mounted between the side arms, a channel base of stamped sheet metal, in the channel of which the transformer rests, and a channel frame of bent stamped sheet metal running around and embracing the upper end and

side arms of the core and having tongues passing through the channel base and bent over thereon to form an interlock between them, said tongues and base having aligned apertures through which anchoring members pass.

3. In a transformer having a core in the form of a closed loop with an intermediate cross arm upon which the coils are mounted and which they surround, a channel frame embracing the outer periphery and sides of the exposed part of the core, a contact terminal board at one end of the transformer, and side members each interlocked at one end with the channel frame and at the other end to said terminal board extending around the exposed sides of the coils to protect the same.

4. In a transformer having a core in the form of a closed loop with an intermediate cross arm upon which the coils are mounted and which they surround, a channel frame embracing the outer periphery and sides of the exposed part of the core, a contact terminal board at one end of the transformer, side members each interlocked at one end with the channel frame and at the other end to said terminal board extending around the exposed sides of the coils to protect the same, said side members having inturned flanges along their side edges extending over the ends of the coils, and protecting discs confined against the ends of the coils by said flanges.

5. In a transformer having a core in the form of a closed loop with an intermediate cross arm upon which the coils are mounted and which they surround, a channel frame embracing the outer periphery and sides of the exposed part of the core, a terminal board of insulating material mounted at one end of the transformer, and side members each interlocked at one end with the channel frame and at its other end having a portion passing through an aperture in the board out of contact with the core or channel frame, extending around the exposed sides of the coils to protect the same.

6. In a transformer having a core in the form of a closed loop with an intermediate cross arm upon which the coils are mounted and which they surround, a channel frame embracing the outer periphery and sides of the exposed part of the core, a terminal board of insulating material mounted at one end of the transformer, side members each interlocked at one end with the channel frame and at its other end having a portion passing through an aperture in the board out of contact with the core or channel frame, extending around the exposed sides of the coils to protect the same, and protecting discs of insulating material confined against the ends of the coils by said side members.

7. In a transformer having a core in the form of a closed loop with an intermediate cross arm upon which the coils are mounted and which they surround, a channel frame embracing the outer periphery and sides of the exposed part of the core, a terminal board of insulating material mounted at one end of the transformer, side members each interlocked at one end with the channel frame and at its other end having a portion passing through an aperture in the board out of contact with the core or channel frame, extending around the exposed sides of the coils to protect the same, said side members having inturned flanges along their side edges extending over the ends of the coils, and protecting discs of insulating material confined against the ends of the coils by the said side members.

8. In a transformer having a core in the form of a closed loop with an intermediate cross arm upon which the coils are mounted between the side arms, a channel base of stamped sheet metal in the channel of which the transformer rests, and a channel frame of bent stamped sheet metal running around and embracing the upper end and side arms of the core, said base having recesses struck up therein from the under face at each end, said channel frame having tongues upon its ends abutting the base, passing through the base and bent over into the recesses to form an interlock between the frame and base, the bent over tongues and the base having aligned apertures through which may be passed suitable elements for securing the transformer to a support.

In witness whereof, I hereunto subscribe my signature.

ALDEN B. STARR.