May 2, 1939. A. E. RITTENHOUSE 2,156,461

TRANSFORMER

Filed Aug. 14, 1937

FIG. 1.

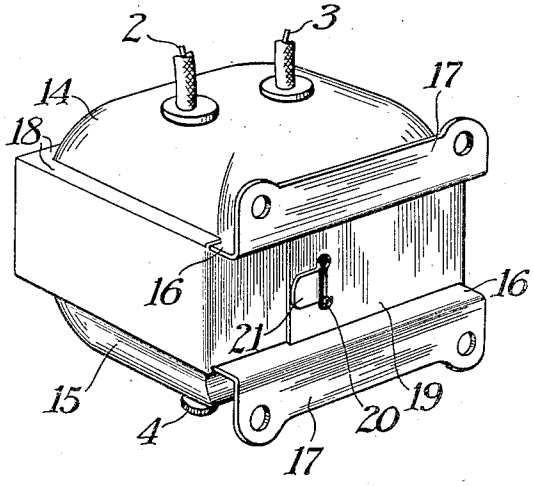


FIG. 2.

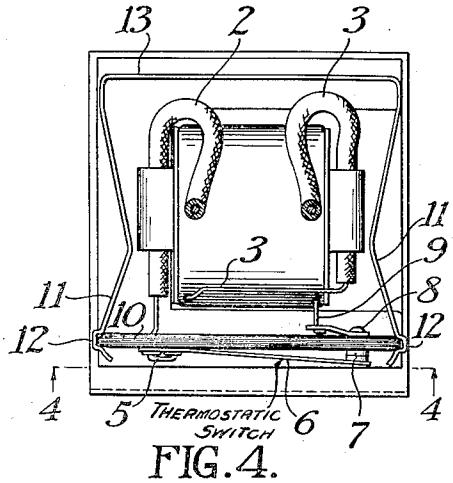
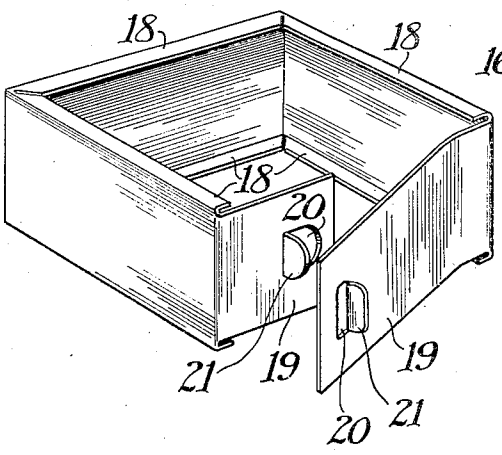
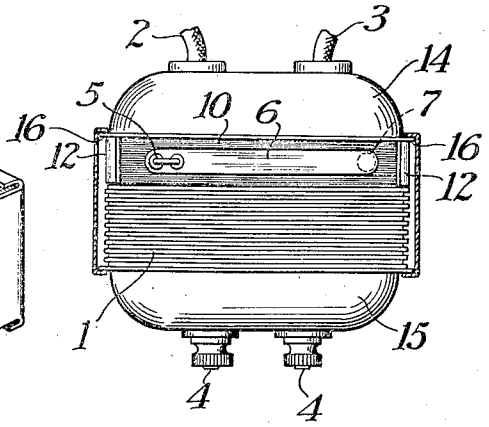


FIG. 4.

FIG. 3.





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TRANSFORMER

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Application August 14, 1937, Serial No. 159,126

3 Claims. (Cl. 175—361)

This invention relates to a transformer, with more particular reference to the type of structure that is adapted for use in the operation of large bells, chimes, valves, relays, damper controls and similar units, and has for its object to provide an efficient and practical device of this character that can be economically manufactured and will operate safely under the varying conditions to which it may be subjected.

In a more particular aspect, the invention has for its purpose to afford a transformer that will not overheat when subjected to an overload or a short circuit of the secondary, at a much lower cost of manufacture than the high reactance type of transformer in use at present for this purpose.

Another object of the invention is to provide a transformer, economical to manufacture and having a capacity that enables it to be used with various units for which high reactance transformers have heretofore been designed, and which is controlled through a thermostatic switch that automatically opens the primary circuit in case of overload or short circuit in the secondary circuit.

It is also an object of this invention to provide a transformer that will not have the objectionable operating characteristics of high reactance transformers.

A further purpose of the invention is to afford an economical and practical design for readily supporting a thermostatic switch in operative relationship between the laminations and housing of a transformer of this type, permitting ready assembly of the parts.

To these and other ends, the invention consists in the construction and arrangement of parts that will appear clearly from the following description when read in conjunction with the accompanying drawing, the novel features being pointed out in the claims following the specification.

In the drawing:

Fig. 1 is a perspective view of a transformer constructed in accordance with one embodiment of the invention;

Fig. 2 is a plan view with the top plate and clamping band removed;

Fig. 3 is a perspective view of the clamping band, and

Fig. 4 is a side elevation, showing the housing in section.

Heretofore, the maximum capacity of a transformer of normal reactance that would operate within a safe temperature and with an input not to exceed fifty watts under any conditions, including a continuous short circuit of the secondary terminals, has been approximately five watts, and consequently, the general practice in building transformers for large bells, chimes and similar units requiring greater capacity than five watts has been to design a transformer with a high reactance which limits the current in event of short circuit.

Such a high reactance transformer is relatively costly to manufacture because of the necessity of a larger core and generally larger design, and from an operating standpoint, such a transformer has less satisfactory regulation and lower efficiency. The reactance may be increased by enlarging the space between the primary and secondary coils to increase the leakage flux, but this also increases the cost of manufacture and reduces the efficiency of the unit. This invention is designed to overcome these objectionable characteristics of a high reactance transformer, and to produce a transformer costing little more than a normal reactance transformer, and yet operating as safely and more efficiently than the high reactance type.

Referring more particularly to the drawing in which like reference characters refer to the same parts throughout the several views, 1 designates the usual laminations of a transformer, 2 and 3 are the conductors of the primary circuit, and 4 are the terminals of the secondary circuit. Conductor 3 extends to the primary coil, while conductor 2 of the primary circuit is connected to a terminal 5 of a thermostatic bimetallic switch 6 which is engageable with a contact 7 that is connected to a terminal 8 from which a connection 9 leads to the other end of the primary coil.

The thermostatic switch 6 is mounted upon a supporting plate 10 made of any suitable insulating material which is preferably removably positioned edgewise and held between opposite ends 11 of a generally U-shaped metal retaining plate that is positioned edgewise as shown. The opposite ends 11 of the metal retaining plate may be provided with suitable pockets 12 that receive the ends of the insulating support 10 on which the thermostatic switch is mounted. The U-shaped retaining plate, designated generally at 13, and the insulating support 10, are both positioned edgewise as shown in Fig. 4, and are clamped between the laminated section 1 and the adjacent portion of the housing, as will now be described.

The housing includes opposite plates 14 and 15 provided with parallel horizontal edge flanges 16, while 17 designate outwardly turned attaching

flanges for securing the transformer to any suitable support. The plates 14 and 15 are held in operative relation with the metal retaining member 13 and the thermostatic switch support 10 by means of a clamping band of spring metal having inwardly turned horizontal flanges 18 around three sides thereof, as shown in Fig. 3, adapted to engage the outer surfaces of the horizontal flanges 16 of the opposite plates. The ends 19 of the clamping band are adapted to overlap each other between the attaching flanges 17 and are provided with cooperating openings 20 and lugs 21 by which they may be attached and held together, as shown in Fig. 1, with the structure completely assembled.

The transformer is designed to operate chimes or other relatively large units, and in the event of overload or short circuit of the secondary terminals, the excessive heat generated will cause the bimetallic switch to move away from the contact 7 and open the primary circuit which remains open until the trouble has been corrected or the temperature lowered to a safe point.

With this construction, a transformer of normal reactance can be safely employed, and the cost of manufacture is consequently much less than the high reactance transformers used heretofore. Also its operating efficiency and other characteristics are superior to those of the high reactance transformer.

The invention is not confined to the particular construction and arrangement disclosed, and this application is intended to cover any other adaptations that may come within the purposes of the invention or the scope of the following claims.

I claim:

1. A transformer including a housing, a generally U-shaped retaining plate positioned edgewise within the housing, a support of insulating material arranged between the opposite ends of said retaining plate, a thermostatic switch carried by said support, and a primary circuit connected to the terminals of said thermostatic switch.

2. A transformer including laminations, a housing consisting of opposite spaced plates, a clamping band located between and connected to said plates to retain them in position, a generally U-shaped metal retaining plate arranged edgewise between said laminations and one of said plates, the opposed ends of said retaining plate having pockets formed therein, supporting plate of insulating material positioned edgewise in said pockets and extending between the opposed ends of the retaining plate, a thermostatic switch carried by said insulating plate, and a primary circuit connected to the terminals of said thermostatic switch.

3. A transformer including laminations, a housing comprising opposite spaced plates having parallel edge flanges and outwardly turned attaching flanges, a clamping band having flanges which overlie said parallel flanges of the plates and end portions which extend between said outwardly turned flanges and are attached to each other, a generally U-shaped metal retaining plate positioned edgewise between said laminations and the adjacent of said plates, a supporting plate of insulating material removably held edgewise between the ends of said retaining plate, a thermostatic switch carried by said supporting plate, and a primary circuit connected to the terminals of said thermostatic switch.

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