April 9, 1929. H. M. ACLY 1,708,859

ELECTRICAL APPARATUS

Filed Jan. 11, 1927

Fig.1.

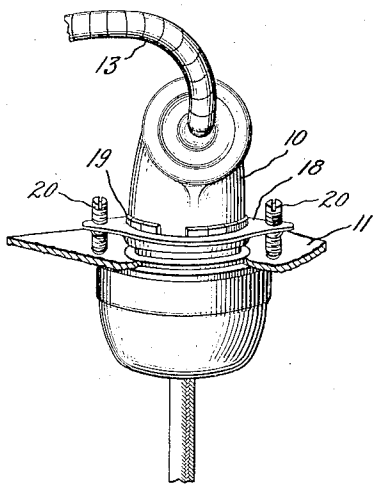


Fig.2.

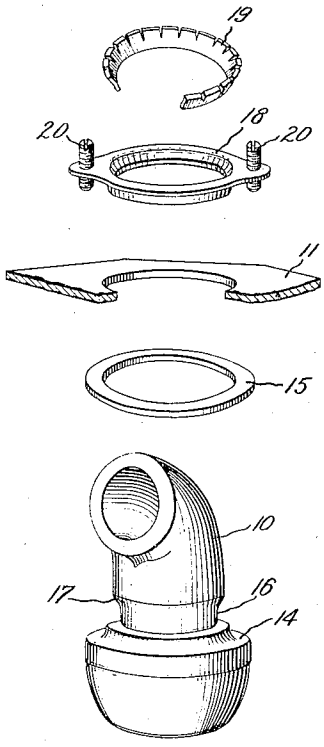


Fig.3.

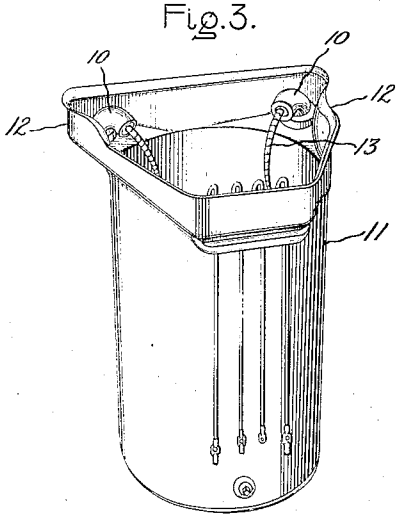
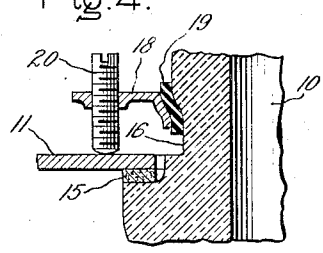


Fig.4.



Inventor:
Harry M. Acly,
by Alexander S. Lamb
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Patented Apr. 9, 1929. 1,708,859

UNITED STATES PATENT OFFICE.

HARRY M. ACLY, OF PITTSFIELD, MASSACHUSETTS, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

ELECTRICAL APPARATUS.

Application filed January 11, 1927. Serial No. 160,478.

My invention relates to electrical apparatus and more particularly to encased electrical apparatus provided with insulating bushings extending through openings in the casing for insulating conductors connected to the apparatus.

The invention is an improvement on the arrangement of bushings disclosed in United States Patent No. 1,494,293 issued May 13, 1924, on an application filed by I. H. Sclater.

The general object of the invention is to provide an improved arrangement of parts whereby such bushings may be readily secured in place or removed from the apparatus casing.

The invention will be better understood from the following description taken in connection with the accompanying drawing in which Fig. 1 shows a fragment of an electrical apparatus casing with a bushing secured in place in accordance with the invention; Fig. 2 is an exploded view of the parts which are shown assembled in Fig. 1; Fig. 3 is a view of a transformer casing provided with bushings formed and secured in position in accordance with the invention; and Fig. 4 shows a detail of the assembled parts.

Like reference characters indicate similar parts in the different figures of the drawing.

The invention will be described in connection with bushings 10 for a transformer casing 11. The casing 11 is shown as having overhanging portions 12 at its upper part, a bushing 10 being secured in an opening in each of these overhanging portions. The bushing 10 has a large outer end to provide the necessary creepage surface between its conductor 13 and the casing 11 which may be grounded. This enlarged outer end of the bushing has a shoulder 14 which fits against a suitable gasket 15 on the outer surface of the casing 11 to provide a tight joint between the bushing and casing. The bushing has a constricted neck 16 in front of the shoulder 14 and ending in a second shoulder 17 having an outer diameter smaller than that of the shoulder 14, the two spaced shoulders 14 and 17 being formed to face each other with the constricted neck 16 between them.

The bushing 10 is secured in place by means of an annular clamping ring 18, a locking ring 19 and a set of screws 20. To assemble and secure the bushing in place through its opening in the casing 11, the gasket is placed around the bushing against the shoulder 14 and the inner or smaller end of the bushing inserted through the opening with the gasket 15 against the outer surface of the casing. The annular clamping ring 18 has an inner diameter greater than the outer diameter of the smaller shoulder 17 and this is slipped over the inner end of the bushing onto the constricted neck 16 and close to the inner surface of the casing and the locking ring 19 is then fitted between the shoulder 17 of the bushing and the inner edge portion of the clamping ring 18. The opening in the clamping ring 18 is just large enough to pass easily over the inner end of the bushing so that it cannot be forced past the shoulder 17 while the locking ring 19 is in place. The screws 20, which are threaded into the clamping ring 18, are next turned down tightly against the inner surface of the casing to force the clamping ring away from the casing and toward the shoulder 17. As the clamping ring is locked to the bushing by the locking ring 19, the bushing is forced tightly against the gasket 15 which forms a tight seal between the bushing and the casing. The locking ring 19 is preferably formed of a narrow strip of flexible and compressible material bent into a ring to fit between the shoulder 17 of the bushing and the inner edge portion of the clamping ring 18 and fiber board has been found to be a satisfactory material. This compressible and flexible locking ring serves to distribute the pressure of the clamping ring 18 over the surface of the shoulder 17 of the bushing which is usually of brittle material such as porcelain and breakage of the bushing by the pressure of the clamping ring is thus minimized.

The invention has been described in what is now considered its preferred embodiment but it will be obvious that changes may be made without departing from the scope of the invention as defined by the appended claim.

What I claim as new and desire to secure by Letters Patent of the United States, is,—

The combination with an electrical apparatus casing having an opening, of an insulating bushing disposed through said opening, said bushing having two spaced shoulders of unequal outer diameter and a constricted portion between said shoulders, a clamping ring having an inner diameter greater than the outer diameter of said smaller shoulder, a locking ring fitted between the inner edge

portion of said clamping ring and said smaller shoulder, said locking ring comprising a narrow flat strip of tough compressible material to distribute the pressure of the clamping ring on the shoulder, the surfaces of said clamping ring and smaller shoulder which are in contact with said locking ring being beveled to fit the surfaces of the locking ring, and means for forcing said clamping ring toward said locking ring and the smaller shoulder to force the larger shoulder toward said casing.

In witness whereof, I have hereunto set my hand this 7th day of Jan., 1927.

HARRY M. ACLY.