

Sept. 9, 1952

E. B. CLARK

2,609,596

METHOD OF MAKING SHEET METAL BUSHINGS

Filed July 9, 1947

Fig. 1.

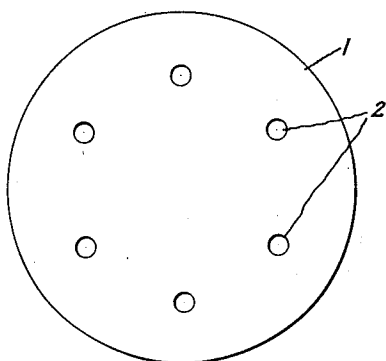


Fig. 4.

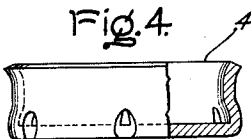


Fig. 5.

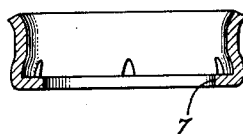


Fig. 2.

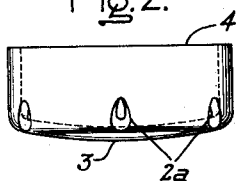


Fig. 6.

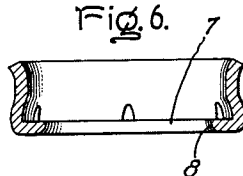


Fig. 3.

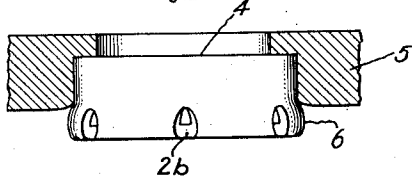
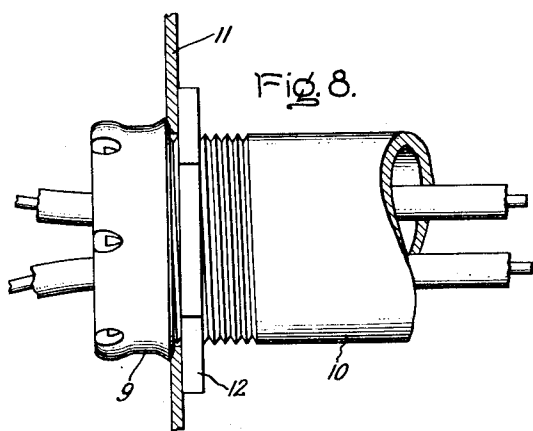


Fig. 7.



Fig. 8.



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UNITED STATES PATENT OFFICE

2,609,596

METHOD OF MAKING SHEET METAL
BUSHINGS

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Application July 9, 1947, Serial No. 759,731

2 Claims. (Cl. 29—148.2)

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My invention relates to electrical conduit bushings, particularly such as are used to terminate the end of a conduit and to secure the latter to an outlet box.

It is an object of my invention to provide an electrical conduit bushing formed of sheet metal and having desired features and characteristics heretofore found only in cast metal bushings and further having other desirable features and characteristics.

It is a further object of my invention to provide a sheet metal formed bushing which can be manufactured at a low cost.

A still further object of my invention is to provide a method of forming electrical conduit bushings from sheet metal with a minimum number of simple, fundamentally round tools and which can be carried out on simple machines as, for example, eyelet machines.

My invention will best be understood from the following description of the bushing and the method whereby it is formed, taken in connection with the accompanying drawing in which Fig. 1 is a plan view of a sheet metal blank punched and pierced in accordance with the first step of my bushing forming process; Figs. 2 and 3 are elevations of my bushing in subsequent stages of formation; Fig. 4 is an elevation partially in section of my bushing in a further stage of formation; Figs. 5 and 6 are sectional views showing additional steps of my forming process; Fig. 7 is a section showing my completed bushing and Fig. 8 is an assembly view showing my bushing secured to the end of a conduit and assisting in holding the same in a wall of an outlet box.

My novel bushing is entirely formed from a simple circular blank of sheet metal. As shown in Fig. 1, the process of forming the bushing commences with a blank 1 punched from sheet metal such as steel plate of a thickness to provide adequate strength and having a plurality of small circular holes 2 pierced therein, the holes preferably being equally spaced in a circle concentric with the edge of the blank and at a suitable distance from the edge of the blank depending upon the desired height of the finished bushing as will appear more clearly below.

The round blank is drawn into a cup shape having an outwardly dished bottom 3 and a smooth top edge 4 as shown in Fig. 2. The holes 2 are now substantially elliptical in shape as indicated at 2a. The drawing is made so that the holes are located along the bottom edge of the cup.

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Thereafter the sides of the cup are clamped with a straight sided ring shaped tool as indicated in section at 5 in Fig. 3. The tool 5 has a straight recess slightly less in depth than the distance between the outer edge 4 of the cup and the line joining the edges of the elliptical holes adjacent thereto.

The bottom of the cup is then knocked back flat, whereby the bottom edge 6 is bulged outwardly around the whole circumference of the cup. This bulging easily takes place in the desired manner because of the presence of the spaced holes which now extend around the bulge and slightly into the bottom of the cup as shown, for example, at 2b in Fig. 3.

In the fourth step of formation of my bushing, the top edge 4 is flared outwardly as shown in Fig. 4. In the fifth step, a round concentric hole 7 is pierced in the bottom of the bushing as indicated in Fig. 5. The outside edge of the hole 7 is then rounded over as shown at 8 in Fig. 6. Finally, the bushing is internally threaded to fit the standard pipe threads used on electrical conduit.

The completed bushing 9 is shown in Fig. 7, and Fig. 8 shows the bushing 9 in use to clamp an end of conduit 10 to an outlet box 11 with the aid of a conventional nut 12 on the other side of the box wall.

All of the steps in the formation of my bushing, except the last step of tapping the inside, can be accomplished consecutively in an eyelet machine so that all six operations are completed in one operation of the machine. The threading may be done by an automatic tapping machine.

It will be seen that the completed bushing represents an internally threaded cup adapted to receive the threaded end of electric conduit, the bushing being flared outwardly at one end preferably to a diameter larger than the thread diameter and having at the other end a central opening of smooth contour with the adjacent walls bulged outwardly and having a plurality of elliptical holes spaced around the circumference of the bulge portion and intersecting the outer edge of that end of the bushing.

The bushing so formed has a number of advantages. The flared end of the bushing is large enough completely to cover and close in outlet boxes the standard knockout holes which are appropriately sized for the size of conduit used. The inside of the flare provides a lead for the tap in the tapping operation. Moreover, since in the flaring operation the upper edge of the cup is tipped downwardly, there results a sharp out-

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standing ring which will bite into the wall of the outlet box, as indicated in Fig. 8, to make a good electrical bond with the box. The bulged end of the bushing provides end clearance for the tap, whereby the bushing can be made with cut threads. The elliptical holes around the edge of the bushing at the bulge are suitably shaped to receive a blunt tool like a screw driver for driving the bushing onto the threaded end of the conduit. The bulge at this end of the bushing provides for a better tool grip than would be the case if the bushing were cylindrical in shape. Moreover, the rounded edge of the hole in the end of the bushing protects the insulation of wires passing through it.

What I claim as new and desire to secure by Letters Patent in the United States is:

1. Method of making an electrical conduit bushing comprising the steps of blanking out a disk of sheet metal, piercing a plurality of holes therein on a circle concentric with the edge of the disk, forming the disk into a cup shape with a dished bottom and with said holes positioned around the side of the cup adjacent the bottom thereof, axially compressing the cup while holding the unperforated annular portion of the side wall thereof against deformation whereby the bottom of the cup is flattened and an outwardly extending annular bulge is formed in the perforated portion of the side wall of the cup, outwardly flaring the edge portion of the side wall of the cup, perforating the center portion of the bottom of the cup and threading the interior of the cup.

2. Method of making an electrical conduit

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bushing comprising the steps of blanking out a disk of sheet metal, piercing a plurality of holes therein on a circle concentric with the edge of the disk, forming the disk into a cup shape with a dished bottom and with said holes positioned around the side of the cup adjacent the bottom, axially compressing the cup while holding the unperforated annular portion of the side wall thereof against deformation whereby the bottom of the cup is flattened and an outwardly extending annular bulge is formed in the perforated portion of the side wall of the cup, perforating the center portion of the bottom of the cup and threading the interior of the cup.

EDWARD B. CLARK.

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