

Jan. 9, 1940.

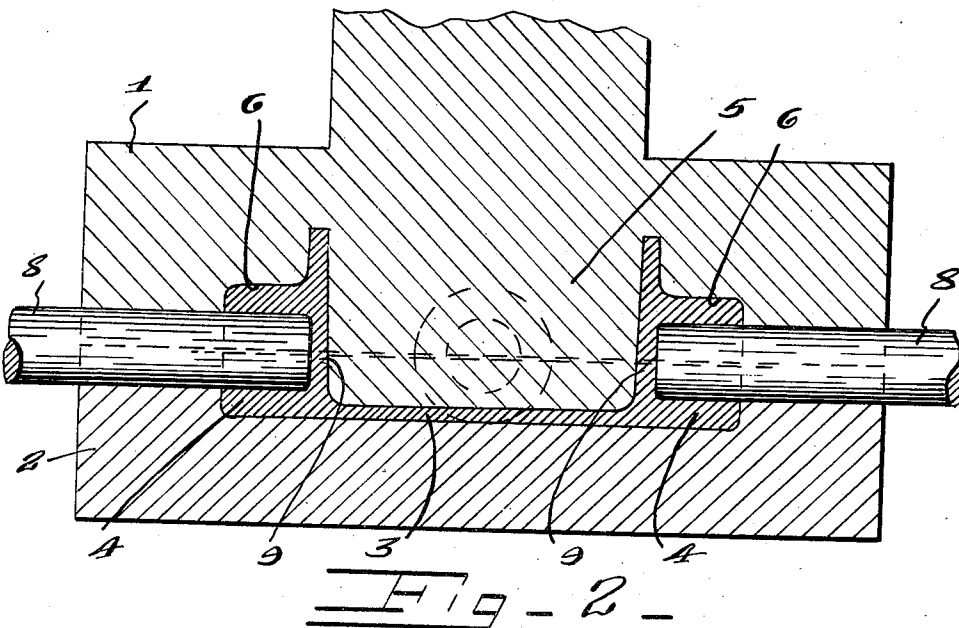
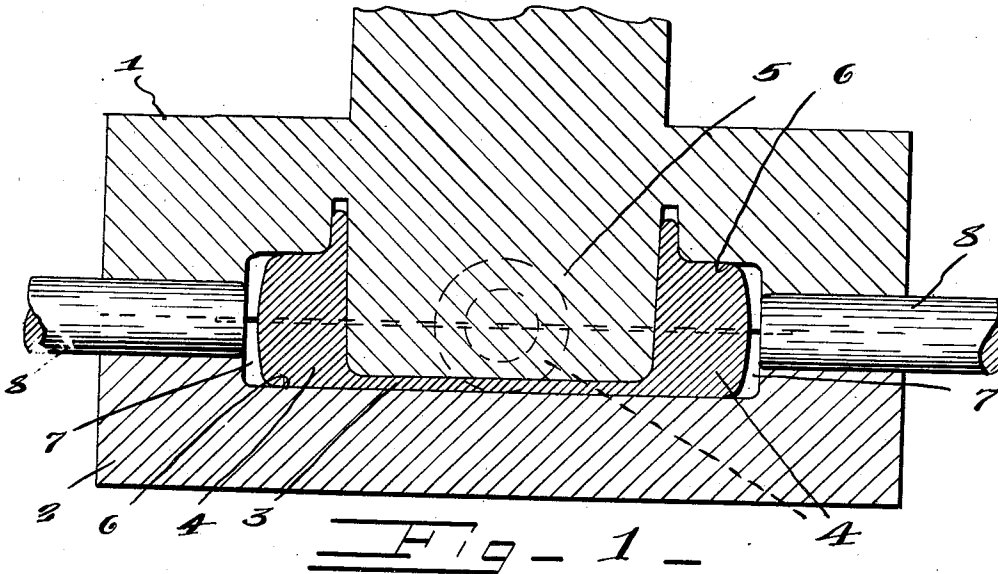
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2,186,322

METHOD OF FORMING BOXES WITH ONE OR MORE NIPPLES

Filed May 8, 1937

3 Sheets-Sheet 1



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Fig - 5 -

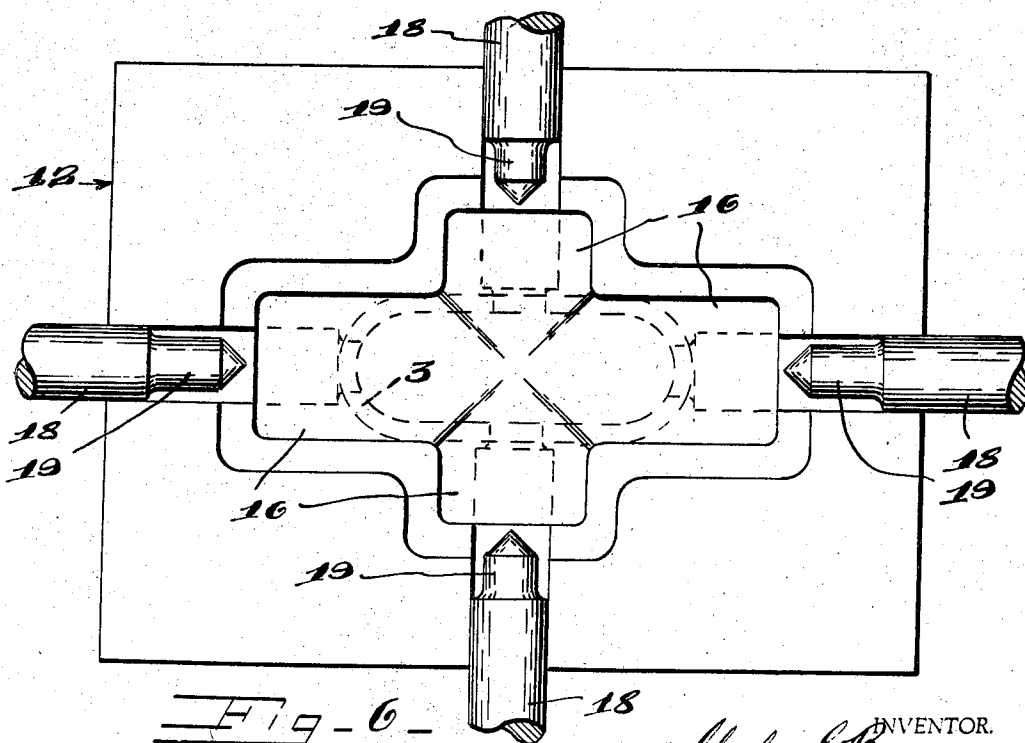
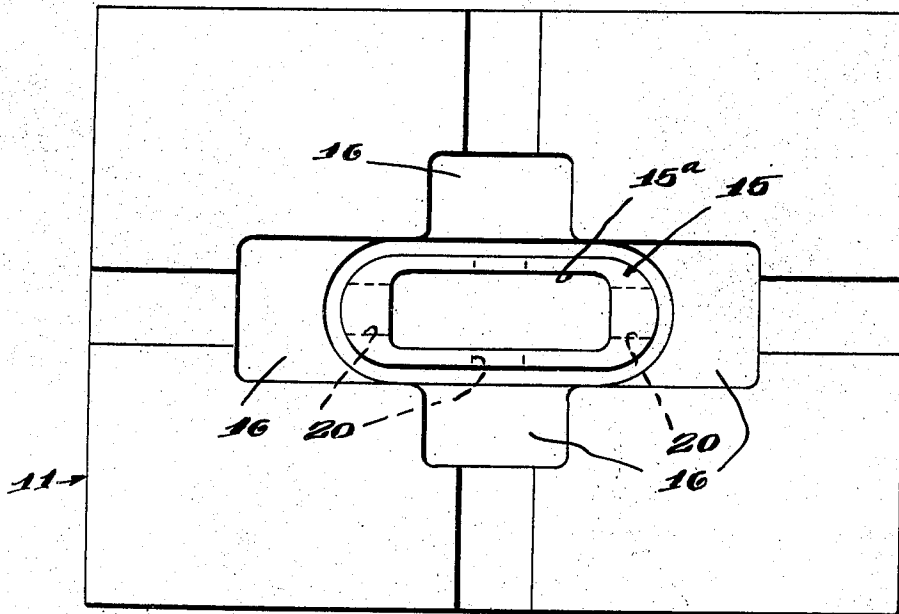


Fig - 6 -

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UNITED STATES PATENT OFFICE

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METHOD OF FORMING BOXES WITH ONE OR MORE NIPPLES

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1 Claim. (Cl. 29—148.2)

This invention relates to the manufacture of metal boxes having nipples, as electric conduit outlet boxes, having tubular nipples for receiving conduits.

5 It has for its object the method of forming conduit outlet boxes, as hereinafter set forth and claimed.

In describing this invention, reference is had to the accompanying drawings in which like characters designate corresponding parts in all the views.

10 Figures 1 and 2 are sectional views through a pair of forging dies, Figure 1 showing the operation of the dies, after they have formed the blank into box form with projecting nipples; Figure 2 being a view similar to Figure 1, showing the punching out operation of the solid nipples into tubular form.

15 Figures 3 and 4 are sectional views similar to Figures 1 and 2 of additional dies that may be used during the punching out operation of the nipples.

20 Figures 5 and 6 are face views of the forging dies shown in Figures 3 and 4, the finished box being shown in broken lines, Figure 6.

25 The method consists in forming the box by forging the same from a blank first into a box body with one side entirely open or open substantially throughout its area, and with one or more solid nipples; then forming the nipples with axial passages communicating with the interior of the box by displacing the metal of the central part of the nipples by a force applied axially, as by punching, while holding the nipples to a predetermined shape to control the displacement of the metal into a symmetrical formation, as into a tubular or cylindrical formation, and finally removing the portion of the wall of the boxlike body in line with the passage of the nipple or nipples, so that the hollow nipples open in the boxlike body.

30 The apparatus consists of a pair of forging dies formed with cavities shaped to forge the blank into a box body with one or more solid nipples projecting therefrom and punches movable between the dies in a direction axially of the nipples and during the operation of the punches displacing the metal of the nipples into the nipple cavities to fill the same.

35 1 and 2 designate, respectively, the opposing forging die sections formed with a cavity between them for shaping the box 3 and the solid nipples 4. The die 1 is provided with a projection or core 5 for forming the interior of the body of the box. The portions 6 of the cavities

forming the nipples 4 are of such size or diameter as not to be completely filled by the metal displaced by the forging operation forming the nipples, so that there is a clearance in the portions 6, as at 7.

8 are punches mounted between the die sections 1, 2, there being one punch for each nipple. These punches are forced inwardly by any suitable means axially into the nipples 4 and displace the metal of the nipples, so as to substantially fill the portions 6 of the cavities so that the walls of the portions 6 symmetrically shape the nipples during the punching operation.

As seen in Figure 2, the punching operation terminates a little short of the inner end of the nipple or short of the interior of the box portion of the blank, leaving a thin slug at 9, which may be afterwards removed in any suitable manner, as by additional punching, boring or drilling, after the blank is removed from the die. However, as seen in Figures 3 and 4, the blank, after it is forged, with the solid nipples, as in Figure 1, may be placed in another pair of dies 11 and 12 fitting the preformed blank, after it is taken from the dies 1, 2, and the core piece 15 is formed with transverse passages 20 axially aligned with the solid nipples 4. The core piece is also formed with a cavity 15a with which the transverse passages 20 communicate to receive the metal displaced while the punches are working in the transverse passages 20. Also, the cavity portions 16 of the dies 11 and 12 are the same length as the nipples, but are of greater diameter than the nipples, leaving an annular clearance around the nipples at 17.

40 The use of the second pair of dies 11, 12 may in some cases be necessary to equally distribute the metal into the nipple cavities when it is unequally distributed in these cavities, after the first forging operation by the dies 12.

18 designates the punches suitably mounted between the sections 11 and 12 in passages aligned with the nipples 4 and the transverse passages 20, these punches having reduced end portions 19 for entering the passages 20, which are of less diameter than the final bore of the nipples. When force is applied to move the punches 18 inwardly, the body of each punch of larger diameter forms the axial passage of the nipple and the portion 19 of smaller diameter moves into the passage 20, and in so doing provides an annular shoulder 21 at the inner end of the nipple against which the end of the conduit received in the nipple, abuts. The metal displaced during the punching operation fills up

the clearance 17, so that the cavity portions form the nipple to a predetermined shape and size during the displacement of the metal by the punches 18.

5 The box, as finally formed, is shown in dotted lines in Figure 6 as an elongated box open at one side, with a nipple 4 at each end and laterally extending nipples between its ends, this being one conventional form of electric conduit outlet box.

10 Under the requirements of the Board of Underwriters, electric conduit outlet boxes must stand certain tests, as to strains, etc., and an outlet box formed by this method and apparatus is particularly strong, well able to stand all the
15 strains and tests, and economical in manufacture.

What I claim is:

The method of making metal boxes open at one side with one or more conduit-receiving nipples, consisting in forging a blank into a boxlike body having one side open substantially throughout the area of said side, and one or more solid projecting nipples, then punching out the nipple or nipples in an axial direction from their outer ends inwardly while holding the nipple or nipples and the body to a predetermined shape during the punching operation, and finally cutting the wall of metal at the inner ends of the nipple or nipples so that the passage or passages of the nipple or nipples formed by the punching-displacing operation, open into the interior of the body.

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