Dec. 30, 1958 W. F. PUNTE ET AL 2,866,582

CAN END AND NOZZLE ASSEMBLY AND METHOD OF PRODUCING SAME

Filed Dec. 13, 1955 2 Sheets-Sheet 1

Fig. 1.

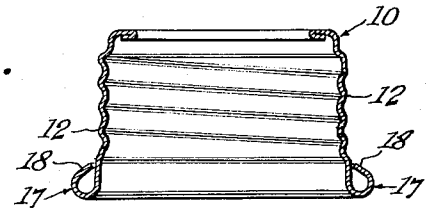


Fig. 2.

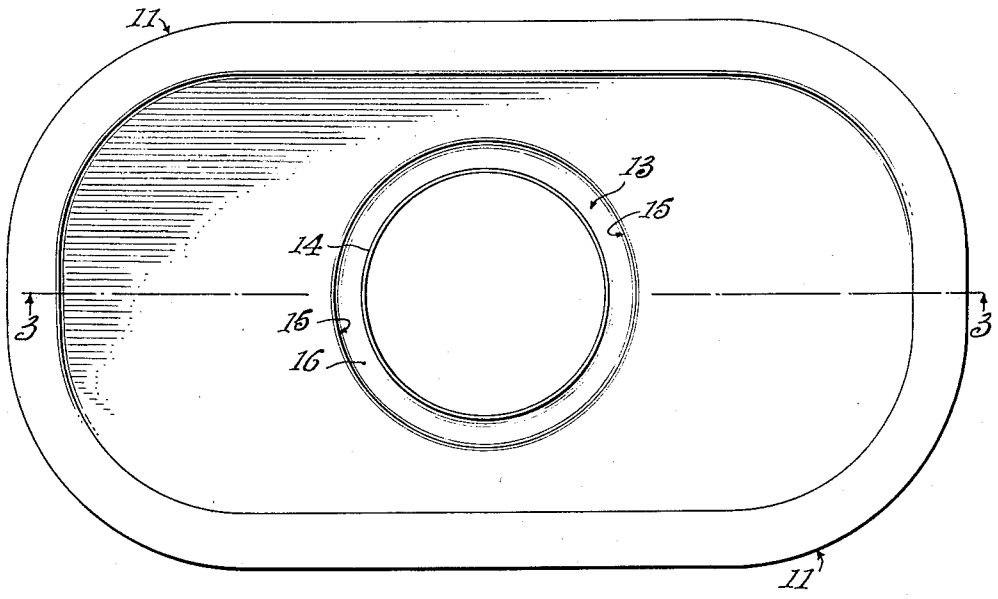
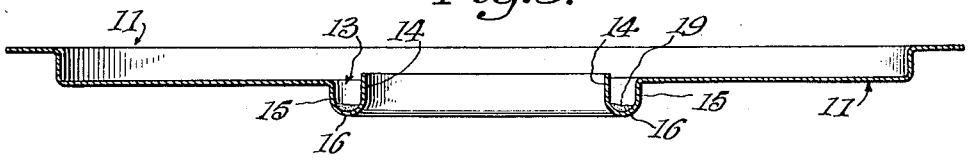


Fig. 3.



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Filed Dec. 13, 1955 2 Sheets-Sheet 2

Fig. 4.

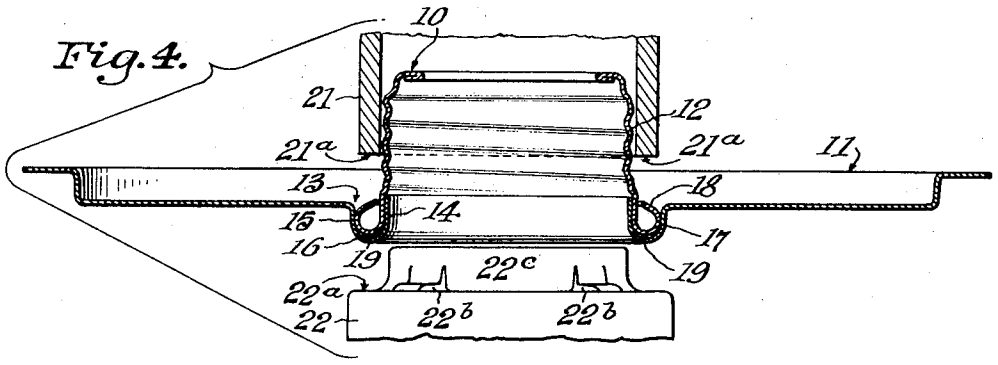


Fig. 5.

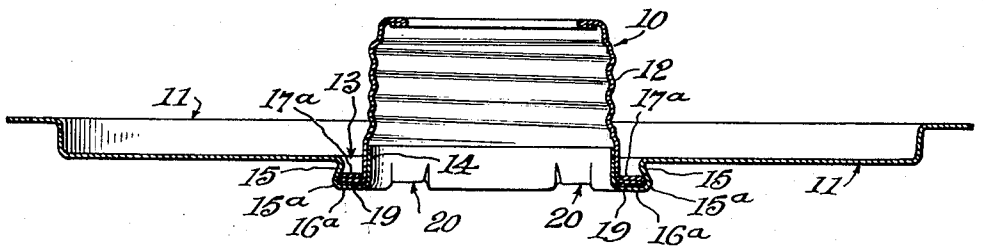
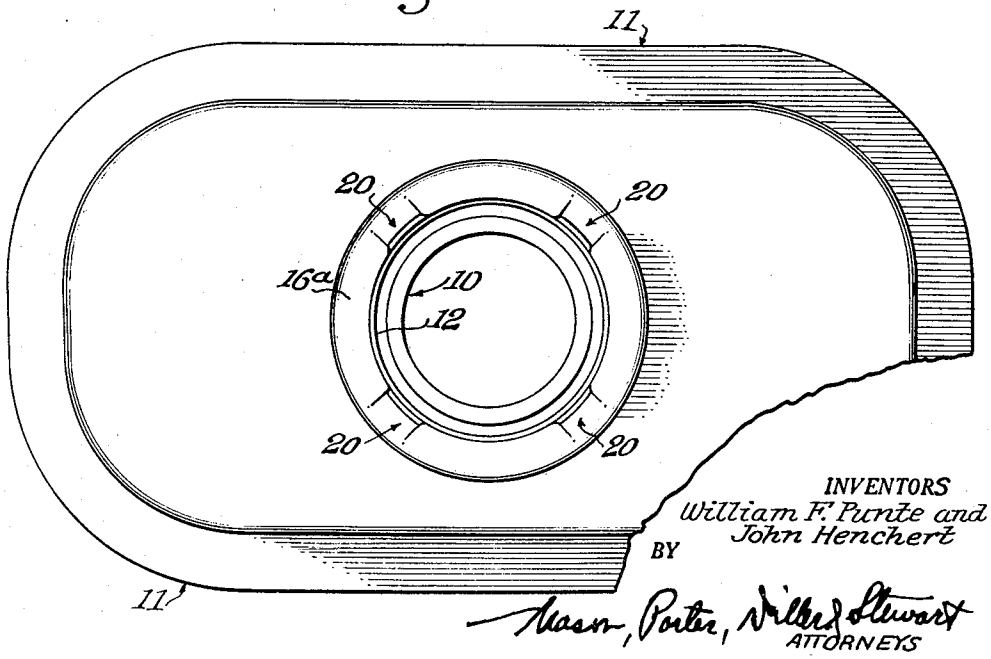


Fig. 6.



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CAN END AND NOZZLE ASSEMBLY AND METHOD OF PRODUCING SAME

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Application December 13, 1955, Serial No. 552,804

11 Claims. (Cl. 222—574)

This invention relates to the attachment of nozzles to can ends and it aims to provide a novel and advantageous assembly of can end and nozzle and an equally novel and advantageous method of producing this assembly.

The invention aims to provide a simple, rapid, economical and highly effective way of attaching the nozzle to the can end without the use of solder, and with no danger of metal cracking or of cracking enamel when enameled can ends are being used.

The can end is formed with a continuous upwardly open groove around an opening therein and the lower end of the nozzle is formed with an external, circumferential, tubular bead for reception in said groove. A quantity of sealing compound is placed on the bottom of the groove, the beaded lower end of the nozzle is inserted into said groove upon the sealing compound and the tubular bead is then flattened, thereby outwardly increasing the radial width of the bead and forcing it into interlocking engagement with the outer side wall of said groove. If this side wall be cylindrical, as preferred, the pressure of the bead against said wall, during the bead flattening operation, outwardly deforms the lower portion of said wall and the outer peripheral edge of the flattened bead becomes tightly seated in the deformed wall portion, thus positively locking the nozzle against endwise movement from the can end. The sealing compound insures that the union between nozzle and can end shall be fluid tight. To obtain the same interlocking of flattened bead and groove side wall, the latter may of course be preformed into the required shape to receive the outer edge of the flattened bead but this complicates the formation of the groove and is not therefore preferred.

The groove bottom is preferably concave and flattened simultaneously with flattening of the aforesaid tubular bead. Thus, during bead and bottom flattening, the bottom forces outwardly upon the lower portion of the groove side wall and the bead does likewise, and these two forces therefore combine to produce the outward deformation of said side wall for interlock with the flattened bead.

When it is desired that the attached nozzle be held against rotation with respect to the can end, for example when a screw cap is to be used on said nozzle, restricted contacting portions of the nozzle and can end are so deformed as to interengage and prohibit such rotation. This deformation is preferably effected simultaneously with the bead flattening operation.

The invention further contemplates imparting a novel shape to the tubular bead of the nozzle to insure greater horizontal expansion of said bead, during the bead flattening operation, than would otherwise be possible.

The invention insures economical production, requires no soldering, and eliminates working the metal on the inside of the can as would be necessary with crimped flanges. Moreover, as no sharp folds are required in the

can end, the incidence of metal cracking is reduced, and when attaching nozzles to enameled can ends, there is little possibility of cracking the enamel.

With the above and other objects in view that will hereinafter appear, the nature of the invention will be more clearly understood by reference to the following detailed description, the appended claims and the several views illustrated in the accompanying drawings.

In the drawings:

Figure 1 of the accompanying drawings is a vertical sectional view of a nozzle beaded at its lower end in accordance with the present invention.

Figure 2 is a top plan view of a can end apertured and grooved in readiness for attachment of the nozzle.

Figure 3 is a sectional view on line 3—3 of Figure 2 and showing the sealing compound in the can end groove.

Figure 4 is a vertical sectional view showing the beaded lower end of the nozzle seated in the can end groove and showing illustrative dies for performing following operations.

Figure 5 is a vertical sectional view showing the completed assembly of nozzle and can end.

Figure 6 is a bottom plan view of the assembly of Figure 5.

A sheet metal nozzle **10** is shown, for attachment to a sheet metal can end **11**, said nozzle having a thread **12** for engagement by a conventional screw cap.

The can end **11** is formed with a continuous upwardly open groove **13** having concentric inner and outer cylindrical side walls **14** and **15**, and a concave bottom **16** integrally joined to said side walls.

The nozzle **10** is of substantially cylindrical form and its lower end is curled outwardly to form an external, circumferential, tubular bead **17**. This bead **17** is given an ovate form in radial section and the free edge portion of the curl, which forms the top **18** of said bead, is extended upwardly and inwardly to the periphery of the nozzle. This inclined bead top performs a function hereinafter explained.

The beaded lower end of the nozzle **10** is formed of such size that upon insertion into the groove **13**, as seen in Figure 4, it will be in contacting relation with both of the groove side walls **14**, **15**. Before such insertion, however, a quantity of sealing compound **19**, commonly known as "dope" is placed in the groove **13** upon the bottom **16**.

After insertion of the beaded end of the nozzle **10** into the groove **13** (Figure 4), the bead **17** and groove bottom **16** are simultaneously flattened. During such flattening, the bead is outwardly widened as shown at **17***a* in Figure 5 and outwardly presses forcibly against the lower portion of the outer side wall **15** of the groove **13**. At the same time the flattening of the concave groove bottom **16** to the flat form shown at **16***a* in Figure 5, causes said bottom to exert an outward force on the groove side wall **15**. The result is that the two forces combine to outwardly deform the lower portion of the side wall **15** as shown at **15***a* in Figure 5 and the outer edge of the flattened bead **17***a* becomes solidly interlocked with this deformed wall portion **15***a*, thereby holding the nozzle **10** against endwise movement with respect to the can end **11**.

During flattening of the bead **17**, the inner edge of its inclined top wall **18**, slides downwardly on the periphery of the nozzle **10** and thus cams the bead outwardly, thus outwardly widening the bead to a greater extent than would be otherwise possible.

In order to prevent rotation of the nozzle **10** with respect to the can end **11**, restricted contacting portions of the two are deformed to provide interengaging portions

which attain this result. Such deformations are shown at **20** in Figures 5 and 6. The specific deformations **20** shown are partially in the flattened bead **17***a* and flattened groove bottom **16***a*, and partially in the wall of the nozzle **10** and contacting groove wall **14**. These deformations **20** may well be formed simultaneously with flattening of the bead **17** and the groove bottom **16**.

In Figure 4, illustrative press dies **21** and **22** have been shown for performing the desired operations. These dies have flat faces **21***a* and **22***a* respectively, which flatten the bead **17** and groove bottom **16**, and die **22** has projections **22***b* which form the deformations **20**. Die **22** is also provided with a cylindrical portion **22***c* for contact with the inner groove wall **14**.

From the foregoing, it will be seen that the nozzle is fluid tightly attached to the can end in a simple, rapid and economical manner, and that danger of cracking the metal of the can end or cracking enamel thereon, is reduced to the minimum, as no sharp bends are required.

While preferences have been disclosed, it is to be understood that variations may well be made within the scope of the invention as defined in the appended claims.

We claim:

1. In a method of attaching a sheet metal nozzle to a can end, the steps of forming the can end with a continuous upwardly open groove having concentric side walls one of which defines an opening through said can end, forming the lower end of the nozzle with an external circumferential tubular bead for reception in said groove, placing a sealing compound in said groove, inserting the beaded lower end of the nozzle into said groove in contact with said groove side walls and upon said sealing compound, and flattening said tubular bead in a direction to radially widen the same into interlocking engagement with the outer side wall of said groove.

2. In a method of attaching a sheet metal nozzle to a can end, the steps of forming the can end with a continuous upwardly open groove having a concave bottom and concentric cylindrical side walls one of which defines an opening through the can end, forming the lower end of the nozzle with an external circumferential tubular bead for reception in said groove, placing a sealing compound upon said concave bottom, inserting the beaded lower end of said nozzle into said groove in contact with said cylindrical side walls and upon said sealing compound, and simultaneously flattening said tubular bead and said concave groove bottom, thereby outwardly widening the lower portion of said groove and outwardly deforming the contiguous lower portion of the outer cylindrical side wall of said groove and interlocking the flattened bead and deformed wall portion.

3. In a method of connecting a substantially cylindrical sheet metal member with a can member, the steps of forming the can member with a continuous groove having a cylindrical outer side wall and a concave bottom, forming the lower end of the cylindrical member with an external circumferential tubular bead, inserting the beaded lower end of said cylindrical member into said groove in contacting relation with said cylindrical side wall, and simultaneously flattening said tubular bead and said concave bottom, thereby outwardly widening the lower portion of said groove and outwardly deforming the contiguous lower portion of said cylindrical side wall and interlocking the flattened bead with the deformed portion of said cylindrical side wall.

4. In a method of connecting a substantially cylindrical sheet metal member with a can member, the steps of forming the can member with a continuous groove having concentric cylindrical side walls and a concave bottom, forming the lower end of the cylindrical member with an external circumferential tubular bead, inserting the beaded lower end of said cylindrical member into said groove in contacting relation with said cylindrical side walls, and simultaneously flattening said tubular bead and concave bottom, thereby outwardly widening the lower portion of said groove and outwardly deforming the contiguous lower portion of the outer side wall and interlocking the flattened bead with the deformed portion of said outer side wall.

5. In a method of attaching a substantially cylindrical sheet metal member to a can member, the steps of forming an upwardly open continuous groove in the can member, outwardly curling the lower end portion of the cylindrical member into tubular bead form and extending the free edge portion of the curl upwardly and inwardly to the periphery of said cylindrical member, inserting the beaded lower end of said cylindrical member into said groove and downwardly flattening the tubular bead to radially expand it into interlocking engagement with the outer side wall of said groove.

6. In a can end and nozzle assembly, a sheet metal can end having an opening and a continuous groove around said opening, said groove having concentric inner and outer side walls and a bottom connecting said side walls, sealing compound covering said bottom, a substantially cylindrical sheet metal nozzle having a lower end portion extending into said groove and snugly surrounding said inner side wall, and a flattened bead integral with said lower end portion of said nozzle, said flattened bead being disposed in the lower portion of said groove and being seated tightly upon said sealing compound, said outer side wall having an outwardly deformed portion in which the peripheral edge of said flattened bead is tightly seated.

7. A structure as specified in claim 6; portions of said can end and nozzle at the juncture of the groove bottom and the inner groove wall being so deformed as to prevent relative rotation of said can end and nozzle.

8. A structure as specified in claim 6; portions of said flattened bead and groove bottom being so deformed as to prevent relative rotation of said can end and nozzle.

9. In a method of attaching a sheet metal body including an upright annular wall to a can end, the steps of forming the can end with a continuous upwardly open groove having concentric side walls, forming the lower end of the body with an external circumferential tubular bead for reception in said groove, inserting the bead of said body in said groove in contact with the groove side walls, flattening the bead in a direction to radially widen the same into secure anchoring engagement with the outer side wall of the groove, and deforming can end wall portions and bead portions to provide interlocking interengagement thereof effective to prevent relative rotation of said can end and body.

10. In a method of attaching a sheet metal body including an upright annular wall to a can end, the steps of forming the can end with a continuous upwardly open groove having concentric side walls, forming the lower end of the body with an external circumferential tubular bead for reception in said groove, inserting the bead of said body in said groove in contact with the groove side walls, flattening the bead in a direction to radially widen the same into secure anchoring engagement with the outer side wall of the groove, and simultaneously with the flattening of the bead deforming can end wall portions at equidistantly spaced intervals about the groove to provide interlocking engagement of bead and deformed can end wall portions effective to prevent relative rotation of said can end and body.

11. In a can end and nozzle assembly, a sheet metal can end having an opening and a continuous groove around said opening, said groove having concentric inner and outer side walls and a bottom connecting said side walls, sealing compound covering said bottom, a substantially cylindrical sheet metal nozzle having a lower end portion extending into said groove and snugly surrounding said inner side wall, and a flattened bead integral with said lower end portion of said nozzle, said flattened bead being disposed in the lower portion of said groove and being seated tightly upon said sealing

compound, said outer wall having a lower portion merging into said bottom and held outwardly deformed relative to the remainder of said outer wall by the peripheral edge of the flattened bead so as to provide a flattened bead retaining overhang on said remainder of said outer wall and engaging over said peripheral bead edge, and said flattened bead including an inwardly directed thickness engaging the outer wall of the nozzle at its inner edge extremity and held in compression between said outer nozzle wall and said outer groove side wall.

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