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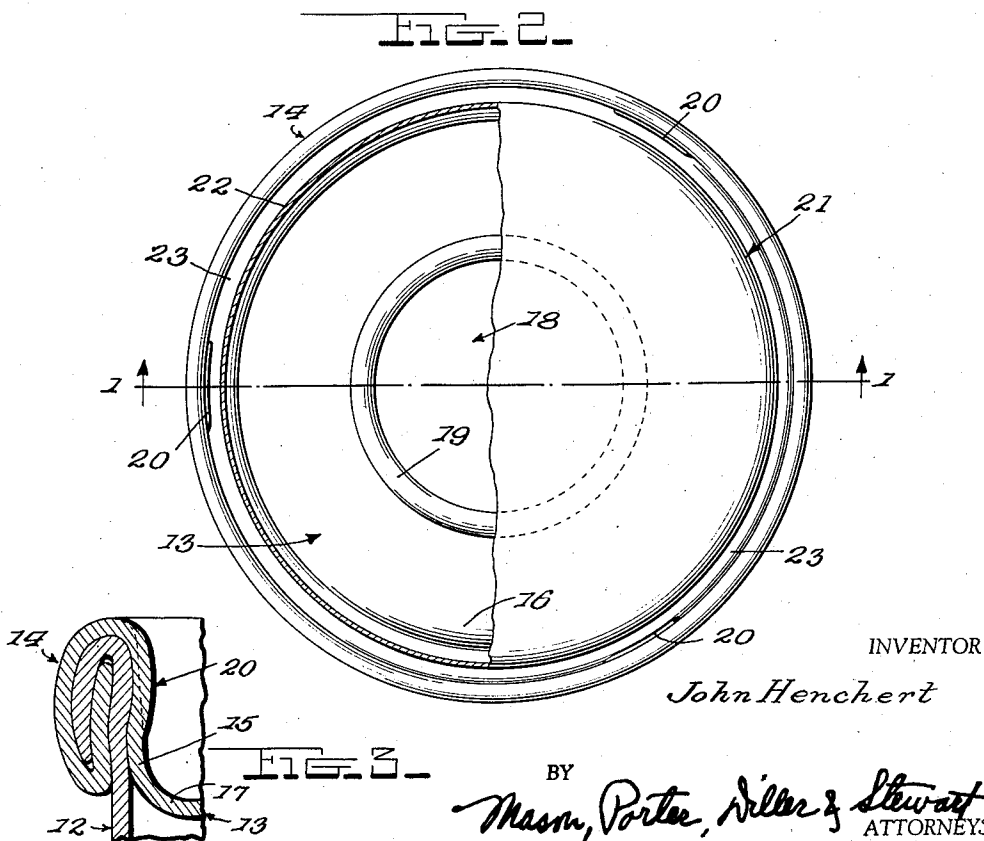
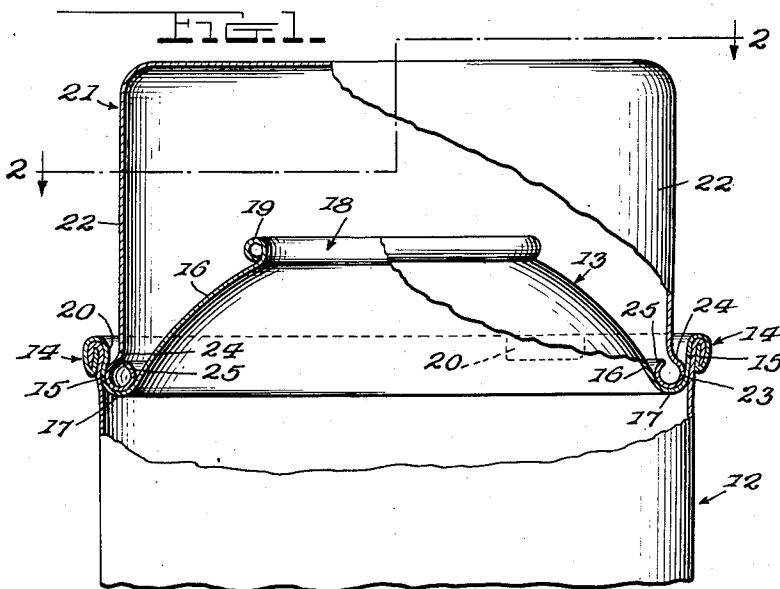
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SPRAY CAN AND SNAP-ON CAP ASSEMBLY AND MANUFACTURE THEREOF

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3 Sheets-Sheet 1



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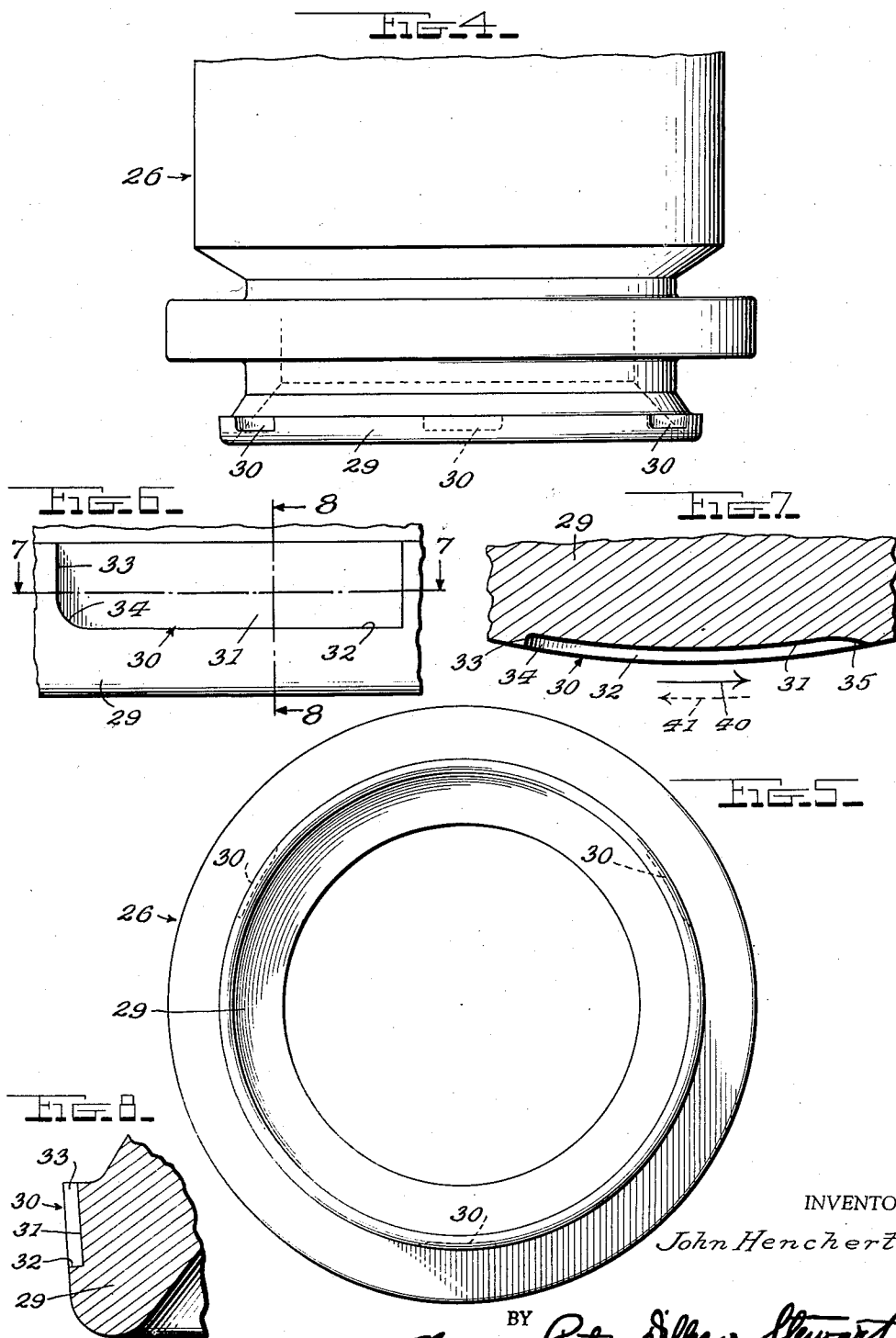
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3 Sheets-Sheet 2



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SPRAY CAN AND SNAP-ON CAP ASSEMBLY AND MANUFACTURE THEREOF

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3 Claims. (Cl. 220—60)

Spray cans of the so-called aerosol type are commonly provided with removable caps which protect the spray valves from dust and the like, and the present invention relates to a can of this general type in which the lower end of a skirted cap may be easily snapped into and from engagement with the can.

The upper end of the can is joined to the can body by a double seam having the usual upstanding chuck wall, and one object of the invention is to provide this wall with circumferentially spaced inwardly projecting detents or mounds, and to provide a skirted cap the lower end of which may be easily snapped into and from engagement with said detents or mounds, thus providing for solidly holding the cap on the can yet permitting easy cap removal and re-application.

Another object of the invention is to form the detents or mounds in a novel manner while seaming the can body and end together.

A seaming chuck engages the can end and its chuck wall while first and second operation seaming rolls form the seam from body-carried and end-carried flanges. During the seam forming operation, restricted portions of the chuck wall are deformed into peripheral recesses in the chuck lip to form the above mentioned detents or mounds, and a further object is to so restrict the radial dimension of said mounds that they cannot lock the seamed can to the chuck and cannot, therefore, interfere with axial separation of the chuck and seamed can by means of the customary knock-out pad within the chuck.

A still further object is to provide a novel one-piece seaming chuck having the aforesaid recesses and useable in manufacturing spray cans such as above mentioned, or cans of other types. In either instance, the portions of the chuck wall deformed into the chuck recesses prevent relative skidding of the chuck and can end, whether the chuck be used to rotate the can as in some seamers, or to non-rotatably hold the cans as in others.

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 fragmentary side elevation, partly in section on line 1—1 of Figure 2, showing the improved can and snap-on cover assembly.

Figure 2 is a plan view partly in horizontal section, on line 2—2 of Figure 1.

Figure 3 is an enlarged detail sectional view through the double seam and one of the detents or mounds.

Figure 4 is a side elevation of the improved seaming chuck.

Figure 5 is a lower end view of the seaming chuck.

Figure 6 is an enlarged fragmentary side elevation showing the preferred form of one of the chuck recesses.

Figures 7 and 8 are detail sectional views on lines 7—7 and 8—8 of Figure 6.

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Figures 9, 10 and 11 are enlarged sectional views showing different steps utilized in forming the double seam and the detents or mounds on the chuck wall thereof.

In Figures 1, 2 and 3 a can body 12 and an upper can end 13 are joined by a double seam 14, said seam having the usual upstanding chuck wall 15. The can end 13 is shown as having a domed portion 16 joined by a chuck wall radius 17 to the chuck wall 15, said domed portion 16 having an opening 18 with a beaded edge 19 for mounting a conventional spray valve.

The double seam 14 is conventional except that the chuck wall 15 is provided with inwardly deformed portions constituting circumferentially spaced mounds 20, three being preferable. These mounds 20 are disposed toward the upper end of the chuck wall 15 and they are shown as elongated circumferentially of the can, due to the construction of the seaming chuck hereinafter described.

A cap 21, preferably formed of sheet metal, is provided to protect the spray valve against dust and the like, said cap 21 having a depending skirt 22. The lower end of this skirt is formed with a circumferential rib 23 to be surrounded by the chuck wall 15, said rib being preferably formed by curving the lower end of the skirt outwardly at 24 and then inwardly curling it at 25. It will be apparent by reference to Figure 1 that just as the outward curving of the rib 23 extends outwardly beyond the upright wall or skirt 22 of the cap 21, the inward curling at 25 extends inwardly of said cap skirt. The rib as thus formed takes the form of an open or hollow resilient tube with the cap skirt or wall 22 extending upwardly therefrom intermediately of the radial cross section of the rib, as shown in Figure 1. It is to be noted also that the circular cross section of the rib 23 conforms in shape to the well rounded curve or radius 17 which joins the domed portion 16 with the annular chuck wall 15 so that the rib can bottom in the upwardly opening channel defined by said dome portion 16, radius 17 and chuck wall 15, as shown in Figure 1.

When the cap 21 is in position upon the can, the rib 23 engages the chuck wall radius 17 and underlies the mounds 20 as seen in Figures 1 and 2. The radial dimension of these mounds 20 is such that the rib 23 will snap past said mounds when either applying or removing the cap 21. Thus, the cap will be securely held in place, yet may be easily removed and reapplied, as required. The mounds 20 preferably project about .010" from the chuck wall 15.

In Figures 4 to 8, a one-piece seaming chuck 26 is shown for cooperation with first and second operation seaming rolls in forming the double seam 14 and providing the chuck wall 15 with the mounds 20. A portion of a first operation seaming roll 27 is shown in Figures 9 and 10, and part of a second operation seaming roll 28 is illustrated in Figure 11.

The lip 29 of the seaming chuck 26 is slightly tapered, at about 4°, as usual. The periphery of this lip 29 is formed with shallow circumferentially spaced recesses 30 which are spaced upwardly from the lower end of said lip and preferably open through the upper end thereof, three of these recesses being shown. All of these recesses 30 are of the same shape and a description of the preferred form of one will suffice for all, particular reference being now made to Figures 6, 7 and 8.

Each recess 30 is elongated circumferentially of the chuck lip 29 and the inner wall 31 of said recess is concentric with the periphery of said lip. The lower side wall 32 is at a right angle to the inner wall 31, and one end of the recess has an abrupt end wall 33, the lower end of the latter being curved at 34 to said lower side wall 32. At the other end of the recess, the inner wall 31 curves outwardly at 35 to the chuck periphery. For a

202 diameter can, the recess 30 is preferably .012" deep, .075" high and .2968" long.

The chuck 26 cooperates as seen in Figures 9 to 11 with the rolls 27 and 28 to seam the can end 13 to the can body 12 and form the mounds 20 on the chuck wall 15. The body 12 is provided with the usual lip flange 36 (Figure 9), and the can end 16 has the conventional peripheral flange 37 projecting outwardly from the chuck wall 15, said flange 37 having the usual downwardly and inwardly curled edge 38. The can end 13 is placed upon the body 12 with the flange 37 resting on the flange 36 and the chuck wall 15 fitting into said body 12, as seen in Figure 9. The chuck 26 is then engaged with the can end 13 as seen also in Figure 9, the tapered periphery of the chuck lip 29 being in contact with the correspondingly tapered chuck wall 15.

We will now assume that the chuck 26 drives the assembled can end and body while the seaming rolls remain relatively stationary, although in some seamers the chuck holds the assembled can end and body against rotation while the seaming rolls travel around the same.

As the assembled can end and body (Figure 9) are rotated, the first operation seaming rolls 27 move in as usual, with the result that the flanges 36, 37 and the curled flange edge 38 are initially spun together or clinched as seen in Figure 10. During this operation, some of the seam metal is not backed up by the chuck lip 29 due to the recesses 30. The result is that restricted portions of the chuck wall 15 are deformed into the recesses 30 as seen at 39 in Figure 10.

When the first operation rolls 27 have completed their function, they withdraw as usual and the second operation rolls 28 move in as seen in Figure 11 to complete the double seam 14. During this seam completing spinning operation, the deformations 39 of Figure 10 become further deformed into the recesses 30 to form the mounds 20 above described. The extent to which these mounds project from the chuck wall 15 is insufficient to interfere with separation of the chuck 26 and the seamed can by relative axial movement effected by the usual knock-out pad within the chuck. As above stated, the preferred extent of projection is about .010" and as the recesses 30 are only .012" deep they will prohibit the formation of mounds having a greater radial dimension than .012" even when the seam metal fills the recesses to a greater extent than shown in Figure 11: and .012" projection of the mounds 20 from the chuck wall 15 will neither interfere with separation of the seamed can and chuck nor with snapping of the cover rib 23 past said mounds during application and removal of the cap 21.

In seamers requiring that the chuck 26 be rotated, said chuck will be driven in the direction of the arrow 40 of Figure 7. In seamers requiring that the chuck be non-rotatable, the seaming rolls will travel about the chuck in the direction indicated by the dotted arrow 41. In either case, the curved end 35 of each recess inner wall 31 allows the deformed metal to gradually move into the recess 30 under the influence of the pressure exerted by the seaming rolls.

In forming the seam 14 with the mounds 20, the usual sealing compound or dope is used and any minute gaps which may occur between adjacent thicknesses of metal in the regions of said mounds become completely filled by said compound or dope and the tightness of the seam will not therefore be diminished.

In the present disclosure, the mounds 20 are formed

for coaction with the snap-on cap 21 of a spray can. However, it has been found that deformation of portions of the seam metal into the chuck recesses will prevent relative skidding of the chuck and can end during seaming. Therefore, the invention is also useable to advantage in the double seaming of other forms of cans.

From the foregoing it will be seen that novel and advantageous provision has been disclosed for attaining the desired ends. Attention is invited, however, to the possibility of making variation within the scope of the invention.

I claim:

1. In a can structure, a round body having a side wall, a can end secured on the body by a fluid tight rolled seam including an inwardly facing upright chuck wall, said can end having an upwardly and inwardly extending domed portion merging outwardly into the chuck wall through a well rounded radius so that said domed portion, radius and chuck wall together provide an upwardly opening annular channel, and a round cap removably assembled on the can end and mounted over said domed portion and including a depending upright skirt having a tubular resilient rib at its lower extremity shaped to conform to the well rounded radius at the bottom of the channel and bottomed in said channel, a portion of said rib extending outwardly of the skirt and a portion of said rib extending inwardly of said skirt so that the skirt extends upwardly from the rib intermediately of the radial cross section of the rib, and said chuck wall having thereon a plurality of spaced inward deformations confined to the region of the seam between said radius and the upper extremity of the seam and dimensioned to slightly overlie the rib bottomed in the channel, permitting ready snapping on and off of the cap.

2. Can structure as defined in claim 1 wherein the inward deformations are three in number and project from the chuck wall approximately .010" and are horizontally arcuate in shape.

3. Can structure as defined in claim 1 wherein the inward deformations are three in number and project from the chuck wall approximately .0100" and are horizontally arcuate in shape, and wherein the seam has dope therein cooperating with the deformation of seam structure at the positions of the inward deformations in assuring against leakage through the seam at said positions.

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