Feb. 3, 1959 A. BINDER 2,871,553

METHOD OF MAKING A CONTAINER

Filed Dec. 13, 1956 4 Sheets-Sheet 1

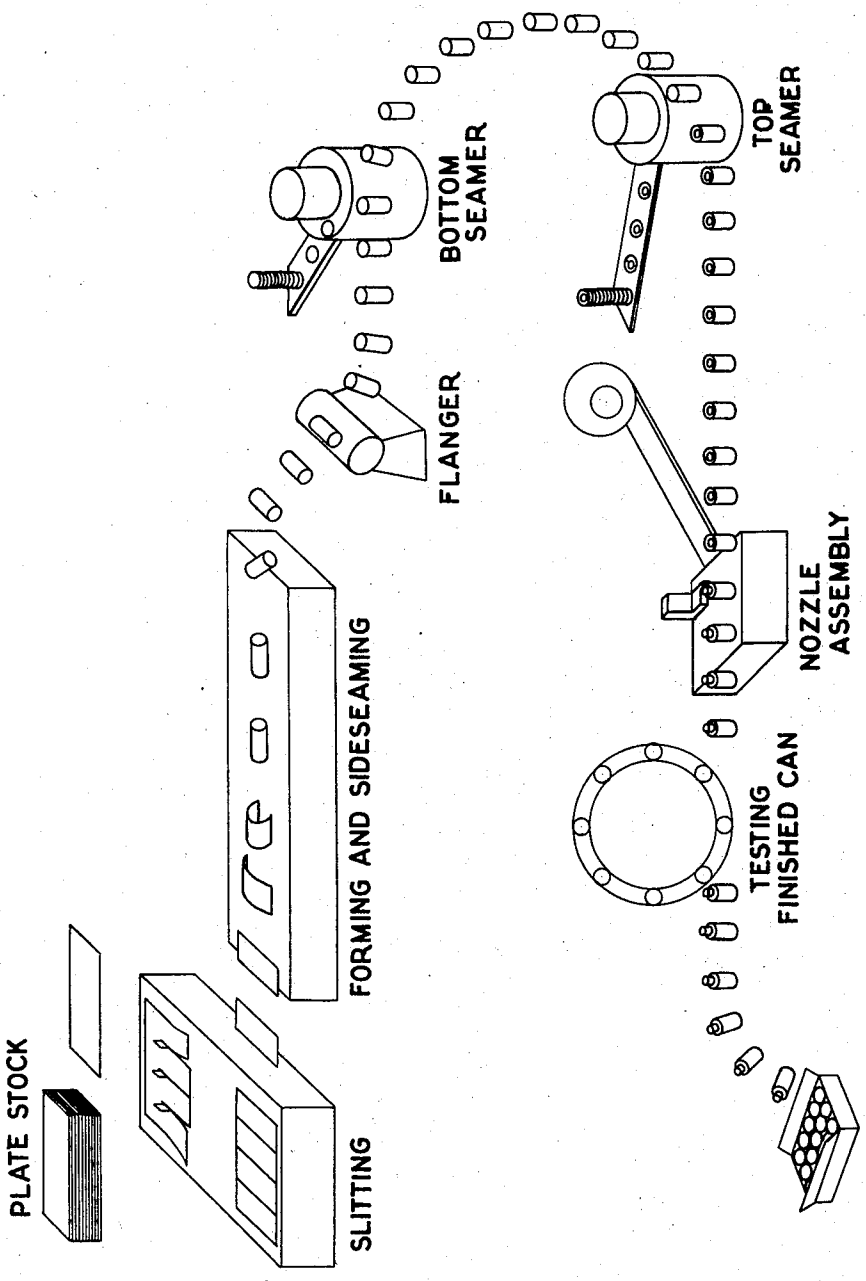


Fig. 1

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METHOD OF MAKING A CONTAINER

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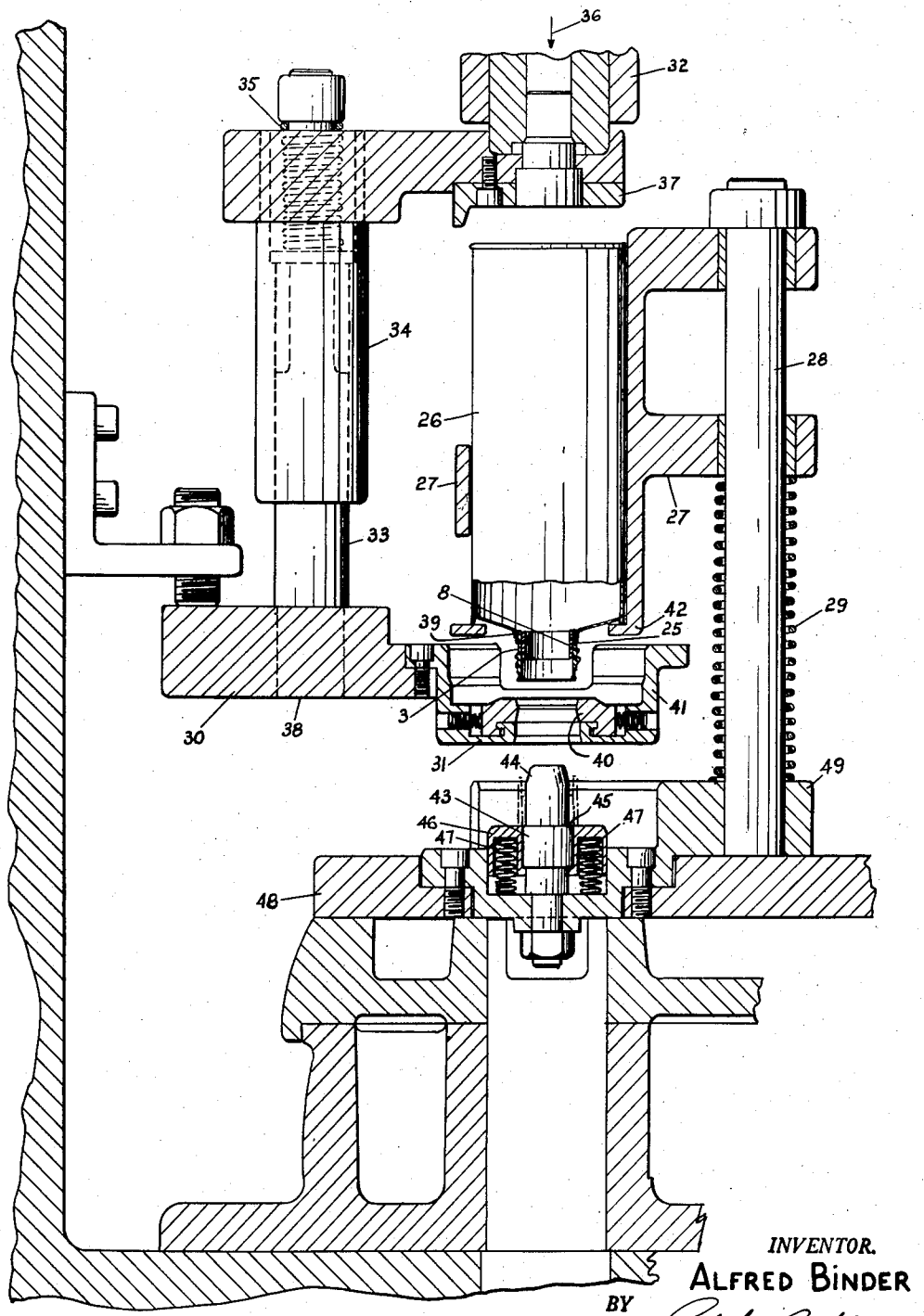


Fig.-2

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Feb. 3, 1959 A. BINDER 2,871,553

METHOD OF MAKING A CONTAINER

Filed Dec. 13, 1956 4 Sheets-Sheet 3

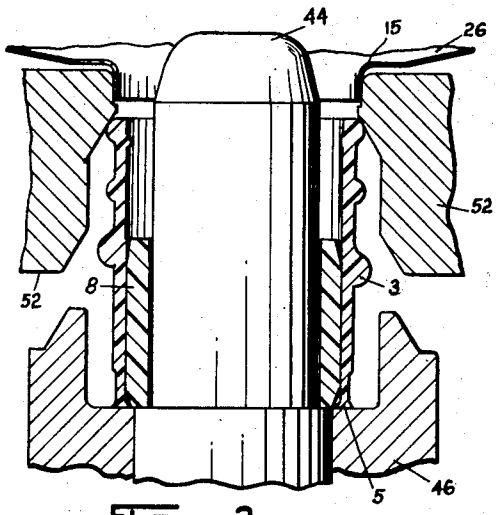


Fig.-3

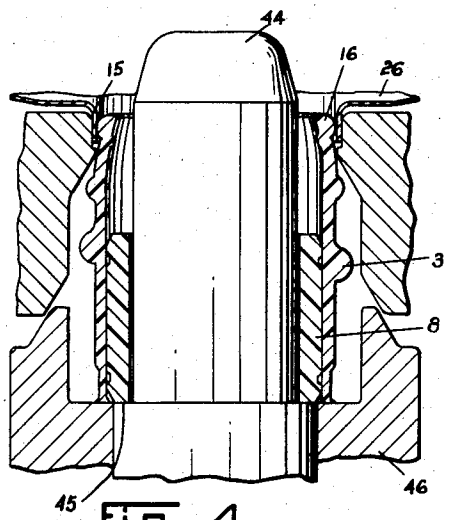


Fig.-4

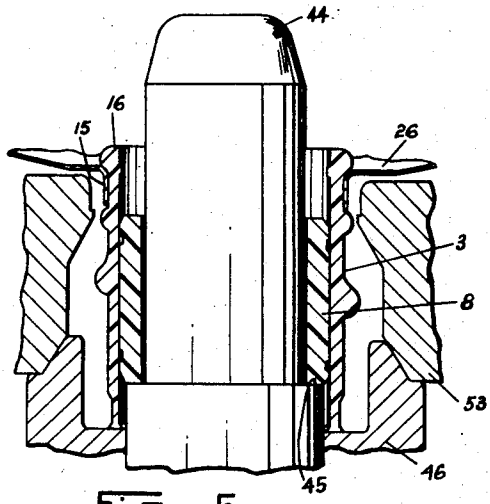


Fig.-5

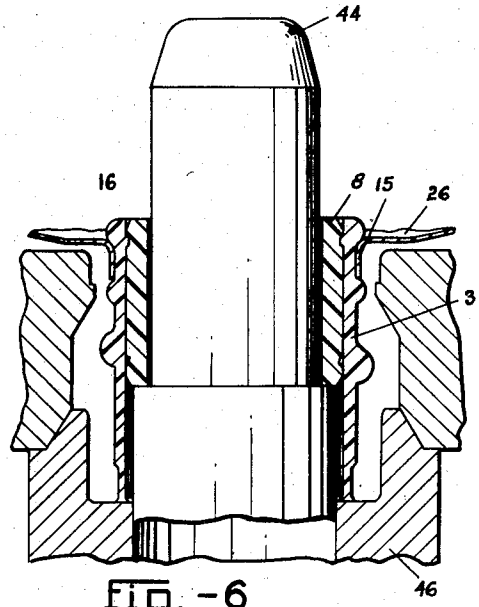


Fig.-6

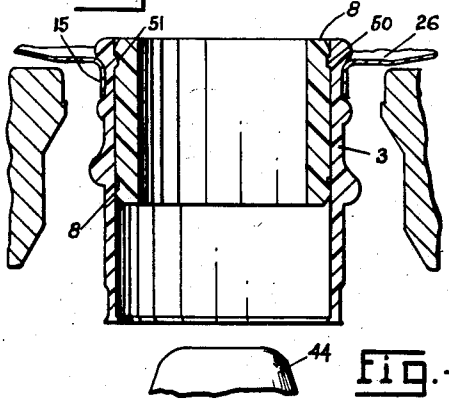


Fig.-7

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METHOD OF MAKING A CONTAINER

Filed Dec. 13, 1956 4 Sheets-Sheet 4

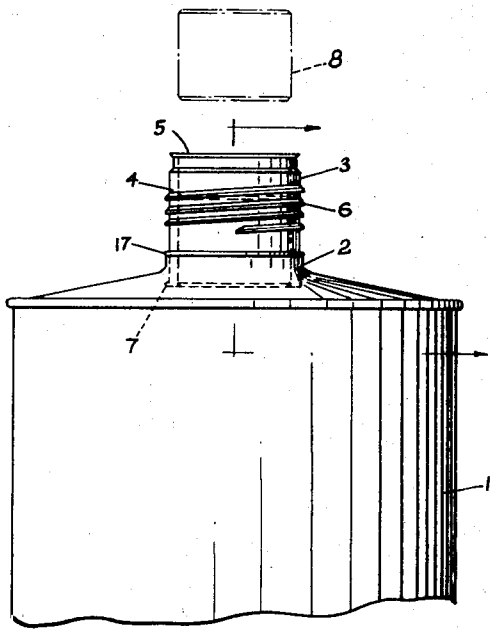


Fig.- 8

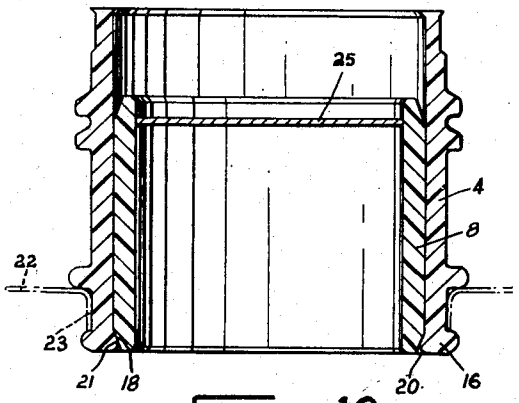


Fig.- 10

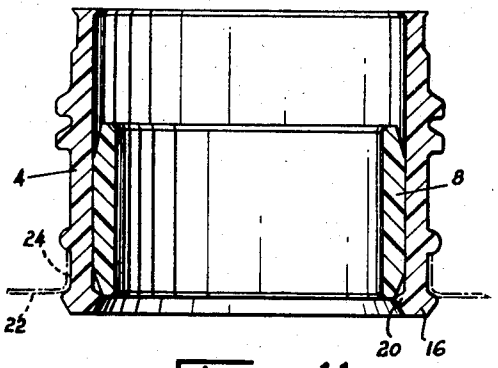


Fig.- 11

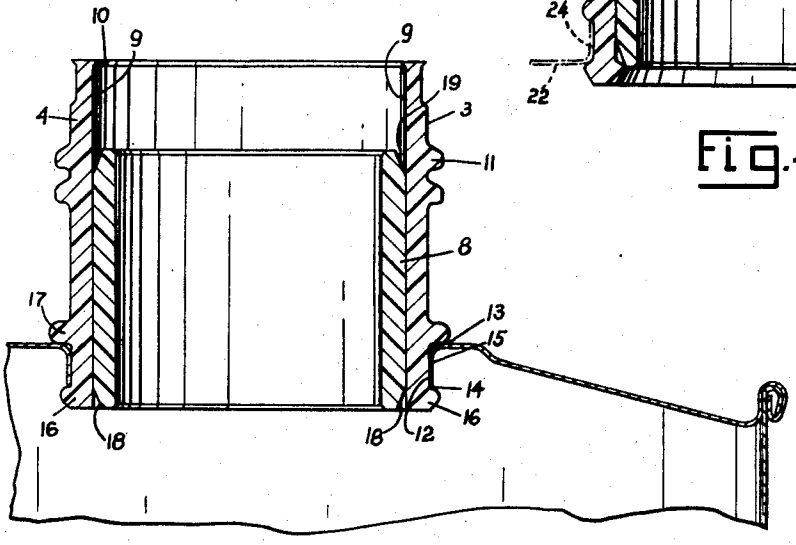


Fig. - 9

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United States Patent Office 2,871,553 Patented Feb. 3, 1959

2,871,553

METHOD OF MAKING A CONTAINER

Alfred Binder, Chicago, Ill., assignor to The Sherwin-Williams Company, Cleveland, Ohio, a corporation of Ohio

Application December 13, 1956, Serial No. 628,028

5 Claims. (Cl. 29—451)

This invention relates, as indicated, to an improved method for making a container, and more particularly to a method of making a metallic container having a non-metallic spout attached thereto.

The dramatic increase in the household use of liquid detergents as well as a multitude of other compositions which can be packaged in metallic containers has highlighted the need for a dispensing device which meets not only the requirements of the material contained, but also the requirements of the plants producing and/or packaging such materials. The liquid detergents, for example, do not lend themselves readily for packaging in wide-mouth containers. Consequently, the top portion of a tin can, for example, comprises a reducing neck and a relatively small diameter spout. The fabrication of these devices from metal, while not particularly complicated in and of itself, introduces problems in the rapid feeding of such entirely metallic devices to the top-affixing machines, because such tops with the protruding spouts are difficult to handle due to their generally unsymmetrical configuration. They are hard to feed from a bulk storage and difficult to transport through conveyor lines.

To answer the problem of convenient dispensing and a non-corrosive spout, the industry has adopted many forms of plastic spouts or nozzles. One of the properties afforded by polyethylene or polypropylene, for example, is that it can be made into the so-called "dripless" spout by providing the outer lip with a chamfered flange. To date, however, such polyethylene or polypropylene nozzles have been attached to the metallic container top portion, and the thus produced top-nozzle assembly then rolled onto the can body by suitable machinery. Again, the can fabricator is dealing with an unsymmetrical object which is difficult to handle.

There is, therefore, a need for a method of making a completed container, and more particularly a method for providing a metallic container body with a non-metallic spout which will enable the emplacement of such non-metallic spout in the metallic can body after all the metal work has been done.

It is a principal object of this invention, therefore, to provide a process for making a container, and more particularly affixing a non-metallic spout to a metallic can body wherein the metal portion of the container has been completely fabricated prior to the attachment of the spout.

Another object of this invention is to provide a method for externally inserting and attaching a non-metallic spout to the top of a metallic container in which top there has been provided a rimmed circular opening of diameter substantially smaller than the diameter of the can body.

Another object of this invention is to provide a process for making a metallic container having a non-metallic spout, which process will enable the isolated emplacement of the spout members at a point remote from the place where the metallic portion of the container has been previously fabricated.

This application is related to my co-pending application Ser. No. 622,389 filed November 15, 1956 describing and claiming a structure for a spout of the type useful in carrying out the process of the present invention, said co-pending application having for an object the provision for an externally insertable nonmetallic spout assembly.

Other objects of this invention will appear as the description proceeds.

In the annexed drawings, Fig. 1 is a diagrammatic flow sheet illustrating the process of fabricating the metallic portion of the containers with which the present invention is concerned and the affixing thereto of the non-metallic spout, testing and packaging the finished containers.

Fig. 2 is a fragmentary cross-sectional illustration of the principally functioning portion of a machine adapted to affix the non-metallic spout members to a metallic container body having a rimmed circular opening in one end thereof.

Figs. 3 through 7 are fragmentary cross-sectional views of the principal positions sequentially assumed by the non-metallic spout members during the operation of insertion into the rimmed circular opening of a metallic can body as influenced by certain insertion tool members.

Fig. 8 shows a portion of a metallic container having the non-metallic nozzle affixed thereto.

Fig. 9 shows in greater detail as a fragmentary cross-section, the top of a metallic container having the non-metallic spout members affixed thereto.

Figs. 10 and 11 show cross-sectional views of spout assemblies contemplated for use in accordance with the present invention.

In discussing the method provided by the present invention, it is convenient to consider first the nature of the spout assembly itself and then to discuss the process for making the containers utilizing the spout assemblies. The term "spout" as used herein with reference to the subject devices will refer to the two piece assembly of the "nozzle" and the retainer ring, unless the context indicates the contrary. The "nozzle" is one component of the "spout."

There is provided in Fig. 8, therefore, a metallic container **1** having a rimmed circular opening **2** therein. Mounted in said rimmed circular opening **2**, there is provided a resiliently deformable plastic nozzle **3** comprising a generally tubular body **4** having a mouth **5** at its upper end, a threaded portion **6** intermediate its extremities, and a flange portion **7** shown internally of the container. In dotted lines there is further shown a retaining ring or hollow cylinder member **8** which is adapted to fit tightly within the tubular body **4**.

Fig. 9 shows in somewhat better detail the structure of the spout composed of the combination of the nozzle **3** and the retaining ring **8**. The inner walls **9** of the tubular body **4** are, it will be observed, substantially non-tapering. By the term "substantially" as used in this connection, is meant that such minor deviations from non-tapering as evidenced by the non-drip lip **10** and its inward protrusion, and such inward protrusion as may appear in flanges more particularly shown in Figs. 10 and 11 do not destroy the non-tapering aspect. The retaining ring **8** is able to negotiate or pass over the inward protrusion of the dripless structure **10** without substantial difficulty, due to the deformability of the plastic employed. Also, as shown in Figs. 4–7, there may be an annular detent **50** provided which locks into a corresponding groove **51** in the retaining ring **8**. This structure is to be regarded as embraced within the term "substantially non-tapering."

Also shown in Fig. 9 are means for retaining a cap such as threads **11** located intermediate the ends of the

tubular body **4**. It is obvious that other cap retaining means, such as, detents may be employed.

In the lower portion of the tubular body **4** there is provided a groove **12** defined by a pair of shoulders **13** and **14**. The circumferential groove **12** is desirably of a diameter such that contact with the rimmed circular opening **15** of the metallic container is made. The lowermost shoulder **14** defines a flange **16** at one extremity of said tubular body **4**. The diameters of the shoulders **13** and **14** are greater than that of the circular opening **15**. The diameter of flange **14**, while greater than the diameter of the circular opening **15**, is further such that the flange **16** is capable of passing through the opening **15** upon application of deforming force in an axial direction. In the preferred case, the shoulder **13** may define a flange **17** which may have a diameter, as shown in Fig. 9, greater than the opening **15** and greater than the maximum diameter of the flange **16**. In practical usage, it is desirable from a standpoint of handling these nozzles in a storage hopper to have the flange **17** of larger maximum diameter than that of the flange **16**.

The retaining ring **8** may be provided with a champfered lower edge **18**, and desirably a similarly champfered upper edge **19**. The practicality of having both the upper and lower edges similarly shaped is obvious in making unnecessary proper orientation of the retaining rings in the storage hopper for this part. The length of the retainer ring **8** may be co-extensive with that of the nozzle, if desired.

In Figs. 10 and 11, modification of the device shown in Figs. 8 and 9 is illustrated. In Fig. 10, for example, the flange **16** is provided with a radially inwardly directed portion **20** having a diameter less than the internal diameter of the tubular body **4**. The upper face **21** of the flange **20** may be so shaped as to engage the champfered face **18** of the retaining ring **8** and provide a seat for said retaining ring. It will be observed that the metallic portion of the container **22** is shown with a downwardly rolled opening **23**.

In Fig. 10 there is also shown a modification of the retaining ring **8** wherein there is provided a frangible disc **25** closing the opening through the retainer ring **8**. In some cases it is desirable to provide an inner seal for fluid contents, which seal is to be broken by the consumer.

In Fig. 11, the metallic portion **22** is shown as an upwardly rolled opening **24**. The flange portion **16** of Fig. 11 is again somewhat differently shaped from that shown in Fig. 10, causing the retaining ring **8** to be disposed in a position somewhat short of the bottom of the tubular member **4**. By the application of downward pressure on the retaining ring **8**, the retaining ring **8** may be very tightly forced against the flange **16** and its inward protuberance **20**, causing the tubular body **4** to be tightly locked to the rimmed opening **24**.

The non-metallic portion of the container, i. e., the spout, composed of the nozzle and retainer ring, may be fabricated most conveniently from polyethylene or polyproylene. The procedure for making such nozzles is a well known plastic molding procedure utilizing a two-piece mold. Other materials may be used for the fabrication of both the nozzle portion and the retaining ring portion such as, for example, butadiene-styrene synthetic rubber, butadiene-acrylonitrile synthetic rubber, natural rubber, neoprene, polyvinyl chloride, etc.

The spout assembly is affixed by a simple press to the metallic container having a relatively small diameter opening in the top thereof (relative to the diameter of the can body). The nozzle portion is threaded onto a cylindrical member having a shoulder which can abut against the upper or dripless edge **5** as shown in Fig. 8, for example. Axial pressure will therefore force the flange **16** through the rimmed opening **15** by causing a deformation of the deformable plastic. When the flange **16** has passed the obstruction provided by the rolled over rimmed opening **15**, it returns to its former shape and becomes retained within the opening by the engagement of the rimmed portion between the shoulders **13** and **14**. The shoulders cooperate to prevent both inward and outward movement of the nozzle **3** with respect to the rimmed circular opening **15**. In order that the nozzle **3** may not be removed from the rimmed opening **15** by a chance oblique blow directed at one side of the nozzle **3**, for example, the retainer ring **8** is sent home in the same operation by a smaller plunger operating within the device for seating the nozzle **3**. The amount of travel of the plunger for seating the retainer ring **8**, as is well understood, can be regulated. With the retainer ring **8** in position, deformation of the tubular body **4** is prevented to an extent sufficient that the spout cannot be easily dislodged from its location in the rimmed circular opening.

The retainer ring **8**, as indicated above, may be made from the same material as the nozzle portion **3**, a stiffer embodiment of the same plastic (e. g., a higher polymer of polyethylene), or it may be made of a rigid material such as metal, fiber, or a resin impregnated paper. The O. D. of the retainer ring is such that a tight sliding fit is obtained with the I. D. of the nozzle **3**.

Referring more particularly to Fig. 1, this is a flow sheet of diagrammatic nature, tracing the fabrication of the metallic portion of the container to the emplacement of the non-metallic spout assembly, and final packing of the container. The process begins with plate stock which may or may not be lithographed, as desired. The plate stock is slit on a conventional slitting machine and then fed into a forming and side seaming machine. From this machine, the hollow cylinders pass through a flanging device which places flanges at either end of the hollow cylinder. The next machine places the bottoms on the hollow cylinder and seams the two members together. The can then passes through a top seamer where top members having a rimmed circular opening therein are seamed to the remaining end of the can body. At this point, the metallic portion of the container is complete. The following operations may be performed at a place remote from the plant wherein the metallic portion is fabricated. This is, of course, permissive and not essential, as the entire operation may be performed at one location.

The metallic can bodies are then passed through a machine which affixes the spout assemblies by external application. The containers with the spouts in position are then tested and then packed. The portion of the process up to the affixing of the spout assembly is conventional, the equipment, procedure, etc. being well known to those skilled in the art of manufacturing metallic containers.

Heretofore, the member which was seamed to the top of the container was not simply a flat or conical member having a rimmed circular opening therein as in the present invention. The top member which was seamed by conventional procedures and equipment to the top had previously had affixed thereto a nozzle or spout. This could have been of either the metallic or non-metallic type. This invention departs from convention in that top members of either a flat or conical cross-section have not had previously affixed thereto a nozzle or spout member. If the spout member was to be rolled into place as one means of anchoring the same, it was necessary to make the top-nozzle assembly before attachment to the can body. Even in the case of non-metallic spouts and nozzles composed of one or two members, prior practice has been to attach the nozzle or spout to the top member before seaming to the can body. One device utilizes a retainer ring having a large flange at one end. Thus must necessarily be inserted from the under-side of the top member, indicating that the operation must be performed prior to the seaming of the metallic top portion to the can body.

The handling of top members with the nozzles or spouts in place is difficult because of the unsymmetrical nature of the object and the poor nesting properties of the assembly.

The process with which this invention is concerned, then, is one for making a container comprising a metallic can body, a metallic bottom seamed to one end, a metallic top having a rimmed circular opening therein seamed to the other end and a non-metallic spout, comprising the steps of (1) substantially axially aligning (*a*) a resiliently deformable plastic nozzle having a tubular body with substantially non-tapering inner walls and a flange at one end of diameter larger than that of said circular opening and capable of passing therethrough upon application of deforming force, and (*b*) said metallic container, in flange-to-rimmed circular opening relationship, (2) applying force in an axial direction to deform said plastic and move said flange through said opening to lock therebehind, and thereafter (3) telescoping within said nozzle a retaining ring adapted to be frictionally retained within said nozzle and to prevent substantial deformation of the nozzle in the region of said flange.

Referring more particularly now to Fig. 2, there is shown in cross-section the operative elements of apparatus for effecting the emplacement of the deformable plastic nozzle and the retaining ring. As shown in Fig. 2, the spout assembly **25** has already been seated into the metallic can body **26**. In Fig. 2 there is shown a clamp **27** rotatably and slideably mounted on a shaft **28**. The purpose of the clamp **27** is to pick up can bodies **26** from a supply line, revolve about the shaft **28** and so position the can body **26** as to enable it to receive the nozzle **25**. Means, such as a spring **29**, maintain the clamp **27** in an extended position, but allow lateral movement of clamp **27** along the shaft **28**. Mounted independently, but in cooperative alignment with said clamp-shaft assembly, is a collar-follower assembly **30** composed of a collar **31** and a follower **32**. The follower **32** is shown as mounted on a shaft **33** which telescopes into a sleeve **34**, suitable means such as a spring **35** operating to maintain the follower in contact with the can body unless force is applied to the follower in the direction of the arrow **36**. Any suitable means for actuating the follower may be provided. The face of the follower **32** is provided with a suitable adapter **37** adapted to engage the bottom of the can **26**. It is removable such that it can be replaced with another adapter **37** to accommodate a container of different size.

The collar assembly **31** attached to the other end **38** of the shaft **33** is adapted to receive and support the rimmed circular opening **39** of the can **26** in a suitable complementally shaped ring **40**. The ring **40** is recessed into a suitable holder **41**, the inner structure of said recess adapted to receive the ringed end **42** of the clamp **27**. It is through the ring **42** that the rimmed circular opening **39** of the can **26** protrudes.

Opposite the collar assembly **31** and in cooperative axial alignment therewith is a coaxial sequentially operating dual plunger **43**. A central fixed plunger **44** is provided with a shoulder **45**, the diameter of which is more than the internal diameter of the retaining ring **8** shown in Figs. 8, to 11, but less than the I. D. of the nozzle **3**. Coaxially mounted with respect to the fixed plunger **44** is a moveable plunger **46**, the I. D. of which is greater than the O. D. of the retainer ring **8** but less than the O. D. of the nozzle **3**. Springs **47** maintain the moveable plunger **46** at its full extension. The fixed plunger **44** is mounted in a base **48**, the extension of which may conveniently form a base for the shaft **28**, and a shoulder **49** against which the spring **29** is permitted to bear. Since there are various size containers to be fitted and spouts to be emplaced, the collar assembly **31**, the adaptor **37** and the dual plunger assembly **43** and the ring **40** may be changed for properly sized equivalent parts, screw fastening means being provided for each element.

In operation, a can body **26** is picked up by the clamp **27** from a feeder line, diagrammatically represented in Fig. 1, and positioned over the collar assembly **31**. The restraining force operating in the direction of the arrow **36** on the follower assembly **32** is released and the follower allowed to contact the bottom of the can body **26**. Additional force applied in the direction opposite to the arrow **36** forces the follower assembly and the clamp in a direction toward the dual plunger assembly **43**. Previous to the operation, the dual plunger assembly **43** has been provided with a deformable plastic nozzle **3** having in its outer end a retainer ring **8**, leaving the flanged end **16** (referring to Fig. 8) free to be deformed under suitable pressure. As the assembly approaches the dual plunger assembly **43**, the rimmed circular opening **39** of the can body **26** is firmly engaged in the complementally shaped ring **40**. The free end of the plastic nozzle is then guided through the collar assembly **31** into the rimmed circular opening under a pressure sufficient to deform the plastic and cause the flange **16** (Fig. 2) to snap in behind the rimmed circular opening **15**. As the motion of the assembly toward the dual plunger **43** continues, the spring loaded moveable plunger **46** recedes allowing the shoulder **45** to force the retainer ring **8** into position adjacent the flange area (**16**) of the nozzle **3**. When the retainer ring **8** is thus emplaced, deformation of the nozzle **3** of the flange **16** is prevented.

For a clearer depiction of this operation, reference may be had to Figs. 3–7. The fixed plunger **44** is shown in each of these figures in various stages of projection within the body of the container **26** fragmentarily shown. The nozzle **3** and the retaining ring **8** are also clearly shown in the various positions during insertion. The shape of the moveable plunger **46** in Figs. 3 through 7 is slightly different from that shown in other figures, although it will be appreciated by those skilled in the art that the shape of the moveable plunger is not critical. In Fig. 3, therefore, there is observed a nozzle **3** with the retainer ring **8** in position at the outer end **5** of the assembly. The movement of the container **26** toward the fixed plunger **44** has not yet been sufficient to cause deformation of the nozzle **3**. In Fig. 4, the initial deformation has occurred, and the moveable plunger **46** has caused the partial seating of the flange **16** behind the rimmed circular opening **15**. The retainer ring **8** has not yet begun to move. In Fig. 5 the flange **16** is completely seated behind the rimmed circular opening **15**, and the moveable plunger **46** has begun to move against its springs **47** not shown in Figs. 3–7. This causes the shoulder **45** to bear against the retainer ring **8**, effectively telescoping the retainer ring **8** inwardly toward the flange **16**. In Fig. 6 the movement of the can body-spout assembly is complete, and the retainer ring **8** is now in its ultimate position in back of the flange **16**, effectively stiffening said flange **16** such that it is not easily deformed by the application of force. In Fig. 7 the can-spout assembly has been withdrawn and only the tip of the fixed plunger **44** is visible. The spout assembly has thus been externally emplaced in a metallic can body having a rimmed circular opening **15**.

Figs. 4 through 7 also show an additional modification of the retainer ring wherein there is provided detent means **50** on the inner wall of the nozzle **3** and a detent receiving groove **51** in the retainer ring **8**. The detent-groove combination serves to lock the retainer ring **8** in the proper position within the nozzle **3**.

After the spout emplacing operation has been completed, the containers may then be tested for leakage or pressure retaining ability and either filled and capped with a suitable closure, not shown, or packed empty for shipment to the filling site.

It should be pointed out that in Figs. 3 through 7, dogs **52** may be provided to engage the rimmed circular opening **15**. These dogs **52** cooperatively engage the upper protuberance **53** of the moveable plunger **46**; are

forced apart, and thereby release the container 26 from their grip. This is another modification of the collar assembly 31 and the moveable plunger 46.

It will be observed, therefore, that there has been provided a process for attaching a non-metal resiliently deformable plastic nozzle to a metallic can body after the metallic portion of the container has been completely fabricated. Sometimes it is desirable to fill the metallic container before emplacing the spout assembly. It is only with a system of the sort provided by this process that the operation of filling a metallic container can precede the attachment of the spout assembly. After the attachment of the spout assembly, then, of course, a suitable closure is provided, e. g., a screw top cap.

The process of this invention also obviates the difficulties encountered in trying to feed metal tops having spouts or nozzles affixed thereto to a seaming machine. Where the tops are without nozzles or spouts, they nest considerably more easily and are thus handled with greater simplicity. The spout assemblies which are used in accordance with the present process are easily handled from a hopper, since they are substantially symmetrical.

There has been provided, also, a process for the manufacture of containers of the commonly recognizable liquid detergent class capable of containing, for example, 12 fluid ounces. These containers are usually lithographed cans, the lithography having been done while still in the plate stock stage prior to slitting. These containers are conveniently fitted with nozzles having an I. D. of approximately ½ inch to approximately ¾ inch and a height of about 1 inch. The usual material for the nozzle is polyethylene, and the usual material for the retainer ring is also polyethylene of somewhat higher molecular weight and, therefore, somewhat stiffer consistency. The metal portion of the container may have a diameter of $2\frac{11}{16}$ inches and a height of 5½ inches.

As previously indicated, the retainer ring 8 may have a length of from about 30% to about 100% of the length of the nozzle 3. To facilitate operation it will be found convenient to partially telescope the retainer ring 8 within the nozzle 3 before threading the assembly upon the fixed plunger 44. So long as the operation of partially telescoping the retainer ring 8 leaves the flange region, i. e., that area between the flanges 16 and 17 (Fig. 9) unsupported or unretained, the extent of such partial telescoping may be anything which is convenient. In the case of a retainer ring having a length equivalent to about 30 to about 50% of the length of the nozzle 3, the ring may be telescoped from the outer end 5 until one edge of the retainer ring 8 is flush with the outermost portion 5 of the nozzle 3. The innermost edge of the retainer ring 8 will extend, therefore, no more than about half way into the tubular body 4 of the nozzle 3. It is to be understood, however, that the telescoping of the retaining ring 8 may be accomplished in a single step after the nozzle has been emplaced or by successive partial telescoping operations as above described.

Other modes of applying the principle of this invention may be employed instead of those specifically set forth above, changes being made as regards the details herein disclosed, provided the elements set forth in any of the following claims, or the equivalent of such be employed.

It is, therefore, particularly pointed out and distinctly claimed as the invention:

1. A process for making a container composed of a metallic can body, a metallic bottom seamed to one end, a metallic top having a rimmed circular opening therein seamed to the other end, and a non-metallic spout, comprising the steps of (1) substantially axially aligning (*a*) a resiliently deformable plastic nozzle having a tubular body with substantially non-tapering inner walls and a flange at one end of a diameter larger than that of said circular opening and capable of passing therethrough upon application of deforming force, and (*b*) said metallic container, in flange-to-rimmed circular opening relationship, (2) applying force in an axial direction to deform said plastic and move said flange through said opening to lock therebehind, and thereafter (3) telescoping within said nozzle a retaining ring adapted to be frictionally retained within said nozzle and to prevent substantial deformation of the nozzle in the region of said flange.

2. A process in accordance with claim 1 in which the retaining ring is relatively stiffer than the resiliently deformable plastic nozzle.

3. A process in accordance with claim 1 in which the resiliently deformable plastic nozzle has one end having a circumferential groove defined by a pair of axially spaced apart shoulders having diameters greater than that of the circular opening, the shoulder next adjacent the extremity of said nozzle defining a flange capable of passing through said opening upon the application of deforming force and the other end having a threaded portion adapted to receive and retain a cap.

4. A process in accordance with claim 3 in which the flange capable of passing through said opening upon the application of deforming force has an internal diameter less than that of the plastic nozzle.

5. A process for making a container composed of a metallic can body, a metallic bottom seamed to one end, a metallic top having a rimmed circular opening therein seamed to the other end, and a non-metallic spout, comprising the steps of (1) substantially axially aligning (*a*) a resiliently deformable plastic nozzle having a tubular body with substantially non-tapering inner walls and a flange at one end of diameter larger than that of said circular opening and capable of passing therethrough upon application of deforming force, said nozzle having a retaining ring partially telescoped therein and adapted to be frictionally retained within said nozzle, no portion of said retaining ring being in the region of said flange, and (*b*) said metallic container, in flange-to-rimmed circular opening relationship, (2) applying force in an axial direction to deform said plastic and move said flange through said opening to lock therebehind, and thereafter (3) further telescoping said retaining ring within said nozzle to position it in the region of said flange whereby to prevent substantial deformation of the nozzle in the region of said flange.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 2,871,553 February 3, 1959

Alfred Binder

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 3, line 59, for "proylene" read -- propylene --; column 4, line 71, for "Thus" read -- This --.

Signed and sealed this 18th day of August 1959.

(SEAL)
Attest:

KARL H. AXLINE
Attesting Officer

ROBERT C. WATSON
Commissioner of Patents