June 28, 1938. F. W. RUMBALL 2,122,325

METHOD OF FORMING A COLLAPSIBLE CONTAINER

Filed April 30, 1935

Fig. 2.

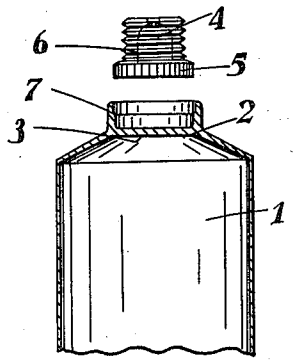


Fig. 1.

Fig. 4.

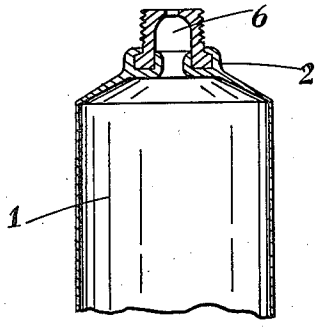
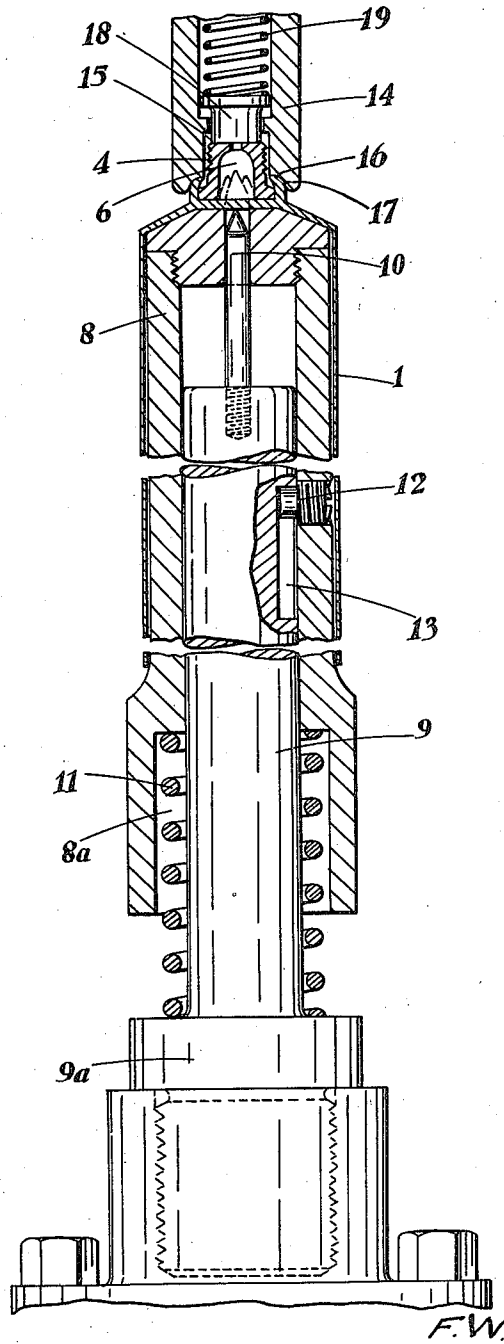


Fig. 3.



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METHOD OF FORMING A COLLAPSIBLE CONTAINER

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8 Claims. (Cl. 29—148.2)

This invention relates to improvements in or relating to collapsible tubes.

It is usual to make collapsible tubes from lead or lead covered with tin and it has been found that the contents such for instance as toothpaste, of such tubes frequently become discoloured or otherwise adversely affected by abrasion or metal between the cap and the tube nozzle and any such tendency is materially increased when the contents of the tubes themselves include an abrasive material.

One of the objects of the invention is to provide an improved method of securing a nozzle portion to the body portion of a collapsible container.

Another object of the invention is to ensure that the nozzle portion of the container shall not turn with respect to the said container after the parts have been assembled.

Still another object of the invention is to provide a method of assembly which can be carried out in a single pressing operation.

With these and other objects in view, I provide a method of securing a nozzle portion to a collapsible container in which the nozzle portion includes an enlarged base adapted to be received within a recess, formed by an upstanding flange in the head of the container and a transverse flange extending across the neck of the container, the former flange being closed on to the upper rim of the said base of the nozzle portion, and the latter flange being closed on to the interior wall of the nozzle portion so as to effect a tight seal between the said container and nozzle portion.

The aforesaid nozzle portion may, of course, include a bore of any desired shape and dimensions and is externally screw threaded so as to receive a screw cap which may be of tin, synthetic resin or other suitable material.

The aforesaid flanges adapted to embrace the base of the nozzle portion are preferably formed integrally with the body of the container and the lower one is preferably initially formed as a complete closure across the neck of the container, such closure being subsequently pierced and having its central part urged into the form of an upstanding annular flange, the latter step being carried out for instance simultaneously with the step of closing the upper flange on to the nozzle portion.

The upper part of the aforesaid container may be of the usual truncated conical form and in such cases the aforesaid flanges are formed at the head of such conical part.

The nozzle portion employed in carrying out my invention may be made of any suitable material which does not adversely affect the material which the tube is to contain. Thus for instance it may be made of tin, synthetic resin or the like.

It is, of course, of great importance to prevent the nozzle portion from turning with respect to the container after the parts have been assembled and for this purpose, the inner and/or outer surfaces of the base of the nozzle portion are preferably milled, knurled or otherwise roughened, and the recess for receiving said head is preferably slightly smaller than the head itself, at least at the root portion so that a tight fit is ensured.

A collapsible container may be conveniently assembled according to the present invention by means of one or more pressing operations. Thus for instance the base of the nozzle portion may be inserted into the entrance of the recess at the head of the container, and the assembly may be mounted in a suitable press, whereupon one die member may urge the nozzle into the base of the recess and close the side flange over the enlarged base of the nozzle portion and an opposed die member may splay the base part of the recess outwardly against the bore of said nozzle portion, said pressing operations being carried out simultaneously or consecutively as may be desired.

The aforesaid die members may be of a composite nature and include parts for preventing deforming or otherwise injuring the nozzle portion or container during the pressing operation or operations.

The above and other objects of the invention will be made apparent from the description that follows: in which reference is made to the accompanying drawing, showing by way of illustration, a preferred form of the invention and in which:—

Figure 1 is a side sectional elevation of the upper part of a collapsible container.

Figure 2 is a side sectional elevation of the nozzle portion.

Figure 3 is a side sectional elevation showing an intermediate stage of assembling said container and nozzle portion.

Figure 4 shows the fully assembled container and nozzle portion.

Referring to the drawing, and more particularly to Figures 1, 2, and 4, the container 1 which may be of tin-coated lead or other suitable material includes the usual cylindrical body part and truncated conical upper part terminating in a cylindrical part forming an upstanding flange

2. A part 3 extends across the upper part of the conical portion of the container 1, said parts 2 and 3 together forming a cylindrical recess. Said container and flanges may conveniently be formed from a single billet of metal in any suitable pressing or other operation.

The nozzle portion of the container consists of an externally screw-threaded portion 4 of cylindrical shape provided with an enlarged base 5. Said nozzle portion includes a bore 6 of any desired dimensions and cross-section and the lower surface of said bore and the outer surfaces of the base 5 are milled, knurled or otherwise treated so as to have a roughened surface.

The upper part of the recess formed by the part 2 is shouldered at 7, the diameter of said shouldered portion being equal to the diameter of the base 5.

The aforesaid nozzle portion may be made of any material which will not adversely affect the material with which the container is to be used and in the case of toothpaste or the like, such portion may be of tin.

In assembling the above described parts the nozzle portion is inserted into the recess at the head of the container 1 so that the base 5 rests on the shouldered part 7. The parts are then inserted in a press which as shown in Figure 3 includes lower and upper die assemblies. The lower assembly comprises a former 8 shaped to fit the interior of the container 1 slidably mounted on a mandrel 9 supported by a base member 9a and having an upper part 10 of ogival shape.

The former 8 is supported by means of a spring 11, surrounding the said mandrel 9 and engaging a recess 8a formed at the lower end of the said former 8, and is thus normally urged into a position in which its upper surface extends above the end of the part 10 of the mandrel 9. A stop 12 is provided on the former 8 and extending inwardly into a slot 13 formed in the mandrel 9, so as to limit the upward movement of the said former 8.

The upper die comprises an outer member 14 having a cylindrical recess 15 co-axial with the lower die and of sufficiently large diameter readily to receive the screw threaded part of the nozzle portion. The lower or outer end of the said recess 15 is increased in diameter to form an annular horizontal shoulder 16, the annular wall 17 of the recess extending outwardly from the said shoulder, being smoothly radiused into the shoulder and being of concave form, the outer end of the said recess being of slightly greater diameter than the annular wall 2 on the tube portion. A plunger 18 is slidably located in the recess and is adapted to be pressed downwardly and outwardly by a spring 19.

It will be understood that any suitable means may be employed for operating the press or any type of press, embodying the above arrangement of upper and lower dies may be used.

In carrying out the pressing operation, a container is first placed over the former 8 of the lower die, and a nozzle portion placed in position on the upper end thereof by the operator. The press is then set in motion, whereupon the upper die assembly is caused to descend, the plunger 18 resting on the upper part 4 of the nozzle portion and forcing the milled base 5 into the relatively soft material of the flange 2 until the said base rests on the plane part 3 of the container.

The continued descent of the upper die assembly then causes the outer member 8 of the lower die assembly to descend against the action of the spring 11 so that the end 10 of the tool 9 is caused to pierce the part 3 of the container as is shown in dotted lines in Figure 3. The aperture so formed is gradually enlarged as the upper die continues to descend and the metal surrounding said aperture is urged upwardly and outwardly into the form of a flange tightly pressed against the bore of the nozzle portion.

Simultaneously with the piercing of the top 3 of the tube portion the concave annular wall 17 of the recess in the upper die 14 contacts with the annular wall 2 on the tube portion.

As soon as the outer member 8 has descended sufficiently far to permit the completion of the operation of piercing the top 3 of the tube portion it is prevented owing to its bearing against the top of the base member 9a from descending further. The plunger 18 of the upper die will, therefore, also come to rest, but the outer member 14 of the upper die continues to descend. The concave inner wall of the recess in the outer member 14 thereupon causes the upper end of the annular wall 2 on the tube portion to turn inwards over the upper edge of the base 5 of the nozzle portion. Finally the horizontal shoulder 16 in the recess abuts against the inturned end of the wall 2 and presses it into firm contact with the upper surface of the base 5.

It will thus be seen that, by a single movement of the upper die assembly towards the lower die, the tube portion is pierced and the nozzle and tube portions are firmly secured together in an absolutely leakproof manner. The milled head of the nozzle will prevent the latter from turning with respect to the tube if force should be applied in applying the closing cap and the manner in which the nozzle and tube portions are secured together prevents distortion of the upper end of the tube.

I claim:—

1. A method of forming a collapsible container having separate body and nozzle portions, comprising forming said nozzle portion with an enlarged base, forming vertical and horizontal flanges at the head of the body portion, said flanges cooperating to form a recess, inserting the enlarged base of said nozzle portion in said recess, upturning the inner part of the horizontal flange so as to grip non-rotatably the bore of the nozzle and inturning the rim of the vertical flange so as to grip non-rotatably the upper surface of the enlarged base of said nozzle.

2. A method of forming a collapsible container having separate body and nozzle portions, comprising forming said nozzle portion with an enlarged base, forming vertical and horizontal flanges at the head of the body portion, said flanges cooperating to form a recess, inserting the enlarged base of said nozzle portion in said recess, upturning the inner part of the horizontal flange so as to grip non-rotatably the bore of the nozzle and inturning the rim of the vertical flange so as to non-rotatably grip the upper surface of the enlarged base of said nozzle, said steps of deforming the flanges to grip the nozzle portion being carried out in a single pressing operation.

3. A method of forming a collapsible container having separate body and nozzle portions, comprising forming said nozzle with an enlarged base, forming an upstanding annular flange around the head of the body portion, forming a transverse flange completely across the body portion immediately below said upstanding flange,

said two flanges cooperating to form a recess, inserting said enlarged base of said nozzle portion into said recess, piercing the transverse flange extending across the container and upturning the material around the so formed aperture so as to form an annular flange adapted to grip non-rotatably the bore of said nozzle portion, and inturning the rim of said flange upstanding from the head of said body portion so as to grip non-rotatably the upper surface of the enlarged base of said nozzle portion.

4. A method of forming a collapsible container having separate body and nozzle portions, comprising forming said nozzle with an enlarged base, forming an upstanding annular flange around the head of the body portion, forming a transverse flange completely across the body portion immediately below said upstanding flange, said two flanges cooperating to form a recess adapted tightly to engage the enlarged base of the nozzle portion, inserting said nozzle portion in said recess, forming an aperture in the centre of said transverse flange, upturning the material around said aperture to form a flange adapted to grip the bore of the nozzle portion, and inturning the rim of the annular flange upstanding from the head of the body portion so as to grip the upper surface of the enlarged base of said nozzle portion, the surfaces of said base portion contacting with the retaining flanges being milled or roughened so as to prevent relative rotary movement between said nozzle and body portions.

5. A method of forming a collapsible container having separate body and nozzle portions, comprising forming said nozzle with an enlarged base, forming an upstanding annular flange around the head of the body portion, forming a transverse flange immediately below said upstanding flange, said two flanges cooperating to form a recess adapted tightly to receive said enlarged base of said nozzle portion, pressing said nozzle into said recess, forming an aperture in the centre of said transverse flange, upturning the material around said aperture to form a flange adapted to non-rotatably grip the bore of said nozzle portion and inturning the rim of the annular flange upstanding from the head of the body portion so as to grip non-rotatably the upper surface of the enlarged base of said nozzle portion, the steps of forming the inner and upper flanges for gripping the base of the nozzle portion being carried out in a single pressing operation.

6. A method of forming a collapsible container having separate body and nozzle portions, comprising forming said nozzle with an enlarged base, forming an upstanding annular flange around the head of the body portion, forming a transverse flange immediately below said upstanding flange, said two flanges cooperating to form a recess adapted tightly to receive said enlarged base of said nozzle portion, pressing said nozzle into said recess, forming an aperture in the centre of said transverse flange, upturning the material around said aperture to form a flange adapted to grip the bore of said nozzle portion and inturning the rim of the annular flange upstanding from the head of the body portion so as to grip the upper surface of the enlarged base of said nozzle portion, the steps of forming the inner and upper flanges for gripping the base of the nozzle portion being carried out in a single pressing operation, and the material parts of the enlarged base of the nozzle portion being milled or roughened so to prevent relative turning movements between said nozzle and body portions.

7. A method of forming a collapsible container having separate body and nozzle portions, comprising forming said nozzle with an enlarged base, forming a recess at the head of the body portion adapted to receive said nozzle portion, milling the surface of said enlarged base of the nozzle portion, pressing said nozzle portion into said recess so that the milled surface cuts into the material of the recess and rotary movement of said nozzle with respect to said recess is prevented, deforming the walls of said recess so as to form flanges embracing respectively, the bore of the nozzle portion and the upper surface of the enlarged base of said nozzle portion whereby firmly to secure said nozzle and body portions together.

8. The herein described method of forming collapsible containers having separate body and nozzle portions comprising the steps of forming the nozzle with an enlarged deformed base, forming a recess at the head of the body portion adapted to receive said nozzle when pressed into said recess and deforming the walls of said recess to form flanges embracing respectively the bore of the nozzle and its deformed base so as together to grip said nozzle and body portion in non-rotatable relation.

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