

Aug. 1, 1939.

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2,167,654

METHOD OF SECURING SOFT METAL SPOUTS TO CONTAINERS

Filed June 23, 1936

Fig. 1

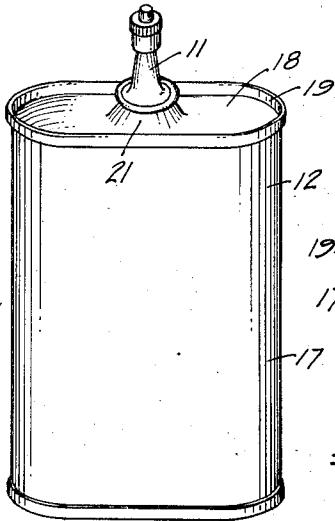


Fig. 4

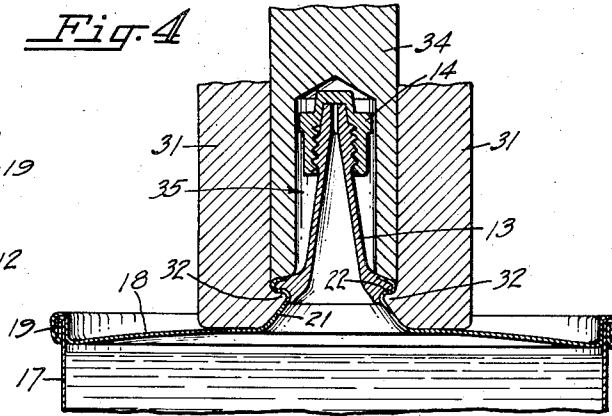


Fig. 5

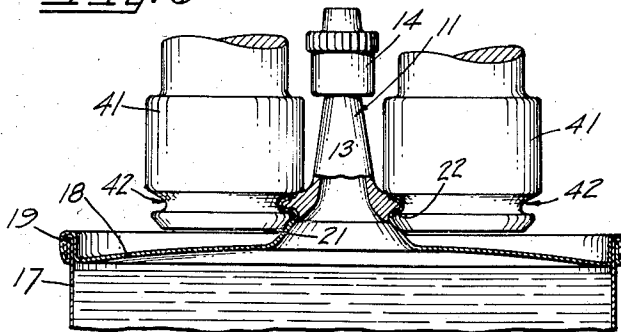


Fig. 3

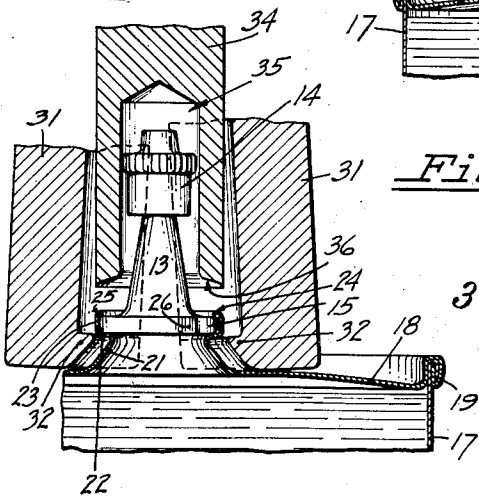
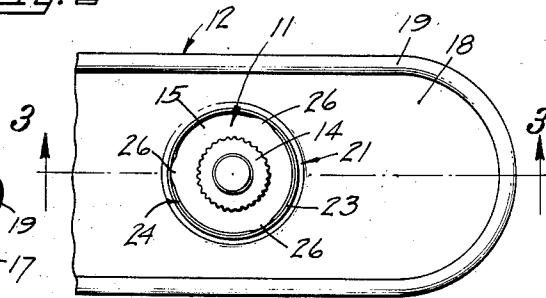


Fig. 2



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2,167,654

METHOD OF SECURING SOFT METAL
SPOUTS TO CONTAINERSJohn M. Hothersall, Brooklyn, N. Y., assignor to
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Application June 23, 1936, Serial No. 86,874

11 Claims. (Cl. 29—148.2)

The present invention relates to the method of securing relatively soft metal spouts to metallic containers or cans of the character usually employed for light lubricating oils or the like and has particular reference to a method of uniting the relatively softer spout with the can after the latter is filled and by a reforming of the material of the container and the material of the spout into a joint which is leak-proof without the use of a gasket.

In the manufacture of cans having relatively soft metal spouts such as, for example, lead or white metal spouts, the spout is usually secured to a neck or nozzle formed on a breast or end closure of the can. Pressure is usually employed to unite these parts since it has proved to be the more expedient method. It has been found that the pressure required to make a tight joint between the spout and the can part to which it is secured is sufficient to collapse the latter unless it is satisfactorily supported. This collapsing difficulty has been avoided by attaching or securing the spout to the can before it is filled but in such a case the filling must be done through the small hole left in one of the end closures of the can and is therefore very slow and unsatisfactory. After filling, the hole must be closed with solder.

The present invention contemplates a method of securing the spout to the can after it is filled so that the relatively larger opening in the can part to which the spout is to be affixed may be utilized in filling the can. In securing the spout to the can part the latter is exteriorly supported to prevent its collapse while the metal of the spout is utilized as an internal support for the can part. In effect, this method is an improvement over my United States Patent 1,797,418, issued March 24, 1931, and provides a way to practically handle a spout somewhat similar in general construction to that disclosed in the Drake United States Patent 1,566,790 issued December 22, 1925.

An object of the present invention is the provision of a method of securing relatively soft metal spouts to cans wherein the material of the can and the base of the spout are simultaneously reformed by a pressure action which extrudes the metal of the spout and causes it to flow into tight fitting engagement with the reformed material of the can.

Another object is the provision of such a method wherein the material of the can adjacent the portion which is reformed is supported against collapse during the reforming so that the secur-

ing of the spout to the can may be effected after the latter is filled.

Still another object is the provision of a method of this character wherein the base of the spout is seated on a shoulder of the can and is held tightly against displacement so that the filled can may be readily conveyed from the filling operation to the spout securing operation without displacement of the spout.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description, which, taken in connection with the accompanying drawing, disclosed a preferred embodiment thereof.

Referring to the drawing:

Figure 1 is a perspective view of a can having a relatively soft metal spout secured thereto by the method of the instant invention;

Fig. 2 is an enlarged top plan view, with parts broken away, of the can illustrated in Fig. 1, and showing the spout in position ready for attachment to the can;

Fig. 3 is a sectional view taken through the can substantially along the line 3—3 in Fig. 2 and also showing in section fragmentary portions of one form of mechanism for securing the positioned spout to the can, the parts of the mechanism being shown in inoperative position as prior to closing in on the spout and can;

Fig. 4 is a sectional view similar to Fig. 3 showing the parts of the mechanism in operative position as at the completion of the spout securing operation; and

Fig. 5 is a sectional view similar to Fig. 4 illustrating a modified form of mechanism for securing the spout to the can.

As a preferred embodiment of the present invention the drawing discloses a relatively soft metal spout 11 (Figs. 1 and 2) which is adapted to be secured to a can 12. The spout is of the construction usually employed for dispensing light lubricating oils and comprises a tapered pouring member 13 (Figs. 3 and 4) which carries a removable screw cap 14 threaded onto the smaller or discharge end of the spout. The larger end of the tapered member is formed with a flanged base 15 of uniform thickness.

The can 12 is a well known commercial can of construction usually employed with soft metal spouts and comprises a tubular body 17 having top and bottom end closures 18 secured thereto by suitable seams 19. The top end closure is preferably provided with an apertured neck or nozzle 21 through which the can is filled and to which the spout 11 is secured after filling. The

wall of the can adjacent the top of the neck is preferably bent outwardly in an overhanging horizontal shoulder 22 (Fig. 3) and thence upwardly in a substantially vertical and annular wall section 23. This construction forms a cup 24 to receive the base 15 of the spout 11 when the latter is assembled with the can. The top of the wall section 23 preferably terminates in an inwardly bent, started curled edge 25.

In accordance with the present method invention the can 12 is adapted to be filled through the opening in the neck 21 before the spout is assembled and after assembly the parts are permanently sealed by simultaneously bending the neck and extruding the spout base by pressure into a tight fitting joint which is leak-proof without the aid of a gasket.

During this assembly protuberances 26 (Fig. 2) on the spout base tightly engage against the inside of the nozzle wall section 23 and hold the spout against displacement so that the can and the positioned nozzle may be transferred from place to place if desired without spilling the can contents or loosening the spout.

In securing the spout to the can the nozzle shoulder 22 and wall section 23 are supported to prevent collapse of the shoulder or deformation of the nozzle or of the top end closure 18. This sealing may be done either by dies or by rollers.

When a die action is used the nozzle shoulder is preferably supported by a pair of jaws or half-molds 31 having inwardly projecting supporting ledges 32. These half-molds are pivoted in any suitable manner and are moved into position completely surrounding and engaging the nozzle wall section 23 with the ledges 32 extending under and engaging the bottom of the shoulder 22.

Pressure is exerted in a vertical direction on top of the enclosed and supported wall section 23 in any suitable manner as by a plunger 34. The plunger is moved down inside of the closed half molds which serve as side guides for the plunger. A central bore 35 in the end of the plunger provides a clearance space, as the plunger descends, for that portion of the spout extending above its base 15. The bottom of the plunger is preferably tapered inwardly and upwardly as at 36 for engagement with the started curled edge 25 of the nozzle.

Downward movement of the plunger on the started curled edge 25 exerts a pressure on the wall section 23 and reforms it, first bending it inwardly over the top of and into engagement with the spout base 15. Continued pressure of the plunger compresses the nozzle wall section against the softer spout base, which is fully supported by the ledges 32, and squeezing the parts contained between the plunger face and the ledges, bends over or reforms the nozzle and extrudes the spout base thereby obliterating the holding protuberances 26 and causing the base to flow into tight fitting engagement with the reformed wall section as shown in Fig. 4. This forms a permanent leak-proof joint between can and spout. The top of the reformed wall section is embedded tightly into the softer metal of the spout forming a flush and continuous surface on the outside of the junction.

Fig. 5 of the drawing illustrates a modified form of mechanism which may be used where the roller principle is employed. Its action also results in securing the spout to the can and produces the same result as just described. In this form of mechanism rollers 41 are utilized and

these may be suitably mounted in a revolving head or similar mechanism. The rollers encircle the spout and are moved in horizontally against the wall section 23 of the nozzle as the reforming and sealing operation progresses. Grooves 42 formed in the rollers are of such a shape as to support the engaged nozzle part as well as to reform the nozzle wall section to the desired contour. In other words, the shoulder 22 is supported against collapse by the lower wall parts of the grooves in the rollers. This spinning action also simultaneously effects extrusion of the softer spout base 15 and causes it to flow into the reformed wall section. Thus a leak-proof joint is formed between can and spout.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the steps of the process described and their order of accomplishment without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the process hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. The method of securing a soft metal spout to a container having a shoulder portion adapted to receive a base of the spout, which comprises supporting the base of the spout on the shoulder, and directly engaging and compressing parts of the container adjacent the shoulder into engagement with the base of the spout, and supporting the shoulder against collapse during the compressing operation to reform the spout and to flow the metal of parts of the same into a leak-proof joint with the compressed parts of the container.

2. The method of securing a soft metal spout to a container having a shoulder portion adapted to receive a base of the spout, which comprises supporting the base of the spout on the shoulder, and directly engaging and compressing parts of the container adjacent the shoulder and embedding the same into the base of the spout, and supporting the shoulder against collapse during the compressing operation to extrude the base of the spout and cause it to flow into tight engagement with the compressed parts of the container to form a leak-proof joint between spout and container.

3. The method of securing a soft metal spout to a container having a shoulder portion adapted to receive a base of the spout, which comprises supporting the base of the spout on the shoulder, and directly engaging and compressing parts of the container adjacent the shoulder into position overlapping the base of the spout, and supporting the shoulder against collapse during the compressing operation to embed the parts of the container into the base of the spout so that the exterior surface of the container parts is flush and coextensive with the exterior surface of the spout base and simultaneously extruding the base of the spout and causing it to flow into tight engagement with the compressed parts of the container to form a leak-proof joint.

4. The method of securing a soft metal spout to a container having a shoulder portion adapted to receive a base of the spout, which comprises directly engaging and supporting the shoulder in a mold against collapse in a direction axially and laterally relative to the spout, and axially engaging and compressing parts of the container adjacent the shoulder into engagement with the

base of the spout to flow the metal of parts of the latter and provide a leak-proof joint.

5 5. The method of securing a soft metal spout to a container having a shoulder portion adapted to receive a base of the spout, which comprises supporting the base of the spout on the shoulder, holding the spout in supported position by frictional engagement between said container shoulder portion and lateral protuberances formed in the spout base, directly engaging and supporting the container shoulder against distortion while the spout is distorted thereby, bending parts of the container adjacent the shoulder over the base of the spout, and simultaneously flowing the metal of said spout base to obliterate its protuberances and to tightly clamp the spout onto the container.

10 6. The method of securing a soft metal spout to a container having a shoulder portion adapted to receive a base of the spout, which comprises supporting the base of the spout on the shoulder, rolling parts of the container adjacent the shoulder while directly engaging and supporting the shoulder against collapse, and reshaping the base of the spout by flowing the metal thereof into close engagement with and between the rolled container parts to unite the spout and container in a tightfitting joint.

15 7. The method of securing a spout to a container, which comprises positioning a preformed spout within a cup-shaped portion of the container, bending inwardly the wall of said cup-shaped portion and simultaneously compressing and reshaping the metal of parts of the spout adjacent said cup-shaped portion into a tight fitting interlocking joint.

20 8. The method of securing a relatively soft metal to a container, which comprises positioning a preformed spout on the container, and simultaneously bending inwardly parts of the container

and extruding outwardly the metal of the softer spout adjacent the container parts into a joint which effects tight fitting interlocking engagement between spout and container.

9. The method of securing a relatively soft metal spout to a container, which comprises positioning the spout on the container, bending inwardly parts of the container and simultaneously extruding outwardly the adjacent metal of parts of the softer spout into a joint which provides tight fitting engagement between spout and container, and directly engaging and supporting parts of the container adjacent the reformed parts against collapse during the reforming and extruding operations.

10. The method of securing a soft metal spout to a container having a cup-shaped portion including an upstanding annular flange and an inwardly projecting peripheral shoulder portion beneath said flange adapted to receive a base of the spout on the shoulder, and bending the free edge of said flange above the shoulder inwardly over the base of the spout to clamp the latter tightly in position, simultaneously compressing and extruding the adjacent softer metal of the spout into tight fitting engagement with said flange, and supporting the shoulder against distortion during the described bending operation.

11. The method of securing a soft metal spout to a container having a shoulder portion adapted to receive a base of the spout, which comprises supporting the base of the spout on the shoulder, bending inwardly parts of the container adjacent the shoulder while simultaneously flowing outwardly the softer metal of the base of the spout to unite the same with said inwardly bent parts in a tight fitting joint, and directly engaging and supporting the shoulder against distortion during the reforming and uniting operation.

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