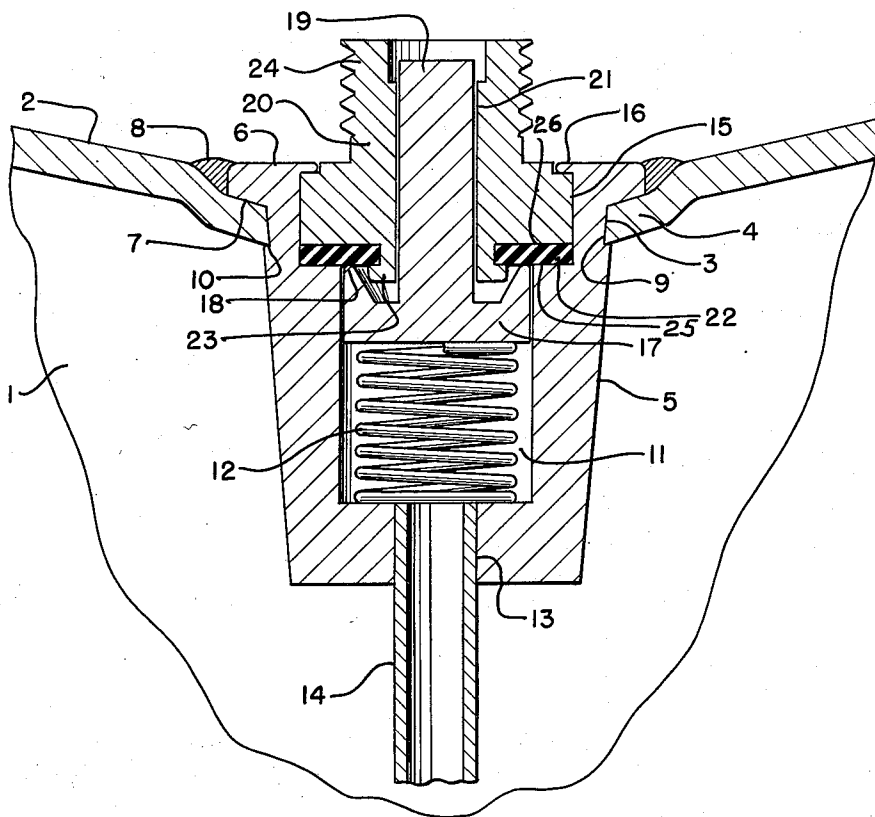


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G. A. BENSON ET AL
CONTAINER VALVE FITTING

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CONTAINER VALVE FITTING

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1

The invention of which the following is a disclosure relates to valve fittings especially adapted for use in small metal containers from which liquids or gases may be dispensed by reason of their own pressure conditions. Examples of such uses are the development of sprays for insecticides, coatings and for the dispensing of fluent liquids, emulsions or mixed liquids and gases.

It is a prime consideration in the storage, transport and use of such materials that they be packaged in a light but pressure-resistant metal can, generally cylindrical. As a part of the container, there must be provided a valve which will withstand the ordinary pressure of the material in the container. However, it must be suitable for the ready discharge of the contents through a nozzle, jet or the like.

From a practical consideration, the assembly of the valve fitting in the container necessitates the establishment of a tight seal usually by soldering.

This, however, requires an elevated temperature which when applied to the completed assembled valve frequently injures the working parts such as the springs, composition valve seats and the like.

It is an object of our invention to provide a fitting which may be completely assembled after its outer portion has already been sealed by soldering to the end of a container.

A further object of our invention is to provide an engagement between the container end and part of the fitting which will maintain the parts in tight engagement without being clamped during the subsequent soldering operation.

A still further object of our invention is to provide an automatically tight fit between the valve fitting and the aperture of the container.

Among the objects of our invention is the provision of a fitting in which the valve parts are inserted in the housing and sealed therein after the housing has already been assembled with the container and solder sealed to the latter.

It will be evident that a further object of our invention is the design of a valve fitting which will permit introduction of the liquid to the container through the valve parts themselves if so desired. In the alternative, the arrangement is such that the liquid contents of the container can be introduced in a quiescent state through the housing of the non-assembled fitting after which the valve parts may be inserted in the same manner as a stopper and finally they may be fastened down or clamped in position.

2

As illustrative of our invention, we have disclosed the preferred form thereof in the following description and shown it in the accompanying drawing representing a longitudinal, axial view of the completed valve fitting and the associated parts of the container.

The valve fitting is intended to be assembled with a sheet metal container 1, which, for example, may have a concave top end 2. This top has a center aperture 3 generally circular in form. The top of the container immediately surrounding the aperture 3 has a depressed ledge 4 concentric with the concavity of the top.

A housing 5 is shown for the fitting. This is made of suitable metal having some slight degree of ductility made use of in its assembly with the valve parts. The housing has a generally tapering or conical outer surface. The upper edge of the housing is formed with a flange 6 extending laterally. This has a lower sloping face 7 of the same concavity as the adjacent ledge 4. In like manner the width of the flange is slightly less than that of the ledge so that a small crevice is left in which molten solder is applied to form the seam 8.

The housing has an undercut groove 9 with a taper conforming to that of the side surface of the housing. A shoulder on edge 10 is thus provided between the groove 9 and the tapering side of the shell 5. The depth of this shoulder may be slight and in the range of .01 inch.

One of the advantages of this design is that the housing 5 may be pressed down through the aperture 3 in the top 2 until the resilience of the top 2 permits passage of the shoulder 10. The parts are thus immovably held together during the subsequent soldering operation without additional clamping. Thus soldering can be carried out before the valve parts are inserted and damage to the latter avoided.

The housing 5 has a central chamber or cavity 11 which is arranged axially and serves as a holder for the compression spring 12.

The bottom of the housing has an opening 13 in which an eduction tube 14 is firmly attached by swaging or the like.

The upper portion of the housing 5 has an enlarged or widened recess 15 coaxial with the concavity 11. The upper edge of the housing adjacent the recess 15 has an upstanding lip or bead 16. Due to the ductility of the metal, this lip or bead may be bent inwardly as shown in the drawing to act as a retainer for the assembled valve parts and exert a clamping pressure on the gasket 22 between adjacent faces 25 and 26

3

of the valve parts and thus form a tight seal between these two surfaces.

The valve proper 17 is in the form of a disk having an upstanding peripheral rim 18. The valve is held up with appropriate force from the compression spring 12. Centrally, the valve has a vertical stem 19 which extends above the top of the housing 5.

The valve stem 19 is surrounded loosely by a sleeve 20 which has a snug fit against the side walls of the enlarged recess 15. The sleeve 20 has an axial bore 21. A clearance of approximately .016 inch separates the valve stem from the sleeve so that liquid may be introduced through the valve parts or discharged therefrom with considerable rapidity. In the discharge, the clearance is also effective to thoroughly agitate the liquid and produce a swirling effect useful in the event the liquid has a volatile gas as a constituent.

The lower face of the sleeve 20 receives a gasket 22 which forms a valve seat. This is in engagement normally with the rim 18 of the valve. The inner portion of the sleeve 20 is extended axially to form a collar 23 which may be peened down over the gasket to hold the same in place.

The upper end of the sleeve 20 has a central hollow boss 24 which is externally screw threaded. This boss provides a connection upon which a nozzle of appropriate design may be attached.

By the design and arrangement thus made, the valve housing may first be fitted into tight locking position in the aperture of the can top. It is then held in position without external means during the soldering operation.

After the housing has been soldered in place, the compression spring, valve and sleeve are inserted in the order named. The ductile bead or lip 16 is then bent inwardly to hold the sleeve against movement out of the housing. At the same time the bead retains the gasket 22 in compression for providing a positive seal between the housing and the sleeve.

The container may be filled with liquid through the open housing 5, suitable conditions of temperature and pressure being maintained to prevent ebullition.

Alternatively, the liquid may be forced inwardly under pressure through the open valve after the latter has been installed.

The can and its contents may then be stored or transported with or without the addition of a cap to the screw threaded boss 24.

When it is desired to dispense the contents, the boss 24 is uncapped and a suitable thumb operated spray nozzle or jet attached as disclosed in the copending application of John Coyle and William F. Punte for patent filed March 20,

4

1946, Serial Number 655,864, now Patent No. 2,514,030, issued July 21, 1950. The operating means of the nozzle will then be used to depress the valve stem and open up the passageway around the valve and through the clearance between the stem and the sleeve.

It will be apparent from the above that we have designed an improved and simplified valve fitting which may be installed with great ease in the course of its assembly. The finally assembled fitting provides adequate seal for the contents, but ready means for its discharge.

While the preferred form of the invention has been set out by way of example, it is possible to vary the structure in minor details of proportion and materials without departing from the invention as defined in the following claims.

What we claim is:

1. In combination with a fixed container end having an inner resilient edge, a valve housing having an end flange and a shallow peripheral groove adjacent the flange, said housing being proportioned to fit into the container end with the groove resiliently receiving and retaining the edge of the said end, and an upstanding lip on the inner upper edge of the housing adapted to be bent inwardly to lock a valve in the housing after the housing has been fitted into the container end and secured therein.

2. In combination with a fixed container end having an inner resilient edge, said end having a narrow depressed ledge surrounding the said edge, a valve housing having an end flange substantially as wide as said ledge and a shallow peripheral groove adjacent the flange, said housing being proportioned to fit in the container end with the groove resiliently receiving and retaining the said edge, and the flange resting on the said ledge, and a solder seal between the edge of the flange and the portion of the end surrounding the ledge.

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