Dec. 24, 1935. J. P. CROASDALE, JR 2,025,379

COMBINED CONTAINER AND STIRRER

Filed Aug. 23, 1934

Fig. 1.

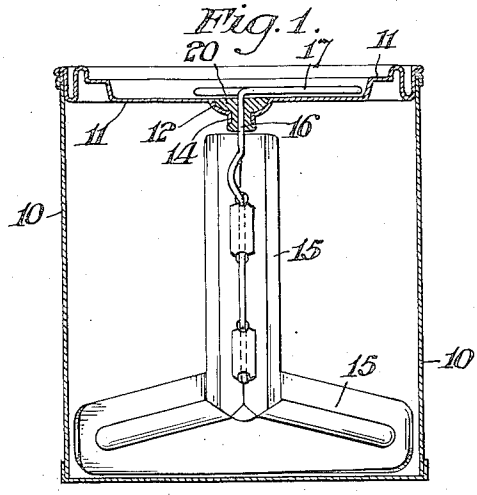
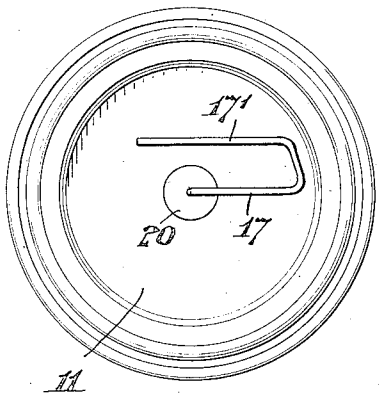


Fig. 2.



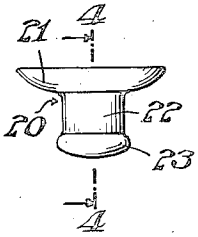


Fig. 3.

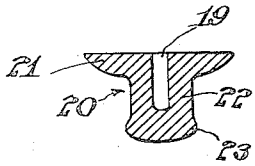
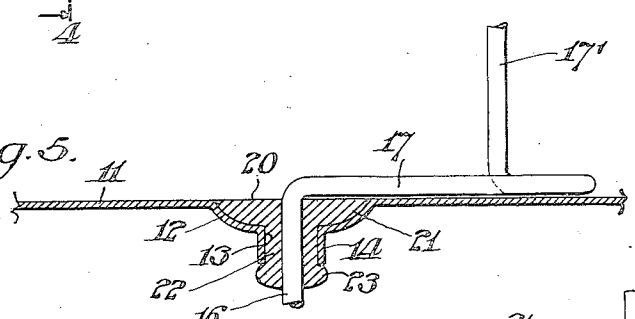


Fig. 4.

Fig. 5.



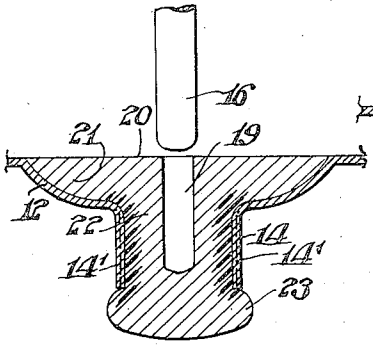


Fig. 6.

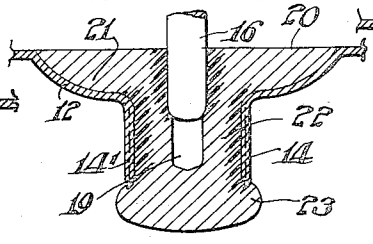


Fig. 7.

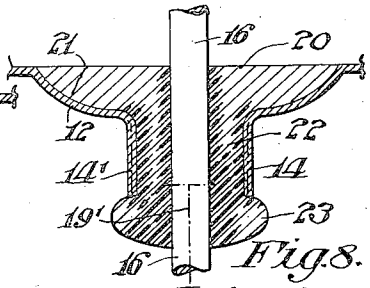


Fig. 8.

Inventor:
John P. Croasdale Jr.,
By J. P. Croasdale
Attorney.

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COMBINED CONTAINER AND STIRRER

John P. Croasdale, Jr., Philadelphia, Pa., assignor of one-half to Anne Spencer Shaw, Chestnut Hill, Pa.

Application August 23, 1934, Serial No. 741,053

3 Claims. (Cl. 259—122)

The invention relates to combined container and stirrer.

The object is to provide an improved container with a device adapted to stir or mix the substance contained therein, said stirrer provided with actuating means having a part projecting through the wall of the container, with means for maintaining a hermetic seal between said projecting part and the wall surrounding the same.

The invention is especially adapted for use with viscous materials such as paint, varnish or the like, in which the components of the material are liable to separate, and of which some of said components are extremely volatile.

It has long been the practice to provide a hermetically closed container for such materials, so that the more volatile ingredients may not be permitted to escape and so cause a deterioration of said mass of material.

When the container is opened, it is customary to use a stick or other suitable instrument to stir the contents so that the said ingredients may be again thoroughly mixed before using. As the container is full, or nearly full of material it is difficult to perform this stirring or mixing operation without splashing or spilling some of the material from the can. It has also been found that, after the can is opened, and only part of the material is used, the material rapidly deteriorates because of the escape of said volatile ingredients.

It has been proposed to provide means for stirring or mixing the contents of the container before opening the same. This requires that the shaft of the stirrer must project through a wall of the container so that a crank handle or other actuating device may be associated with said stirrer outside the container.

Until it is desired to operate the stirrer, the part projecting through the wall of the container must be hermetically sealed thereto for the reason, as above stated, that there may be no escape of the fluid or volatile ingredients of said material during storing and transportation.

It is also desirable that the seal shall be maintained after the stirring operation, in case only a part of the contents is used.

In large containers, such as barrels, drums or casks, the usual gasket or stuffing box has been proposed. Such devices however are expensive, and as the gaskets are usually of more or less porous material, while serving to prevent serious leak of liquid, will not prevent the escape of volatile gases, especially when the same are under pressure slightly above atmospheric.

In the use of small containers, such as quart, pint and half pint tin cans, sold at a very small price, such means would be prohibited because of the cost. In connection with small tin containers it has been proposed to seal the shaft with the surrounding wall of the container by a soft solder, which seal may be readily broken by rotation of the smooth actuating shaft. The operation of soldering is also quite expensive, as it must be practiced with care. It also has the objection that, when the seal is once broken, it is impossible, after using a part, to protect the remaining contents from deterioration by evaporation.

The purpose of the present invention is to provide a hermetic seal, between the shaft and the container wall, which shall be extremely inexpensive to make and to apply, and which may also be employed to maintain such hermetic seal at all times, before, during and after the stirring operation; a seal that will prevent the escape of volatile material, even when the same is slightly above atmospheric pressure, due to temperature or other conditions.

Referring to the drawing which illustrates, merely by way of example, suitable means for effecting the invention;—

Fig. 1 is a sectional view of a can with my improved construction.

Fig. 2 is a plan view of same.

Fig. 3 is an elevation of the sealing body, on an enlarged scale.

Fig. 4 is a section on line 4, 4 of Fig. 3.

Fig. 5 is a similar sectional view showing the assembly.

Figs. 6, 7, and 8 are diagrammatic views, on a still larger scale, showing the processes of assembly and the resulting regions and degrees of compression.

Similar numerals refer to similar parts throughout the several views.

In the example shown, the can or container 10 is provided with the closure or lid 11 pressed into position with the can to provide a hermetic seal therebetween. The lid 11 is provided with the depression 12 and a centrally disposed opening 13. The opening 13 is provided with a downwardly projecting tubular flange 14.

The stirrer or mixer 15 is connected in any suitable way with the actuating shaft 16. This shaft has a part 14 which projects upwardly through the opening 13, and is then bent over to

lie flat upon the top of lid 11, and below the outer peripheral margin of the lid and can. This part of the shaft which lies flat upon the lid is bent into U-shape with the two parallel extensions 17 and 17'. The outer extension 17' is adapted to be lifted into the vertical position, as shown in Fig. 5, to form a crank handle for the shaft actuation.

A formation or plug 20 of preferably resilient, compressible material, such for example as cork, or rubber, or other fluid tight substance or composition, which is softer than the metal of the shaft and the surrounding wall of the lid, surrounds the shaft and projects into and through the tubular flange 14 of the opening 13, in the lid 11.

This plug 20 is preferably provided with an axially disposed channel 19 extending into the plug from the upper face or end thereof, partly toward the other end. This channel 19 has a diameter substantially less than the diameter of the shaft 16. The plug has an enlarged upper part 21, a downwardly extending part 22 of less diameter and a slight ridge or enlargement 23 at the bottom. The extension or part 22 is of diameter normally greater than the diameter of the tubular flange 14 of opening 13.

Assembly and operation

In assembling the parts, in accordance with the at present preferred manner, the compressible formation 20 is forced into the flanged opening 13 until the slightly enlarged end 23 passes beneath the bottom of flange 14. This forcing of formation 20 into the tubular flange 14, which has an interior diameter less than the normal diameter of extension 22, causes a compression of the formation 20, gradually diminishing in density from its periphery, as indicated by the lining in Figs. 6, 7, and 8. This compression causes a slight extrusion or expanding of the lower enlarged part 23 outwardly beneath the lower margin of flange 14, also as shown in the said figures. This also tends to hold the semispherical part 21 in pressure engagement with the depressed part 12 of lid 11.

The shaft 16 is then forced into the channel 19 and, as the shaft diameter is greater than the diameter of the channel, the material of the plug is put under compression radially, in the region surrounding the shaft. The density of this compression gradually diminishes toward the periphery of the formation 20, so that the density of said formation is greater at the region adjacent its periphery and at the region adjacent the shaft, and less in the intermediate region, as indicated in Fig. 7.

After the shaft has reached the bottom of channel 19, it is then forced through the material of the plug through the balance of said plug extension as indicated in Fig. 8.

By the last described operation, the material is forced radially from the center or axis, indicated by the broken line 19', to an amount approximately corresponding to the diameter of the shaft 16, thus increasing the degree or density of compression of material adjacent to and surrounding the shaft at the lower end of the plug or formation 20.

The oppositely directed compressions, and the degrees of compressions, in the said regions surrounding the shaft and surrounded by the flange, leave practically no uncompressed parts in said region extending from the bottom of channel 19 to the bottom of the flange 14. This double compression also causes a further extrusion, or pushing out of the annular enlargement 23 beneath the bottom of flange 14, as shown in Fig. 8. In this way an extremely efficient hermetic seal is produced between shaft and flange at the critical point or line, that is, where the leak of the volatile content would naturally tend to start. The projecting annular part 23 beneath the lower end of flange 14 also serves to lock the formation 20 in opening 13 and flange 14, against accidental displacement, as for instance, when lifting the extension 17' as above described. This hermetic seal between the flange 14 of the opening 13 and the shaft 16, due to the cooperating oppositely directed compressions, is sufficient to resist or prevent the passage of volatile content, even when the pressure inside and outside the container differ.

Another distinct advantage of this arrangement is that the shaft may be rotated indefinitely without departing from its normal vertical position, that is without rocking and hence tending to break the hermetic seal, which seal will always be assured by the compressions referred to. In accordance with the means described, after a part of the contents has been used, the lid may be replaced and the seal between shaft and flange will be as effective as ever.

The production and assembly of the parts, as herein described, are extremely simple and inexpensive; in fact the cost is only a fraction of a cent per can.

To operate the stirrer, a finger is placed and pressed upon the extension 17, adjacent the top of the plug, while the outer end of extension 17' is lifted, thereby bending the wire and providing a crank handle for rotating the shaft.

What I claim is:—

1. In combination with a hermetically sealed container having a shaft opening in its wall, a stirrer within the container, a rotatable shaft connected to the stirrer and having a part projecting through said opening, means for rotating the shaft, and means forming a journal bearing for said shaft, comprising a resilient and compressible body within the opening under substantial and constant compression in directions radial to the axis of the shaft but having unconfined end portions on both sides of the opening, said bearing adapted to maintain the shaft substantially perpendicular to the plane of the surrounding wall and to maintain a hermetic seal between the shaft and said surrounding wall while permitting free rotation of the shaft.

2. In combination with a hermetically sealed container having a shaft opening in its wall, a straight cylindrical flange associated with said opening, a stirrer within the container, a rotatable shaft connected to the stirrer and having a part projecting through said opening, means for rotating the shaft, and means forming a journal bearing for said shaft comprising a resilient and compressible body having a portion within the opening under substantial and constant compression in directions, radial to the axis of the shaft, and unrestrained portions at both ends of said cylindrical flange, said bearing adapted to maintain the shaft substantially perpendicular to the plane of the surrounding wall, and to maintain a hermetic seal between the shaft and said surrounding wall while permitting free rotation of the shaft.

3. In combination with a hermetically sealed container having a shaft opening in its wall, a

stirrer within the container, a rotatable shaft connected to the stirrer and having a part projecting through said opening, means for rotating the shaft, and means forming a journal bearing for said shaft, comprising a resilient and compressible body within the opening under substantial and constant compression in directions radial to the axis of the shaft, said body formed with an axial channel extending part way therethrough, the shaft extending through the channel and through the material of the body beyond the end of the channel and in alinement therewith, so as to displace the material in amount corresponding to the dimensions of the displacing part of the shaft.

JNO. P. CROASDALE, JR.