July 23, 1963 H. F. WHEATON 3,098,579

CLOSURE RECONDITIONING MEANS AND METHODS

Filed Nov. 12, 1958

Fig. 1.

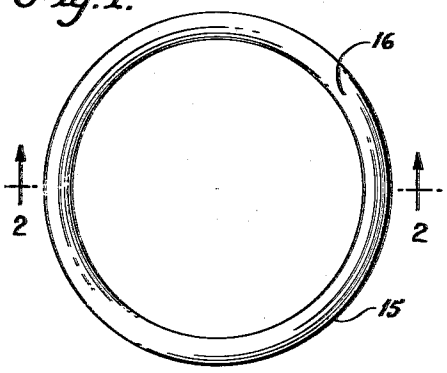


Fig. 3.

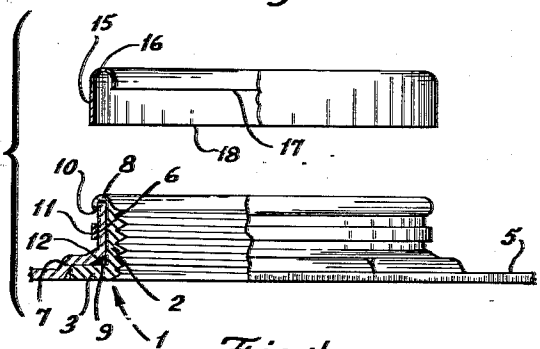


Fig. 2.

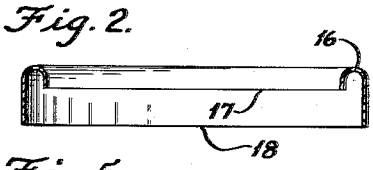


Fig. 4.

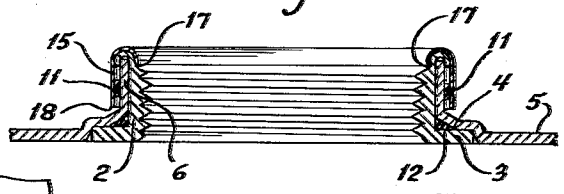


Fig. 5.

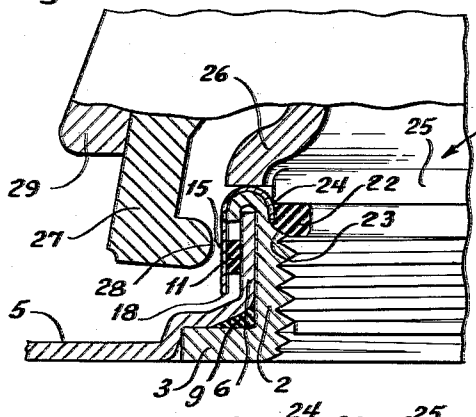


Fig. 6.

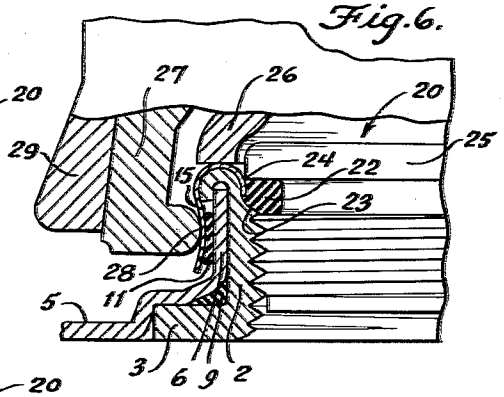


Fig. 7.

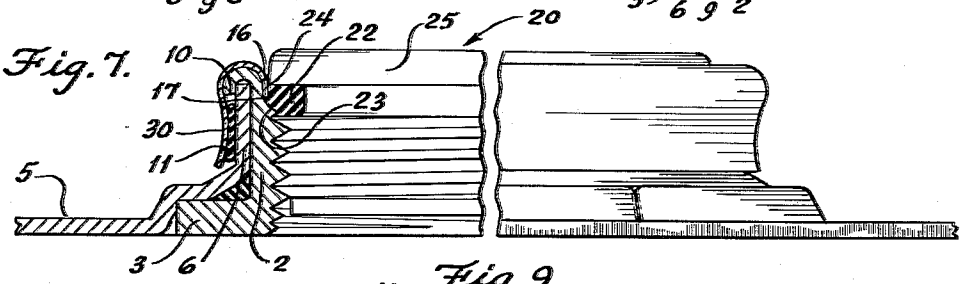


Fig. 8.

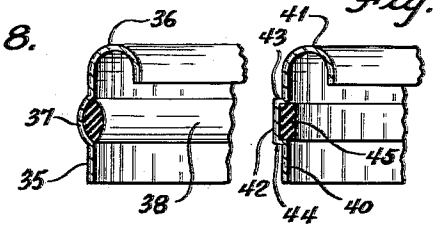


Fig. 9.

INVENTOR.

HERBERT F. WHEATON

BY

Albert M. Parker

ATTORNEY.

United States Patent Office

3,098,579
Patented July 23, 1963

3,098,579

CLOSURE RECONDITIONING MEANS AND METHODS

Herbert F. Wheaton, Murray Hill, N.J., assignor to American Flange & Manufacturing Co. Inc., New York, N.Y., a corporation of Delaware

Filed Nov. 12, 1958, Ser. No. 773,457
8 Claims. (Cl. 220—39)

This invention relates to the reconditioning of closures for steel barrels and drums and to methods for effecting the same. It is particularly concerned with devices and methods for restoring drum closures to leakproof condition, once their gaskets have been rendered ineffective by the heat employed in the reconditioning of steel drums.

Steel barrels and drums, as now manufactured and marketed, commonly have their exteriors lacquered or painted in colors or designs selected by the shippers. A good proportion of these containers are made solely for the purpose of taking a single trip when carrying commodities which are inflammable, dangerous or poisonous. When they have completed such trip they may still be effective packages and, in some instances, may be used without reconditioning for commodities which fall outside of the range of the inflammable, dangerous or poisonous field.

An example of this would be in the case of new drums, which make a single trip containing alcohol and could thereafter be used without any particular reconditioning for the shipment of kerosene or paint. Many drums, however, become somewhat battered, or have their finish scarred, in shipment and others are used for the shipment of commodities which are difficult to clean out of them. Even the drums which survive the first trip well are shortly likely to be scarred or otherwise damaged, so that the reconditioning of them is indicated.

A substantial business has accordingly grown up in the reconditioning of drums and, in the course of this business, it is now customary to remove the paint, or lacquer, from the exterior and completely clean out the interior of the drums so that they can have their exteriors re-painted and be re-used for shipment of commodities which are non-hazardous.

One of the principal steps undertaken in the reconditioning is the burning or heating of the drums in conveyors in ovens where the temperature is in the range of 1000° F. and thus raises the steel of the drums to a dull red heat. With regard to the closures, no effective gasket material has yet been devised for the gasketing between the closure flange or bushing and the container wall stock, for effectively withstanding the reconditioning temperatures for the period of time for which they are continued. Generally speaking all gaskets fail when subjected to such temperature, resulting in leakage at the closures.

Considerable effort has been exerted in an attempt to find a solution to this problem. Most of it has been directed toward a search for gasket materials, or gasketing constructions, which will withstand the heat. To date these efforts have been to no avail and the likelihood of solving the problem in this manner presently looks rather remote. The instant invention, however, provides a solution to the problem and does so in a simple, economical manner. The invention merely provides for the application of a gasket and a reconditioning seating collar to the exterior of the closure, once the drum has been reconditioned. The effectiveness of this collar is partially achieved by the application of, and co-action of, one of the closure elements itself, while the securing of it in place is effected by the use of capseal applying tools already available throughout the industry.

The reconditioning collar and gasketing of the invention prevents leakage of the contents of the container in one direction and cooperates with the gasket of the closure plug for preventing leakage in the other direction. Thus the problem is solved by the application of a minimum number of parts, of the utmost simplicity, which may be easily and effectively secured in place.

It is accordingly the principal object of the invention to provide means for the reconditioning of closures of reconditioned drums.

Another object is to provide reconditioning means for drum closures which are simple, readily applicable and whose applicability suggests itself to the workmen, so that no mistake can be made.

A further object is to provide such means which, though applied to the outside of the closure, do not interfere with the normal closing function for which the closure is designed.

A still further object is to provide methods for the reconditioning of drum closures which utilize parts of the closure themselves and capsealing tools already available to the industry for effecting the reconditioning.

Still further and more detailed objects will in part be obvious and in part be pointed out as the description of the invention, taken in conjunction with the accompanying drawing, proceeds.

In that drawing:

FIG. 1 is a top plan view of a reconditioning collar in accordance with the invention.

FIG. 2 is a section thereof taken on line 2—2 of FIG. 1 and looking in the direction of the arrows.

FIG. 3 is an exploded view of an assembly of a closure flange and container wall neck to be reconditioned, showing the reconditioning gasket already in place on the container wall neck and the reconditioning collar positioned ready to be seated thereover.

FIG. 4 is a vertical sectional view of such assembly with the closure reconditioning collar seated in place thereon but prior to the securing of that collar thereto.

FIG. 5 is an enlarged fragmentary vertical section of a portion of the closure as seen in FIG. 4 but with the plug screwed in place in the flange and with the jaw of the sealing tool about to crimp the skirt of the reconditioning collar into final position.

FIG. 6 is a similar view, showing the condition after the jaw of the tool has been actuated.

FIG. 7 is a part sectional, part elevational view of a closure reconditioned in accordance with the invention; and

FIGS. 8 and 9 are enlarged fragmentary sectional views of modified forms of reconditioning collars.

Considering first the closure element assembly to be reconditioned it would normally include a flange or bushing, generally indicated at 1, having a screw threaded neck 2 with a laterally extending base 3 around the bottom end thereof. The base 3 is received in a mated embossing 4, formed in the stock of the drum wall 5, around

the bottom of the container wall neck 6, which latter receives the flange neck 2. The usual relationship is that the periphery 7 of the embossing 4 and the periphery of the flange base 3 are related polygonally so as to prevent rotation.

At its upper end the closure flange is beaded over, as seen at 8, around the upper end of the drum stock neck 6 to hold the flange in place in the opening. At the same time this beading at 8 serves to compress the flange gasket 9 which lies in the pocket between the flange base 2 and its neck 3 and the opposed portion of the container wall stock extending between the embossing 4 and the neck 6. It is this gasket 9 which is attacked by the heat produced in the reconditioning of the drum as above described. Thus it will be apparent that if the gasket 9 fails, the contents of the container may be able to leak out in the path provided between the flange base 3, the drum stock 4, the opposed necks 2 and 6 and around inside the bead 8. Fluid resulting from any such leakage would emerge at the line 10, where the bead 8 terminates against the container wall stock neck 6.

With the gasket 9 rendered ineffective, considerable leakage can take place through this path for, though the parts are well fitted, it is recognized that metal-to-metal contact rarely makes an effective seal against the passage of liquids. This is particularly true when there is likely to be some pressure built up behind the liquid as commonly occurs in steel drums.

Efforts have been made to apply exterior sealing members across the line where the end of the bead 10 engages the neck 6. This has been difficult to do and the effecting of the securing of the means to hold such sealing means or auxiliary gaskets in place generally tends to move the gaskets away from that position. Thus such efforts fail to provide a solution to the problem. Furthermore there is a possibility that a certain portion of the drum stock neck 6 will be split part way down from the top of that neck. While the gasket 9 is effective such splits are of no moment, but once the gasket 9 fails they have to be taken into consideration, for they would provide more leakage paths than the one which would emerge at the end of the bead 10.

Taking all these features and others into consideration, the invention contemplates the solution of the problem by a double gasketing arrangement. The first of the gaskets is a simple annular one 11 which is applied over the neck 6 and holds itself in place thereon. It need be in no particular location but would preferably be intermediate the position 10 and the position 12, where the neck 6 rounds out into the embossing 4. Thus it would well cover any splits in the neck 6 which, to the small extent that they exist, normally extend little, if any, below the end of the beat at 10.

Once this gasket is in place the reconditioning collar of the invention is ready to be applied. This collar, as best seen in FIGS. 1, 2 and 3, is made of light weight steel sheet, has a cylindrical skirt portion 15 terminating at its upper end in an inturned round beaded portion 16. The beaded portion 16 is contoured so as to mate with and seat down uniformly over the bead 8. The portion 16 terminates at a line 17 which brings it just down to the uppermost of the threads of the neck 2 so that it overlies the normal plug gasket seat provided by the flange. The height or length of the skirt portion 15 is such that when the collar is positioned in place over the closure flange, the bottom 18 of the portion 15 will come down just short of making contact with the container wall stock where the embossed portion 4 and the rounded portion 12 merge. Furthermore, as seen in FIGS. 4 and 5, the skirt 15 of the collar lies down straight from the periphery of the bead 8, so that it just overlies the outer periphery of the gasket 11.

This collar member 15, 16 is of considerably lighter weight metal than that of the adjacent parts. It is presently preferred to be made of sheet steel of approximately

.014" as against the 11 gauge or the .118" thickness of the flange stock and the thickness of the drum stock which would commonly be 18 gauge, .048" or, in some instances, may be 16 gauge, .0625". However the reconditioning collar member does not serve to any particular extent as a structural element. Its purpose is merely to serve as a gasket seating and holding member. Thus, surprisingly, a member of the thickness indicated, does the job with full effectiveness. Furthermore its thickness is sufficiently minimized that the application of the closure plug and of a capseal over the closure can be effected in substantially the same manner as is done for this closure in the absence of any such member.

Considering the closure plug, it is the next element to be introduced into the picture, for once the reconditioning collar 15, 16 is seated over the closure and over the gasket 11, as shown in FIG. 4, the next step is to hold it in place there, while its skirt 15 is crimped inward. This holding is effected by applying the closure plug, generally indicated at 20, to the flange by screwing its threaded side wall 21 down into the threaded neck 2 of the flange until the gasket 22, carried by the plug, bridges across the end edge 17 of the collar between the upper surface of the uppermost of the threads and the adjacent surface of the collar portion 16, as best seen at 23 in FIGS. 5, 6 and 7. On continued downward turning of the plug, the corner edge 24, of its head 25, will eventually come into contact with the rounded portion 16 of the reconditioning collar, at which time further turning of the plug will be prevented. When the plug reaches this position the plug gasket 22 will have been sufficiently compressed so as to make a tight joint, not only against leakage up between the engaged threads of the plug 21 and the flange neck 2 but, also, against any leakage that may have found its way up around the exterior of bead 8 and within the overlying portion of the bead 16, for, as readily seen in FIG. 7, the gasket 22 seals across and blocks off any path of leakage at the end 17 of the bead portion 16. Besides this gasketing action the plug, by the engagement of the corner edge 24 with the portion 16, serves to hold the reconditioning collar 15, 16, in place for the crimping of the portion 15 to be effected.

The application of the plug then performs the dual function of securing the collar 15, 16 in position to be crimped in place and, at the same time, gaskets the end of the collar at 17 against any possible leakage. This being the only direction in which liquid can flow from the container, effective sealing against leakage is provided by causing the plug gasket to perform its normal function of preventing leakage up through the threads as well as the additional function of blocking possible leakage between the bead 8 and the portion 16.

In the reconditioning of drums the drum reconditioner would, in any event, secure new plugs in the flange before shipping out the drums to his customer, so no additional operation is called for by the application of the plug to hold the collar 15, 16 in place.

Once the plug 20 is secured in place the final step of the reconditioning is effected by the use of capseal applying tools, already available for applying capseals over container closures in the manner taught in United States Patents Nos. 1,982,144, 1,982,145 and 1,887,435. These tools normally have an inverted cup-like seating portion which seats or locates them on the capseal and, in this instance, will seat them on the upper surface of the rounded portion 16. The seating of the portion 26 of this element is illustrated by the showing of a fragmentary portion thereof, in FIGS. 5 and 6 .Such sealing tools, as illustrated in Letters Patent No. 1,887,435 just referred to, are provided with a plurality of jaw members 27, swingably mounted to have their actuating faces 28 forced inwardly against the skirt portions 15 of the reconditioning collar. This inward forcing is effected by the downward movement of a bell-like member 29 shown fragmentarily in FIGS. 5 and 6.

By referring to FIGS. 6 and 7 then it will be seen that once the inward crimping of the skirt **15** has been effected, that skirt will be generally rounded inwardly as illustrated at **30** in FIG. 7 and the gasket **11**, behind it, will be compressed and spread throughout a substantial portion of the height of the neck **6**. This crimping and compression of the gasket has been found by tests to effectively prevent any leakage downwardly from the position **10**, and to seal off any splits in the neck so that the only path open is that up around the bead **8**. That path, however, is blocked off by the plug gasket **22** so that the assembly of the closure flange and container wall neck, by means of the invention, is restored to full operativeness.

It will be readily apparent that it is a simple matter when, at the time the reconditioner is ready to put the plugs in the closures of the reconditioned drums, for the gaskets **11** to be applied over the neck **6** and for the reconditioning collars **15, 16**, to be seated over the bead **8** and down past the neck **6**. Then, when the plug is secured in place, the workman merely needs to apply the sealing tool and crimp the portions **15** in against the gaskets and the reconditioning of the closure is complete.

With normal usage the reconditioning collar **15, 16**, will perform effectively through several re-uses of the drum. If, however, it is desired to remove the collar at any time and replace it with a new one and a new gasket **11**, that can readily be done.

Further, though the use of the plug has been indicated to hold the reconditioning collar in place for the crimping of its skirt **15** inwardly, this step can be performed in other ways. One of these is by providing a special tool having an anvil portion which overlies the rounded portion **16** in place of the seating element **26**. Such anvil is so related to the tool jaws that once the anvil is positioned on the member **16**, while the same is seated over the flange bead **8**, the jaws are in the right position to crimp the skirt **15** inwardly to complete the reconditioning. Normally, however, the expense of this tool and additional operation in the use of it can be avoided by applying the plugs as described and sealing by means of the normally available capseal applying tools.

A somewhat modified form of reconditioning collar is illustrated in FIG. 8. Here the cylindrical skirt **35** has a turned or beaded over portion **36**, the same as the portion **16** of the previous form. However, the skirt **35** is annularly outwardly recessed at **37** to form a pocket for the reception of a gasket **38**. The gasket in this instance can advantageously be applied by flowing it in place in fluid state while the collar is spun. In this way the gasket stays in place in the recess **37**, while it is seating and once it is set it remains there. In keeping with this modification then, the need for applying a separate gasket **11** is eliminated. Instead the gasket is already in place in the collar and when the collar is applied the gasket is positioned opposite the container wall neck **6**. Then when the inward crimping of the portion **35** is effected that portion is flattened out, the gasket is compressed and spread between the portions **35** and **36** and is effective in the same manner as the gasket **11**.

In the FIG. 9 modification the cylindrical skirt **40** carries the beaded portion **41** like the portions **16** and **36** previously described. The skirt **40** however is formed with an annular recess therein which is initially rectangular in cross-section, having a base **42** and sides **43** and **44**, but with an open mouth opposite the base **42**. This recess receives an annular preformed gasket **45** which fills the recess and projects radially inwardly only a short distance beyond the skirt **40**. The sides **43** and **44** are preferably crimped toward each other adjacent the open mouth of the recess to hold the gasket **45** in place before the collar is put into use. This crimping may be before or after the application of the gasket.

Here, again, as in the FIG. 8 form, the recess **42, 43, 44**, is substantially flattened out and eliminated as the collar **40** is crimped in place over a closure neck. At the same time the gasket **45** is flatttened out between the collar and the container wall neck **6**.

Though, in the foregoing, the presently preferred modified form of the invention is shown and described, it is, of course, to be understood that this showing and description is for illustrative and not for limiting purposes.

Having described my invention, what I claim as new and desire to obtain Letters Patent for is:

1. A reconditioning collar for the reconditioning of steel drum closures, which closures include an upstanding neck formed out of the container wall stock and a closure flange having a cylindrical portion within said neck, said flange having a portion beaded over the upper end of said container wall neck and having a laterally extending portion, at the other end of said cylindrical portion, securing a gasket between the same and the inner surface of the container wall stock at the base of the neck, which reconditioning collar comprises, a substantially cylindrical skirt portion and an integral inwardly beaded rim portion at the upper end of said skirt portion, said bead portion being formed for mated engagement with the beaded over portion of said closure flange and said skirt portion formed to extend downwardly past said bead in opposition to said container wall neck spaced outwardly thereform and for a substantial portion of the height thereof, the lower portion of said skirt portion, in one position of the securing thereof, flaring outwardly away from said container wall neck, said reconditioning collar being formed of light weight deformable sheet steel of substantially less thickness than the thickness of said container wall stock.

2. A reconditioning collar as in claim 1, and including a gasket formed in situ on the inner surface of said skirt.

3. A reconditioning collar as in claim 1, said skirt, at a position spaced well below said bead portion, being formed with an outwardly extending, inwardly opening annular recess therein and a gasket secured in said recess and extending radially inwardly a short distance beyond the inner face of said skirt.

4. A reconditioning collar as in claim 3, wherein said gasket is formed in place in said recess out of settable material.

5. A reconditioning collar as in claim 3, wherein said recess is substantially rectangular in cross-section and said gasket is a pre-formed member snugly received within said recess and extending a short distance radially inwardly from the inner surface of said collar.

6. A reconditioned drum closure element assembly which assembly comprises, an upstanding neck formed out of the stock of a container wall, a closure flange, having a sleeve portion received within said container wall neck, having a base portion underlying said container wall at the lower end of said container wall neck and a bead portion at the upper end of said sleeve portion turning outwardly into a rounded bead overlying the upper end of said container wall neck, a gasket seated on said container wall neck and surrounding the same and a reconditioning collar seated over said assembly, said collar having a skirt portion positioned in overlying relationship with respect to said container wall neck and engaging said gasket and a bead portion turned inwardly at the upper end of said skirt portion, said bead portion of said collar being mated to and seated on said beaded upper end of said closure flange and terminating in a downturned portion in engagement with the inner surface of said beaded upper end of said closure flange, said closure flange being threaded internally, said threads terminating at the commencement of said bead, a closure plug threadedly secured within said flange, said closure plug carrying a gasket adjacent the upper end thereof and said gasket overlying the terminating end of said downturned portion of said reconditioning collar and bridging the zone between the said reconditioning collar and the upper end of said flange threads.

7. An assembly as in claim 6, wherein said skirt of said

reconditioning collar is crimped inwardly towards said container wall neck and said gasket is compressed and extended axially of said neck.

8. A reconditioned drum closure element assembly which assembly comprises, an upstanding neck formed out of the stock of a container wall, a closure flange having a sleeve portion received within said container wall neck, having a base portion underlying said container wall at the lower end of said container wall neck and a bead portion at the upper end of said sleeve portion turning outwardly into a rounded bead overlying the upper end of said container wall neck, a gasket seated on said container wall neck and surrounding the same and a reconditioning collar seated over said assembly, said collar having a skirt portion positioned in overlying substantially spaced relationship with respect to said container wall neck and engaging said gasket and a bead portion turned inwardly at the upper end of said skirt portion, said bead portion of said collar being mated to and seated on said beaded upper end of said closure flange and terminating in a downturned portion in engagement with

the inner surface of said bead portion at the upper end of said closure flange and continuing throughout the extent of said inner surface, said skirt being crimped inwardly towards said container wall neck and said gasket being compressed therebetween and extended axially of said neck.

References Cited in the file of this patent

UNITED STATES PATENTS

1,737,182	Bell	Nov. 26, 1929
1,982,145	Shera	Nov. 27, 1934
2,050,942	Francis	Aug. 11, 1936
2,224,337	Bostwick	Dec. 10, 1940
2,475,007	Carlson	July 5, 1949
2,772,037	Rieke	Nov. 27, 1956
2,801,023	Baker et al.	July 30, 1957
2,961,111	Nesme	Nov. 22, 1960

FOREIGN PATENTS

449,676	Great Britain	June 22, 1936