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3,177,014

PLASTIC FITTING FOR DISPENSING LIQUIDS FROM DRUMS

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2 Sheets-Sheet 1

Fig. 1

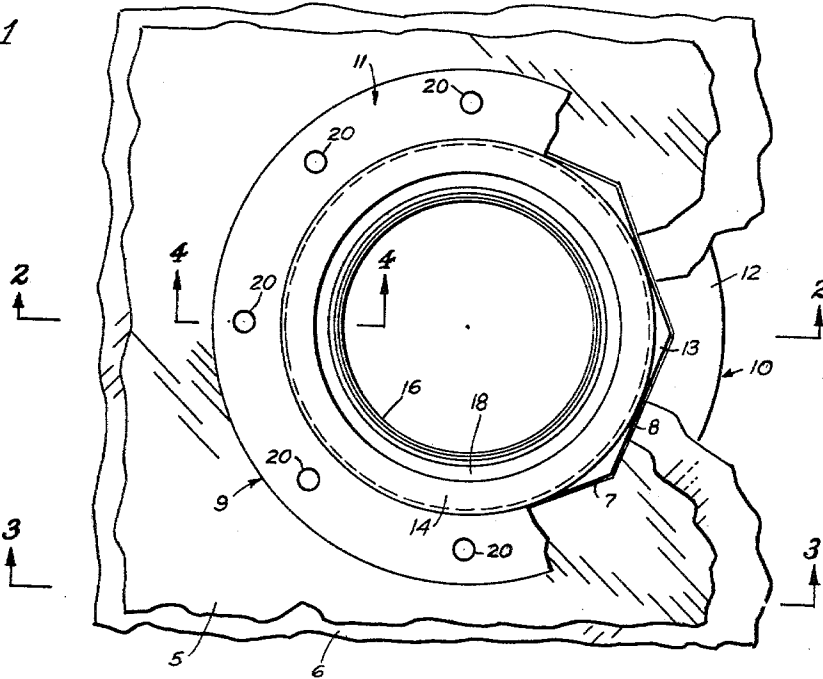


Fig. 2

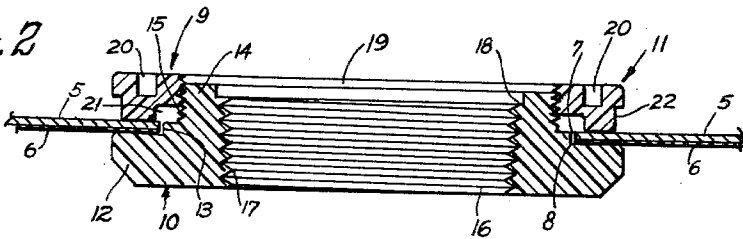
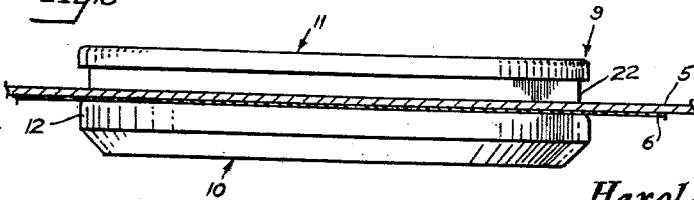


Fig. 3



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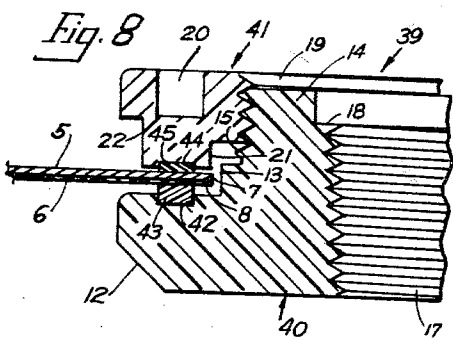
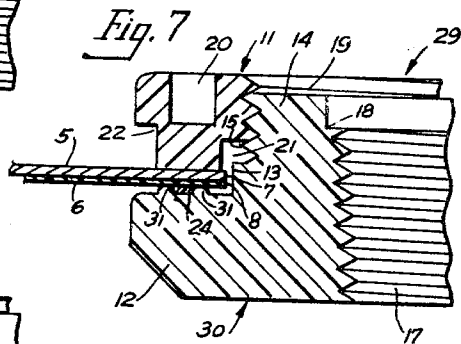
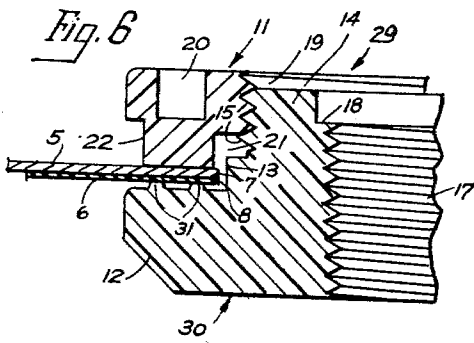
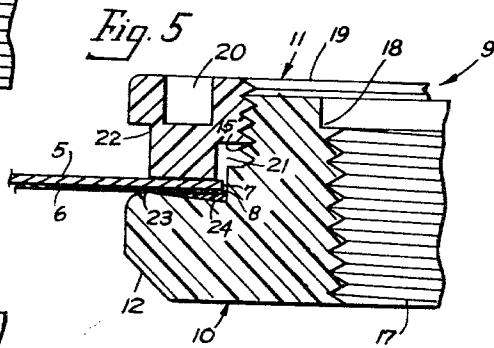
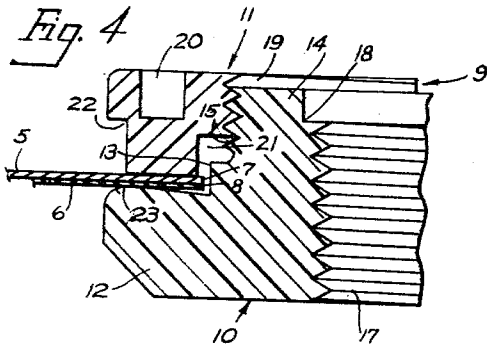
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**PLASTIC FITTING FOR DISPENSING LIQUIDS FROM DRUMS**

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1 Claim. (Cl. 285-206)

This invention relates in general to new and useful improvements in drum construction, and more particularly relates to a novel fitting for filling and dispensing liquids from drums.

The majority of drums used for shipping and dispensing liquids are presently made of steel or a combination of a fibre sidewall and steel cover. It is common practice to install fittings in the drum ends for filling and dispensing, the opening of which is fitted with a plug closure for shipping, which plug is replaced by a faucet or valve for dispensing. It is also common practice to install a similar fitting, smaller in size and referred to as a vent, which is used to admit air into the drum as the contents are drawn off through the faucet. There are two basic types of fittings commercially used. The one consists of an all metal fitting and the other a combination of metal and plastic such as polyethylene. Both types require that the opening in the drum be punched and formed to receive the fitting which is then attached to the specially formed opening by means of special crimping dies.

Since many liquid products are corrosive to steel, the interior of the drum as well as the fittings themselves are given a chemically resistant protective coating, which has not been entirely satisfactory for the following reasons. In forming the contour of the opening to receive the fitting, the metal is severely stretched and formed so that the contour is not only difficult to coat but it is also well known to the art that deformed and stretched metal is more difficult to adequately coat than flat undistorted steel. Secondly, the metal screw threads are extremely difficult to coat and the coating on the threads is subject to damage when the plug is inserted and removed. A third shortcoming of available fittings is that some are so designed that a cut edge in either the opening or the fitting flange proper is exposed to the drum contents and it is well known to the art that it is extremely difficult to adequately apply a protective coating to the cut edge of steel. A fourth disadvantage is that the die action necessary to crimp the fitting onto the formed opening of the drum has a tendency to damage the protective coating. A fifth disadvantage is that when the protective coating has been pre-applied to the steel member of the drum, which is the most economical method of application, subsequent punching and forming necessary for the fitting attachment will damage the coating. A sixth disadvantage is that present fittings cannot be attached to a fibre cover because of the way they must be die crimped to a formed opening, which forming operation can only be done with metal.

In view of the foregoing, it is the primary object of this invention to provide a novel plastic fitting specifically intended for mounting in an opening in a drum end to form a seal with the drum end and at the same time permit the contents of the drum to be dispensed there-through, the fitting being of a nature so as to permit a complete protection of the drum end against corrosive or acid materials packaged therein.

Another object of the invention is to provide a suitable fitting which may be used equally as well with metal drum ends and fibre drum ends, which fitting is of a nature to provide a seal with the drum end with which

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it is associated and at the same time being relatively inexpensive to produce.

Another object of the invention is to provide a fitting for drum ends which is threaded together so that it may be readily installed without the use of heavy press or crimping die equipment as has been the case in the past.

Still another object of the invention is to provide a plastic fitting having no metal components that would be susceptible to attack by corrosive liquid contents.

Another object of the invention is to provide a plastic fitting that requires only a simple opening punched in the metal end, said cut edge of the opening being so positioned that it is not exposed to the drum contents. In addition, the opening in the metal end does not require deforming for crimping the fitting thereto, hence eliminates the danger of damage to the protective coating and subsequent corrosion from the liquid contents.

Another object of the invention is to provide a plastic fitting which permits a plastic sealing disk to be engaged between it and the underside of the metal end, which eliminates all contact between the corrosive liquid contents of the drum and the metal end.

Still another object of the invention is to provide a novel plastic fitting for use with drum ends to provide dispensing openings in the drum ends, the fittings being of a nature whereby the desired seals with the drum ends may be obtained and the fittings require no special sealing disks of their own so that the drums can be filled through the fittings without removing the drum ends.

A still further object of the invention is to provide a plastic fitting which is secured in place through a threading operation between the two parts thereof and which fitting, when installed, is in no way permanently distorted whereby, when desired, the fitting may be removed from one drum and utilized in another drum, thus making the fitting economically attractive.

Still another object of the invention is to provide a novel plastic fitting to be used in conjunction with a drum end for forming a dispensing opening therein, the drum end being provided with a non-circular cross-sectional opening therein, and the plastic fitting including a first member adapted to be passed through the drum end from the inner surface thereof to the outer surface thereof and the member having an intermediate portion of an outline similar to the outline of the opening in the drum end whereby the member is locked against rotation with respect to the drum end, and the fitting further including a retaining ring which is secured to the member to urge the member into sealing engagement with the drum end.

A further object of the invention is to provide a novel plastic fitting for use in conjunction with a drum end for forming a dispensing opening therein, the plastic fitting including two parts which are threadedly connected together and which parts may be heat fused together after being initially positioned to provide a permanent connection between the two parts of the fitting thus insuring against accidental loosening of these two parts.

With the above, and other objects in view that will hereinafter appear, the nature of the invention will be more clearly understood by reference to the following detailed description, the appended claim, and the several views illustrated in the accompanying drawings.

In the drawings:

FIGURE 1 is a fragmentary plan view of a drum end incorporating the fitting which is the subject of this invention, portions of the drum end and fitting being broken away for purposes of clarity.

FIGURE 2 is a transverse sectional view taken along the line 2-2 of FIGURE 1, and shows generally the details of the fitting and the relationship thereof with respect to the drum end.

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FIGURE 3 is a transverse sectional view taken along the line 3—3 of FIGURE 1, and shows the fitting in elevation.

FIGURE 4 is an enlarged fragmentary sectional view taken along the line 4—4 of FIGURE 1, and shows the specific details of the fitting and the relationship thereof with respect to the drum end and a sealing disk underlying the drum end.

FIGURE 5 is an enlarged fragmentary sectional view similar to FIGURE 4, and shows the fitting being provided with a sealing compound to further effect a seal between the fitting and the drum end.

FIGURE 6 is an enlarged fragmentary sectional view similar to FIGURE 4, and shows a slightly modified form of fitting.

FIGURE 7 is an enlarged fragmentary sectional view similar to FIGURE 4, and shows the fitting of FIGURE 6 provided with sealing compound to provide an additional seal.

FIGURE 8 is an enlarged fragmentary sectional view similar to FIGURE 4, and shows still another form of fitting.

This invention particularly relates to the provision of a drum end with a fitting through which the drum may be filled or the contents of the drum may be dispensed. The present fitting is intended primarily to be used with either metal or fibre drum ends, which drum ends have associated therewith a sealing disk to protect the drum end against the contents of the drum. However, when this protection is not required, the sealing disk may be omitted. In the event the sealing disk is omitted, the fitting will still function in the desired manner.

A conventional drum end is illustrated in the several views of the drawings and is generally referred to by the numeral 5. As pointed out above, the drum end 5 may be either formed of metal or fibre. A sealing disk 6, which is preferably formed of a plastic material, underlies the underside of the drum end 5 and provides protection therefor. The drum end 5 is provided with an opening 7 which is of a non-circular cross-section and is illustrated as being octagonal in outline, although it may be of other non-circular configuration. The sealing disk 6 is provided with a similar opening 8 which is aligned with the opening 7.

In accordance with the invention, a plastic fitting 9 is secured to the drum end 5 and the sealing disk 6. The plastic fitting 9 includes a dispensing opening defining member 10 and a retaining ring 11. The member 10 and the retaining ring 11 cooperate to clamp the drum end 5 and the sealing disk 6 therebetween and form the desired dispensing opening in the drum end.

The member 10 includes a lower flange 12 which is preferably circular in outline and which is relatively thick. The flange 12 underlies the sealing disk 6 around the opening 8 formed therein. An intermediate portion 13 of the member 10 is disposed upwardly of the flange 12 and is of a reduced cross-section. The intermediate portion 13 has a configuration corresponding generally to the configuration of the openings 7 and 8, and closely fits therein to form an interlock between the member 10 and the drum end 5, thus preventing rotation of the member 10 with respect to the drum end 5. The member 10 also includes an upper portion which is of a reduced cross-section, the upper portion being referred to by the numeral 14 and having external threads 15.

The member 10 has a dispensing opening 16 extending therethrough. The dispensing opening 16 has internal threads 17, which threads are of the conventional tapered pipe thread type. The opening 16 will be of the size normally found in drums of the type to which the present invention relates to permit the desired dispensing operation, as well as the attachment of customary faucet or valve. The openings 16 will be normally closed by a customary plug closure which is threaded into the opening 16 and which will abut against the annular shoulder 18

disposed at the upper end of the threads 17, the shoulder 18 being recessed and adapted to engage a suitable sealing material. It is preferred that the closure member be formed of a plastic and, if desired, a polyethylene closure member which is commercially available may be used, although other materials may suffice.

The retaining ring 11 is provided with internal threads 19 which match the external threads 15 of the member 10. Thus, the retaining ring 11 may be readily threaded onto the reduced upper portion 14 of the member 10. In order to facilitate rotation of the retaining ring 11, it is provided with a plurality of upwardly opening vertical bores 20 which may be suitably engaged by pins of a spanner wrench.

The lower inner portion of the retaining ring 11 is undercut, as at 21, to provide clearance for the intermediate portion 13 of the member 10 and to assure proper engagement of the outer surface of the drum end 5 by the lower surface of the retaining ring 11. Thus, when the retaining ring 11 is threaded into place, it will tightly engage the drum end 5 and clamp the same against the upper surface of the flange 12, which upper surface may be considered to be a drum bed seating surface. The lower outer portion of the retaining ring 11 is also undercut, as at 22, to facilitate the installation of a metal seal over the top of the retaining ring 11 to make the fitting pilfer-proof in accordance with the usual practice.

It is preferred that the fitting 9 be formed of polypropylene, although it may be formed of a polyethylene or other suitable plastics. The fitting 9 may be used with a drum end either protected by a sealing disk, such as the sealing disk 6, or unprotected. Also, it is to be understood that the inner surface of the drum end 5 may be provided with a suitable plastic coating or integral lining which will eliminate the necessity for the sealing disk 6.

Reference is now made to FIGURE 4 in particular, wherein the details of the fitting 9 are shown on a much larger scale. It is to be noted that the upper surface or drum end seating surface of the flange 12 slopes inwardly and downwardly to define an outer peripheral seating portion 23. The slope is preferred over a flat surface in that it provides for a more effective seal although flat surfaces may suffice. The seating portion 23 projects above the remainder of the upper surface of the flange 12 and is engaged by the sealing disk 6, when the sealing disk is used, or by the inner surface of the drum end 5. The relationship of the retaining ring 11 with respect to the peripheral seating portion 23 is such that the drum end 5 and the sealing disk 6 are urged downwardly in a manner to assure a continuous seal between the flange 12 and either the sealing disk, when used, or the drum end when no sealing disk is used, along the peripheral seating portion 23.

Reference is now made to FIGURE 5, which figure is identical to FIGURE 4 with the exception that there has been added to the connection between the fitting 9 and the drum end 5 sealing compound 24. The sealing compound 24 is disposed in the recessed portion of the upper surface of the flange 12 in underlying relation to the sealing disk 6. It will be readily apparent that the sealing compound 24 is additive to the seal between the sealing disk 6 and the upper surface of the flange 12 along the peripheral seating portion 23. Although the sealing engagement between the peripheral seating portion 23 and either the sealing disk 6 or the drum end 5 provides an adequate seal, the introduction of a sealing compound, such as the sealing compound 24, is an added protection against the entrance of the contents of the drum into the interior of the fitting 9 where it could attack the raw edge of the drum end 5 about the opening 7 formed therein.

At this time, it is pointed out that it is feasible to have the upper surface of the flange 12 smooth and to provide the sealing compound 24 to effect the desired seal. How-

ever, the arrangement illustrated in FIGURE 5 will provide a much more efficient seal.

Reference is now made to FIGURE 6, wherein a modified form of fitting, generally referred to by the numeral 29, is illustrated. The fitting 29 includes the retaining ring 11. On the other hand, it includes a dispensing opening defining member which is slightly different from the member 10, and is generally referred to by the numeral 30. The member 30 differs from the member 10 only in that the upper or drum end seating surface of the flange 12 is modified. Accordingly, like reference numerals have been given like parts of the members 10 and 30.

In lieu of the upper surface of the flange 12 sloping downwardly and inwardly, as in the case of the flange surface of the member 10, the upper surface of the flange 12 is disposed generally parallel to the drum end 15. In order to provide the desired seal, a pair of concentric ribs 31 project upwardly from the upper surface of the flange 12 for sealing engagement with the sealing disk 6 or the drum end 5 when the sealing disk is not used. It is to be noted that the ribs 31 are generally centered with respect to the downwardly projecting portion of the retaining ring 11 so that the pressure exerted by the retaining ring 11 in its clamping action is directed generally equally to the two ribs 31.

In FIGURE 7, the fitting 29 has been modified to the extent that sealing compound, such as the sealing compound 24, is disposed intermediate the ribs 31. The sealing compound 24 will engage the inner surface of the sealing disk 6 to form a seal thereto, which seal is in addition to the two seals formed by the engagement of the ribs 31 with the inner surface of the sealing disk 6. Of course, when the sealing disk 6 is omitted, the sealing compound will form a similar seal with the inner surface of the drum end 5.

Reference is now made to FIGURE 8 in particular, wherein another form of fitting, generally referred to by the numeral 39, is illustrated. The fitting 39 incorporates a slightly modified form of dispensing opening defining member, generally referred to by the numeral 40, and a slightly modified form of retaining ring, generally referred to by the numeral 41. The member 40 has been modified so as to differ from the member 10 only in that the upper or drum end seating surface of the flange 12 is disposed generally parallel to the drum end 5 and is provided with an annular recess 42 in which there is seated a gasket 43, the gasket 43 at least initially projecting up out of the recess 42 for engagement with the inner surface of the sealing disk to form the desired seal therewith. Of course, if desired, the recess 42 could be omitted. When the sealing disk 6 is omitted, the gasket 43 will engage the inner surface of the drum end 5 and provide the necessary seal. All other components of the member 40 are identical with the member 10 and will be referred to by like reference numerals.

The retaining ring 41 differs from the retaining ring 11 only in that the undersurface thereof is provided with an annular recess 44 in which there is seated a gasket 45. The gasket 45 at least initially projects downwardly below the undersurface of the retaining ring 41 so as to compressively engage the outer surface of the drum end 5. It will be apparent that the gasket or sealing ring 45 is aligned with the gasket or sealing ring 43 so that the drum end 5 and the sealing disk 6 are clamped between the two. At this time, it is pointed out that if desired, the gasket 45 could be omitted and the seal between the fitting and the drum end construction be primarily between the gasket 43 and the sealing disk 6.

From the foregoing description of the invention and the several illustrations in the drawings, it will be readily apparent that the several fittings illustrated and described

herein provide an effective seal with a drum end construction wherein the drum may or may not be provided with a sealing disk underlying the drum end. In addition, the fittings perform the desired function equally as well irrespective of whether the drum end is formed of metal or fibre. Further, since the two parts of each fitting are threadedly secured together, when desired, the fitting can be reusable in other drums. On the other hand, the parts of the fittings being formed of a heat fusible plastic, the contacting or abutting portions of the retaining ring and the dispensing opening defining member may be heat fused together to form a permanent and efficient connection between the two parts. Numerous other advantages of the invention, such as of ease of assembly, will be readily apparent upon further study of the fittings.

From the foregoing, it will be seen that novel and advantageous provision has been made for carrying out the desired end. However, attention is again directed to the fact that variations may be made in the example fittings disclosed herein without departing from the spirit and scope of the invention, as defined in the appended claim.

I claim:

In a drum construction, a drum end, a sealing disk secured to an inner surface of the drum end, a fitting carried by said drum end for dispensing the contents of the drum, said drum end and sealing disk each having an opening, said drum end opening being of a non-circular outline, said fitting including a dispensing opening defining member and a retaining ring, said member including a lower flange underlying said drum end sealing disk and a reduced externally threaded upper portion projecting through said drum end opening above said drum end, said reduced upper portion having an intermediate portion of a non-circular outline for seating in the drum end opening to prevent rotation of said member relative to said drum end, said retaining ring being positioned on said upper portion with said drum end and sealing disk being clamped between said flange and said retaining ring, said member and said retaining ring being formed of a plastic material resistant to attack by corrosive liquids and acids, said flange and said retaining ring having opposed surfaces between which said drum end and sealing disk are clamped, the surface of said flange including a pair of upwardly directed spaced annular ribs bearing against said sealing disk, and sealing compound disposed between said ribs, said sealing disk and said drum end.

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