

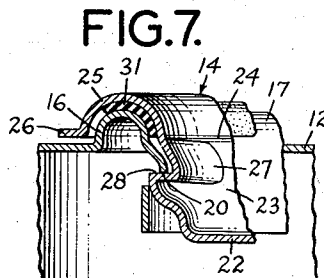
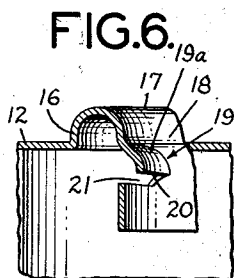
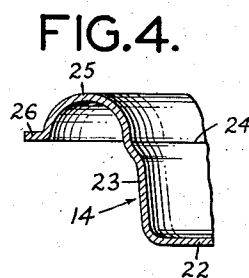
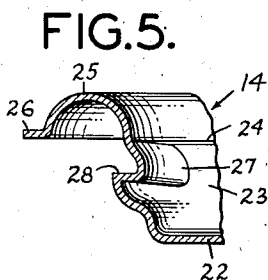
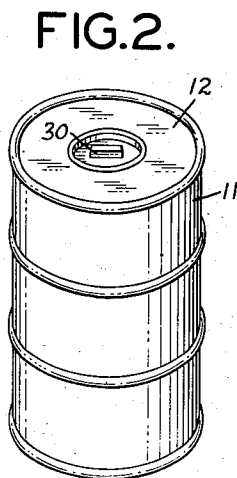
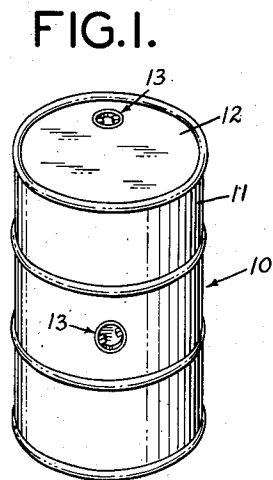
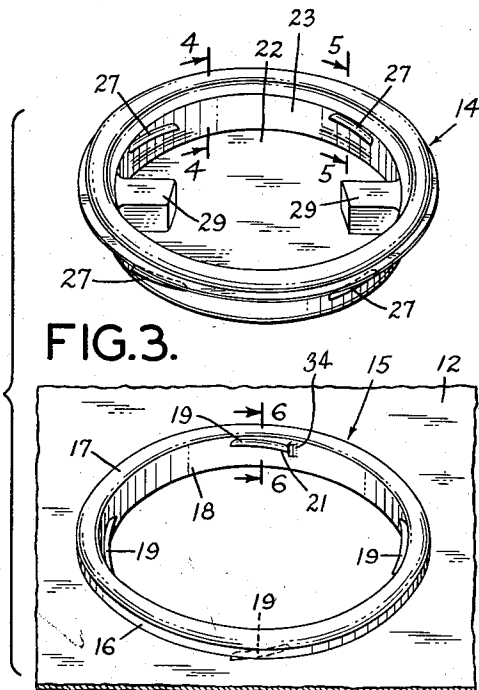
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CLOSURE FOR CONTAINERS

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CLOSURE FOR CONTAINERS

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1 Claim. (Cl. 220—40)

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This invention relates to closures for containers and the like and more particularly to a new and improved closure assembly for containers.

Containers, such as drums, are commonly formed with openings smaller than one surface of the container. One type of such opening is commonly referred to as a bung, and is generally used in a container for holding a liquid. These bungs usually involve a threaded closure and the bung assemblage is separately formed and secured in the container. Their construction is relatively complex and their use requires threading the closure into the threads of the bung opening. This often consumes some time in getting the threads started properly and to turn the threaded closure up tight. There is always the difficulty of crossing the threads or otherwise damaging them.

Another type of closure with a relatively small opening as compared with the surface of the container in which it is formed, is a friction-held closure in which the closure is pressed into the opening in the container and held there by friction. This type of closure is usually used on containers for solids. It is relatively insecure and generally requires some other type of locking means.

It is an object of this invention to provide a novel closure which is free of the deficiencies of the prior art and which nevertheless may be manufactured by mass production techniques at minimum cost.

It is another object of the invention to provide a novel closure for containers which may be disposed at any one of a plurality of points on the container, the closure affording a liquid-tight seal having high resistance to shock, vibration and the like and which may be repeatedly assembled and disassembled without destroying the effectiveness of the seal.

According to the invention the closure comprises an annular portion which may be formed in any given plane surface or curved surface of the container which surface is larger than the size of the opening. The margin of the opening is formed with a sealing surface and a substantially cylindrical wall portion extends therefrom into the container, both the sealing surface and wall portion preferably being carried by the container surface bounding the closure.

A plurality of circumferentially spaced locking members are formed on the inner surface of the cylindrical wall, the locking members preferably being formed by striking out portions of the wall to provide inclined, flat locking surfaces, as well as a plurality of drain-openings com-

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municating with the inside of the container at a point above the inner edge of the cylindrical wall.

The closure member is disc-shaped and is formed with a peripheral sealing surface, a peripheral or cylindrical wall and a recessed center portion adapted to be received within the opening in the container. Spaced-apart locking members are formed externally on a peripheral wall of the closure to be received initially between the locking members on said cylindrical wall so that rotation of the closure causes the locking members to engage those on the cylindrical wall to draw the sealing surfaces into engagement. In order to facilitate rotation of the closure, finger-grip means may be formed integrally on the closure element in the central portion.

The above and other features and advantages of the invention will become apparent by reference to the following specification taken in conjunction with the accompanying drawings in which:

Fig. 1 is a view in perspective of a container selected for purposes of illustration of the invention and having two closures formed therein according to the invention, said closures being of the bung type;

Fig. 2 is a view in perspective of a container showing a modified embodiment of the invention in which the closure is relatively larger;

Fig. 3 is a view in perspective of the closure assembly showing both the closure member and the contoured means defining the opening in which the closure member is received;

Fig. 4 is a fragmentary view in cross section of the closure member shown in Fig. 3, taken on the line 4—4 and looking in the direction of the arrows;

Fig. 5 is a fragmentary view in cross section of the closure member shown in Fig. 3, taken on the line 5—5 and looking in the direction of the arrows;

Fig. 6 is a fragmentary view in cross section of the wall means defining the opening in the container and a locking member formed therein to provide a drain opening taken on the line 6—6 of Fig. 3 and looking in the direction of the arrows; and

Fig. 7 is a fragmentary view in cross section corresponding to Figs. 5 and 6 and showing the closure member locked in sealing position in the opening in the container.

Referring to the drawings, a preferred form of the invention is shown as embodied in a metal drum 10. Alternatively the closure may be incorporated in containers of other types and

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shapes, a metal drum having been selected herein merely for purposes of illustration.

The drum 10 comprises a disc-shaped top surface 12 and a cylindrical wall portion 11. Formed in the wall 11 as well as in the surface 12 are closure assemblies 13, each comprising a removable closure member 14 and a contoured seat 15, all as formed according to the invention described below.

The seat 15 comprises an annular, upstanding wall portion 16 formed integrally with the surface 12, and a shaped, continuous sealing bead or surface 17 disposed thereabove. The inner edge of the sealing surface 17 joins an inner cylindrical wall portion 18 having a plurality of equally spaced-apart locking members 19 formed therein closely adjacent the sealing surface. For purposes of illustration the total number of locking members 19 shown in the drawing is four, although it will be understood that more or less may be provided to suit the particular requirements of each closure.

According to a preferred embodiment of the invention these locking members 19 are formed as struck-out, elongated portions each having a rounded upper surface 19a and a lower engaging or bearing surface 20 facing into the container and separated from the wall to form a drain opening therein as designated generally by the numeral 21 and communicating with the inside of the container. The bearing surfaces 20 on locking members 19 are carefully formed so as to be laterally perpendicular to the axis of the cylindrical wall portion, the surfaces 20 also being inclined at a small angle to the plane normal to the axis of the cylindrical portion, such as 4° for example, to afford a wedging action in the closure assembly as described below.

The closure member 14 comprises a disc-shaped member having a recessed center portion 22 formed integrally with an upstanding peripheral wall portion 23 having an annular indentation 24 formed therein and connecting with an outwardly rolled sealing surface or edge 25, the periphery of which may be formed with an annular radial extension 26.

The peripheral wall portion 23 is formed with four circumferentially spaced, inwardly projecting locking members 27 each having an engaging or bearing surface 28 (Fig. 4) which is laterally perpendicular to the axis of the peripheral wall and also longitudinally inclined at an angle of 4° to the plane of the central surface portion 22. The length of each locking member 27 is slightly less than the circumferential distance between adjacent locking members 19 formed on the container in order that the former may be received between the latter in seating the closure.

Also formed within the recessed closure member 14 are a pair of finger-gripping elements or wrench lugs 29 diametrically aligned adjacent opposite edges of the closure to facilitate turning manipulation as is required in locking and unlocking the closure.

If desired, and if the dimensions of the closure are such that it is possible, the handle element may be modified as shown in Fig. 2 wherein the handle 30 is formed as a single element centrally disposed within the closure.

The closure is assembled by seating the closure member 14 in the opening defined by the wall 18 so that the locking members 27 are received between the spaced locking members 19. Rotation of the closure member brings the inclined bearing surface 20 of the locking members 19 into

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wedging engagement with corresponding bearing surface 28 of the locking members 27 formed in the closure member 14. Because the respective cooperating bearing surfaces 20 and 28 are inclined, a wedging action is set up which draws the annular sealing surface 25 of the closure tightly against the annular sealing surface 17 formed on the container to form an effective fluid-tight seal therebetween. The curved portion 19a of the locking member 19 affords springing action which serves to maintain the locked bearing surfaces 20 and 28 in engagement at such times as the closure assembly is subjected to extraordinary stresses. Thus it will be understood that even if the closure member is caused to turn slightly through jarring, the tension of the sprung portion 19a will continue to hold the sealing surfaces in engagement. Because the engaged surfaces 20 and 28 respectively, are transversely perpendicular to the axis of cylindrical and peripheral wall portions the closure will remain fixed in sealing position and will withstand extreme shock and vibration which would dislodge closures of conventional design. This is to be contrasted with the angular engagement of threads.

If desired a gasket member 31 may be interposed between the contiguous sealing surfaces to supplement the sealing properties of the assembly.

It will be apparent that a closure formed according to this invention may, depending upon its size, be incorporated in any flat or gently curved surface such as the top or side of a metal barrel, drum or other container.

It will also be apparent that the invention provides highly effective closures for containers, the structural design of the closure being such that it may be formed conveniently and economically in containers of a wide variety of shapes and sizes. Moreover the closure is one which is extremely robust even though the sheet material of which it is formed may be comparatively thin, with the characteristics of the design being such that both the locking members and drain apertures of the container may be formed in a single fabricating operation to provide a closure seat which does not interfere unnecessarily with the process of draining the container of fluid contents. Moreover the spring action provided by the locking members, as well as the fact that the mutually engaged bearing surfaces of the locking members are perpendicular to the centerline of the opening, results in a fluid-tight closure capable of withstanding extreme shock without leaking.

In certain closure assemblies formed according to the invention it may be desirable to provide means whereby the person removing the closure member will be able to ascertain precisely when the locking members 27 of the closure 14 are angularly disposed between the locking members 19 carried by the container, in which position the closure may be unseated and lifted free of the container. To this end a stop lug 34 (Fig. 3) may be formed adjacent the end of one or more of the locking members 19, which lug will be engaged by the trailing end of one of the locking members 27 of the closure as the closure is counter-rotated to release the lock. The locking member 27 which will engage the lug 34 will of course be that one which was next circumferentially spaced from it in the proper hand of rotation when the lock was established. The lug 34 may, according to the particular re-

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quirements of the closure, extend either above or below the locking member 19, or it may extend in both directions as shown in Fig. 3 for purposes of illustration. Or if preferred a stop lug may be formed on the locking member 27 on the closure member. In any event a stop lug may also be utilized to limit the angular movement of the closure member to a predetermined amount, thereby to prevent the development of extraordinary locking force, for example, which might damage the closure assembly in certain cases.

While specific embodiments have been described in detail herein, it will be understood that the invention should not be limited thereto, but is susceptible of changes and modifications within the scope of the following claim.

I claim:

A container and closure therefor, one surface of the container having a cylindrical wall portion defining an opening therein and extending into the container, said container having an outer product-confining wall laterally surrounding and spaced from said cylindrical wall portion, a continuous circumferential sealing surface joining said cylindrical wall portion adjacent its outer end and said surface in a fluid tight connection, a plurality of angularly spaced-apart locking members projecting radially inwardly from said cylindrical wall portion, each of said locking members having a bearing surface substantially perpendicular to said cylindrical wall portion and being slightly inclined with respect to a plane perpendicular to the longitudinal axis of said cylindrical wall portion, said locking members being struck inwardly from the surface of the cylindrical wall to form drain openings communicating with the inside of the container, each of said locking members being disposed in said cylindrical wall portion substantially in the plane of said outer product-confining wall, said locking members being spaced from the inner edge of said cylindrical wall portion along the axis of the cylindrical wall portion; said closure being of substantially disc-like shape and having a continuous outwardly extending circumferential sealing surface conforming to and

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adapted to overlie the sealing surface on said cylindrical wall portion to form a tight joint, said closure also having a central depressed portion forming a peripheral wall, the upper portion of said peripheral wall fitting within said cylindrical wall portion and the lower portion of said peripheral wall having a plurality of angularly spaced-apart outwardly projecting locking members, the length of said closure locking members being less than the spacing between the adjacent container locking members to facilitate insertion of the closure in the container; each of said closure locking members having a bearing surface lying substantially perpendicular to said peripheral wall of the closure and being slightly inclined with respect to a plane perpendicular to the axis of said peripheral wall, such that when the closure is turned in the container the locking member bearing surfaces on the cylindrical wall portion of the container tightly engage the locking member bearing surfaces on the closure, bringing the circumferential sealing surfaces on the closure and on said cylindrical wall portion towards each other to form an effective seal preventing leakage through said drain openings.

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