Feb. 20, 1962 M. J. KLYGIS 3,022,103

LOCKING RING FOR A REMOVABLE DRUM HEAD

Filed Sept. 25, 1958 2 Sheets-Sheet 1

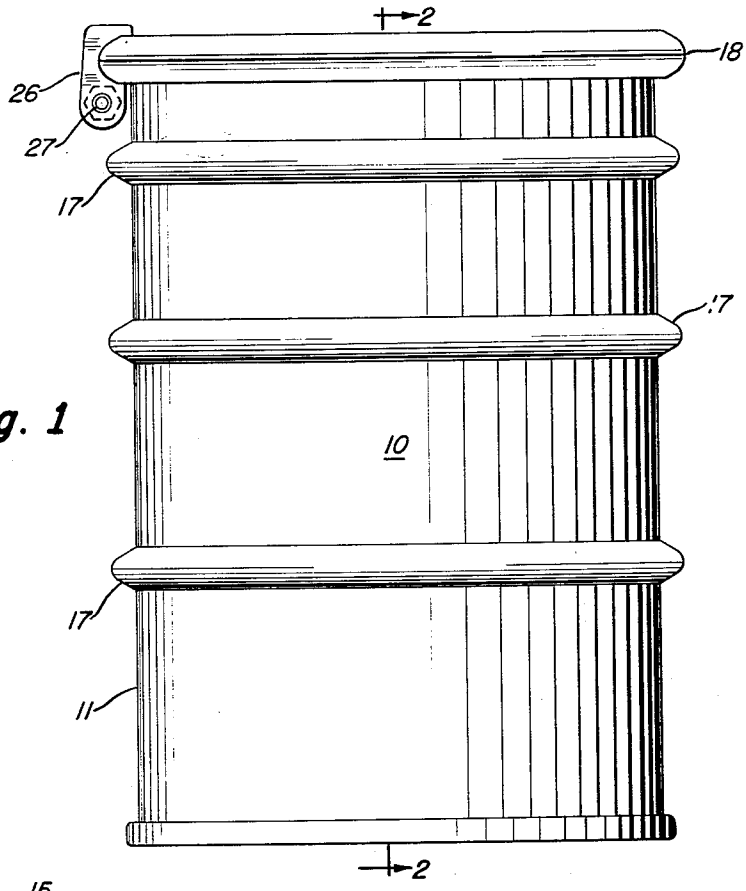


Fig. 1

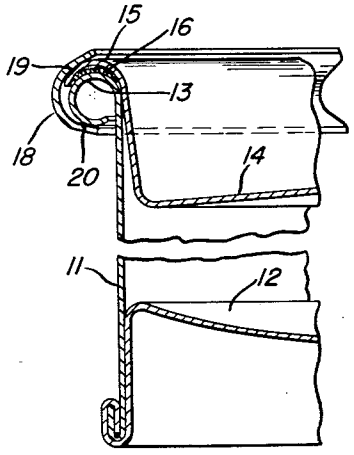


Fig. 2

INVENTOR.
Mindaugas J. Klygis

BY

Merriam, Lorch & Smith
ATTORNEYS

Feb. 20, 1962 M. J. KLYGIS 3,022,103

LOCKING RING FOR A REMOVABLE DRUM HEAD

Filed Sept. 25, 1958 2 Sheets-Sheet 2

Fig. 3

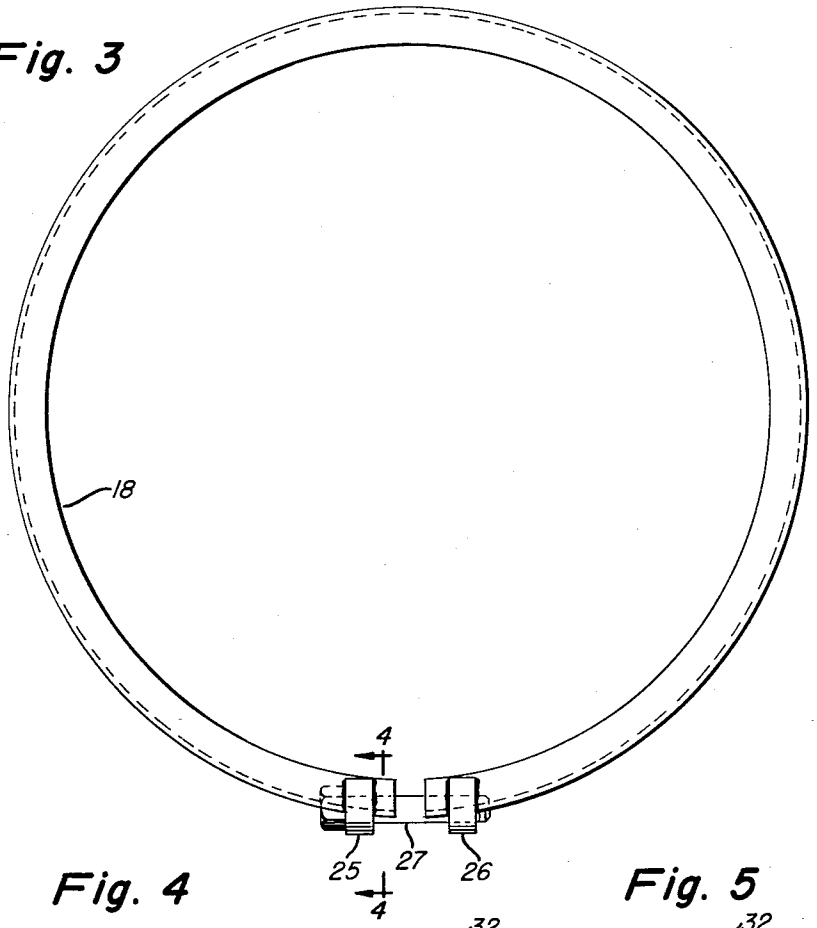


Fig. 4

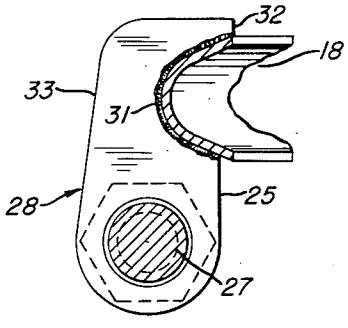
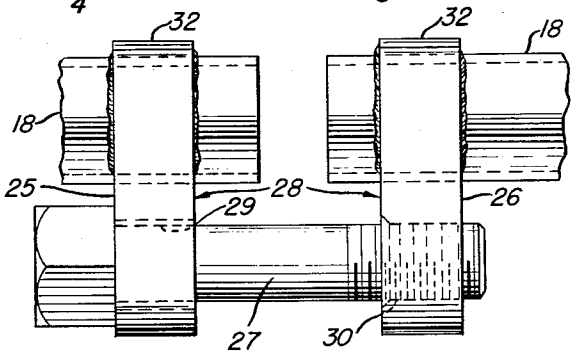


Fig. 5



INVENTOR.
Mindaugas J. Klygis

BY

Merriam, Lorch & Smith
ATTORNEYS

United States Patent Office 3,022,103 Patented Feb. 20, 1962

3,022,103

LOCKING RING FOR A REMOVABLE DRUM HEAD

Mindaugas J. Klygis, Chicago, Ill., assignor to Inland Steel Company, Chicago, Ill., a corporation of Delaware

Filed Sept. 25, 1958, Ser. No. 763,400
1 Claim. (Cl. 292—256.67)

This invention relates to metallic containers of the drum or barrel type. It is more specifically concerned with closures for drums or barrels provided with removable heads.

Where less than carload quantities of bulk materials are required, for ease of handling, transporting, etc., various products are shipped to consumers in barrels or drums. These containers are fabricated from various gauges of metal and are designed to stand considerable abuse. There are two types of drums or barrels, (1) those provided with a threaded bung and a vent for the transporting of liquid materials, and (2) those fitted with full removable heads to facilitate emptying liquids, semi-liquids, paste, or solid substances contained therein.

When transport equipment of this nature is shipped in interstate commerce, government supervision of the quality of the drum obtains and the Interstate Commerce Commission exercises regulatory control over drum manufacture. For example, steel drums employed as single trip containers must conform to established specifications for designs, marking, etc., and must pass certain tests designed to evaluate fluid integrity of the drum in use. In one of these tests the drum or barrel is given a dropping test in which it is filled with water to 98 percent capacity and dropped from height of 4 feet onto solid concrete so as to strike diagonally on chime, or when without chime seam, to strike on other circumferential seams. Closing devices and other parts projecting beyond chime or rolling hoops must also be capable of withstanding this test. Full removable-head drums, when subjected to this test, are dropped on the removable head end of the drum and with conventional type closing rings employed to affix the drum head to the drum it is difficult to provide closures which can pass this test without failure of the seal and resultant leakage.

According to this invention there is provided an improved closing ring for removable-head drums which in combination with the removable drum head provides a closure which will withstand peripheral impact on the closure and remain fluid tight.

FIGURE 1 illustrates in elevation a removable-head drum type metallic container employing the closing ring of this invention.

FIGURE 2 is a fragmentary cross sectional view of the closure assembly through line 2—2 of FIGURE 1 illustrating the interrelation of the drum flange, the drum-head flange, and the locking ring.

FIGURE 3 is a top plan view of the locking ring of this invention showing the positioning of the lug elements.

FIGURE 4 is a side elevation view through line 4—4 of FIGURE 3 of one of the lug elements utilized for joining the split ends of the locking ring.

FIGURE 5 is a fragmentary front elevation view of the terminal ends of the locking ring with the pair of lug elements fastened thereto and connected by means of a threaded fastener, one of said elements being provided with an internally threaded hole which engages with the threaded fastener elements, the other lug element being provided with an opening through which the threaded fastener passes to engage the internally threaded hole of the adjacent lug element.

In the drawing, the specific embodiment of the closing

ring of this invention is employed as part of the closure assembly used to seal a conventional removable-head drum 10 which is generally fabricated from a light or heavy gauge steel sheet, depending upon the service requirements. Drum 10 consists of an open-ended cylindrical shell 11. Crowned head 12 is integrally affixed to the bottom of shell 11 by means of the double folded seam as shown or other conventional sheet metal seaming expedients. The top of drum 10 is provided with a rolled flanged chime 13. Removable head 14 which is also crowned is provided with an outwardly directed rolled flange 15 which engages with curl 13 which functions as a drum-end flange. A suitable sealant or gasket material 16 is interposed between curl 13 and head flange 15. Generally, rolling hoops 17 formed integral with shell 11 by rolling or swedging are used to provide added strength and facilitate handling. To bring head flange 15 into sealing relation with curl 13 and gasket 16, closing ring 18 is used. Ring 18 in the illustrative embodiment is a split, channel-shaped member having a cross section which engages the curl or end flange and head flange used on the drum assembly. In this instance the transverse cross section is substantially semi-circular with upper portion 19 of channel engaging head flange 15 and lower portion 20 contacting curl 13.

The split ends of ring 18 are interconnected by a pair of lug elements 25 and 26 which are joined by threaded fastener 27. Each lug element 25 and 26, which in FIGURES 4–5 is shown in full scale, comprises body 28 which is fabricated from a metal bar rectangular in cross section and having a low ratio of width to thickness, preferably less than 1. For the purposes of this invention "width" is the dimension of the side of the body which is coextensive with the sidewall of the drum or barrel. The upper portion of body 28 is integrally mounted adjacent the terminal end of ring 18, preferably by welding. The dependent portion of body 28 is fitted with openings traversing the width thereof for use with the threaded fastener 27. In lug element 26 opening 30 is internally threaded and mates with the threaded end of fastener 27. Opening 29 in lug element 25 has a smooth bore of larger diameter than the shank portion of threaded fastener 27 to permit fastener 27 to turn freely therein when the lug elements are out of alignment. A circularly arcuate notch 31 is cut from the upper portion of body 28 to permit the mounting of the lug elements 25 and 26 to locking ring 18. The inner surface of notch 31 is circularly arcuate, e.g. 120° arc, symmetrical about a bisector of notch 31 normal to the longitudinal axis of body 28. The outer surfaces are planar and tangential to the circularly arcuate inner surface. The upper surface has a projecting lip 32 which in combination with the upper outer surface of notch 31 circumambiently engages the upper, lug element, mounting area of locking ring 18. The lip 32 of the lugs 25 and 26, as illustrated in FIGURE 4 with respect to lug 25, extends beyond the plane of the body 28. By this arrangement additional rigidity is provided in the ring 18 adjacent the free ends thereof which are particularly susceptible to damage in the event that a container drops.

If desired, as shown, outer face 33 can be slightly inwardly tapered, e.g. 5°–10°, toward the top of body 28 and the bottom and top edges can be chamfered to a desired radius to improve the appearance of the lug element.

In order to provide suitable rigidity the body should have sufficient thickness so that the notch portion of the body will not extend beyond the longitudinal axis thereof.

The body is preferably fabricated from steel, forged to the desired shape; however, other metallic materials of construction, as well as fabricating techniques, such as casting, can also be used. The width to thickness

ratio of the body will generally be less than 1 and preferably about 0.5–0.7. For example, in the illustrative example, the body of the lug element was ⅝ inch wide and 1⅛ inches thick. The notch portion of the lug element body will extend for about one-half of the length of the body and the dependent portion will make up the other half thereof. The notch configuration will depend upon the transverse cross-sectional shape of the locking ring which conforms with the shape provided by the assembled end flange and head flange. Generally, however, the trough shaped channel has the arcuate cross-section shown. The gauge of metal used in forming the locking ring will depend upon the container size; for example, 12 gauge sheet strip is used for a 55 gallon removable-head container. The threaded fastener used to connect the lug elements of the locking ring is a conventional bolt of suitable length and preferably provided with National Coarse threads. In the illustrative example a ⅝ inch NC bolt was used.

The locking ring and improved lug element of this invention can be used for installing removable drum heads on drums and barrels fabricated from conventional materials of construction such as steel, aluminum, etc., and having capacities of from 10 to 100 gallons or more. It has especial application in connection with straight side 30 and 55 gallon steel containers.

Although the instant invention has been illustrated by complete specific embodiments, it is to be understood that various modifications can be made by those skilled in this art without departing from the scope of the invention. Accordingly, this invention is to be limited only as defined in the appended claim.

What is claimed is:

A locking ring for enclosing an open-ended barrel or drum having a flanged curl outwardly depending from the open end with a removable drum head having an outwardly directed head flange cooperating with said curl, said ring comprising a split, channel-shaped ring having the open end of said channel directed inwardly, one portion of said ring engaging the head flange and the other portion of said ring engaging the curl, and a lug element mounted adjacent each terminal end of said ring, each lug element comprising a body fabricated from a forged steel bar having a rectangular cross section with a ratio of width to thickness within the range of about 0.5–0.7, each of said bodies having a notched portion welded to said ring and a dependent connector portion, each of said notched portions being provided with a notch having a configuration similar to the transverse cross section of said channel-shaped ring and having an upper portion welded to said ring and including an integral lip projecting beyond the drum side of said body cooperating with said notch to encompass the portion of said ring engaging the head flange, and a lower portion encompasing the portion of the ring engaging the curl, the depth of said notch being less than about one-half the thickness of said bar, the dependent connector portion of one of said lug elements being provided with an internally threaded opening adapted to receive a threaded fastener, the other of said lug elements being provided with a smooth bore opening whereby the lug elements can be connected.

References Cited in the file of this patent

UNITED STATES PATENTS

1,449,940	Hackney	Mar. 27, 1923
1,969,120	Coakley	Aug. 7, 1934
2,226,396	Wackman	Dec. 24, 1940

FOREIGN PATENTS

491	Germany	Sept. 23, 1877
42,381	France	Apr. 25, 1933