June 12, 1928. A. MAUSER 1,673,011

CLOSURE FOR RECEPTACLES

Filed Sept. 21, 1926 2 Sheets-Sheet 1

Fig. 1.

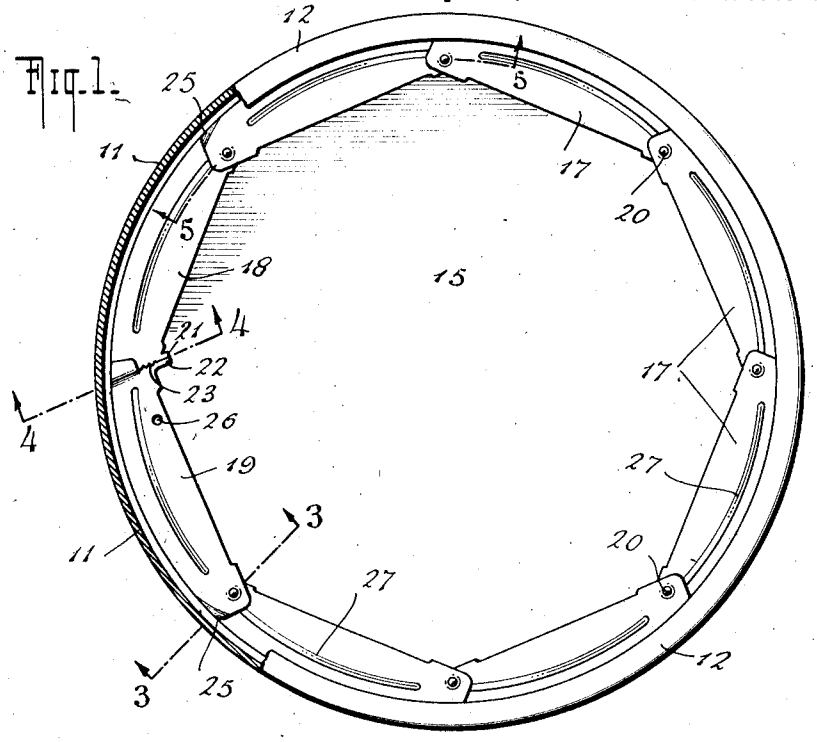
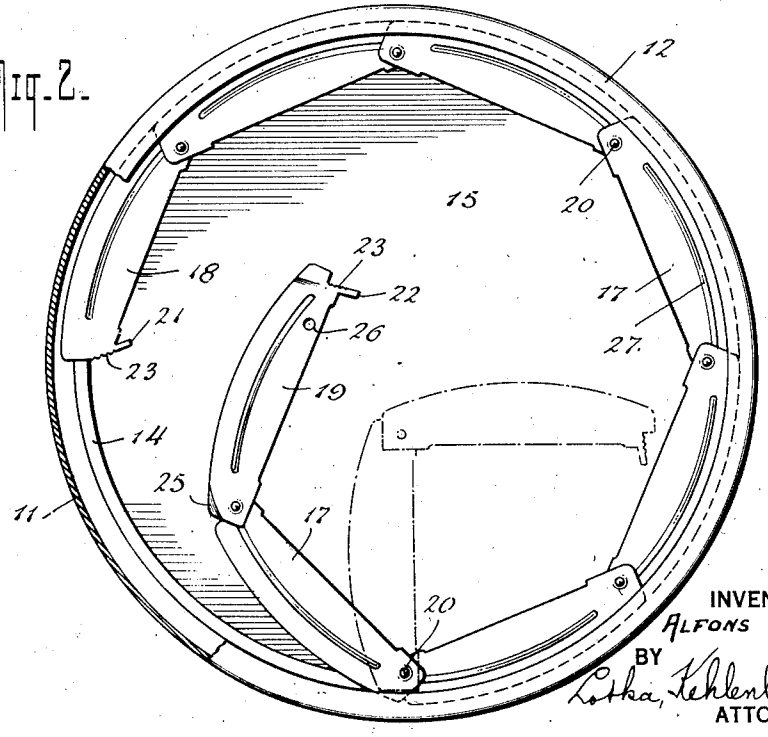


Fig. 2.



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2 Sheets-Sheet 2

Fig. 3.

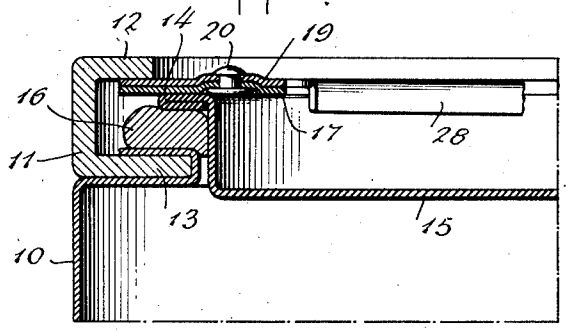


Fig. 4.

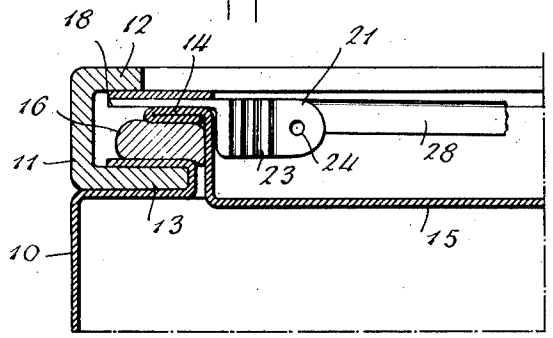
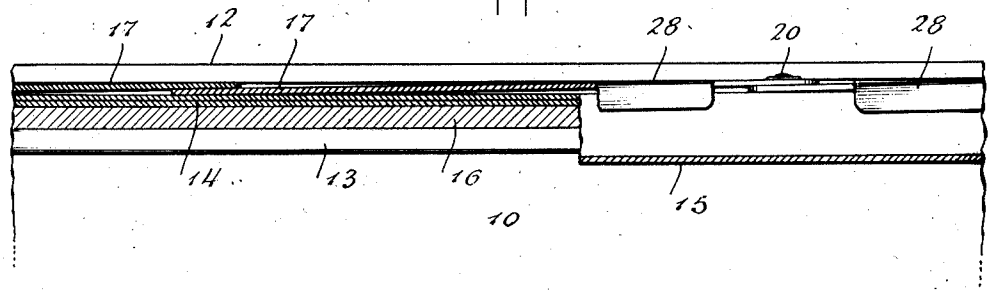


Fig. 5.



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UNITED STATES PATENT OFFICE.

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CLOSURE FOR RECEPTACLES.

Application filed September 21, 1926, Serial No. 136,752, and in Germany October 9, 1925.

This invention relates to closures for receptacles and particularly sheet metal receptacles or drums of comparatively large dimensions such as are employed as containers for shipping pigments; chemicals and similar materials. It is standard practice to provide one end of such containers with a removable closure or cover, the diameter of which is preferably made as large as possible, and to use means for detachably securing said cover to the receptacle.

The nature of the materials, namely, chemicals etc., for which these large containers or drums are employed makes it imperative, that the means employed for securing the covers be so constructed that leakage of the container's contents will be prevented and that accidental dislodging of the cover will not occur. Such construction is not only necessary in order to avoid loss to the shipper or consignee, but also to meet the rigid standards of governmental regulations pertaining to the transportation of such materials by common carriers. Furthermore, practical commercial considerations demand that although a secure and tight closure of the container be assured, the construction must at the same time be such that the operation of closing and opening the closure may be quickly and readily accomplished, preferably without it being necessary to employ special tools for such operation. As the provision of a closure that would fully meet all of the above requirements has therefore been a matter of considerable difficulty, many different types of closure constructions have been proposed. One of the most efficient of such types is characterized by the provision of a pair of annular surfaces at the open end of the container spaced, one above the other, the cover being pressed against a packing on the lower of such surfaces by locking means which are engaged between the cover and the upper of said surfaces to exert a wedging effect for pressing the cover tightly against said packing. It is to closures of this type that the present invention relates more particularly, the principal object of the invention being to improve upon this type of closure by providing a new and improved locking ring, the construction of which will not only enable a secure and tight closing of the container to be effected, but in addition will enable the operation of securing or removing the cover to be performed quickly and easily without the necessity of resorting to the use of any auxiliary tools such as wrenches, bars, levers etc.

A further object of the invention is to provide a new and improved locking ring consisting of a number of pivotally connected sections capable of being made from comparatively small pieces of sheet metal thereby enabling the ring to be constructed of scrap material and consequently at a low cost.

Another object is to so construct the locking ring that the sectional elements thereof may be employed as levers in the operation of inserting or removing the ring thereby facilitating such operation.

These and other objects will appear more fully from the following more detailed description and by reference to the accompanying drawing forming a part hereof, and wherein Fig. 1 is an end view of a container equipped with a closure locking ring constructed in accordance with the principles of my invention, the cover and locking ring being shown in locked position; Fig. 2 is a view similar to Fig. 1, but showing the locking ring only partially engaged in order to illustrate the operation of inserting or removing said ring, and Figs. 3, 4 and 5 are sections on the line 3—3, 4—4 and 5—5 respectively, of Fig. 1.

As shown in Fig. 3 of the drawings, the reference character 10 indicates a receptacle or container provided at its end with a covering seat 11, having a pair of annular surfaces 12, 13 arranged one above the other in spaced relationship. An annular peripheral flange 14 of the cover 15 is adapted to be supported by the lower surface 13 and a packing or gasket 16 is usually interposed between said surface and flange 14 to insure a tight leak-proof joint. For the purpose of pressing the packing 16 tightly between the cover and surface 13, it is the custom to provide locking means, such as latches, pivoted upon a cover, or a locking ring; the ends of the latches, or the ring, as the case may be, being inserted between the upper face of the peripheral cover flange 14 and the upper annular surface 12 of the ring seat 11 for exerting a wedging action to press the cover tightly against the gasket.

While the pivoted latches possess the advantage that they can be manipulated without requiring the use of auxiliary or special tools, they are subject to the objection

that they are more easily unfastened by accident, and also to the objection that the provision of the rivets passing through the cover introduces an additional possibility of leakage about such rivets through the cover. While the locking rings, the most common type of which consists of a split ring of spring metal, effect a more secure locking of the cover, the split ring types are difficult to insert and remove, and require the use of special or auxiliary tools for manipulating them.

In accordance with the present invention, I construct the locking ring of a plurality of articulated sections connected together in the manner of the well known carpenter's rule, and so constructed that as the ring is inserted, each section thereof exerts a downward wedging action upon the cover flange and in addition each ring section serves as a lever for the insertion (or removal) of the adjacent section connected with it.

As shown most clearly in Figs. 1 and 2, the locking ring of the present invention consists of a plurality of articulated or pivotally connected sections 17 of similar construction and the end sections 18, 19. Considering the end sections 18 and 19 as the first and last sections respectively, it will be noted that the ring sections are so connected by the rivets 20, that each section overlaps at its front end the rear end of the preceding section. The first and last end sections 18 and 19 are provided with the laterally projecting lugs 21 and 22 respectively, provided with the serrated faces 23 adapted, when the ring is in locked position, to interengage and hold the ring securely in such position. As an additional precaution against accidental unlocking of the ring, the lugs 21 and 22 are provided with apertures 24 adapted to aline when the ring is locked and through which apertures a wire, cotter pin, seal or any other suitable device may be passed. The last section 19 is provided at its rear end with an upwardly offset ear 25 which, when said section is fully engaged, extends over the front end of the section 18 in overlapping relationship therewith.

Assuming the cover 15 and packing 16 to be placed upon the lower surface 13 of the ring seat, the locking ring is inserted in the following manner; the terminal section 18 is grasped in the hand and its front inner corner is thrust between the top of the cover flange 14 and the cover seat ring surface 12. For facilitating the insertion of the sections, their front inner corners are preferably chamfered off to a wedge shape as indicated by the reference character 25. After the insertion of the section 18 has been started as described, the second or adjacent ring section 17 is then grasped and used as a lever to push the terminal section into its fully engaged position, said section 17 being held substantially radially of the cover during the pushing operation. As the end section 18 is being inserted, the section 17 is held at an angle thereto sufficient to prevent the inner chamfered end 26 of said section 17 from engaging until the section 18 is pushed home; section 17 is then moved laterally as a lever, that is, up or down, to compress the gasket and facilitate the engagement of its inner end. The next section 17 is now grasped and used as a lever for forcing the preceding section into engagement, a similar operation being followed with each succeeding section until all the sections are inserted into locking position. It will be noted that the operation of inserting the ring as described above effects a gradual wedging action or compression upon the gasket starting from substantially a point engagement of the first section and proceeding around the cover until the entire ring is engaged. As nearly the entire gasket is placed under compression at the time the last terminal section 19 is being inserted, very little resistance is offered to the insertion of this section, which is pushed home until the serrated face 23 of its lateral lug 22 engages with the co-operating face of the lug 21 and the ear 25 engages over the front end of section 18. It will be noted that the faces of the lugs 21, 22 extend at an angle to a radial plane passing through the meeting ends of the terminal sections 18, 19 so that practically no resistance will be offered by said faces to the movement of the last section into its final position.

While the extra thickness of the ring caused by the overlapping of the sections at the joints thereof produces a plurality of zones of heavier pressure between the cover and ring at equal distances about the cover, the pressure of said zones is, however, substantially equally distributed about the circumference of the gasket through the material of the cover and the portions of the ring sections adjacent to the overlapped joints thereof, each ring section pressing against the upper surface of abutment 12 for nearly half of its length adjacent to its front end and against the cover substantially an equal distance adjacent to its rear end.

The manner in which the sections may be employed as levers for squeezing or compressing the gasket during the insertion of the ring permits the gasket and other closure parts to be so dimensioned that a very effective compression of the gasket is obtained and a secure and tight closure results.

It will be understood after the locking ring is completely engaged, that as the ring sections are flat and are squeezed between the flat faces of the cover flange and surface 12 by the upward pressure of the gasket, such pressure will serve to hold the ring in position. In addition, the engagement of the serrated faces 23 will serve to prevent ac-

cidental dislodging of the ring, while the provision of the apertures 24 permits a locking wire or seal to be employed as a further security.

In removing the ring, the operation of inserting is reversed, that is, the last section 19 is pulled out first and then the sections 17 successively until the first section 18 is disengaged.

In case difficulty is encountered in starting to remove the last section 19, an aperture 26 is provided therein in which a baling hook, a piece of wire or any convenient article may be inserted to provide a grip, although the use of such aperture will not ordinarily be necessary.

By making the ring of a number of comparatively short pieces it is possible to use scrap material in the manufacture thereof. The sections are preferably punch or die pressed into the desired shape and are for the purpose of strengthening also preferably provided with the grooves or ribs 27 and flanges 28, the latter also serving as a stop, when employed with a cover having its central portion depressed below the peripheral flange 14 thereof, for engagement with the vertically extending flange 30 of said cover, to limit the inward movement of the ring sections.

I do not claim broadly the use of a plurality of pivotally connected elements for constructing a closure locking ring, as I am aware that it has been proposed to use a number of relatively long sections connected by separate short plates or rings and also to employ short elements arranged alternately above and below each other somewhat in the manner of a sprocket chain, neither of such constructions, however, possess the advantages of the construction herein disclosed, nor can they be caused to perform the functions of the elements or sections of such construction, particularly with respect to the locking and unlocking thereof.

The use of short elements where employed with long sections or with similar short elements is objectionable because of the great difficulty experienced in inserting the ring to its locked position. The use of relatively long and short sections results in the production of unequally spaced zones of greater pressure upon the cover and therefore leakage of the contents is more apt to occur than when the ring is constructed of sections of equal length. When short elements arranged in sprocket-chain relationship are used, the insertion of the locking ring is very difficult and the sealing of the cover is not as efficient as when the ring is constructed as hereinbefore disclosed.

I claim:

1. A closure for receptacles having a lower seat for a cover and an upper surface or abutment spaced from said seat between which abutment and the cover, locking means are adapted to be engaged for pressing said cover towards said seat, characterized by said locking means comprising a locking ring consisting of a plurality of sections of substantially equal length pivotally connected at their ends in overlapping imbricated or scale-like relationship, whereby each section will contact alternately with said abutment and with said cover.

2. A closure for receptacles having a lower seat for a cover and an upper surface or abutment spaced from said seat between which abutment and the cover, locking means are adapted to be engaged for pressing said cover towards said seat, characterized by said locking means comprising a locking ring consisting of a plurality of sections of substantially equal length, each section being formed of a similarly shaped wide strip or band of sheet metal, and means for connecting said sections with their ends in overlapping imbricated or scale-like relationship, said sections and pivotal connecting means being so constructed and arranged that when said ring is in locked position it forms a complete annulus having a double thickness of said metal between said cover and abutment at spaced intervals adjacent to said pivotal means to form a plurality of pressure zones, each of said sections pressing in a pair of adjacent zones alternately upon said cover and said abutment.

3. A closure for receptacles having a lower seat for a cover and an upper surface or abutment spaced from said seat between which abutment and the cover, locking means are adapted to be engaged for pressing said cover towards said seat, characterized by said locking means, comprising an expansible locking ring consisting of a plurality of sections of substantially similar shape and size, each constructed of a wide band or strip of sheet metal and means for pivotally connecting said sections in overlapping imbricated or scale-like relationship, said sections, when said ring is expanded, forming along their inner sides a complete annulus between said cover and abutment, having, at equally spaced intervals adjacent to said connecting means, a double thickness of said metal to form a plurality of zones of heavier pressure, and, when said ring is collapsed, the overlapping metal which forms said double thickness being located out of contact with said abutment, whereby when said ring is being inserted between said abutment and cover, the single thickness of each of said sections may be completely engaged between said abutment and cover before said double thickness is engaged and each section performs a wedging action which facilitates its insertion.

4. A closure for receptacles having a lower

seat for a cover and an upper surface or abutment spaced from said seat between which abutment and the cover, locking means are adapted to be engaged for pressing said cover towards said seat, characterized by said locking means, comprising an expansible locking ring consisting of a plurality of sections of substantially similar shape and size, each constructed of a wide band or strip of sheet metal and means for pivotally connecting said sections in overlapping relationship, said sections, when said ring is expanded, forming along their inner sides a complete annulus between said cover and abutment having, at equally spaced intervals adjacent to said connecting means, a double thickness of said metal to form a plurality of zones of heavier pressure, and, when said ring is collapsed, the overlapping metal which forms said double thickness being located out of contact with said abutment, whereby the single thickness of each of said sections may be completely engaged between said abutment and cover before said double thickness, and said sections serving as levers for facilitating the insertion of said ring between said cover and abutment.

5. A closure as set forth in claim 1, in which the terminal sections of the locking ring are provided with means for locking said ring in expanded condition.

6. A closure as set forth in claim 1, in which the terminal sections of the clocking ring are provided with serrated faces adapted to be brought into co-operative locking engagement when said ring is expanded.

In testimony whereof I have hereunto set my hand.

ALFONS MAUSER.