

Feb. 11, 1930.

W. J. BOYLE, JR

1,746,926

CLOSURE FOR SHEET METAL CONTAINERS AND THE LIKE

Filed Jan. 9, 1928

2 Sheets-Sheet 1

Fig. 1.

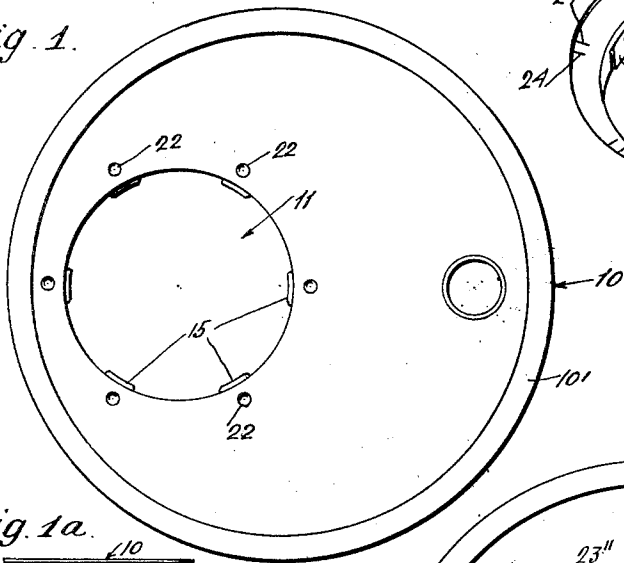


Fig. 1a.

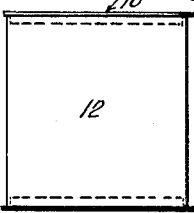


Fig. 2.

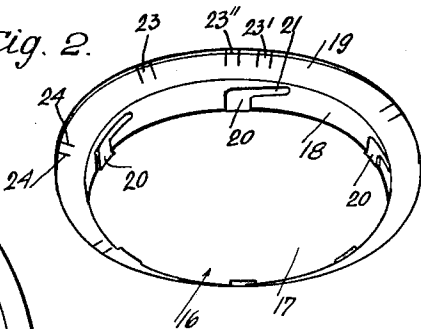


Fig. 3.

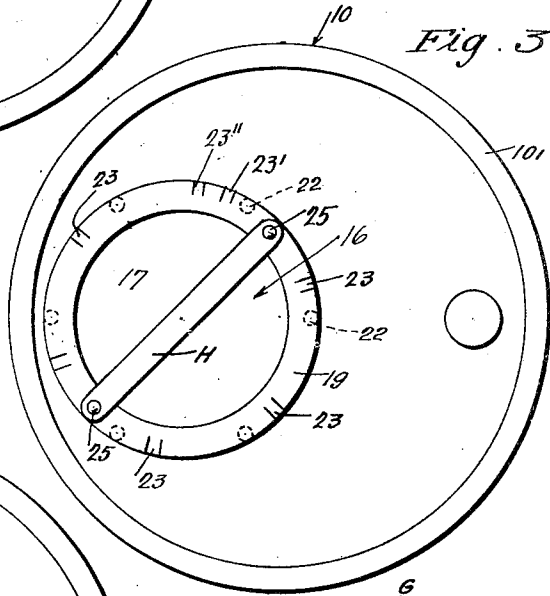


Fig. 4.

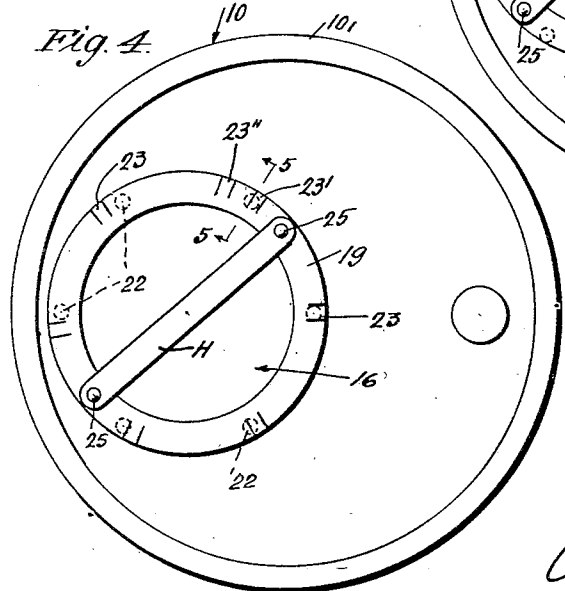
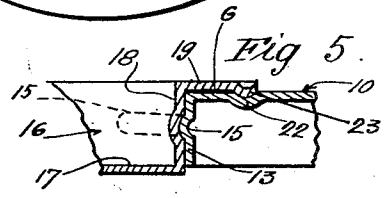


Fig. 5.



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2 Sheets-Sheet 2

Fig. 6.

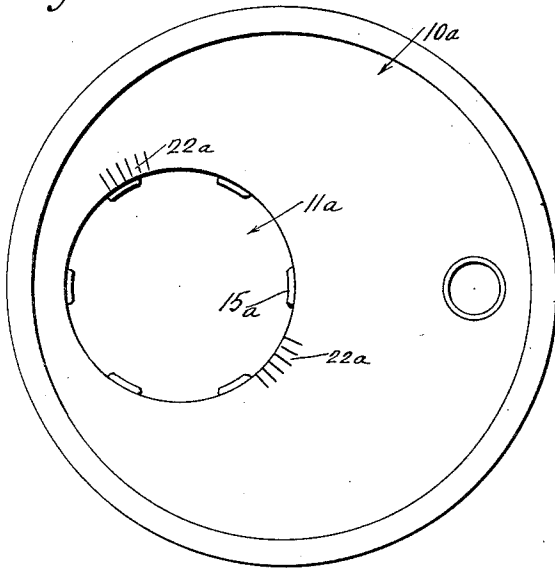


Fig. 7.

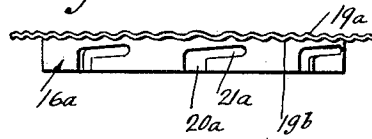


Fig. 8.

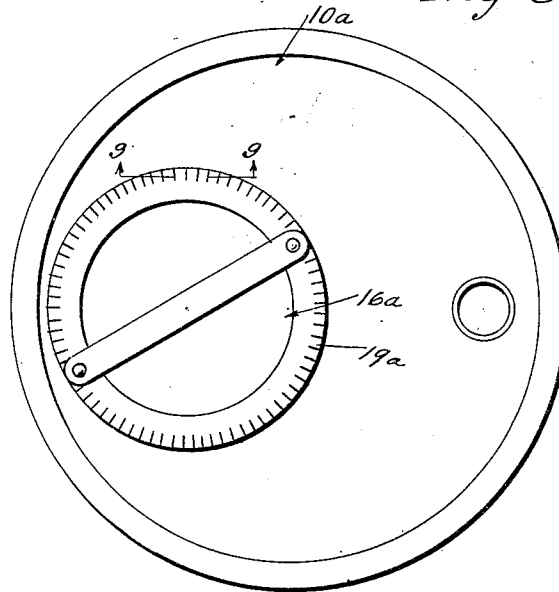
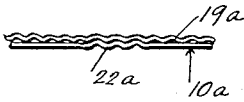


Fig. 9.



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UNITED STATES PATENT OFFICE

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CLOSURE FOR SHEET-METAL CONTAINERS AND THE LIKE

Application filed January 9, 1928. Serial No. 245,343.

This invention has to do generally with closures for sheet metal containers and the like, and is more particularly concerned with closures which embody a sheet metal head having a relatively large opening therein and adapted to be closed by a removable cover which is rotated with respect to the head to engage holding means thereon.

A closure typifying the above is shown and described in United States Letters Patent No. 1,590,098 issued to Alfred J. Muhlbach, August 31, 1926, and entitled "Closure for sheet metal containers." The general advantages of this type of closure over the usual ones are generally set forth in the aforementioned patent and therefore need not be discussed here, particularly since I have shown in the instant application my invention as applied to a closure practically identical, in general structure, to that shown and discussed in the patent. It will suffice to say that this form of closure is at once extremely simple, involves no fastening parts other than those contained within the formation of the closure itself, is easily and comparatively cheaply manufactured, and is most efficient in use.

The only shortcoming of this type of closure resides in the fact that it sometimes happens the covers are not turned fully home, that is, they are not turned sufficiently to fully interengage the coacting holding elements on the cover and head. This is particularly apt to occur when gaskets are used between the head and cover. With this looseness existing, even though it be comparatively slight, the jars, vibrations and handling shocks incident to transit, are very apt to work the cover free or, at least, to a position where leakage may occur through the openings.

Therefore, it is among the objects of the present invention to provide means whereby, after the cover has been rotated into closed position, assurance may be had that the cover may not be rotated reversely to free it until wilful effort is made by an operator. This releasable locking means is of an extremely simple nature, calling only for machine operations which may be performed at practically no added cost, and, if desired, when the head

and cover are being initially pressed to shape. However, the particular nature of the locking means, of which I have shown two illustrative though not limitative embodiments, may be discussed to better advantage in connection with the following detailed specification, wherein other objects and novel features will be made apparent.

Reference will be had to the accompanying drawings, in which:

Fig. 1^a is a side elevation showing my improved closure applied to a drum;

Fig. 1 is a top plan view, enlarged with respect to Fig. 1^a, showing the head portion of the closure, the cover being omitted;

Fig. 2 is a perspective view of one form of cover having an illustrative embodiment of my invention applied thereto;

Fig. 3 is a plan view similar to Fig. 1 except that it shows the cover over the head opening but not yet rotated into holding position;

Fig. 4 is a view similar to Fig. 3 but showing the cover locked in position;

Fig. 5 is an enlarged, fragmentary section on line 5—5 of Fig. 4;

Fig. 6 is a view generally similar to Fig. 1 but showing a modified type of locking means;

Fig. 7 is a side elevation of the modified cover used in connection with the head shown in Fig. 6;

Fig. 8 is a view similar to Fig. 4 but showing the modified type of head and cover; and

Fig. 9 is an enlarged, fragmentary section on line 9—9 of Fig. 8.

At the outset, I wish to make the reservation that while I have here shown a bayonet slot type of connection between the head and the cover for holding them against movement in the direction of the axis of the head opening, this is merely illustrative of the rotationally locking type of connection, and my means for locking the cover against rotation in a direction to disengage the holding means may as well be applied to a closure having any other type of holding means operative by reason of cover rotation, for instance, ordinary screw threads.

First referring to Figs. 1^a to 5, inclusive,

a typical drum head is indicated at 10 having an offset opening 11 of appreciable size, the head, preferably though not necessarily, having a peripheral offset flange 10' secured in any suitable manner to the drum body 12. Opening 11 has an inwardly extending peripheral flange or circular wall 13 (Fig. 5) in which is formed a plurality of locking lugs 15, each of which is formed by pressing the metal of the flange inwardly. Preferably, each lug 15 is elongated horizontally and is substantially semi-circular in cross-section. While there may be as many such lugs as desired, I have shown by way of illustration six of them, equally spaced about the circumference of flange 13.

Head 10 is made of sheet metal, as is also the cap or cover 16, said cover being adapted to close opening 11 and, with head 10, being considered as a sheet metal closure for the end of drum 12.

Cover 16 is in the form of a shallow, flanged cup, having a recessed bottom 17, a cylindrical side wall 18, and a peripheral flange 19 at the upper edge of side wall 18. Cylindrical side wall 18 fits fairly closely but easily into opening 11, flange 19 being adapted to overlie head 10 adjacent opening 11 when the cover is in closing position. This flange may either rest directly upon head 10 or upon a gasket G which is supported by said head about opening 11.

In the cylindrical side wall 18 of the cover there is a plurality of recesses 20 corresponding in number and relative placement to the number and placement of locking lugs 15 on head 10. These recesses are sunk in the external face of wall 18 and extend upwardly from the bottom edge of that wall, as is clearly shown in Fig. 2, and are of sufficient peripheral length and of sufficient depth that when the cover is initially placed in opening 11 by straight downward movement, the recesses 20 will pass the several locking lugs 15, the locking lugs then occupying a position in alignment with the angularly or spirally arranged grooves 21 which are provided in wall 18 and open at one end to recesses 20. Each lug 15 is placed at a slight angle to the circumferential extent of flange 13, this angularity being the same as that of grooves 21. Grooves 21 are large enough to take lugs 15 easily, but with no excessive looseness, and the grooves are long enough so that subsequent rotation of the cover in a given direction brings these grooves into engagement with the locking lugs and the angular or spiral action between the grooves and lugs then draws the cover down tightly to bring flange 19 into engagement either with the top of head 10 or with gasket G, the cover thus being clamped down to hold it against separative movement with respect to the head in the direction of the axis of opening 11.

Now while the angle of lugs 15 and grooves

21 are such as tend to prevent accidental reverse rotation of the cover under the influence of minor jars or vibration, it is found that often the cover is not rotated sufficiently to move lugs 15 fully home, this condition being occasioned sometimes by carelessness and sometimes by slight irregularities in the head or cover formation and sometimes by reason of an overly thick gasket. Excessive jars or exceedingly rough handling then often tends to rotate the cover to a position either which permits leakage through the opening, or, sometimes, actually frees the interengaging means on the cover and head. This condition may result under some circumstances even though the cover may have been initially rotated to move the locking lugs fully home.

Therefore, I have provided releasable locking means whereby such reverse rotation may be positively prevented until such a time as occasion arises for the wilful opening of the drum. Generally, this locking means may be considered as one or more members on the cover which are adapted to be brought into such engagement with the head as will prevent relative rotation of the cover and head when said cover is in closing position.

The locking elements on the cover preferably are provided in the flange 19, and the coacting members on the head are provided on the upper face thereof about opening 11. Though these locking members may be of any suitable character which will permit of releasable engagement when the cover is turned fully home, I have shown means which are preferred due to their simplicity and the fact that they may be formed easily, cheaply and rapidly and, if desired, at the time the head and cover are being pressed to shape.

Thus I have provided a circularly arranged series of depressions 22 in head 10 about openings 11, the walls defining the sides of these depressions forming, in effect, shoulders which extend downwardly from the upper face of the head. While these depressions may be provided in any suitable number, I find that in a drum head of usual size, six equally spaced depressions suffice. I then provide flexible tongues on flange 19, which tongues or one of them, is adapted to be bent into a registering depression 22 after the cover has been rotated to carry lugs 15 into grooves 21. These tongues 23 are conveniently formed by slitting flange 19 as at 24, the slits extending to the peripheral edge of said flange. Thus, the tongues normally all lie in the plane of the flange until they are bent therefrom, and consequently the head may be rotated to engage holding lugs 15 and grooves 21 without interference from the tongues.

However, after the cover has been tightly clamped to the head by rotation with respect

thereto, it is a matter of ease to bend one or more of the tongues into registering depressions 22, the side edges of the tongues presenting shoulders which coast with the shoulders presented by the refining walls of the sides of the depressions to prevent subsequent rotation of the cover with respect to the head, and therefore prevent the cover from jarring or being shifted rotationally to a position which would loosen the joint between the cover and head or which would allow separative movement of the cover with respect to the head in the direction of the axis of opening 11.

Now it is found that due to various irregularities in formation and to the different thicknesses of gaskets, that different degrees of cover rotation are allowed before the cover is clamped down firmly. Consequently, it is desirable that the positively locking means be so arranged that it may be effective irrespective of the distance which lugs 15 have been entered in grooves 21. In other words, while it is desirable that the tongues be of considerable width so as to have sufficient strength and stiffness, it is desirable that there be a relatively fine degree of locking capacity, so the locking means may be positive irrespective of the position of lugs 15. This may be expressed otherwise by saying that the tongue should be relatively coarse and yet be capable of functioning as though they were relatively fine to give a wide range of locking positions, this relative coarseness and fineness also, of course, applying to the depressions considered as teeth with which the tongues engage.

I have illustrated a very convenient and effective way of accomplishing the above. For convenience I will refer to the particular number of recesses and tongues here shown, but it will be understood this is in no way intended to infer that the invention is limited to this particular number or to this particular relation in number between the depressions and tongues. I have shown six equally spaced recesses, and seven tongues. Two of these tongues, namely, 23' and 23'' are spaced apart angularly substantially the distance through which a given lug 15 may move through a corresponding groove 21 from the time it has entered just sufficiently to prevent longitudinal separation of the cover to the time it is at the closed end of the groove 21. The remaining tongues 23 are spaced apart equally, the spacing being greater than that between tongues 23' and 23''.

Assuming that the cover is rotated right-handedly, as viewed in Fig. 3, to engage lugs 15 in grooves 21, one of the tongues is positioned to register with a corresponding recess as soon as the cover has been rotated enough to enter lugs 15 in grooves 21 sufficiently to prevent the above mentioned longitudinal separation. It follows that there are six po-

sitions to which the cover may be further rotated between this position and the time when said lugs are fully entered in said grooves (assuming the head can be rotated to bring this full entry about) when one of the tongues will be in full register with a corresponding recess.

It will be seen that this gives a capacity for relatively fine selection of locking positions even though the locking elements be relatively coarse and few in number. Furthermore, the tongues serve as indicators, since, until the first one comes into register with a depression, the operator knows the cover has not been sufficiently rotated.

In Fig. 3, the cover has not been sufficiently rotated to bring the first tongue 23' into register with a depression, and the operator knows the cover must be turned further. In Fig. 4 the cover is shown as having been rotated sufficiently to bring tongue 23'' over depression 22' and the tongue as having bent thereinto.

When occasion arises for opening the drum, it is a matter of ease to pry up the bent tongue from its corresponding recess, whereupon reverse rotation of the cover, for instance through the bar handle H, riveted to flange 19 at 25, serves to clear the lugs 15 from grooves 21 whereupon the cover may be lifted clear from the head.

In Figs. 6 to 9, inclusive, I have illustrated a variational type of locking means. Such parts of the closure as are similar to those described in connection with the above, and which operate in the same manner, are given the same reference numerals with the addition of the exponent "a," and their formation and function need not be repeated here.

In this form, flange 19^a of cover 16^a is crimped or corrugated radially, thus giving the effect on the underside of said flange of angularly spaced and radially extending shoulders 19^b. Of course, the corrugating need not be continued entirely around the flange.

Complementary corrugations or radially extending shoulders 22^a are provided on the upper face of head 10^a about opening 11^a. The flange 19^a is sufficiently flexible that when the cover is rotated to engage lugs 15^a with grooves 21^a, the flange will give upwardly sufficiently to allow the corrugations to yield upwardly or ratchet over corrugations 22^a, but when the cover is turned sufficiently to clamp it firmly to the head, corrugations 19^a and 22^a engage one another sufficiently tightly to prevent accidental reverse rotation of the cover due to jars or shocks. It will be apparent that any desired number of corrugations 22^a may be provided in head 10^a, the number and fineness thereof depending upon individual requirements.

It will be understood the drawings and description are to be considered merely as illus-

trative of and not restrictive on the broader claim appended thereto, for various changes in design, structure and arrangement may be made without departing from the spirit and scope of said claim.

I claim:

A sheet metal closure embodying in combination with an apertured sheet metal member, a removable cover for the opening in the member, a portion of said cover being adapted to overlie the member adjacent the opening when the cover is in closing position, disengageable means on the cover and member adapted to be brought into operative coaction by relative rotation of the member and the cover to hold the cover and member releasably against separative movement in the direction of the axis of the opening, said overlying portion being cut radially inward from its outermost edge to provide tongues, said tongues being bent into engagement with the member to hold the cover releasably against rotation with respect to the member when the cover is in closing position.

In witness that I claim the foregoing I have hereunto subscribed my name this 7th day of November, 1927.

WILLIS J. BOYLE, JR.

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