

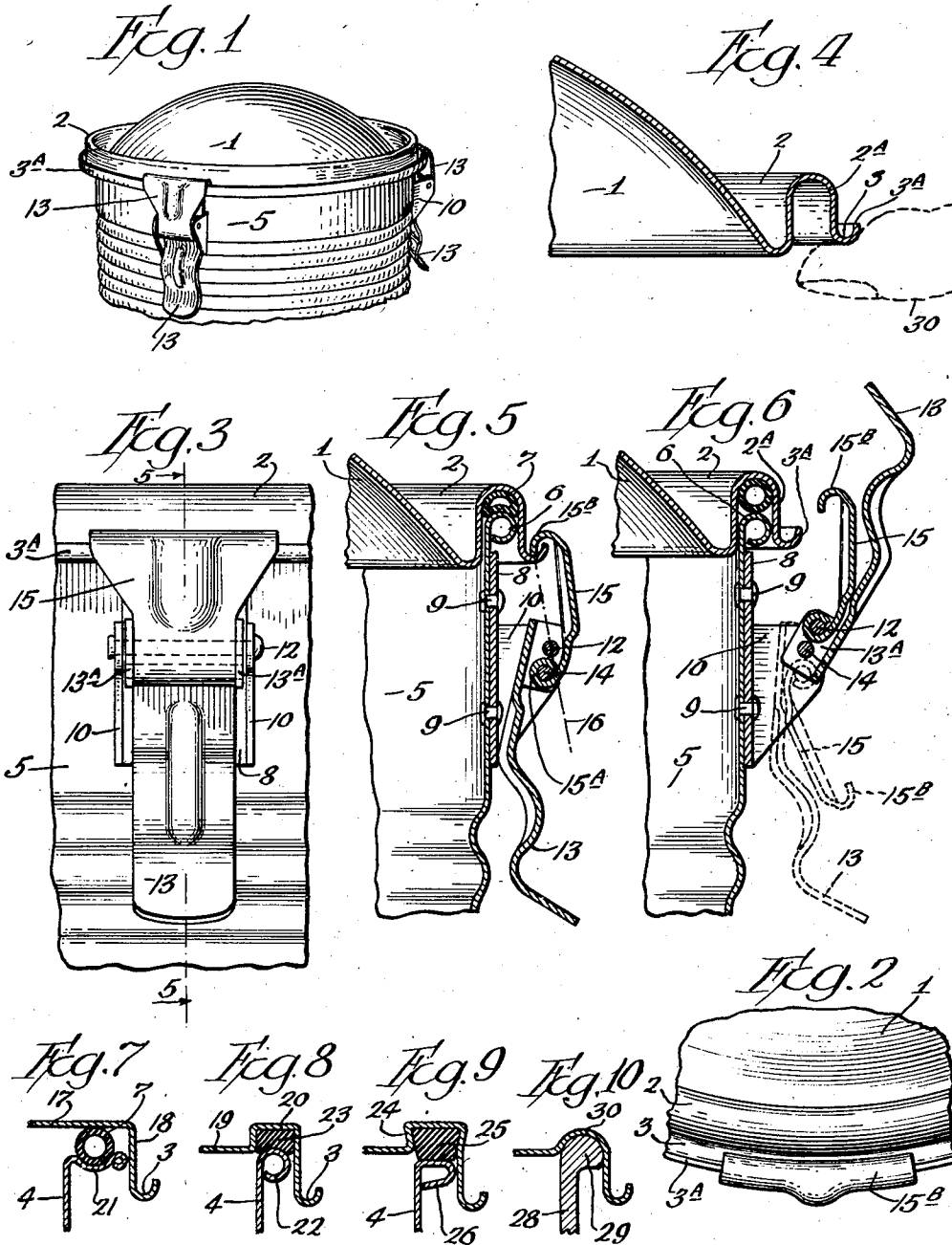
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CONTAINER CLOSURE

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CONTAINER CLOSURE

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My invention relates to the closures for drums, barrels or other receptacles and in its general objects aims to provide a receptacle head or closure which can easily and speedily be attached in effective sealing relation to the receptacle; and which can readily be detached from the receptacle even when a partial vacuum has been formed in the receptacle, without the use of tools and without injuring the hand of a person who manually detaches the closure.

In a more particular aspect, my invention relates to the class of containers in which the closure is held in sealing relation to the receptacle by means of clamps which are mounted on the receptacle and which engage portions of the closure. In this aspect, my invention aims to provide a closure having its clamp-engaging portions formed so as to distribute the pressure of the clamp considerably beyond the area of engagement, thereby permitting the use of relatively narrow clamps and effectively distributing the clamping pressure over a gasket or other sealing member interposed between the closure and the mouth of the container.

Furthermore, my invention aims to provide a closure of the above recited clamped type, in which no portion of the clamps will project above the top of the closure; and in which the closure portions engaged by the clamp are so formed as to add rigidity to the closure, thereby permitting the use of lighter material for this closure than would otherwise be required.

Moreover, my invention aims to provide a clamp-attached closure in which the above recited advantageous features can readily be secured with widely varying shapes of the top of the closure—as for example with both flat tops and dome-shaped tops—and whereby the said advantageous features can be secured with widely varying sectional shapes of a sealing ring interposed between the receptacle and the closure.

Still further and also more detailed objects will appear from the following specification and the accompanying drawing, in which

Fig. 1 is a perspective view of the upper portion of a metal container embodying my invention, showing this as it appears when the cover or closure is clamped in sealing relation to the container.

Fig. 2 is an enlarged plan view of an edge portion of the container.

Fig. 3 is a similarly enlarged elevation of an upper portion of the container.

Fig. 4 is a vertical section through a portion of the cover or closure, taken radially of the latter.

Fig. 5 is a vertical section taken radially of the container and along the longitudinal axis of one of the clamping means, namely along the line 5—5 of Fig. 3, when the cover is clamped to the container.

Fig. 6 is a section similar to Fig. 5, taken when the clamp has been released and is being swung to its open position, with dotted lines showing the positions of the parts of the clamping means when depending in their opened disposition.

Figs. 7, 8, 9 and 10 are sections of edge portions of other forms of covers and closures and of the parts adjacent thereto.

In its immediate commercial applications, my invention is particularly advantageous for use in connection with containers constructed entirely of sheet metal and employed under conditions involving pressure differences between the interior and the exterior of the container, hence I am more particularly describing my invention in connection with a corresponding embodiment.

In the drawing, Fig. 1 shows the upper portion of the container of a washing machine of the class in which the container is manually rotated when in use and is equally adapted for use with so called dry-cleaning liquids or for use with hot water and soap; other desirable features of such a hand-operated washing machine being more fully disclosed in my copending application #513,068, filed February 3, 1931 for United States Patent on a Dry-cleaning or washing machine. When using such a machine for washing clothes with boiling water and soap, the water within the container gradually shrinks in volume as it cools, thereby producing a partial vacuum in the remaining portion of the container. Consequently, the relatively higher pressure of the outer air will press the cover or closure so firmly against the receptacle portion of the container (even after a releasing of clamps employed for latching the closure to the receptacle to hold the closure in sealing relation to the receptacle during the rotation of the container which agitates its contents) that it requires considerable effort to raise the closure or cover off the receptacle.

If the peripheral portion of the cover has an outer flange depending outside the mouth portion of the receptacle, any woman pressing her fingers upwardly against the lower edge of this flange to raise the cover is apt to have her fingers scratched or lacerated by this flange edge, since it is difficult in practice to round such flange edges without adding considerably to the cost of the cover. Moreover, the metal used for such

covers or closure members is usually of such small thickness that digitally engaged edge of the metal will dig into the fingers of the user and make the latter sore even if these fingers are otherwise uninjured.

To guard against such occurrences, and also to secure other advantages hereafter pointed out, I desirably form the closure or cover member for such a container after the manner shown in Figs. 1 to 6. These figures show the main and central portion 1 of the cover in the form of an upwardly convexed dome, thereby shaping it so that it will withstand a severe downward and inward pressure without materially changing its shape, and hence permitting the use of lighter metal than would otherwise be required. Bordering this circular main portion is a bead 2 having an inverted U-shaped section radially of the cover, and the outer depending flange 2A of this bead is recurved outwardly and upwardly to form an annular trough which has the upper end of its outer trough wall 3A disposed considerably below the level of the top of the said bead 2.

The corresponding receptacle has the upper end of its generally cylindrical peripheral wall 5 curled at its upper or mouth end to form a bead 6. The bead 6 preferably has its inner edge flush with the bore of the receptacle wall 5, this bore being of approximately the same radius as the outer face of the radially inward riser wall of the bead 2 and the width of the bead 6 (radially of the receptacle) being slightly less than the interior width of the said inverted channel-forming cover bead 2. Moreover the height of the said cover bead 2 is desirably such that this bead will entirely house the mouth-end bead 6 on the receptacle even when an annular sealing member 7 is also disposed within the cover bead above the said receptacle bead 6.

This sealing member is here shown as a soft rubber tube 7 wedged in the upper portion of the cover bead 2 and compressed vertically between the latter bead and receptacle bead 6 when the cover is clamped down upon the receptacle. For effecting this clamping, I desirably employ at least three clamping mechanisms spaced uniformly about the periphery of the container and permanently mounted on the receptacle, each of which clamping mechanisms includes a movable hook member having a cover-gripping portion hookingly engaging the trough on the cover.

As here shown, each of these clamping mechanisms has as its stationary portion a bracket having a base 8 secured to the exterior of the receptacle wall 5 by two rivets 9 and having two wings 10 projecting outwardly from the lateral edges of the said base. These wings 10 are spanned by a horizontal pin 12 upon which one end of a lever 13 is pivoted, desirably by providing the said end of the lever with two pivoting wings 13A through which the said pin 12 extends. These pivoting wings are spanned at a distance from the said pin 12 by a second and also horizontal pivot pin 14, the distance between the axes of the two pins 12 and 14 being desirably a small fraction of the length of the lever 13.

Pivoted upon the second pin 14, as by having one end portion 15A curled about this pin, is a hook member 15 having its other end recurved to form a hook 15B, the direction of the curving being inwardly with respect to the receptacle when the hook member is swung so as to present its hook end uppermost.

When the lever 13 is swung in a counter-clock-

wise direction from its clamp-releasing position of Fig. 5, it carries the hook member with it and raises the hook portion 15B so as to dispose the tip of the hook higher than the top of the outer trough wall of the cover, so that the tip portion of the hook can engage the outer wall 2A of the cover bead when the lever is swung still farther in the said direction than shown in Fig. 5. Then a return swinging of the lever (in a clock-wise direction) will first draw the free end of the hook into the trough 3 and thereafter cause the hook member to pull the cover downward, thereby vertically compressing the sealing member 6 and likewise expanding this sealing member radially of the cover to afford an effective seal between the receptacle and the cover.

By suitably proportioning the vertical spacing of the lever-pivoting pin 12 from the top of the receptacle bead 6, with respect to the length of the hook member 15, the resiliency of the sealing member will permit the lever to be swung in the said closure-clamping direction until the hook-pivoting pin has passed a plane 16 extending through the hook-engaged portion of the trough and along the axis of the lever-pivoting pin 12, thereby automatically latching the lever and hook combination in its cover-closing position.

In practice, I desirably form the hook end 15B of the hook member so that it will arch freely above the top of the outer trough wall 3A (as in Fig. 5) when the clamping arrangement is operative, thereby causing the extreme tip of the hook to press downwardly on the bottom of the trough, and also curve the hook tip portion (flat-wise) as shown in Fig. 2 to correspond to the horizontal radius of the trough bottom. By thus forming the interhooking parts, I cause the downward pull on the hook member to pull downward on the outer wall of the cover bead 2, and this tension action on the said bead wall is distributed over a considerably greater length of the bead than the width of the said hook tip, particularly since the arched bead formation gives high rigidity to this portion of the cover. Consequently, I readily secure an adequate pressure distribution to compressing the sealing member for its entire length, without requiring auxiliary clamp-heads (as has heretofore been proposed) and while employing lighter metal for the cover than has been found necessary with cover-clamping arrangements heretofore employed.

To detach the cover, each clamp is released by merely swinging the lever from the position of Fig. 5 to that shown in Fig. 6, thereby automatically unlatching the hooking and relaxing the compression on the sealing member. However, if a partial vacuum has been created in the container, the pressure of the outer air on the cover may still hold the cover in a lowered position at or approximating that of Fig. 5) until the cover is manually raised for a sufficient extent so as to allow air to enter the receptacle.

This raising can readily be done digitally, particularly when the outer bead wall 2A on the cover depends for a considerable distance below the bead on the receptacle so that the fingers of the user can reach freely under the trough on the cover to press the latter upwardly. In exerting such pressure, each finger 30 engages the rounded trough bottom (as shown in Fig. 4) so that these fingers are not injured in any way.

With the outer trough wall 3A reaching to a less height than adjacent radially inward por-

tions of the cover, no part of the clamping means projects above the main portions of the cover. Consequently, containers constructed according to my invention can readily be stacked upon one another if provided with suitably formed bottoms.

However, while I have heretofore described my invention in an embodiment in which the cover includes an upwardly convexed bead adjacent to the peripheral trough, and in which this bead entirely houses both the sealing member and a bead on the mouth of the receptacle when the container is tightly closed by the clamping means, I do not wish to be limited to these or other details of the construction and arrangement above disclosed, since many changes might be made without departing either from the spirit of my invention or from the appended claims.

For example, Fig. 7 shows an edge portion of a cover having an upright flange 18 depending from the outer edge of the flat major portion 17 of the cover, this flange being recurved at its lower end to afford a trough, and the receptacle having an outwardly directed flange 21 supporting a hollow sealing ring 7.

In Fig. 8, a bead 20 of angular section is interposed between the main and flat cover portion 19 and the trough, which bead houses a solid sealing ring 23 resting on a receptacle bead; and in Fig. 9 the cover bead 24 tapers downwardly so as to grip a solid sealing ring or gasket 25 seats on a flat-topped bead 26 on the receptacle wall 4.

So also, I do not wish to be limited to the use of my cover trough and trough-hooking arrangement in connection with receptacles formed of sheet metal, or for use in connection with a sealing ring. For example, Fig. 10 shows a solid bead 29 formed on the mouth end of a receptacle 28 which may be of fibre, earthenware or the like; and shows the cover as having a bead 30 seated directly on the receptacle bead 29, it being obvious that my previously described trough and trough-engaging clamping would function equally well with containers having parts thereof formed after the manner of Figs. 7, 8 and 9, and also (though with a less tight sealing effect) when these parts are constructed and formed as in Fig. 10.

I claim as my invention:

1. The combination with a receptacle, of a cover for the mouth thereof having its marginal portion provided with a depending flange located at the outer side of the receptacle, said flange be-

ing provided with an outturned and upturned portion forming with the depending flange an open trough of which the outturned portion constitutes the bottom and the upturned portion forms the outer wall, and means for attaching the cover to the receptacle, said attaching means including an upstanding hook having an inturned and downturned end that extends over the said outer trough wall and bears upon the bottom of said trough, and means connecting the hook to the receptacle to draw said end downwardly upon said bottom, said means permitting the lateral movement of the hook to pass over the outer trough wall.

2. The combination with a receptacle, of a cover for the mouth thereof having its marginal portion provided with a depending flange located at the outer side of the receptacle, said flange being provided with an axially curved outturned and upturned portion forming with the depending flange an open trough, of which the outturned portion constitutes the bottom and the upturned portion forms the outer wall, and means for attaching the cover to the receptacle, said attaching means including an upstanding hook having an inturned and downturned and transversely curved end that extends over the said outer trough wall and has an extended bearing upon the bottom of said trough, and means connecting the hook to the receptacle to draw said end downwardly upon said bottom, said means permitting the lateral movement of the hook to pass over the outer trough wall.

3. The combination with a receptacle having a continuous wall surrounding its open mouth, of a cover for said mouth having a marginal depending flange overlying the outer side of the receptacle at said mouth, said flange having an outturned portion at its lower end and said outturned portion terminating in an upstanding wall of less height than the flange and forming with said flange and outturned portion a trough having an open top, and means for attaching the cover to the receptacle including a hook having an inturned and downturned end that extends over the outer trough wall, said downturned end being longer than the height of the wall and bearing upon the trough bottom, and means mounting the hook on the receptacle and for drawing it downwardly to effect said bearing and for elevating it sufficiently to allow it to pass over the said outer trough wall.

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