April 16, 1946. R. NYDEN 2,398,554

CLOSURE

Filed July 31, 1942

Fig. 1

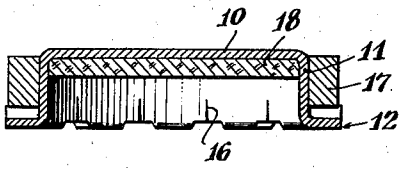


Fig. 2

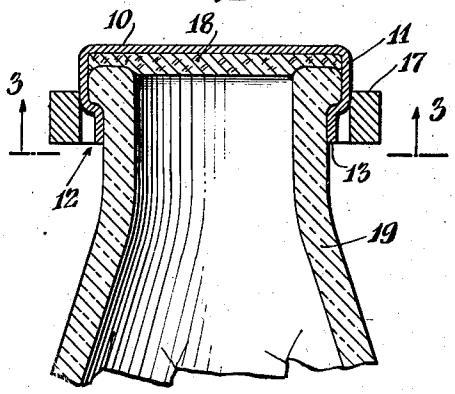


Fig. 3

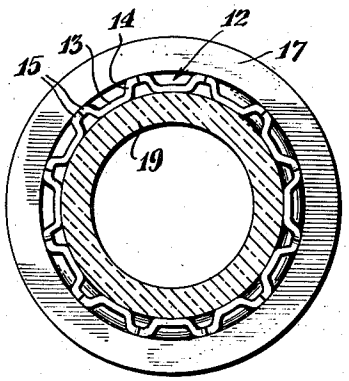


Fig. 4

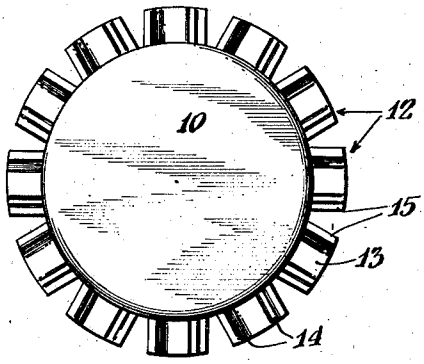


Fig. 5

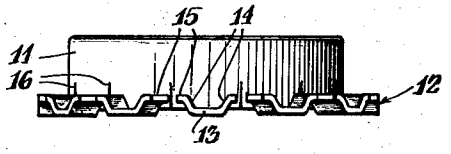


Fig. 6

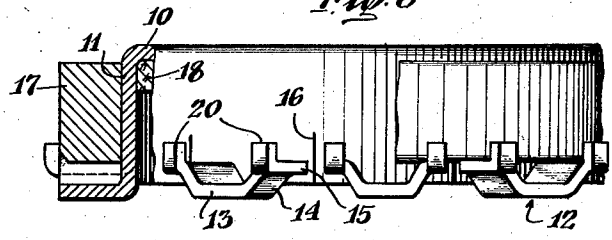
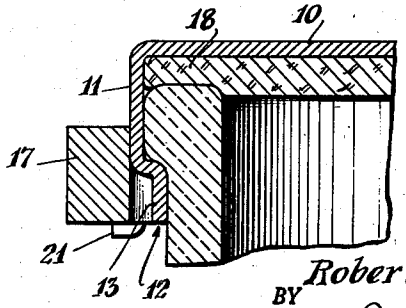


Fig. 7



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CLOSURE

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Application July 31, 1942, Serial No. 452,997

2 Claims. (Cl. 215—45)

This invention relates to a structurally and functionally improved closure, and in its more specific aspects aims to provide a non-metallic closure unit or cap that can be readily constructed of sheet material such as paper and the like and is capable of employment with receptacles such as bottles and where heretofore metallic caps of the "crown" type have been employed.

It is an object of the invention, to furnish a closure unit of this character which will effectively seal receptacles and maintain the contents of the same in proper condition, even where internal pressures are involved such as in the case of carbonated beverages, beer, etc.

A further object is that of furnishing a closure which may be utilized in connection with standard filling and capping machines as heretofore utilized in association with metallic crowns; the present closure embracing a structure such that no changes in the standard machines will be necessary, or else, such change as may be desirable will require modification of the apparatus to only a minor extent.

Another object is that of furnishing a unit of this type which may be opened by means of standard appliances. Also, when so opened, it is intended that by the present invention and in common with metallic crowns as heretofore employed, that the cap may not again be utilized. Accordingly, if the closure has been tampered with, such fact will readily be evident to even the casual observer.

Another object is that of furnishing a closure which may readily be manufactured by automatic methods and machinery and which may accordingly be produced in large quantities and at low production costs; such closure being capable of being readily stored for long periods without deterioration.

Other objects of the invention will be in part pointed out in the following detailed disclosure of certain illustrative but preferred embodiments of the invention and will be in part obvious as the disclosure proceeds.

The invention accordingly comprises the features of construction, combination of elements, and arrangement of parts, which will be exemplified in the construction hereinafter set forth and the scope of the application of which will be indicated in the claims.

For a detailed disclosure of the nature, objects and advantages of the invention, reference is made to the following detailed description and to the accompanying drawing in which:

Fig. 1 is a transverse vertical central sectional view through a closure prior to its application to a receptacle;

Fig. 2 is a similar view but showing the complete closure in applied position;

Fig. 3 is a sectional view taken along the lines 3—3 viewed in the direction of the arrows as indicated in Fig. 2;

Fig. 4 is a plan view of the cap as shown in Fig. 1 but with the ring removed;

Fig. 5 is a side elevation of the cap as illustrated in Fig. 4;

Fig. 6 is a fragmentary enlarged elevational view with certain of the parts illustrated in section and also showing a slightly modified form of construction; and

Fig. 7 is a fragmentary enlarged vertical sectional view of the unit as shown in Fig. 6 in applied position upon a receptacle.

As will be understood, the present invention contemplates a closure which is especially appropriate at the present time, in that it may be wholly formed of non-metallic material, but will at the same time properly seal the contents of a receptacle against contamination or escape. This will be true even in the case of beer and similar beverages where high pressures are present (especially during the pasteurizing step). It is of course to be understood that where liquids at atmospheric pressure are at no substantial pressure, and are to be sealed within the receptacle, certain of the hereinafter described structure might be modified or dispensed with.

Thus, in the drawing there is shown a closure which is preferably formed of sheet stock such as paper. The specific type of stock utilized might, of course, vary widely according to the type of receptacle and receptacle contents which are in contemplation. Also, according to the type of stock employed, as well as the forming process utilized, the several parts of the closure might be "drawn" to a greater or lesser extent. This would result in a modification of the proportions illustrated in the drawing to a corresponding extent, and would have the ultimate effect in the closure of certain of the parts being in substantially overlapping or abutting relationship with respect to each other. Additionally, the material employed in forming the closure might be impregnated or coated with a suitable substance or substances, all as is well known to experts in the paper and similar industries. The specific procedure followed would accordingly be governed again by the ultimate use and purpose of the closure.

Thus referring primarily to Fig. 1, the numeral 10 indicates the body portion of this closure element from which side walls 11 extend downwardly forming the skirt portion of the closure. At their lower edges, these side walls are continued by what might be generally termed a flange portion 12 forming an extension of the skirt portion.

In the preferred structure of the improved closure member, as shown in the drawing, the skirt portion 11, 12 is formed at its lower marginal portion or zone with a peripheral series of flutes or corrugations extending entirely around the closure member. While these corrugations may be differently constructed, as herein shown, they comprise a peripheral series of tabs or lugs 13 each with marginally deflected portions or flanges 14 and supplemental flanges 15 offset with reference to the body portions 13. The adjacent sections or tabs 13 may be separated by means of slits 16 in the sheet material. As clearly seen in Figs. 3 and 5, it will be noted that this structure provides a fluted or corrugated wall portion or zone at the lower extremity of the skirt or side wall portion 11, the portions 13 forming the inner crests of the corrugations while the portions 15 form the outer crests. These corrugations in their normal operative position, as shown in Figs. 2 and 3, are substantially vertical; or in other words, these corrugations extend substantially longitudinally of the cap or closure member. The angularly disposed flanges 14, 15 positioned along the opposite margins of the respective tabs or lugs 13 are effective in stiffening and reinforcing said lugs thus adapting the closure for effective use when constructed of paper or similar non-metallic stock. It will be noted that the deflecting or bending of the outer corrugations along longitudinal lines form the angularly disposed flanges 14, 15 which in effect form opposite marginal reinforcing flanges for each of the tabs or lugs 13, each said marginal flange having a longitudinal reinforcing rib formed by the angularly disposed flange sections 14, 15. This corrugated structure performs an important function in this type of closure which is made entirely of non-metallic materials since it not only provides a very convenient and effective means for locking the closure in its closing position on the receptacle, but it also serves to reinforce and strengthen the closure element at said locking tabs 13 thereof that particularly need reinforcement to form a strong locking or attaching device cooperating with the wall structure of the receptacle as, for example, with the bead adjacent the mouth thereof as shown in Fig. 2.

From the foregoing it will be seen that the skirt portion of the closure member includes the upper marginal part or zone 11 which is uncorrugated or otherwise undeformed so as to present a substantially smooth outer surface, and the lower marginal part or zone formed by the circumferential series of separated lugs 13. This lower zone is deformed to provide the outer corrugations 14, 15 and the intermediate inner parts or corrugations. All of these corrugations terminate at their upper extremities substantially at the circumferential line or zone of juncture of the upper zone 11 with the lower zone formed by the lugs 13, this line or zone of juncture approximately defining the axes or lines upon which the lugs 13 swing or are bent inwardly from their outer positions as indicated in Figs. 1, 5 and 6 to the inner or operative applied positions thereof as shown in Figs. 2 and 7. The line or zone of juncture between the upper and lower zones of the closure skirt extends entirely around the skirt and is positioned intermediate the upper uncorrugated zone 11 and the lower corrugated zone.

In order to secure the closure in place, and also with a view to manipulating the lugs 13, a ring 17 is employed. This ring may be formed from a section of a tube which would have a close sliding fit upon the exterior face of the wall 11. Affixed to the inner face of the closure, is a seal 18. Ordinarily this seal may not be dispensed with, although by special treatment or otherwise the inner face of the cap portion 10 might provide a seal in contact with the pouring lip of the bottle. If a seal such as 18 is utilized, it may be formed of cork, a laminated structure, foil, layers of paper, etc.

In utilizing this closure, any standard and acceptable method of procedure for filling the bottles is followed, and the same will be true of the seating of the closure upon the sealing lip of the receptacle. It will be understood that such seating will involve a sealing contact between this lip and the liner or the inner face of the closure. In certain instances, it is conceivable that the manipulating and retaining ring 17 might be dispensed with. However, in the case of beverages or liquids under pressure, the use of some functionally equivalent element is contemplated. However, in cases where it might be feasible to dispense with the ring 17, the machines heretofore utilized to apply seals of the crown type might—with slight modification or no modification at all—cooperate directly with the lug portions defining the flange 12. Otherwise, and with the use of the ring 17 or its equivalent, these machines—again with such modification as may be necessary—may cooperate with the ring.

Such cooperation obviously merely requires the projection of the ring. Incident to such projection, the lower edge of the ring will cam against the upper surfaces of the flange portions 15 corresponding to the outwardly disposed crests of the corrugations of the corrugated locking wall structure and will swing the entire lug portions of the wall around their points of juncture with the wall 11 so that these lugs will in effect, provide a downwardly extending continuation of the wall or skirt 11. As the locking ring 17 is projected downwardly into its final locking position, shown in Fig. 2, it engages with the outwardly disposed crests 15 of the corrugated locking wall structure thus causing the lower corrugated portion of the skirt to be swung downwardly and inwardly and to engage in camming relation against the underside of the lug or bead adjacent to the receptacle opening. When the locking ring is in its final locking position it is in engagement with the outwardly disposed crests of the corrugations, while the inwardly disposed crests engage tightly against the adjacent wall of the receptacle. This will have the result that the entire closure will be firmly drawn into contact with the surfaces of the receptacle. Thus, an effective seal will be furnished between the liner 18 and the pouring lip of the bottle, or else between this lip and any other adjacent surface of the closure. In this position of the parts, the closure will be locked against further movement with respect to the bottle due to the constricting and confining effect of the ring.

The corrugated portions of the closure will act against the ring to frictionally lock the same in position against any accidental displacement, and no casual vibration or jarring of the parts—

such as would occur ordinarily during shipment—will have any effect on the sealing action of the closure, and despite the fact that the latter may be confining liquids under high pressure within the receptacle.

At the same time, however, it is obvious that any ordinary implement customarily employed for the removal of seals of the crown type, might be utilized to engage the ring and effect removal of the same. Thereafter, the closure may readily be removed from the receptacle. It will again be apparent that with such removal, and as a consequence of the distortion of the parts, it will not be practicable for anyone to re-apply the closure without the fact that the latter has been tampered with becoming readily apparent to even a casual observer.

Under certain conditions, it might be desirable to provide a stop structure as part of the closure and which would serve to confine the movement of the manipulating and retaining ring to a certain zone. If such a stop is desired, the structure illustrated in Figs. 6 and 7 may be employed. In these views it will be apparent that in addition to the structures heretofore described, extensions 20 may form part of the corrugated wall structure. As shown in Fig. 6 and prior to the application of the cap to a receptacle, these extensions will preferably project in a direction substantially parallel to the side wall 11. However, as the ring 17 is forced downwardly to manipulate the lugs of the closure as heretofore described, the extensions 20 will move to the position shown at 21 in Fig. 7. In such position, they will act to restrain further movement of the ring, thus achieving the desired result. It is advantageous to position these stop lugs 20 as shown in Fig. 6 substantially at the crests or top flanges 15 of the outer corrugations 14, 15 of the lower zone of the skirt, these lugs being substantially angularly disposed extensions of certain of said crests.

From the foregoing it will be appreciated that among others, the several objects of the invention as specifically aforenoted are achieved. Obviously, numerous changes in construction and re-arrangement of the parts might be resorted to without departing from the spirit of the invention as defined by the claims.

The invention having thus been fully described, the following is claimed:

1. A receptacle closure having a body portion to extend across the mouth of a receptacle and an angularly disposed skirt portion to extend along and enclose parts of the receptacle adjacent to said mouth, said skirt portion having upper and lower zones the lower of which is corrugated and the corrugations thereof extending substantially longitudinally of the closure over the lower marginal portion or zone of said skirt portion and terminating short of said upper zone which is free of such corrugations, said corrugated skirt portion or zone having at peripherally spaced points therearound a multiplicity of outer corrugations with outwardly disposed crests substantially in line with the outer surface of the upper zone when the closure is applied in operative position, the inner surface of said corrugated skirt portion or zone being positioned for contact with said adjacent receptacle parts, said corrugated skirt portion or zone being divided along lines extending substantially along the crest portions of said outer corrugations to form a multiplicity of separated securing lugs each having oppositely disposed marginal reinforcing flanges each of which is transversely bent or deflected along longitudinal lines to provide a longitudinal flange-reinforcing rib, each said marginal reinforcing flange being positioned in abutting relation with an adjacent said marginal reinforcing flange when the closure is operatively applied in closing position, said separated securing lugs being attached for swinging movements to applied positions along axes lying substantially along the line of juncture of said upper and lower zones.

2. A receptacle closure having a body portion to extend across the mouth of a receptacle and an angularly disposed skirt portion to extend along and enclose parts of the receptacle adjacent to said mouth, said skirt portion having upper and lower zones the lower of which is corrugated and the corrugations thereof extending substantially longitudinally of the closure over the lower marginal portion or zone of said skirt portion and terminating short of said upper zone which is free of such corrugations, said corrugated skirt portion or zone having at peripherally spaced points therearound a multiplicity of outer and inner corrugations, said outer corrugations having outwardly disposed crests substantially in line with the outer surface of the upper zone when the closure is applied in operative position, said inner corrugations of said corrugated skirt portion or zone having inwardly disposed crests positioned for contact with said adjacent receptacle parts, said corrugated skirt portion or zone being divided along lines extending substantially along the crest portions of certain of said corrugations to form a multiplicity of separated securing lugs each having oppositely disposed marginal reinforcing flanges each of which is transversely bent or deflected along longitudinal lines to provide a longitudinal flange-reinforcing rib, each said marginal reinforcing flange being positioned in abutting relation with an adjacent said marginal reinforcing flange when the closure is operatively applied in closing position, said separated securing lugs being attached for swinging movements to applied positions along axes lying substantially along the line of juncture of said upper and lower zones.

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