June 7, 1932. A. H. WARTH 1,861,589

BOTTLE CLOSURE

Filed April 12, 1928

Fig. 1.

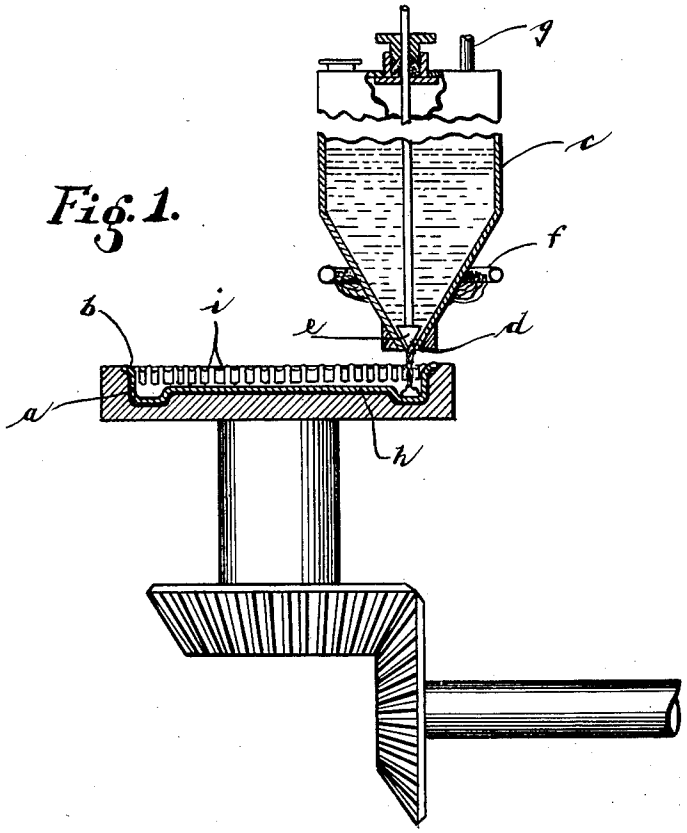


Fig. 3.

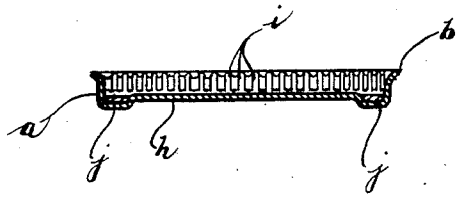
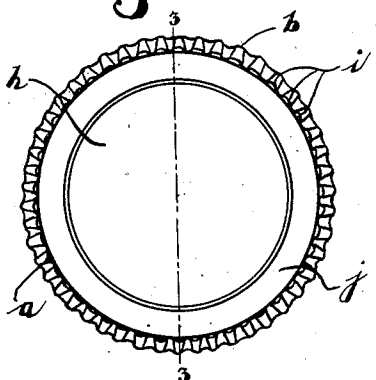


Fig. 2.



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UNITED STATES PATENT OFFICE

ALBIN H. WARTH, OF BALTIMORE, MARYLAND, ASSIGNOR TO CROWN CORK & SEAL COMPANY, INC., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK

BOTTLE CLOSURE

Application filed April 12, 1928. Serial No. 269,430.

My invention relates to bottle closures, and more particularly to a type of closure having an annular sealing gasket adjacent the skirt of a metallic shell, and to the character of the gasket and the mode of applying it to the shell.

Closures of the type to which my invention relates have a wide range of utility in connection with bottles, jars, glasses and other containers, and consist of a skirted metallic shell so formed as to facilitate the securing of the closure to, while forming a gas and liquid tight seal about the opening of, the container closed by the closure. The means for securing an air and liquid tight joint with closures of the general type to which the invention relates, has had wide variance, according to the character of the closure, of the container and of the contents of the latter, including natural and composition cork cushion disks, disks of composite construction, treated paper disks and annular gaskets of various materials including vulcanized rubber, the disks and gaskets being retained in position by means of cement, frictional engagement between the edges thereof and the skirts of the shell, or as a result of the mounting of the shell upon the container.

The difficulty with many closures of the type above referred to has been not only the expense and difficulties of assembling, but likelihood of the contents of a container acquiring the characteristic taste of the material forming the disk or gasket, or of such contents attacking the binding medium between the disk or gasket and the shell so as to break the bond between the shell and the gasket and permit the seepage of air or gases from or into the container between the shell and the gasket with a resultant deterioration of its contents.

It is desired to emphasize that in closures of the general type to which my invention relates, the facility of production of same is of importance equal to the minimizing of the other conditions above referred to, since such closures must be produced in large quantities and at low cost to justify their commercial use.

In the various closures above referred to, the universal practice has been to secure a pre-formed disk or gasket in a pre-formed metallic shell.

My present invention has to do only with that type of closure in which the packing or sealing medium is positioned adjacent the skirt of a metallic shell, the portion of the closure with which the contents of the container contact being unprotected by the packing or cushioning medium so as to avoid possible absorption by such contents of the characteristic taste of the cushioning or sealing medium. In fact, the construction of the closure is such as to reduce to a minimum likelihood of the contact of the contents of a container with the material of the gasket, and to have the gasket so located that seepage of liquids or gases between the gasket and the metallic shell is practically impossible because of the location of the material forming this gasket and of its inherent characteristics of semi-resiliency and semi-plasticity, which will be more fully referred to hereinafter.

As heretofore stated, the common practice has been to use pre-formed gaskets and cement them to the metallic shell. By the method of my invention, closures may be produced in which gaskets of substantially uniform dimensions and bulk may be formed directly in the metallic shell and be self-adherent thereto, thus not only ensuring uniformity in the product, but facilitating the production of closures.

The invention consists in a bottle closure embodying the novel characteristics and the novel steps, hereinafter set forth and described, and more particularly pointed out in the claims hereto appended.

Referring to the drawing,

Fig. 1 is a conventional showing of the method of my invention with parts thereof shown in cross section;

Fig. 2 is a bottom plan view of a completed cap made by the process illustrated in Fig. 1; and

Fig. 3 is a section on the line 3—3 of Fig. 2.

Like letters refer to like parts throughout the several views.

In producing closures embodying the in-

vention, I use a pre-formed metallic shell *a* provided with a skirt *b*, which in the form of the invention shown, is of the usual flared, fluted type commonly found in crown seals. The provision made for securing the closure in position upon a container, however, is immaterial to the invention and may take any of the various forms now commonly in use for so securing metallic shells in relation to the neck of a container.

In applying the gasket, which, for convenience will be called an edge gasket or one positioned only adjacent the skirt, I rotate this shell about a vertical axis and deliver or pour adjacent the skirt thereof and in a viscous form, a compound containing latex and a suitable filler such as bentonite. Of course the higher the speed of rotation of the shell, the more rapid will be the production of the closures. The semi-fluidity of the latex mass will cause it to spread and seek a level, thus ensuring uniformity in the dimensions of the gasket formed thereby as determined by the capacity of the nozzle through which it is delivered to within the shell.

In actual practice is has been found desirable to maintain the desired fluidity of the latex compound by applying heat to the container, of which the nozzle forms an outlet.

In the drawing, the container is shown at *c*, the nozzle at *d* and a valve controlling the nozzle at *e*, this valve being used for controlling the duration of the flow. The heating means is shown at *f*. The container is shown as being a closed container having an airline *g* communicating therewith so as to permit the application of sufficient pressure to the contents of the container to ensure a smooth, uniform flow of the compound. High pressure is not required, however. Any desired form of nozzle having the desired capacity may be employed, it being unnecessary, by reason of the fluidity or viscosity of the compound, to deliver it in ribbon form.

The inherent adhesiveness of the latex content of the compound will cause a fairly strong adherence of the gasket in its entirety to the shell so that the use of cements is dispensed with, thus not only effecting a saving of time but of materials.

In order to define the maximum width of the gasket, the shell is preferably provided with an inwardly formed central portion indicated at *h*, spaced from the skirt a distance approximating the desired width of the gasket, the annular trough adjacent the skirt thus formed not only serving to confine the compound during the formation of the gasket, but permitting the formation of a gasket which, in its entirety, will be above the plane of the central inner face of the closure so that distortion of the material of the gasket when applying it to a container will form an effective seal at the bottom and at both sides of the channel at the same time avoiding contact of the edge of the gasket with the contents of the container. This condition of use not only prevents the possible escape of liquids and gases between the gasket and the shell, but avoids destruction of the bond between the gasket and the shell, or any substantial contact of the contents of the container with the gasket.

The shell, immediately upon the completion of the pouring operation, may be removed from adjacent the nozzle and allowed to rest at normal temperatures until the compound has set or cured. If desired, a gentle heat may be applied to accelerate the drying operation, high temperatures, however, being unnecessary since the compound contains no vulcanizing agent and the setting operation is largely a matter of siccation.

The result is a gasket which is slightly resilient and slightly plastic, which two characteristics will aid materially in securing an effective joint when the closure is applied to a container, since the material of the gasket will readily conform to the neck of the container but will be distorted as a result of the application of pressure so as to completely fill the channel and closely hug the side walls thereof.

By so proportioning the width of the gasket as to cause the central depressed portion of the shell to occupy substantially the entire space within the neck of the bottle, and to have the neck of the bottle contact with substantially the entire area of the width of the gasket, there can be no deterioration of the gasket while the closure is upon the container.

As a result of the hereinbefore described method of manufacture, I am enabled to rapidly produce bottle closures which embody therein a metallic shell *a*, having a skirt *b* provided with means as flutes *i* for securing the closure in position upon a container. Adjacent the skirt is an annular gasket *j* of semi-elastic, semi-plastic, non-absorbent material, a compound of latex and a filler. This gasket is also impervious to gases and cannot be attacked by acids ordinarily found in the substances packed in containers with which the closures are used. It is of substantially uniform width and thickness affording a smooth level surface of contact with the neck of the container.

The gasket *j* is so located as to reduce to a minimum an area of possible contact with the contents of the container, since the major portion thereof, when the closure is in use, will be positioned beyond the pouring lip of the container.

While the material of the gasket has little or no compressibility, its semi-plasticity will permit it to readily conform to the contour of the portion of the container with which it contacts upon the application of but

little pressure as compared with the pressure developed in an ordinary capping machine, the flexibility of the material assisting in securing a desired tight joint between the neck of the container and the gasket.

The presence of the depressed central portion of the shell *h* avoids excessive distortion of the gasket and affords a contacting area between the inner edge thereof and the contents of a bottle, which is negligible. Furthermore, the sides of this channel afford very effective packing areas co-operating with the edges of the gasket which minimizes likelihood of seepage of the liquid or gases within the container between the gasket and the metallic shell.

Closures of the invention are particularly applicable to wide mouthed jars containing various kinds of foodstuffs, in connection with which it is highly desirable to provide a closure sufficiently tight to exclude atmospheric air from the container.

Closures used with wide mouthed jars are commonly provided with securing means consisting of interrupted screw threads or an elongated skirt adapted to be spun under the lip of the bottle for securing the closures in position thereon, and it is obvious that the fluted skirt shown in the drawings is therefore not material to the invention.

The use of latex secures, in the finished product, all of the advantages of rubber including its non-absorptive, acid resistant and resilient properties. By using the same without the employment of vulcanizing agents, I not only avoid the steps of moulding and vulcanizing in the production of the gaskets, but preserve the native adhesiveness of the latex to an extent to secure a firm bonding of the gasket to the shell and thus avoid the necessity of the use of adhesives with the incidental labor of application to the shell.

By using a plastic filler, I am enabled to not only secure a semi-plastic condition in the gasket by reducing the inherent elasticity of the rubber content of the latex, but avoid stickiness in the gasket of the finished product since during the final stage in the process, in passing from a viscous to a semi-plastic state, the adhesiveness of the compound disappears, although the bonding of the gasket to the shell is not interfered with.

While the batch of the compound is inherently tacky, the application of heat maintains it in a viscous condition permitting it to flow freely through the nozzle, and by diffusion, spread until the upper surface thereof finds its own level before the drying out stage causes the setting of the composition. The tackiness at this stage of the method results in the desired formation of a bond between the gasket and the shell.

By delivering a volume of the compound of latex and filler insufficient to completely fill the channel in the shell, the gasket in its entirety may be so positioned as to make the area of contact between the gasket and the contents of the container negligible.

It is not my intention to limit myself to the particular compound herein specified, since the use of fillers other than that specified may be resorted to if desired, nor is it my intention to limit myself to the specific details of construction of the cap as a whole, as shown in the drawing, particularly as the size and form of the shell is subject to wide variation.

Having described the invention, what I claim as new and desire to have protected by Letters Patent, is:—

1. A closure of the type herein referred to, consisting of a skirted metallic shell having adjacent the skirt thereof an annular gasket formed of a semi-resilient and semi-plastic compound composed of latex and a filler, said gasket being self-adherent to the metal of the shell and having sufficient thickness to permit it to conform to irregularities in the surface of the neck of a bottle or jar.

2. A closure of the type herein referred to, consisting of a skirted metallic shell having an annular channel about the edge thereof, wtihin which is a gasket formed of a semi-resilient and semi-plastic compound composed of latex and a filler, said gasket being self-adherent to the metal of the shell and having sufficient thickness to permit it to conform to irregularities in the surface of the neck of a bottle or jar.

3. A closure of the type herein referred to, consisting of a skirted metallic shell having a depressed central portion forming an annular channel about the edge thereof, within which is a gasket formed of a semi-resilient and semi-plastic compound composed of latex and a filler, said gasket being self-adherent to the metal of the shell and having sufficient thickness to permit it to conform to irregularities in the surface of the neck of a bottle or jar.

4. A closure of the type herein referred to, consisting of a skirted metallic shell having an annular channel about the edge thereof, within which is a gasket formed of a semi-resilient and semi-plastic compound composed of latex and a filler, said gasket being self-adherent to the metal of the shell and having sufficient thickness to permit it to conform to irregularities in the surface of the neck of a bottle or jar, the contacting area of said gasket being below the top of the channel.

In witness whereof I have hereunto affixed my signature this 3rd day of April, 1928.

ALBIN H. WARTH.