Feb. 5, 1929. 1,700,984

J. M. HOTHERSALL

METHOD AND MEANS FOR CLOSING CONTAINERS

Filed Jan. 10, 1925

Fig. 1

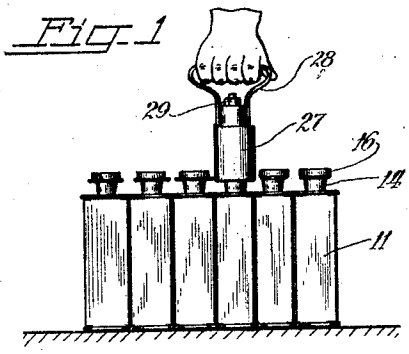


Fig. 3

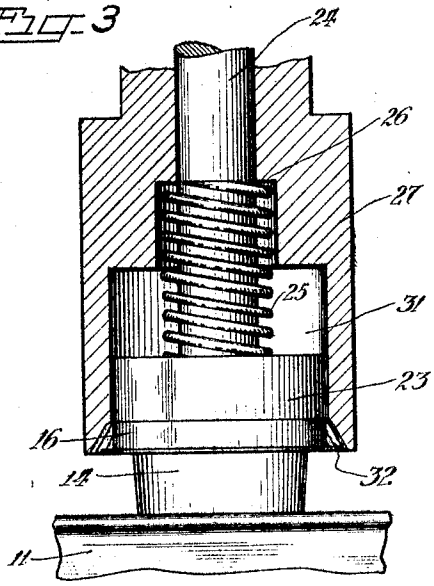


Fig. 2

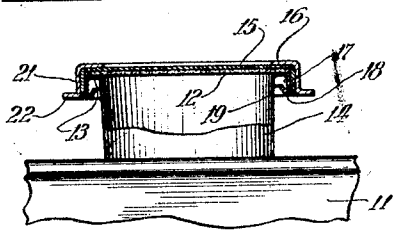


Fig. 4

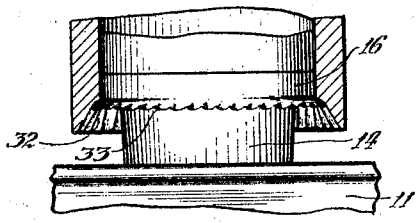


Fig. 5

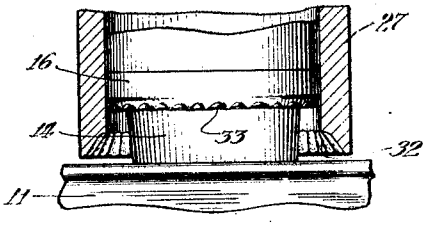


Fig. 6

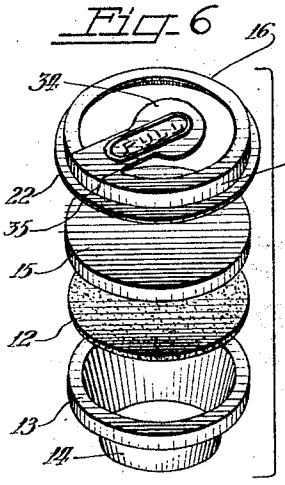


Fig. 7

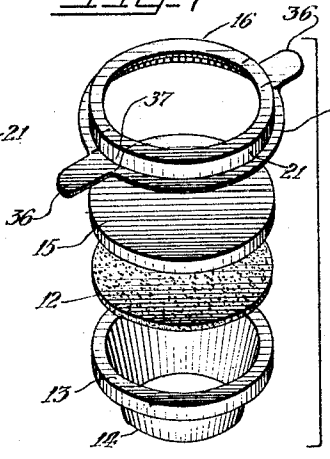
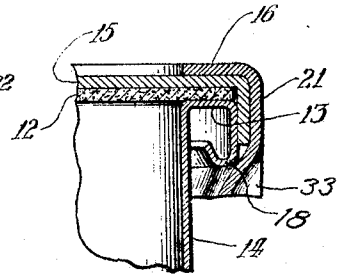


Fig. 8



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UNITED STATES PATENT OFFICE.

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METHOD AND MEANS FOR CLOSING CONTAINERS.

Application filed January 10, 1925. Serial No. 1,532.

The present invention relates to a method and means for closing containers and, while it is perhaps particularly adapted for attaching metallic closures to nozzles, or extended neck portions of metal containers, it is also capable of use in applying closures to glass bottles, or jars having shoulders formed upon the neck or body thereof and, in its broader aspects, is not limited to the closing of any particular form of container.

In attaching closures to nozzle type containers in the past, it has been customary to place the closure elements upon the nozzle and to spin the metal of a retaining portion of said closure elements into tight engagement with an outwardly extended cooperating part upon the nozzle or neck of the container. Mechanism for this purpose ordinarily involves the use of rollers which engage the edge or flange on the closure and roll or spin the same into retaining position. Another form of mechanism employed for the purpose involves the use of a series of squeezer jaws, or die members, adapted to contract about the periphery of the closure member and, by a squeezing action to fold the metal of the closure member into contact with the nozzle or extended part of the container.

Both these forms of closing mechanism have required more or less complicated and relatively large and expensive machinery for the proper mounting and operation of the rollers, or jaws, and while they are satisfactory and practical for large plants, wherein the closing machines may be incorporated as a part of a line of automatic machinery and the production is in such quantity as to justify the expense of continuous operation of such machinery, in smaller plants, where production is more limited and somewhat intermittent, an automatic closing machine of the type just described is not practical because of the cost and the expense of upkeep and operation. On this account hand tools have sometimes been employed in such places, these, however, being ordinarily of the rotary type which require considerable skill and strength for operation and, therefore, cannot be depended upon for uniform results, or for continued operation for a very great length of time, due to the element of human skill and to the fact that very few operators can continuously exert the pressure and power necessary for efficient operation throughout the hours of a work day. When the closing operation is not efficiently performed either because of lack of skill or strength and endurance of the operator, imperfect results are frequently obtained which cause depreciation of the contents of the imperfectly closed containers

Furthermore, this type of tool requires the removal of each container separately from a line or group in which it may be located and the replacement thereof, after the closing operation, or the placing of the closed can in a box or shipping case so that the numerous operations involved add too greatly to the cost of production and prevent efficient operation.

My invention is directed to the provision of an improved method and means for operating upon the closures of containers after the same have been positioned to effectively attach them to the container nozzle without the difficulties hereinbefore referred to. While I have shown the means for accomplishing this result as embodied in a hand tool, it will be apparent that it is also readily adaptable to an automatic machine for performing the same closing action. The tool is of very simple construction and of small size and when manipulated by hand, may be employed to close the containers without moving them from the position in which they may be arranged either in a line in the factory or in a packing case.

A highly important feature of my invention is the provision of a method and means for closing containers by which the retaining portion of the closure is accurately shaped to most effectively engage the particular nozzle upon which the closure is placed, the shaping being accomplished after the parts are positioned upon the nozzle and the tool employed for carrying out the method of the invention being provided for this purpose with interior ridges and valleys, or corrugations, adapted to deform the flange of an outwardly flanged closure element so that the excess metal may be taken up in the folds or corrugations and the flange cause to grip the cooperating part upon the nozzle to retain the parts in assembled and tightly closed relation.

I am aware that it is old in the manufacture of seals for bottles or jars to provide a sealing cap of the crown and cork type and that such caps are applied to and held upon the necks of bottles or containers by crimp-

ing the flange of the closure and causing an inwardly extending bead or projection in the flange to engage under the edge of the bottle nozzle or neck. This, however, is a very different type and style of closure than the one disclosed in my invention. In the crown and cork type of closure, the crimped flange of the closure is formed before the closure is applied to the nozzle or neck. In other words, the closure has a partially outstanding crimped and corrugated flange before it is applied and after being secured in position, these crimps are bent further into place. This action does not give the exact adaptation of the closure member to the neck about which it is placed. In my invention, since the flange is straight previous to closing, the neck or nozzle part is the shaping element for the bending of the closure member. Each portion of the flange that is forced inwardly in forming each corrugation is exactly related to the part of the nozzle or neck that it engages and this is independent of any irregularities in the flange of the nozzle or neck. This molding or forming of each corrugation to the correct position upon the nozzle results in the proper tension of the parts upon the gasket or pack within the closure member. This insures proper sealing tension of the closing member in connection with the gasket or pack. In the crown and cork type, the metal is already partially shaped and the closing action does not reshape to adapt the closure to the nozzle or neck, but rather carries the partial shaping further to form the complete bending of the closure member.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description, which, taken in connection with the accompanying drawings, discloses a preferred embodiment thereof.

In said drawings, I have shown, for illustrative purposes only, the preferred embodiment of my invention, in which,

Figure 1 is an elevational view of a series of cans provided with nozzles and closures therefor, which are being applied in accordance with my invention;

Fig. 2 is an enlarged fragmentary view of the upper part of the container and nozzle, the latter being broken away and sectionalized to better illustrate the closure elements;

Fig. 3 is a view of the assembled parts shown in Fig. 2 and of the closing tool in its initial position for the closing operation, said tool being shown in cross section for illustration of the internal parts;

Figs. 4 and 5 are views similar to Fig. 3 and showing the different positions of the closing tool and the flange of the outer closure member as the closing operation progresses;

Fig. 6 is a perspective view of the container nozzle and closure elements in separated relationship;

Fig. 7 is a similar view, showing a different form of outer sealing ring; and

Fig. 8 is an enlarged partial section of the nozzle and closure elements after the latter have been applied in accordance with my invention.

The cans 11, shown in Fig. 1 of the drawing, may, as previously stated, be arranged in adjacent relationship, either in a line in the factory or in a packing case, or other convenient location, with the closure elements placed thereon in any preferred manner in the relationship shown in Fig. 2. Said closure elements, as shown in Fig. 6, consist of a cork, or gasket, 12 adapted to be placed upon a top horizontal ledge 13 formed upon the nozzle 14, which extends upwardly from the top of the can and may be applied thereto in any suitable or approved manner, a cup-shaped closure member 15 being applied over the cork 12 and the nozzle flange, and a sealing ring 16 is then applied over said cup-shaped member 15, so that the parts, prior to the use of the closing tool, are arranged as shown in Fig. 2 of the drawing. Viewing said figure, it will be observed that the nozzle flange extends vertically downward from the ledge 13, as indicated at 17, and then is turned inwardly and upwardly at 18 toward the nozzle wall. The sealing ring 16 has a vertical wall 21, terminating in an outwardly extending flange 22, which flange is adapted to be operated upon by the closing tool to clamp the parts in closing position, as will now be described.

The closing tool consists of an inner disk 23, having a rod 24 extending upwardly therefrom and surrounded by a spring 25, which bears at one end against said disk 23 and at the other end against a shoulder 26 formed within an outer cylinder or sleeve 27, which fits over the disk 23 and is adapted to be moved downwardly relative thereto against the tension of the spring 25, a handle 28 being provided upon said sleeve 27 for this purpose. This handle has a transverse grip whereby it may be strongly pushed and forced downward over the sealing member to deform the same, as shown in Fig. 1. The upper end of the rod 24 is threaded and has a nut 29 thereon to hold the parts in assembled relationship. The disk 23 is disposed within a bore 31 of said sleeve 27 and the wall of the sleeve, at the lower edge thereof, is formed upon the interior with an outwardly inclined portion 32, which is provided with a series of ridges and valleys, as clearly illustrated in Figs. 3 to 5 of the drawings. In operation, the disk 23 of the closing tool is placed upon the top of the sealing ring 16 and pressure applied through the handle 28 to the sleeve 27 to force the same downwardly against the tension of the spring 25 and relatively to said disk 23.

Inasmuch as the flange 22 of the sealing ring is extended outwardly so that there is an excess of material in the outer part thereof, said excess must be taken up by deforming the flange when it is brought to smaller diameter and it is for this purpose that the portion 32 of the sleeve is formed as described, the flange 32 being brought to the crimped or corrugated form, as indicated at 33 in Figs. 4 and 5, when said sleeve is forced downwardly from the position shown in Fig. 3 to that shown in Fig. 4. Further downward movement of said sleeve forces the corrugated flange of the sealing ring inwardly over the vertical line of the wall part 21, so that the parts are arranged in the relationship shown in Fig. 8, with the corrugations of the flange 22 in contact with the underside of the nozzle flange at the point of bend 18.

For the purpose of opening the container, I provide means for removing the sealing ring 16, which, as shown in Fig. 6, comprises an inwardly extending tongue 34 projected from the top part of the ring which is scored upon a line 35 extending to the flange 22, so that by pulling said tongue, the sealing ring may be severed and readily removed. In Fig. 7, I have shown a somewhat different form of opening arrangement, tongues 36 being extended from opposite sides of the flange 22 and the material of the ring being scored upon lines 37 extending inwardly almost to the inner diameter of the top portion of the ring, so that by pulling upwardly upon said tongues, the ring may be severed at one or both sides to break the seal.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention, or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. The method of closing sheet metal containers having an outwardly extending hollow sheet metal retaining part which consists in arranging a closure, including a gasket and an inverted cup-member therein and a sealing ring element, upon a neck or open end of the container with the sealing element extended laterally, forming corrugations in said laterally extending sealing element after it is arranged upon the container, and pressing the corrugated portion of said sealing element downwardly to cause it to bend inwardly under the edge of the cup-member and toward the container wall and to engage beneath the outwardly extending retaining part.

2. A tool for closing containers, consisting of a sleeve adapted to fit closely around the body of a flanged closure member and to slide downward around said body, and an inner pressure disk adapted to bear on the top of the closure member, said sleeve having corrugating ridges formed on the end thereof for crimping the flange of the closure.

JOHN M. HOTHERSALL.