Feb. 27, 1940. C. HAMMER 2,191,989

METHOD OF MAKING CONTAINER CAPS OR CLOSURES

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Fig. 8.

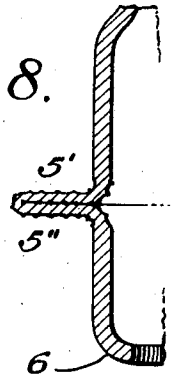


Fig. 9.



Fig. 1.

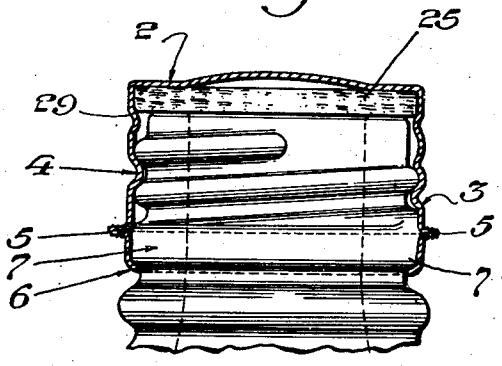


Fig. 2.

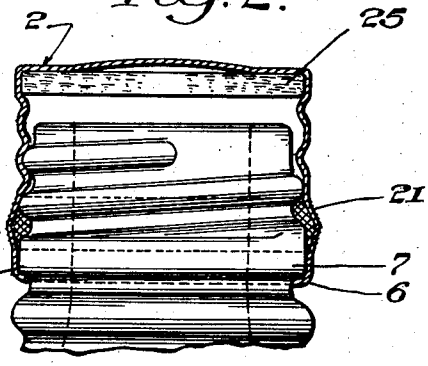


Fig. 3.

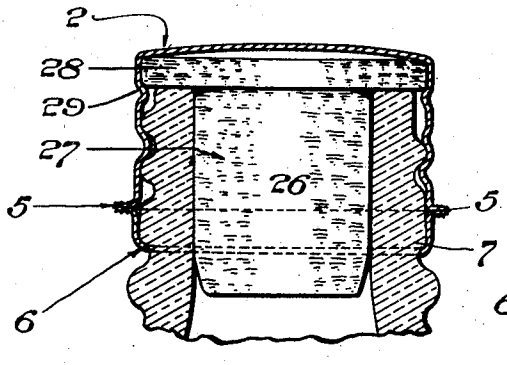
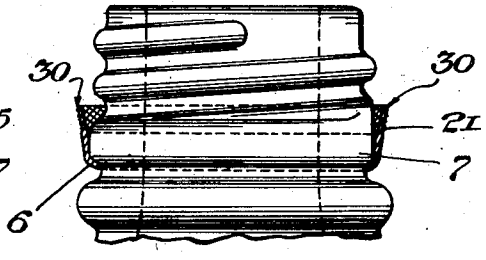


Fig. 4.



INVENTOR

Charles Hammer

BY

ATTORNEY

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METHOD OF MAKING CONTAINER CAPS OR CLOSURES

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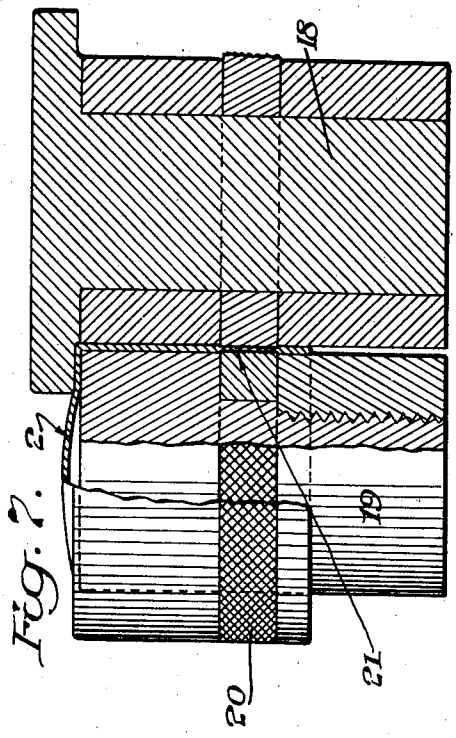


Fig. 4.

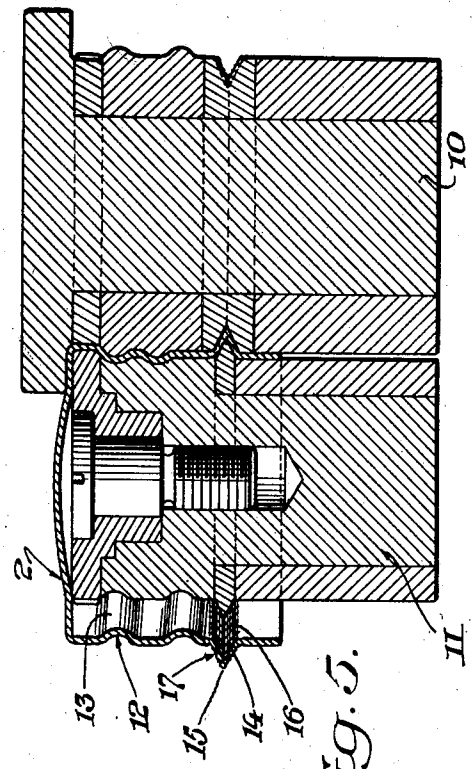


Fig. 5.

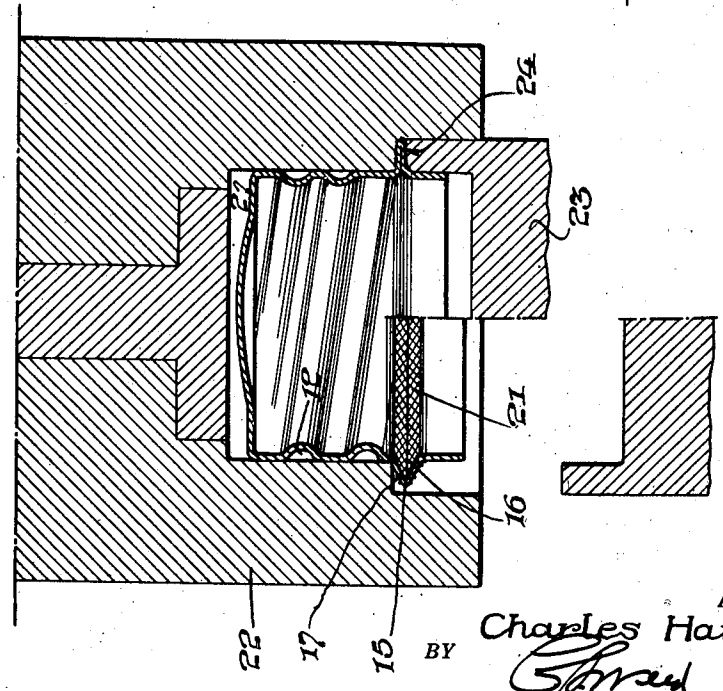


Fig. 6.

INVENTOR
Charles Hammer
BY
ATTORNEY

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UNITED STATES PATENT OFFICE

2,191,989

METHOD OF MAKING CONTAINER CAPS OR CLOSURES

Charles Hammer, Garden City, N. Y.

Original application July 21, 1937, Serial No. 154,747, now Patent No. 2,175,350, dated October 10, 1939. Divided and this application June 1, 1939, Serial No. 276,820

10 Claims. (Cl. 113—121)

This invention relates to caps or closures for containers or receptacles, it more particularly relating to the method of making an improved preformed, rotatable severable reseal cap whereby a container or receptacle such as a bottle or jar may be effectively sealed and resealed and yet so constructed that, when replaced on the container, the cap will indicate that the container has been opened and thus prevent tampering with the contents thereof, the present application being a division of my U. S. Letters Patent 2,175,350 of October 10, 1939.

An object of the present invention is the provision of a method of making an improved cap severable without the use of objectionable scoring, score lines or tear-off strips.

In the manufacture of severable caps, it has been the practice to accomplish this result either by scoring the cap so as to enable one part of the cap to be severed from another part thereof along the score lines or by providing tear-off strips.

The art has recognized that score lines are objectionable because of the difficulty of accurately gauging the depth of the score lines since, if not scored deeply enough, the cap will not tear, or will tear unequally. Consequently, the accuracy required has made the caps difficult to manufacture and, therefore, unsatisfactory to manufacturers especially in view of the fact that repeated use of scoring tools affects their efficiency and causes complaint by customers.

Tear-off strips are also objectionable since, frequently, it is difficult to sever the strip along a predetermined line, resulting in but a portion of the band being removed and requiring the application of tools to remove the cap. Also, it is not infrequent that manipulation of such strips results in injuries to the hands of the user which have sometimes proven serious. Consequently, customers have taken a strong dislike to such type of caps. Therefore, it is the object of the present improvement to provide a severable cap which is not dependent upon either score lines or tear-off strips or the application of tools to insure removal.

Metal caps or closures which indicate tampering with the contents of a container have been patented but they have either not proven very successful or are of that form in which the cap is made of some thin pliable metal which will permit the cap to be pressed or molded on to the container to conform to the shape thereof—in other words, caps of pliable metal in which the locking elements such as threads are formed when the cap is applied to the container, and, therefore, in handling, they are easily bent out of shape and are not efficient in resealing the container as is a preformed metal cap, that is, one in which the metal is sufficiently rigid to permit the cap with its locking elements or threads to be formed on a machine and applied to the container without the necessity of shaping or molding it thereon, which requires time and is expensive, while its re-use to preserve the contents of the container, due to its light and flimsy character, is materially interfered with.

Another object of the invention therefore, as hereinbefore stated, is to provide an improved preformed cap, that is, one in which the cap may be efficiently and inexpensively made by machinery and shipped in quantities for quick and easy application to containers without the molding or shaping of the threads while on the container.

Furthermore, it has been the practice to use, in connection with rotatable caps, sealing disks for sealing the edge of the container but I believe I am the first to provide a combined severable cap and sealing medium which will not only indicate that the contents of the container have been tampered with but will efficiently seal the upper edge of the container and also the interior neck thereof.

Therefore, one of the objects of the present improvement is the provision of an improved cap readily severable without the use of objectionable tear-off strips or score lines to indicate tampering with the contents of the container and having combined therewith a sealing medium of such form that it will efficiently seal not only the upper edge of the container but also the interior neck.

In the drawings accompanying and forming a part of this specification,

Fig. 1 illustrates in section this improved cap applied to the neck of a container such as a bottle.

Fig. 2 illustrates this improved cap in section partly rotated in a direction opposite to that required for its application.

Fig. 3 illustrates this improved cap in section and having the improved sealing medium attached thereto.

Fig. 4 illustrates the upper portion of a container with the cap severed and the resealing part thereof removed.

Fig. 5 is a sectional view illustrating a step in the method of making this improved cap.

Fig. 6 illustrates a sectional view of another step in the method of making this improved cap.

Fig. 7 illustrates in section, the weakening of

a portion of the skirt of a cap prior to the formation of the severable projection.

Fig. 8 is an enlarged view of a portion of the cap illustrating the compressed, weakened, severable flange, and

Fig. 9 illustrates the manner in which the weakened flange is stretched during the rotation of the cap off of the container to sever it along the apex of the flange shown in Fig. 8.

Similar characters of reference indicate corresponding parts in the several views.

Before explaining in detail the present improvement and mode of operation thereof, I desire to have it understood that the invention is not limited to the details of construction and arrangement of parts illustrated in the accompanying drawings since the invention is capable of other embodiments, and that the phraseology employed is for the purpose of description and not of limitation.

In the preferred form of cap herein shown, it is illustrated as a threaded cap although, obviously, it could be made with any suitable rotatable locking elements if desired and the improvements may be used with various styles of caps. In the present instance, the cap comprises a top 2 and a depending skirt 3 having locking elements such as threads 4 formed on the skirt.

Below these locking elements, the cap is provided with an annular weakened exteriorly projecting compressed flange 5 having therebelow a depending portion 6 which may be readily bent or spun around a shoulder 7 of the container, thereby permanently securing the lower part of the cap to the bottle, this bending, of course, taking place after the cap has been completely rotated on to the container.

In manufacturing this improved cap, the locking elements, when in the form of threads 4, and the annular projecting severable flange 5 are first formed by rolling these elements into the skirt of the cap by the use of suitable, properly shaped male and female rolls 10 and 11, (see Fig. 5) whereby the locking threads may be first formed as shallow grooves 12 on the exterior of the cap and projections 13 on the interior while the annular severable flange is first formed as a shallow groove 14 on the interior of the cap and a projection 15 on the exterior.

During this rolling operation, that part of the tool forming the annular projection 15 also acts upon the metal forming the projection both exteriorly and interiorly as at 16 and 17 (see Fig. 5), thereby weakening it although, if preferred, the weakening of the cap skirt where this projection is to be formed may take place prior to the rolling of the threads and the projection into the skirt, (see Fig. 7) by suitable male and female rolls 18 and 19 whereby the metal of the skirt is provided with an annular weakened band 20, (see Fig. 7), at which point the metal, due to this weakening operation, is shown thinner and, therefore, weaker, as at 21, than other portions of the cap.

Subsequent to the formation of the locking threads and the shallow groove forming the projecting severable flange, the weakened portion of the metal of the cap is subjected to compression by suitable male and female dies 22 and 23 depthwise of the cap, (see Fig. 6) so that the walls of the shallow groove are compressed into substantial juxtaposition, as illustrated at 24 (see Fig. 6), thereby sharply bending the apex of the weakened annular severable flange and, consequently, further weakening it.

Fig. 6 illustrates the cap in position in the dies, the die spaced from the shallow severable flange at the left side while, at the right side, the die has been shifted to compress the weakened walls of this severable flange into juxtaposition.

The lower portion 5' of the skirt of the cap and the upper portion 5'' of the depending portion 6 are weakened whereby they are of less thickness, as at 21, thus weakening this portion of the cap and it is at this thinned area that the cap is provided with the outwardly extending compressed flange 5.

In practice, if preferred, the weakened portion at or adjacent to the apex of the annular severable flange may be scored as indicated by the dotted lines in Figs. 1 and 3, which also indicate the bend of the material, thereby further to weaken it if found desirable since, in view of the fact that the weakened portion of the cap does not depend entirely upon such scored line, the objectionable features of such scoring, as hereinbefore referred to, are not present.

The cap may be provided with a suitable exteriorly knurled portion by means of which the cap may be rotated off or on to the container, as desired.

At the time the projecting weakened severable flange is squeezed or compressed, the entire cap may also be subjected to end or depthwise compression, thereby to reform the shallow thread locking grooves to give them a greater depth of projection, thus providing a more accurate thread and one that is more nearly to the pitch line than has been possible heretofore.

Heretofore, in forming thread grooves in caps, the larger or deeper the thread in the cap, the smaller the threading tool or roll must be on which it is formed since the cap must be readily removable from the threading tool or roll so that a small thread roll cannot very well make a true pitch in a large cylinder or cap, but by forming the shallow grooves in the first instance to form the threads and then reforming them, a truer and better thread is obtained since the closer the cap diameter is to the diameter of the tool or roll that makes the thread, the nearer the pitch of the thread will be obtained.

The cap may be used with suitable liners 25 (Fig. 1), or with a sealing medium such as a flanged cork 26 (see Fig. 3), the part 27 of which projects into the neck of the container and effectively seals the same while the flanged portion 28 thereof overlaps the upper edge of the neck and also seals this portion of the container. The flange 28 also effectively secures the cork within the cap, it being interlocked therewith. For this purpose, the outer edge of the flange is squeezed into an annular recess 29 formed in the cap.

Thus, in practice, the combined cork and cap may be applied or removed in a single operation, the rotation of the cap on to the bottle tightly compressing the cork thereinto and, at the same time, the rotation of the cap in the opposite direction removing the cork with the threaded portion of the cap, leaving the lower portion 6 spun around the shoulder of the container (see Fig. 4).

In the present improvement, the gradual rotation of the cap off of the container results in opening and spreading the annular severable projection 5, (see Figs. 2 and 9) thus further weakening the already weakened or partially cracked metal at the apex of the projection, and as the continued rotation of the cap off of the container takes place, this will readily break and separate

the cap on a circumferential line at the apex of the projection without the necessity of a tearing action such as heretofore necessary when tear-off strips were provided. Therefore, in the present improvement, not only is the cap more readily and quickly severed but this spreading action draws the two walls 5' and 5'' (see Fig. 9) apart and so lengthens them that the two parts will not properly fit together thereafter. When, consequently, the upper part of the cap is turned on to reseal the bottle, as the two parts no longer fit together, it can be readily detected both by the hand and the eye that the container has been unsealed and tampered with.

Thus, it will be seen that when the cap is rotated off of the container, that portion of the cap having the locking threads will be broken away along the weakened apex of the annular projection 5, leaving the lower part of the cap 6 permanently secured to the bottle at the shoulder and with a raw edge 30 (see Fig. 4) projecting upwardly since this depending portion 6 is unweakened and, consequently, insures the severance of one part of the cap from another along the apex of the projection so that, while the threaded portion of the cap may be replaced to reseal the bottle to preserve its contents, it is impracticable effectively to replace it to conceal this edge.

Thus, the user will immediately know that the bottle has been previously opened or tampered with whereas, with those caps that merely have a depending skirt provided with a slot or scored weakened lower portion and no outwardly extending annular ridge or projection, there is nothing to indicate when the cap has been replaced or that the bottle has been opened previously because the adjacent portions of the depending skirt can be brought so closely together as to appear practically as though the cap had never been removed. In other words, neither the eye nor hand can readily detect the fact that the cap portions have been previously separated. In the present improvement, however, not only will the stretched and projecting raw edge of the separated portions of the cap indicate that the cap has been previously removed or tampered with by inspection, but the raw edge will indicate to the hand of the user such fact and this cannot well be concealed by any manipulation of the cap portions.

Therefore, I apprehend that I have provided a severable cap which not only can be preformed and, hence, made in quantities prior to their application to containers, but I have provided one which will effectively and efficiently prevent tampering with the contents without detection.

The term "weakened" as used herein, has reference to that particular mechanical action in which a rolling tool is used to thin the metal in any desired way as by compression, milling or knurling, preferably to form fine grooves or indentations across the face of the metal and in this operation, the metal can be so thinned or even perforated and thus so weakened that, in rotating the cap off of the container, the parts thereof will be readily severed without the use of tear-off strips or scoring.

It is to be understood that, by describing in detail herein any particular form, structure or arrangement, it is not intended to limit the invention beyond the terms of the several claims or the requirements of the prior art.

Having thus explained the nature of my said invention and described a way of constructing and using the same, although without attempting to set forth all of the forms in which it may be made or all of the modes of its use, I claim:

1. The method of making a preformed closure cap capable of reuse for the life of the container and having a skirt with locking elements therein for rotatably securing the cap onto a container which consists in providing the skirt with a weakened-wall shallow groove on the interior by thinning the walls of the groove throughout and then compressing the two walls only of the groove into juxtaposition to form an annular projection having a weakened portion.

2. The method of making a preformed closure cap capable of reuse for the life of the container and having a skirt with locking elements therein for rotatably securing the cap on to a container which consists in providing the skirt with a thin-walled shallow groove by rolling and grooving the metal of the skirt at such grooved portion to thin the walls of the groove throughout to form a weakened part and then compressing the two walls only of the groove into substantial juxtaposition to form an annular projection having a weakened portion.

3. The method of making a preformed closure cap capable of reuse for the life of the container and having a skirt with locking elements therein for rotatably securing the cap on to a container which consists in providing the skirt with a weakened wall shallow groove by rolling and scoring and grooving the metal of the skirt to thin the walls of the groove throughout and then compressing the two walls only of the groove into substantial juxtaposition to form an annular projection having a weakened portion.

4. The method of making a preformed closure cap capable of reuse for the life of the container and having a skirt with locking elements therein for rotatably securing the cap on to a container and with a depending bendable portion adapted to be bent around the shoulder of a container which consists in decreasing the thickness of the metal at the lower portion of said skirt and the top portion of said depending portion to thin such metal portions throughout thereby to weaken it and then compressing the metal only of this weakened portion into substantial juxtaposition to form an annular weakened projection readily severable at the apex thereof.

5. The method of making a preformed closure cap capable of reuse for the life of the container and having a skirt with locking elements therein for rotatably securing the cap on to a container and with a depending bendable portion adapted to be bent around the shoulder of a container which consists in decreasing the thickness of the metal at the lower portion of said skirt and the top portion of said depending portion to thin such metal portions throughout thereby to weaken it and then compressing the metal only of this weakened portion into substantial juxtaposition to form an annular weakened projection extending beyond the plane of said skirt and depending portion, and readily severable at the apex thereof.

6. The method of making a preformed closure cap capable of reuse for the life of the container and having a skirt with locking elements therein for rotatably securing the cap on to a container and with a depending bendable portion adapted to be bent around the shoulder of a container which consists in providing the skirt with an interior weakened-wall shallow groove at the juncture of said skirt and depending portion by thinning the walls of the groove throughout,

then compressing the two walls only of the groove into substantial juxtaposition to form a weakened annular projection extending beyond the plane of said skirt and depending portion.

7. The method of making a preformed closure cap capable of reuse for the life of the container and having a skirt with locking elements therein for rotatably securing the cap on to a container and with a depending bendable portion adapted to be bent around the shoulder of a container which consists in providing the skirt with an interior weakened-wall shallow groove at the juncture of said skirt and depending portion by rolling and grooving the metal of the skirt to thin the walls of the groove throughout and then compressing the two walls only of the groove into substantial juxtaposition to form a weakened annular projection extending beyond the plane of said skirt and depending portion.

8. The method of making a preformed closure cap capable of reuse for the life of the container and having a skirt with locking elements therein for rotatably securing the cap on to a container and with a depending bendable portion adapted to be bent around the shoulder of a container which consists in providing the skirt with an interior weakened-wall shallow groove at the juncture of said skirt and depending portion by rolling, scoring and grooving the metal of the skirt to thin the walls of the groove throughout and then compressing the two walls only of the groove into substantial juxtaposition to form a weakened annular projection extending beyond the plane of said skirt and depending portion.

9. The method of making a preformed closure cap capable of reuse for the life of the container and having a skirt which consists in providing the skirt with relatively shallow locking threads for rotatably securing the cap on to a container and also providing the skirt with an interior thin-walled shallow groove by grooving and decreasing the thickness of the walls of said groove, then compressing the two walls only of the groove into juxtaposition to form an annular projection having a weakened portion and simultaneously subjecting the cap to endwise compression thereby to reform the shallow thread grooves to give them greater depth of projection.

10. The method of making a preformed closure cap capable of reuse for the life of the container and having a skirt with locking elements therein for rotatably securing the cap on to a container and with a depending bendable portion adapted to be bent around the shoulder of a container, which consists in forming an annular recess at the top of the skirt for the reception of the flange of a cork and providing the skirt with an interior weakened-wall shallow groove at the juncture of said skirt and depending portion by thinning the walls of the groove throughout and then compressing the two walls only of the groove into substantial juxtaposition to form an annular weakened projection extending beyond the plane of the skirt and depending portion.

CHARLES HAMMER.