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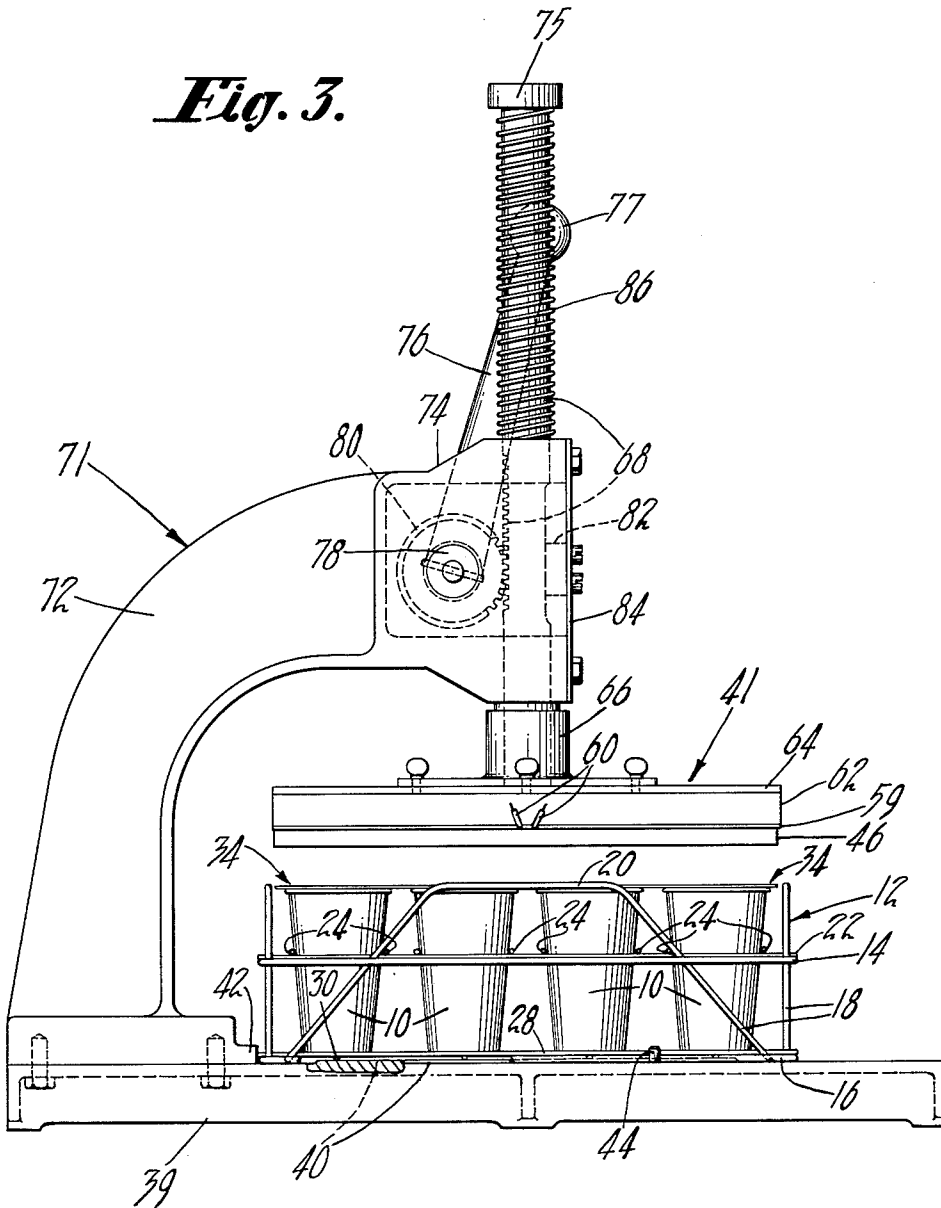
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METHOD AND APPARATUS FOR CAPPING INDIVIDUAL CONTAINERS

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3 Sheets-Sheet 2

**Fig. 3.**



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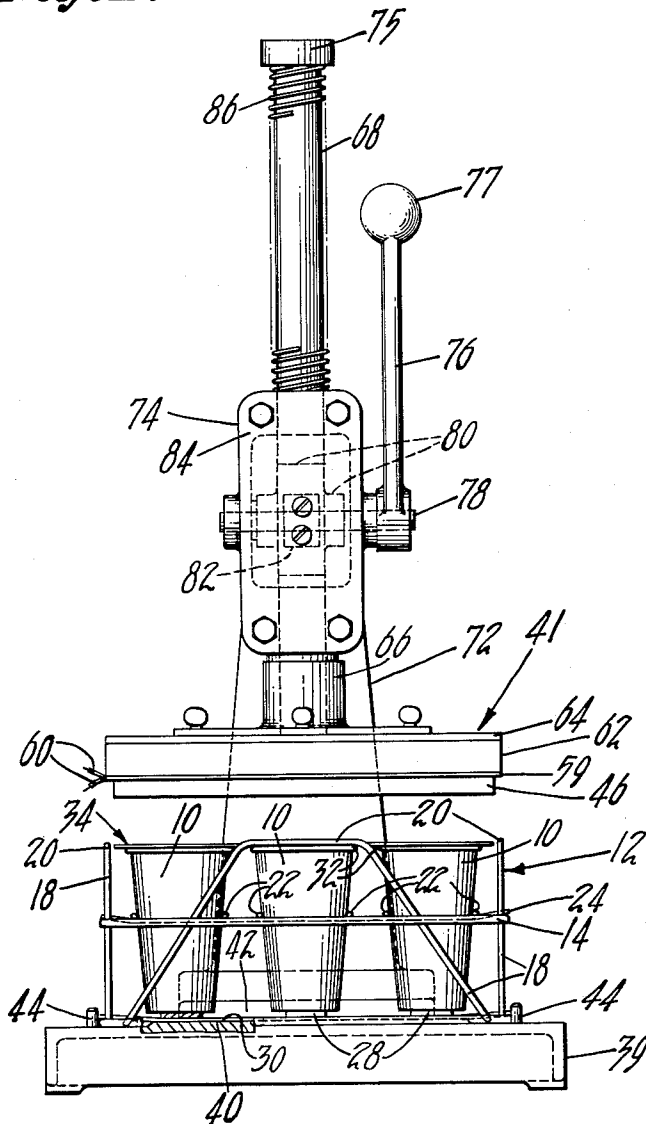
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**Fig. 4.**



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## METHOD AND APPARATUS FOR CAPPING INDIVIDUAL CONTAINERS

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This invention relates to a method and apparatus for simultaneously capping and sealing a plurality of individual containers.

Frequently, potable liquids vended at public gatherings are packaged in cans and/or glass bottles and are either served to the customer in such a container or are poured into a disposable cup by the vendor as he serves the customer.

Should the vendor sell the liquids in their original bottles, considerable danger to the public is involved due to probable breakage when the empty bottle is discarded. Further, empty bottles have been known to inflict injury on the participants of sporting events. For such reasons, the sale of drinks in cans or bottles at public gatherings has been discouraged and, in fact, banned in certain areas.

Occasionally, drinks which are prepared in bulk quantities are poured into individual containers by the vender prior to vending. In these instances it is necessary to cap each container individually so that they will not spill while the vendor carries them among the spectators. It is readily apparent that hand capping single individual containers could be considered unsanitary and is both time-consuming and awkward, resulting in reduced sales time for the vendor.

It is, therefore, an object of the instant invention to provide a method and apparatus for quickly capping and sealing individual disposable containers.

It is a further object to provide a method and apparatus for simultaneously capping and sealing a plurality of filled containers.

An additional object is to provide means for concurrently adhering and sealing a plurality of covers to each of a number of containers.

Another object of this invention is to provide a simple, inexpensive apparatus for capping and sealing a plurality of individual containers.

A still further object is to provide a holder for a plurality of containers which may be used to retain them in predetermined order during sealing and also as a carrier during distribution of the containers.

A still further object of this invention is to provide a sealing cap which is easily affixed to the container brim and easily removable therefrom.

Another object is the provision of means for dividing a single cover sheet into a plurality of cover sections while each section is being adhered to its container.

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

The above objects are achieved by holding a plurality of containers in a predetermined pattern with their open tops in a substantially horizontal plane and providing a heat sealable sheet, containing a plurality of potential covers, for each of the containers. This sheet is placed over the open tops of the containers with a potential cover over each open top. A portion of each potential cover is then heated and pressed into sealing engagement around the brim of each container, while simultaneously drawing the sheet around the brim of each container. Each

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potential cover is thus adhered to the brim of a container and the stretching of the sheet, induced by the drawing, severs the sheet along the weakened areas therein, to provide an individual cover sealed on each container.

In order to accomplish the above method, an apparatus is provided comprising a frame having a head mounted thereon for vertical reciprocation, a holder for retaining a plurality of containers in a predetermined pattern therein with their open tops disposed in a substantially horizontal plane, and with a heat sealable cover sheet overlying the open tops. The sheet has weakened areas formed therein around each of the open tops. A base, on the frame, is disposed beneath the head. Locating means are provided on the base for receiving and retaining the holder in vertical alignment with the head. Secured to the lower end of the head is a sealing plate whose lower surface has recesses formed therein. Each of the recesses are aligned with, and conform to the external brim dimensions of an open top container in the holder. Means are provided for heating the sealing plate and for reciprocating the head, whereby, upon the downward stroke of the head, heated hot walls of each of the recesses shape and apply the sheet to the brim of a container top, while simultaneously straining and thereby severing the sheet along the weakened areas between the containers, thus providing an individual cover to each individual container.

The holder which is provided for receiving the containers has two vertically spaced rectangular frames. Secured to the upper of the horizontal frames are pairs of parallel members in lengthwise and crosswise directions defining a plurality of substantially square compartments, spaced from each other and from the frame. Lengthwise and crosswise strips are secured to the lower frame and positioned for intersecting below the center of each compartment for supporting the cup in the compartments. Handle members are secured to and join the spaced adjacent sides of the upper and lower frame, and extend above the upper frame, thereby defining the interior of the holder.

Referring to the drawings:

FIG. 1 is a partial sectional perspective view of the container holder having containers therein and the flexible sealing sheet in position prior to sealing, and an example of a capped and sealed container.

FIG. 2 is an enlarged fragmentary side elevational view, partly in section, of the sealing head showing the relationship of the components during the capping and sealing operation.

FIG. 3 is an elevational view showing the capping apparatus and containers prior to sealing the containers.

FIG. 4 is an end view thereof.

As a preferred or exemplary embodiment of the instant invention, a plurality of filled, open top cups 10, are placed in a holder, generally designated 12 (see FIG. 1). The holder 12 is shown here as a wire basket, but it is readily understood that many other materials may be used for its construction. Two substantially horizontal frames 14 and 16 are spaced laterally from each other by means of members 18, which are weldably secured to the frames 14 and 16. Members 18 not only serve to support and separate the frames, but also form handles 20 that are used to carry the holder 12. In addition, the handles 20 define the interior of the holder 12.

Pairs of substantially parallel lengthwise wires 22 and crosswise wires 24, secured to the upper frame 14, define individual compartments 26, spaced from each other, for receiving the filled cups. Secured to the lower frame 16 are lengthwise strips 28 and crosswise wires 30 which intersect substantially below the center of the compartments 26 formed by the intersecting pairs of wires 22 and

24 of the upper frame 14. These lower strips 28 and wires 30 cooperate with the compartments 26 to insure and maintain vertical positioning of the cups 10.

The cups 10 are placed in the compartments 26 and then filled with a potable liquid 31. Since the compartments 26 are spaced from each other, the cup brims 32 are also separated from one another. Once the cups 10 are within the holder 12, a flexible heat sealable sheet, generally designated 34, is positioned over the open brims 32 and within the area defined by the handles 20. This sheet 34 has lengthwise and crosswise weakened areas 36 therein which facilitate separation of the sheet 34 into potential covers or sections 38. The weakened areas 36 may be intermittently perforated, as shown in FIG. 1, scored, thinned, or weakened in any other suitable manner.

A moisture-proof material, such as glassine, is used for making the sheet 34. Upon one or both surfaces of the sheet is placed a coating which has adhesive properties when heated. It is preferable, however, that only the side in contact with the cup brims be coated. Among the many materials that can be used for the coating, wax has been found to be the most inexpensive, and also the most compatible with the process. Heat sealable plastic sheets, such as polyethylene film, are also useable.

Once the containers 10 have been placed into the holder 12 and the sheet 34 placed thereover, the holder 12 is placed upon a base 39 so that a raised area 40 on the base 39 is beneath and in intimate contact with the strips 28 and wires 30. This provides support for the cups 10. In order to position the holder 12 correctly in relation to a vertically reciprocable sealing head, generally designated 41, a stop 42 toward the rear of the base 39 and guide pins 44, in the base 39, are provided for locating the position of the holder 12 when placing it on the base 39.

When the holder 12, the cups 10, and the sealing sheet 34 are in proper position, the head 41 is lowered toward the cups 10 by means which will be more fully described hereinafter.

Secured to the lower surface of the head 41 is a metallic plate 46 preferably composed of a good heat conductor such as aluminum. The plate 46 is maintained hot as will be described more fully hereinafter. While the upper surface of the plate 46 is substantially flat, when viewed from the underside, the plate 46 has a plurality of regularly spaced and aligned bores or recesses 48 each adapted to fit around the upper periphery of a cup 10 to seal the sheet 34 thereto. The plate 46 is substantially rectangular conforming to the area enclosed by the handles 20 so as to enter between the handles and contact the sheet 34 when the head 41 is lowered.

A circular skirt 52 surrounds each bore 48 in the plate 46. Upon lowering the head 41, the free end of the skirt 52 engages the sheet 34 in proximity to the weakened lines 36. As the head 41 and plate 46 continue downwardly the pressure of the free end of the skirt 52 on the sheet 34 ruptures the sheet along the weakened lines 36 thereby dividing the sheet 34 into the individual sealing lids 38. As the plate continues to descend, the just-freed margins 53 of the individual lids 38 slide along the inwardly inclined face 54 of the skirt 52 thereby being forced into engagement with the cup brim 32.

At its uppermost end, the inclined face 54 of the skirt 52 merges with an annular, arcuate channel 55. The diameter of the annular channel is substantially equal to the diameter of the cup at its brim 32 and the shape of the channel is substantially the same as the shape of the brim 32. In the lowermost position of the plate 46, the annular channel 55 forces a portion of the lids 38 spaced slightly inwardly from their free edges 53 into relatively tight engagement with the cup brim 32; and by virtue of the hot-melt adhesive, e.g. paraffin wax, thermoplastic, etc., disposed between the lid and the cup brim, the heated plate 46 heat seals the lid to the cup brim. Immediately

adjacent in a radial direction of the channel 55 is a shoulder 56 which extends below the uppermost level of the brim 32 so as to extend slightly into the cup 10. This construction extends the channel 55, when viewed in cross-section, through an arc of approximately 180° so as to provide substantial surface contact and thereby a good area of heat sealing between each individual lid and its associated cup brim. Inwardly of the shoulder 56 the plate 46 is bored out to prevent contact between the center portion of the lid 38 and the plate and also to minimize the volume of metal that must be maintained hot. Thereafter, the head 41 is raised releasing the plate 46 from engagement with the sealed cup.

Covering the top surface of the plate 46 is a heating pad 59, having electrical leads 60 embedded therein and connected to a suitable power source, which is not shown. The pad 59 maintains the plate 46 at a temperature slightly above that temperature necessary to produce a tacky adhesive condition on the surface of the sheet 34. The pad 59 is made of silicone rubber or may be any other elastomeric material which is not deteriorated upon being heated.

It can be readily understood that other means may be used to heat the sealing plate 46 without departing from the spirit of this invention. One such method would be through the use of electrical resistance heating, by means well known in the art, such as is utilized in a common electric iron.

In order to maintain an equal distribution of pressure upon each of the cups 10, a resilient cushion 62 is disposed between the heating pad 59 and a rigid back-up or supporting plate 64. Any suitable resilient material not deteriorated by heat, such as a foamed polyurethane, may be used for the cushion 62. The rigid plate 64 is removably secured to a coupling 66 located at the bottom of a rack 68.

FIGS. 3 and 4 illustrate a means for reciprocating the head 41 as mentioned hereinbefore. It includes a frame, generally designated 71, having a substantially horizontal base section 39 with a raised area 40 thereon. An arcuate standard 72 is removably secured to the base 39. Within a housing 74, integral with the upper end of standard 72 is a rack 68 adapted to reciprocate in a substantially vertical direction. The rack 68 has a stop 75 integral with the upper end thereof, and the sealing head, 41, secured to its lower end.

In order to move the rack in a downward direction, a handle 76 terminating in a knob 77, is secured to and mounted for oscillation on a shaft 78, to which is keyed a pinion 80. As the handle 76 is pulled downward, the pinion 80 meshes with the rack 68, thus lowering the head 41. During its vertical movement, the rack 68 is also slidably engaged by a block 82 which is removably mounted on a cover plate 84. This maintains true vertical alignment of the rack 68. Plate 84 is in turn removably secured to the housing 74. Keyed to the lower end of the rack 68 is the coupling 66, to which is removably secured the head 41.

As the shaft is lowered, a compression spring 86, disposed about the upper part of the rack 68 between the housing 74 and the stop 75, exerts an upward force on the rack 68, thus returning it to its original position when the handle 76 is released.

The cups, now being capped and sealed, may be moved about without danger of spilling the liquid contained therein. The vendor then removes the holder 12 from the capping device and sells the filled containers 10 to persons attending the gathering. When the customer receives the container 10 he has only to grip one of the section corners 88 between two fingers, peel the section 38 from the top of the container 10, and consume the contents thereof.

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 and in the steps of the method described and their order of accomplishment, 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. An apparatus for affixing a cover sheet to the open tops of a plurality of individual containers held within a holder, said holder retaining said containers in a plurality of substantially spaced parallel rows with their open tops disposed in a substantially horizontal plane and with a heat sealable cover sheet overlying said open tops, said sheet having a plurality of crossed weakened areas therein about each of said tops so said sheet may be separated into a plurality of individual covers for closing said individual open top containers, said apparatus comprising:

a frame;

a head mounted for vertical reciprocation on said frame;

a base on said frame disposed beneath said head;

locating means on said base for receiving and retaining said holder in vertical alignment with said head when said containers are being closed with said covers;

a sealing plate secured to the lower end of said head, the lower surface of said sealing plate having a plurality of recesses therein in a plurality of substantially parallel rows defined by walls, each of said recesses being aligned with and conforming to the external brim dimensions of an open top container in said holder;

resilient means within said head for maintaining substantially equal pressure upon each of said container brims when closing said containers;

means for heating said sealing plate;

and means for reciprocating said head whereby, upon the downward stroke of said head, said heated walls separate said sheet along said weakened areas into individual covers, and thereafter shape and heat seal each of said covers to the brim of a container.

2. The apparatus as set forth in claim 1, wherein the lower surface of the sealing plate is non-adhesive relative to said cover sheet.

3. The apparatus as set forth in claim 1, wherein the sealing plate is metallic.

4. The apparatus as set forth in claim 1, wherein said resilient means is a resilient cushion disposed between said head and said sealing plate.

5. A method of substantially simultaneously sealing each of a plurality of containers with an individual cover formed from a single heat sealable sheet, said method comprising the steps of:

placing a plurality of containers in a portable holder in a plurality of substantially spaced parallel rows with

their open tops in a substantially horizontal plane; providing a heat sealable sheet containing a plurality of potential covers for said containers, said potential covers arranged in the same pattern as said containers and separated from each other by weakened areas in said sheet;

positioning said sheet over the open tops of said containers with a potential cover over each open top container;

positioning said holder, having said open top containers therein, in an apparatus having a sealing head with a plurality of rows of substantially parallel recesses therein conforming to the external brim dimensions of said open top containers, so that said recesses and said open top containers are in vertical alignment;

lowering said sealing head to force said sheet into contact with said container brims, thus separating said sheet along said weakened areas to provide an individual cover for each container and drawing a cover around the brim of a container;

and substantially simultaneously heating and pressing each individual cover in engagement with a container brim to heat seal said covers to said brims while maintaining substantially equal pressure upon each of said cup brims.

6. The method as set forth in claim 5, wherein said heating maintains a temperature slightly greater than the melting point of the heat sealable material of said sheet.

7. The method as set forth in claim 5, wherein said sheet is a plastic film.

8. The method as set forth in claim 5, wherein said sheet has a heat sealable coating.

9. The method as set forth in claim 5, wherein said sheet is weakened in lengthwise and crosswise lines, thereby forming substantially rectangular areas on said sheet.

10. The method as set forth in claim 9, wherein the weakened lines are intermittently perforated.

11. The method as set forth in claim 5, wherein said sheet is separated into said individual covers by the pressure exerted on weakened lengthwise and crosswise lines therein during sealing, by the surface of the heating plate surrounding recesses therein.

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