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CLOSURE FOR TUMBLERS, JARS, AND OTHER RECEPTACLES

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To all whom it may concern:

Be it known that I, HARRY INGRAM, a citizen of the United States, and a resident of Brooklyn, in the State of Kings and New York, have invented certain new and useful Improvements in Closures for Tumblers, Jars, and Other Receptacles, of which the following is a specification.

The invention relates to closures for tumblers, jars and other receptacles of the character employed for holding food products and within which said products are sterilized or processed by being subjected to the necessary degrees of heat in hot water boilers or in retorts.

The invention resides in a novel valved cap for a tumbler or the like adapted to permit of the escape of excess pressure generated within the tumbler during the sterilizing or processing of its contents, this escape of the excess pressure preventing the blowing off of the cap and the loss of the contents of the tumbler.

The cap of my invention is also of advantage when placed directly on a tumbler or the like containing products not intended to be subjected to sterilizing or processing operations, in that the cap when applied to the tumbler permits the air which would otherwise be trapped in the tumbler and form an objectionable cushion below the cap, to escape through the cap.

In one performance of my invention, I employ a cap, gasket and tumbler of the character disclosed in Letters Patent of the United States No. 1,353,396, dated September 21, 1920, granted to Alfred Ingram and Harry Ingram, except that in the top of the cap I form a small hole or aperture for the escape of the excess pressure from within the tumbler, and in connection with such closure features I provide within the tumbler and in near relation to the lower surface of the top of the cap, a support for a soft pad, as for instance, a small rubber disk, which is disposed directly below and normally closes said hole or aperture in the cap. During the sterilizing or processing of the contents of the tumbler, the heat generates considerable pressure within the tumbler and the excess of this pressure, in accordance with my invention, acts against the lower surface of the cap and flexes the same upwardly from said pad or rubber disk and thereby unseals the hole or opening in the cap and said pressure escapes or becomes relieved through said hole or opening, the lower surface of the cap returning to said pad or disk and said hole or opening becoming ressealed as soon as the excess pressure has escaped. When further excess pressure becomes generated within the tumbler, it will become automatically relieved, as before. The cap is of thin flexible material, as thin sheet aluminum, and hence its central portion may flex upwardly from and downwardly against the pad or rubber disk and act as a diaphragm valve.

The cap may be applied to the tumbler under the well-known vacuum sealing process or by hand. After the tumbler has been removed from the boiler or retort and allowed to cool, the vacuum previously created within the tumbler by the vacuum sealing process or that created therein by the heat during the sterilizing or processing of the food products and subsequent cooling, will permit atmospheric pressure acting against the top of the cap to seal the cap upon the tumbler and the hole in said cap against said pad or rubber disk or such other sealing surface as may be supported below said hole.

Referring to the accompanying drawings:

Fig. 1 is a side elevation, partly in section, illustrating a tumbler with the closure of my invention applied thereto, the parts being shown in their initial relation or prior to the vacuum sealing of the receptacle;

Fig. 2 is a corresponding view, partly broken away, illustrating the relation of the parts after the package has been subjected to the vacuum sealing process;

Fig. 3 is a central vertical section through the closure and its gasket and associated parts and is presented to clearly illustrate the preferred form of gasket and the preferred manner of placing the same in the cap preparatory to the application of the cap and gasket upon a receptacle;
Fig. 4 is a plan view, on a smaller scale, of the closure:

Fig. 5 is a detached plan view of the support I placed within the cap and having mounted thereon a rubber or yielding disk or other sealing surface disposed below a small central hole formed in the cap, and Fig. 6 illustrates a modified form of support for the rubber disk, the support shown in Fig. 5 being an open frame and the support shown in Fig. 6 being a disk having a series of small apertures or holes formed therein.

In the drawings, 10 designates a tumbler, 11 the contents thereof and 12 a cap or closure for said tumbler.

The cap 12 is in one integral piece and of disk outline and has a top portion 13 and a depending annular flange or skirt portion 14 which, when the cap is to be applied to a receptacle having straight as distinguished from offset outer side walls, is preferably composed of an upper part 15, an intermediate part 16 and a lower part 17, the part 15 being offset outwardly from the plane of the part 17 and the part 16 being inclined downwardly and inwardly and connecting the parts 15, 17. The parts 15, 16 with the outer portions of the top of the cap form an annular groove or recess 18 (Fig. 3) within which is placed a sealing ring or gasket 19.

The cap as thus far described has the cap or closure fully described in Letters Patent of Great Britain No. 162,577, dated July 2, 1920, to Alfred Ingram and Harry Ingram, and the said patent also fully shows and describes the gasket 19 and the manner of employing the same. I deem it unnecessary therefore to give a detailed description of the cap, gasket and tumbler.

My invention pertains in means for permitting excess internal pressure generated within the tumbler during the sterilizing or processing of the contents thereof to automatically escape through the top 13 of the cap, and to this end I provide in the top 13 a small exit hole or aperture 20, and below the top of the cap I provide a support 21 for a small sealing pad or rubber disk 23 which is directly below the aforesaid hole 20. The support 21 may take the form of an open frame or grid, as shown in Fig. 5, and at the center thereof is provided a raised bead 22 to seat the rubber disk 23 and confine the same below the aforesaid hole 20 in the top of the cap. The support 21 extends outwardly into the recess 18 of the cap and when the cap is in position rests upon the upper edge or lip of the tumbler 10, as clearly shown in Figs. 1 and 2. The cap is formed by preference of thin sheet aluminum, but may be formed of other metals or materials and is capable of being flexed upwardly and downwardly to a limited extent at its central portion. Normally the central portion of the top 13 of the cap rests upon the pad or disk 23 and the hole 20 in said top is closed by said disk.

After the tumbler 10 has been filled and has received the cap 12 and its parts and has been subjected to vacuum sealing, then reaching the condition shown in Fig. 2, the contents of the tumbler may be sterilized or processed by setting or immersing the tumbler in water brought to the proper temperature in accordance with the nature of the goods being sterilized or processed. During the sterilization or processing of the contents of the tumbler while the latter is within the retort or boiler, pressure will be generated within the tumbler and excess of this pressure must be relieved, otherwise the cap will likely be blown off from the tumbler.

In accordance with my present invention the excess pressure generated in the tumbler during the processing or sterilizing, will act against and lift the central portion of the top 13 of the cap from the rubber disk 23 and said pressure will then escape through the hole 20 in said top 13, thus relieving the interior of the tumbler from undue pressure, after which the vacuum within the tumbler will retract the central portions of the top of the cap downwardly against the rubber disk 23. Any further excess of pressure arising within the tumbler will be relieved in the same way until finally the process of sterilizing or processing will have been accomplished without any danger of the interior pressure within the tumbler blowing off the cap. When the tumblers have been removed from the boiler or retort for cooling, the central portion of the top 13 of the cap will be held down against the rubber disk 23, by the vacuum within the tumbler and by atmospheric pressure acting against said top 13.

In Fig. 6 I illustrate a modified form of support for the sealing pad or surface cooperating with the hole 20 in the cap, and therein the support is in the form of a disk 25 having a beading 26 for confining the sealing pad or the like 27. The disk 25 is formed with a series of holes or apertures 28 up through which the excess pressure generated within the tumbler may pass to act against the lower surface of the top of the cap.

The valved cap of my invention is not only of great utility when employed on tumblers which after receiving their contents are sealed in the chamber of a vacuum sealing machine and then subjected to sterilizing or processing operations, but is highly advantageous in its application to tumblers and other receptacles containing products not required or intended to be sterilized or processed. When the usual close-fitting cap is pressed down upon a receptacle, a certain quantity of the air in the cap and in the
receptacle becomes trapped below the cap and forms a cushion whose tendency is, unless relieved, to loosen or raise the cap, and this becomes especially objectionable when the skirt of the cap is against the smooth side walls of the receptacle. When a receptacle with air trapped in its upper end and having no means for the escape of the air is exposed to a warm atmosphere, the air will expand and lift the cap. It is detrimental in other ways for air to be trapped within the receptacle. When the valved cap of my invention is pressed home on a tumbler or other receptacle, the air which would otherwise be confined, acts against the top of the cap and rapidly escapes through the hole 20, creating a partial vacuum in the receptacle tending thereafter to keep the hole 20 against the sealing pad 23.

The cap is self-venting to pressures created within the receptacle.

I have illustrated the most satisfactory cap and gasket known to me but I am aware that my invention is applicable to other known types of closure caps and therefore I do not confine my invention to the specific construction of cap and gasket shown and described. Nor do I confine my invention to the specific means shown and described for supporting the sealing pad or surface 23 below the escape opening 20, since obviously this support may vary in many particulars.

What I claim as my invention and desire to secure by Letters Patent, is:

1. A closure for sealing tumblers and other receptacles comprising a cap of disk outline having a skirt portion and formed in its top with an outlet hole and said top about said hole being capable of limited vertical flexion, and a sealing surface supported closely below the top of the cap at said hole for sealing the same, said top under the force of pressure generated within the receptacle being adapted to flex upwardly from said sealing surface to open said hole for the relief of said pressure and to thereafter engage said surface for sealing said hole.

2. A closure as in claim 1, in which the sealing surface is a small rubber pad of greater diameter than said hole.

3. A closure as in claim 1, in which the support for said sealing surface rests upon the lip of the receptacle and is held thereon by said cap.

Signed at Wheeling, in the county of Ohio, and State of West Virginia, this first day of February, A. D. 1924.

HARRY INGRAM.