

No. 819,237.

PATENTED MAY 1, 1906.

W. A. LORENZ.
HERMETIC CLOSURE FOR TUMBLERS.
APPLICATION FILED JULY 29, 1905.

2 SHEETS—SHEET 1.

Fig. 1

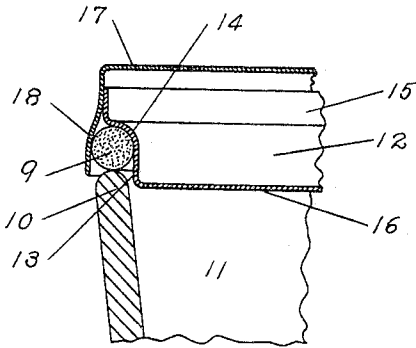


Fig. 2

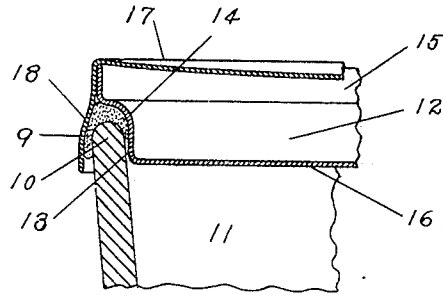
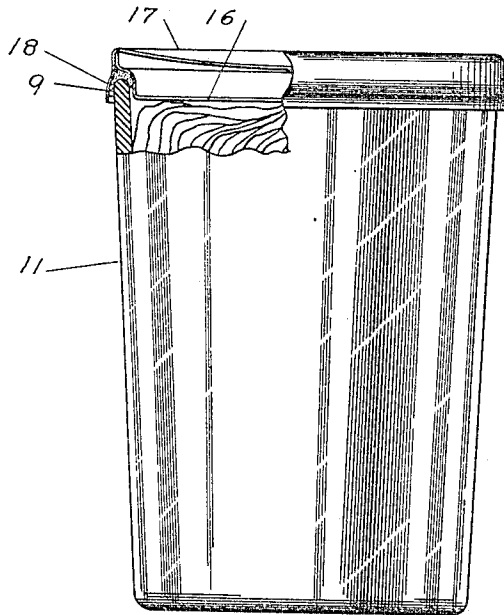


Fig. 3



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2 SHEETS—SHEET 2.

Fig. 4

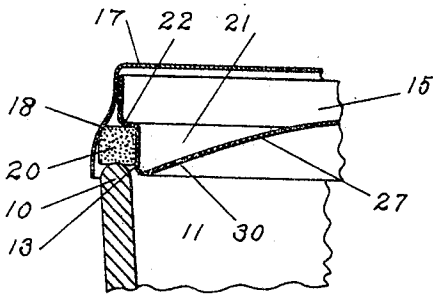


Fig. 5

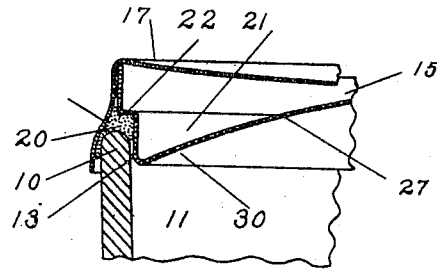


Fig. 6

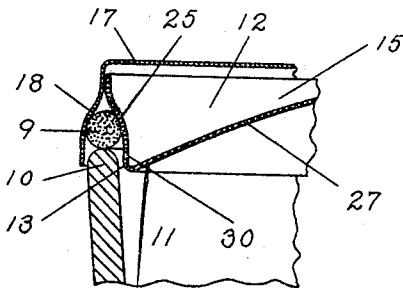


Fig. 7

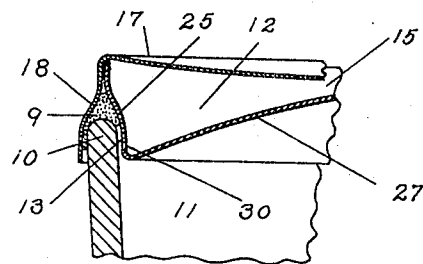
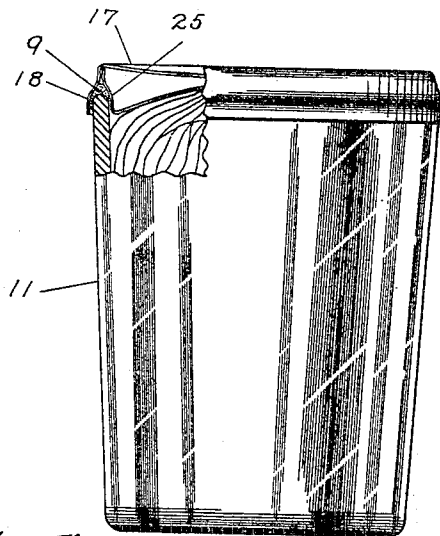


Fig. 8



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UNITED STATES PATENT OFFICE.

WILLIAM A. LORENZ, OF HARTFORD, CONNECTICUT.

HERMETIC CLOSURE FOR TUMBLERS.

No. 819,237.

Specification of Letters Patent.

Patented May 1, 1906.

Application filed July 29, 1905. Serial No. 271,755.

To all whom it may concern:

Be it known that I, WILLIAM A. LORENZ, a citizen of the United States, and a resident of Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Hermetic Closures for Tumblers, of which the following is a full, clear, and exact specification.

This invention relates to improvements in closures for the hermetic sealing of tumblers and other plain-rimmed receptacles.

The present closure-joint now commonly used for hermetically sealing jars is that in which the cap is of a flaring form where it engages with the sealing-gasket, the latter being supported upon a shoulder or in a groove provided for it below the level of the rim of the jar and upon the inner or outer surface thereof, according as an internal or external cap is to be used. In either case, however, the shoulder unfits the receptacle for many subsequent household uses which might be served by a tumbler or mug or cup having a plain rim; but the difficulty of employing these plain-rimmed receptacles in connection with a flaring cap and gasket has been that they afford no means for receiving and maintaining the cap or gasket in correct position upon the rim of the receptacle during the sealing operation. Moreover, the rims of tumblers and similar receptacles are commonly rounded on the top, which increases the difficulty of supporting and maintaining the gasket in concentric relation to the rim during the sealing operation.

The most approved form of closure employed for the hermetic sealing of receptacles is that now commonly known as a "wedging" closure, in which the gasket is compressed at an angle against either the inner or outer shoulder of a receptacle. In applying this wedging type of closure to tumblers a further difficulty is experienced from the fact that the tumbler-rims are liable to imperfections and irregularities in the circular zone of contact between the gasket and the tumbler-rim.

In the present invention means are provided for compressing or wedging the gasket on more than one zone of its surface. The gasket is supported in circular form by the closure, which brings it into conformity with the circle of the tumbler-rim, being supported in a downwardly-facing groove formed between the converging walls of the flexible

flaring rims of two separate closure members placed one within the other. These two members are preferably struck up from sheet metal and are made in the form of caps having flexible flaring rims. One of these members is smaller than the other, so that when inverted and placed within the larger member the outer wall of its flaring rim coöperates with the inner wall of the rim of the outer member to form the annular groove above referred to. The lower portions of one or both of these members project below the gasket and serve, when placed in position upon the tumbler, to centralize the closure approximately therewith. The flaring rims of the two metallic members of the closure rest independently upon two different zones of the gasket, these members being fitted together so as to provide for a limited amount of vertical movement relative to each other. In this way during the sealing operation the gasket is compressed in at least two zones upon the inner and outer sides, respectively, of the tumbler-rim, thus increasing the security of the seal without sacrificing the other desirable features of the wedging type of closure.

This invention is herein illustrated in connection with the hermetic sealing of an ordinary tumbler as being one of the best representatives of the type herein designated as "plain-rimmed" receptacles.

Figures 1 and 2 of the drawings are enlarged fragmentary views of the tumbler, its gasket, cap, and support. Fig. 1 shows the parts in the position occupied by them during the air-expelling or air-exhausting position, while Fig. 2 shows the cap and gasket-support pushed down in their sealed position. Fig. 3 is a view, partly in section, of a gasket, cap, and tumbler in their sealed condition. Figs. 4 and 5 represent a modified form of the gasket and its support, Fig. 4 showing the parts in their unsealed position and Fig. 5 showing them in their sealed position. In this modification a gasket of substantially square section is employed. Figs. 6, 7, and 8 show a further modification, more especially of the form of the gasket-support.

In the embodiment of this invention which is shown in Figs. 1, 2, and 3 the gasket 9 rests upon and concentrically with the rim 10 of the tumbler 11, being held in this concentric relation by means of the inner closure member 12, herein termed the "gas-

ket-support," the lower portion 13 of which projects within the tumbler-rim sufficiently to centralize itself and the gasket therewith. The rounded flaring portion 14 engages with
 5 and rests upon the gasket, thus forming means for sustaining itself while centralizing the gasket. The upper portion 15 of the support is preferably cylindrical and fits the inner and upper portion of the flaring cap 17,
 10 so as to centralize the cap with the gasket and support, the coacting portions of the cap and support being of such proportions as to permit a limited sliding movement of the cap relative to the support downwardly from the
 15 position shown in Fig. 1, as shown by comparison with Fig. 2. The flaring portion 18 of the cap rests against the outer side of the gasket.

In the modification shown in Figs. 4 and 5
 20 a gasket 20 of substantially square cross-section is shown, and the form of the gasket-support 21 is correspondingly varied. In this case the sealing pressure of the support 21 is applied by means of the corner 22, more
 25 directly upon the top of the gasket than in the previous figures, although the pinching action upon the inner side of the rim is or may be considerable.

In the modification shown in Figs. 4 to 8,
 30 inclusive, the middle portion 27 is arched upwardly considerably more than is the case with the support 12, (shown in Figs. 1 and 2,) in which the corresponding portion 16 is flat, or substantially so. This flattened form im-
 35 parts stiffness to the support, whereas the arched form is more flexible, one or the other of these forms being chosen according to the conditions or required capacity of particular cases.

An important feature of this invention resides in the fact that it enables the flexibility
 40 of the turned-up rim portion of the inner support to be utilized in adjusting itself to irregularities in the tumblers and more particularly to their departure from circular con-
 45 tour. Inasmuch as these supports engage with the gasket at a considerable distance above their bottom corners, it will be seen that this adaptability, due to the flexibility of
 50 the turned-up rims, is sufficient to enable the support to adapt itself to the aforesaid irregularities during the sealing operation.

In the modification shown in Figs. 6, 7, and 8 the sealing zone 25 has a less abrupt incli-
 55 nation than in the preceding figures, thus carrying its circle or zone of hardest contact with the gasket well inside the rim of the tumbler. The angle of the contour of the inner support shown in these figures is about
 60 equal to that of the outer cap, so that the wedging action of the support and of the cap takes effect upon the gasket about equally upon the two sides of the tumbler-rim and at about equal angles from the center thereof.

Although these upturned rims of the gasket-
 65 support are thus flexibly adaptable during the sealing operation to the irregularities in the contour of the tumbler, they serve when sealed to reinforce the rim of the receptacle to a considerable degree against the outside
 70 pressure of the atmosphere due to the vacuum within, thereby reducing to an appreciable extent the danger of breakage through accident or careless handling.

* In sealing tumblers with this improved
 75 closure the tumblers after being filled are placed in a suitable exhausting apparatus with the closures resting in the positions shown in Figs. 1, 4, and 6, respectively, thus
 80 allowing free exit of the air from the interior of the tumbler during the exhausting operation, during which time also the closures are retained in a level and central relation to the tumbler-rims. At the conclusion of the
 85 sealing operation the closures are pressed down by any well-known devices employed for that purpose, the first portion of the move-
 90 ment serving to carry the outer cap 17 downwardly without appreciably moving the inner support 12 until the top of the cap comes
 95 against the upper edge of the support, from which time they are both moved down together. This preliminary movement of the outer cap tends to seal the outer portion of the gasket upon the outer edge of the recep-
 100 tacle-rim somewhat in advance of the compression of the other portions of the gasket, it being generally considered preferable to place the principal reliance upon a seal obtained by wedging pressure from the outside.
 105 The continued downward pressure of the cap acting upon the gasket-support serves to compress also the inner portion of the gasket, the position of the greatest pressure being determined by the contour of the support, which,
 110 as indicated by the different modifications shown herein, may be adapted to different requirements or conditions. Any of these gasket-supports may be provided with a hole
 115 30 to permit the escape of the air between the cap and the support. These inner supports may be made of waterproof paper, glass, sheet metal, or other suitable material, the thicknesses and contour being suitably adapted to the material employed and adapted to
 120 the manufacturing process or methods found preferable for making them; but they are preferably made from sheet metal which should be non-corrosive or be protected from corrosion by suitable lacquer or enamel, es-
 125 pecially if the supports are to come in contact with the contents of the jar. If not required as inner covers or linings for the cap, the web portions 16 or 27 may be omitted, thus using only the ring-shaped peripheral
 portion of the support.

By properly proportioning the cap and the gasket so as to regulate the extent of sliding

movement of the cap relative to the inner support a differential pressure may be exerted. The more movement allowed to the outer cap the greater the pressure exerted upon the outer edge of the receptacle as compared with the pressure upon the top or inner rim of the receptacle.

These closures may be made and completely assembled for use independently of the receptacles upon which they are to be employed, being preferably applied thereto after the receptacles are filled. This enables the receptacles to be examined after they are filled, so as to make sure that the rims are not smeared with the contents of the jar while filling it, which is likely to happen in the haste usually attendant upon such operations.

It is not essential that both the inner support and the cap should project below the tumbler-rim during their initial positions. (Shown in Figs. 1, 4, and 6.) It is sufficient if either of them when in that position projects below the tumbler-rim sufficiently far to centralize the closure with the rim. It is, however, considered preferable to have the inner cap project within the receptacle for this purpose. For that reason, among others, the inner members are herein designated as "gasket-supports." It will be understood, however, that this is a more or less arbitrary designation used mainly to distinguish this member from the outer cap.

In my prior application, Serial No. 193,705, filed February 15, 1904, I have shown, described, and claimed the combination, with a receptacle, a cap, and a gasket, of a separate support for positioning the gasket, and as to this feature thus broadly claimed this application is subordinate to the said prior application.

In my prior application, Serial No. 194,536, filed February 20, 1904, I have shown, described, and claimed the combination, with a plain-rimmed receptacle and a gasket, of a cap having a pair of oppositely-disposed flaring portions for pressing the gasket in wedging relation to both edges of the rim of the receptacle, and as to this feature broadly claimed the present application is subordinate to the said prior application.

I claim as my invention—

1. The combination with a receptacle and a gasket, of a cap and a separate gasket-support provided with flexible flaring rims and seated upon two different zones of the gasket.

2. The combination with a receptacle and a gasket, of a cap and a separate gasket-support provided with flexible flaring rims seated upon the outer and inner zones, respectively of the gasket.

3. The combination with a receptacle, of a separate gasket-support provided with means for centralizing itself with the receptacle, a

flaring cap provided with means for carrying the support down with it, and a gasket inserted between the support and the cap.

4. The combination with a plain-rimmed receptacle and a gasket, of a gasket-support resting upon and within the gasket, and a separate flaring cap resting upon the gasket having a limited sliding movement upon the support, whereby the support and the cap rest independently upon the gasket.

5. The combination with a plain-rimmed receptacle and a gasket, of a gasket-support resting upon and within the gasket, and a separate flaring cap fitted for limited sliding movement upon the support, and resting upon the outer portion of the gasket, whereby the cap and support rest independently upon the gasket prior to the sealing operation, and compress the gasket against the inner and outer portions of the receptacle-rim in the sealing operation.

6. The combination with a plain-rimmed receptacle and a gasket, of a flaring cap resting upon the gasket, and a separate gasket-support having a flexible rim provided with means for centralizing itself within the receptacle-rim, and with means for supporting itself upon the gasket.

7. The combination with a plain-rimmed receptacle and a gasket, of a gasket-support provided with means for centralizing itself within the receptacle-rim, and having a flaring rim resting within and upon the gasket, and an outer cap covering the inner support and the gasket and having a flaring rim resting upon the gasket.

8. The combination with a plain-rimmed receptacle and a gasket, of a gasket-support provided with means for centralizing itself within the rim of the receptacle, and having a flaring rim resting within and upon the gasket, and a cap inclosing the support and having a flaring rim resting upon an outer zone of the gasket, the support and the cap resting upon the gasket independently of each other.

9. The combination with a plain-rimmed receptacle and a gasket, of an inner and an outer sealing-cap each provided with a flaring rim for compressing the gasket, one of the said caps having its flaring rim turned downwardly over an outer zone of the gasket while the other cap is inverted within the first cap, and rests upon the gasket, and extends within the circle of the receptacle-rim, to centralize the several members with each other.

10. The combination with a receptacle and a gasket, of an inner sealing-cap having an upwardly and outwardly flaring flexible rim seated upon an inner zone of the gasket, and an outer sealing-cap having a downwardly and outwardly flaring flexible rim seated upon an outer zone of the gasket.

11. A closure for receptacles comprising

two separate caps provided with flaring flexible rims, one of said caps being inverted within the other cap with the adjacent sides of their respective rims forming the upwardly-
5 converging walls of a downwardly-facing annular groove which approximately conforms in position to the rim of the receptacle, and a gasket seated in said groove.

In testimony whereof I have signed my name to this specification in the presence of 10 two subscribing witnesses.

WILLIAM A. LORENZ.

Witnesses:

H. MALLNER,
JANETTE S. ELLSWORTH.