

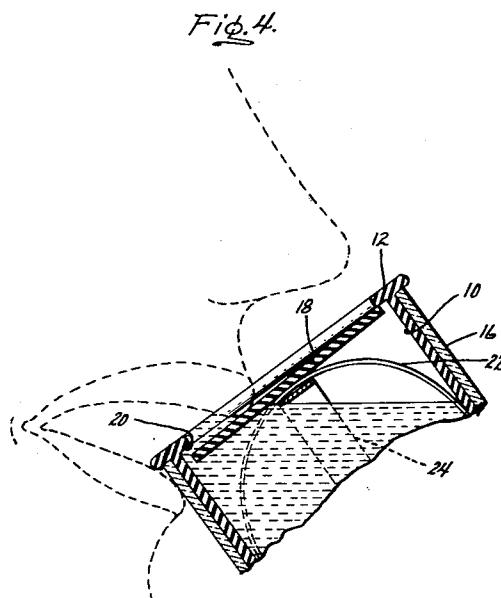
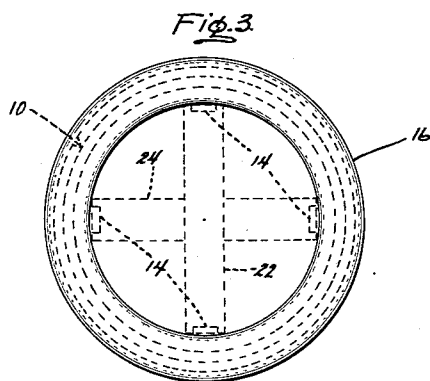
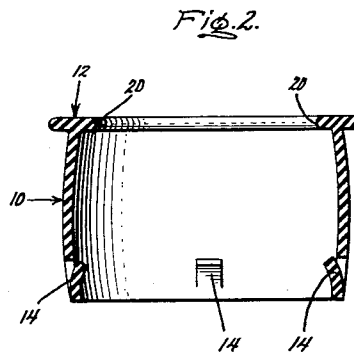
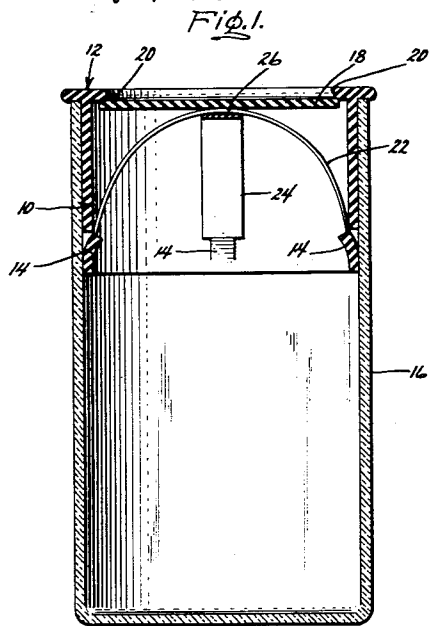
Jan. 2, 1962

R. B. SMITH
SPILL-PROOF DEVICE

3,015,411

Filed July 9, 1958

2 Sheets-Sheet 1



Inventor:
Richard B. Smith,
by *Lust & Orisk*
Attorneys

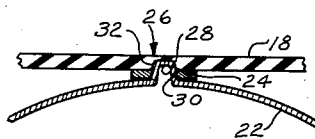
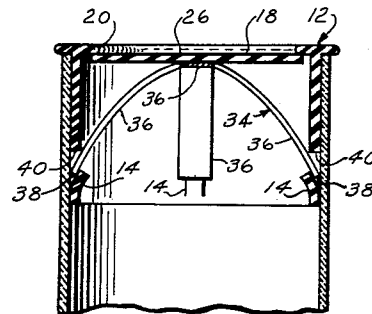
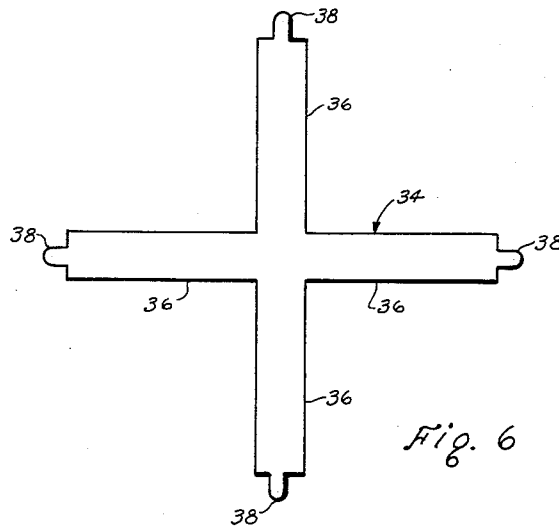
Jan. 2, 1962

R. B. SMITH
SPILL-PROOF DEVICE

3,015,411

Filed July 9, 1958

2 Sheets-Sheet 2



INVENTOR.
Richard B. Smith
BY *Gust F. Irish*
Attorneys

1

3,015,411

SPILL-PROOF DEVICE

Richard B. Smith, 709 W. Oakdale Drive, Fort Wayne, Ind., assignor of forty-five percent to Willard M. Jones, Fort Wayne, Ind.

Filed July 9, 1958, Ser. No. 747,530

10 Claims. (Cl. 220-90.4)

The present invention relates to a spill-proof device, and more particularly to an adaptor or insert construction having a cover for use in conjunction with a tumbler, cup or similar container having an open end from which liquid may be poured or drunk.

The prior art is replete with spill-proof containers and the like which are especially adapted for use by infants, invalids, and others, in such a manner as to prevent the accidental spilling of the liquid contents. All of these prior devices known to me utilize some type of closure or cover over the discharge end of the container, with a suitable number of holes or apertures being provided therein from which the liquid contents may be poured or drunk. These constructions are not entirely satisfactory, because the holes or apertures interfere with the free flow of the liquid, and, still further, are open for spilling the contents of the container if the latter should be upset or inverted. Also, when a person desires to drink from one of these containers, it is necessary that the holes be aligned with the mouth.

It is therefore an object of this invention to provide a spill-proof device which is permanently closed and can be opened by only deliberate action on the part of the user.

It is another object of this invention to provide a spill-proof device having a closure which is operable from any position about the perimeter of the container, thereby rendering the invention useful without any particular training on the part of the user.

It is still another object of this invention to provide a spill-proof device which is operable merely by the force of the lips during a normal drinking action.

It is yet another object of this invention to provide a spill-proof device which may be operated by the mere force of the lips during drinking and is further leakproof if the container is accidentally dropped, jarred or upset.

Other objects of this invention will become apparent as the description proceeds.

To the accomplishment of the above and related objects, my invention may be embodied in the forms illustrated in the accompanying drawings, attention being called to the fact, however, that the drawings are illustrative only, and that specific change may be made in the specific constructions illustrated and described, so long as the scope of the appended claims is not violated.

In the drawings:

FIG. 1 is a longitudinal sectional view of one embodiment of this invention shown as being used in conjunction with an ordinary glass tumbler;

FIG. 2 is a sectional illustration of the sleeve-like member of FIG. 1;

FIG. 3 is a top plan view of the spill-proof adaptor of FIG. 1;

FIG. 4 is a fragmentary sectional illustration showing the invention in use;

FIG. 5 is a fragmentary sectional illustration of another embodiment of this invention;

FIG. 6 is a plan view of an alternative spring configuration; and

FIG. 7 is a fragmentary sectional illustration of another embodiment of this invention, having the spring structure of FIG. 6 incorporated therein.

Referring to the drawings, the invention comprises a

2

sleeve-like member or insert 10 (FIG. 2) which preferably is tubular in shape and formed of a molded plastic material such as polyethylene or polystyrene. The cylindrical portion of this member 10 is shaped slightly convexly outwardly for a purpose which will be explained in the following. A flat rim or flange 12 of annular form is secured to or integrally molded with the perimeter of the upper end of the insert 10 and is provided with two lips which extend both radially inwardly and outwardly from the respective inner and outer surfaces of the insert 10. Near the opposite end of the insert 10 are provided four abutments or retainers 14 spaced circumferentially by substantially ninety degrees (90°) and extending radially inwardly from the insert inner surface. In the preferred embodiment of this invention, these abutments, respectively, are merely formed by lancing the insert along three sides and deforming the resulting element or finger inwardly to provide a discontinuity in the inner surface of the insert. The purpose of these retainers 14 will be explained more fully in the following.

Also, as will appear in the following, other abutment or retainer constructions may be used without departing from the spirit or scope of this invention. For example, an annular groove or shoulder may be provided on the inner surface of the insert which will perform the same purpose.

As seen more clearly in FIG. 1, the insert 10 is fitted into the open end of an ordinary glass tumbler 16. By forming the convex portion of the insert to a diameter which is slightly larger than that of the tumbler opening, it is seen that a frictional grip is provided which will hold the insert in place. Also, it will be noted that the radially outwardly projecting lip of the flange 10 provides a stop for abutting the upper perimeter of the tumbler 16 to prevent the insert 10 from being inserted too deeply into the tumbler.

A suitable disc-shaped closure plate 18 formed of sheet plastic material or the like and having an outer diameter which is slightly smaller than the inner diameter of the insert 10 is fitted inside the insert and normally engages the peripheral margin of the underside of the radially inwardly projecting lip 20 of the flange 12. This engagement between the cover plate 18 and the lip 20 is continuous throughout the overlapping circumferential portions thereof, thereby providing a seal or closure for the opening provided by the flange 12.

A spring is used to urge yieldably this cover 18 into sealing engagement with the lip 20 as just explained. In the illustrated embodiment of this invention, this spring is composed of two elongated, flat spring members 22 and 24 made of suitable plastic or spring metal which normally assume a straight and flat configuration. These two springs 22 and 24, however, are bent or curved without unduly stressing the material, so that if released from the illustrated position, they would straighten out fully. The spring 22 is curved as shown with its midportion 26 engaging the center of the underside of the cover 18. The opposite ends of this spring are engaged with the upper surfaces of the two diametrically opposite abutments or retainers 14 and spring outwardly into engagement with the adjacent surface of the insert 10. The spring 22 is thereby retained in place and exerts a spring force against the underside of the cover 18 which holds the latter into engagement with the lip 20. The spring 24, which may be identical to the spring 22, is similarly retained by the other two diametrically opposite retainers 14, but instead of bearing directly against the underside of the cover 18 engages the midportion 26 of the spring 22, yieldably urging the latter against the cover 18. Thus, the two springs 22 and 24 at right angles to

3

each other conjointly yieldably urge the cover 18 into sealing engagement with the flange lip 20.

It will now be apparent, at any point about the periphery of the cover 18, the cover may be depressed, breaking the engagement with the flange lip 20. The tumbler 16 may be filled with liquid by merely depressing one edge of the cover 18 and then pouring the liquid into the opening thus provided between the cover and the flange lip 20.

In drinking from the tumbler, the tumbler is tipped in the usual manner and placed to the lips also in the usual manner, as illustrated in FIG. 4. The upper lip forces the cover 18 away from the flange lip 20, thereby providing an opening through which the liquid may pass. This drinking operation may be performed from any position around the periphery of the tumbler; hence, the user need have no concern as to whether or not he is using the apparatus correctly. As mentioned earlier, instead of using the retainers 14, an annular groove or shoulder on the insert 10 for receiving the opposite ends of the two springs 22 and 24 may be used. Alternatively, only one spring 22, 24 need be used without sacrificing the utility of the invention.

In FIG. 5 is illustrated a slightly different construction from that shown in the preceding figures. In some instances, the two springs 22 and 24 of FIG. 1 might slide or move relative to each other and thereby become tilted or cocked at such an angle that they might not engage the central portion of the cover 18. In order to overcome this possibility, the two springs 22 and 24 as well as the cover 18 may be detachably connected together. One means for accomplishing this attachment is shown in FIG. 5, wherein the spring 22 is formed with a dimple or projection 28 which is received by a companion perforation 30 in the spring 24. Still further, the cover 18 might be formed with a depression or socket 32 in its central portion, which also receives the extremity of the projection 28. By this means, the two springs 22 and 24 are held against relative movement with respect to each other as well as with respect to the cover 18. The parts are formed to fit loosely, so that disassembly for cleaning purposes may be easily effected.

In FIGS. 6 and 7 is illustrated a slightly different embodiment of this invention, which differs primarily from the embodiment shown in FIGS. 1, 3 and 4 in the respect that instead of using two springs 22 and 24, only a single, flat, spider-like spring 34 is used, having four arms 36 which extend radially outwardly at right angles. On the end of each of these arms 36 is provided a short, narrowed tongue or projection 38. This spring 34 may be formed of suitable metallic or plastic materials, its purpose and function being essentially the same as that of the two springs 22 and 24 of FIG. 1. This spring is shown in FIG. 7 as being assembled in the insert of FIG. 2 by inserting the tongues into the apertures 40 provided by forming the ears or abutments 14 radially inwardly. The widened portions or shoulder between the tongue 38 and the respective arm 36, being wider than the respective abutment 14, engages the side of the insert 10 whereby the respective arms 36 are retained in place. By means of this construction, the spring 34 is held against lateral movement and will thereby engage, at all times, the central portion 26 of the cover 18.

As described, the invention presents no sharp edges or corners which could cut or scratch the lips of a user. Still further, the construction is completely disassemblable for cleaning and has no cracks, interstices or crevices which might collect liquor or food particles. All of the parts may be fabricated of suitable plastic material, or instead may be part metal and part plastic. The construction is economical to fabricate, and, being such, it may be considered as disposable. This is particularly important when it is considered that possible usage of the invention extends to aircraft and ships which are subject

4

to violent movement of the type which normally spills the contents from open cups or tumblers. Thus, after usage, the adaptor could be disposed of.

With respect to operation, it is noteworthy that the tumbler may be filled even with the cover in place: by merely depressing the cover, liquid may be poured into the tumbler. If the tumbler is dropped or upset, no spillage can occur, since the cover is always tightly sealed in place. Even the smallest infant or any invalid normally incapable of using an open tumbler can use the present device without accidentally spilling the contents thereof, and this feature becomes particularly important with respect to those persons suffering from cerebral palsy.

The tumblers 16 may be fabricated of plastic, glass, paper or metal, and, still further, a bottom may be provided on the insert, thereby forming the non-spill structure into a cup or container thereby rendering it unnecessary to use a separate container.

What is claimed is:

1. An adaptor for open-ended drinking tumblers and the like comprising a cylindrically shaped tubular insert of plastic material for insertion in the open end of the tumbler, said insert being convexly shaped radially outwardly for tightly gripping the wall of said tumbler, a flat annular rim secured to the perimeter of one end of said insert, said rim extending radially outwardly of the outer surface of said insert for engaging the rim of said tumbler and inwardly of the inner surface of said insert to define a circular opening, a flat circular closure plate loosely fitting inside said insert and normally engaging the underside of said rim around the entire inner peripheral margin thereof thereby closing said opening, two metallic elongated flat springs arranged at right angles to each other with juxtaposed flat sides thereof in engagement, four inwardly projecting abutments on the inner side of said insert spaced a predetermined distance from said one end, said abutments being circumferentially spaced in quadrature from each other, the ends of said springs engaging respective ones of said abutments and said insert, said springs being curved with the midportions thereof operatively engaging the central portion of the underside of said closure plate and urging the latter to closed position whereby said plate may be depressed away from said rim against said springs at any point on its periphery to permit drinking or pouring from said tumbler.

2. An adaptor for open-ended drinking tumblers and the like comprising a cylindrically shaped tubular insert of plastic material for insertion in the open end of the tumbler, said insert being convexly shaped radially outwardly for tightly gripping the wall of said tumbler, a flat annular rim secured to the perimeter of one end of said insert, said rim extending radially outwardly of the outer surface of said insert for engaging the rim of said tumbler and inwardly of the inner surface of said insert to define a circular opening, a circular closure plate loosely fitting inside said insert and normally engaging the underside of said rim around the inner peripheral margin thereof thereby closing said opening, two elongated flat springs arranged at right angles to each other, four inwardly projecting abutments on the inner side of said insert spaced a predetermined distance from said one end, said abutments being circumferentially spaced in quadrature from each other, the ends of said springs engaging respective ones of said abutments and said insert, said springs being curved with the midportions thereof operatively engaging the central portion of the underside of said closure plate and urging the latter to closed position whereby said plate may be depressed away from said rim against said springs at any point on its periphery to permit drinking or pouring from said tumbler.

3. An adaptor for open-ended drinking tumblers and the like comprising a cylindrically shaped tubular insert for insertion in the open end of the tumbler, a flat annular rim secured to the perimeter of one end of said insert,

5

said rim extending radially outwardly of the outer surface of said insert for engaging the rim of said tumbler and inwardly of the inner surface of said insert to define a circular opening, a circular closure plate loosely fitting inside said insert and normally engaging the underside of said rim around the inner peripheral margin thereof thereby closing said opening, two elongated flat springs arranged at right angles to each other, four inwardly projecting abutments on the inner side of said insert spaced at a predetermined distance from said one end, said abutments being circumferentially spaced in quadrature from each other, the ends of said springs engaging respective ones of said abutments and said insert, said springs being curved with the midportions thereof operatively engaging the central portion of the underside of said closure plate and urging the latter to closed position whereby said plate may be depressed away from said rim against said springs at any point on its periphery to permit drinking or pouring from said tumbler.

4. An adaptor for open-ended drinking tumblers and the like comprising a cylindrically shaped tubular member having means for attaching the same to the open end of the tumbler, a flat annular rim secured to the perimeter of one end of said member, said rim extending radially inwardly of the inner surfaces of said member to define a circular opening, a flat circular closure plate loosely fitting inside said member and normally engaging the underside of said rim around the inner peripheral margin thereof thereby closing said opening, two elongated flat springs arranged at right angles to each other, four inwardly projecting abutments on the inner side of said member spaced at a predetermined distance from said one end, said abutments being circumferentially spaced in quadrature from each other, the ends of said springs engaging respective ones of said abutments and said member, said springs being curved with the midportions thereof operatively engaging the central portion of the underside of said closure plate and urging the latter to closed position whereby said plate may be depressed away from said rim against said springs at any point on its periphery to permit drinking or pouring from said tumbler.

5. For use as a closure for an open-ended drinking tumbler and the like, a sleeve-like member having means for attaching the same to the open end of the tumbler, a radially inwardly extending flange on said member at one end thereof defining a central opening coaxial with said sleeve-like member, a flat extended area closure member loosely fitting inside said sleeve-like member and normally engaging the peripheral margin of said flange for closing said opening, four retainers on the inner side of said sleeve-like member in quadrature relation, said retainers being spaced a predetermined distance from said one end, a first elongated flat spring having opposite ends engaging and being retained by two diametrically opposite ones of said four retainers, said spring being curved toward and engaging the central portion of the underside of said closure member and yieldably urging said closure member into engagement with said flange, a second elongated flat spring having opposite ends engaging and being retained by the other two of said retainers, said second spring being curved and yieldably bearing against said first spring at a point adjacent to said closure member for yieldably urging the latter into engagement with said flange whereby said closure member may be depressed away from said rim against said spring at any point on its periphery to permit drinking or pouring from said tumbler.

6. For use as a closure for an open-ended drinking tumbler and the like, a sleeve-like member having means for attaching the same to the open end of the tumbler, a radially inwardly extending flange on said member at one end defining a center opening coaxial with said sleeve-like member, a flat extended area closure member loosely fitting inside sleeve-like member and normally engaging

6

the peripheral margin of said flange for closing said opening, two diametrically opposite retainers on the inner side of said sleeve-like member, and a U-shaped spring bearing at its midportion against the central portion of the underside of said closure member urging the latter into closed position against said flange, the opposite ends of said spring engaging and being held in place by said two retainers respectively whereby said closure member may be depressed away from said rim against said spring at any point on its periphery to permit drinking or pouring from said tumbler.

7. An adaptor for open ended drinking tumblers and the like comprising a cylindrically shaped tubular insert of plastic material for insertion in the open end of the tumbler, said insert being convexly shaped radially outwardly for tightly gripping the wall of said tumbler, a flat annular rim secured to the perimeter of one end of said insert, said rim extending radially outwardly of the outer surface of said insert for engaging the rim of said tumbler and inwardly of the inner surface of said insert to define a circular opening, a flat circular closure plate loosely fitting inside said insert and normally engaging the underside of said rim around the entire inner peripheral margin thereof thereby closing said opening, a flat spring member having four arms extending radially outwardly at right angles with respect to each other, a tongue provided on the outer extremity of each arm, four inwardly projecting abutments on the inner side of said insert spaced a predetermined distance from said one end, said abutments being circumferentially spaced in quadrature from each other, four apertures provided in said insert in registry with said four abutments, respectively, the tongues on said arms fitting into said apertures respectively, said arms being curved to urge resiliently the central portion of said spring member into engagement with the central portion of said plate and the latter into engagement with said rim whereby said plate may be depressed away from said rim against said spring at any point on its periphery to permit drinking or pouring from said tumbler.

8. An adaptor for open ended drinking tumblers and the like comprising a cylindrically shaped tubular insert of plastic material for insertion in the open end of the tumbler, said insert being convexly shaped radially outwardly for tightly gripping the wall of said tumbler, a flat annular rim secured to the perimeter of one end of said insert, said rim extending radially outwardly of the outer surface of said insert for engaging the rim of said tumbler and inwardly of the inner surface of said insert to define a circular opening, a flat circular closure plate loosely fitting inside said insert and normally engaging the underside of said rim around the entire inner peripheral margin thereof thereby closing said opening, a flat spring member having four arms extending radially outwardly at right angles with respect to each other, four inwardly projecting abutments on the inner side of said insert spaced a predetermined distance from said one end, said abutments being circumferentially spaced in quadrature from each other, the extremities of said arms engaging respective ones of said abutments, said arms being curved to urge resiliently the central portion of said spring member into engagement with the central portion of said plate and said plate into engagement with said rim whereby said plate may be depressed away from said rim against said spring at any point on its periphery to permit drinking or pouring from said tumbler.

9. An adaptor for open ended drinking tumblers and the like comprising a cylindrically shaped tubular insert of plastic material for insertion in the open end of the tumbler, said insert being convexly shaped radially outwardly for tightly gripping the wall of said tumbler, a flat annular rim secured to the perimeter of one end of said insert, said rim extending radially outwardly of the outer surface of said insert for engaging the rim of said tumbler and inwardly of the inner surface of said insert to define

a circular opening, a flat circular closure plate loosely fitting inside said insert and normally engaging the underside of said rim around the entire inner peripheral margin thereof thereby closing said opening, a flat spring member having four arms extending radially outwardly at right angles with respect to each other, and four inwardly projecting abutments on the inner side of said insert and spaced circumferentially apart, said spring member being interposed between said abutments and said cover, the extremities of said arms engaging respective ones of said abutments, said arms being curved to urge resiliently the central portion of said spring member into engagement with the central portion of the underside of said plate and said plate into engagement with said rim whereby said plate may be depressed away from said rim against said spring at any point on its periphery to permit drinking or pouring from said tumbler.

10. An adaptor for open ended drinking tumblers and the like comprising a cylindrically shaped tubular insert of plastic material for insertion in the open end of the tumbler, said insert being convexly shaped radially outwardly for tightly gripping the wall of said tumbler, a flat annular rim secured to the perimeter of one end of said insert, said rim extending radially outwardly of the outer surface of said insert for engaging the rim of said tumbler and inwardly of the inner surface of said insert to define a circular opening, a flat circular closure plate loosely fitting inside said insert and normally engaging the underside of said rim around the entire inner peripheral margin thereof thereby closing said opening, two metallic elongated flat springs arranged at right angles to each other with juxtaposed flat sides thereof in engagement, four inwardly projecting abutments on the inner side of said insert spaced a predetermined distance from said one end, said abutments being circumferentially spaced in quadrature from each other, the ends of said springs engaging respective ones of said abutments and said insert, said springs being curved with the midportions thereof operatively engaging the central portion of the underside of said closure plate and urging the latter to closed position, one of said springs directly engaging said plate and the other spring bearing against said one spring, one spring having an aperture therein at a position opposite the central portion of said plate, the other spring having a projection thereon which passes through said aperture, and said plate having a recess in its central portion which receives the end of said projection, said plate being depressible away from said rim against said springs at any point on its periphery to permit drinking or pouring from said tumbler.

gated flat springs arranged at right angles to each other with juxtaposed flat sides thereof in engagement, four inwardly projecting abutments on the inner side of said insert spaced a predetermined distance from said one end, said abutments being circumferentially spaced in quadrature from each other, the ends of said springs engaging respective ones of said abutments and said insert, said springs being curved with the midportions thereof operatively engaging the central portion of the underside of said closure plate and urging the latter to closed position, one of said springs directly engaging said plate and the other spring bearing against said one spring, one spring having an aperture therein at a position opposite the central portion of said plate, the other spring having a projection thereon which passes through said aperture, and said plate having a recess in its central portion which receives the end of said projection, said plate being depressible away from said rim against said springs at any point on its periphery to permit drinking or pouring from said tumbler.

References Cited in the file of this patent

UNITED STATES PATENTS

2,113,695	Krannak	Apr. 12, 1938
2,556,571	Bobbs et al.	June 12, 1951
2,646,670	Spalding	July 28, 1953

FOREIGN PATENTS

197,454	Switzerland	Apr. 30, 1938
1,093,277	France	Nov. 17, 1954