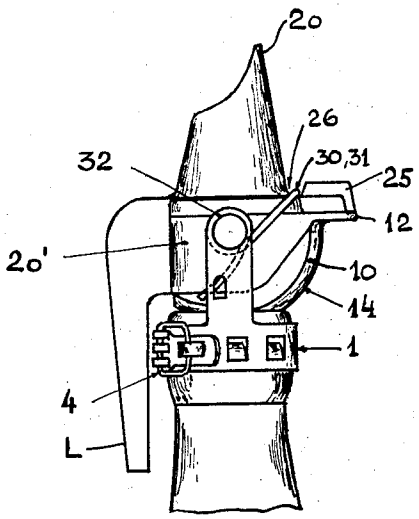
Dec. 8, 1959 H. H. FURN 2,916,190

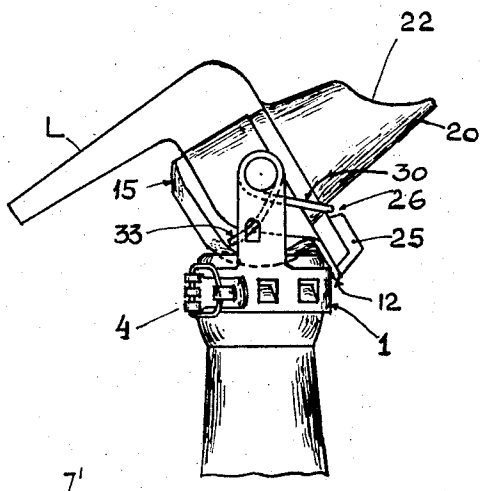
CONTAINER CLOSURE AND DISPENSING DEVICE

Filed March 13, 1957 2 Sheets-Sheet 1



OPEN

FIG. 1



CLOSED

FIG. 2

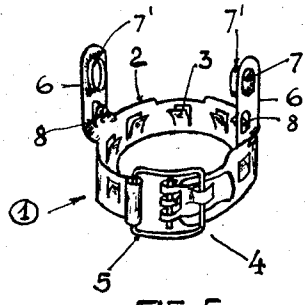
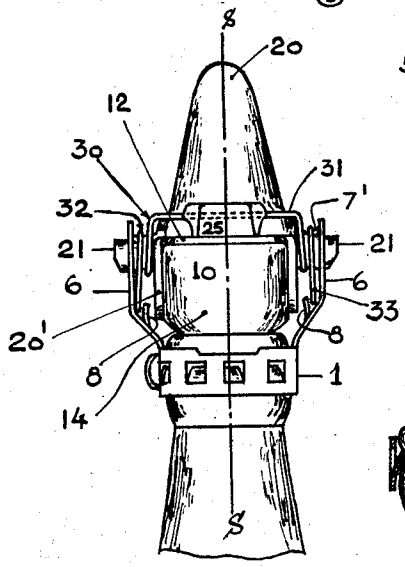


FIG. 5



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FIG. 3

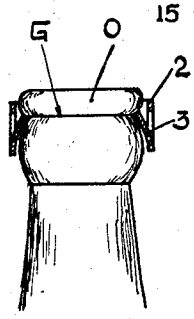


FIG. 6

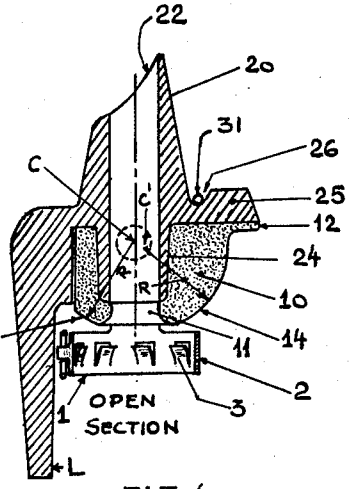


FIG. 4

INVENTOR

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Dec. 8, 1959 H. H. FURN 2,916,190

CONTAINER CLOSURE AND DISPENSING DEVICE

Filed March 13, 1957 2 Sheets-Sheet 2

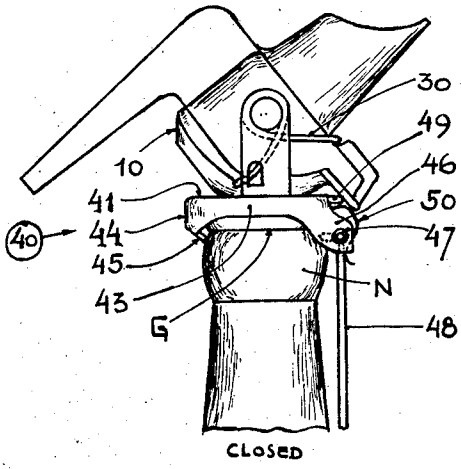


FIG. 7

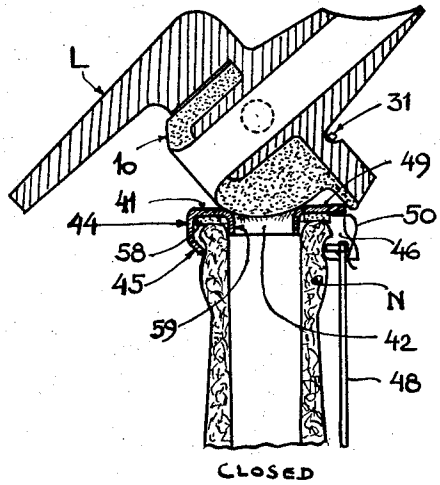


FIG. 8

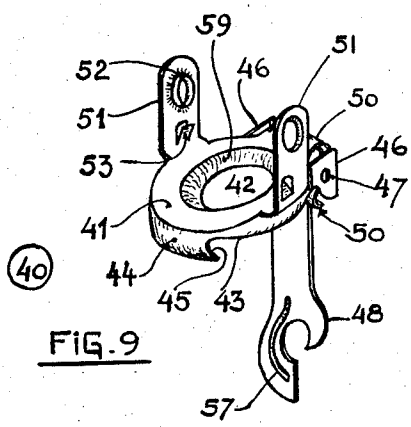


FIG. 9

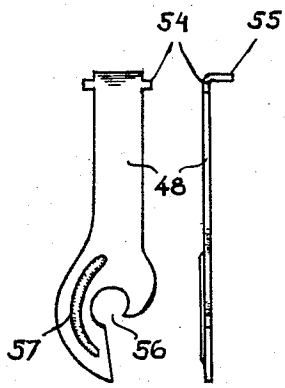


FIG. 10

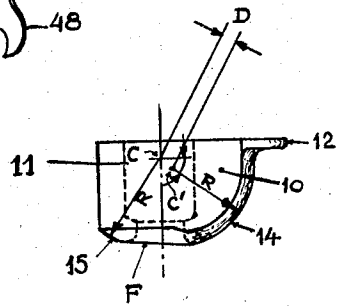


FIG. 11

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United States Patent Office 2,916,190 Patented Dec. 8, 1959

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CONTAINER CLOSURE AND DISPENSING DEVICE

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Application March 13, 1957, Serial No. 645,786

9 Claims. (Cl. 222—517)

This invention relates to a container closure and dispensing devices and more specifically to devices readily attachable to and removable from liquid containers such as bottles.

One object of this invention is a two position dispensing device permitting closure and outflow, respectively, while providing at all times apart from a controlled outflow a complete hermetic seal for the necks of bottles after they have been opened thereby eliminating leakage or evaporation of liquids, gas or any other elements contained therein.

Another object of the invention is to build such a device of a minimum of elements, such as inexpensive stampings and moldings capable of mass-manufacture and quick assembly, and permitting rapid attachment or removal from a bottle by the flick of a finger or another simple manual operation.

Still another object of the invention is to effect outflow by mere depression of a control lever and without affecting the permanent seal between bottle neck and dispensing device, such control lever in turn causing a sealing member acting as a valve to rotate from a closure position into a dispensing position.

Further object of the invention is to control the outflow according to the degree of depression of an actuating lever.

In a preferred embodiment of the invention the actuating lever is normally in closed position and will automatically preferably under spring control return to this position once the operator's finger releases the actuating lever thereby stopping the outflow completely and transforming it automatically again from a dispensing device into a hermetic closure. Thus, apart from a well controlled outflow, any leakage of contents, liquid or gaseous, is excluded and the original condition of the liquid such as alcoholic content, freshness, flavor, etc. are preserved for all practical purposes in substantially the same manner as if the bottle were completely resealed.

Opening and automatic self-closing can be repeated at will as many times as desired without removing the device from the bottle neck, and substantially without being affected by or effecting the contents of the bottle.

The advantage to the user of this device and to the diverse manufacturers of bottle carbonated liquids such as soft drinks, beer, champagne, but also evaporable liquids such as liquor, is the fact, that this device will overcome the human shortcoming of forgetfulness, thus enabling the user to purchase the far more economical family size bottles now manufactured and promoted by most of the bottling plants without having to fear spoilage of the remaining contents by forgetting to close the bottle after pouring.

As explained above, and as will be seen from the following detailed description, the device will close itself once the user's finger is removed therefrom and the bottle has been set back on the table.

Another flick of the finger will remove the device from an emptied bottle and attach it to the next one.

These and other objects of the invention will be more fully apparent from the accompanying drawings in which—

Fig. 1 illustrates the device in a frontal elevation in dispensing or pouring position.

Fig. 2 is a frontal elevation of the upper part of a bottle showing a dispensing attachment applied thereto, embodying certain features of the invention in the closed condition.

Fig. 3 represents a rear view of Fig. 1.

Fig. 4 represents a section through Fig. 3 along lines 4—4, but omitting the bottle part in order to give a clear view of the arrangement and interrelation of all major parts.

Fig. 5 represents an isometric view of the attachment part of the device.

Fig. 6 shows the attachment part of Fig. 5 in a section perpendicular to lines 4—4 of Fig. 3.

Figs. 7 and 8 in front and side elevations (the latter in section) represent a modified dispensing device and Fig. 9 the supporting part in an isometric view.

Figs. 10 and 11 represent a part of Fig. 9 in front and side views, respectively; and Figure 11 is a side elevational view of only the elastic sealing member showing the geometry thereof.

Referring to the drawing in detail, wherein similar reference characters designate corresponding parts throughout the several views, part N generally indicates the neck of a bottle with which the device can be associated.

The general construction of the device includes a clamping member or spring as illustrated in detail in Fig. 5. Clamp spring **1** is made of hardened spring steel, which is nickel and chromium plated. It consists of a neckband **2** from which a number of stamped prongs, **3**, protrude inwardly and upwardly, all substantially of the same size and height. When neckband **2** is drawn tightly towards and around the upper portion of bottle neck N by means of the clamping clasp **4**, prongs **3** will engage bottle neck N fitting in to groove G and abutting against the uppermost overhanging portion O of bottle neck N (Fig. 6).

Since, as will be explained further below, an upward pull is exerted upon clamp spring **1** as a result of the simultaneous compression of the elastic sealing member **10**, these prongs will exert a firm and very powerful grip on bottle neck N.

Neckband **2** is locked by clamping clasp **4** which is of common, self-locking construction. The lock includes a clasp ring **5** made of spring steel wire and designed with its inherent elasticity to take care of variations in bottle neck sizes whether due to production tolerances or—within limit—due to any other reasons.

The above mentioned self-locking feature serves to prevent self-opening of the clasp.

Built integrally with neckband **2** are two diametrically opposite perpendicular posts **6** (Fig. 5), each provided with a so-called eyelet opening **7** serving as pivotal supports for actuating lever L . The cylindrical extensions **7'** of eyelets **7** point inward towards the center axis of clamp spring **1**. These extensions **7'** are drawn smoothly on their inside and form the bearings for journals **21**, permitting rotation of spout **20** without lateral movement.

Posts **6** have, furthermore, each one small inner prong **8** arranged below eyelet **7**. Prongs **8** are bent and point slightly inwards towards the center axis of clamp spring **1**. Prongs **8** form a resting wedge for the ends **31** of torque spring **30**, controlling the return movement of the dispensing device from pouring to closure position.

Spout 20 (Fig. 1–4) molded from impact resistant plastic or made by die-casting, is made of one piece with control lever L, actuating the entire device including a spout 20 with pouring end 22 and an axial hole 23 extending through spout 20. Spout 20 has a tubular projection or boss 24 surrounded by an approximately semi-cylindrical outer shell 20' terminating at one side into lever L and at the other side into a projection 25 which forms a stop limiting the amount of rotation of the device. Projection 25 has a groove 26 adapted to receive crossbow 31 of return spring 30.

Integral with outer shell 20' are the two journals 21 arranged on opposite sides of shell 20' and permitting the shell 20' and spout 20 and lever L attached thereto to rotate within eyelet bearings 7 of clamp spring 1 as described before.

In the annular space provided between shell 20' and inner boss 24 and closely adhering to boss 24, there is an elastic sealing member or ball 10 made from an inorganic elastic mixture which had to be specially developed, after prolonged experiments with natural or silicone rubbers which were found incapable to overcome the problem of very high friction of these materials on very smooth glass or metal surfaces in dry condition. Furthermore, a mixture had to be developed which would conform with the Food and Drug Regulations of the Government, and which, besides having a very low friction coefficient, would not accept or retain any food particles, as sugars or syrups, when they slowly evaporated or dried on ball 10 after usage. Other necessary properties of this compound are great softness, high compressibility and a high degree of rebound or elastic memory. While such an elastic mixture is of great help for proper operation, this disclosure is in no way restricted to it.

Ball 10 has a bore 11 and fits so tightly into shell 20' on hole 23 and over tubular boss 24 that no internal leakage can occur. Ball 10 has a thin flat protrusion 12 matching in shape and size lateral projection 25 of shell 20'. Protrusion 12 is elastic and cushions the impact of projection 25 on bottle N when, after pouring, return spring 30 turns the device rapidly into closed position (Fig. 2).

Sliding surfaces 14 and 15 of ball 10, apart from intermediary flat portion around the opening of bore 11, are of approximately globular shape adapted to increase pressure in closing and while the device rotates towards its closed position. A corresponding decrease in pressure will occur when the device rotates towards the open position. This facilitates the opening of the device and its practical operation under any conditions.

Once the device is rotated towards open (Fig. 1) the liquid will lubricate the sliding sealing surfaces 14 and 15 which in turn facilitates automatic closure in spite of increasing closing pressure. This is achieved in the following manner:

Ball surfaces 14 and 15 have substantially the same radius R; center C of ball surface 15 coincides with the axis of rotation extending through the journals 21 of shell 20'. The center C' of ball surface 14, however, is offset to the right and slightly downward by a certain amount. When rotated clockwise from open to closed position (from Fig. 1 to Fig. 2) center C' therefore will swing around center C mentioned above, increasing by a certain amount the distance of journals 21 from the bottle opening. If ball 10 were incompressible, it would increase by that amount. In reality, it cannot increase, because the clamp spring 2 cannot be stretched, and since something has to give, the compression increases upon rotation to closed position and thereby improves the hermetic sealing.

Return spring 30 is formed as a double torque spring. It controls the closing function and consists of two torque coils 32 wound around each journal 21.

The two loose ends 33 of coils 32 are braced against the inner prongs 8 of posts 6 of clamp spring 1. Coils 32 are pretensioned or assembled in a tensioned condition.

Both coils 32 are joined by a common bow 31 extending across shell 20' and embedded in groove 26. Depressing lever L from closed to open position will wind up torque coils 32 and store the power needed to cause rapid automatic closure upon release of lever L.

Figs. 7–11 show a modification of the invention in that instead of a clamp spring 1 as shown in Fig. 5, a clamping arrangement 40 as shown in Figs. 7, 8, 9 and and 10 is used presenting a well defined seat for the operation of a lever controlled valve member such as shown in Figs. 1–4 at 10.

In this case, a stamped flat seat member 41 has a very smooth centrally located opening 42 adapted to receive under compression the sliding surfaces 14 and 15 in Fig. 4 of a ball 10 rotating over aperture 42 of seat member 41 in a manner similar to that previously explained with respect to Figs. 1–4.

Seat member 41 has two downwardly bent side skirts 43 and a front skirt 44 which in its lower portion is partly bent back, forming hooked shape 45; seat member 41 carries two flat vertical wings 46, each containing a hole 47 at the approximate height of bottle groove G. Holes 47 form the two opposite bearings for the journals of operating lever 48. The flat seat 41 of seat member 41 has a slight flat protrusion 49 between the two wings 46 to the underside of which is welded an S-shaped spring 50. This spring at its lower end presses against operating lever 48 below its bearing suspension thereby keeping it in firmly closed position when the device is affixed to bottle neck N.

Protruding from each side of flat seat 41 and bent vertically upward, is an arm or post 51, having an eyelet 52 integrally formed thereon at its upper end. Posts 51 also have formed thereon each an inwardly and upwardly bent prong 53 at their lower ends. Eyelets 52 and prongs 53 are of similar shape and dimensions and serve substantially the same purpose as described with respect to Fig. 5.

As shown in Figs. 10 and 11, operating lever 48 is L-shaped, carrying near its bent end two integrally stamped journals 54 fitting into bearing holes 47 of wings 46. Lever 48 is snapped into position during assembly shown in Figs. 7 and 8. The short end 55 communicates with groove G of neck N of the bottle when lever 48 is pressed downward by the operating person, thereby opposing forcefully the hook shaped portions 45 on the front 44 of seat member 40 and thus holding the seat firmly on the bottle. Accidental removal is prevented by spring 50 which holds lever 48 in its closed position.

Any raising of lever 48 by the operating person has to be effected against the opposing force of spring 50 whereby hooked portion 45 acts as a pivot at the other side of the bottle until, at a certain point, the device will easily come off the bottle neck N.

Lever 48, Figs. 9 and 11, at its lower end is formed in the familiar shape 56 of a bottle opener and reinforced with an integral rib 57 thereby additionally combining the useful feature of a bottle cap remover, in accordance with the invention, with a bottle closure and dispensing device.

Inside and on the underside of flat seat 41 is a ring shaped soft flat rubber washer 58, held in place by outer skirts 43 and 44 and inner skirt 59 around hole 42. Washer 59 is being compressed when the device is attached to the bottle, thereby supplying a tight and hermetic seal for the aperture.

In all other details of Figs. 7 and 8 the device is substantially similar to that previously described.

While the invention has been described as taking a particular form, it will be understood that the various parts of the invention may be changed without departing

from the spirit thereof, as for instance to include brand names or trademarks molded in, and hence the invention is not limited to the precise construction set forth, but such changes and alterations may be made as fairly come within the scope of the appended claims.

I claim:

1. In an automatic bottle closure and pouring device: the combination of a circularly rotatable spout member having a large tubular opening therethrough, with an elastic semi-ball-shaped sealing member at one end having a large tubular opening therethrough, this opening being concentric with and in continuation of said spout opening; supporting means for said spout member secured to the neck of a bottle for holding the closure and pouring device thereto with compressment of said elastic sealing member in direct slidable contact with the lip of the open end of the bottle, and means for rotatably shifting said spout member and elastic sealing member with respect to said supporting means from one position defining a closed position, wherein the seating surface of said elastic sealing member hermetically seals the bottle opening, to an open position wherein the tubular opening through spout and sealing member axially registers with the open end of the bottle permitting rapid pouring action; and means attached to the spout member and supporting member whereby the movement from closed to open position is caused to occur against a spring force, and the movement from open to closed position is caused by said spring force.

2. Dispenser according to claim 1, wherein said supporting means are adapted to be attached to a bottle opening and, wherein said rotating means include bearings arranged on said supporting means and journals fitting said bearings and arranged on said spout member; said seating surface being so formed as to fit in closed position hermetically tight over said bottle opening and, during movement from closed to open position, to slide tangentially over said opening; said seating surface of the sealing member, when in open position, having a large tubular opening therethrough communicating with the bottle opening at one side and extending through said spout member to the outer atmosphere on the other side, permitting rapid pouring of the bottle contents; said attachable supporting means to include a base member adapted to fit tightly onto a bottle neck and, having an opening communicating with said bottle opening; and said rotating means to include bearings arranged on said supporting means and journals fitting said bearings and arranged on said spout member; said elastic seating surface being so formed as to seal in closed position hermetically over said bottle opening during movement from closed to open position to slide tangentially over said bottle opening, the movement to be practically friction free, whereby this hermetically tight sealing fit between the elastic seating surface and the bottle opening remains uninterrupted during rotation and in open position.

3. Dispenser according to claim 1, wherein said elastic seating surface is part of an elastic member, removable from said spout member, and wherein said elastic seating surface has an opening extending through the spout member in a direction substantially perpendicular to the opening face; a portion of said elastic surface, around said opening being of globular shape of a radius formed around the axis of rotation; and the portion of said surface adjoining said opening on the closed position side thereof being of globular shape of a radius substantially equal, but formed around an axis offset from axis of rotation towards said closed position side whereby to provide an increased pressure of the elastic member against the lip of the bottle when the closure member is in closed position.

4. Dispenser according to claim 1, wherein said spout member consists of a tubular part, the upper section forming the spout and the lower section being surrounded,

spaced therefrom, by a semi-cylindrical shell extending at its closed side into a lever substantially parallel to said tubular part and extending at its open side into a flat projection perpendicular to said tubular part; there being provided in the space between said shell and said lower tubular section an elastic ball member forming said elastic seating surface; said spout member comprising also a pair of journals extending to the outside from said semi-cylindrical shell, forming an axis of rotation intersecting the center of curvature of at least an open position part of said seating surface; a closed position part of said seating surface having a center arranged outside of said first center.

5. In a dispensing attachment for a bottle neck, supporting means attachable to the bottle neck, at least partially ball shaped elastic sealing means having an opening therethrough registerable with the opening in the bottle neck when the sealing means is in open position and hermetically closing the bottle when the sealing means is in closed position, means for rotating said sealing means against spring force from closed to open position, including means permitting automatic rotation of said sealing means under control of said spring force from open to closed position, wherein said sealing means has two ball-shaped surfaces of substantially equal radii; a surface portion at the transition of these ball surfaces, around the tubular opening, being relatively flat; another surface portion at the closed position side of said sealing means having substantially the same curvature as, but radially displaced relative to a further surface portion at the open position side of said sealing means, the latter curvature having a center substantially coinciding with the center of rotation and the former curvature having a center arranged in closed position slightly below that of said latter curvature, so as to increase the sealing pressure when closed and to decrease the pressure while opening, thereby overcoming friction and facilitating opening, and wherein said elastic sealing means has a flat protrusion to absorb impact when said sealing means, under spring control, returns into closed position.

6. In a dispensing attachment for a bottle neck, supporting means attachable to the bottle neck, at least partially ball shaped elastic sealing means having an opening therethrough registerable with the opening in the bottle neck when the sealing means is in open position, the sealing means hermetically closing the bottle when it is in closed position, means for rotating said sealing means against spring force from closed to open position, including means permitting automatic rotation of said sealing means under control of said spring force from open to closed position, comprising a hollow shell having an internal tubing adapted to receive part of said elastic sealing means in the space between shell and tubing with interference fit, thereby preventing an internal leakage during pouring; and integral with said shell a lever permitting rotational movement of said shell from open to closed position and conversely, comprising further, integral with said shell, a tubular pouring spout aligned with said inner tubing and said opening in said elastic sealing means; there being further provided at said shell a bumper section extending perpendicularly to said shell and limiting the degree of rotation of such sealing means by abutting against the bottle neck; and on said shell, outside thereof, two diametrically opposed cylindrical boses forming journals for the rotational movement and bearings for a power spring of the torque-wound type, consisting of a pair of torque coils connected by a bow shaped portion and located on the said journals, the bow being embedded in a groove on the top of said bumper section and braced against the walls of said groove, the free ends of said torque coils being braced, at least partially prewound, on part of said supporting means.

7. A dispensing attachment according to claim 6, wherein said supporting means include a clamping spring

and a pair of arms extending diametrically therefrom in a direction parallel to the bottle axis; said arms having openings forming bearings for said journals and prongs bracing the ends of said spring, the pretensioned torque coils being further tightened when turning from closed to open position, thereby increasing the torque power stored and enhancing automatical return from open to closed position; said clamping spring including a band shaped portion adapted to fit around a bottle neck and a clasp type member including a built-in lever for tightening said band shaped portion to said bottle neck, whereby said clamping spring is of the over-center locking type to prevent self-opening; there being also provided a slightly bowshaped spring member to supply the force for tight strapping said band shaped portion around the bottle neck, regardless of slight diametral variations due to production tolerances.

8. A dispensing attachment according to claim 7, where said band shaped portion contains a number of upwardly shaped inside prongs distributed evenly around the bottle neck, all substantially of even length and height and arranged in such a manner that the upper ends engage firmly and tightly the upper rim of the bottle neck, thereby bracing and securing said band member so forcefully to the bottle neck that no removal in the clamped position could take place except by destruction.

9. A dispensing attachment according to claim 7, wherein said band shaped portion has two diametrically opposed upright spring parts, said parts have each an eyelet shaped hole with smooth inside surfaces forming bearings for said shell journals; said upright parts being further provided with upwardly extending inner prongs below said eyelet openings, said prongs being formed to act as resting members for the free coil ends of said torque spring; and wherein said upright parts are so dimensioned as to produce a compressive force on the elastic sealing means when affixed to the bottle neck, thereby precluding leakage of contents in any position of said bottle; said upright parts having small S-shaped portions to produce sufficient springiness to take into account production tolerances and to assure a substantially constant amount of compression.

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