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DISPENSING PUMP WITH CONTAINER ATTACHING MEANS

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FIG. 1

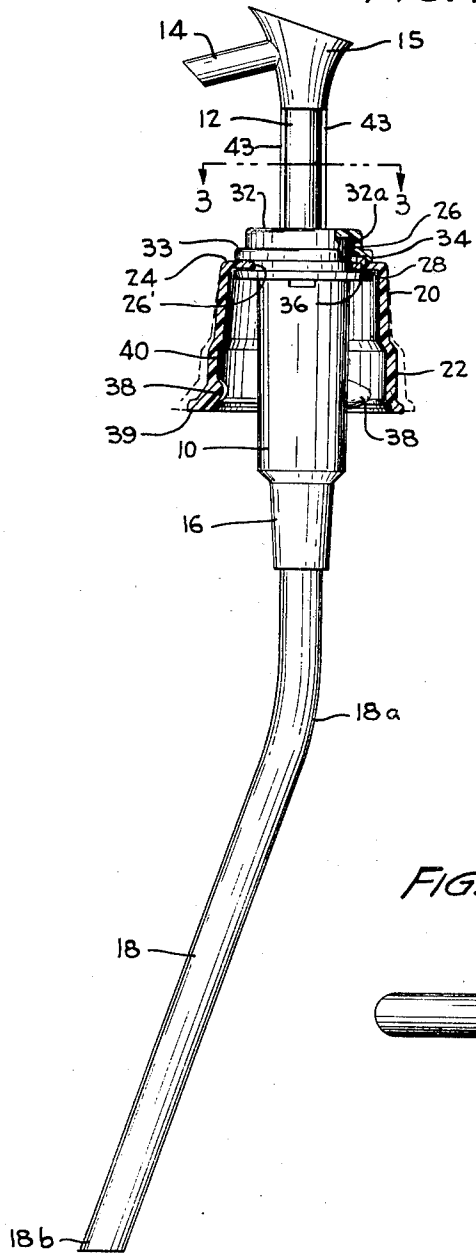


FIG. 2

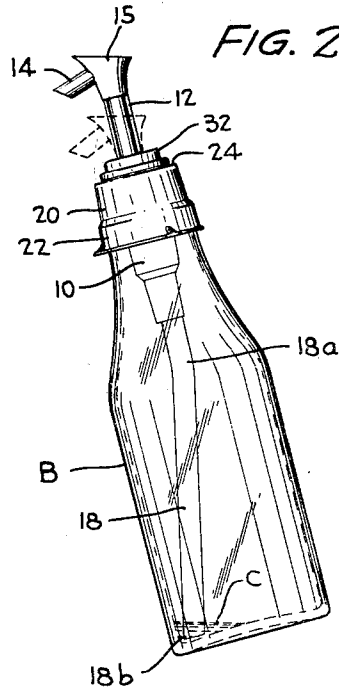
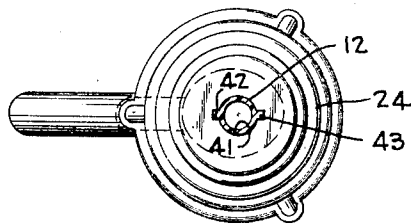


FIG. 3



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**DISPENSING PUMP WITH CONTAINER
ATTACHING MEANS**

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This invention relates to a dispensing pump for fluids and viscous materials for use in dispensing same in desired amounts from a bottle or other conventional container. The invention is particularly adapted for use in dispensing catchup from the bottles in which it is normally supplied and is adapted for repeated application and use with successive containers. It is a particular object of the invention to provide such a dispensing pump or unit incorporating a reciprocal pump plunger having a generally radially directed discharge spout and having a suction tube adapted to depend into the bottle in an axial direction and bent or offset in the same radial plane as the discharge spout so that when the bottle is tilted to deliver the discharged material in the desired direction, the offset lower end of the suction tube will automatically be positioned in the lowermost corner of the bottle in position to be immersed in and withdraw substantially all of the bottle contents.

It is a more particular object to so interrelate the discharge spout of the reciprocating plunger and the radially offset lower end of the suction tube that the tube will at all times be disposed in the same radial plane. This is accomplished in accordance with the invention through slidably keying the pump plunger to a collar fixed on the pump barrel whereby it is free to reciprocate but held against rotation and by fixedly securing the suction tube to the pump barrel with the offset portion of the pump tube in the same plane as the radially projecting discharge spout carried by the plunger.

It is a still further important object to provide such a dispensing pump structure which is operatively associated with and carried by an elastically distortable container cap which, by virtue of its ability to elastically deform, is capable of efficient application to bottles or containers throughout a wide variation of sizes and types.

The application of the pump structure to a cap having the desired deformability prevents the problem of providing against separation of these parts due to expansion or stretching of the cap incident to its application to large diameter container necks or spouts with resulting separation of the respective parts or leakage of the contents of the container.

With this in mind the same collar through which the pump plunger is reciprocable and to which it is keyed against rotation to thereby maintain the proper orientation between the plunger discharge spout and the suction tube, also is made to coact in a novel manner with the deformable or stretchable container cap to prevent separation of these parts incident to stretching of the cap. Thus, in carrying out the invention, the container cap and the collar are formed to define relatively interfitting and interlocking annular tongue and groove elements which secure these parts against relative radial displacement.

A preferred embodiment of the invention is illustrated in the accompanying drawing merely by way of illustration and without any intention of limiting the invention to any of the specific details shown.

In the accompanying drawing:

FIGURE 1 represents a view of an assembled container cap and dispensing pump in accordance with the invention, showing in broken lines the radial expansibility

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of the stretchable cap which adapts it for application to the necks of containers throughout a wide variation of sizes.

FIGURE 2 is a view in reduced scale of the device illustrated in FIGURE 1, showing the same applied to a usual catchup bottle which is tilted to bring the nearly exhausted contents thereof into position for withdrawal by the pump. In this view the pump plunger is shown in full lines in its fully projected or raised position and in broken lines in its depressed position.

FIGURE 3 is a view on the line 3-3 of FIGURE 1.

Referring now in detail to the accompanying drawing, the reference character 10 therein designates a generally conventional pump barrel of a usual reciprocating dispensing pump within which is disposed for reciprocation a usual spring projected plunger 12, of which only the upwardly projecting end portion is shown. Both the pump barrel 10 and plunger 12 are of hollow tubular construction in communication with each other interiorly of the barrel so that they jointly define a passage for fluid material extending axially upwardly through the barrel and plunger and outwardly through a radial discharge spout 14 projecting laterally or radially from one side of a usual finger piece 15 at the upper end of the plunger. As is usual in such structures the pump is operated by downward finger pressure on the finger piece 15 against the action of the projecting spring (not shown) within the pump barrel 10.

In addition to the spring above mentioned, it will be understood that the pump barrel and plunger both contain usual check valves arranged in accordance with usual practice to permit and in fact to produce upward flow of material outwardly toward and through the spout 14 responsive to reciprocation of the plunger 12.

Depending from the lower or intake end portion 16 of the pump barrel and in communication with the interior of the pump barrel is a hollow suction tube 18 open at its lower end 18b in usual manner. This tube 18 as shown in FIGURE 2 is intended to depend into the interior of a container substantially to the bottom thereof for withdrawal of the container contents.

The foregoing pump structure is normally supported centrally or axially in the container such as B by means of a resiliently deformable and stretchable closure cap 20 having an elastically stretchable depending skirt 22 adapted to depend around the container neck and having a radially inwardly directed annular top 24 adapted to overlie the end of the bottle neck and defining a central opening for reception of an upward continuation 26 of the plunger barrel 10.

The vertical position of the pump structure is maintained by a radial flange 28 on the pump barrel at the base of the upward continuation 26, the same being integral with the pump barrel and adapted to abut against the under side of the top 24 as well as to rest on the upper end of the neck bottle B. As will be apparent in FIGURE 1, the upwardly projecting sleeve-like container of the pump barrel extends upwardly through the opening in the cap and is snugly received and cemented or otherwise fixedly secured within a collar 32 of greater diameter than the opening 26'. The collar 32 thus overlies and abuts against the upper surface of the cap 20 around the opening 26' and it will be seen further that the collar is provided with a socket 32a which snugly receives the barrel extension 26. The pump barrel 10, plunger 12 and collar 32 are all preferably of relatively rigid material such as a suitable vinyl plastic composition. The outwardly projecting portion 33 of the collar which overlies and abuts against the cap 20 is preferably provided with a downwardly opening annular groove 34 for reception of the upwardly projecting annular rib 36 on the closure cap, thereby providing a tongue and groove type interlock be-

tween these elements preventing relative radial displacement. The purpose of this is to prevent detachment of the resiliently stretchable cap 20 or, in other words, its removal from the groove defined between the flanges 28 and 33 of the collar incident to unusual stretching of the cap such as might occur during application of the cap to a bottle having a neck of unusually large external diameter. The cap 20 may be formed of appropriate resiliently stretchable and deformable materials such as a vinyl material formed with or incorporating a sufficient amount of plasticizer to lend to it the desired qualities of resilience and deformability or may be of the nature of synthetic rubber if desired.

In order to adapt the cap 20 for application to various types and sizes of bottles, the enlarged skirt portion 22 of the cap is provided with a series of relatively spaced internally projecting lugs 38 to be passed over and snapped inwardly beneath the usual transfer bead of the bottle as is conventional in various snap-on type caps. If desired, radially outwardly projecting exterior lugs 39 may be integrally formed around the inner edge of the cap to facilitate its removal by upward finger pressure.

Formed within the cap there may be a downwardly directed annular shoulder 40 for abutment against and preferably for sealing engagement with the upwardly directed surface of the bottle transfer bead.

In order that the tube 18 may be positioned to remove substantially the entire contents of the bottle B in which the pump is disposed, this tube is bent at 18a in a radial plane of the pump barrel parallel to its axis so that its lower end 18b will be positioned in one corner of the lower end of the bottle. Thus when the bottle is tilted as in FIGURE 2, the last remaining portion C of its contents will be caused to concentrate in this lowermost corner around the downwardly opening lower end 18b.

In order for such an arrangement to operate effectively, it is highly desirable that the relative orientation of the discharge spout 14 and the lower end 18b be such that they lie in the same radial plane. With this arrangement it will be seen that when the bottle is tilted, as in FIGURE 2, to place the spout delivery end in the desired position over the point of discharge, the lower end of extremity 18b of the suction tube will be automatically located in the lowermost corner of the tilted bottle. In order to maintain these positions of relative orientation, the tube 18 is fixed to the barrel 10 as is the collar 32. The collar 32 defines an opening 41 through which the plunger 12 slidably projects and reciprocates and is in wiping engagement with the other surface of the plunger in accordance with usual practice. Relative rotation between the plunger and collar is prevented by suitably keying or splining these two elements together. Thus in the exemplification shown, the collar is provided with one or more keyways 42 extending outwardly radially from the opening 41 for sliding reception of keys 43—43 fixed on and preferably molded integrally with the plunger.

In the overall operation of the device it will be readily apparent that the assembled dispensing pump unit and its supporting cap 20 may be readily applied to and removed from various bottles for repeated use simply by the expedient of inserting the tube and pump barrel into the bottle and pressing the expansible cap 20 downwardly over the neck of the bottle until its lugs 38 snap beneath the transfer bead of the bottle. It may be removed when

desired simply by upper finger pressure beneath the lugs 39.

The use of the pump for dispensing purposes is substantially as above described. Normally the bottle will be grasped and tilted in the manner indicated in FIGURE 2 to bring the discharge spout 14 generally over the area on which the contents of the bottle are to be delivered. Then by depressing and releasing the plunger 12 through finger pressure on the finger piece 15 thereof, the contents of the container B may be discharged in any desired amount until exhausted. By virtue of the bent arrangement of the tube and the disposition of its intake end in the corner of the bottle, together with the disposition of the discharge spout 14 in a common radial plane with this tube end 18b, it will be seen that the tilting of the bottle will normally deliver or direct any last remnants of its contents in a position to be drawn upwardly through the tube 18 whereby the pump may be effective in discharging substantially the entire contents of the container without loss or waste.

It will further be readily apparent that the novel arrangement of the rigid collar 32, in addition to cooperating with the plunger to secure it against rotation, also coacts with the stretchable cap 20 to prevent radial dislocation or separation of the interconnected portions of these parts, despite the formation of the cap 20 of highly deformable and flexible material and despite this objection thereof to very substantial radial stretching forces.

In this application I have shown and described only the preferred embodiment of the invention simply by way of illustration of its practice. However, I recognize that the invention is capable of other and different embodiments and that its several details may be modified in various ways, all without departing from the invention as defined in the claims hereinafter set forth.

Having thus described my invention, I claim:

1. The combination of a resiliently stretchable and deformable snap-on type container closure cap, with a dispensing pump, said cap having a top formed with a central circular aperture therethrough, said pump having a cylindrical barrel disposed through said aperture, and having a radial flange beneath and abutting against the under side of said top, an annular collar having a socket snugly receiving and secured on the upper end of said barrel above said cap, said collar having an outwardly projecting annular portion overlying said cap top, said top and said portion having axially directed means jointly defining an interlock between said collar and top, to thereby prevent radial expansion and withdrawal of said cap top from between said flange and said overlying portion.

2. The combination as defined in claim 1, wherein said collar and said cylinder, together with their overlying portion and flange respectively, are formed of substantially rigid material, said interlock being defined by an annular groove on said portion concentrically surrounding and confining an annular rib on said top.

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