

June 6, 1961

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2,987,208

NURSING NIPPLE AND CAP

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2 Sheets-Sheet 1

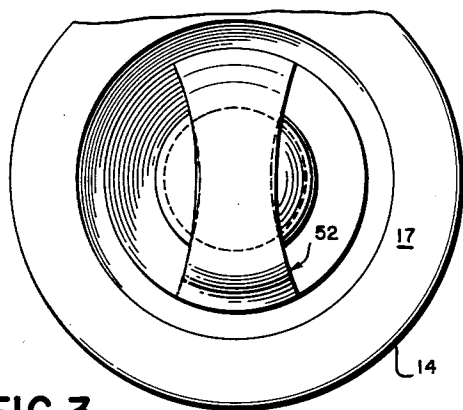


FIG. 3

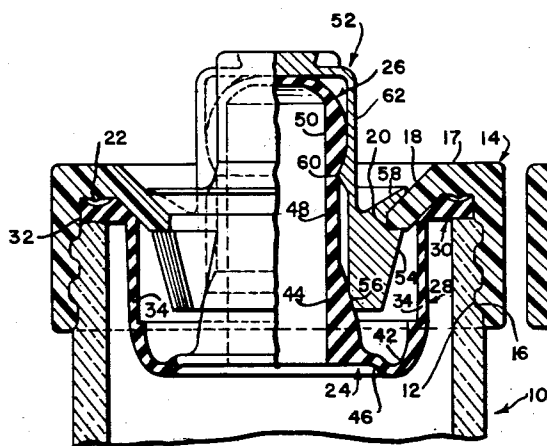


FIG. 1

FIG. 4

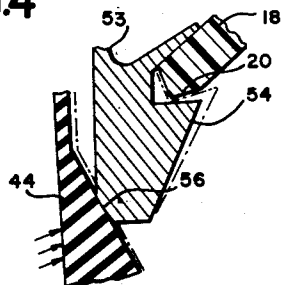


FIG. 2

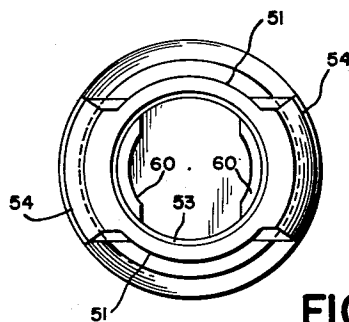
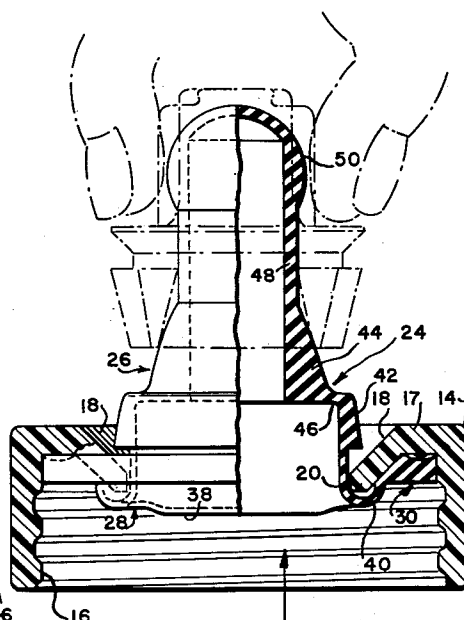


FIG. 5

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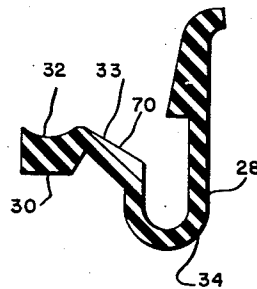
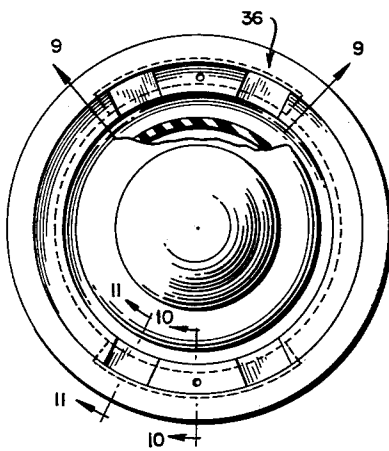
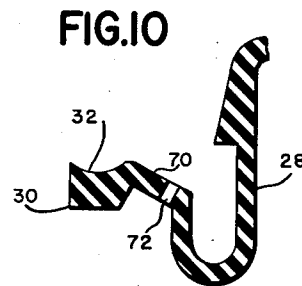
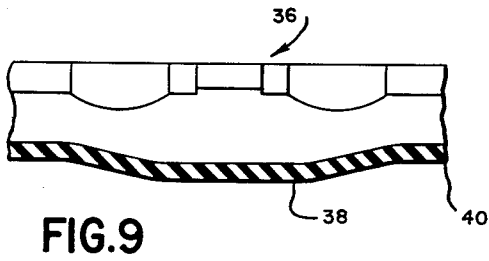
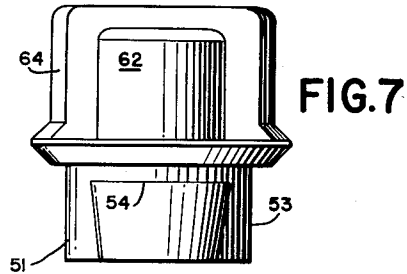
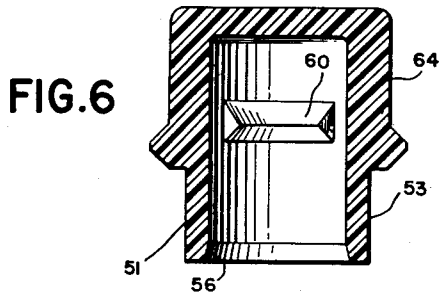
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1

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NURSING NIPPLE AND CAP
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This invention relates to improvements in infant nursing nipples of the vented type and a cover cap therefor, which nipple and cover cap are adapted to be applied to an infant nursing bottle.

The art on infant nursing nipples and bottles is highly developed and includes a number of arrangements for allowing nursing fluid within a bottle to be dispensed by the sucking of an infant. Such constructions quite commonly include an air vent to prevent a vacuum build-up inside the bottle, and furthermore such constructions sometimes include a cap or cover arrangement adapted to be applied to the nipple when the bottle is to be stored.

In my prior application, Serial No. 572,480, filed March 19, 1956, now Patent Number 2,956,702, granted October 18, 1960, there is disclosed an infant nursing nipple and cover cap combination in which the nipple is constructed in a manner to provide two stable conditions, one stable condition telescoped within the mouth of a nursing bottle in retracted position and the other stable condition being the extended or operative position. A cover cap made of flexible material or having finger wells therein is adapted to be positioned over the mouth of the nursing bottle when the nipple is in its retracted position within the mouth of the bottle to provide adequately for storage of the bottle and contents in a minimum amount of space and without leakage. It is the purpose of this invention to improve on the nipple and cover cap arrangement disclosed in my aforesaid patent while embodying the same basic principles of a retractable nipple having two equilibrium states and a replaceable and removable cover cap member being at least partially constructed of materials sufficiently flexible to allow the nipple in retracted position to be grasped through the intermediary of the cover member and pulled out to an extended position as the cap member is removed.

When the two equilibrium state nipple is in its retracted position, it is of course, extremely desirable to provide means for closing the venting valve. Accordingly, it is an object of this invention to provide a construction of a nursing nipple of the type having two equilibrium states in which the retracted equilibrium state causes an increase in the pressure on the valve section against the under side of a bottle cover, thus assuring additional sealing pressure tending to keep the valve closed even though pressure of a cap may create a downward force on the nipple body.

When a two equilibrium state nipple is positioned in its retracted state and covered by a cover member and placed in a storage position, for example in a horizontal position in a refrigerator, there is a possibility of pressure building up within the bottle if a cold bottle is filled with hot liquid and then sealed. Such a pressure could cause the two state nipple to blow out from its retracted state to its extended state, blowing off the covered cap and allowing the contents of the bottle to spill out. To prevent such occurrence, it is the object of this invention to provide a cover cap structure for cooperating with the nipple and a bottle sealing cover to be self-locking and to positively prevent any such blowout.

It is also an object of this invention to provide a cap configuration for a cover cap of an infant nursing bottle, which cap configuration is adapted to facilitate withdrawal of the cap from within a bottle cover. It is a further object to provide a cap configuration to facilitate

2

withdrawal of the nipple within the cap from its retracted to its extended position at the same time the cap is withdrawn. It is an additional object to provide convenient means for gripping the nipple through portions of the flexible cap.

Other objects and advantages of the invention will be pointed out in the following description and claims and illustrated in the accompanying drawings, which disclose, by way of example, the principles of the invention and the best mode which has been contemplated by applying these principles.

In the drawings:

FIG. 1 is a side sectional elevation showing an infant nursing bottle and a bottle cover, the improved two equilibrium state nipple construction of this invention and the improved nipple cap configuration of this invention.

FIG. 2 is a similar side sectional elevation showing the nursing bottle cover and the nipple cooperating therewith, the nipple having been withdrawn from its retracted to its extended position by means of removing the nipple cap, shown in phantom lines.

FIG. 3 is a top plan view of the assembly including the nipple cap and nipple bottle cover shown in FIG. 1.

FIG. 4 is a detail view of a portion of the nipple, cap and bottle cover illustrating the provision for preventing the cap from blowing off during a pressure build-up within the bottle.

FIG. 5 is a bottom view of the nipple cap only.

FIG. 6 is a side sectional elevation view of the nipple cap illustrating the means for allowing withdrawal of the nipple with removal of the cap.

FIG. 7 is a side elevation view of the nipple cap showing the outside of the configuration of the nipple cap to facilitate withdrawal of the cap from the bottle cover.

FIG. 8 is a top plan view of the two stage retractable nipple only, with a portion thereof broken away for the sake of clarity.

FIG. 9 is a detail view taken along line 9—9 of FIG. 8.

FIG. 10 is a sectional elevation detail view taken along line 10—10 of FIG. 8.

FIG. 11 is a detail sectional elevation view along line 11—11 of FIG. 8.

In general, the nipple portion of this invention is an improvement on the two equilibrium state nipple disclosed in my aforesaid copending application Serial No. 572,480 and on the vented nipple disclosed in my previously issued Patent 2,628,616, granted February 17, 1953. The nipple consists of a relatively rigid nipple portion, a flange portion and a flexible web portion interconnecting the nipple to the flange in such a manner to allow the nipple to assume two equilibrium states. The web portion contains therein an air vent or valve as is common in nipples to vent vacuum which might occur in the nursing bottle. In order to assure a positive seal when the two stage nipple is in its retracted position, a portion of the web interconnecting the nipple and flange is longer than another portion. The portion containing the valve area is longer than the portion not containing the valve area so that when the nipple is in retractable position the web portion results in an excess of material which pushes the valve area upwards and creates additional sealing pressure. Also, the cap configuration provides a pair of shoulders for cooperating with the bottle cover and a tapered inside portion cooperating with the nipple portion when the nipple is in retracted position. These tapered shoulders, when pressure generated within the bottle trying to blow out the nipple from retracted to extended position, serves to tighten the cap shoulders within the bottle cover, to prevent nipple blow out. The cap retaining shoulders which engage the bottle cover extend around only a portion of the circumference of the cap so that when exerting

a pressure on the finger wells, causing the cap to assume an oval shape, the opposite bulged out sections will still have an outer diameter less than the diameter of the hole of the cover, thus this oval shape is compensated for and the cap may be easily withdrawn. Within the inside of the cap there are protrusions of ridges which cooperate with an enlarged tip of the nipple to facilitate withdrawal of the nipple when the cap is withdrawn. Also, the cap includes thickened and thinner areas, the thinner areas functioning as finger wells in somewhat the manner disclosed and claimed in my aforesaid application, as in Serial No. 572,480.

Referring now to the drawings for a detailed description, as shown in FIG. 1, an infant nursing bottle 10 constructed of glass, plastic or other suitable materials is threaded on the outside near the top at 12 in order to receive a cover and accompanying nursing nipple assembly.

A cover 14 suitably constructed of plastic or the like is provided with internal thread 16 for screwing on to the top of the bottle 10. The cover includes an inwardly extending flange portion 17 and a downwardly extending flange portion 18, the downwardly extending flange portion terminating in a V-shaped flange tip 20. A ridge 22 is provided on the underside of the inwardly extending cover flange portion 17.

A two equilibrium state nipple 24 is adapted to assume a stable state in either the retracted position of FIG. 1 or the extended position of FIG. 2 and includes in general three separate portions. These portions are a relatively rigid nipple portion 26, a flexible interconnecting web portion 28 and a thickened flange portion 30 adapted to cooperate with the top of bottle 10 and the underside of cover 14.

Thickened flange portion 30 is provided with an annular hollowed out groove 32 for cooperating with depending annular ridge 22 of cover member 14. The purpose of such groove and annular ridge is similar to that in my previous application, namely, to restrain the tendency of the material to flow to other parts of the nipple thus preventing transmission of forces to the web portion 28 when the cover 14 is tightened. These forces would otherwise tend to deflect the web portion to cause malfunctioning of the valve apertures or vent to be described hereinafter.

The flexible interconnection web portion 28 is constructed to allow the web to assume two equilibrium states or stable positions. This portion includes a valve section 33 and a thin section 34, portions of which are longer than other portions as can be seen in FIG. 2. The thin portion 34 includes a pair of longer sections 38 for containing a valve or vent and a shorter section 40 does not contain a valve or vent. By this construction, when the nipple is in retracted position as shown in FIG. 1, the greater length of the thin flexible web 38 is adjacent a valve, and this results in an excess of web material in the valve area and pushes the valve section 33 upward, thus creating additional sealing pressure against the underside of cap 14. Adjacent the thin section 34 of the flexible interconnecting web portion there is a thickened shoulder portion 42. The thickened shoulder portion 42 is joined to the relatively rigid nipple portion 26 by a thin interconnecting system 46 which flexes, as shown by comparison of FIGS. 1 and 2, to allow the nipple to assume its two equilibrium states.

The relatively rigid portion 26 of the nipple includes a tapered cylindrical thickened section 44 which is integrally joined to a thinner cylindrical section 48, which in turn is terminated at the top of the nipple portion in an enlarged tip portion 50 having the usual dispensing apertures therein.

A novel configuration of a removable cap 52 is provided in combination with the two state nipple in order that the nipple may be withdrawn from its retracted stage to its extended state upon removing the cap. The cap includes a body section 53 having a pair of oppositely extending shoulders 54 which cooperate with the V-shaped

cover flange tip 20 as shown in detail in FIG. 4. As shown in FIG. 4, the extending shoulders 54 cooperate with the V-shaped tip 20 of inwardly extending flange 18 of cover 14 to provide a nominal snap-in lock. The wall portion 53 of the cap 52 includes tapered inner surface 56 adapted to mate with the tapered thickened shoulder 44 and cooperate therewith also as shown in FIG. 4. Therefore, when pressure builds up within the bottle and is applied to the inside of the nipple when in retracted position the tapered shoulder 44 bears on the tapered surface 56 of the cap 52 and forces the extending shoulders 54 farther under the V-shaped tip 20 of inwardly extending flange 18 of cover 14, thereby providing a firm lock for the cap 52 over the nipple 24.

Also on the cap 52, is an annular extension 58 mating with the top in a downwardly extending flange 18. The top portion of the cap 52 includes on the inside thereof a pair of inwardly extending lugs 60 arranged in such a position that with the nipple in retracted position and the cap in place as shown in FIG. 1, the lug 60 will be just below the enlarged tip 50 of the nipple. Thus, upon withdrawing the cap, the lugs 60 assist in securing the nipple to the cap so that the nipple can be also withdrawn from its retracted position to its extended position as shown in FIG. 2.

The top of the cap 52 includes two pair of diametrically opposed thin sections 62 which are separated by thick wall portions 64. When the thin wall finger well sections are depressed they cause the annular shoulders 54 to move inwardly thus releasing the lock and allowing the cap 52 to be removed by the fingers as illustrated in FIG. 2. This also allows the inwardly extending lug 60 to grip under the nipple and minimize the possibility of the nipple slipping out from within the cap as the cap is removed until the nipple has reached its extended position. The finger well portions 62 are, of course, equivalent to the finger wells disclosed and claimed in my aforesaid application Serial No. 572,480, however, their arrangement in the side walls of the vertically extending cap is somewhat more convenient than the arrangement disclosed in my earlier application.

The extending shoulders 54 of the cap, which are each limited to about one fourth of the circumference and are diametrically positioned, disengage the bottle cover 14 when thin finger well sections 62 in the top of the cap 52 are pressed in. However, such deformation causes the cap 52 to assume an oval shape. To prevent binding against the cooperating sections of the bottle cover 14 portions 51 of the cap body 53 between the shoulders 54 have an outer diameter which is substantially less than the diameter of the hole in the bottle cover 14 defined by the inner edge to cover tip 20. Thus, when portions 51 are expanded outwardly into oval shape they will still clear the hole in the bottle cover.

Referring now to the valve arrangement illustrated in FIGS. 8 through 11, this valve is similar in principle to the one described in my aforementioned copending application Serial No. 572,480. That is, the valve pads are positioned in a series of sectors of intermediate relative thin sections, FIG. 11 separated by intermediate relatively thick sections, FIG. 10. The portions 70 on the upper surface of the valve sections shown in FIG. 10 will be flush with the bottom surface of downwardly extending flange portion 18 of cover 14 when the cover is secured on the bottle. When the nipple is in extended or operative position as shown in FIG. 2, it can be seen that there is a path to the atmosphere from the edge of the cooperating surface of the valve portion 70 and the cover member 14. The valve vent is formed by an aperture 72 in the thick section shown in FIG. 10. When fluid is removed from the bottle by nursing of an infant on the nipple, pressure inside the bottle is reduced below atmosphere, thus creating a pressure difference across the web sectors of FIGS. 10 and 11, resulting in a force tending to deflect the web, including the thick web sectors of FIG. 10 away from contact with the underside of

5

the cover 14. When the sectors of FIG. 10 are in contact with the underside of the cap, valve openings 72 are sealed off, thus preventing fluid from escaping there-through and when the sectors of FIG. 10 are deflected away from the underside of the cover 14 by a decrease of pressure within the bottle resulting in a pressure difference across the thin sectors FIG. 11, air is allowed to flow from outside to within the bottle to equalize the pressure. As the pressure within the bottle is raised to the level of atmospheric pressure, the force on the thin sectors of FIG. 11 disappears and the web resumes its normal shape again forcing the thick valve sectors of FIG. 10 into contact with the underside of the cap sealing off the valve openings 23.

As shown in FIG. 9, the thin portion of web 34 is longer in the area 38 containing the valve 36 than it is in the area 40 not containing the valve. This additional material causes the area 38 containing the valve to be buckled up more tightly against the underside of the cover 14 to accomplish a more positive seal when the nipple is in the retracted position. The configuration shown in FIG. 9 including the reduced elevation of the area 40 on either side of the valve area 38 serves the function of providing an excess length of rubber material in the horizontal plane so as not to resist an upward movement of the valve area 38 when the nipple is in the retracted position; and tends to direct the buckling effect of the retracted nipple position in the upward direction, thus minimizing any tendency to buckle inwardly which might cause the flange 30 to become slightly oval in shape. Further, this construction functions to facilitate normal venting action by providing greater freedom of movement of the valve area in the downward direction.

The operation of the device is believed to be apparent from the foregoing description. When the nursing bottle 10 is to be stored it can be filled with liquid, the two state nipple 24 can be placed on the top and the cover 14 screwed thereon to hold the nipple in place. The nipple 24, the cover 14 and the cap 52 can be placed on the bottle 10 as a unit or placed on separately. In any event, when they are all in place and the nipple in retracted position, the fluid dispensing apertures in the enlarged portion 50 of the nipple 24 are sealed by the cap 52 and any pressure which might be generated by vapor pressure within the sealed bottle 10 will only cause the cap 52 to assume a tighter seal with the cover 14. Thus, the bottle can be stored in any position in any convenient locality. When it is desired to use the bottle for infant nursing, the finger well portion 62 of the cap is depressed and the cap is pulled vertically upward. The depressing of the finger well portions loosens the lock between shoulders 54 of cap 52 and edge 20 of cover 14. It similarly causes lugs 60 on the inner surface of cap 52 to better engage the enlarged portion 50 of the nozzle to assure that the nipple will not stay in retracted position, but will come out to extended position when the cap 52 is removed. The cap can then be further removed from the nipple in extended position and the nipple is ready for nursing. The construction of the cap 52 with the shortened diameter portions on its base 53 between shoulders 54 provides for easy removal of the cap. The additional web sections in the area of the valve as shown in FIG. 9, results in better sealing of the valve when the nipple is in retracted position.

While there have been shown and described and pointed out the fundamental novel features of the invention as applied to the preferred embodiment, it will be understood that various omissions and substitutions and changes in the form and details of the device illustrated and in its operation may be made by those skilled in the art without departing from the spirit of the invention. It is the intention, therefore, to be limited only as indicated by the scope of the following claims.

What is claimed is:

1. In an infant nursing arrangement of the type in-

6

cluding a bottle, a cover adapted to be secured to the top of the bottle and a nipple, the nipple including a flange portion adapted to cooperate with the top of the bottle and be secured thereto by the cover, a relatively rigid nipple portion, and a flexible interconnecting portion allowing said nipple to assume two stable equilibrium states capable of resisting the forces of gravity, one equilibrium state being a retracted position within the cover and the other position being an extended or nursing position, and a vent valve in the flexible interconnecting web portion, cooperating with the cover, the improvement that comprises, a longer portion the thin flexible interconnecting web portion being in the area of the valve such portion having a length more than the radial length of the material in the areas which do not contain the valve such that when the nipple is in retracted position the additional length of material in the area of the valve will cause such area to buckle the valve area against the cover causing additional pressure of the valve area against the underside of the cover member and more positive closing of the valve.

2. An infant nursing arrangement as defined in claim 1, further comprising at least one pair of diametrically opposed valves and corresponding longer portions of the thin flexible interconnecting web portion.

3. An infant nursing arrangement as defined in claim 2, further comprising a cap for said nipple, said cap adapted to cooperate with said bottle cover and close the opening therein as well as cover the relatively rigid tip of the nipple when said nipple is in retracted position, the cap including substantially vertical cylindrical body having at least a pair of outwardly extending shoulders on the lower portion of the surface thereof adapted to engage the inside edge of the bottle cover and to thereby provide a nominal snap fit, the lower portion of the cylindrical cap adapted to cooperate with a portion of the rigid nipple so that pressure from inside the nipple tending to force the nipple from retracted to extending position will exert a pressure on the cap and change the nominal snap fit between the annular shoulders and the cover into a secure lock, thereby preventing blowout upon the build-up of pressure within the bottle.

4. In combination with a nursing bottle and cover therefor, the cover being attached to the top of the bottle and providing a central opening therein for a nipple, an improved nipple and cap combination comprising, a nipple of the type having a rigid nipple portion, a flange portion and a flexible interconnecting web connecting said portions in such a manner as to provide two stable equilibrium states capable of resisting gravity forces, and a cap for said nipple, said cap adapted to cooperate with said bottle cover and close the opening therein as well as cover the relatively rigid tip of the nipple when said nipple is in retracted position, the cap including substantially vertical cylindrical body having at least a pair of outwardly extending shoulders on the lower portion of the surface thereof adapted to engage the inside edge of the bottle cover and to thereby provide a nominal snap fit, the lower portion of the cylindrical cap adapted to cooperate with a portion of the rigid nipple so that pressure from inside the nipple tending to force the nipple from retracted to extending position will exert a pressure on the cap and change the nominal snap fit between the annular shoulders and the cover into a secure lock, thereby preventing blowout upon the build-up of pressure within the bottle.

5. An arrangement as defined in claim 4, wherein the cooperating mating surfaces between the rigid portion of the nipple and the inside of the cap are generally conical in shape.

6. An arrangement as defined in claim 4, further comprising thin finger well portions on the cylindrical walls of the cap located above the extending shoulders, the finger wells adapted to be pressed inwardly thereby causing the shoulders to be pressed inwardly and allowing the

7

cap to be removed from engagement with the bottle cover.
7. A nipple and cap arrangement as defined in claim 6 further comprising an enlarged nipple tip portion on the rigid portion of said nipple, and an inwardly extending lug means on the inside of the cap body adapted to engage below the enlarged portions of the nipple to assist in preventing the nipple from slipping out from within the cap when the cap is removed from the cover and the nipple is thereby withdrawn from retracted to extended position.

10

8

8. A device as defined in claim 6 wherein the outer periphery of the body of the cap adjacent the extending shoulders is of less diameter than the corresponding hole in the cover so that when the finger wells are depressed and the cap assumes an oval shape, the cap can still be removed from the hole in the cover without binding.

No references cited.