

PATENT SPECIFICATION

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DRAWINGS ATTACHED

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(54) INFANTS FEEDING BOTTLES

(71) We, LEWIS WOOLF GRIP-TIGHT LIMITED, of 144 Oakfield Road, Selly Oak, Birmingham, 29, a British Company, do hereby declare the invention for which we pray that a Patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to infants' feeding bottles comprising a container for liquid, a teat secured onto the container, a detachable teat cap enclosing the teat before use, and means whereby, before the bottle is made ready for use, the interior of the teat is separated from the interior of the container.

Prefilled and often sterilised disposable infants' feeding bottles have been proposed and used in which the contents of the container and the interior of the teat are separated from one another before use. This expedient is adopted since in the absence of a closure element, there would be a tendency for the liquid to dry leading to clogging and to an increased risk of deterioration of the contents of the bottle, and of the teat.

This requirement has commonly been met by providing separate seals on the container top and on a package containing the teat and its holder. These require to be removed separately before the bottle is ready for use. This procedure increases the risk of contamination of the contents as well as of the teat interior, as well as resulting in a device which is relatively costly to manufacture.

Sometimes the bottle and teat assembly are separately packaged and are only fitted together immediately prior to use and after the individual packaging has been removed. With such devices it has been unpracticable and indeed ineffective to sterilise the container and the teat with its holder together. On the contrary this has normally been carried out as separate operations, thus further increasing manufacturing and filling costs.

It has also been proposed to arrange for the teat to be permanently fixed to the container and for their interiors to be separated

by a closure member which is displaced by some externally applied force. Such forces have involved undesirable distortion of the teat. In other cases, the closure member has been difficult to dislodge when it is required to do so.

The object of this invention is to provide a disposable infant's feeding bottle in which, not only is the contents of the bottle kept separate from the interior of the teat before use, but also the risk of contamination during preparation for use is minimised by avoiding the necessity for separation of the parts during such preparation. Furthermore, the opening of the interior of the teat to the interior of the container can be simply and speedily carried out.

According to the present invention, an infant's feeding bottle comprises a container for liquid, having an outlet opening surrounded by a seating, a resilient teat with an outlet orifice, the teat having a flange portion engaging the seating and secured on the container to create a seal to contain the liquid in the container, a removable teat cap enclosing the teat, the cap having an annular portion engaging a portion of the teat to create a further seal therewith and a closure member sealing against communication between the interior of the container and the interior of the teat, said closure member being frictionally engaged in the interior of the teat and being displaceable by manipulation of the teat cap to remove the closure member from its sealing position, such manipulation being carried out with the teat cap covering the teat.

The invention will now be described by way of example with reference to the accompanying drawings in which:—

Figure 1 is an enlarged cross-sectional view of the top of a feeding bottle in the packed condition and constructed in accordance with the invention.

Figure 2 is a cross-sectional view of the feeding bottle top in Figure 1 in a partially opened condition,

Figure 3 shows the same bottle top in a

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further position during the opening sequence,

Figure 4 is a view of the feeding bottle top in open condition, prepared for use,

5 Figure 5 is a cross-sectional view of the top of an alternative form of feeding bottle in accordance with the invention,

Figure 6 is a similar view of a further alternative construction, and

10 Figures 7, 8 and 9 are diagrammatic views of still further alternative constructions.

Referring to the construction shown in Figures 1 to 4, there is provided an infant's feeding bottle comprising a bottle 10 for liquid feed having an outlet opening 11 surrounded by a flat seating surface 12. Adjacent to the outlet opening 11 is a neck 13 which provides a narrower opening than the opening 11. The neck 13 is bounded, on its side, nearer to the surface 12, with a frusto conical surface 14, while at the end of this surface there is a cylindrical surface 15.

20 The flat surface 12 forms a seating for a flange 16 of a resilient teat 17. To secure the teat 17 to the bottle 10, a securing ring 18 engaging over the teat flange 16 is provided. This ring 18 is rolled onto the frusto conical surface 14 of the bottle.

25 The teat 17 has a bulbous end which is apertured at 18 in the usual manner of such devices. Between the flange 16 and the bulbous end, the teat is distorted to form a neck at 19 and has an internal annular projection 21 formed adjacent the narrowest part of the neck 19. Joining the neck 19 with the flange 12 is a cylindrical portion 22 which is, in Figure 4, shown in its free, unstressed condition.

30 Enclosing the teat 17 is a cap 23. The cap 23 has a stepped open end comprising a skirt portion 24 encompassing the securing ring 18 and a double stepped portion 25. Figure 1 shows the cap skirt portion 24 folded round at its lower end, as shown, onto the portion of the securing ring 18 which lies on the surface 14 of the bottle. Such engagement retains the cap 23 on the bottle 10.

35 When the cap 23 is in the position illustrated in Figure 1, the inner annular step of its portion 25 is in frictional engagement with the external surface of the cylindrical portion 22 of the teat 17 causing this portion to become folded.

40 Within the teat and bottle opening is a closure member 26, the purpose of which is to prevent access between the interior of the bottle and the interior of the teat. This closure member 26 is a generally cylindrical cup shaped part having its open end presented towards the bottle interior. The rim at the open end is thickened to provide an external peripheral frusto conical portion 27. The external edge of the closed end of the part is radiused at 28. The mean diameter of the frusto conical portion 27 is approximately
65 equal to the diameter of the opening 11 of the

bottle 10 so that the closure member lodges in this opening to seal it. Both the bottle 10 and the closure member 26 are, however, made from material which provides sufficient resilience to allow the closure member to be pushed completely through the opening 11, as will be described. There is further sealing engagement between the external cylindrical surface of the closure member 26 and the interior of the teat at a region adjacent to the stepped portion 25 of the cap 23. Indeed such engagement is created by pressure of the cap 23 on the teat cylindrical portion 22 which is thus deformed, as described, so that, in turn, it engages the closure member 26.

70 The parts have, for the most part been described in their positions illustrated in Figure 1. This is the condition of the device when it is stored. When it is to be made ready for use, however, certain operations must be carried out in sequence and Figures 2, 3 and 4 illustrate the progressive condition of the device to the fully open and prepared condition of Figure 4.

75 The first step is to pull the cap 23 upwards to release its skirt portion 24 from engagement around the securing ring 18. The material of the cap is such as to allow the necessary fracture or expansion merely by hand applied force. Removal to the position illustrated in Figure 2 will allow the resilient teat to revert to its unstressed position. This will release the seal between the cap 23 and the teat 17, as well as releasing that between the interior of the teat and the closure member 26.

80 The next operation is to drive the cap downwards to the original position as shown in Figure 3. Because the cap diameter, excluding its flange is less than that of the cylindrical portion 22 of the teat, this portion 22 will be folded or buckled as illustrated. Reliance is also placed upon the frictional contact between the stepped portion 25 of the cap and the external surface of the teat. The choice of materials for these parts is governed by such requirements. The internal projection 21 of the teat engages the end of the closure member 26 and causes it to be pushed through the opening 11 in the bottle 10, thus allowing liquid in the bottle to reach the interior of the teat.

85 Immediately before use, the cap 23 is removed and discarded.

90 Figure 4 shows the teat in its unstressed condition and the closure member 26 occupying the space in the bottle between the opening 11 and the neck 13. It is prevented, by its size, from entering the bottle interior through the neck 13. The shape and size of the closure member as well as the space it occupies, are chosen to prevent the closure member from lodging in a position in which it will block the flow of liquid between the interior of the bottle and the interior of the teat.

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The bottle is intended to be discarded after use and no provision is made for removal and subsequent replacement of the teat.

5 The sequence of assembly of the parts comprises inserting the teat 17 into the securing ring 18, inserting this into the cap 23, placing the closure member 26 into the teat interior and finally mounting this assembly onto the prefilled bottle 10, ensuring correct engagement of the closure member in the opening 11 of the bottle, and then rolling or otherwise deforming the skirt portion 24 of the cap 23 and the securing ring depending edge into engagement with the frusto conical surface 14 of the bottle 10. Plastics materials are generally preferred for construction of the cap and securing ring, but metal or other suitable material or any combination of these may be used.

20 The feeding bottle is preferably sterilised after assembly by a heating process.

In Figure 5 there is shown an alternative form of feeding bottle comprising a bottle 30 for liquid feed, and preferably formed from a rigid self-supporting plastics material.

25 The bottle 10 has an opening 31 and surrounding this is a conical external surface 32. An annular groove 33 is formed in the surface 32. Engaging the open top of the container 30 is a resilient teat 34, teat covering cap 35, closure member 36 and securing ring 37 which are assembled together before being placed on the bottle in similar manner to the construction previously described. The teat 34 is provided at its end with one or more outlet holes (not illustrated). The teat has a conical flange 38 formed to engage with the corresponding conical surface 32 of the bottle 30. The teat 34 also has a step providing a flat annular portion 39.

40 The teat flange 38 is held against the surface 32 of the container by the securing ring 37 which is of generally frusto conical form having internal annular beads 41, 42 at its wider and narrower ends respectively. The bead 41 at the wider end engages the annular groove 33 in the bottle 30.

45 The cap 35 is domed and forms an enclosure within which the teat 34 is disposed. There is not necessarily contact between the domed end of the cap 35 and the cap 35. The open end of the cap 35 is provided with a lip 43 which is engaged under the bead 42 of the securing ring 37.

55 Within the teat open end is disposed the closure member 36 which is in the form of a short flanged cylindrical cup. The flange 44 of this closure member 36 engages under the flat annular portion 39 of the teat 34. The external cylindrical surface of the closure member 36 engages with a corresponding cylindrical internal surface of the teat. Such surface is formed on a portion of the teat which is engaged externally with an internal surface of the cap 35 adjacent to its lip 43.

The cap, closure member and securing ring are preferably formed from a stiff plastics material which however has some degree of resilience. As shown, the cap is provided with an inwardly directed shallow annular enlargement 45 so that sealing engagement between the cap, teat and closure member in the required region is achieved.

A further seal is provided by the lip 43 of the cap which engages the flat annular surface 39 of the teat, this being internally supported by the flange 44 of the closure member 36.

A still further seal is provided by the securing ring 37, the teat flange 38 and the surface 32 of the bottle 30.

Furthermore, the closure member 36 forms a seal separating the contents of the bottle 30 from the interior of the teat 34. The closure member 36 is held within the teat by frictional engagement with the teat and will not readily become dislodged during transit and storage of the feeding bottle. The closure member moreover, serves to retain all the parts of the assembly prior to the fitting of this assembly to the container.

The closure member 36, as illustrated in Figure 5, has a hole 46 in its cylindrical wall. The wall in this region is also locally flattened. This arrangement serves as a valve whereby air from the interior of the teat can enter the interior of the container. This movement of air will only occur if there is a substantial pressure differential between the two zones of the feeding bottle, since the flexible teat will normally close the hole 46.

Circumstances in which such pressure differential can build up include sterilisation processes involving heating. It may, however, be unnecessary to make any provision for such air transference.

When the feeding bottle, which is prefilled and sterilised is required for use, the cap 35 is struck on its domed end so that its lip 43 transmits a force to the closure 36, causing it to be dislodged into the interior of the container, thus allowing liquid to enter the interior of the teat 34.

The cap 35 is now removed and discarded, and the bottle is ready for use. When the bottle has been emptied it too may be discarded.

Figure 6 shows a construction which is similar to Figure 5 but the closure member is in two parts 47, 48 to define an enclosure. The part 47 is cup shaped and the part 48 is a flat disc secured to the open end of the cup part 47. The bond between them, however, is weak. They may be alternatively connected together by means of frictionally engaging formations.

The closure formed within the composite closure member can contain an additive substance indicated generally at 49, such additive substance being liquid, solid or gaseous. The cap 35 has an integral external annular bead

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51 which, when the bottle is assembled, is adjacent the position of the closed end of the cup part 47.

Like that in Figure 5, the composite closure member forms a seal separating the contents of the bottle 30 from the interior of the teat 34 and is held by frictional engagement in the teat and will not readily become dislodged during transit or storage of the bottle.

When the feeding bottle is required for use, the cap 35 is struck on its domed end so that its lip 43 transmits a force to the part 48 of the composite closure member. This is sufficient to dislodge this part so that the contents of the enclosure formed by the composite closure member can discharge into the interior of the bottle to mix with the contents of the bottle. This operation may conveniently be carried out before the bottle is to be used, but in some circumstances, and depending upon the nature of the additive substance, it may be desirable that this operation be delayed until almost immediately before the bottle is to be used.

In this condition of the interior of the teat is still sealed from the interior of the bottle and the cap 35 is still in place to protect the teat 34 from external contamination.

When it is required to use the bottle the cap 35 is depressed still further until the bead 51 on the cap engages the retaining ring 37. There will be a squeezing action applied to the cup part 47 of the closure member through the teat, thus dislodging the part 47 and causing it to fall into the interior of the container 10. The contents of the container can now reach the interior of the teat.

Figure 7 is a diagrammatic representation of an alternative construction in which a teat 52 within a cap 53 has, within it, a solid stepped closure member 54. A securing ring for the teat as well as for the cap is provided but is not shown.

In Figure 8, a similar diagrammatic representation shows a solid, but elongated, closure member 55 provided within a teat 56 which is itself enclosed within a cap 57. The closure member 55 has an enlargement 58 at its end enclosed within the domed end of the teat 56. To dislodge the closure member 55, the end of the teat must be struck. This is carried out by crushing the end of the cap 57.

Figure 9 diagrammatically illustrates a construction having a necked teat 59. Within the teat 59 is a hollow stepped tubular closure member 61, the wider end engaging in the open end of the teat and the narrower end being closed and extending almost to the domed end of the teat 59. The closure member 61 is removed in similar manner to that of Figure 8. A cap 62 surrounds the teat 59. Securing rings are omitted from the drawings.

Frictional engagement of the cap on the outside of the teat can be employed, no provision being made for the retention of the cap

other than by such frictional engagement. However, interengaging formations on the cap and teat may be used to resist relative movement between them. It is necessary to provide means whereby manipulation of the cap dislodges the closure member within the teat without the need to remove the cap from the teat.

WHAT WE CLAIM IS:—

1. An infant's feeding bottle comprising a container for liquid, having an outlet opening surrounded by a seating, a resilient teat with an outlet orifice, the teat having a flange portion engaging the seating and secured on the container to create a seal to contain the liquid in the container, a removable teat cap enclosing the teat, the cap having an annular portion engaging a portion of the teat to create a further seal therewith and a closure member sealing against communication between the interior of the container and the interior of the teat, said closure member being frictionally engaged in the interior of the teat and being displaceable by manipulation of the teat cap to remove the closure member from its sealing position, such manipulation being carried out with the teat cap covering the teat.

2. An infant's feeding bottle as claimed in Claim 1, in which the teat is held on the container by a securing ring and the cap is secured onto the container by means of an integral formation on the cap which overlies the securing ring.

3. An infant's feeding bottle as claimed in either of Claims 1 and 2 in which the closure member is engaged in the opening of the container as well as within the teat.

4. An infant's feeding bottle as claimed in Claim 3, in which the cap, in its assembled position, deforms the teat so as to create the sealing engagement between the closure member and the teat interior.

5. An infant's feeding bottle as claimed in any one of Claims 2, 3 and 4 in which the cap is shaped to engage the outside of the teat so that when it is removed and subsequently replaced, it will cause distortion of the teat to drive the closure member from its sealing position into the container.

6. An infant's feeding bottle as claimed in Claim 5, in which the teat has an integral projection to engage the closure member when it is distorted by the cap.

7. An infant's feeding bottle as claimed in either of Claims 5 and 6 in which there is frictional contact between the teat and the closure member and between the teat and the cap over respective concentric cylindrical portions thereof, so that when the cap is moved to dislodge the closure member, such movement is imparted through the intermediary of the teat.

8. An infant's feeding bottle comprising a container for liquid, having an outlet opening surrounded by a seating, a resilient teat with

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51 which, when the bottle is assembled, is adjacent the position of the closed end of the cup part 47.

5 Like that in Figure 5, the composite closure member forms a seal separating the contents of the bottle 30 from the interior of the teat 34 and is held by frictional engagement in the teat and will not readily become dislodged during transit or storage of the bottle.

10 When the feeding bottle is required for use, the cap 35 is struck on its domed end so that its lip 43 transmits a force to the part 48 of the composite closure member. This is sufficient to dislodge this part so that the contents of the enclosure formed by the composite closure member can discharge into the interior of the bottle to mix with the contents of the bottle. This operation may conveniently be carried out before the bottle is to be used, but in some circumstances, and depending upon the nature of the additive substance, it may be desirable that this operation be delayed until almost immediately before the bottle is to be used.

25 In this condition of the interior of the teat is still sealed from the interior of the bottle and the cap 35 is still in place to protect the teat 34 from external contamination.

30 When it is required to use the bottle the cap 35 is depressed still further until the bead 51 on the cap engages the retaining ring 37. There will be a squeezing action applied to the cup part 47 of the closure member through the teat, thus dislodging the part 47 and causing it to fall into the interior of the container 10. The contents of the container can now reach the interior of the teat.

40 Figure 7 is a diagrammatic representation of an alternative construction in which a teat 52 within a cap 53 has, within it, a solid stepped closure member 54. A securing ring for the teat as well as for the cap is provided but is not shown.

45 In Figure 8, a similar diagrammatic representation shows a solid, but elongated, closure member 55 provided within a teat 56 which is itself enclosed within a cap 57. The closure member 55 has an enlargement 58 at its end enclosed within the domed end of the teat 56. To dislodge the closure member 55, the end of the teat must be struck. This is carried out by crushing the end of the cap 57.

50 Figure 9 diagrammatically illustrates a construction having a necked teat 59. Within the teat 59 is a hollow stepped tubular closure member 61, the wider end engaging in the open end of the teat and the narrower end being closed and extending almost to the domed end of the teat 59. The closure member 61 is removed in similar manner to that of Figure 8. A cap 62 surrounds the teat 59. Securing rings are omitted from the drawings.

60 Frictional engagement of the cap on the outside of the teat can be employed, no provision being made for the retention of the cap

other than by such frictional engagement. However, interengaging formations on the cap and teat may be used to resist relative movement between them. It is necessary to provide means whereby manipulation of the cap dislodges the closure member within the teat without the need to remove the cap from the teat.

WHAT WE CLAIM IS:—

75 1. An infant's feeding bottle comprising a container for liquid, having an outlet opening surrounded by a seating, a resilient teat with an outlet orifice, the teat having a flange portion engaging the seating and secured on the container to create a seal to contain the liquid in the container, a removable teat cap enclosing the teat, the cap having an annular portion engaging a portion of the teat to create a further seal therewith and a closure member sealing against communication between the interior of the container and the interior of the teat, said closure member being frictionally engaged in the interior of the teat and being displaceable by manipulation of the teat cap to remove the closure member from its sealing position, such manipulation being carried out with the teat cap covering the teat.

80 2. An infant's feeding bottle as claimed in Claim 1, in which the teat is held on the container by a securing ring and the cap is secured onto the container by means of an integral formation on the cap which overlies the securing ring.

85 3. An infant's feeding bottle as claimed in either of Claims 1 and 2 in which the closure member is engaged in the opening of the container as well as within the teat.

90 4. An infant's feeding bottle as claimed in Claim 3, in which the cap, in its assembled position, deforms the teat so as to create the sealing engagement between the closure member and the teat interior.

95 5. An infant's feeding bottle as claimed in any one of Claims 2, 3 and 4 in which the cap is shaped to engage the outside of the teat so that when it is removed and subsequently replaced, it will cause distortion of the teat to drive the closure member from its sealing position into the container.

100 6. An infant's feeding bottle as claimed in Claim 5, in which the teat has an integral projection to engage the closure member when it is distorted by the cap.

105 7. An infant's feeding bottle as claimed in either of Claims 5 and 6 in which there is frictional contact between the teat and the closure member and between the teat and the cap over respective concentric cylindrical portions thereof, so that when the cap is moved to dislodge the closure member, such movement is imparted through the intermediary of the teat.

110 8. An infant's feeding bottle comprising a container for liquid, having an outlet opening surrounded by a seating, a resilient teat with



an outlet orifice, the teat having a flange portion engaging the seating and secured on the container to create a seal to contain the liquid in the container, a removable teat cap enclosing the teat, the cap having an annular portion engaging a portion of the teat to create a further seal therewith and a closure member sealing against communication between the interior of the container and the interior of the teat, said closure member being frictionally engaged in the interior of the teat and being displaceable by manipulation of the teat cap to remove the closure member from its sealing position, such manipulation being carried out with the teat cap covering the teat, the cap being shaped to engage the outside of the teat to provide frictional contact therewith and to create frictional contact between the teat and the closure member, through respective cylindrical portions thereof.

9. An infant's feeding bottle as claimed in any one of the preceding Claims in which the container is necked to provide a zone in which the closure member is retained after being dislodged from the sealing position.

10. An infant's feeding bottle as claimed in Claim 1, in which the cap and teat flange are both secured to the container by means of a single retaining ring.

11. An infant's feeding bottle as claimed in Claim 10, in which the cap has a lip which engages a flange on the closure member through the teat and, by application of pressure to the cap, in a direction normal to the flange, drives the closure member into the interior of the container.

12. An infant's feeding bottle as claimed in any one of the preceding Claims in which the closure member defines within it an enclosure in which a further substance can be stored without contact between this substance and the interiors of the teat and of the container, means being provided whereby the substance in the closure member can be allowed to mix with the contents of the

container.

13. An infant's feeding bottle as claimed in Claim 11 in which the closure member is in two parts and the means for allowing mixture of the substance with the contents of the container comprises means whereby one of the parts can be dislodged so as to allow such mixture, the other part being in place to prevent the mixture entering the interior of the teat, and further means whereby the other part of the closure member can be separately dislodged.

14. An infant's feeding bottle as claimed in Claim 1 in which the closure member is elongated into the teat interior and can be dislodged by pressing the end of the cap onto this closure member end, through the teat.

15. An infant's feeding bottle substantially as hereinbefore described with reference to and as shown in Figures 1 to 4 of the accompanying drawings.

16. An infant's feeding bottle substantially as hereinbefore described with reference to and as shown in Figure 5 of the accompanying drawings.

17. An infant's feeding bottle substantially as hereinbefore described with reference to and as shown in Figure 6 of the accompanying drawings.

18. An infant's feeding bottle substantially as hereinbefore described with reference to and as shown in Figure 7 of the accompanying drawings.

19. An infant's feeding bottle substantially as hereinbefore described with reference to and as shown in Figure 8 of the accompanying drawings.

20. An infant's feeding bottle substantially as hereinbefore described with reference to and as shown in Figure 9 of the accompanying drawings.

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