

PATENT SPECIFICATION

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DRAWINGS ATTACHED

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(19)



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(54) DISPENSERS WITH CAPTIVE CAPS

(71) We, THE METAL BOX COMPANY LIMITED, of 37 Baker Street, London, W1A 1AN, 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:—

The invention relates to dispensers such as for use in dispensing flowable substances from containers.

According to the invention, there is provided a dispenser for dispensing a flowable substance, comprising a nozzle and a cap both formed of resilient plastics material, a hinge of resilient plastics material joining the cap to the nozzle for movement between a closed position in which it seals an open end of the nozzle and an open position clear of the nozzle, the hinge comprising an arm of plastics material which joins the outside of the nozzle to the cap and has relatively rigid and relatively flexible portions so as to define a single hinge axis which is located spaced from and between the nozzle and the cap, and a detent member made of resilient plastics material and positioned to mechanically interfere with the closing movement of the cap so as to develop a force which prevents the cap from moving further towards the closed position until overcome.

A dispenser embodying the invention will now be described, by way of example only, with reference to the accompanying drawings in which:

Figure 1 is a transverse section through the dispenser, as applied to a collapsible toothpaste tube;

Figure 2 is a top plan on Figure 1;

Figure 3 is an end elevation on Figure 1; and

Figure 4 is a transverse section of the dispenser of Figure 1 but showing the dispenser in the closed position.

The dispenser formed (as by injection moulding) in one piece of resilient plastics material which may, for example, be low or high density polyethylene or may be polypropylene. The dispenser may be used for attachment to a toothpaste tube. It comprises a nozzle whose open end is perpendicular to the nozzle axis, and a closure cap 51. At its opposite end, the nozzle 50 has a bead 52 for engaging behind an external bead on the nozzle of the toothpaste tube (not shown) so as to hold the dispenser in position. The cap 51 is frusto-conical in shape and has an open end for receiving the nozzle. A wall 56 divides the cap into two halves. On one side of the wall, there is provided an annular collar 58. The closure cap is hinged to the nozzle by means of two hinge arms 60, 62. Each of these hinge arms has a thick portion 60A, 62A which extends rigidly from the underside of the lower peripheral edge of the nozzle 50, and a much thinner portion 60B, 62B which is attached to the peripheral edge of the wider end of the cap 51. Associated with the hinge is a detent member 64 which projects outwardly from a peripheral portion of the cap 51 near its wider end and between the hinge arms 60, 62. In operation, the cap and the nozzle are hingable relative to each other by virtue of the flexibility of the thin hinge arm portions 60B, 62B, and the nozzle and cap therefore hinge relative to each other approximately about the line of join between the thick and thin hinge arm portions. Figure 1 shows the cap in its open position to allow dispensing of the toothpaste out through the upper end of the nozzle 50. To close the nozzle, the cap 51 is lifted so as to turn about the hinge structure described above, and the wider open end of the cap closes over the nozzle 50 with the annular collar 58 engaging the upper end of the nozzle. The internal diameter of the annular shoulder 58 is arranged to be a tight fit on the external diameter of the upper part of the nozzle and, because of the angle at which the annular shoulder 58 approaches the nozzle 50 during the hinging motion, slight lifting of the cap and distortion of the shoulder 58 has to occur to allow the shoulder to snap over the nozzle 50. An inner peripheral chamfer on the

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The closure cap is hinged to the nozzle by means of two hinge arms 60, 62. Each of these hinge arms has a thick portion 60A, 62A which extends rigidly from the underside of the lower peripheral edge of the nozzle 50, and a much thinner portion 60B, 62B which is attached to the peripheral edge of the wider end of the cap 51.

Associated with the hinge is a detent member 64 which projects outwardly from a peripheral portion of the cap 51 near its wider end and between the hinge arms 60, 62.

In operation, the cap and the nozzle are hingable relative to each other by virtue of the flexibility of the thin hinge arm portions 60B, 62B, and the nozzle and cap therefore hinge relative to each other approximately about the line of join between the thick and thin hinge arm portions. Figure 1 shows the cap in its open position to allow dispensing of the toothpaste out through the upper end of the nozzle 50.

To close the nozzle, the cap 51 is lifted so as to turn about the hinge structure described above, and the wider open end of the cap closes over the nozzle 50 with the annular collar 58 engaging the upper end of the nozzle. The internal diameter of the annular shoulder 58 is arranged to be a tight fit on the external diameter of the upper part of the nozzle and, because of the angle at which the annular shoulder 58 approaches the nozzle 50 during the hinging motion, slight lifting of the cap and distortion of the shoulder 58 has to occur to allow the shoulder to snap over the nozzle 50. An inner peripheral chamfer on the

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shoulder 58 and an outer peripheral chamfer on the nozzle 50 aid this process.

In the closed position of the cap, the hinge is stretched slightly as a result of the lifting action which is necessary to snap the shoulder over the nozzle, and the resultant stress in the hinge helps to retain the cap 51 in the closed position.

When the cap 51 begins to move towards the closed position as described above, the detent 64 moves into contact with the lower peripheral edge of the nozzle 50. Continued movement of the cap 51 causes slight bending of the detent member 64 and slight distortion of the lower peripheral edge of the nozzle 50 to allow the detent 64 to pass and permit the cap to move on into the closed position. The detent 64 therefore produces a force tending to hold the cap in the open position and prevents it interfering with a paste-dispensing operation.

The taper of the cap 51 provides a space 66 (Fig. 4) which accommodates any excess paste which has accumulated around the nozzle 50. If the excess paste is too great in quantity to be accommodated in the space 66, then the closing operation of the cap 51 will push out this excess paste around the peripheral edge of the wider end of the cap. The peripheral edge then engages the side of the nozzle to form a secondary seal.

The narrower end of the cap 51 may be cut across at an angle with the aim of emphasizing to the user that the cap is removed by a pushing and hinging operation instead of by a screwing operation. A flat 68 may be formed on one side of the cap for the same purpose.

The detent 64 may be mounted on the nozzle, instead of on the cap as illustrated, so as to contact the cap as the latter moves into the closed position, the detent being bent in response to the closing force to allow the cap to move into the closed position.

The open end of the nozzle may be inclined to the nozzle axis.

WHAT WE CLAIM IS:—

1. A dispenser for dispensing a flowable substance, comprising a nozzle and a cap both formed of resilient plastics material, a hinge of resilient plastics material joining the cap to the nozzle for movement between a closed position in which it seals an open end of the nozzle and an open position clear of the nozzle the hinge comprising an arm of plastics material which joins the outside of the nozzle to the cap and has relatively rigid and relatively flexible portions so as to define a single hinge axis which is located spaced from and between the nozzle and the cap, and a detent member made of resilient plastics material and positioned to mechanically interfere with the closing movement of the cap so as to develop a force which prevents the cap from moving further towards the closed position until overcome.

2. A dispenser according to claim 1, in which stress in the plastics material when the cap is in the closed position tends to hold the cap in the closed position.

3. A dispenser according to claim 2, in which the stress is at least partly produced by stretching of the plastics material.

4. A dispenser according to any preceding claim, in which the nozzle and the cap are so shaped that in the closed position one of them is at least partially inserted in the other so as to define a closed clearance space between the nozzle and the cap.

5. A dispenser according to claim 4, in which the nozzle is tapered inwardly towards its said open end, the cap being of hollow form with an open end whereby, when the cap is in the closed position, the nozzle projects through the open end of the cap and is closed off by a closure wall in the cap, and the said clearance space is provided between the outer wall of the nozzle and the inner wall of the cap.

6. A dispenser according to claim 5, in which the said closure wall of the cap includes a projection which engages and seals the open end of the nozzle when the cap is in the closed position.

7. A dispenser according to claim 6, in which the projection is a collar which engages the outside of the nozzle.

8. A dispenser according to any one of claims 5 to 7, in which the cap is arranged to engage the nozzle, when in the closed position, in a region adjacent the open end of the cap so as to provide a further seal between the cap and the nozzle.

9. A dispenser according to any preceding claim, in which the hinge comprises a member of plastics material interconnecting the nozzle and the cap and having a reduced thickness portion shaped so as to provide the hinge axis in a plane perpendicular to the axis of the nozzle.

10. A dispenser according to any preceding claim, in which the detent member comprises a member attached to the cap or the nozzle and arranged to contact the other thereof so as to produce the said force as the cap moves to the closed position, distortion at the point of contact taking place when the force is overcome.

11. A dispenser according to claim 10, in which the hinge comprises two, substantially parallel, hinge arms of plastics material each joined at one end to the nozzle and at the other end to the cap and each comprising integral rigid and flexible portions whereby the hinge axis is substantially coincident with the line of join of the two portions of each hinge arm, the detent member extending from the cap at a position between the two hinge arms whereby to contact the nozzle at a position between the two hinge arms as the cap is moved to the closed position.

shoulder 58 and an outer peripheral chamfer on the nozzle 50 aid this process.

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5 action which is necessary to snap the shoulder over the nozzle, and the resultant stress in the hinge helps to retain the cap 51 in the closed position.

10 When the cap 51 begins to move towards the closed position as described above, the detent 64 moves into contact with the lower peripheral edge of the nozzle 50. Continued movement of the cap 51 causes slight bending of the detent member 64 and slight distortion of the lower peripheral edge of the nozzle 50 to allow the detent 64 to pass and permit the cap to move on into the closed position. The detent 64 therefore produces a force tending to hold the cap in the open position and prevents it interfering with a paste-dispensing operation.

15 The taper of the cap 51 provides a space 66 (Fig. 4) which accommodates any excess paste which has accumulated around the nozzle 50. If the excess paste is too great in quantity to be accommodated in the space 66, then the closing operation of the cap 51 will push out this excess paste around the peripheral edge of the wider end of the cap. The peripheral edge then engages the side of the nozzle to form a secondary seal.

20 The narrower end of the cap 51 may be cut across at an angle with the aim of emphasizing to the user that the cap is removed by a pushing and hinging operation instead of by a screwing operation. A flat 68 may be formed on one side of the cap for the same purpose.

25 The detent 64 may be mounted on the nozzle, instead of on the cap as illustrated, so as to contact the cap as the latter moves into the closed position, the detent being bent in response to the closing force to allow the cap to move into the closed position.

30 The open end of the nozzle may be inclined to the nozzle axis.

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2. A dispenser according to claim 1, in which stress in the plastics material when the cap is in the closed position tends to hold the cap in the closed position.

3. A dispenser according to claim 2, in which the stress is at least partly produced by stretching of the plastics material.

4. A dispenser according to any preceding claim, in which the nozzle and the cap are so shaped that in the closed position one of them is at least partially inserted in the other so as to define a closed clearance space between the nozzle and the cap.

5. A dispenser according to claim 4, in which the nozzle is tapered inwardly towards its said open end, the cap being of hollow form with an open end whereby, when the cap is in the closed position, the nozzle projects through the open end of the cap and is closed off by a closure wall in the cap, and the said clearance space is provided between the outer wall of the nozzle and the inner wall of the cap.

6. A dispenser according to claim 5, in which the said closure wall of the cap includes a projection which engages and seals the open end of the nozzle when the cap is in the closed position.

7. A dispenser according to claim 6, in which the projection is a collar which engages the outside of the nozzle.

8. A dispenser according to any one of claims 5 to 7, in which the cap is arranged to engage the nozzle, when in the closed position, in a region adjacent the open end of the cap so as to provide a further seal between the cap and the nozzle.

9. A dispenser according to any preceding claim, in which the hinge comprises a member of plastics material interconnecting the nozzle and the cap and having a reduced thickness portion shaped so as to provide the hinge axis in a plane perpendicular to the axis of the nozzle.

10. A dispenser according to any preceding claim, in which the detent member comprises a member attached to the cap or the nozzle and arranged to contact the other thereof so as to produce the said force as the cap moves to the closed position, distortion at the point of contact taking place when the force is overcome.

11. A dispenser according to claim 10, in which the hinge comprises two, substantially parallel, hinge arms of plastics material each joined at one end to the nozzle and at the other end to the cap and each comprising integral rigid and flexible portions whereby the hinge axis is substantially coincident with the line of join of the two portions of each hinge arm, the detent member extending from the cap at a position between the two hinge arms whereby to contact the nozzle at a position between the two hinge arms as the cap is moved to the closed position.



12. A dispenser according to any preceding claim, in which the open end of the nozzle is inclined to the nozzle axis.
13. A dispenser for dispensing a flowable substance, substantially as described with reference to the accompanying drawings.
14. A collapsible tube for containing paste, fitted with a dispenser according to any preceding claim around an open end of the tube.
15. A tube according to claim 14, in which the dispenser has an annular bead which engages an annular bead on the neck of the tube to hold the dispenser in position.

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