

PATENT SPECIFICATION

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(54) CONTAINER-PLUG

(71) We, KOBAYASHI PHARMACEUTICAL CO., LTD., a Japanese body corporate, of 25, 5-chome, Doshomachi, Higashi-ku, Osaka, Japan, 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 an applicator-plug for a liquid container, especially a liquid medicine container with which it is possible to apply a freely adjusted amount of liquid medicine from the container to an affected part.

According to the present invention an applicator-plug for a liquid container comprises a plug body having a central through-hole and including two axially spaced valve seats inside the plug body, a valve body including two tapered portions engageable respectively with the two valve seats and resilient means to hold the valve body in contact with the valve seats.

In a preferred form of the invention, the applicator-plug comprises a plug body having a peripheral shoulder portion inside the lower end thereof, a central through-hole and a projecting edge surrounding the central through-hole at the top end, the plug body including two valve seats axially spaced inside the plug body, and the outside thereof being adapted to be fixed tightly to the mouth of a container; a valve body including two tapered portions engageable respectively with the two valve seats, the upper one of said tapered portions having a top surface on substantially the same or a slightly higher level than the top surface of said projecting edge; at least one resilient body being provided between said peripheral shoulder portion inside the lower end of said plug body and the bottom of the valve body, the valve body being held in contact with the valve seats by said resilient body; and a liquid dispensing pad, made of sponge-like material and presenting an exposed liquid-dispensing surface, the pad being fixed to the top of said plug

body to cover the through-hole and the projecting edge and thereby to absorb liquid dispensed through the plug body.

The valve body and the resilient body may be formed as one unitary bond to reduce production costs. The resilient body may be spiral. The upper tapered portion of the valve body may have one or more axial grooves.

The invention will now be described with reference to the accompanying drawings in which:

Fig. 1 is a cross-sectional view of an embodiment of the applicator-plug of this invention set in a container mouth;

Fig. 2 is a cross-sectional view of the plug body of the embodiment of Fig. 1;

Fig. 3 is a side view of a unitary body of the embodiment of Fig. 1 comprising a valve and a spiral resilient portion; and

Fig. 4 is a top view of the unitary bond as shown in Fig. 3.

The plug relating to the embodiment of Figs. 1 to 4 comprises a plug body (a) having a peripheral shoulder portion 21 inside the lower end of the plug body, a central through-hole 24 tapering toward the top, a conical valve seat 23 communicating with the central through-hole, a ring-shaped projecting edge 26 surrounding the central through-hole, a basin 27 for holding liquid medicine inside of the ring-shaped projecting edge 26, and a cylindrical flange 30 having a ring-shaped groove 28 in the upper side and a ring-shaped groove 29 in the lower side; a cover 31 made of sponge-like material covering the top of the plug body, the cover being inserted in the space defined by ring-shaped groove 28 and being held tightly between the outside of the ring-shaped projecting edge 26 and the top end of the flange 30 bent inward; a resilient ring body 32 made of soft plastics material, the ring body being positioned on the peripheral shoulder portion 21 of the plug body (a); and a unitary body (b) including a conical valve 34 and some resilient spiral bars 33, the valve

34 being formed into a conical shape fitting tightly in the conical valve seat 23 of the plug body (a), a projecting portion 35 with taper for inserting in the through-hole 24
 5 being formed on the upper part portion of the conical valve 34, and the resilient spiral bars 33 being provided on the lower part portion of the valve 34 and being received by the resilient ring body 32. The container
 10 neck 36 has a rim 37 which fits tightly in the groove 29, thus securing the plug in the containers.

The grooves 35' shown in the Figs. 1, 3 and 4 are not an indispensable feature, since
 15 the through-hole 24 and the projection 35 are both tapered. It will be seen that the unitary body (b) has two conical valve portions, namely the tapered projecting portion 35 and the conical valve 34, and the body (a)
 20 has two corresponding valve seats, namely the tapered through-hole 24 and the conical valve seat 23. This arrangement permits liquid medicine in the container to pass through the applicator-plug when it is in
 25 use but maintains a complete seal which prevents leakage of the liquid medicine when the medicine is not being used.

When the container fitted with the applicator-plug shown in the drawings is used, a
 30 cap 38 is removed from the neck 36 of the container, the container is held upside down and the cover 31 is pressed against the affected part to apply the liquid medicine to the part.

35 When the cover 31 is pressed against the affected part, valve body 34,35 is pushed down and overcomes the resisting compressing force of the spiral resilient bars 33, the conical valve 34 of the valve body and the
 40 conical valve seat 23 of the plug body separate from each other as also do the projecting portion 35 and the through-hole 24, and liquid medicine flows into the basin 27. The liquid medicine in basin 27 seeps through
 45 the cover 31 and is then applied to the affected part. The flow rate of the liquid medicine is adjusted by varying the force with which the cover 31 is pressed against the affected part which, in turn, controls the
 50 opening of the valve body 34,35.

When the liquid medicine is not being applied, the valve seats 23,24 of the plug body and the conical valve 11 are sealed by the valve body 34,35 acted on by the force
 55 of the spiral resilient bars 33. Therefore, there is no fear of leakage of the medicine.

WHAT WE CLAIM IS:—

1. An applicator plug for a liquid container comprising a plug body having a central through-hole and including two axially
 60 spaced valve seats inside the plug body, a valve body including two tapered portions engageable respectively with the two valve seats and resilient means to hold the valve body in contact with the valve seats.

2. An applicator-plug for a liquid container comprising a plug body having a peripheral shoulder portion inside the lower end thereof, a central through-hole and a
 70 projecting edge surrounding the central through-hole at the top end, the plug body including two axially spaced valve seats inside the plug body, and the outside thereof being adapted to be fixed tightly to the mouth of a container; a valve body including two tapered
 75 portions engageable respectively with the two valve seats, the upper one of said tapered portions having a top surface on substantially the same or a slightly higher level than the top surface of said projecting edge;
 80 at least one resilient body being provided between said peripheral shoulder portion inside the lower end of said plug body and the bottom of the valve body, the valve body being held in contact with the valve seats
 85 by said resilient body; and a liquid dispensing pad, made of sponge-like material and presenting an exposed liquid-dispensing surface, the pad being fixed to the top of said plug body, to cover the through-hole and the
 90 projecting edge and thereby to absorb liquid dispensed through the plug body.

3. An applicator-plug as claimed in claim 2, in which the valve body and at least one
 95 resilient body are formed as one unitary body.

4. An applicator-plug as claimed in claim 3, in which the resilient body is spiral.

5. An applicator-plug is claimed in any one of claims 2 to 4, in which the upper
 100 tapered portion of the valve body has one or more axial grooves.

6. A container having fixed in the mouth thereof an applicator plug as claimed in any one of claims 2 to 5.

7. An applicator plug as claimed in claim 105 2, constructed and arranged substantially as hereinbefore described with reference to and as illustrated in Figs. 1 to 4 of the accompanying drawings.

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34 being formed into a conical shape fitting tightly in the conical valve seat 23 of the plug body (a), a projecting portion 35 with taper for inserting in the through-hole 24 being formed on the upper part portion of the conical valve 34, and the resilient spiral bars 33 being provided on the lower part portion of the valve 34 and being received by the resilient ring body 32. The container neck 36 has a rim 37 which fits tightly in the groove 29, thus securing the plug in the containers.

The grooves 35' shown in the Figs. 1, 3 and 4 are not an indispensable feature, since the through-hole 24 and the projection 35 are both tapered. It will be seen that the unitary body (b) has two conical valve portions, namely the tapered projecting portion 35 and the conical valve 34, and the body (a) has two corresponding valve seats, namely the tapered through-hole 24 and the conical valve seat 23. This arrangement permits liquid medicine in the container to pass through the applicator-plug when it is in use but maintains a complete seal which prevents leakage of the liquid medicine when the medicine is not being used.

When the container fitted with the applicator-plug shown in the drawings is used, a cap 38 is removed from the neck 36 of the container, the container is held upside down and the cover 31 is pressed against the affected part to apply the liquid medicine to the part.

When the cover 31 is pressed against the affected part, valve body 34,35 is pushed down and overcomes the resisting compressing force of the spiral resilient bars 33, the conical valve 34 of the valve body and the conical valve seat 23 of the plug body separate from each other as also do the projecting portion 35 and the through-hole 24, and liquid medicine flows into the basin 27. The liquid medicine in basin 27 seeps through the cover 31 and is then applied to the affected part. The flow rate of the liquid medicine is adjusted by varying the force with which the cover 31 is pressed against the affected part which, in turn, controls the opening of the valve body 34,35.

When the liquid medicine is not being applied, the valve seats 23,24 of the plug body and the conical valve 11 are sealed by the valve body 34,35 acted on by the force of the spiral resilient bars 33. Therefore, there is no fear of leakage of the medicine.

WHAT WE CLAIM IS:—

1. An applicator plug for a liquid container comprising a plug body having a central through-hole and including two axially spaced valve seats inside the plug body, a valve body including two tapered portions engageable respectively with the two valve seats and resilient means to hold the valve body in contact with the valve seats.

2. An applicator-plug for a liquid container comprising a plug body having a peripheral shoulder portion inside the lower end thereof, a central through-hole and a projecting edge surrounding the central through-hole at the top end, the plug body including two axially spaced valve seats inside the plug body, and the outside thereof being adapted to be fixed tightly to the mouth of a container; a valve body including two tapered portions engageable respectively with the two valve seats, the upper one of said tapered portions having a top surface on substantially the same or a slightly higher level than the top surface of said projecting edge; at least one resilient body being provided between said peripheral shoulder portion inside the lower end of said plug body and the bottom of the valve body, the valve body being held in contact with the valve seats by said resilient body; and a liquid dispensing pad, made of sponge-like material and presenting an exposed liquid-dispensing surface, the pad being fixed to the top of said plug body, to cover the through-hole and the projecting edge and thereby to absorb liquid dispensed through the plug body.

3. An applicator-plug as claimed in claim 2, in which the valve body and at least one resilient body are formed as one unitary body.

4. An applicator-plug as claimed in claim 3, in which the resilient body is spiral.

5. An applicator-plug is claimed in any one of claims 2 to 4, in which the upper tapered portion of the valve body has one or more axial grooves.

6. A container having fixed in the mouth thereof an applicator plug as claimed in any one of claims 2 to 5.

7. An applicator plug as claimed in claim 2, constructed and arranged substantially as hereinbefore described with reference to and as illustrated in Figs. 1 to 4 of the accompanying drawings.

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