Jan. 12, 1960 L. L. LERNER ET AL 2,920,624

EYE DROP DISPENSER

Filed July 31, 1958

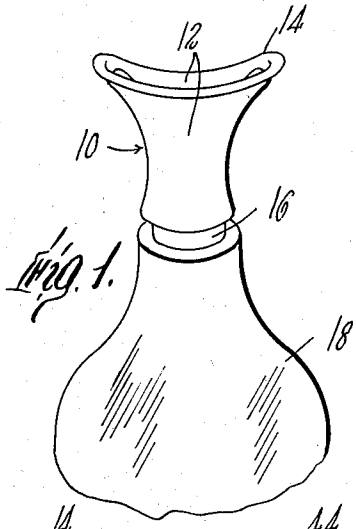


Fig. 1.

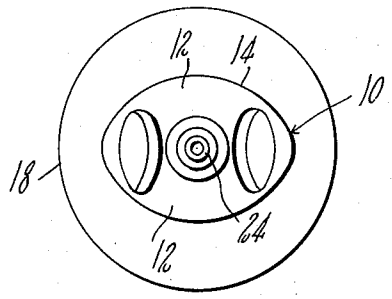


Fig. 2.

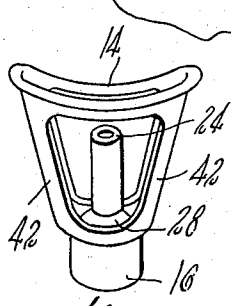


Fig. 6.

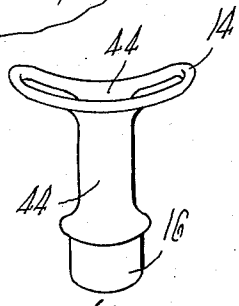


Fig. 7.

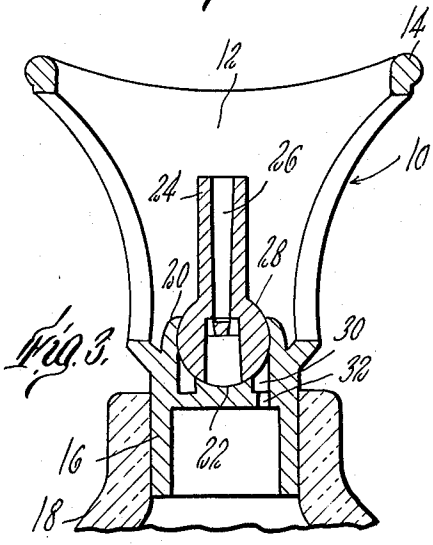


Fig. 3.

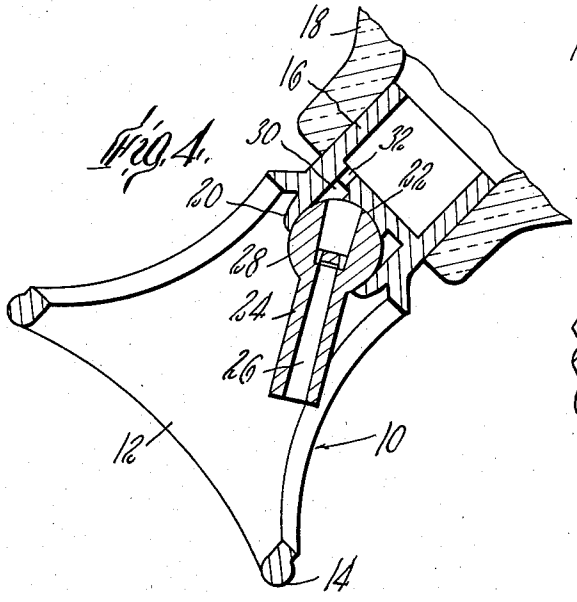


Fig. 4.

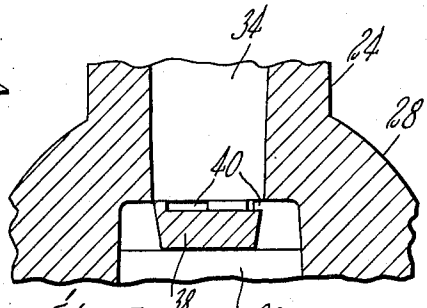


Fig. 5.

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EYE DROP DISPENSER

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Application July 31, 1958, Serial No. 752,229

6 Claims. (Cl. 128—233)

This invention relates to an eye drop dispenser having a ball-and-socket type outlet and a frame for maintaining the outlet in the desired spaced relation to the eyeball and pertains more specifically to a spigot of improved one-piece molded construction.

One object of the present invention is to provide an eye drop dispenser having a ball-and-socket-type outlet in combination with a frame for positioning the outlet and maintaining it in the desired spaced relation with respect to the eyeball, the outlet and frame being so arranged that drops are dispensed only when the spigot of the outlet is tilted away from center position, so that the drops do not fall directly on the cornea of the eye.

Another object is to provide an eye drop dispenser of the type described having a one-piece spigot of improved construction for dispensing the eye drop liquid at the desired slow rate.

Other and further objects will be apparent from the drawing and from the description which follows.

In the drawing:

Fig. 1 is a perspective view showing one embodiment of the present invention mounted on a container;

Fig. 2 is a plan view of the embodiment shown in Fig. 1;

Fig. 3 is a view in cross section on an enlarged scale, partly broken away, showing the spigot in closed position;

Fig. 4 is a view corresponding to Fig. 3 showing the spigot in open position;

Fig. 5 is a view in cross section on a greatly enlarged scale of a portion of the central bore of the spigot;

Fig. 6 is a perspective view showing another embodiment of the invention; and

Fig. 7 is a perspective view showing still a third embodiment of the invention.

As appears from the drawing the device comprises a frame **10** made up of a pair of uprights **12, 12** rigidly supporting a curved oval-shaped marginal portion **14** which is shaped so as to adapt it to engage the flesh around the eyeball of the person using the device. Extending downwardly from the lower portion of frame **10** is a flange **16** adapted to be engaged within the mouth of a container **18** in a press fit and which serves to support frame **10** in the desired position on the container **18**. Extending upwardly within the interior of frame **10** from the bottom portion thereof is a supporting member **20** having an outwardly and upwardly opening cavity provided with a spherically curved inner surface **22**. A spigot **24** is provided with a central bore **26** and has adjacent its lower end a bearing **28** having a spherically curved outer surface which mates with the inner surface **22** of supporting member **20**. The opening of the cavity within supporting member **20** is sufficiently large with respect to spigot **24** so that the latter may be tilted in any direction away from the centered position shown in Fig. 3 while bearing **28** still remains engaged within supporting member **20**.

Supporting member **20** is provided with an annular aperture or channel **30** in its wall. A conduit **32** connects annular channel **30** with the interior of container **18** when the device is mounted in place on the container.

The central bore **26** of spigot **24** is made up of two coaxial passageways **34, 36** extending inwardly from opposite ends of the spigot, each passageway decreasing in diameter inwardly from its respective end. A cap or dam **38** is provided at the intersection of the two passageways, a plurality of radially facing ports **40, 40** providing the sole communication between the two passageways **34, 36**.

When spigot **24** is in centered position, as shown in Fig. 3, the lower passageway **36** of central bore **26** is sealed against the spherical inner face **22** of the cavity of supporting member **20** within which the spigot is seated, so that none of the liquid within container **18** can flow through the spigot.

When spigot **24** is tilted in any direction away from its centered position, as shown in Fig. 4, passageway **36** comes into registration with a portion of annular aperture **30**, which in turn communicates through conduit **32** with the interior of container **18**. The device accordingly provides in this position of the spigot a continuous passageway for the liquid contents of container **18** to flow outwardly through the central bore of spigot **24**. The very small ports **40, 40** prevent excessively rapid flow of the liquid within container **18** through spigot **24**, permitting the liquid to emerge only dropwise, not as a continuous stream. Inasmuch as the liquid is permitted to emerge only when spigot **24** is tilted away from centered position and since marginal portion **14** of the frame **10** locates the spigot with respect to the eyeball, the drops can fall only on the marginal portion of the eyeball near the lids and not directly upon the cornea. Container **18** may be either rigid or, if desired, of the flexible squeeze bottle type.

In the embodiment shown in Fig. 6 the shape of frame **10** has been varied by placing uprights **42, 42** at the narrow ends of the oval marginal portion **14**, while in the embodiment shown in Fig. 7 the uprights **44, 44** have been reduced in width to form narrow posts.

The simple construction of the present invention facilitates manufacture of the device since it may readily be made of a plastic composition by a molding operation. The device may consist of only three parts: supporting member **20**, frame **10** (integral with the downwardly extending flange **16**), and spigot **24** (integral with bearing member **28**). Indeed, supporting member **20** and frame **10** may be molded as a single, integral construction provided a plastic composition having the desired rigidity for the frame and resiliency for the socket portion is employed. Molding of spigot **24** and control over the effective cross-sectional area of the central bore is readily achieved during the molding operation since it is not necessary to employ delicate pins of very small diameter in the mold. Instead, the size of the radial ports **40, 40** may readily be controlled by means of short projecting portions on one of the relatively thick and strong pins of the mold which are used to form passageways **34, 36**.

Any of the conventional plastic molding compositions having the desired combination of hardness and resiliency as well as the property of being inert to the liquid material being dispensed may be employed. Polyethylene, polystyrene and other similar materials have been found to be satisfactory. Preferably an elastic resilient plastic such as polyethylene is employed for at least the socket portion of the device to permit the spigot to be readily assembled with it, while a relatively hard and rigid plastic such as polystyrene is employed for frame **10**. It will be apparent that the exact configuration of frame **10** (as distinct from marginal portion **14**) is not critical and that it may be continuous instead of reticulate.

Although specific embodiments of the invention have been described herein, it is not intended to limit the invention solely thereto, but to include all of the obvious variations and modifications within the spirit and scope of the appended claims.

What is claimed is:

1. An eye drop dispenser comprising a ball-and-socket outlet which is closed against the passage of liquid when the spigot is in centered position and which is open to permit passage of liquid when the spigot is in tilted position, and a frame extending outwardly around said outlet, said frame having a curved margin adapted to engage the flesh around the eyeball to maintain said outlet in the desired spaced relation to the eyeball.

2. An eye drop dispenser as defined in claim 1 including in addition means for mounting said dispenser upon a container.

3. An eye drop dispenser comprising a container for the liquid to be dispensed and mounted upon the mouth of said container a ball-and-socket outlet which is closed against the passage of liquid when the spigot is in centered position and which is open to permit passage of liquid when the spigot is in tilted position, and a frame extending outwardly around said outlet, said frame having a curved margin adapted to engage the flesh around the eyeball to maintain said outlet in the desired spaced relation to the eyeball.

4. An eye drop dispenser comprising a spigot for dispensing the eye drops, said spigot having a central bore, a supporting member having a ball-and-socket connection with said spigot to permit tilting movement of said spigot away from centered position, and including means for supplying eye drops to the central bore of said spigot only when the latter is in tilted position, and a frame extending outwardly around said spigot having a curved margin adapted to engage the flesh around the eyeball to hold said spigot in the desired spaced relation to the eyeball.

5. An eye drop dispenser comprising a spigot for dispensing the eye drops, said spigot comprising an elongated member having a central bore and provided adjacent one end with a bearing having a spherically curved surface, a supporting member adapted to be mounted on the mouth of a container having an outwardly opening cavity provided with a spherically curved inner surface adapted to engage the surface of said bearing member to permit tilting movement of said spigot in all directions away from a centered position, an annular aperture in the wall of said cavity providing the sole communication between said cavity and the interior of said container, said channel being positioned to communicate with the central bore of said spigot only when the latter is tilted away from centered position, and a frame extending outwardly around said spigot having a curved margin adapted to engage the flesh around the eyeball to hold said spigot in the desired spaced relation to the eyeball.

6. In an eye drop dispenser, a dispensing spigot comprising an elongated member having a central bore, said bore being formed of a first passageway extending inwardly from one end of said spigot and a second passageway of substantially greater diameter than the first extending inwardly from the other end of said spigot coaxially with the first said passageway, said passageways each decreasing in diameter inwardly from said respective ends and communicating with each other through a plurality of radially facing ports.

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