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K. COURT

2,365,524

DISPENSING CAPSULE

Filed May 25, 1942

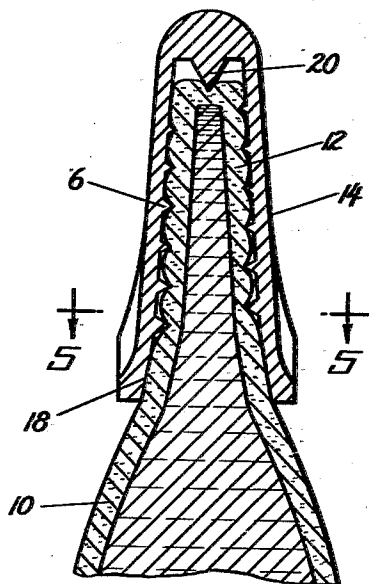


FIG. 1

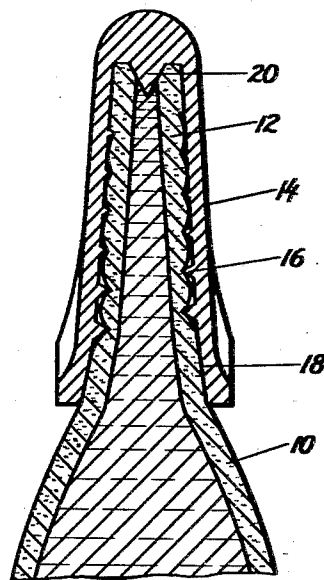


FIG. 2

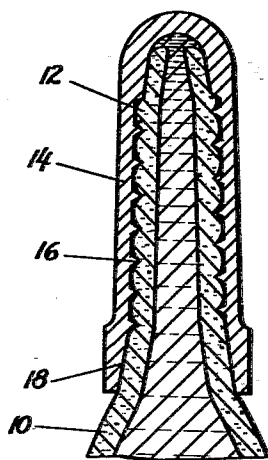


FIG. 3

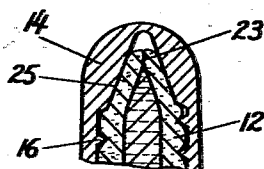


FIG. 4

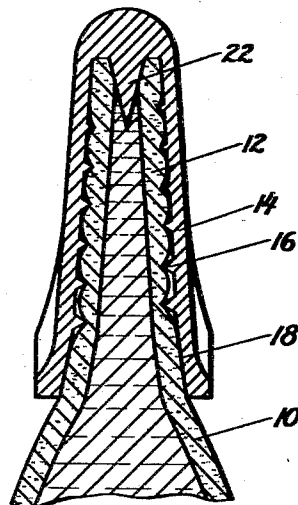


FIG. 5

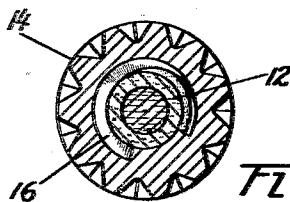


FIG. 6

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2,365,524

DISPENSING CAPSULE

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Application May 25, 1942, Serial No. 444,363

1 Claim. (Cl. 222—81)

This invention relates to improvements in capsule containers adapted for dispensing content substance and particularly to capsules of flexible deformable material such as the soft pliable gelatin capsules of commerce and to improvements in their fabrication.

More particularly the invention relates to improvements in capsules of the general character illustrated in Patent No. 2,134,489, October 28, 1938, applicant Robert P. Scherer. Such a capsule is of a general bottle shape. It is formed of soft pliable gelatin. The contents are adapted to be extruded through the opened neck or spout of the capsule. This improved capsule is provided with a resilient deformable discharge spout portion which is fitted with a removable closure cap adapted to seal the same against leakage.

The discharge spout of the cap is so relatively formed and shaped that the cap upon being engaged over the spout deforms the wall of the spout and so wedges the same within the cap as to prevent leakage of the capsule content substance. Preferably the capsule is of a size which may contain a plurality of dosage increments of the provided content substance. Ointment carrying capsules are examples in point. However, the particular content substance has nothing to do with the invention and a capsule embodying the invention may be employed to carry any desired dispensable content substance.

This improved combined capsule and cap is so formed that the capsule is sealed against leakage of its contents without the employment in association with the cap of gaskets, washers or the like. The cooperation between the cap and the discharge spout of the capsule is such that the seal directly therebetween is effective. The cooperating cap and discharge spout are so relatively shaped and the discharge spout is formed of such material that the spout wall deformably responds to pressure of the cap to serve a purpose ordinarily served by a deformable gasket interposed between a closure cap and its container.

Preferably the cap is so shaped that while sealing the capsule discharge opening against leakage it also prevents such opening from closing by self adhesion of the capsule wall material. In one modification the cap is so formed as to itself pierce the wall to form a discharge opening therethrough and to seal such opening against leakage while at the same time maintaining the opening so that the contents may be dispensed therethrough when the cap is removed.

The construction is simple and inexpensive. It does not require the use of instruments or tools

for manipulation and it is effective to prevent leakage.

Other objects and advantages will more fully appear from the following description, appended claims and accompanying drawing, wherein:

Fig. 1 is a cross-sectional view through a capsule embodying my invention and wherein the capsule is hermetically sealed independently of the cap,

Fig. 2 is a cross-sectional view similar to that of Fig. 1 showing the construction of Fig. 1 with the capsule opened and sealed by the cap,

Fig. 3 is a cross-sectional view of a capsule of the same character with a modified form of cap and showing the capsule opened but sealed by the cap,

Fig. 4 is a slightly modified form of construction showing the capsule in cross-section as in Fig. 1 but showing a slightly modified form of cap structure,

Fig. 5 is a section taken on line 5—5 of Fig. 1, and

Fig. 6 illustrates another modified form of construction.

Dispensing capsules of the type here illustrated are commonly formed of soft pliable gelatin which contains sufficient plasticizer so as to be readily deformable. The capsule embodies a body portion 10 and a spout portion 12. This spout portion is shown as tapered and in Fig. 1 hermetically independently sealed in the manner in which it would be following the forming and filling by the manufacturer. Such capsules may be used to contain any content substance which it might be desired to dispense by opening the end of the spout and squeezing the capsule body to extrude the contents. They may be of a size to contain a plurality of discharges of content substance or of a size containing merely one dosage. The invention does not pertain in any way to a particular content substance and the capsule illustrated may be employed as a container for any desired content substance.

The neck or spout portion 12 of the capsule is not only relatively pliable and deformable but possesses a slow resiliency and as here shown is originally formed smooth upon the outer surface and sealed over at the end independently of the cap and as shown in Fig. 1. The cap shown in the figures of the drawing is indicated as 14. It may be formed of a suitable hard plastic of a thermosetting or thermoplastic character, metal or any other suitable material. It is shown as interiorly threaded as at 16. The thread diameter is here shown as cylindrical but the wall of the

cap is interiorly tapered as illustrated. The thread substantially fades out at the bottom of the cap and also terminates flush with the inner surface of the cap at the opposite end as in a ramp structure as shown in Fig. 5. The taper of the inner wall of the cap is preferably more pronounced adjacent to the bottom wall of the cap as at 18.

The cap shown in Figs. 1 and 2 is provided with a teat 20 projecting interiorly from the bottom wall of the cap. This teat is so shaped and so spaced from the tapered portion 18 of the cap that when the cap is threaded upon the spout of the capsule the side wall of the end of the spout is wedged and deformed between the teat 20 and the tapered wall portion 18 forming an effective seal against leakage. As shown in Fig. 1, the teat does not pierce through the end wall of the spout but deforms the same, while in Fig. 2, which illustrates the capsule after the end of the spout has been pierced or opened, the teat projects into the spout discharge opening and closes the same serving a dual purpose. It serves first to wedge the side wall of the spout between the teat and the wall of the cap to effect the seal and it serves, secondly, to maintain the discharge opening against accidental adhesive closure which might otherwise result.

In Fig. 3 the cap is not provided with a teat and the seal results from the responsive deformation of the spout as the cap is threaded thereon. The seal of the structure shown in Fig. 3 is not so effective as that shown in Figs. 1 and 2. The construction shown in Figs. 1 and 2 is highly effective as is the construction shown in Fig. 4. In Fig. 3 the capsule shown is one which has been opened. When the article leaves the manufacturing plant the capsule would be hermetically independently sealed as is the capsule in Fig. 1. After being once used, the end of the spout would have been opened by piercing or clipping and would appear as shown in Fig. 3. Obviously, during the time that the capsule was independently hermetically sealed there would be no leakage and this construction in Fig. 3 should be suitable for use with content of a viscous character such as creams, ointments or the like.

In Fig. 4 the cap is provided with a teat 22 which is more pointed than the teat 20 in Figs. 1 and 2 and is adapted to pierce the end of the spout. The teat 20 of Figs. 1 and 2 is not sufficiently pointed to pierce the end of the spout but merely deforms the same. The teat 22 of the cap of Fig. 4 pierces the end of the spout when the cap is threaded upon the spout and remains in the opening thus formed sealing such opening and wedging the adjacent side wall of the spout against the adjacent side wall of the cap as shown.

Fig. 6 illustrates a capsule and cap which resembles that of Fig. 3 in that the capsule spout is provided with an opening 23 at the end and the cap tapers internally as at 25 so as to wedge the spout opening 23 closed when the cap is fully received upon the spout.

As heretofore stated, the plastic material of which the capsule spout is formed is sufficiently soft, pliable and resilient and the spout itself has an external diameter greater than the internal

diameter of the cap adjacent to the bottom wall so that when the cap is threaded thereupon the spout deformably responds to effect the threaded engagement with the cap. It will be noted that this deformable response results in the spout structure incompletely filling the groove between the threads at the outer end of the cap. There is a natural but slow resiliency in the spout structure which causes it to continue to apply a yielding pressure against the threaded portion of the cap and adjacent the end of the spout the material is wedged and deformed to provide a perfectly tight seal which is effective to prevent leakage. The spout structure itself therefore serves the same purpose as a deformable gasket normally serves between a threaded cap and the threaded spout of a container. Upon removal of the cap from the spout, the indentations formed by the thread tend to partially fade out as the spout material relaxes showing the inherent resilient deformable character of the material.

Capsules of this character may be used as containers for liquids, pastes, creams, ointments or the like and may contain a plurality of dosages. If the capsule of Fig. 4 is employed the teat 22 pierces the discharge opening in the end of the spout and maintains such opening while the cap is in place. Upon removal of the cap such portion of the content substance may be extruded as is desired through squeezing the capsule body. Upon replacement of the cap the teat enters the discharge opening and the end of the spout is wedged and deformed as hereinabove described to effect a seal. With the capsule shown in Figs. 1 and 2 the end of the spout must be pierced or clipped to provide the discharge opening and the seal is effected as heretofore set forth.

What I claim is:

The combination with a collapsible tube having a long tapered nozzle formed of soft deformable plastic material normally closed at the outer end of a deep cup shaped internally threaded cap, said cap adapted to be threaded down upon the nozzle and adapted to form a thread on the nozzle as the cap is threaded down thereover, said cap provided with an internal axial tapered piercing projection adapted to puncture the end of the nozzle, that portion of the interior of the cap encircling the piercing projection constituting a tapered annular recess within the cap surrounding the projection, said recess having a width adjacent to the base of the projection which width is less than the normal radial thickness of the wall of the nozzle whereby the wall of the nozzle adjacent to the end of the nozzle is compressed between the tapered base of the projection and the encircling wall of the cap to less than its normal thickness when the projection is pierced through the end of the nozzle, said piercing projection being of a length substantially less than the depth of the cap but greater than the normal thickness of the wall of the nozzle and said nozzle having a diameter sufficiently greater than the interior diameter of the threaded portion of the cap whereby the cap may be threadedly engaged upon the nozzle without the piercing projection of the cap puncturing through the end of the nozzle.

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