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[33] **France**
[31] **82,413**

[54] **PACKAGING DEVICE FOR SEPARATE
PREMEASURED QUANTITIES OF MATERIALS**
8 Claims, 7 Drawing Figs.

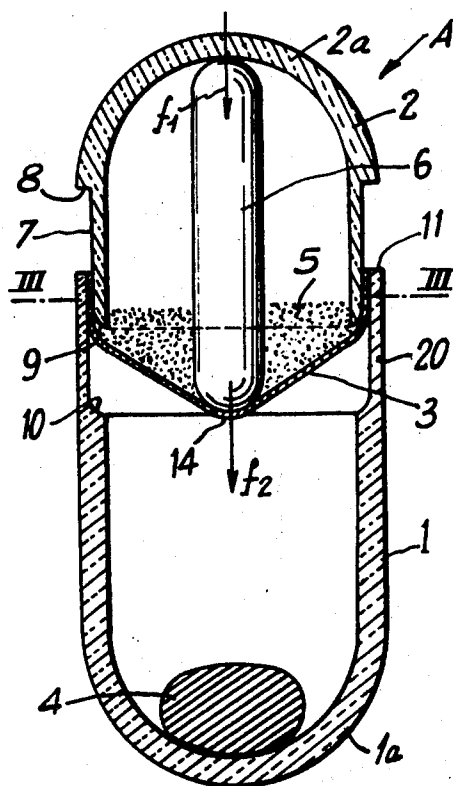
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B65d 81/32
[50] Field of Search **206/47(A),**
63.5; 215/6; 259/72; 220/20.5, 89(A)

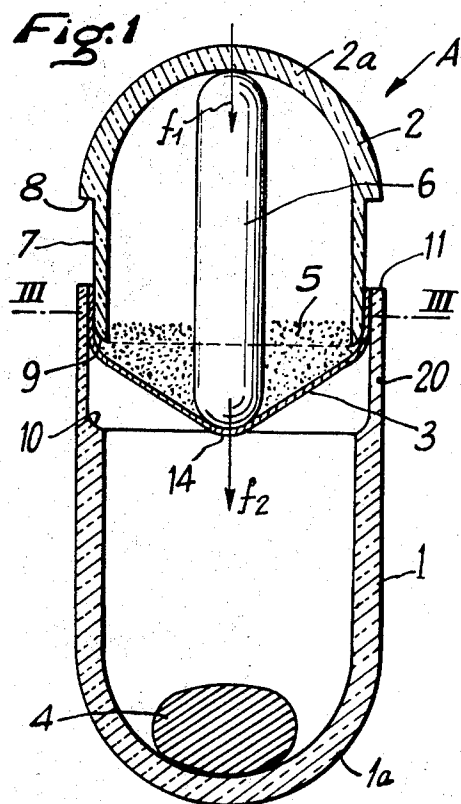
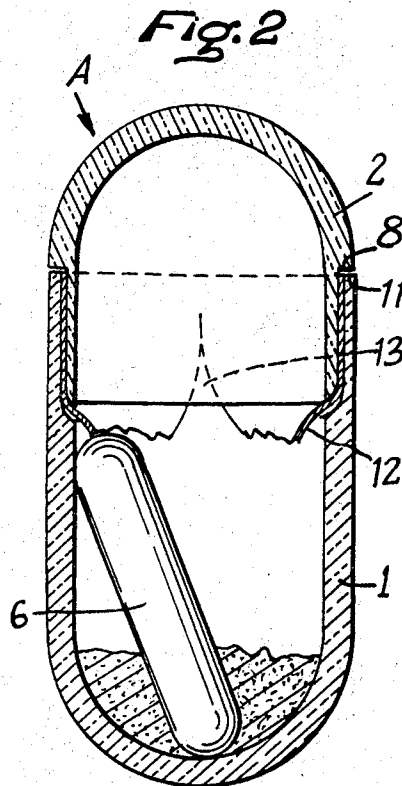
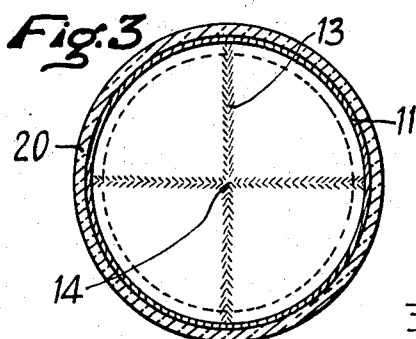
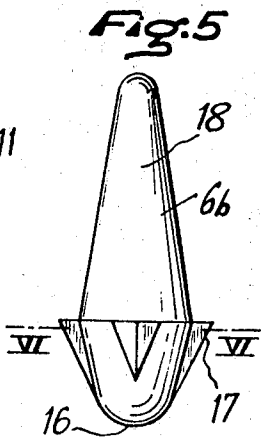
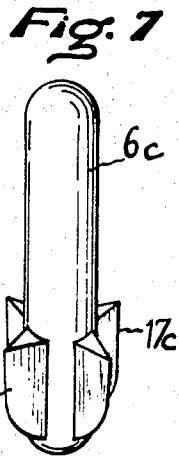
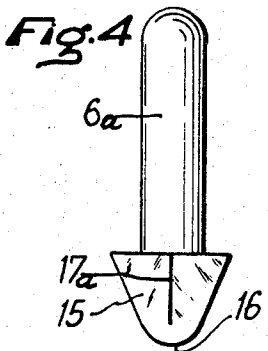
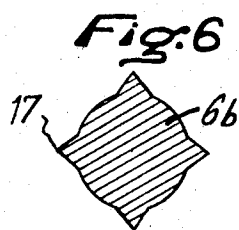
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ABSTRACT: A packaging device is formed of two separate open ended containers arranged in telescopically sliding interengagement with the open ends in opposed relationship. Each of the containers holds a premeasured quantity of material to be mixed with the other immediately prior to use. A tearable membrane is disposed across the end of one of the containers to prevent any mixing during storage of the packaging device. A punch member is positioned in the other container and during storage the punch member contacts and extends between the membrane and the opposite end of the container in which it is located. The contact of punch member with the membrane during storage is insufficient to cause any tearing action, however, when the materials are to be mixed the containers are urged together in sliding relationship and the punch member tears the membrane and permits the mixing of the materials. Additionally, the packaging device also acts as a mixing vessel for the materials when they are ready to be used. The membrane may be provided with weakened spots or tear lines to facilitate the perforation of the membrane. Further, the punch member may be provided with lateral projections near its end in contact with the membrane to provide a greater tearing action.





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PACKAGING DEVICE FOR SEPARATE PREMEASURED QUANTITIES OF MATERIALS

SUMMARY OF THE INVENTION

Numerous devices have been proposed for storing two premeasured substances within a unitary package in separate compartments until the materials are ready to be mixed. In some of these devices membranes have been employed for separating the device into the two compartments containing the substances. When the substances are ready to be used the membrane is broken and the materials are mixed. One of the problems with stapling devices is that generally they require the use of both hands to effect the mixing operation. Further, the construction of the container often does not lend itself to the insertion of a small pestle or similar instrument to promote complete mixing by shaking, as for example in mixing machines used for the preparation of dental amalgams.

The primary object of the present invention is to provide a new method of packaging in which the materials may be maintained separate during the storage period and then easily mixed when they are ready for use.

Another object of the invention is to afford a packaging device utilizing a tearable membrane, as a separation means between two compartments, in combination with a punch member for positively tearing the member when the materials are to be mixed.

Still, another object of the invention is to provide a membrane construction which is easily torn by the punch member.

Moreover, another object of the invention is to supply a punch member which is easily positioned within the packaging device and which effectively tears the membrane when the materials are ready to be used.

A further object of the invention is to employ the punch member to assist in thoroughly mixing the materials after the membrane has been perforated.

And still another object of the invention is to provide a container construction which can be easily manipulated by one hand when the materials are ready to be used.

The invention is characterized by the fact that the two substances to be mixed, for example, in the case of a dental amalgam, a metallic powder and mercury, are disposed in separate open and containers of generally cylindrical shape which are capable of telescopically sliding one within the other in the axial direction of the containers. One of the containers is provided with a membrane across its open end for maintaining the substances separate during the storage period. The other container has a punch member for tearing the membrane when the substances are ready to be mixed. During storage the punch member is in contact with the membrane but does not cause it to tear. However, when an external pressure is applied, driving one of the containers into the other, the punch member tears the membrane permitting the mixing of the substances in the two containers.

The punch member is an axially elongated element having a transverse dimension considerably less than that of the container in which it is positioned and extends between the closed end of its container and the membrane at the open end of the other container. In this position during storage the punch member exerts a slight pressure against the membrane and is ready to tear the membrane when additional pressure is exerted by pressing the two containers together.

To assure ease in perforating the membrane, it can be provided with weakened areas or lines of reduced thickness along which the tearing operation can be easily accomplished.

Further, to assure adequate tearing or perforation of the membrane the punch member can be provided with projections adjacent its end in contact with the membrane which will provide additional tearing action when the two containers are telescoped one into the other.

The various features of novelty which characterize the invention are pointed out with particularity in the claims annexed to and forming a part of this specification. For a better

understanding of the invention, its operating advantages and specific objects attained by its use, reference should be had to the accompanying drawings and descriptive matter in which there are illustrated and described preferred embodiments of the invention.

DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. 1 is a vertical sectional view, on an enlarged scale, of one form of a packaging device embodying the present invention, with the device arranged in its storage disposition;

FIG. 2 is a vertical sectional view similar to FIG. 1, however, with the packaging device in its mixing disposition;

FIG. 3 is a sectional view of the lower member of the packaging device taken along the line III-III of FIG. 1;

FIG. 4 is a side view of another embodiment of the punch member shown in FIG. 1;

FIG. 5 is still another embodiment of the punch member shown in FIG. 1;

FIG. 6 is a transverse sectional view of the punch member shown in FIG. 5 taken along line VI-VI; and

FIG. 7 is a perspective side view of a further embodiment of the punch member illustrated in FIG. 1.

DETAILED DESCRIPTION OF THE INVENTION

In FIG. 1 a packaging device A, which is also used as a mixing vessel, is shown in its storage arrangement or disposition comprising a lower cylindrically shaped container 1 having a closed end 1a and a generally similarly shaped cylindrical upper container 2 having a closed end 2a. The upper container 2 is fitted in telescopically sliding engagement within the open end of the lower container 1. The containers are axially movable along the longitudinal axis of the device A.

At its open end the lower container 1 has a section 20 of reduced thickness and with a greater inside diameter than the remainder of the cylindrical wall forming the container. The lower end of this reduced thickness section provides a beveled shoulder 10 which faces upwardly toward the upper container 2. In contradistinction the open end portion of the cylindrical wall of upper container 2 has the same inside diameter but due to a reduced thickness section 7 has a smaller outside diameter than the remainder of its cylindrically shaped wall. The reduced thickness section 7 of the upper container has a rounded or beveled edge 9 at its open end. In addition an outwardly extending shoulder 8 is provided at the junction between the reduced section 7 of the upper container and the remainder of its cylindrical wall section. A similar shoulder 11 is provided at the open end of the lower container 1. The shoulders 8 and 11 along with the beveled shoulders 9 and 10 limit the extent of travel of the upper container within the reduced thickness section 20 of the lower container.

Secured to the inner portion of the wall section 20 at the open end of the lower container 1 is a thin membrane 3 which can be easily torn and which provides a seal between the two containers 1 and 2 as long as they are positioned in the disposition shown in FIG. 1. The membrane 3 may be molded or in-laid on the inner surface of the wall section 20. The membrane 3 as shown in FIG. 1, has a generally pyramidal shape extending downwardly into the lower container 1. To assure adequate tearing, the membrane may be provided with lines 13 of reduced thickness arranged perpendicularly to one another at the center point 14 of the membrane. One of the substances 4 to be mixed in the device A is shown in the lower end of the container 2, and may be, for example, mercury for use in a dental amalgam.

As mentioned previously the upper container 2 is arranged to fit within the open end of the lower container 1 and to slide within its reduced thickness section 20 along the surface of the membrane 3. The upper container 2, as shown in FIG. 1, contains a metallic powder substance 5 which mixes with the mercury 4 in the lower container to form an amalgam. In addition, the upper container 2 holds a punch member 6 which is axially

elongated with rounded ends and has a diameter considerably smaller than the interior diameter of the upper container 2. At its upper end the punch member 6 is in contact with the inner surface of the closed end 2a of the upper container 2 and at its lower end the punch member is in contact with the upper surface of the membrane 3. Initially the upper container 2 is inserted into the lower container 3 only a sufficient extent to hold the punch member in position exerting a slight but non-perforating force against the membrane 3.

When the materials in the device are ready to be used a person holding the device in one hand can exert sufficient pressure in the direction of the arrow f1 at the upper end of the device whereby a pressure is transmitted to point f2 at the center 14 of the membrane where the punch member will, due to the force exerted, perforate or tear the membrane so that the substance 5 will fall, by gravity, into the lower container 1 for mixing with the substance 4. Further, as the upper container is pressed downwardly it rides along the inner surface of the membrane within the reduced thickness section 20 and tensions the membrane or stretches it so that additional assurance is provided that it will tear under the action of the punch member. In FIG. 2 the device A is shown with the upper container 2 fully telescoped within the lower container 1 with the membrane 3 torn and the punch member 6 located within the lower container 1. In this form the device A can be inserted into a mixing or vibrating apparatus wherein the substances 4 and 5 can be properly blended. During the mixing operation the punch member 6 will assist in properly mixing the substances.

Since the membrane is readily perforated or torn the operation can be easily performed one-handed by telescoping the upper container into the lower container without the need for any additional mechanical apparatus.

As mentioned above in FIG. 1, the end of the punch member 6 in contact with the membrane 3 is rounded and is sufficient to tear the membrane, but it does not contain the cutting parts, shown in FIGS. 4 through 7, which facilitate the tearing operation. In the punch member 6a shown in FIG. 4 the end in contact with the membrane is provided with four sides 15 diverging from its rounded end 16 and forming four cutting ridges 17 at spaced positions about the periphery of the punch member. The end surface 16 of the punch member, in contact with the membrane when the packaging device in its storage disposition, is rounded to prevent any premature perforation. Further, it will be noted in FIGS. 5 and 7 that the end surfaces of the punch members 6b and 6c are also rounded where they contact the membrane. In FIG. 5 the shank end 18 of the punch member 6b has a tapered appearance diverging downwardly to the cutting head which is formed by four cutting parts 17b disposed about its periphery. In FIG. 7 the punch member 6c has a body portion similar to that in FIGS. 1 and 4, but it has a quartet of cutting parts extending laterally from its surface to provide additional tearing action through the membrane.

The membrane can be molded or formed to provide a pyramidal shape having the same number of surfaces as there are cutting edges on the punch member 6 whereby the cutting parts or sections 17a, 17b, and 17c may be arranged to coincide with the lines 13 on the membrane to assure ease in tearing through it.

The invention is not limited to the embodiment shown in the drawings. The shape and arrangement of the membrane and the punch member may be varied. The membrane can assume any appropriate form suitable for tearing under the action of the punch member. Further, in the case of a dental amalgam the mercury may be placed in the upper container 2 along with the punch, which may be made of a material resistant to the mercury, while the metallic powder is contained within the lower container 1.

While specific embodiments of the invention have been shown and described in detail to illustrate the application of the inventive principles, it will be understood that the invention may be embodied otherwise without departing from such principles.

I claim:

1. A packaging device for maintaining substances in separate compartments during a storage period prior to use when the substances are mixed together is comprised of a first axially extending container having an open end and a closed end and being adapted to contain one of the substances to be mixed, a second axially extending container having an open end and a closed end and being adapted to contain the other substance to be mixed, the open end of said second container arranged to be positioned within the open end of said first container in a telescopically coupled arrangement for movement from a storage position which is maintained during the storage period of the packaging device to a mixing position when the substances are to be mixed together, said first container having an inwardly facing surface commencing at its open end and extending in the axial direction thereof for at least the extent of the movement of said second container as it is moved from the storage position to the mixing position, a tearable membrane disposed across the open end of said first container for maintaining the substance contained within said first and second containers separated when said containers are assembled in the storage position, said membrane being secured to said inwardly facing surface of said first container at its open end so that with said first and second containers assembled in the storage position the outer surface of said second container adjacent its open end contacts the surface of said membrane and moves along the surface of said membrane when said second container is moved into the mixing position, said membrane being slack in the storage position of said first container so that with said first container oriented vertically and its open end facing upwardly said membrane sags downwardly into said first container, an axially elongated punch member having a diameter transverse to its elongated axis which is considerably smaller than the diameter of said second container and said punch member being disposed within said second container for tearing said membrane when the substances are to be mixed and said second container is moved into the mixing position, said punch member having a dimension along its elongated axis at least greater than the interior dimension of said second member between its closed and open ends so that in the storage position said punch member is in contact at one of its axially spaced ends with said membrane and at its other end with the closed end of said second container in which it is located, the force exerted by said punch member against said membrane in the storage position being insufficient to cause any tearing action and when said first and second containers are telescopically urged together in sliding relationship into the mixing position, the action of said punch member in contact with said membrane and of said second container urging said membrane outwardly against said inwardly facing surface of said first container at its open end tears said membrane permitting the materials in said containers to mix.

2. A packaging device as set forth in claim 1, wherein said punch member has a cylindrical shape with rounded ends one of which contacts the closed end surface of said second container and the other of which contacts the surface of said membrane secured across the open end of said first container.

3. A packaging device as set forth in claim 1, wherein said punch member has cutting edge projections provided at the end thereof in contact with said membrane in the storage position for tearing said membrane when said first and second containers are forced together for mixing the substances, and said projections being spaced from contact with said membrane when said containers are in the storage position.

4. A packaging device as set forth in claim 1, wherein said membrane has reduced thickness weakened sections for assuring tearing of the membrane. when said punch member is forced against the membrane in tearing engagement.

5. A packaging device as set forth in claim 1, wherein tear lines are formed in said membrane for ease in perforating membrane.

6. A packaging device as set forth in claim 1, wherein said first container comprises a first cylindrical wall having a rounded closure end and said second container comprises a

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second cylindrical wall having a rounded closure end, said second container at its open end having an outside diameter slightly less than the inside diameter of said first container at its open end whereby said second container fits within said first container in telescopic arrangement with said membrane positioned between the juxtaposed surfaces of said first and second containers, and in the mixing position said first and second containers forming a mixing space having the same inside diameter for its axial extent.

7. A packaging device as set forth in claim 6, wherein a 10

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shoulder is formed on the interior surface of the first container spaced from its open end for forming a stop surface limiting the extent of the telescopic insertion of said second container into said first container.

8. A packaging device as set forth in claim 6, wherein one of said substances is a metallic powder and the other of said substances is a mercury for forming a dental amalgam upon mixing after the membrane has been torn.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,537,577 Dated November 3, 1970

Inventor(s) Jean-Jacques Goupil

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

In the heading of the patent, under [31], the number of the French application should be corrected to read

-- 82,143 --

Signed and sealed this 25th day of May 1971.

(SEAL)
Attest:

EDWARD M. FLETCHER, JR.
Attesting Officer

WILLIAM E. SCHUYLER, JR.
Commissioner of Patents