

- [54] **MULTI-CHAMBER CONTAINER**
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- [73] Assignee: **Jean-Jacques Goupil**, Cachan, France
- [22] Filed: **Aug. 12, 1971**
- [21] Appl. No.: **171,178**

Related U.S. Application Data

- [63] Continuation-in-part of Ser. No. 33,780, Jan. 5, 1970, Pat. No. 3,619,488, which is a continuation-in-part of Ser. No. 703,422, Feb. 6, 1968, abandoned.

Foreign Application Priority Data

- [30] Aug. 12, 1970 France 7029647
- [52] U.S. Cl. 206/47 A, 128/272, 206/63.5
- [51] Int. Cl. B65d 81/32
- [58] Field of Search 206/47 A, 63.5; 215/6; 220/20.5; 128/272

[56] **References Cited**

UNITED STATES PATENTS

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Primary Examiner—William T. Dixon, Jr.
Attorney—Darby & Darby

[57] **ABSTRACT**

A container having two chambers defined by a partition member, each chamber holding a particular material, and a plunger to move the partition to a position wherein the separator permits the fluid from one chamber to flow to the other chamber and be mixed therein. Means are provided to prevent the partition member from falling into the chamber where the mixing takes place while still permitting the material to flow from one chamber to the other.

8 Claims, 4 Drawing Figures

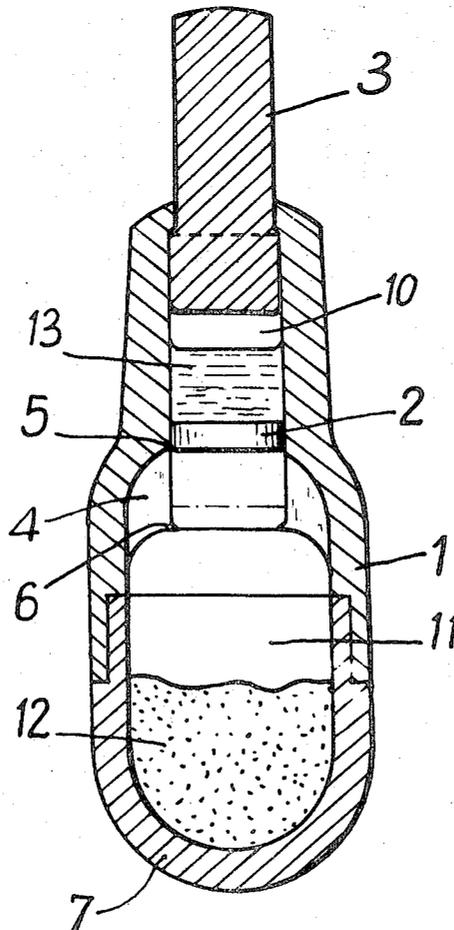


Fig:1

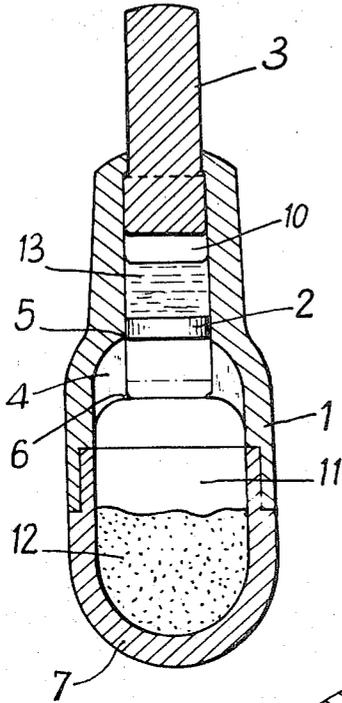


Fig:3

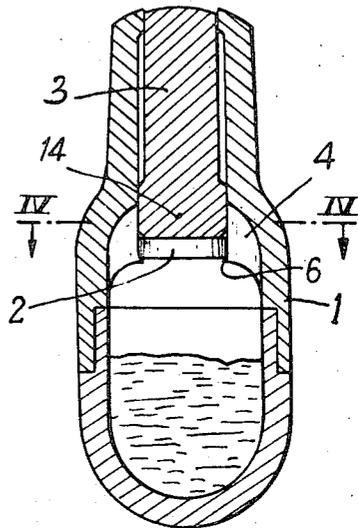


Fig:2

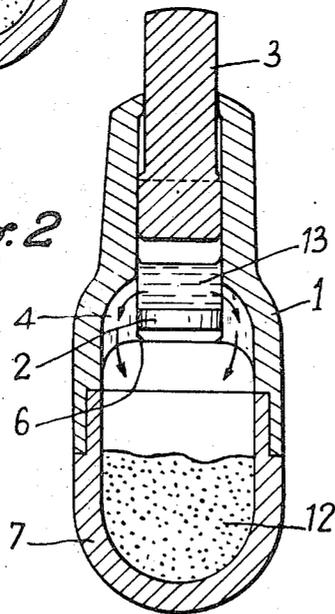
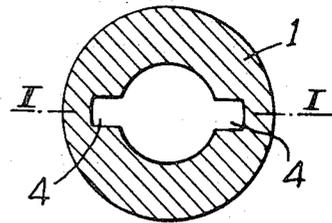


Fig:4



MULTI-CHAMBER CONTAINER

RELATED APPLICATION

This application is a continuation-in-part of my prior copending U.S. Pat. application Ser. No. 33,780, filed Jan. 5, 1970 now U.S. Pat. No. 3,619,488 which is in turn a continuation-in-part of my prior copending U.S. Pat. application Ser. No. 703,422, now abandoned filed Feb. 6, 1968.

This invention relates to the improvements and/or modifications in multi-chamber devices for packaging of predosed substances.

The first of my aforesaid prior applications discloses a cartridge-like device comprising two chambers or compartments or the like separated from one another by a releasable partition in the form of a disc or flat object clamped resiliently between the walls of the device and adapted to be expelled into one of the chambers by means of a pusher or plunger or the like sliding in the opposite end of the other chamber, the partition serving after its expulsion as an agitator to grind the mix of substances by agitation. In the second of my aforesaid applications, a ball is used as the partition member.

Devices of this kind are of use more particularly when, to ensure an intimate and homogeneous mixing of the ingredients, the mixing is performed by means of a weight which grinds the mixture when the cartridge-like device is shaken in conventional agitators. This occurs inter alia with dental amalgams.

It has been found that The presence of a weight during agitation is unnecessary and possibly even undesirable for some mixtures, including mixtures of two substances to be used in the preparation of dental cements such as the conventional products which are prepared by mixing a metal oxide base powder with an acid liquid.

The present invention provides an improvement in such a container, the improvement being achieved by modifying the previously disclosed cartridge-like devices so that the releasable partition is kept away from the two substances while they are being mixed by agitation.

According to the present application, the device has a releasable partition which can take up two positions — an initial or closing position, in which the partition separates from one another in two chambers containing the substances to be mixed, and a final or mixing position, in which the partition cooperates with the pusher to close the chamber in which mixing is carried out.

Preferably, the wall of the device has, in a zone intermediate the two chambers corresponding to movement of the partition between its two positions, one or more passages in permanent communication with the mixing chamber, the passage or passages providing communication between the two chambers when the partition is moved by the pusher to a position where the contents of one chamber is to be placed into the mixing chamber and the contents are to be mixed and being closed at other times.

Preferably, when in the mixing position the moving partition completes the contour of the mixing chamber while the pusher closes the passages between the two chambers and engages with the rear surface of the partition.

In order that the invention may be more readily understood, there now will be described an embodiment,

given by way of example only, with reference to the accompanying drawings in which:

FIGS. 1, 2 and 3 are elevational views in cross-section along the lines I—I of FIG. 4, and

FIG. 4 is a view in cross-section on the line IV—IV of FIG. 3.

Referring to the drawings, the cartridge-like device is embodied, in just the same way as in the aforesaid parent applications, by a casing of plastic material comprising two members 1, 7 which engage telescopically with one another and which bound two chambers or cavities or compartments or the like 10, 11 respectively each receiving one of two substances to be mixed together, namely a powder 12 and a liquid 13. A plunger or pusher or the like 3 can slide in member 1 and can act in the internal cylindrical part of member 1. As in the two aforesaid applications, the partition is moved by the plunger as it produces a hydrostatic force on liquid 12.

Before mixing begins, the two chambers 10, 11 are separated from one another by a movable partition 2 which can be in the form of a disc or the like, as disclosed in the first of my aforesaid applications, or in any other appropriate form, such as a ball as disclosed in the second of my aforesaid applications. Consequently, and as the drawings show, the partition 2 can remain in a stable position just by friction or, if force-fitted, by the resilience of the plastic used to make it or the housing.

The lower cylindrical part of member 1 extends until it telescopes over the lower part 7 to form a space for the chamber 11. Preferably, upper part 1 has an edge 6 serving as an abutment and as a stop for the partition 2 when the same has moved into its final position shown in FIG. 3 as a result of the plunger 3 having been pushed all the way home.

The inner wall of member 1 is formed at the bottom of chamber 10 with passages 4. Two passages 4 are provided in the present case but their number and distribution can vary as appropriate. The passages 4 extend from the bottom surface of partition 2, when the same is in its chamber-separating position shown in FIG. 1, to the chamber 11 into which the passages 4 open without restriction.

When the device is loaded with the two substances, in chambers 10 and 11, the same are separated from one another by the partition 2. Since partition member 2 is above the passages 4 (FIG. 1), it closes the chamber 10 hermetically so that no liquid 13 can leak to the product 12 in the other chamber. For mixing, the plunger 3 is pushed in. When the plunger 3 is in the intermediate position shown in FIG. 2, the partition 2 is part-way along the length of the passages 4 clearing the openings to the passages in the top chamber 10, so that the two chambers 10, 11 communicate with one another and the liquid 13 descends into the chamber 11, as indicated by arrows, and mixes with the product 12.

At the end of the plunging-in movement of plunger 3 (see FIG. 3) all the liquid has discharged from the liquid-containing chamber 10 and the plunger 3 forces the partition 2 into engagement with the edge 6 where it is held. In this position, the partition 2 maintains the continuity of the top part or ceiling of chamber 11 except for the passages 4, which are blocked anyway by the terminal part 14 of the plunger 3. Chamber 10 has therefore been emptied and the two substances are

combined in the completely closed chamber 11. Mixing can then be carried out by conventional agitation.

What is claimed is:

1. A container for the packaging and mixing of predetermined amounts of materials comprising a housing formed by first and second interconnectable sections, said second section having a closed lower end, a movable partition member located in one of said sections of said housing, said partition member when in a first position dividing the interior of said housing into first and second chambers each for holding a respective first and second material which are to be admixed, said second chamber being formed at least in part by said second housing section including its closed lower end, the internal volume of the second chamber being sufficiently great to accommodate the materials in both said chambers, a plunger accessible from outside of said housing having a portion extending through said housing for moving within said first chamber from a first position to a second position to move said partition member within said housing in a corresponding manner from its first position in which the partition member separates the two chambers to a second position, means on the interior of said housing in the zone between the first and second positions of said partition member forming a passage for transfer of the material in said first chamber to said second chamber as the material in said first chamber is moved into said zone by said plunger portion, said partition member blocking the passage for transfer of the material in said first chamber when in said first position and said plunger portion and said partition member sealing off the passage from the two materials in the second chamber and closing off the top of said second chamber, when both said plunger and said partition members are in their respective second positions, and means on the interior

wall of the housing for engaging and holding said partition member at its second position to form a part of the second chamber to permit mixing of the two materials therein, the mixed materials being removable by disassembling the two interconnected housing sections.

2. A container as in claim 1 wherein said means on the interior wall of the housing for engaging and holding the partition means comprises a projection on said housing.

3. A container according to claim 1 wherein the plunger portion engages the rear surface of said partition member when both said plunger portion and said partition member are in their respective second positions.

4. A container according to claim 1 wherein the passage forming means between the two chambers comprises at least one recess formed on the inner wall of the housing starting at a point adjacent the point of rest of the partition member at its first position.

5. A container according to claim 1 wherein said partition member is disc shaped.

6. A container according to claim 1 wherein the part of said plunger accessible from outside of the housing becomes substantially flush with said housing when said plunger portion and said partition members are in their respective second positions to preclude further movement of said partition member.

7. A container according to claim 1 wherein the material in said first chamber is a liquid and force is transmitted from said plunger portion to said partition member through said liquid.

8. A container as in claim 1 wherein said plunger portion within said first chamber forms a seal with the interior wall of the housing in the area remote from the passage.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,785,481 Dated January 15, 1974

Inventor(s) PIERRE ALLET-COCHE

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

Column 1, line 6, after "1970", cancel "now
U.S. Patent No. 3,619,488" .

Signed and sealed this 6th day of August 1974.

(SEAL)
Attest:

McCOY M. GIBSON, JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents