

[54] MULTI-CHAMBER CONTAINER
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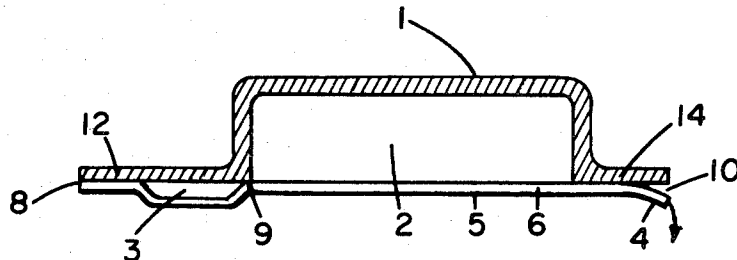
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[51] Int. Cl. B65d 25/08, B65d 81/32
[58] Field of Search 206/47 A, 56 AB,
206/56 AA, 63.5; 229/56; 215/6; 128/272

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[57] ABSTRACT
A multi-chamber container for separately accommo-
dating reacting materials which, when mixed, are ready
for use as dental preparations. The container has an
open-ended thin walled body which is covered by a tear
foil and which forms in conjunction with a marginal ex-
tension of the main container body, one or more sec-
ondary chambers, from which liquid or paste mixtures
can be pressed into the main chamber by destroying a
separating diaphragm or seam.

7 Claims, 7 Drawing Figures



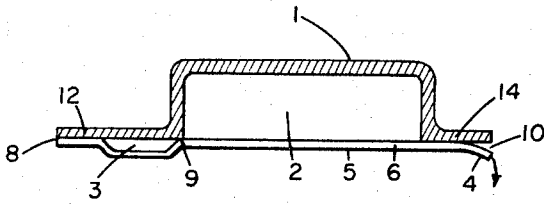


FIG. 1

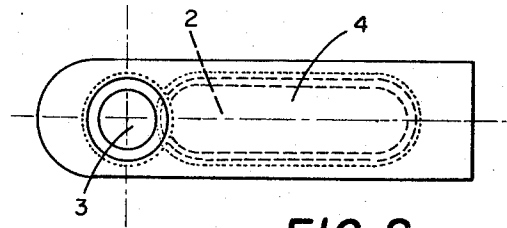


FIG. 2

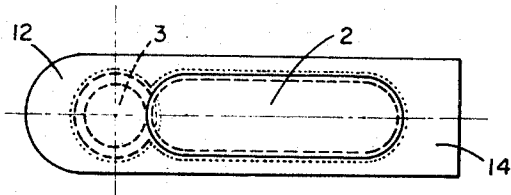


FIG. 3

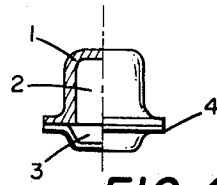


FIG. 4

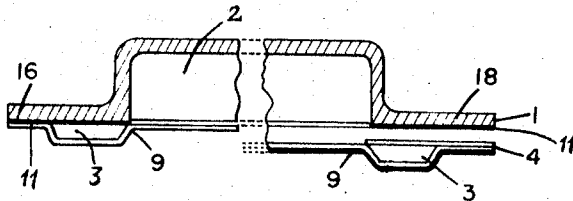


FIG. 5

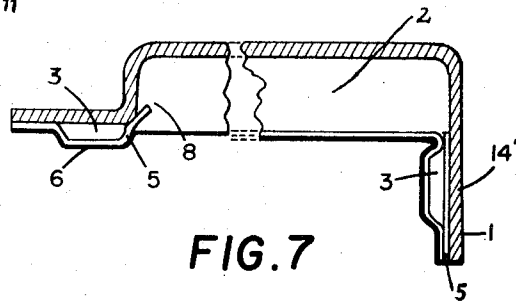


FIG. 7

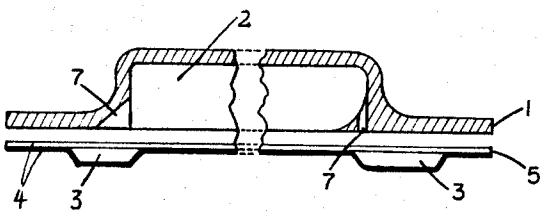


FIG. 6

MULTI-CHAMBER CONTAINER

The present invention relates to a multi-chamber container for separately accommodating materials that react with each other, such as constituent parts of a ready-to-use dental preparation. The individual chambers are separated from each other by readily destructible diaphragms or diaphragm seams for mixing the reacting materials.

In the prior art, French Pat. No. 1,144,883 already discloses a multi-chamber container having a destructible diaphragm. The configuration of the conventional container, however, is such that it cannot adequately provide a quantitatively constant mixture nor is the same suitable for mechanical mixing.

The German Pat. No. 1,276,866 and its patent of addition German Pat. No. 1,287,251, disclose a multi-chamber container for similar applications in which, for the purpose of puncturing or destroying the diaphragm, two chambers of the container are arranged to move telescopically. One of the chambers is provided in the form of a foil cushion. A container of this kind consists of at least two complex structural components and a diaphragm or foil cushion. Practical experience has shown, however, that the only designs ensuring adequate time-saving are those also provided with a cover for removing the finished mixture. In practice, therefore, the device must contain another part. The individual parts for a finished container of this kind must be produced separately and the container chambers must be filled separately and, if necessary, sealed. Moreover, each individual container must be assembled after the filling operation. The complexity of this type of container therefore requires a considerable amount of mechanical work to produce the parts, to fill the mixture components into the chambers, and to assembly the container.

It is therefore the primary object of the present invention to provide a container which can be manufactured and filled with the reacting dental materials more efficiently and, preferably, by means of a single machine.

An aspect of the present invention resides in the provision of a multi-chamber container which separately accommodates two or more substances which react with each other and which are adapted for use in the preparation of ready-to-use dental materials. The container comprises a substantially stiff container body having an upwardly extending depression constituting the primary chamber containing one said substance, and a generally horizontally disposed flange completely surrounding and extending outwardly from the border or edge of said primary chamber. A strippable flexible foil overlies the primary chamber and overlies and adheres to the bottom surface of the flange and completely to the border of the primary chamber. A depression in the flexible foil constitutes the secondary chamber which has a significantly smaller volume than the primary chamber and contains a second substance of the ready-to-use dental materials. The secondary chamber is defined by the spacing between a predetermined surface of the flange located at least in part substantially immediately adjacent to the border of the primary chamber and the flexible foil.

For a better understanding of the present invention, together with other and further objects thereof, reference is had to the following description taken in con-

nection with the accompanying drawings, and its scope will be pointed out in the appended claims.

In the drawings:

FIG. 1 is an elevational view in cross section of a container in accordance with the invention;

FIG. 2 and 3 are bottom and top views, respectively, of the container;

FIG. 4 is an end view of the container, partly in cross section; and

FIGS. 5 to 7 are views similar to FIG. 1 but illustrate modifications thereof.

In accordance with the present invention, the container is provided with a tear foil, which forms one wall of the main chamber of the container, and forms in conjunction with another wall, or with a folded portion of another wall of the main chamber, one or more secondary chambers, from which a liquid or paste mixture material may be pressed into the main chamber by destroying a separating diaphragm, or by separating a preferably welded seam.

With the modern plastic-foil-packaging techniques in use today, a container of this can be made completely out of foils of various kinds. The main body of the container can be made of a foil relatively rigid in its finished state, and capable of transferring the vibrations from a mechanical mixing apparatus substantially undiminished to the mixture.

The tear-foil, which may consist of several layers or, preferably, of a metal reinforced layer, either forms the secondary chambers directly with the wall of the main chamber of the container, or forms the secondary chambers as foil cushions. After the main chamber of the container has been filled, the whole foil is glued or welded to the edges of the open main chamber.

These operations, which result in a filled, ready-to-use container, require as initial materials merely the different foils and the different content materials and can therefore be put together, on an assembly line, by a single metering and packaging machine. This represents a considerable saving in material, transportation and manufacturing costs.

In order to puncture or destroy the separating diaphragm or the separating diaphragm seam, and for pressing the various filler materials from the respective secondary chambers into the corresponding main chambers, a certain surface pressure must be applied to the secondary chambers.

This may be accomplished immediately prior to use in a very wide variety of ways: by means of plastic pincers, or by placing the appropriate foil side of the container on a solid base and by pressing it, with a solid object, e.g., the package box, against the folded portion of the container wall under which the secondary chamber is located.

However, since the containers according to the present invention are intended for use with mechanical vibratory or shaker equipment, for mixing purposes, it is most convenient and most expeditious to fasten the container to the mixer in such a manner that the necessary clamping simultaneously applies the required surface pressure at the correct locations.

Referring now to the drawings there is shown in FIGS. 1 to 4 a container having a thin walled shape retaining body 1 with a configuration establishing a main chamber 2. A secondary chamber 3 is formed partly by a marginal extension 12 of the main body 1 and a multi-layer tear foil 4 is adhesively secured on the projection

12. Slightly remote from the outer edge of the extension 12 the foil 4 is raised to establish in spaced relation to extension 12 the chamber 3 and lowered again to enclose the secondary chamber 3 proximate to the edge of main chamber 2. At the intersection between chambers 2 and 3 there is provided a readily rupturable, preferably welded or glued, narrow seam 8. The secondary chamber 3 is located opposite to but lengthwise offset from the main chamber 2 and the chambers are thus physically separated to prevent exchange of material therebetween. The foil 4 further extends across the opening of chamber 2 to cover and seal the same and again is adhesively joined with a marginal portion 14. Surface pressure applied to the multi-layer tear foil 4, which comprises an acid-resistant inner foil 5 and a cover foil 6 which may be reinforced with metal, causes the content of the secondary chamber 3 to press against the seam 8 and to burst at its weakest location, see 9, into the main chamber 2 of the container. After the mixing process has been completed, the entire foil layer 4 may be separated from the main body 1 of the container, starting from a location 10 remote from the secondary chamber, to open and expose part, or all, of the main chamber 2 so that the finished mixture can be removed rapidly and completely.

In FIG. 5 there are shown two modifications of the container described above each of them including one secondary chamber for the container. The marginal extension 16, 18 of a main chamber are adapted to mate with the foil forming the secondary chambers, and are pre-coated with an acid-resistant layer of foil which can be sealed, or with a self-adhesive material 11. One secondary chamber 3 is located adjacent to the elongated extension 18 and is filled separately. The tear foil 4 which forms the secondary chamber 3 can be sealed or glued to the main body 1 of the container, there forming the weakest location 9. The halves not shown contain a spot for tearing the foil layer, either with or without an additional and optional secondary chamber. These devices are used in the same way as the container shown in FIG. 1.

In FIG. 6, there are shown two container designs in which only one separating diaphragm must be punctured or destroyed. The designs permit greater tolerances for welding or gluing. The separating diaphragm 5 is caused to burst by the application of surface pressure at the opening 7 in the main body 1 of the container, and the content of the secondary chamber 3 is pressed into the main chamber 2. The tear foil layer 4, with its secondary chamber 3, in the form of a foil cushion, may be filled separately and may be applied to the main body 1 of the container by gluing, or welding. These devices are used in the same way as the example of execution in FIG. 1. The halves not shown are similar to those in FIG. 2.

Finally, FIG. 7 illustrates, again, an embodiment having a readily rupturable diaphragm. A combined welding and gluing process may be used. The secondary chamber 22 is first filled as a foil cushion and is then welded as a whole to the main body 1 of the container.

After the main chamber 2 has been filled, a stable cover foil 6 may be used to cover the still-open portion of the container.

In this modification, the extension 14' is folded 90° to facilitate the attachment of the container to the mixer in a manner which may be advantageous under certain circumstances.

While there have been described what are at present considered to be the preferred embodiments of this invention, it will be obvious to those skilled in the art that various changes and modifications may be made therein without departing from the invention, and it is aimed, therefore, in the appended claims to cover all such changes and modifications as fall within the true spirit and scope of the invention.

What is claimed is:

1. A multi-chamber container separately accommodating two or more substances which react with each other, for use in the preparation of ready-to-use dental material, the container comprising: a substantially stiff container body having an upwardly extending depression constituting the primary chamber containing one said substance, and a generally horizontally disposed flange completely surrounding and extending outwardly from the border or edge of said primary chamber; a strippable flexible foil overlying said chamber and overlying and adhering to the bottom surface of said flange and completely to said border thereof, a depression in said flexible foil constituting a secondary chamber having a significantly smaller volume than said primary chamber and containing a second substance, said secondary chamber being defined by a spacing between a predetermined surface of said flange located at least in part substantially immediately adjacent to said border of said primary chamber and said flexible foil.

2. A multi-chamber container according to claim 1 wherein said secondary chamber is located contiguous to but lengthwise offset from said main chamber.

3. A multi-chamber container according to claim 1, in which said body and said primary chamber are elongated in an axial direction.

4. A multi-chamber container according to claim 3, wherein said predetermined surface area of said flange is located at one axial end of said body.

5. A multi-chamber container according to claim 4, wherein said flanged axial end establishing said predetermined surface area is folded about 90° to the plane of the opening of said primary chamber.

6. A multi-chamber container according to claim 1, in which said flexible foil is composed of an acid-resisting inner foil and a reinforcing cover foil.

7. A multi-chamber container according to claim 1, wherein the adherence of said flexible foil to said flange in the region between said secondary and primary chamber is rupturable, for emptying the substance of the secondary chamber into that of the primary chamber.

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