

UNITED STATES PATENT OFFICE

2,350,931

DISPENSING PACKAGE

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Application March 10, 1943, Serial No. 478,612

10 Claims. (Cl. 222-107)

This invention relates in general to the packaging of powdered or pulverulent material, and more particularly the invention contemplates a package for medicinal powder which shall be capable of dispensing or ejecting its contents by a bellows action so that the powder can be easily directed into a wound in a human body and at the same time spread or disseminated evenly and quickly over the injured tissues.

Heretofore, some packages of this general character have included walls or sections of walls movable toward each other by manual pressure or squeezing to eject the contents and movable away from each other by a spring. Other known packages include complex folded walls certain of which are resilient or springy and another type of package has its opposed walls embossed to provide inherent resiliency and permit a bellows action of the walls.

These known packages are either complicated and expensive in construction or are deficient in operation, or are awkward or cumbersome in shape and consequently difficult to handle and to pack for shipping.

One object of my invention is to provide a package of the general character described which shall embody novel and improved features of construction such that the package shall be simple, inexpensive, substantially flat and handy in shape, easy to use and efficient in operation.

Another object of the invention is to provide such a package which shall comprise two simple flat layers or sheets of flexible material having some inherent resiliency, such as fibrous material like paper or cardboard, secured together and forming a compartment for powder or other fluent substance between them, and novel and improved means for causing certain portions of said layers or sheets that form the walls of said compartment to buckle, bulge or ripple so that when a discharge passage for said compartment is opened, said buckled, bulging or rippled portions of one said layer may be forced or squeezed toward the other layer by manual pressure to cause expulsion or blowing of the powder from said compartment through said discharge passage by a bellows action and upon release of said manual pressure said portions of said layers will spring apart or recover their original positions ready to be squeezed together to produce another discharge of the powder from said compartment.

Further objects are to provide a novel and improved method of buckling and holding buckled the walls of the compartment of a dispensing container of the specific character described; and

especially to provide such a method whereby the walls of the compartment shall automatically become buckled after completion of the container and particularly after the filling and closing thereof.

Other objects, advantages and results of the invention will be brought out by the following description in conjunction with the accompanying drawing in which

Figure 1 is a perspective view of a dispensing package or container embodying my invention.

Figure 2 is an enlarged sectional perspective view of the package or container before the walls of the powder-containing compartment have become buckled.

Figure 3 is a similar view showing the package with the walls of the powder-containing compartment in normal buckled position and with the tearing flap removed for opening the compartment.

Figure 4 is a vertical longitudinal sectional view on the line 4-4 of Figure 1.

Figure 5 is a similar view with the tearing flap removed and showing the manner of expelling powder from the compartment.

Figure 6 is a view similar to Figure 1 showing a modification of the invention.

Figure 7 is a vertical longitudinal sectional view on the line 7-7 of Figure 6, and

Figures 8 and 9 are transverse sectional views of other embodiments of the invention.

For the purpose of illustrating the principles of the invention, I have shown it in conjunction with a generally known type of flexible-wall package such as described and claimed in my United States Patent No. 2,103,389 dated December 28, 1937.

Specifically describing the illustrated embodiment of the invention, the package or container is shown as comprising two layers or strips 1 and 2 of suitable flexible material, for example paper, "Cellophane," "Pliofilm," metal foil and the like, preferably material having some inherent resiliency such as paper or cardboard. The layers 1 and 2 are sealed together at certain zones to form a compartment for holding the material to be packaged or transported, particularly fluent material such as powder. Specifically, the layers 1 and 2 are sealed together at one end as indicated at 3, along the longitudinal margins as indicated at 4 and at the other end as indicated at 5. The portions of the layers 1 and 2 bounded by the zones 3, 4 and 5 are spaced from each other and form the walls of a compartment 6 for the substance contained in the package. The zone 5

preferably is shaped to form a restricted discharge neck 7 for the compartment and comprises a tearing flap which may be removed from the package along a perforated or scored guide line 8 to form a discharge passage 9 for the compartment 6.

The layers of material 1 and 2 may be secured together in any suitable manner either adhesively or thermoplastically, as is known in the art.

In accordance with the invention means is provided for normally holding the walls of the compartment 6 in buckled, rippled or bulging condition so that the walls can be manually flexed with a bellows action to expel the contents of the compartment. As shown in Figures 1 to 5 inclusive, a tension element 10 is secured to the walls of the compartment at spaced points so that tension is applied to said walls in such a manner as to buckle them between said points. More specifically, the tension element 10 consists of a strip or sheet of suitable material that extends transversely of the compartment 6 and has its ends 11 sealed in the opposite longitudinal marginal zones 4 at opposite sides of the compartment. The tension element 10 exerts tension at the points 11 so as to pull the marginal portions 4 of the package or container inwardly toward each other and thereby buckle or ripple the walls of the compartment as shown in Figure 3.

I have discovered that the tension element 10 can be caused to exert the desired tension on the walls of the compartment by relative changes in the linear dimensions of said walls and said tension element between the points of connection of the tension element to the walls of the compartment, and preferably the material of said walls of the compartment and the material of the tension element are such as to be capable of relative inherent changes in linear dimensions between said points of connection of the tension element to said walls. Specifically I have found it desirable to make the tension element 10 of such material that it will shrink relatively to the material of the layers 1 and 2 after the element has been secured to the walls of the compartment. In the now preferred embodiment of my invention, the layers 1 and 2 are formed of paper and the tension element 10 is formed of "Cellophane."

Figure 2 shows the package or container before the relative changes in the linear dimensions of the walls of the compartment and the tension element have occurred, while Figure 3 shows the package after said relative changes have taken place and particularly after the tension element 10 has shrunk relative to the layers 1 and 2. It will be noted that the width of the compartment 6 in Figure 3 is less than that in Figure 2, the difference in width being compensated by the buckling or rippling of the walls of the compartment.

With this construction it will be observed that when the compartment has been opened by tearing of the flap 5, the contents of the compartment may be expelled or blown from the discharge opening 9 with a bellows action by manual application of pressure on the opposite walls of the compartment, as between the thumb and forefinger, as illustrated in Figure 5. This structure and function is especially useful to the armed forces of our country in the application of medicinal powder to wounds of soldiers and sailors in the field or at sea. The package has a flat handy shape so that it can easily be packed,

shipped and handled, and the restricted discharge of the powder in a jet as the result of the bellows action of the package facilitates the direction of the powder into the wound and the spreading or dissemination of the powder evenly and quickly over the injured tissues.

A modification of the package is shown in Figures 6 and 7 where two tension elements 12 and 13 are provided, said elements being spaced apart longitudinally of the compartment 14 and having their ends secured to the walls of the package in the sealed longitudinal marginal zones 15 of the package which correspond to the zones 4. The two tension elements 12 and 13 operate in a manner similar to that of the tension element 10 and the structure and operation of this form of package or container otherwise are the same as the structure and operation of the package shown in Figures 1 to 5 inclusive.

The packages may be made and filled in any suitable manner and the tension elements may be applied to the packages in various ways. I have found it to be desirable, however, to make the packages according to the method and with apparatus similar to that disclosed in my Patent No. 2,245,827, and to apply the tension elements to the packages as the latter are formed. More specifically, two strips of material are fed step by step into juxtaposition to each other between two dies, and the tension element 10 in the form of a continuous strip may be fed between the strips of packaging material. Periodically the dies will press the strips of packaging material together so as to form the bottom margin 3 and longitudinal side margins 4 of one package and simultaneously form the zone 5 of the next preceding package. The partially formed package, that is the package having the zones 3 and 4 completed, will have the material to be packaged deposited in the compartment 6 at the upper end of the package before the zone 5 is formed to close the compartment. It will thus be seen that the tension element 10 will be secured in the marginal zones 4 of the package as said zones are formed. The material of the tension element may be such that it will shrink during the formation of the package or hours or days after the package has been filled and closed, whichever is preferred. The strip that forms the tension element can be severed after the sealing operation, and the packages can be cut apart after the package-closing operation.

In some cases it may be desirable to make the layers 1 and 2 of material which will expand relative to the tension element which may be such that its dimensions will not materially change, in which case the walls of the compartment may become buckled by expansion of the layers 1 and 2 rather than by the shrinkage of the tension element 10. This function might be effected by preliminarily shrinking the layers 1 and 2 before they are sealed together so that after the package has been formed they will expand under normal atmospheric conditions or under special conditions.

Referring to Figure 8, it is also possible to form one layer 16 of the package A of material which expands relatively to the other layer 17, or said wall 17 of the package may be formed of material which contracts or shrinks relatively to the other layer 16, so that one of the layers is buckled.

As shown in Figure 9, one or both walls 19 and 20 of the package may be formed of laminated flexible sheet material having thicknesses 21 and

22 secured together, e. g. adhesively, the inner of which shrinks relatively to the outer or the outer of which expands relatively to the inner.

While I have shown the invention as embodied in one type of package it will be understood by those skilled in the art that other types of packages may be constructed within the spirit and scope of the invention.

What I claim is:

1. A dispensing container having flexible walls forming a compartment for a fluent substance, and a tension element extending across said compartment and connected at spaced zones to said walls, the materials of at least one wall and of said tension element being such that relative changes in the linear dimensions of said wall and said tension element between said spaced zones are caused by inherent changes in at least one of said materials, so that tension is exerted on said spaced zones to cause buckling of said walls and to permit flexing thereof with a bellows action for expelling the contents of said compartment.

2. A dispensing package comprising opposed normally flat layers of flexible material secured together along marginal zones that are approximately in a common plane to form a compartment between them whose walls are spaced portions of said layers bounded by said marginal zones, and a tension element extending across said compartment and having its ends secured between said layers in said marginal zones at opposite sides of said compartment, the material of said tension element being such that relative changes in the linear dimensions of said tension element and said walls between said opposite marginal zones are caused by inherent changes in said material of said tension element whereby tension is exerted on said opposite marginal zones so as to buckle said walls and to permit flexing thereof with a bellows action to expel the contents of said compartment.

3. The dispensing container set forth in claim 1, wherein said tension on the walls of the container has been caused by shrinking of said tension element relatively to said walls.

4. The dispensing container set forth in claim 2 wherein said tension exerted by said tension element has been caused by shrinking of said

tension element relatively to the walls of the compartment.

5. The dispensing container set forth in claim 1, wherein said walls are paper and said tension element is a strip of "Cellophane."

6. The dispensing container set forth in claim 2 wherein said walls are paper and said tension element is a strip of "Cellophane."

7. A dispensing container having flexible walls forming a compartment for a fluent substance, and a tension element extending transversely of said compartment and having its ends connected at spaced points to said walls, said walls and said tension element being formed of materials such that relative changes are caused by atmospheric conditions in the linear dimensions of said walls and said tension element between said spaced points to cause buckling of said walls, whereby they may be flexed with a bellows action to expel the contents of said compartment.

8. A dispensing container comprising a plurality of thicknesses of flexible material secured together in certain zones which form the margins of a compartment whose walls are the spaced portions of certain of said thicknesses between said margins, at least one of said walls being buckled by changes in the linear dimensions of at least one of said thicknesses between at least two opposite margins of said compartment.

9. A dispensing container comprising two opposed layers of flexible material secured together in certain zones which form the margins of a compartment whose walls are the spaced portions of said layers between said margins, at least one of said layers being buckled as the result of relative changes in the linear dimensions of said layers between at least two opposite margins of said compartment.

10. A dispensing container comprising two opposed walls secured together in certain zones which form the margins of a compartment for a fluent substance, at least one of said walls being laminated and including at least two thicknesses of flexible material such that relative changes occur in the linear dimensions of said thicknesses to cause buckling of said wall, whereby said wall may be flexed with a bellows action to expel the contents of said compartment.

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