Jan. 1, 1946. H. F. WATERS 2,392,206

METHOD OF MAKING FLUID-TIGHT BAGS

Filed Dec. 5, 1941

Fig. 1.

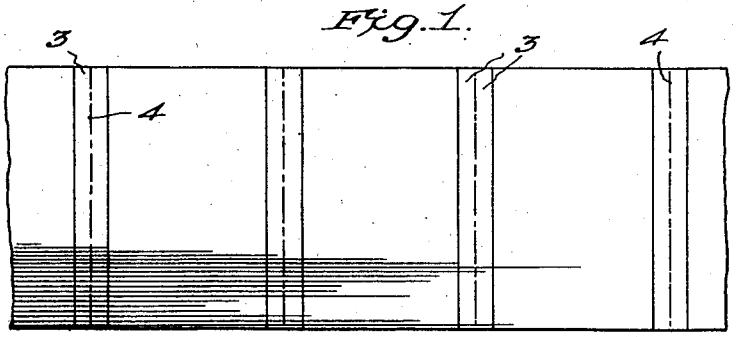


Fig. 2.



Fig. 3.

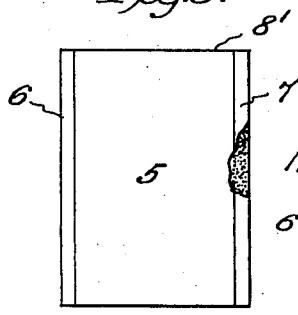


Fig. 4.

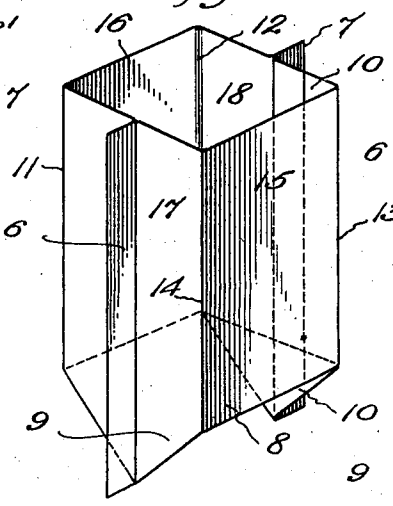


Fig. 5

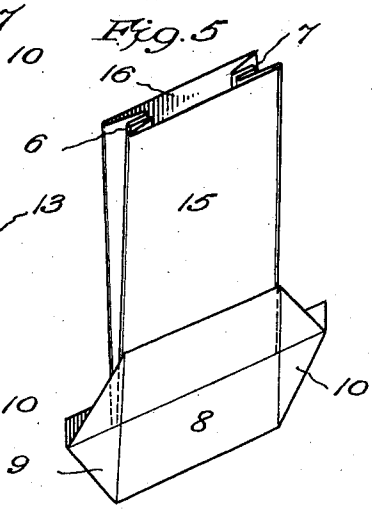


Fig. 6.

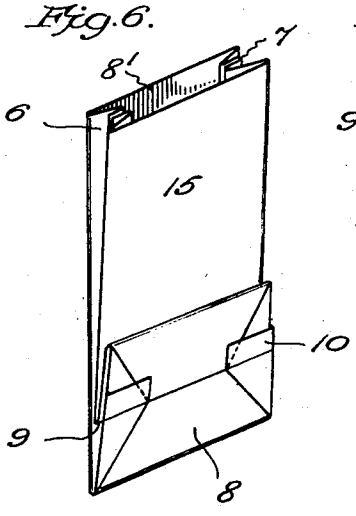
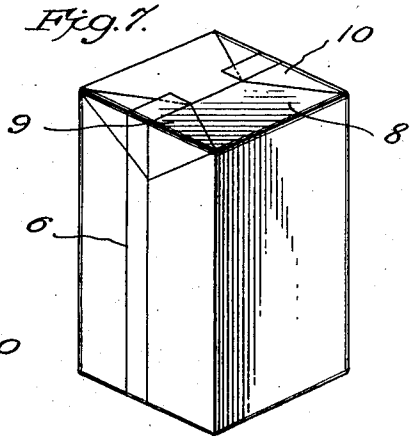


Fig. 7.



INVENTOR.
HARRY F. WATERS
BY Frederick A. Norton
ATTORNEY

Patented Jan. 1, 1946 2,392,206

UNITED STATES PATENT OFFICE

2,392,206

METHOD OF MAKING FLUID-TIGHT BAGS

Harry F. Waters, New York, N. Y.

Original application May 25, 1940, Serial No. 337,112. Divided and this application December 5, 1941, Serial No. 421,792

3 Claims. (Cl. 93—35)

The present invention relates to methods of making fluid-tight bags, and, more particularly, to fluid-tight bags of the automatically opening bottom type.

This application is a division of my application Serial No. 337,112, filed May 25, 1940, for Fluid-tight bags and method of making the same.

Heretofore, various fluid-tight bags were proposed most of which were constituted of a fluid-tight and fusible material which was converted into a tube by means of a longitudinal heat-seal and has been divided into unit lengths sealed at one end thereof. These bags were generally constituted of chlorinated rubber compounds, particularly of a chlorinated rubber film known in the trade as Pliofilm. Most of these bags had a substantially tubular structure and due to the inner adhesion between the inner surfaces thereof, it was relatively difficult to open or square up the same for the purpose of introduction of the contents. As those skilled in the art know, particularly for the retail trade, it is desirable to provide bags of the so-called automatically opening bottom type, which are provided with a preformed bottom structure. Of these bags particularly the so-called ABC bags and the satchel type or diamond fold bags were used to a substantial extent. However, it was impossible to provide bags of the automatically opening bottom type which were of a fluid-tight character. On the other hand, there was substantial demand in the trade for a fluid-tight bag which could be shipped and stored in a flattened condition and which could be opened or squared-up at a moment's notice simply by shaking the bag. Thus, for example, in the retail merchandizing of various food products it was desirable to provide fluid-tight and hermetically sealed bags which prevented the entrance of atmospheric moisture into the contents and the evaporation of the natural moisture from the contents. A similar need for an inexpensive and fluid-tight packaging medium existed in merchandizing food products of a liquid or semi-liquid consistency such as pickles, sauerkraut, potato salad, various pickled and preserved fish, and the like. According to present practice cardboard containers were used with or without a fluid resisting liner. These prior methods required great care and attention on the part of the retailer and of the customer in that the packages had to be carried in an upright position and even so, losses due to spilling, etc., were considerable. In addition, the cost of such packaging materials was rather high with respect to the purchasing price of these relatively low-priced commodities. Although from time to time, various suggestions and proposals were made to solve the outstanding problem and to provide the art with a simple and inexpensive fluid-tight bag, none, as far as I am aware, of these prior suggestions and proposals was completely satisfactory and successful.

It is an object of the present invention to provide a simple and completely satisfactory solution for the outstanding problem.

It is another object of the present invention to provide a method of forming a bag of fluid-tight character which is capable of being shipped and stored in the flattened or knocked-down condition and which may be erected or squared-up for the convenient introduction of the contents by means of a simple and rapid manual operation.

It is a further object of the present invention to provide a method of forming a novel and improved fluid-tight bag having a preformed bottom incorporated therein which is constituted of a sheet material fluid-tight and fusible on at least one face thereof, said material being converted into a bag exclusively by means of completely flat and fluid-tight seams in a single plane.

Still another object of the present invention is to provide a method of forming a bag of the automatically opening bottom type in the form of a heat-sealed, and fluid-tight envelope all the seams of which are in a single plane and are substantially free from reentrant folds and similar danger points of leakage.

It is also within the contemplation of the invention to provide a method of forming a fluid-tight bag of the ABC or satchel type which may be opened and filled with solid, semi-liquid, or liquid merchandise and which may be readily and hermetically sealed to prevent deterioration, loss or spilling of the contents during transportation and storage.

The invention also contemplates a method for manufacturing the bags embodying the invention in a simple, inexpensive and practical manner.

Other and further objects and advantages of the invention will become apparent from the following description taken in conjunction with the accompanying drawing in which:

Fig. 1 illustrates a plan view of a blank for the manufacture of fluid-tight bags embodying the invention;

Fig. 2 depicts an end view of the blank shown in Fig. 1;

Fig. 3 shows a plan view of a unitary portion of the blank shown in Figs. 1 and 2, constituting an envelope adapted to be converted into a fluid-tight bag;

Fig. 4 shows a perspective view of a preferred embodiment of the invention after it has been squared-up and prior to the formation of the automatically opening bottom;

Fig. 5 is a similar view of the fluid-tight bag

with the automatically opening bottom formed and prior to folding in the tabs of the bottom structure;

Fig. 6 is a similar view of the finished fluid-tight bag in its flattened form as it appears during shipment and storage;

Fig. 7 is a perspective view of the finished fluid-tight bag in its squared-up condition and with its bottom side up;

Broadly stated, according to the principles of the invention, I provide a method of forming a fluid-tight bag adapted to be shipped and stored in the flattened condition and to be squared-up into a structure ready for the introduction of materials to be packed by means of a single and simple manual operation. Although, various fluid-tight, flexible and fusible materials may be used, I prefer to employ a flexible and non-fusible sheet material which is coated or laminated with a fluid-tight and fusible material on one face thereof. Generally, I employ a paper sheet laminated with a fluid-tight and fusible film such as Pliofilm, Vinylite, and the like. I have found that in order to convert such initial material into a fluid-tight bag great advantages are obtained by applying heat-seals to the suitably manipulated and folded material in such regions as to permit all heat-seals to be brought into a single plane. Thus, in most cases, I first convert the sheet-like material into a completely flat envelope by means of folding it about a plurality of lines and by heat-sealing the resulting folded structure in predetermined portions thereof. I have discovered that it is extremely desirable to carefully avoid re-entrant folds and intervening layers of material in the heat-sealed regions. In other words, in the regions which are to be heat-sealed, preferably only two layers, of material are placed face to face against one another, whereby pin holes, re-entrant folds and similar danger points of leakage may be positively avoided. Experience has demonstrated that the presence of re-entrant folds and intervening layers in the heat-sealed regions make it difficult, if not impossible, to obtain a positively fluid-tight bag structure. This broad concept of my invention may be carried out in various ways. Thus, in the simplest case, a sheet-like material, fusible on one face thereof is folded along a medial line and heat-sealed along predetermined lines to provide envelopes of a completely flat character which are completely sealed, except on one edge thereof. These envelopes are provided with a preformed bottom structure by means of a plurality of folding operations bringing such bottom surface into the plane of one of the panels of the bag. It is also possible to start out by folding over a strip of suitable material along a plurality of fold lines and to seal the longitudinal edges thereof together to form a tube which is subsequently provided with a preformed bottom and cut into unitary lengths. The number and the character of the longitudinal folds determines whether a bag of the so-called bellows-fold type or of the so-called diamond-fold type is obtained. Due to the presence of the preformed bottom, the flattened bags may be squared-up by gripping the upper end of one of the main panels thereof and shaking the bag, as those skilled in the art will readily understand. Of course, a large number of variations is possible in accordance with the arrangement of the heat-sealed regions with respect to the various panels of the bag, as it will appear more fully from the following detailed description of a few preferred embodiments of the present invention.

Referring now more particularly to Figs. 1 to 7 of the drawing, a preferred embodiment of the invention and the preferred procedure followed in its manufacture will be described. As it will be observed in Figs. 1 and 2, a strip 1 of flexible material is provided having a fluid-tight and fusible coating at least on one face thereof. This strip or web of material is folded along a longitudinal line 2 to form a U-shaped structure and to have its longitudinal and lateral edges in registering position. Transverse heat-sealed areas 3 are provided at uniformly spaced intervals extending across the complete width of the U-shaped strip. Hereafter, the folded and sealed strip may be cut along lines 4 into envelopes 5 which are heat-sealed along lateral marginal portions 6 and 7, are closed at their bottom and have an opening 8 at the top edge thereof (Fig. 3).

The next step in converting envelope 5 into a bag with an automatically opening bottom is squaring-up the envelope by means of a suitable mandrel or other device whereby the structure shown in Fig. 4 is obtained. This structure has a rectangular cross section and has two laterally extending fins 6' and 7' corresponding to the heat-sealed regions of envelope 5, a flat and rectangular bottom surface 8 and two tabs 9 and 10 which form continuations of the bottom 8 and of fins 6 and 7. It will be noted that this operation converted the completely flat envelope into a squared-bag having fold lines 11, 12, 13 and 14 defining main panels 15 and 16 and end panels 17 and 18. This structure may be further modified by folding bottom 8 in the plane of main panel 15 and by pushing in fins 6 and 7 to provide re-entrant folds of the end panels and obtaining a bag structure generally known in the art as a bag of the bellows fold type. Tabs 9 and 10 are shown for clarity of illustration as extending in the plane of bottom 8 (Fig. 5). This structure may be converted into one with a completely formed bottom by turning tabs 9 and 10 towards each other and in contact with bottom 8, a spot of suitable adhesive being employed for securing the tabs in this position. Fig. 6 depicts the finished bag in this flattened condition and having its preformed bottom also flattened in the plane of the main panels. Preferably and in accordance with conventional practice the bag is shipped and stored in this shape. When it is desired to fill the bag with the desired contents, one of the main panels is gripped in proximity to the upper opening or top edge of the bag and shaking the bag will cause the re-entrant end walls to square-up and to have the bottom assume its normal position at right angles to the main and end panels. Fig. 7 shows the bag in the completely finished and squared-up condition with its bottom side turned up. The squared-up bag may now be easily filled with any desired material and may be provided with a top heat-seal in proximity to the upper edge thereof to fluid-tightly and hermetically seal the contents and to positively prevent deterioration and loss of the contents during transportation and prior to its final utilization.

It will be noted that the advantages of my invention are numerous. Thus, I have disclosed fluid-tight bags of the automatically opening bottom type, which may be reduced to the form of a completely flat envelope in which only flat and plane heat-sealed regions are present and doubled-up layers, reentrant folds and intervening

layers of material are notably absent. After the bags embodying the invention have been squared-up and filled with the contents, the mouth walls of the bag may be flattened against each other and may be hermetically sealed by applying heat and pressure to a transverse strip thereof. It is worth noting that the structure of the bags of the invention is such that also the top seal may be made completely flat. Of course, those skilled in the art will readily appreciate that this is of very great importance when manufacturing and employing bags for fluid-tightly packaging materials, due to the fact that completely flat seals of the described character can positively assure permanent fluid-tightness of the bag or package.

The bags embodying the present invention may be manufactured of flexible materials which are fusible on both faces thereof or at least on one face thereof. While when employing material fusible on both faces thereof, such as a flexible sheet constituted of an integral mass of fluid-tight and thermoplastic character, for example, Pliofilm, lap type seams may be employed, I generally prefer to employ the fin-type seam described in all of the previous embodiments.

Moreover, it will be readily appreciated that all of the bags of the invention may be readily manufactured on a practical and commercial scale and at a low price. Of course, it will be understood that while I have disclosed manual operations for converting the sheet-like material into the bags of the invention, in practice, generally suitable automatic machinery is employed for carrying out the necessary manipulations of the material.

Although the present invention has been described in connection with a few preferred embodiments thereof, variations and modifications may be resorted to by those skilled in the art without departing from the principles of the present invention. Thus, instead of a single strip of flexible material fusible on at least one face thereof, it is also possible to employ other laminated or duplex materials for the same purpose particularly a combination of a non-fusible sheet with a fusible sheet spotted to each other such as, for example, by bonding to each other a sheet of paper and a sheet of Pliofilm. In the drawing, I have shown the tabs resulting from the formation of the bottom structure adhesively secured to the bottom surface. As an alternative, it is also possible to leave these tabs unattached and have them extend upwards in the direction of the corresponding end panels in the squared-up condition of the bag. This modification will be particularly resorted to when the finished bag is inserted into a carton of appropriate dimensions. I consider all of these variations and modifications as within the true spirit and scope of my invention as disclosed in the foregoing description and defined by the appended claims.

I claim:

1. The method of making a fluid-tight bag of the automatically opening bottom type which comprises folding over a sheet of flexible material fluid-tight and fusible on at least one face thereof to bring its edges into substantially registering position and to have its fusible face within, heat-sealing said folded sheet along two of its edges to convert it into an envelope closed at three edges thereof and having a filling opening at the fourth edge thereof, squaring-up said envelope to form pairs of main and end panels, a rectangular bottom panel and a pair of vertically depending ears, medially infolding said end panels to bring them between the main panels, flattening the bottom panel and the ears connected therewith into a single plane against said main panels thereby providing automatically opening bottom-forming creases in main and end panels, and folding back and securing said ears to said bottom panel whereby a flattened readily erectable fluid-tight bag having a preformed bottom structure is provided having only two layers of material in face to face contact throughout its seams.

2. The method of making a fluid-tight bag of the automatically opening bottom type which comprises folding over a sheet of flexible material fluid-tight and fusible on at least one face thereof about a transverse medial line to bring its edges into a substantially registering position and to have its fusible face within, heat-sealing said folded sheet along the two longitudinal edges thereof to convert the same into a fluid-tight envelope closed at three edges thereof and having a filling opening at the fourth transverse edge thereof, squaring-up said envelope to form pairs of main and end panels a bottom panel and a pair of vertically depending ears, medially infolding said end panels to bring them between the main panels, flattening the bottom panel with the associated ears into a single plane against one of said main panels thereby providing automatically opening bottom-forming creases in main and end panels and thereafter folding back and securing said ears to said bottom panel whereby a flattened readily erectable fluid-tight bag having a preformed automatically opening bottom structure is provided having only two layers of material in face to face contact throughout its seams.

3. The method of making a fluid-tight bag of the automatically opening bottom type which comprises providing a sheet of paper having a layer of fluid-tight and thermoplastic material bonded to one face thereof, folding said sheet about a transverse medial line to bring its edges into a substantially registering position and to have said thermoplastic material within, heat-sealing said folded sheet along the two longitudinal edges thereof to convert the same into a fluid-tight envelope closed at three edges thereof and having a filling opening at the fourth transverse edge thereof, squaring-up said envelope to form pairs of main and end panels, a bottom panel and a pair of triangular ears and to convert the seams into projecting medial fins, medially infolding said end panels and the fins thereon to bring them between the main panels, flattening the bottom panel with the associated ears into a single plane against one of said main panels thereby providing automatically opening bottom-forming creases in the main and end panels, and thereafter folding back and securing said ears to said bottom panel whereby a flattened readily erectable fluid-tight bag having a preformed automatically opening bottom structure is provided which is completely free from reentrant and doubled-up layers of materials in its seams.

HARRY F. WATERS.