March 20, 1951 J. E. SNYDER 2,545,710

PACKAGE

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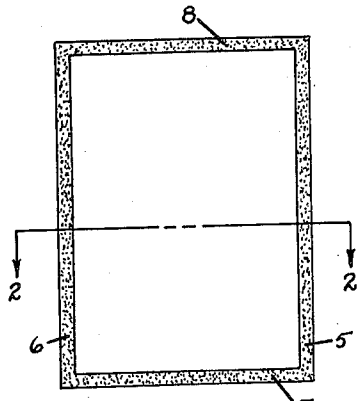


Fig. 1

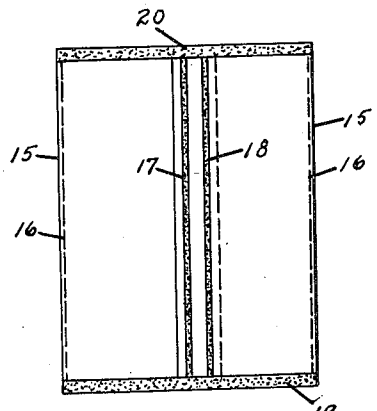


Fig. 3

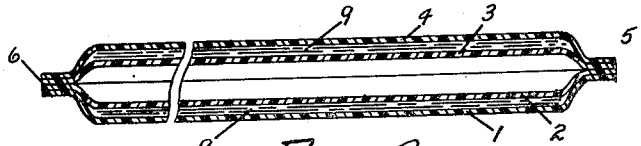


Fig. 2

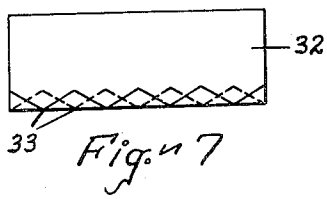


Fig. 7

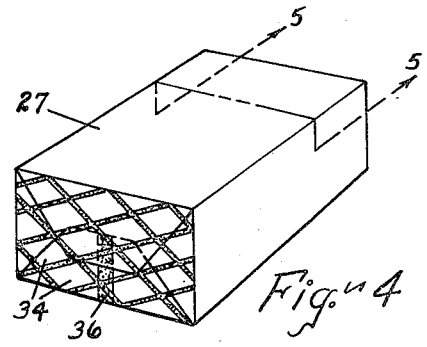


Fig. 4

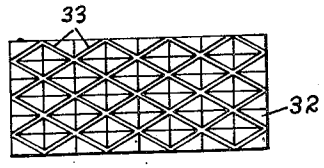


Fig. 6

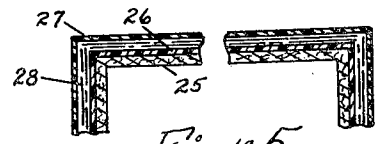


Fig. 5

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PACKAGE

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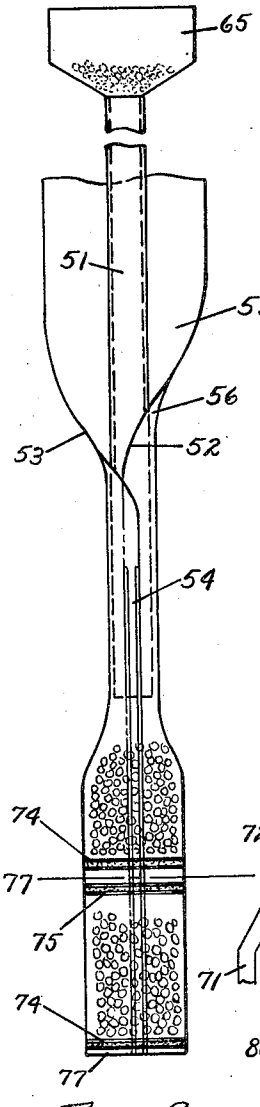


Fig. 9

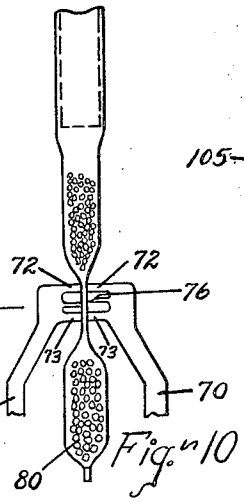


Fig. 10

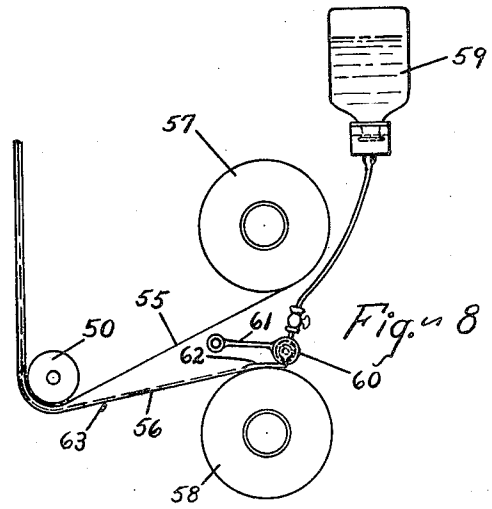


Fig. 8

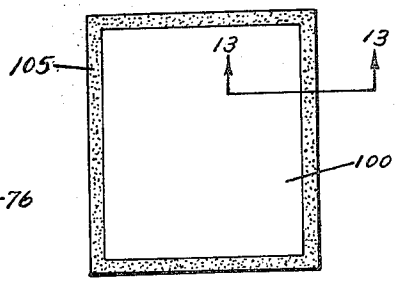


Fig. 12

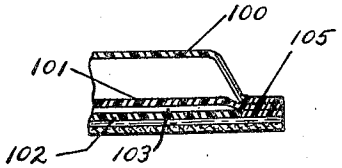


Fig. 13

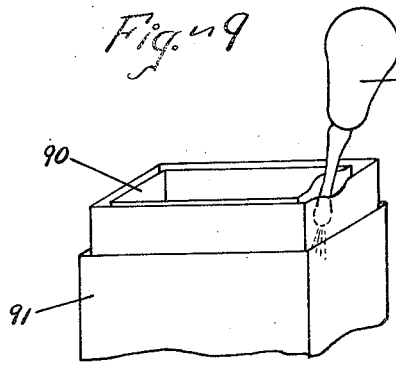


Fig. 11

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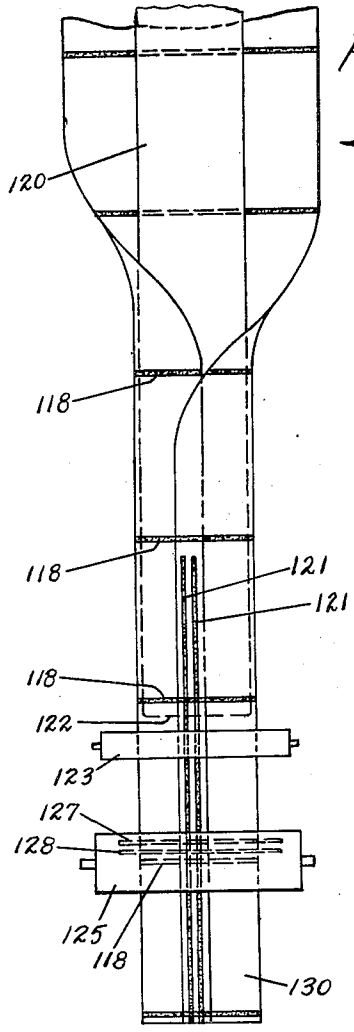


Fig. 15

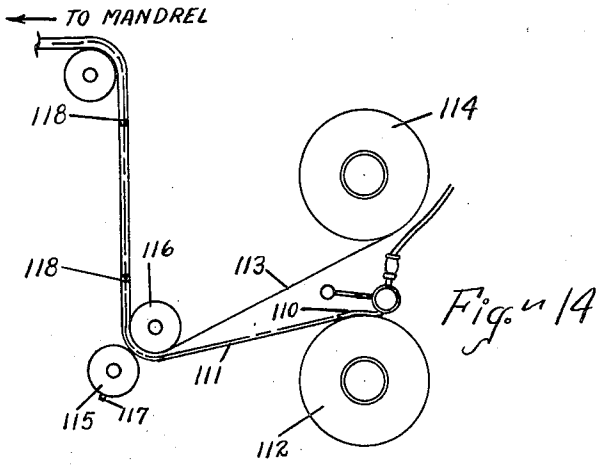


Fig. 14

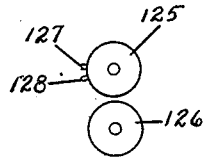


Fig. 16

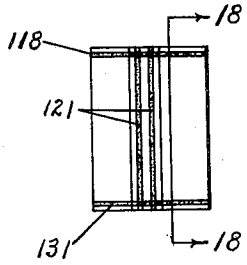


Fig. 17

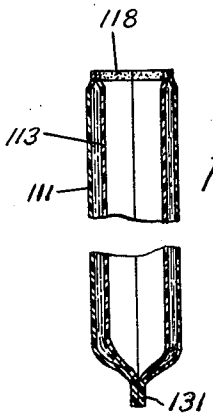


Fig. 18

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Patented Mar. 20, 1951 2,545,710

UNITED STATES PATENT OFFICE

2,545,710

PACKAGE

James E. Snyder, Akron, Ohio, assignor to Wingfoot Corporation, Akron, Ohio, a corporation of Delaware

Application September 4, 1948, Serial No. 47,844

3 Claims. (Cl. 312—31)

1

This invention relates to an improvement in packages and methods of making them. The preferred package of this invention has a two-ply wrapper and air-conditioning means located between the plies. Each ply of the wrapping material is of a composition substantially impervious to a component of the atmosphere affected by the air-conditioner. Thus if the air-conditioner is a humidifying or desiccating agent the wrapping material is substantially impervious to the passage of moisture vapor.

The market affords a great variety of wrapping materials which have peculiar properties, making them desirable for the packaging of different materials. Some of these wrapping materials are highly resistant to the passage of moisture vapor and are therefore adapted for packaging materials which are to be kept dry and materials which are to be kept moist. Other packaging materials are resistant to the passage of carbon dioxide and are used for packaging salts, etc., which are readily affected by this gas. Other materials are relatively resistant to the passage of oxygen and are used for packaging materials affected by oxygen. Certain of the packaging materials are suitable for protecting a material against a variety of deteriorating influences. All such may be used in making the different packages to which this invention relates.

Although the packaging materials afford substantial protection to a variety of such different influences, they merely approach perfection. According to this invention, the protection afforded by a wrapping material is augmented by using a double wrap and including an air-conditioner between the plies. The air-conditioner retards loss of a gaseous ingredient from the package or the entrance of a gaseous deteriorating agent into the package. For instance, if it is desired to maintain high humidity within the package two plies of a moisture-tight wrapping material are used and water or some water-supplying material is placed between them. On the other hand, the package may be protected against entrance of a gaseous material, such as moisture, oxygen, etc. For example, if the contents of a package are to be kept in an anhydrous condition, a dehydrating agent is placed between the plies.

The invention will be further explained in connection with the accompanying drawings in which—

Fig. 1 is a side view of a double-walled bag with air-conditioner between the walls;

Fig. 2 is a section on the line 2—2 of Fig. 1;

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Fig. 3 is a side view of an alternative bag structure;

Fig. 4 is a view in perspective of a box with a double-ply wrapper;

Fig. 5 is a section on the line 5—5 of Fig. 4;

Figs. 6 and 7 are a bottom and side view of the sealer used for sealing the end of the package shown in Fig. 4;

Fig. 8 is a side elevation of one end of bag-making and filling equipment;

Fig. 9 is an elevation on an enlarged scale of the other end of the same equipment (omitting the sealing and severing means);

Fig. 10 is a view taken at right angles to the view shown in Fig. 9, showing the sealing and severing means in operative position;

Fig. 11 is a view showing manual means for incorporating water, etc. between the plies of a bag;

Fig. 12 is a plan view of another package illustrating the invention;

Fig. 13 is an enlarged section on the line 13—13 of Fig. 12;

Fig. 14 is a side elevation of one end of a bag-making machine adapted for carrying out the invention;

Fig. 15 is a plan view of the other end of the machine on an enlarged scale;

Fig. 16 is an end view of the cutting and severing means of Fig. 15;

Fig. 17 is a side view of a finished open bag made by the equipment shown in Figs. 14–16; and

Fig. 18 is a section on the line 18—18 of Fig. 17 showing the open mouth of the bag with the two plies constituting the wall sealed at the top.

The bag of Figs. 1 and 2 is of duplex construction, i. e., the walls are composed of two plies of material and they are not laminated together. This is clearly illustrated in Fig. 2 in which the front wall is shown as being formed of the two plies 1 and 2 and the back wall as being formed of the two plies 3 and 4. All four plies are united in a seal 5 at one edge and a seal 6 at the other edge. A preferred film for moisture-proof packaging is rubber hydrochloride film, and when this film is used the seals are preferably made by heat and pressure. Both plies need not be made of the same composition. The wrapping materials that may be employed include films of regenerated cellulose, cellulosic films, copolymer of vinyl chloride and vinylidine chloride, other vinyl compounds, polyethylene, etc. There is a seal 7 across the bottom and after filling the bag it is closed by the seal 8 across the top. The space

between the walls is exaggerated in Fig. 2 to illustrate the presence of the air-conditioning medium. This is located in the two spaces 9 between the walls. This space will ordinarily be no wider than the thickness of the film, and may be narrower.

If the contents of the package are to be maintained at a high humidity, water is placed between the walls of the bag. If the walls are not easily wet by water, it may be advantageous to add a wetting agent. Thus, the composition 9 between the walls of the bag shown in Figs. 1 and 2 may be one hundred per cent water or it may be 99.9 per cent water and 0.1 per cent of an aerosol or other wetting agent. To reduce the rate at which the water evaporates from between the two plies, glycerine or the like may be added. Thus, the two walls of the bag may be separated by a composition which is formed of five per cent glycerine, 94.9 per cent water, and 0.1 per cent of a wetting agent. The composition 9 will ordinarily be spread as a thin film between the walls. If the walls of the bag are transparent the film will advantageously be distributed uniformly between them so as not to affect the transparency of the bag.

If, instead of desiring to keep the contents of the package moist, it is desired to keep the contents dry, a desiccating agent, e. g., anhydrous glycerine, etc., will be placed between the plies constituting the individual walls. Although a dry granular material might be used, a liquid is preferred for transparent packages. If it is desired to protect the contents from oxygen, an oxygen-absorbing material such as tung oil or other drying oil may be used between the plies. If it is desired to protect the contents of the bag from carbon dioxide, some absorbent or carbon-dioxide reactant will be placed between the walls such as a dilute solution of sodium hydroxide or saturated lime water or even a solution of pure water. Thus, the air-conditioner between the plies of the walls of the bag will be varied depending upon the protection desired.

Obviously, if one desires a package to maintain high humidity the film employed will be moisture-tight. It must also be water-tight if the humidifying agent placed between the walls is a liquid. Thus, for example, if water, or water with a wetting agent, or water containing a wetting agent and glycerine is employed, rubber hydrochloride material will form a desirable packaging material. The films 2 and 3, which are adjacent the contents of the package may be of thinner gauge or may be of such a composition that they transmit moisture vapor more readily than the outer films 1 and 4. The outer films 1 and 4 would then tend to prevent loss of moisture from the package, whereas the films 2 and 3 would permit equilibrium conditions to be built up and maintained between the air-conditioner and the contents of the package.

If the package is to be kept dry and a desiccating agent such as glycerine is used between the walls of the package, rubber hydrochloride film will again be desirable for use as the packaging material. If the package is to be kept free from carbon dioxide, a cellulosic film may be the preferred packaging material. For excluding oxygen, regenerated cellulose film may be preferred. Thus, the composition of the wrapping material may be varied. The two plies forming the duplex wall may be of the same or different composition.

Fig. 3 shows a bag of somewhat different construction which may be used for the same purpose. Here, the two walls 15 and 16 are folded at each edge of the bag and separately sealed at 17 and 18 respectively. The tube formed in this way is sealed across the bottom at 19 and after filling is closed at the top by the seal 20.

Figs. 4 and 5 show a box-like structure of cardboard or the like 25 wrapped with plies 26 and 27 of wrapping material which overlap on all sides of the package. The space 28 between them is filled with air-conditioner which is preferably in liquid form and applied as a thin film. The package is formed by wrapping the box in the wrapper in any manner and sealing in any manner that produces a tight closure.

According to a preferred method of sealing, a heated plate 32 (Figs. 6 and 7) with raised diamond-shaped ridges 33 is pressed against each end of the package. The diamonds form separate, tight, diamond-shaped enclosures 34 between the overlapping portions of the double-walled wrapper at the ends of the package and insure against channeling of the wrapper at the folds with unobstructed passage of gases through the channels. The longitudinal seam 36 may be made in the usual manner.

Figs. 8 to 10 illustrate somewhat diagrammatically the application of the invention to a type of bag-making and filling equipment widely used at the present time. The two plies of bag material are passed around a guide roll 50 (Fig. 8) up over a mandrel (not shown) and then down around a filling tube 51 (Fig. 9) where the edges 52 and 53 of the plies are brought together by a usual former (not shown) and sealed in the area 54 by a usual sealer (not shown). This makes a continuous double-walled tube, and means is shown in Fig. 10 for sealing the tube at intervals and cutting it in bags of desired length.

Following the operation in detail, two sheets of rubber hydrochloride film 55 and 56 are fed from the stock rolls 57 and 58. Water or other conditioning material is supplied from a tank 59 into the horizontal feeding cylinder 60. The cylinder is supported by brackets 61 from any suitable supporting means. The wick 62, which is substantially as wide as the plies feeds water through a water-tight seal in the bottom of the cylinder 60 on to the ply 56. This ply is thus covered with a thin film of water 63. The two plies are brought together under the roller 50 and are fed up over a suitable mandrel (not shown), and thence down around the filling tube 51. The material to be packaged, whether liquid or granular, etc., is supplied from the hopper 65. The bottom of the hopper may be equipped with a valve—or other suitable means for feeding measured amounts of the material through the feeding tube 51.

The arms 70 and 71 reach up and press against opposite sides of the tube. The top and bottom fingers 72 and 73 on each side of the bag are heated to form the heat seals 74 and 75 at the bottom and top, respectively, of each bag as it is formed. Between these fingers is the cut-off 76 which cuts the tube along the line 77. Thus, in a single operation the top seal 75 is formed on one bag, the bottom seal 74 is formed on the bag immediately above it, and the two bags are separated along the line 77. Each time the two arms 70 and 71 are brought together, a new bag 80 is formed, and as the bag is formed the arms pull the tube down over the filling tube 51 a bag's length and the operation is then repeated. The longitudinal seam 54 and the horizontal seams

74 and 75 unite the two plies of film 55 and 56 right through the film of water, and prevent the escape of water from between the plies.

Fig. 11 illustrates the introduction of air-conditioner manually between the plies of individual bags before sealing. The duplex or double-walled bag 90 is opened up inside of the container 91. Water or the like is introduced between the two plies of the bag from the bulb 92. But a small amount of water is necessary. The bag may then be filled with the material to be packaged and the top may be sealed. If preferred, the bag may be filled before introduction of the air-conditioner between the plies, but the first method tends to give more uniform distribution of the air-conditioner between the plies.

Figs. 12 and 13 show an alternative type of package in which a bag of transparent material is backed up by heavy paper or the like. The contents of the package is held between the plies 100 and 101 of rubber hydrochloride film. The ply 101 may be somewhat thinner than the outer ply 100 to facilitate the transmission of moisture to keep the contents of the package moist. The bag is backed up by a ply 102 of rubber hydrochloride film which may be of the same thickness as the ply 100 and which is affixed to heavy paper. Between the plies 101 and 102 is the layer of water or other conditioning material 103. These three plies are united around the edges in the area 105 by a seal which holds the water between the plies 101 and 102. The heavy outer plies 100 and 102 prevent loss of moisture from the package, and the ply 101 being thinner facilitates the maintenance of equilibrium in the two compartments on opposite sides of it.

Figs. 14 to 16 illustrate how a bag machine of a usual type may be adapted for making the bags of this invention. The mechanism for feeding the water to the wick 110 is no different from that shown in Fig. 8. The bottom or outer ply 111 of rubber hydrochloride film is taken from the stock roll 112. The top or inner ply 113 is taken from the stock roll 114. These are passed between the rolls 115 and 116, which may be driven rolls. The rib 117 on the roll 115 is heated. Thus, at every revolution of the roll 115 the two plies of film are sealed at intervals as at 118. This seal extends across the entire width of the two plies of film. The rotation of the roll 115 is coordinated with rotation of the cut-off and sealing roll (described below) so that bags of predetermined length are formed. The seal 118 unites the two plies at the top edge of the finished bag and prevents the loss of moisture from between the plies until the two sides of the bag are sealed together after filling. After leaving the rolls 115, 116 the double ply of film is folded over the horizontal mandrel 120 by any usual means. The opposite edges of the two films are overlapped and united by the parallel heat-seals 121. The seals 121 unite the edges of the individual plies right through the film of water which separates them, and this seals the water in between the plies.

The mandrel 120 is a flat mandrel. The flat tube formed on this mandrel is drawn off its bottom 122 and pulled forward by the bite rolls 123 (of which only one is shown). These rolls deliver the forward end of the tube between the rollers 125 and 126 (Fig. 16). The roller 125 is provided with heated rib 127 and the cut-off 128. The roller 126 merely forms a back-up roller. The rotation of roller 125 is coordinated with the rotation of roller 116. As the two plies pass between the two rollers 125 and 126 the completed bag 130 is severed from the tube by the cut-off 128 and the heated rib 127 forms the bottom seal 131 of the bag.

In the finished bag illustrated in Fig. 18 the bottom seam is formed by the heated rib 127. The top seal 118 which unites the two plies of film, but not the two walls of the bag, is formed by the heated rib 117 (Fig. 14). The longitudinal seams 121 are made by continuous sealers of the usual type (not shown). The bag is open. The seam 118 prevents the loss of air-conditioner throughout the life of the open bag. If adhesive is used for the final closure, after filling, the seam 118 will continue to perform this function. If the final closure is formed by a heat seal, this will ordinarily unite the two plies of the walls of the bag as well as uniting the two walls, and the seam 118 will lose its importance.

The drawings are illustrative. The invention is applicable to a variety of different kinds of packages, using different bag materials, made in different ways; and different air-conditioners may be used as required.

What I claim is:

1. A package enclosed in wrapping material the edges of which are heat-sealed to one another to form a tight enclosure, the wrapping material being formed of two plies of heat-sealable film having the same contour which films are sealed together adjacent all their edges and separated throughout the rest of their area by an air-conditioner.

2. The package of claim 1 in which the air-conditioner is water.

3. The method of forming a package which comprises laminating two films of heat-sealable material with a film of water between them and coextensive with each, sealing all the edges of the two films of heat-sealable material together by heat and pressure, which pressure pushes the water away and presses the films into contact, and then enclosing in this film the material to be packaged and uniting the edges of the film by heat and pressure to form a tight enclosure.

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