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Rausing et al.

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[54] **METHOD OF MAKING PACKAGING CONTAINERS**

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Related U.S. Application Data

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[30] **Foreign Application Priority Data**

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[52] **U.S. Cl.** ..... **93/36.6,** 93/36 PC, 156/244, 93/36 DA

[51] **Int. Cl.** **B31b 15/00**

[58] **Field of Search** ..... 156/244, 229; 93/36 PC, 93/36 R, 36 MM, 36.6, 36 DA

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[57] **ABSTRACT**

A method of making a packaging container in which the finished container has a sealing fin extending upwardly from the top of the container and transversely of the container, said fin comprising two sections of the container blank which are heat sealed together by the use of a layer of thermoplastic material on the sections, said layer being molecularly oriented in the longitudinal direction of the fin so that opening of the package may be facilitated.

5 Claims, 6 Drawing Figures

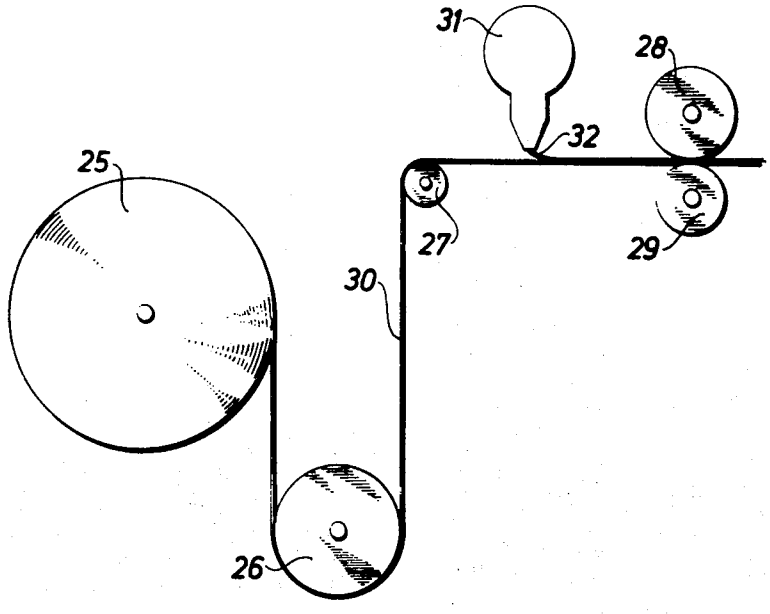


Fig. 1

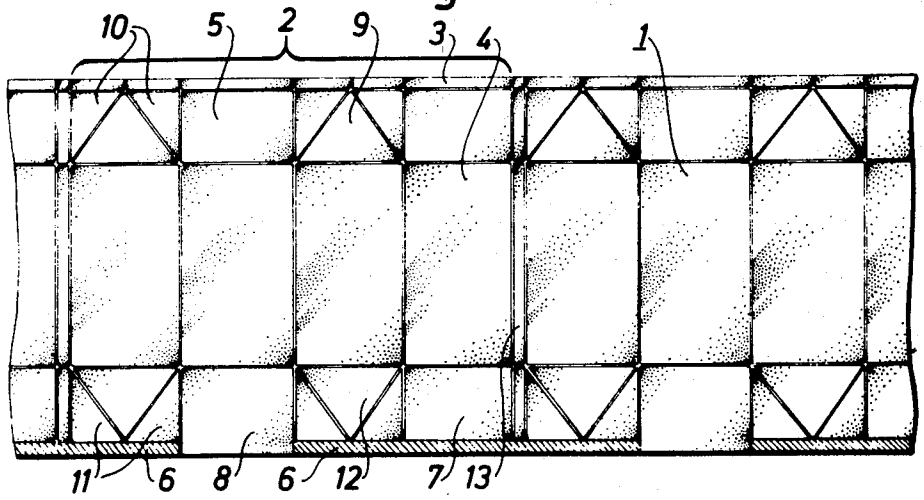


Fig. 2a

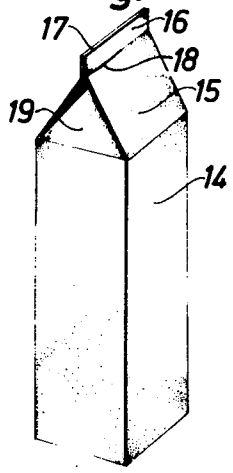


Fig. 2b

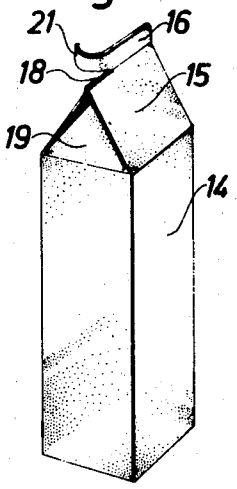


Fig. 2c

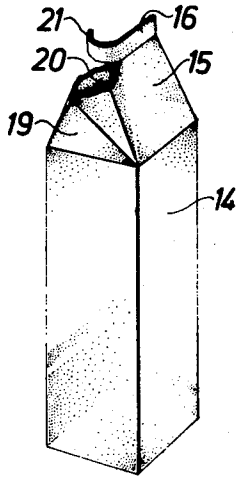


Fig. 3

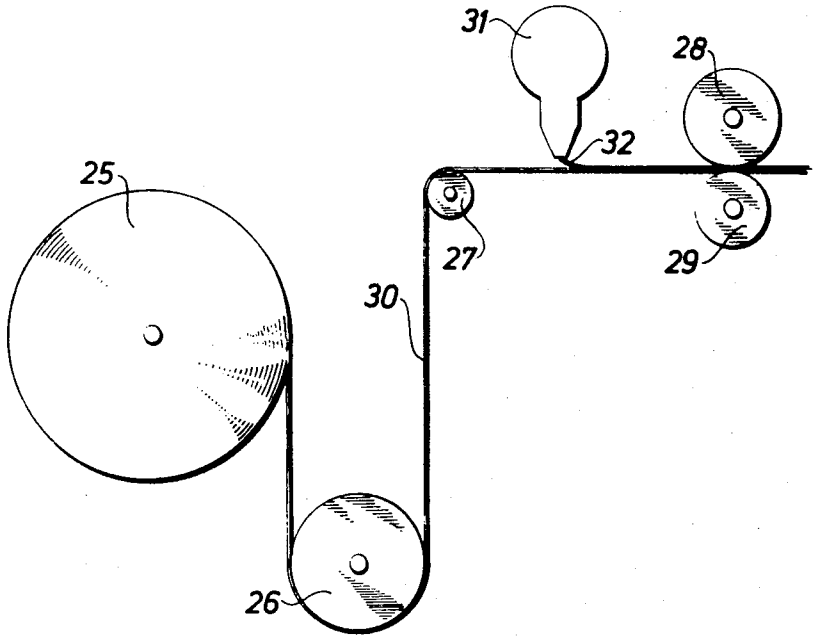
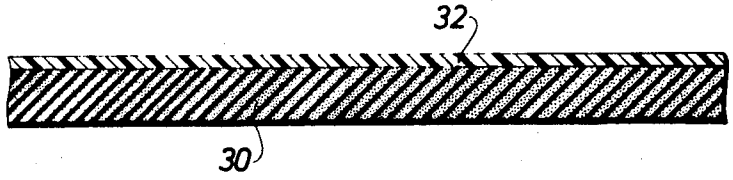


Fig. 4



METHOD OF MAKING PACKAGING CONTAINERS

This is a division of application Ser. No. 266,721 filed June 27, 1972.

The present invention relates to a packing container of the type that is manufactured from a web or a flat blank of a thermoplastic-coated carrier material by folding and heat-sealing of the packing material, the intention being to close the packing container formed after filling by means of sealing along a sealing fin which extends transversely across the packing containers.

In the manufacture of disposable packages, especially for liquids, a packing material is often used which consists of a carrier layer which is coated, at least on the side which is intended to form the inside of the packing containers, with a homogeneous, heat-sealable plastic material. The carrier material used most commonly is paper or cardboard and the coating material occurring most commonly is probably polyethylene, and the packing material is manufactured most frequently in the form of a web, from which either package blanks are punched out, or from which the packing containers are made by folding the web into a tube which is then sealed along its longitudinal edges, whereupon the tube can be filled with the filling goods and be sealed up to individual packages by means of successive transverse sealings at a distance from one another.

If the packing containers are intended to be manufactured from blanks, these are punched out first as mentioned above, from the packing material web, whereupon the said blanks are formed to packing containers by folding them along folding lines, preferably provided in advance, which facilitate the folding, and these packing containers are then closed by heat-sealing, which is made possible by virtue of the said thermoplastic coatings.

The packages of the above-mentioned type, which are manufactured of paper or cardboard with a thermoplastic layer of e.g. polyethylene, are relatively hard to open, however, since the carrier material layer is difficult to tear and the thermoplastic layer supplies a tough inner membrane which renders more difficult the ripping open of the packages. To facilitate the opening of these known packages it is customary to arrange tearing indications in the package walls in the form of perforations partly breaking through the package walls. It has become apparent, however, that these tearing indications are not as effective as would be desired, and that it is difficult besides to arrange these tearing indications in the packing material in such a manner that an absolute guarantee exists that the packaging material will not be completely punched through.

To overcome the disadvantages mentioned above it is suggested in accordance with the present invention to provide a packing container which is characterized in that the carrier material is made of polystyrene foam which is coated with one or more plastic layers of one or more thermoplastic materials which plastic layer or layers is or are given molecular orientation in a direction which coincides with the longitudinal direction of the said sealing fins.

The invention concerns the manner of manufacture of a packing container in accordance with the invention, which manner is characterized in that a web of

polystyrene foam is coated by extrusion with one or more homogenuous layers of thermoplastic material, the coating being carried out so that the speed of the web is kept higher than the speed at which the thermoplastic material issues from the extruder, which has the result that the thermoplastic layer or layers is or are subjected to a molecule-orienting stretching in connection with the coating, that the packing blanks are punched from the web, the said blanks at the punching being oriented in such a manner in relation to the web, that the parts which are intended to form the sealing fins of the packing containers are orientated in the longitudinal direction of the web.

The invention will be described in the following with reference to the enclosed diagrammatic drawing, in which

FIG. 1 shows a packing material web indicating a row of packing blanks arranged one after the other,

FIGS. 2*a*, 2*b*, and 2*c* show a finished package and how the same is opened,

FIG. 3 shows a method for the manufacture of packing material for packages in accordance with the invention, and

FIG. 4 shows an enlarged cross-section through a packaging material web.

FIG. 1 shows a packing material web **1**, on which packing blanks **2** are arranged one after the other. In the figure are shown the packing blanks **2** before they are separated from the web but after the folding lines facilitating the folding have been put on the web **1.** As is apparent from FIG. **1,** the packing blanks **2** are oriented across the packing material web **1,** and each packing blank **2** has four side walls **4** and a longitudinal joint section **13,** which is intended to be used as connecting section when the packing blank **2** through folding has acquired tubular shape with square or rectangular cross-section. Each one of the packing blanks **2** is provided moreovoer with top closure sections **5,9,10,** and bottom closure flaps **7,8,11.** The hatched areas **6** are meant to be punched away from the web and the punched away material has to be removed as unavoidable waste.

The top closure sections of the packing blank **2** comprise two rectangular sections **5** and two triangular sections **9,** the sections **5** and **9** being joined to one another by means of triangular backfolding sections **10.** The rectangular sections **5** as well as the backfolding sections **10** are joined moreover to the sealing section **3.**

At the formation of the top of the packages the triangular sections **9** are folded in towards one another over the opening of the packing container, the backfolding sections **10** coming to be located between the rectangular sections **5** and the triangular sections **9.** The closure sections **3** will be placed together to form a flattened sealing fin **16.**

The bottom of the package is formed in a similar manner as the top of the package, but with the difference that the bottom-forming flaps **7,8,11,12** are not connected to any sealing section, but the sealing of the bottom is done in that the longer of the rectangular bottom sections **8** with its outer part has to overlap the shorter rectangular flap **7** and that all the bottom-forming sections are folded together in a flat bottom which is pressed together between heated surfaces so that the thermoplastic coatings are made to melt and

retain the bottom-forming sections in the position where they are inserted in each other.

In FIG. 2*a* is shown a finished package in which the folded together closure sections **3** form a sealing fin **16.** The sealing sections **3** are sealed to each other along a sealing region **17,** which in the case shown here does not extend over the whole height of the sealing fin **16.**

By arranging the top closure of the package in the above manner a tight and stable package is obtained. However, if the package is to be manufactured e.g. of cardboard it will be very difficult to open it even if scissors or a knife are used, since it will be necessary to cut or clip through four layers of cardboard below the sealing area **17** of the sealing fin, that is to say in the area marked **18** in FIG. 2*a*.

If the packing material instead of cardboard is made of foamed plastic, e.g. an extruded polystyrene foam which is coated with a layer of homogeneous plastic oriented in longitudinal direction of the web the opening work will become considerably easier owing to the fact that an extruded film of polystyrene foam will be readily tearable without any weakening being provided beforehand in the packing material. This homogeneous foamed plastic layer can in fact be readily torn in orientation direction, whilst it is very difficult to rip it in other directions. By using in this manner a polystyrene foam as a carrier packing material and an oriented homogeneous plastic film, preferably polystyrene film, as a coating material on the carrier layer, the packing material can very easily be torn in the direction of orientation of the homogeneous plastic layer whilst it can be torn only with difficulties in other directions. As it is desired in the present case to open the package by ripping up the sealing fin **16** below the sealing region **17,** the packing blanks are punched out of a web in the manner as shown in FIG. **1,** where the carrier packing material layer consists of extruded polystyrene foam and the homogeneous plastic layer consists of polystyrene film which is molecule-oriented in longitudinal direction of the web. Since the homogeneous plastic layer in the embodiment shown here has its direction of orientation in the same direction as the length of the sealing fin **16,** it becomes simple to rip off the sealing fin **16** along the area **18** below the sealing region **17,** but for further facilitation of the tearing it is of course possible to provide a light perforation or slots along the tearing area **18.**

When the sealing fin **16** has been ripped up along the ripping area **18,** as illustrated in FIG. 2*b*, the ripped-up parts of the fin **16** are folded out or torn off, whereupon the folded-in triangular flap **19** can be pulled out in the manner as shown in FIG. 2*c* to form a rhomboidal opening **20,** through which the contents in the packages **14** become accessible.

The invention also relates to the manner of manufacture of a packing material of the kind which is used in packages in accordance with the invention, that is to say a packing material which consists of a web of polystyrene foam with a coat of homogeneous, molecule-oriented plastic material, which is molecule-oriented in the direction of the web. The homogeneous plastic material may preferably consist of homogeneous polystyrene film and the polystyrene foam web can likewise preferably be extruded. In FIG. **3** is shown how a previously manufactured, extruded polystyrene foam web **30** is rolled off a cylinder **25** and is passed over guide rolls **26,27** and subsequently underneath an extruder **31.** Through the extruder **31** is extruded a homogeneous polystyrene film **32** which is placed on the polystyrene foam web **30,** whereupon the coated web **30** is introduced between cooled press rolls **28,29** for a lamination of the material.

By keeping the speed of the web **30** appreciably higher than the speed of extrusion of the polystyrene material from the extruder **31,** a stretching of the extruded polystyrene film **32** takes place, which stretching may be between **5** and **20** times. By virtue of the stretching in conjunction with the lamination a molecule orientation of the extruded polystyrene plastic is achieved which, as described earlier, has the result that the layer of polystyrene plastic can readily be ripped open in the direction of orientation, whilst it can be torn only with difficulties in other directions.

Finally in FIG. **4** is shown an enlarged cross-section through a manufactured packing material web, the polystyrene foam layer being marked **30** and the extruded and oriented homogeneous polystyrene layer marked **32.**

It was found that an excellent packing material for the above-mentioned purpose is obtained when a previously extruded polystyrene foam web of a thickness between 0.25 and 1.5 mm is coated with a homogeneous polystyrene film which in this orientated layer has a thickness between 0.02 and 0.2 mm. It was found that plastic material other than polystyrene can also be used as a coating layer, and it was found possible for example to use polyethylene or polypropylene. The best results were achieved, however, with polystyrene as a coating material.

It is also possible of course to coat the outside of the polystyrene foam with a plastic layer so as to enhance the appearance of the package. The polystyrene foam material is not moisture-absorbing, in the same manner as paper or cardboard however, and an outside coating of plastic material is therefore not essential as a protection of the packages against atmospheric moisture.

We claim:

1. A method for manufacturing a packaging container comprising moving a web of polystyrene foam packaging material longitudinally of its length, extruding thereonto at least one layer of at least one homogeneous thermoplastic material at a speed substantially less than the speed of the web so as to effect a stretching of the extruded homogeneous thermoplastic material on the web of packaging material to molecularly orient the thermoplastic material in the longitudinal direction of the web, passing the coated web between cooled press rolls to laminate the coated web, cutting blanks from the web and erecting said blanks to form containers having a sealing fin at the top thereof extending upwardly from the top of the container and transversely thereacross, the molecular orientation of the homogeneous thermoplastic material being in the longitudinal direction of the sealing fin whereby tearing of the sealing fin will be facilitated when opening the container.

2. A method as claimed in claim **1** wherein the speed of the moving web and the speed of extrusion of the at least one homogeneous thermoplastic material are such that the at least one thermoplastic material will be stretched from about 5 to about 20 times.

3. A method as claimed in claim **1** wherein the at least one homogeneous thermoplastic material is ex-

truded in such an amount that the layer, after stretching, will have a thickness of from about 0.02 to about 0.2 mm.

4. A method as claimed in claim **1** wherein the at least one homogeneous thermoplastic material is selected from the group consisting of polystyrene, polyethylene and polypropylene.

5. A method as claimed in claim **1** wherein the at least one homogeneous thermoplastic material is polystyrene.

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