United States Patent

[11] **3,552,631**

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Division of Ser. No. 584,904, Oct. 6, 1966, now Patent No. 3,471,351.

[54] **PACKAGING MATERIAL HAVING A STRIP ON ONE SIDE AND COVERING TAPES ON THE OTHER SIDE**
2 Claims, 5 Drawing Figs.

[52] **U.S. Cl.** **229/7,** 229/22; 220/53
[51] **Int. Cl.** **B65d 17/00,** B65d 83/00
[50] **Field of Search** 161/112, 113; 156/252; 229/7, 22; 220/53, 54

[56] **References Cited**

UNITED STATES PATENTS

2,870,935	1/1959	Houghtelling	229/7X
2,940,884	6/1960	White	161/113X
3,101,879	8/1963	M-Jagenberg	229/7
3,166,226	1/1965	Mobley	229/7
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ABSTRACT: Packaging material and package made therefrom which has an opening therein covered by a pull tab on one side and a strip of elongated material on the other side sealing the edges of the opening and being sealed to that portion of the pull tab assembly through the opening.

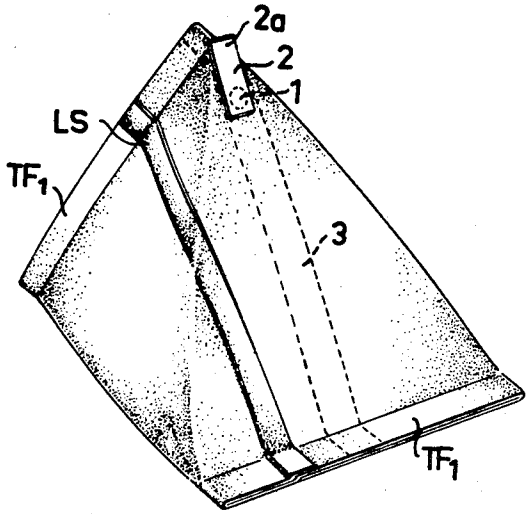

Fig.1

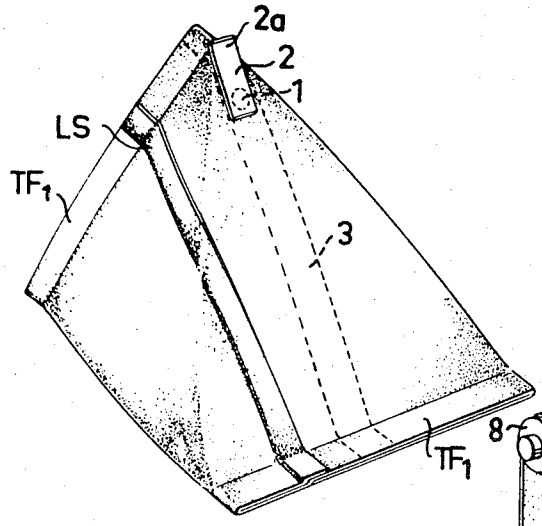

Fig.2

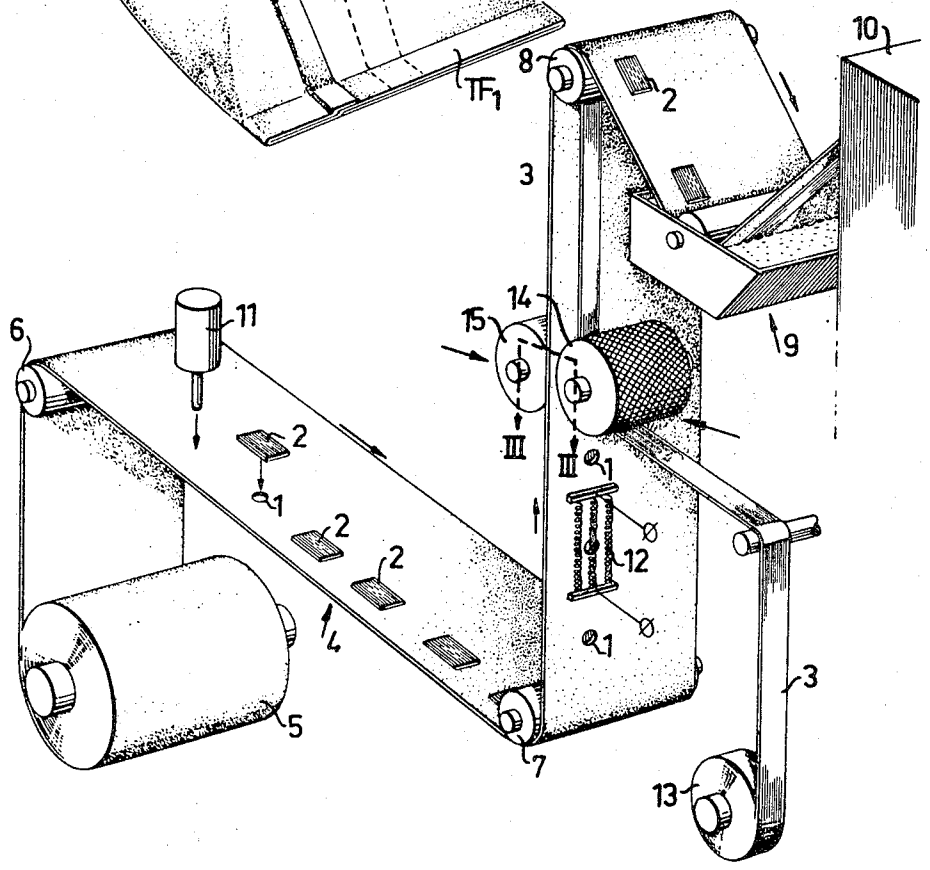

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Fig.3

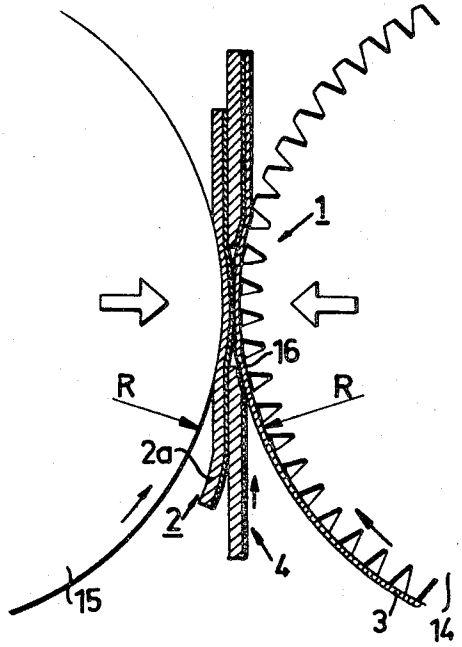


Fig.4

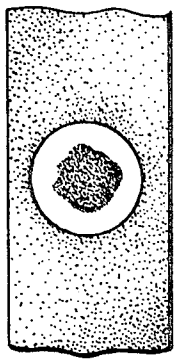
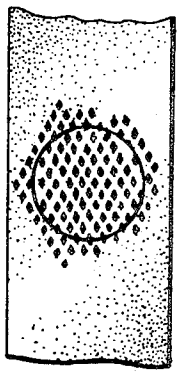


Fig.5



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PACKAGING MATERIAL HAVING A STRIP ON ONE SIDE AND COVERING TAPES ON THE OTHER SIDE

This is a division of Application Ser. No. 584,904, filed Oct. 6, 1966, now U.S. Pat. No. 3,471,351, issued Oct. 7, 1969.

This invention refers to a web-shaped packaging material of paper, plastic, cardboard or the like, which has been provided with apertures entirely penetrating the material, the apertures being intended to form access openings in the finished packages, said apertures further being covered by removable tapes or wafers on the side of the material intended to define the outside of the packages.

There are known in the art, i.e. by the U.S. Pat. No. 3,166,226, packages of the kind having an aperture punched in the wall, the aperture being covered by a tape sealed to the container wall around the aperture. The difficulties of, in the case when the packaging material comprises a fibrous carrier layer, providing access means that are not susceptible to leakage have been paid attention to inter alia in the said patent. The solution suggested in the patent for preventing liquid from being sucked up in the fibrous layer, comprises the step of heat sealing the tape to the region of the aperture, which causes some of a polyethylene lamina of the tape to penetrate into the outer portion of the paper lamina of the web-material so that the polyethylene is infused around the fibers thereby impregnating the cut surfaces of the aperture. Though the method has great merits, it cannot, however, be considered sufficiently safe for the use in producing sterile packages, while in this the tightness of the packages unconditionally must be guaranteed. In this connection it should be noticed that such packages which not are leaking in the normal sense of the word but which in any region have their walls wet through, from a bacteriological point of view are considered as leaky.

One solution of the problem is given in the U.S. Pat. No. 2,870,935, in which is shown a can with an opening and an outer cover and an inner seal united with the outer cover and being able to be removed to obtain access to the contents of the container.

An analogous solution is also shown in the Swedish Pat. No. 194,525. According to this patent the inner seal consists of a piece of a sheet material which is thin compared with the outer cover. Preferably the inner sheet consists of a thin plastic material, which easily might be torn as it is well united with the outer cover. However, pieces of a thin sheet material are difficult to work with, which constitutes a drawback of the method. One object of the present invention therefor is to eliminate this drawback by a covering method which is in line with a continuous way of working.

Thus the material according to the present invention is characterized therein that a continuous strip of a tearable material covering the apertures is applied to the other side of the packaging material, the strip being affixed on one hand to the material around and between the apertures, and on the other hand to those portions of the outer tapes which are accessible through the apertures.

The invention also aims at a method for producing the material characterized in that the strip together with the web material under compression and active uniting are being brought between a pressure roller and a counteraction means, the strip being fed between the pressure roller and that surface of the web material which is intended to define the inside of the finished containers, the strip being brought to the apertures and to be affixed on one hand to the packaging material around and between the apertures and on the other hand to portions of the outer tapes accessible through the apertures. The necessary adhesion between the inner strip, the web material and the outer tape, is provided preferably therein that the web material and the tape are coated with a thermoplastic layer on the side turned to the strip, and in that the web material together with its tapes is heated immediately prior to its being brought into contact with the strip. Of course it is also possible instead or in addition to activate the strip to an adhesive state, the strip preferably consisting of a thin thermoplastic material. One can also provide the strip with special glues.

When developing a device for carrying out the method there was first suggested to provide a pressure roller made of soft rubber hoping that the roller might be able to bring the thin inner strip into a good contact with the outer tape. The method might be said to constitute a transfer of the principles shown in the U.S. Pat. No. 2,646,105 to a continuous way of operation. However, the result did not turn out to become the desired and the method also has other drawbacks. Thus, instead of a strong seal between the outer tape and the inner strip within the main portion of the area of the aperture, there was obtained only a rather bad seal between the two members within a region of the center of the aperture. Further the soft pressure roller proved very soon to be worn out.

These drawbacks, however, are eliminated by utilizing a new device thereafter developed and which is characterized therein that the pressure roller is knurled and is made of a rather hard material. Thanks to this in itself rather simple design a number of advantages are gained. The hard wear disappears by choosing a nonsoft material that has other desirable features. That plastic material which is for sale under the trademark Teflon has proved to be suitable. Thanks to the roller being knurled considerable surface pressures are obtained in the regions of the apexes of the knurl pattern so that the web material within these regions strongly might be compressed. By the fact that the thickness of the web material thus in certain regions, inter alia in the region of aperture edges, might be reduced and under influence of the radius of the roller good seals have been obtained between the tapes and the inner strip also in the peripheral portions of the discharge openings. In the case when the knurl has been given the shape of a cross pattern, the seals will receive the shape of a regular pattern of dots. One has noted that a seal which has been made by means of such a device satisfies all demands as to its tightness. Further, at the same seal a piece of the inner strip substantially corresponding to the size of the aperture punched in the web material will certainly be removed when tearing off the outer tape.

The invention will now be more closely described with reference to the attached drawings, in which:

FIG. 1 shows a tetrahedron-shaped package which is provided with a tape covering a discharge opening punched in the package wall;

FIG. 2 schematically illustrates how the discharge openings on that side of the package material which is intended to define the inside of the finished containers, are being covered with an inner tightening strip;

FIG. 3 is a section 111–111 in FIG. 2 in a large scale;

FIG. 4 schematically, in a large scale shows a seal obtained according to a method first suggested during the development of the present invention; and

FIG. 5 shows a seal obtained by means of a preferred embodiment of the device according to the invention.

The package chosen by way of example and to which the principles of the invention are intended to be applied consists, as is apparent from FIG. 1, of a tetrahedron-shaped container of a well-known kind. The package has in a way known in the art been made of a web-shaped packaging material, which by special means has been formed into a tube. The tube having been longitudinally sealed, filled up to a certain level with a filling material, sealed and severed in sealing zones transverse to the tube axis. The invention has been developed for the use in an aseptic machine, i.e. a machine which under aseptic conditions fills sterile package containers with a sterile filling material. At these machines the web material is sterilized prior to its being fed into the sterile machine. Preferably the web material is sterilized therein that it is fed through a sterilizing bath as will be shown in the following.

The packaging container shown in FIG. 1 has in a well-known manner been provided with transverse seal fins TF_1 and a longitudinal seam LS. Positioned in one of the four corners of the container there is a discharge opening 1 punched in the package wall. The discharge opening is exteriorly covered by a tape 2 sealed to the portion of the wall surrounding the opening. An end portion 2*a* of the tape is unsealed to the con-

tainer to provided a pull-tab for removing the tape when access to the contents of the container is desired. Interiorly the container is further provided with a strip of a thin thermoplastic material. The strip has been indicated by dash lines in the FIG. and designated 3. Further, the strip has been sealed to the tape 2 in the region of the aperture 1 in a manner which will be more closely described with reference to the following, so that when the tape is torn away a piece of the inner strip will be removed whereby a passage through the aperture is established.

In FIG. 2 a process for the manufacturing the packaging material is schematically illustrated. Herein 4 refers to a web-shaped packaging material which at a projected machine is intended to consist of a paper which on the side intended to define the inside of the packages has been provided with a plastic coating. Preferably the material also comprises an aluminum lamina. However, also other materials are possible, e.g. two-side, plastic-coated materials. The present invention, however, has its greatest importance for such materials which for economical or other reasons have been provided with a plastic coating only on one side.

The web material is continuously or intermittently unwound from a supply roll 5; guided over conducting rollers 6, 7 and 8; through a sterilizer 9 in which the plastic-coated surface is treated with a sterilizing agent; and into a sterile chamber 10 in which the sterile material is formed into a tube which in a well-known manner under aseptic conditions is filled and separated into closed packages.

Between the conducting rollers 6 and 7 apertures 1 are punched by means of a puncher 11 penetrating the material 4, the apertures being covered by tapes 2. The tapes preferably consist of plastic strips or plastic coated paper strips which prior to their being applied are heated, so that they when being mounted will adhere to the web material.

By means of heating coils 12 the plastic-coated surface of the web material 4 is heated to such an extent that the plastic lamina of the web material 4 and the portions of the tapes defined by the apertures 1 will be adhesive. A strip 3 consisting of a thin thermoplastic material, e.g. polyethylene, is unwound from a supply roll 13. The strip 3 is guided between a cross knurled pressure roller 14 and the web material 4 by being driven by the web material which is pulled upward between the pressure roller 14 and a counter action roller 15. The two rollers are supported in bearings and are rotated by the web material 4. Further, they are forced against each other thereby compressing the web material 4; the strip 3; and the tapes 2, so that the strip 3 is united with the soft made plastic coating. Due to the fact that the pressure roller 14 is made of the soft material called Teflon damages in the thin strip 3 are avoided. By the choice of material one also prevents from adherence between the pressure roller 14 and the soft-made plastic coating. The counteraction roller 15 is preferably made of a soft rubber.

In FIG. 3 is more closely illustrated how the uniting of the inner strip 3 and the outer tape 2 is carried out. At a projected apparatus the two rollers 14 and 15 are given equal radii R= 14 mm. and equal axial lengths of 28 mm. The counteraction roller 15 is as mentioned made of a rather soft rubber material and the pressure roller 14 is made of Teflon and is cross knurled. The cuts have been made to a depth of 0.6 mm. whereupon the apexes have been smoothed off one or a few tenths of a millimeter. Compared to this might be mentioned that the paper qualities (the packaging material 4) for which the apparatus is intended to be used have a thickness of 0.15 to 0.30 mm. In the region of the access openings the thickness is increased to substantially twice as much due to the tapes 2. The inner strip 3 has a breadth of about 10 mm. and a thickness of 0.05 mm.

Due to the fact that the pressure roller 14 is knurled and by a suitable choice of the radius R very high surface pressures are obtained in the regions of the apexes of the knurl pattern. A strong compression of the packaging material thus is obtained within these well-defined areas. Because of dimensional circumstances these substantially dot-shaped regions of compression are very difficult to set forth in a vertical section as in FIG. 3. Instead there is referred to FIG. 5 in which is shown a typical sealing pattern obtained by means of the device according to the invention. The sealing has been carried out in a number of small rhombidic areas corresponding to the apexes of the knurled pattern. As the roller 14 runs over the aperture 1 the knurled apexes force the strip 3 against the tape 2 so that the adhesive-activated tape and the strip are permanently united. In FIG. 3 a knurled apex in turn to force a piece of the strip 3 into the aperture 1 into contact with the tape 2 has been designated 16.

As a comparison there is in FIG. 4 shown a seal obtained by means of the device which was first proposed during the development of the present invention, i.e. a device wherein the pressure roller consists of a flexible rubber roller. Due to the fact that one in this case cannot obtain as high surface pressures as when utilizing a firm knurled roller the thickness of the packaging material will have an essential influence upon the result. Contact between the inner strip 3 and the outer tape 2 thus only will occur within a rather small portion of the aperture 1. Further it is not only desirable that the two materials are brought into contact with each other but far rather that they are firmly compressed within the contact regions.

It should be apparent that the invention is not limited by the described embodiment of the invention but only of the attached claims. As possible modifications i.e. might be mentioned that the apertures 1 need not have the shown circular shape. For certain purposes it might instead be more suitable to provide the packaging material with slot-shaped apertures. In this case it might be more advantageous to give the pressure roller a simple knurled pattern. The applications of the invention of course are not restricted to tetrahedron-shaped packages. Also modifications of the counteraction means as well as of other members of course are possible to carry out without departing from the spirit and scope of the invention.

I claim:

1. Packaging material comprising: a supply of web material; a plurality of apertures in said material, a tab of material sealed to one side of said web material over said apertures and a continuous strip of material sealed to the other of said web material and covering said apertures, said continuous strip of material adhering to the edges of said apertures and to the portion of said tab material accessible through said apertures.

2. The structure of claim 1 wherein said tab of material and continuous strip of material both have a plastic layer facing one another.