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2,383,728

PACKAGE

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FIG. 1.

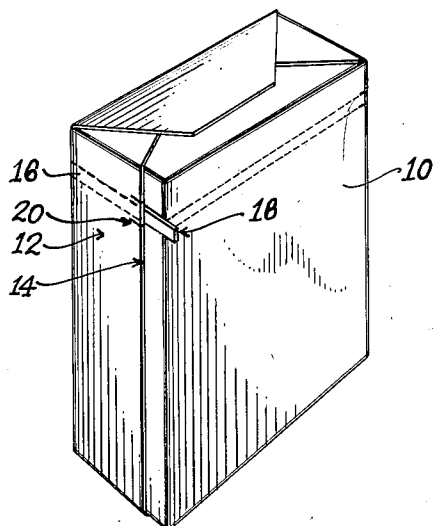
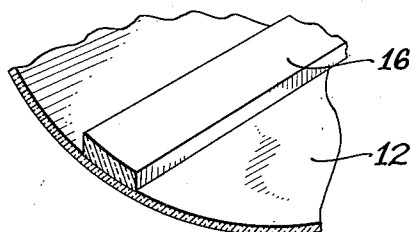


FIG. 2.



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PACKAGE

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3 Claims. (Cl. 229—51)

This invention relates to wrapped packages and to tear strips of the type which extend about a package beneath a wrapper and project from an edge of the wrapper in position to be readily grasped for tearing open the wrapper.

Tear strips of this character are used extensively on packages which have wrappers formed of non-fibrous sheet material, such as Cellophane, cellulose acetate, and the like, because the edges of such wrappers are generally sealed in place to render the package airtight and moisture-proof and it is therefore difficult to open the package unless a tear strip is provided. They are also used to overcome the tendency of non-fibrous materials to tear in an unrestricted manner and to permit the removal of one end or a predetermined portion of the wrapper without destroying the entire wrapper.

The tear strips generally used are formed of material similar to that of which the wrapper is formed in order to avoid differences in shrinkage and expansion of the wrapper and strip which might cause puckering or rupture of the wrapper. Moreover, most wrapping and packaging operations are performed more readily if all of the material handled is of the same type or kind, and, therefore, when the wrapper is formed of non-fibrous material the tear strip used is almost always formed of a similar non-fibrous material.

The wrapper is usually formed of very thin and flexible material for reasons of economy and in order that the wrapper may be applied easily and conform accurately to the shape of the package so as to present a neat appearance. However, when the tear strip, which is relatively narrow, is formed of material similar to the wrapper the strip is necessarily weak and therefore tends to break when pulled away from the package. Moreover, such strips are so flexible and flimsy that they are difficult to handle by machine since they tend to buckle if attempts are made to feed or advance the strip by a pushing operation in wrapping a package or forming a wrapper for use on a package.

It has been suggested that a stronger tear strip could be made by laminating thin sheets of material and cutting the laminated sheet into strips which would be stronger than the material of which the wrapper is formed. The amount of material used and the operations required to produce such strips increase the cost of the strip materially and the resulting strip still possesses greater flexibility than is desired in many wrapping and packaging operations.

It is therefore a general object of the present invention to provide an improved tear strip for package wrappers which is economical to produce, easy to handle and possesses relatively great tensile strength.

Another object of the present invention is to

provide a package with a non-fibrous wrapper and a tear strip for removing the wrapper which is formed of a unitary piece of material that is substantially thicker and stronger than the material of which the wrapper is formed.

A further object of the present invention is to provide an improved tear strip for packages which possesses sufficient stiffness to permit it to be advanced by package-wrapping or wrapper-forming machines using a pushing operation in feeding the strip.

Other objects and advantages of the invention will be apparent to those skilled in the art from the following description.

Packages of the present invention, in general, are provided with a wrapper formed of non-fibrous material and have a tearing strip formed of a unitary piece of non-fibrous material which is thicker and possesses greater tensile strength than the wrapper, and extends about the package beneath the wrapper with an end thereof projecting beyond an edge of the wrapper in position to be readily grasped to tear open the wrapper.

In its preferred embodiment the invention provides a package having a wrapper formed of regenerated cellulose with a tear strip also formed of regenerated cellulose, but possessing materially greater strength and stiffness than the regenerated cellulose wrapper.

It has now been found that if the tear strip is formed of a unitary piece of relatively thick non-fibrous material the tensile strength of the strip will greatly exceed that of a laminated strip of equal thickness and exceeds that of the usual wrapper. The cost of producing tear strips is thus reduced while the tensile strength of the strip is improved. It has further been found that if the plasticizer content of a relatively thick strip of regenerated cellulose is not substantially greater than that contained in a sheet of regenerated cellulose of the type generally used in forming package wrappers, the strip will possess the desirable stiffness necessary to enable it to be pushed and advanced readily in feeding the strip during packaging and wrapping operations.

It should be understood, however, that the invention is not limited in its application to regenerated cellulose, but may be used when the wrapper, or the tear strip or both are formed of other non-fibrous materials such as cellulosic compositions of the type of cellulose ethers, cellulose esters, nitrocellulose, cellulose acetate and the like, or non-cellulosic materials such as casein, gelatin, rubber derivatives or substitutes, synthetic resinous materials such as vinyl type polymers and resinous materials and, in general, any suitable type of non-fibrous wrapper-forming material.

The invention accordingly comprises the sev-

eral elements and the relation of said elements with respect to each other which are exemplified by the following detailed disclosure and the scope of the invention will be indicated in the claims.

For a further understanding of the nature and objects of the invention, reference may be had to the following detailed description taken in combination with the accompanying drawing, in which:

Fig. 1 is a view of a typical wrapped package embodying the present invention, and

Fig. 2 is a diagrammatic illustration on an enlarged scale showing a portion of a tear strip and wrapper embodying the present invention.

For purposes of illustration the invention is shown in the drawing as applied to a package 10, such as a cigarette package, having a wrapper 12 extending about the package and presenting an edge 14 which preferably is sealed against the adjacent underlying portion of the wrapper so as to provide an airtight and moisture-proof enclosure for the package. A tear strip 16 extends about the package and beneath the wrapper 12 and is provided with an end 18 which projects beyond the edge 14 of the wrapper in position to be readily grasped to tear open the wrapper. The tear strip 16 is preferably bonded to the wrapper on the inner face thereof by the action of heat or an adhesive or otherwise to prevent it from pulling out from beneath the wrapper when grasped to open the package. The wrapper also may be provided with slits 20 which extend inward from the edge 14 of the wrapper on opposite sides of the projecting end 18 of the tear strip so as to insure tearing of the wrapper readily when the end of the tear strip is pulled away from the package.

Those characteristics of the package and tearing strip outlined so far in the description are conventional and typical of wrapped packages of the prior art and therefore it will be apparent that the present invention is applicable to conventional packaging practice and may be used in the wrapping of any desired type, size or shape of package or article.

The tear strip of the present invention is formed of a unitary piece of material of greater tensile strength than the wrapper and preferably is thicker and stiffer than the wrapper. It is important, however, that the tear strip should not be so thick as to produce any irregularities in the surface of the package which might detract from its appearance or interfere with the operation of the wrapping or packaging mechanism used to apply the wrapper.

As is usual with tear strips, the strip of the present invention may be colored, printed or decorated as desired. Moreover, when necessary the wrapper and/or the strip may be rendered moistureproof or waterproof and/or heat-sealable by impregnating or coating with suitable agents or compositions.

Normally, it is necessary to anchor the tear strip so that it does not shift its position or slip out from under the wrapper when pulled. This may be accomplished in various ways. For example, when the wrapper and the strip are both heat sealable, either inherently or as a result of being coated, the strip can be anchored by heat sealing it to the wrapper simultaneously or prior to sealing the wrapper. Or, the strip may be anchored to the wrapper by means of an adhesive. Less conveniently, the enclosed end of the strip may be folded about the enclosed edge of the wrapper to anchor the strip.

Since the invention is particularly applicable to wrappers and tear strips formed of Cellophane (plasticized sheets of regenerated cellulose), it will hereafter be described with special reference thereto, but it will be understood that the invention is by no means limited to its application to Cellophane and may be used when the wrapper or the tear strip or both are formed of any other non-fibrous sheet material.

The properties of regenerated cellulose are largely dependent upon the amount of plasticizer incorporated in the material, for example, with No. 300 Cellophane the amount of plasticizer, such as glycerine, required to produce a sheet suitable for use as a package wrapper is relatively small and generally is in the neighborhood of about 13%. In order to obtain a corresponding flexibility in a No. 900 Cellophane sheet, the amount of plasticizer incorporated therein must be much higher and generally is in the neighborhood of 22%. In forming tear strips of Cellophane, it has been discovered that the tensile strength of relatively thick sheets of Cellophane containing a relatively small amount of plasticizer is extremely high, and in fact a strip formed as a unitary piece of regenerated cellulose .0025 inch thick and containing only 13% of plasticizer has been found to possess nearly 40% greater tensile strength than a strip of equal thickness made up of laminations of relatively thin sheets of regenerated cellulose containing an equal amount of plasticizer. This surprising improvement in the tensile strength of the unitary strip is accompanied by an increase in stiffness which is of particular advantage in the use of such strips in packaging operations wherein the strip is advanced by pushing the strip rather than by pulling the strip into position during the wrapping or packaging operation.

In accordance with the preferred form of the present invention the tear strip used is therefore formed of a unitary piece of Cellophane which is substantially thicker than the Cellophane of which the wrapper is formed. It is also preferred to form the strip of material containing substantially the same, or not much more plasticizer than that present in the wrapper to which it is applied. The tensile strength of the strip is therefore much greater than that of the wrapper, and when the strip is pulled to tear open the wrapper the danger of the end of the strip breaking off or of the strip breaking during the tearing operation is substantially eliminated.

By way of illustration, but not by way of limiting the present invention, there is given in the following table a comparison of the physical characteristics of various Cellophane strips, of which the tensile tests were made with the grain (in the machine direction).

No.	Wt. in grams per sq. meter	Width in inch	Thickness in inch	Plasticizer	Relative tensile strength
				Percent	
1.....	300.....	$\frac{3}{32}$	.0008	13	7,500
2.....	900.....	$\frac{3}{32}$	.0028	22	12,000
3.....	Laminated 2 sheets 300.	$\frac{3}{32}$	.0024	13	14,500
4.....	900.....	$\frac{3}{32}$	.0022	13	19,500

¹Total.

Material No. 1 may be considered typical of the Cellophane wrapper normally used on cigarette packages. Material No. 2 is typical of the characteristics of normal No. 900 Cellophane. Material No. 3 was formed by laminating by means of a water-insoluble adhesive, two sheets of No. 300

Cellophane, each sheet containing 13% plasticizer. It will be noted that the material No. 4 comprising the strip of the present invention, while containing only 13% plasticizer, has the highest tensile strength of any of the materials shown. In fact material No. 4 has nearly 40% greater tensile strength than the material No. 3 and yet is 10% thinner than material No. 3. This relatively great strength is accompanied by greater stiffness and characteristically improved handling qualities of the strip for wrapping and packaging operations. The material No. 3 gave a yield of 2,400 yards per pound while material No. 4 contained 2,640 yards per pound, an increase of 10% over material No. 3.

In order to illustrate a concrete example of the present invention a package wrapper may be formed of Cellophane using the usual light weight sheet employed in wrapping packages; namely, a sheet weighing 300 grams per square meter and approximately .0008 inch in thickness, containing 13% of glycerine as a plasticizer and having a relative tensile strength of 10,000. The tear strip employed in combination with the wrapper may then be in the form of a unitary strip $\frac{1}{2}$ of an inch wide and formed of No. 900 Cellophane of about .0025 inch in thickness and having a relative tensile strength of about 20,000. The plasticizer content of the tear strip may also be 13%. Because of its stiffness the present tear strip can be fed very easily into place with respect to the wrapper material by a pushing operation in a conventional wrapping machine. The wrapped package thus produced can be opened easily and with certainty by pulling the projecting end of the strip away from the package and even if the strip is jerked or the package carelessly handled in opening the wrapper the tear strip will still withstand considerable rough treatment without breaking. Moreover, the strip can be fabricated merely by slitting, without the use of adhesives or special laminating equipment and therefore the cost of the strip is materially reduced.

While the particular tear strip described above was formed of Cellophane and only $\frac{1}{2}$ of an inch in width, it will be obvious that the strip may be of any desired width and formed of material other than Cellophane.

Since certain changes may be made in carrying out the above method without departing from the scope of the invention, it is intended that all matter contained in the above description shall be interpreted as illustrative and not in a limiting sense.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A package having a wrapper extending about the package and formed of a plasticized non-fibrous material and a separate unattached tear strip located beneath the wrapper and extending about the package with an end of the strip projecting beyond an outer edge of the wrapper, said strip being a single unfolded band of plasticized non-fibrous material similar to that of the wrapper but thicker than the wrapper and containing less plasticizer per unit of thickness than the wrapper, as a result of which the strip possesses a greater tensile strength and a greater stiffness than the wrapper whereby the strip may be advanced by a pushing operation in wrapping the package and permitting the wrapper to be torn by the strip when the strip is pulled against the edge of the wrapper.

2. A package having a wrapper extending about the package and formed of a plasticized regenerated cellulose and a separate unattached tear strip located beneath the wrapper and extending about the package with an end of the strip projecting beyond an outer edge of the wrapper, said strip being a single unfolded band of plasticized regenerated cellulose similar to that of the wrapper but thicker than the wrapper and containing less plasticizer per unit of thickness than the wrapper, as a result of which the strip possesses a greater tensile strength and a greater stiffness than the wrapper whereby the strip may be advanced by a pushing operation in wrapping the package and permitting the wrapper to be torn by the strip when the strip is pulled against the edge of the wrapper.

3. A package having a wrapper extending about the package and formed of a plasticized non-fibrous material and a tear strip located beneath the wrapper and extending about the package with an end of the strip projecting beyond an outer edge of the wrapper, said strip being a single unfolded band of plasticized non-fibrous material similar to that of the wrapper but thicker than the wrapper and containing less plasticizer per unit of thickness than the wrapper, as a result of which the strip possesses a greater tensile strength and a greater stiffness than the wrapper whereby the strip may be advanced by a pushing operation in wrapping the package and permitting the wrapper to be torn by the strip when the strip is pulled against the edge of the wrapper.

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