TEAR STRIP FOR PACKAGES

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ABSTRACT

A tear strip for a package wrapping. The tear strip consists of a seed tape which is adhered to the inside of the wrapping and extends around the inside of the wrapping to a projecting tab which may be pulled to tear the wrapping. The seed tape, which contains plant seeds, is water soluble, so it can be dampened on one side and then can be self-adhered to the wrapping, and after use it can be removed from the torn wrapping and planted. The thickened portions of the tape formed by the seeds weld particularly well to the wrapping, facilitating sealing of the tear strip to the wrapping.

10 Claims, 8 Drawing Figures
TEAR STRIP FOR PACKAGES

This invention relates to an improved tear strip for package wrappings.

It is common practice for package wrappings to provide a tear strip which encircles the package and which has an end projecting from the wrapping. When the projecting end of the tear strip is pulled, the wrapping is ripped along the line of the tear strip, exposing the package or the contents of the package for consumption. A particularly common use of such tear strips is in cigarette packaging.

Most cigarette packages are wrapped in coated, moisture proof, transparent, cellulose film of the kind sold under the trade mark “Cellophane” by the DaPont Company. Such wrappings usually include a tear strip of the same coated cellulose film. The tear strip is normally adhered to the cellulose film wrapping by solvent. The procedure involves passing the tear strip over a wick wetted with solvent, thus wetting the tear strip, and then passing the tear strip and the wrapping between the nip of a pair of rollers to seal them together.

It is found that in the high speed wrapping machinery presently used (which may typically wrap three packages per second), considerable difficulty is experienced in obtaining adequate adhesion between the conventional flat tear strip and the package wrapping. The reason for this is that insufficient time is available for the solvent to render the tear strip soft and tacky so that the strip will adhere to the package wrapping. The time could be increased by increasing the distance between the point where the tear strip is wetted and the rollers where the strip is sealed to the package wrapping, but this would increase the size of the machinery unduly. As a result of these difficulties, some tobacco companies have been seriously considering using other much more costly methods of attaching tear strips to their package wrappings.

Accordingly, it is an object of this invention to provide a tear strip that can be sealed much more readily to a package wrapping. To this end the invention provides a tear strip having a series of small thickened portions spaced apart along its length. The thickened portions constitute high spots on which extra pressure is applied by the rollers, and it is found that this creates a much improved adhesion at the thickened areas. In effect a series of spot welds is formed when the tear strip and wrapping pass through the rollers. Preferably the tear strip consists of two layers with the thickened portions being formed by a series of spaced apart particles sealed between the layers. In a preferred embodiment of the invention the tear strip consists of a water soluble seed tape, the particles being seeds sealed between the layers of the tape. The seed tape adheres strongly to the wrapping at the location of the seeds, and yet it can be torn away and then planted, reducing litter. Since the seed tape is normally of an elastic material, the use of the seed tape also assists the user in grasping and pulling the projecting end of the tear strip, particularly when the projecting end is short.

Further objects and advantages of the invention will appear from the following description, taken together with the accompanying drawings, in which:

FIG. 1 is a perspective view (much enlarged) of a portion of a conventional seed tape;
FIG. 2 is a sectional view along lines II—II of FIG. 1;
FIG. 3 is a diagrammatic view showing application of the seed tape to a package wrapping film;
FIG. 4 is a plan view of a wrapping film to which the seed tape has been laminated;
FIG. 5 is a perspective view of a package having a wrapping which includes the tear strip of the invention;
FIG. 6 is a plan view of the tear strip and associated piece of package wrapping after removal from the package;
FIG. 7 is a sectional view showing a coated seed for use in the tear strip of the invention; and
FIG. 8 is a sectional view of a modified tear strip according to the invention.

Reference is first made to FIGS. 1 and 2, which show a conventional seed tape 2 of the kind commercially available from the Union Carbide Company under its trade mark “Polynox.” The seed tape 2 is formed by providing a relatively wide strip of the tape material, depositing plant seeds 4 at spaced intervals along the tape, and then folding the tape over on itself and sealing along a strip 6. The resultant tape is tightly sealed to prevent movement of the seeds 4. The sealing is performed by wetting the tape with water, since the tape is water soluble. The resultant seed tape possesses such high tensile strength that the average person would have difficulty in tearing it.

The above identified seed tape, which is conventional and can be purchased at most garden shops, has in the past been used solely as a planting medium. In this use the tape is placed in the ground, covered by a thin layer of soil, and wetted, causing the tape material to dissolve and allowing growth of the seeds, which are properly spaced apart along the tape. The physical characteristics of a typical conventional material, primarily a polyethylene oxide, used for the tape are given in Table I at the end of this description.

According to the invention, the above described seed tape may be used in a simple manner as a package wrapping tear strip. FIG. 3 shows diagrammatically a typical manner in which the seed tape may be applied to a package wrapping. As shown in FIG. 3, the seed tape 2 is unrolled from a reel 8 and is passed between rolls 10, 12 of an applicator which dampen one side of the seed tape slightly with a suitable solvent 14, partially dissolving the dampened side. The extent of the dampening is limited to prevent undue weakening of the seed tape. If desired, a suitable wick applicator may be used in place of the applicator roll 10.

Various solvents may be used, so long as they promote adequate adhesion between the seed tape and the package wrapping. For example, the solvent 14 may simply be ordinary water, which will dampen the seed tape and will cause it to stick to most package wrappings. Preferably one of the family of solvents sold under the trade mark “Cellosolve”, such as glycol ethyl ether, hydroxy ether, or 2-ethoxyethanol, is used. These solvents will soften or partially dissolve the surface of the seed tape and will promote a strong bond to most films.

After the seed tape has been dampened with solvent, it is passed between the nip of laminating rolls 16. The rolls 16 are typically of steel and are preferably provided with an exterior coat 18 of urethane or other resilient material to avoid crushing the seeds 4. (The rolls 10, 12 may also be coated with a resilient material if desired.) A package wrapping film 20 of appropriate width, supplied from reel 22, is also passed between the
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rolls 16, and the damp (and therefore partially dissolved) seed tape 2 self-adheres to the package wrapping film 20. The resultant laminated film 24, which is shown in plan view in FIG. 4, is then fed to a conventional packaging machine diagrammatically indicated at 28, where it is used to wrap packages.

A typical wrapped package employing the laminated film 24 is shown in FIG. 5. The package wrapping is conventional and is accomplished in the wrapping machine 28 by placing an edge 34 of the film 24 on the box 32, encircling the box 32 with the film 24 until edge 36 of the wrapping film overlaps edge 34 to form a two layer strip 38, and heat sealing the two layers of strip 38 together. The ends of the wrapping are then folded down and heat sealed as indicated at 40 to complete the wrapping.

When the wrapping process is completed, the seed tape 2, which has been laminated to the inside of the wrapping film, will have an end portion 42 which underlies the double heat sealed strip 38 and is thereby firmly anchored in place so long as the edge 34 of the wrapping remains in place. From end 42 the seed tape extends around the inside of the wrapping to a tab 44 projecting from the edge 36 of the package wrap.

The wrapping film 20 will typically be, as previously mentioned, a moisture proof, coated, heat sealable transparent cellulose film of the kind marketed under the trade mark "Cellophane" by the DuPont Company.

When a user wishes to open the wrapping, he grasps the tab 44 and pulls it, tearing the package wrapping. After he has pulled the tear strip around the package, the wrapping is typically divided by the tear strip into two portions, with the seed tape tear strip adhering to a third portion 46 as shown in FIG. 6. The user can then remove the seed tape 2 from the portion 46 and plant it.

It is found that when the seed tape 2 is used as a tear strip, areas of particularly strong bonding between the seed tape 2 and the film 22 to which it is laminated occur at the location of the seeds 4. The reason for this is that the seeds form thickened portions of the seed tape, and extra pressure is applied on the thickened portions by the rolls 16 as the seed tape and film pass therethrough. It is also found that the poly(ethylene oxide) used for most seed tapes has more affinity for the cellulose package wrapping films and that its adhesion to such films is superior to the adhesion that could be achieved by using a cellulose film tear strip. However, although in effect spot welds are formed between the seed tape and the package wrapping film at the location of the seeds, the spot welds are small in area and are well spaced apart, so that a user can remove the seed tape tear strip 2 from the film portion 46 (FIG. 5) without destroying the seed tape.

It is also found that when the seed tape is formed by poly(ethylene oxide), it has much more tensile strength in the machine direction than does Cellophane, so that the seed tape is much less likely to tear when used as a tear strip. It is further found that a poly(ethylene oxide) seed tape is quite elastic (as indicated in Table 1), and this assists a user when pulling the tab 44, particularly if the tab 44 is short.

The seed tape described can be heat sealed, since it melts at a temperature of about 125°F. Thus it can be heat sealed to some films, such as Cellophane cellulose film, since that film also can be fused at a temperature of about 125°F. However, achieving adhesion by dampening the seed tape with a solvent such as water or an organic solvent is simpler since special heated rollers and the like are not required.

Preferably the tear strip of the invention will be between about 3/32 and 3/8 inches wide. It is difficult to place most seeds in a strip narrower than about 3/32 inch, and a width of more than about 3/8 inch usually creates an unsightly appearance for most packages. However, in special circumstances other widths may be used if desired.

The plant seeds 4 embedded in the seed tape may be of any desired kind, but preferably they are quite small and are of a nature able to withstand a fairly substantial degree of pressure. If desired, each seed can be coated in a thin layer 48 (FIG. 7) of soft resilient material which will cushion and protect the seed during its passage through the rollers 16. A suitable such material is the same material from which the seed tape itself is formed, namely a poly (ethylene oxide), i.e. the seed will be provided with an extra cushioning layer of this material in addition to the cushioning provided by the seed tape itself. (The coating material must of course be water soluble, to allow the seed to grow when planted.)

Although the particles which form thickened portions of the tear strip 2 have been described as seeds, it will be appreciated that if it is not desired to plant the tear strip, then the thickened portions can simply be thickened portions of seed tape, formed by sealing additional layers of seed tape between the upper and lower layers. Alternatively, the thickened portions may be formed by small beads or discs of coloured plastic or other material sealed between the layers of the poly(ethylene oxide) tear strip in place of the seeds.

Although the use of a poly(ethylene oxide) tear strip material is preferred in view of its ready adhesion to wrapping films such as Cellophane, other materials can be used for the tear strip, including simply Cellophane itself. The tear strip may also be a single layer, as shown at 50 in FIG. 8, with beads or discs of plastic material 52 adhered to one side of the tear strip (the other side of the tear strip will then be wetted with solvent). In all cases, however, the tear strip of the invention will have small thickened portions spaced longitudinally along its length, so that a single series of spot welds will be formed when it is laminated to a package wrapping film.

**TABLE 1**

<table>
<thead>
<tr>
<th>Tear strip material: α-hydro-ω-methyleneoxy (oxyethylene)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Properties:</td>
</tr>
<tr>
<td>Specific gravity</td>
</tr>
<tr>
<td>Area Factor (in/lb)</td>
</tr>
<tr>
<td>Tensile Strength (psi)</td>
</tr>
<tr>
<td>Elongation (percent)</td>
</tr>
<tr>
<td>Secant Modulus at 1% (psi)</td>
</tr>
<tr>
<td>Tear Strength (g/mil)</td>
</tr>
<tr>
<td>Solubility at 40°C</td>
</tr>
<tr>
<td>Haze (percent)</td>
</tr>
<tr>
<td>Specular Transmission (percent)</td>
</tr>
<tr>
<td>Appearance</td>
</tr>
<tr>
<td>Melting Point (°F)</td>
</tr>
<tr>
<td>Heat Sealing Temperature Range (°F)</td>
</tr>
<tr>
<td>Solubility (organic solvents)</td>
</tr>
</tbody>
</table>

*Times measured with 2"x3" packets filled with Polyethylene pellets using gentle agitation.
What we claim is:

1. In a package having a tearable wrapping, an improved tear strip comprising a thin, elongated strip of material having a plurality of small, longitudinally spaced apart thickened portions, said strip extending along the interior of said wrapping and one side of said strip being adhered to said wrapping at least at said thickened portions, one end of said strip projecting from said wrapping, so that said strip may be pulled to tear said wrapping and to remove said wrapping from said package.

2. The invention according to claim 1 wherein said strip comprises two discrete layers joined together, and a plurality of small, longitudinally spaced apart particles sealed between said layers, said particles forming said thickened areas.

3. The invention according to claim 2 wherein said particles are plant seeds, said material being soluble in water.

4. The invention according to claim 3 wherein said seeds are coated in a soft water soluble substance to cushion the seeds against shattering.

5. The invention according to claim 3 wherein said material consists primarily of a poly(ethylene oxide) having substantial tensile strength and substantial elasticity.

6. The invention according to claim 3 wherein said wrapping comprises a cellulose film.

7. An improved tear strip and wrapping combination, comprising a tearable wrapping, a tear strip comprising a thin, elongated strip of material having a plurality of small, longitudinally spaced apart thickened portions, said strip lying against said wrapping and one side of said strip being adhered to said wrapping at least at said thickened portions.

8. The invention according to claim 7 wherein said strip comprises two discrete layers joined together, and a plurality of small, longitudinally spaced apart particles sealed between said layers, said particles forming said thickened areas.

9. The invention according to claim 8 wherein said particles are plant seeds, said material being soluble in water.

10. The invention according to claim 9 wherein said seeds are coated in a soft water soluble substance to cushion the seeds against shattering, and wherein said material consists primarily of a poly(ethylene oxide) having substantial tensile strength and substantial elasticity.