Aug. 9, 1966 H. N. HOVLAND 3,265,287

HERMETICALLY SEALED CIGARETTE PACKAGE WITH OPENING FEATURE

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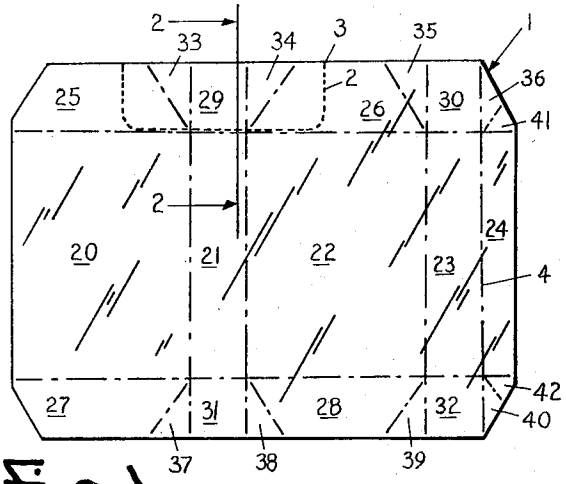


Fig. 1

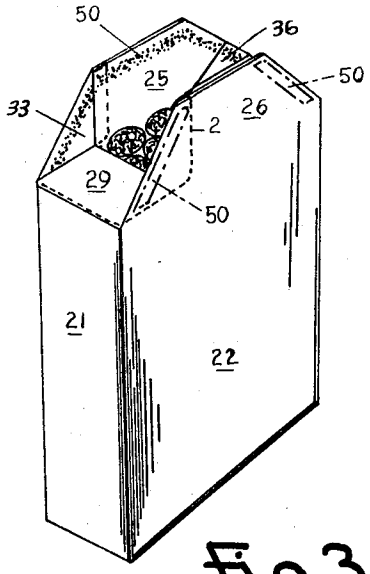
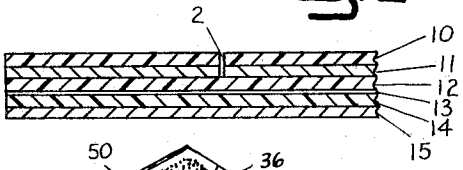


Fig. 3

Fig. 2



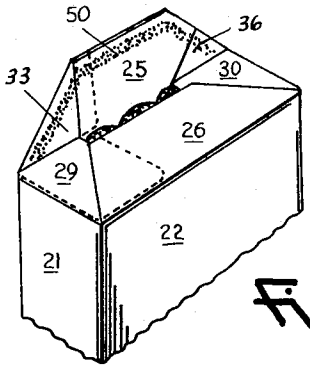


Fig. 4

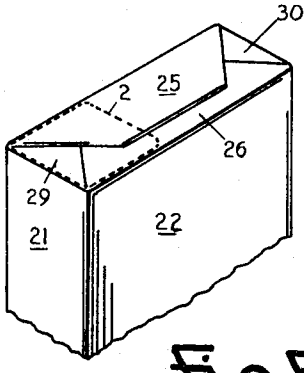


Fig. 5

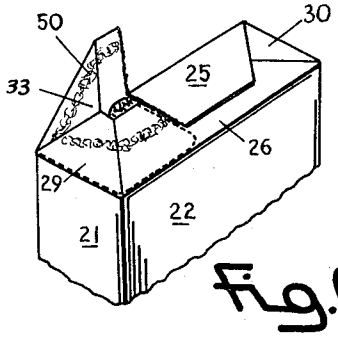


Fig. 6

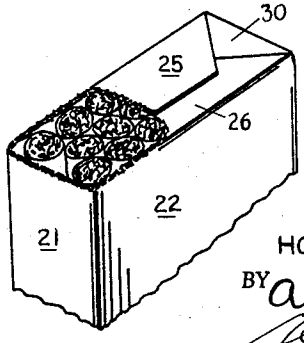


Fig. 7

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HERMETICALLY SEALED CIGARETTE PACKAGE WITH OPENING FEATURE

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6 Claims. (Cl. 229—51)

This invention relates to a package for cigarettes and the like. More specifically, the invention relates to substantially hermetically sealed packages formed from multiply packaging material and having built in an opening means which does not affect the keeping qualities of the package.

Cigarettes are customarily packaged by first enclosing them in contact with the paper-side of a laminated foil wrapper. This wrapper is then overwrapped with a printed paper label which covers all except the top portion of the foil and then further enclosed in a cellophane overwrap. The package is opened by first tearing open the cellophane overwrap and then removing a portion of the foil laminate to expose the cigarettes. This use of three separate wrapping materials entails high material costs as well as complex and expensive wrapping machinery.

In my Patent No. 3,115,293, issued December 24, 1963, I disclosed a cigarette package which overcomes many of the shortcomings of the conventional packages. The present invention is an improvement over the package shown in this patent and now makes possible a cigarette package in which the foil portion can be eliminated completely, resulting in a substantial saving in material cost. The elimination of the foil also does away with a "washboard" effect caused by a tendency of the foil to assume the contour of the cigarettes. Although the foil, which is the most protective portion of the conventional package, is eliminated, it has been found that the package of the present invention can increase the shelf life of cigarettes very substantially. The opening means of the present invention makes possible packages which have these greatly superior protective qualities and yet are easier to open than the conventional packages. The opening means of the present invention can be used in a manner similar to that used in opening the foil portion of the conventional packages and therefore should result in no confusion to the user. A further advantage of the present invention is that the package blank can be folded and closed on machines employing standard folding and sealing elements.

Further details, advantages and objects of the invention will be apparent from the following specification and appended drawings wherein:

FIGURE 1 is a plan view of the outside surface of a blank used in forming the package of the present invention,

FIGURE 2 is a magnified cut away sectional view of the blank taken along line 2—2 in FIGURE 1,

FIGURE 3 is a perspective view of a package containing cigarettes in a partially closed form,

FIGURE 4 is a broken away perspective view of the top of the package shown in FIGURE 3 and showing a further step in the closing thereof,

FIGURE 5 is a broken away perspective view of the completed package in a closed and sealed condition,

FIGURE 6 is a broken away perspective view of the package showing the first step in the opening thereof, and

FIGURE 7 is a broken away perspective view of the opened package.

Referring first to FIGURES 1 and 2, it is seen that the blank 1 from which the package is made is formed from a composite multi-ply material which has a line of weakness, preferably a line of perforations 2 passing through at least one but not all of the plies of the material. A slit

3 through all plies of the wrapper may optionally be provided at one end of the line of perforations to facilitate initiation of opening. The fold lines 4 dividing the blank into panels are not ordinarily scored onto the blank, and thus the lines 4 shown indicate imaginary lines which in FIGURE 1 represent the folds to be formed during the formation of the blank into a package.

Blank 1 is preferably formed from flexible organic packaging materials. Preferably at least one of the plies which has the line of perforations is formed of an easy-to-tear material such as paper, while the imperforate protective layers may be formed from elastomers which are stretchy and ordinarily difficult to tear. It is desirable to use a plurality of layers in order to impart the desired protective qualities to the wrapper, but the wrapper should not be permitted to become so thick that opening will be difficult. The term "imperforate" as used herein is intended to mean that the material is not perforated at any point which would disturb the protective properties of the package. Therefore the inner plies of the blank shown in the drawings are considered "imperforate" even though slit 3 passes through all of the plies. In the presently preferred construction shown in FIGURE 2, the outer perforated layers of the wrapper comprise a paper layer 11 having a coating 10 of polyethylene. The imperforate portion of the wrapper comprises a layer of polyethylene 12 adhered to the inner side of paper layer 11, a thin coating of wax 13 on the inner side of polyethylene layer 12, a further polyethylene layer 14 and a further layer of paper 15 which comprises the inner surface of the wrapper. A multi-ply material such as this can best be formed by first extruding the layer of polyethylene 10 on a web of paper 11, and cutting the line of perforations into this composite material. Paper 15 can similarly be coated with polyethylene 14 by extrusion and layer of wax 13 applied thereover. The two webs thus formed can be united by extruding the layer of polyethylene 12 therebetween as the webs are brought together. It will be apparent to those skilled in the art that many other materials can be substituted for these preferred materials. For example, one or more of the polyethylene layers could be replaced by cellophane, polypropylene, polyvinylchloride, or other materials. The wax layer 13 serves to fill any pinholes which may exist in the polyethylene layers and thus greatly adds to the protective qualities of the sheet. Other materials, such as emulsions containing polyvinylidine chloride, latexes, or co-polymers and modifications of these and other similar materials can be substituted for the wax. This layer of wax or the like can be omitted entirely if the remaining imperforate plies are adequate in providing the desired degree of protection.

The blank shown in FIGURE 1 is adapted to be folded to form the completed package and includes main panels 20, 22, side panels 21, 23, glue panel 24, end panels 25, 26, 27, 28, side panel flaps 29, 30, 31, 32, closure flaps 33, 34, 35, 36, 37, 38 39, 40, and glue panel flaps 41 and 42. The blank is formed into a package by folding the same around a mandrel in a conventional manner to form the side and end panels. Adhesive is applied to the outer surface of glue flap 24 to form a tubular shell. The articles to be packaged may then be inserted in the tubular shell and the top and bottom of the package sealed. Alternatively, one end of the package may be sealed first, the product inserted, and the other end then sealed. The various flaps forming the end panel at each end of the package are folded in a conventional manner following the sequence of steps shown in FIGURES 3–5, and adhesive 50 is applied to the inner surfaces of the main end flaps. The preferred pattern for adhesive application is shown in FIGURE 3. In order that the package be hermetically sealed, it is necessary to apply the adhesive

in a closed pattern which extends across the length and width of the flaps as shown to effectively block off any channels to the atmosphere when the flaps are sealed. In order for the opening feature of the present invention to function properly, it is necessary that only a minor portion of the area adjacent beneath the line of weakness in flap **26** be covered by adhesive. If more than a minor portion of this area is covered, the package is difficult to open. Any adhesive having adequate sealing properties can be used, the preferred type being what are commonly referred to as "hot melt" adhesives.

It is preferred that line **2** be placed either on or above the fold lines dividing the top end panel from the side and end panels. If it is located in the end or side panels, opening of the package is more difficult.

Referring to FIGURE 6, it is seen that opening of the package can easily be begun by grasping the corner of flap **25** adjacent flap **33** and pulling upward and away from side panel **22** toward panel **20**. The package can be opened by continuing to tear the same along the line of perforations. The direction in which the tearing is continued is optional with the user, who will ordinarily completely tear out the portion of the package set off by the line **2** to obtain a package which is open at one corner as shown in FIGURE 7.

In order to form a package which will open easily, it is necessary that the plies forming the same be tenaciously bonded to one another so that the imperforate layers will acquire the tearing characteristics of the perforated layers. If an imperforate layer is formed from an elastic, difficult-to-tear material and the bond between the plies is not sufficiently strong, the plies will delaminate when an attempt is made to open the package. When such delamination occurs, a substantial web of material on both sides of the line of perforations is formed which will stretch rather than tear when opening is attempted. However, if the plies are tenaciously bonded to each other, such delamination will not occur and the tearing force will be concentrated on a narrow width of the imperforate plies. It is believed that this concentration of the tearing force on a relatively small width of the material, even though elastic, enables the same to be easily stretched beyond the elastic limit so that tearing is possible. Tenacious bonds between polyethylene and substrates upon which the polyethylene is extruded are normally formed by the application to the substrate prior to extrusion of an adhesion promoter as a polyalkylene imine or the equivalent. Such adhesion promoters are ordinarily applied in minute quantities to a substrate to improve the receptiveness thereof to bonding to an elastomeric coating extruded thereon.

The following example will further illustrate the effectiveness of the present invention.

EXAMPLE

A number of packages identical to that shown in the drawings were formed from a blank having outer perforated layers including 8 lbs./ream (3000 ft.^{2}) of high density polyethylene over 30 lbs./ream paper. The inner layers, all of which are intact and imperforate, included a 6 lbs./ream layer of low density polyethylene, an 18 lbs./ream layer of microcrystalline wax, a second 6 lbs./ream layer of low density polyethylene, and an innermost layer of 15 lbs./ream tissue paper. The packages were sealed with a hot melt adhesive containing a blend of microcrystalline wax, an ethylene-vinyl acetate copolymer, and a glycerol ester of hydrogenated abietic acid. The contents were a commercially available brand of cigarettes. The packages thus formed were compared with conventional cigarette packages containing the same brand of cigarettes. Under ordinary conditions these conventional packages are known to provide a shelf life of about 17 days to the cigarettes contained therein. Packages of both types were placed in a "jungle room" in which the air was maintained at 100° F. with a relative humidity of 90% and in a "desert room" maintained at 100° F. with a relative humidity of 20%. The moisture content of t cigarettes was measured, initially and at one week i tervals by opening specimens of each type. The resu of these measurements are summarized in Tables I a II, wherein the packages of this invention are referred as "unitary packages."

Table I

[Packages stored at 100° F., 20% R.H.]

Package	Average Percent Moisture			
	Initial	One Week	Two Weeks	Thre Week
Conventional	14.8	11.3	10.5	8
Unitary	14.8	14.1	12.9	1

Table II

[Packages stored at 100° F., 90% R.H.]

Package	Average Percent Moisture			
	Initial	One Week	Two Weeks	Thre Week
Conventional	14.8	16.3	19.1	2(
Unitary	14.8	15.0	16.4	17

The present invention provides a package having tamperproof opening means which does not destroy th ability of the package to maintain a freshness of the a ticles enclosed therein. This opening means is readil accessible and easily detached, and yet does not m terially weaken the inner plies of the package. Whil specific embodiments have been described herein for th purpose of clarity, it is to be understood that the inve tion is not limited thereto, as various modifications wi be apparent to those skilled in the art.

I claim:

1. A package for cigarettes or the like which con prises a product enclosed within a substantially hermet cally sealed unitary "shell" formed from a composi multi-ply blank, said plies including a plurality of laye of paper and a plurality of layers of a synthetic ela tomeric polymeric resin, said shell including a pair of o posed main panels, a pair of opposed side panels co nected to the side edges of said main panels, opposed en panels connected to the end edges of said main and sid panels, said end panels being formed from opposed fir flaps attached to the end edges of said main panels an opposed second flaps attached to the end edges of sai side panels and to the side edges of said first flaps, po tions of said flaps adjacent the outer corners thereof b ing folded inwardly on diagonals running from the inn corners of said first flaps so as to lie between and again the inner surface of adjacent portions of said first flap said second flaps lying in subposed relationship wit respect to the infolded portions of the first flaps, at lea one of said polymeric resin plies being intact, integra imperforate, and water-vapor impervious, at least one c said paper plies and at least one of said polymeric resi plies having a line of weakness extending transversel across one of said first flaps, thence along the fold lin joining said one of the first flaps to a main panel to a inner corner thereof, thence along the extent of the fol line joining the adjacent second flap to its associated sid panel, thence along the fold line joining the next adjacen first flap to its associated main panel to a point approxi mately opposite the position of the line of weakness i said one front flap, and thence transversely across sai next adjacent first flap, said plies being tenaciously bonde to one another whereby said imperforate ply will tea along with the ply having said line of weakness.

2. The package of claim **1** wherein said imperforat layer comprises an elastic difficult-to-tear material.

3. The package of claim 1 wherein a slit is provided through all of said plies at one end of said line of weaknes whereby tearing along the line of weaknes can easily be initiated.

4. The package of claim 1 wherein said line of weakness comprises a line of perforations.

5. The package of claim 1 wherein each of said first flaps is sealed by an adhesive distributed to block off any channels to the atmosphere and thus to effectively seal the ends of said package.

6. The package of claim 5 wherein said adhesive covers only a minor portion of the surface of the flap beneath said line of weakness.

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