

Packaging for tobacco industry products

Description

This invention relates to packaging tobacco industry products, for example
5 smokeable tobacco products such as cigarettes.

Conventional cigarette box packaging consists of a bundle of cigarettes wrapped in
a paper/metal foil laminate sheet, received in a container typically formed of carton
board. The container usually has a hinged lid to provide access to the cigarette
10 bundle. The container is often formed from a pre-printed blank of SBS board stock
which is folded and wrapped around the cigarette bundle. The container is wrapped
in a heat sealable clear film, most commonly polypropylene with an embedded tear
tape to assist in easy opening.

15 Of these packaging components, only the outermost film contributes in a significant
manner to the shelf life stability of the packaged cigarettes. The plastics film acts as
a moisture barrier but its effectiveness is highly dependent upon obtaining adequate
seals in the folded, overlapped areas of the film wrap. Nevertheless, the low
moisture barrier transmission rate through the plastics film helps maintain the
20 starting moisture and other volatile components of the cigarettes as manufactured,
when the packaged cigarettes are exposed to environments that have either a higher
or lower relative humidity than the internal humidity of the cigarette pack. Whilst
polypropylene film has commonly been employed as the outer wrapping, other film
materials have been used which offer reduced moisture transmission rates, for
25 example vacuum metallised plastics films but these materials are still highly
dependent upon achieving a proper seal of the folded, overlapped areas of the film
when wrapped around the container.

Alternative packages have been proposed to replace the interior wrapping or the
30 SBS board with materials and structures that provide the requisite moisture barrier
properties, thereby eliminating the need for an exterior film of plastics material as
an over-wrap. Examples include rigid, injection moulded plastic packs with integral

seals. However, these approaches are not suitable for use with conventional, carton board containers produced in high volume by mass production techniques.

5 In one aspect, the invention provides a package comprising a closed container that contains tobacco industry products, and a coating of plastics material that has been applied to the container in a layer that provides an air tight seal between the interior and exterior of the container.

10 By applying the plastics material as a coating, a continuous layer can be provided over the entire exterior of the container avoiding the need to provide sealed joints, and thereby providing an improved seal between the interior and exterior of the container.

15 A valve may be provided to allow a pressure differential to be established between the interior and exterior of the container. The pressure differential may comprise an increased pressure within the container, created for example with an inert gas such as nitrogen.

20 An interior wrapping may be provided between the container and the tobacco products, which can be bio-degradable.

25 The container may be fabricated of air-permeable material such as carton board, for example SBS, and the plastics layer may extend over the entire exterior surface of the container to provide the airtight seal. The plastics layer may comprise a polymer for example polypropylene or polyethylene, and may include an additive to facilitate decomposition of the plastics material and/or an additive to enhance the airtight seal provided by the plastics material.

30 The container may have a main body and a lid that can be opened to provide access the tobacco products, the layer of plastics material providing a seal between the main body and the lid.

A line of weakness may be provided in the layer of plastics material to facilitate opening of the lid, in the form of a tear strip or a line of reduced thickness in the plastics layer.

- 5 The invention also includes a method of packaging tobacco industry products, comprising applying a coating of plastics material to a container containing the tobacco products, to render the container airtight.

10 The invention further provides apparatus for packaging tobacco industry products, the apparatus including a packaging device operable to pack tobacco industry products into a container, and a coating device to coat the container with a plastics material in a layer that provides an airtight seal.

15 In a further aspect the invention provides a package comprising a container, and tobacco products within a flexible hermetically sealed bag, within the container.

A valve may be provided in the bag to allow a pressure differential to be established between the interior and exterior of the bag. Means for rupturing the hermetically sealed bag may be provided to allow access to the tobacco industry products.

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In order that the invention may be more fully understood embodiments thereof will now be described by way of illustrative example with reference to the accompanying drawings, in which:

- Figure 1 is a perspective view of a pack of cigarettes with its lid open;
25 Figure 2 is a perspective view corresponding to Figure 1 with the lid shut;
Figure 3 is a sectional view of a pack shown in Figures 1 and 2;
Figure 4 is a schematic illustration of apparatus for packaging cigarettes;
Figures 5A-5C are schematic illustrations of the progress of a container through an alternative form of coating station that utilises a curtain of coating material;
30 Figure 6 is a schematic part sectional view of another embodiment of coating station that utilises a heated tunnel of air; and
Figure 7 is a schematic sectional view of an alternative embodiment of cigarette pack in accordance with the invention.

Figures 1 to 3 illustrate a pack of cigarettes in accordance with the invention that comprises a container 1 in the form of a rectangular main body 2 with a hinged, flip-top lid 3 that contains two parallel rows of filter cigarettes 4 contained with an
5 inner wrapping 5.

The container 1 may be made from carton board such as SBS by folding from a pre-printed blank in a manner known *per se*. The inner wrapping 5 may be formed of paper and need not include a metal foil laminate, and so is bio-degradable.

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As shown clearly in Figure 3, the outer surface of the container 1 is coated with a plastics material to provide a continuous coating 6 which provides an airtight seal. As illustrated in Figure 2, a tear strip 7 is configured around the join between the main body 2 and the lid 3, so as to allow the user to remove the strip 7 and thereby
15 break the continuity of the coating 6 and permit the lid 3 to be opened. The tear strip 7 may be applied to the container prior to the application of the coating 6 or subsequently. The tear strip 7 thus provides a line of weakness to enable opening of the lid. The line of weakness can be created in alternative ways and for example, the plastics coating 6 may be scored or otherwise thinned without rupturing along
20 the perimeter of the lid 3 to permit opening of the lid.

A one-way valve 8 is fitted into a wall of the container 1. The valve allows the pressure differential to be established between the interior and exterior of the container. Conveniently, the valve can permit an over-pressure to be created within
25 the container, which does not dissipate significantly over time due to the provision of the airtight, sealed coating 6 on the exterior of the container. The valve 8 comprises a unit which can be push-fitted into a small aperture in a side wall of the container either before or after application of the coating 6. If applied after application of the coating 6, the valve 8 may bond with the coating 6 as it hardens.
30 In the example shown in Figure 3, the valve 8 includes a main body 9 with a central passageway 10 that contains a one-way integral flap valve 11 so that gas can be pumped into the container to provide the over-pressure. The level of overpressure will depend upon the structural integrity of the coated container 1. The application

of over-pressure provides both functional and user benefits. The overpressure improves the shelf life potential of the cigarettes by reducing internal vapour pressures of the water and other volatile components thereby reducing the potential for spotting and staining of the cigarettes 4 as compared with a corresponding
5 hermetically sealed container at atmospheric pressure. Also, for the user, the overpressure rigidifies the container 1, which provides the pack with a distinctive touch and feel. When opened, the escaping gas is audible to the user, confirming the freshness of the cigarettes, and has an aroma which provides a cue as to the freshness of the tobacco product.

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The coating 6 applied to the container 1 may be a polymer such as polypropylene or polyethylene with desired physical and barrier properties. The coating is selected such that it readily adheres to the surface of the container 1 and preferably solidifies so as to be substantially transparent in order that printed surfaces of the container 1
15 remain visible through the coating. The plastics coating 6 may be selected to give a particular tactile feel or visual impression on the exterior surface. Depending on the plastics material selected, it may be desirable to use clear lacquered or varnished ink coating to aid in bonding the plastic coating 6 to printed areas of the container 1.

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The plastics material may incorporate an additive material for causing the plastics coating 6 to decompose easily in a compost or landfill environment. In this way, the interior wrapping 5, which need not include metallic foil, along with the container 1 and the plastics coating 6 are all biodegradable and may be certifiable as
25 a degradable or biodegradable structure. The additive material of a used decomposition may be selected from products offered by EPI Environment Plastics Inc (Vancouver, BC) or other similar available products.

The plastics coating 6 may also include an additive material for improving the air
30 barrier properties of the coating without interfering with its optical transparency. One such material is Nanolock™ marketed (by InMat Inc., Hillsboro, New Jersey, USA). This additive greatly improves the shelf stability of the resulting package to a

near hermetic level so as to improve the shelf life and freshness of the tobacco product for the user.

Figure 4 illustrates an apparatus for packaging tobacco products to provide packs as
5 illustrated in Figures 1-3. A packaging machine 12 in a generally conventional
manner, wraps bundles of cigarettes with the interior wrapping 5 and then with a
pre-printed blank of SPS material to form the container 1. Successive packs of
cigarettes with containers 1 fabricated by the machine 13 are fed along a conveyer
13 in direction 14 to station 15 at which the tear strip 7 is applied to the container 1
10 at the join between the lid 3 and main body 2. The containers 1 then move from
the tear strip fitting station 15 to coating station 16 at which liquid or molten
plastics polymer material containing the aforementioned additives is pumped from a
reservoir 17 through spray heads 18 to spray coat each container 1 completely and
thereby provide the continuous, sealed coating 6 shown in Figure 3. The coated
15 containers are moved from the coating station 16 to a valve-fitting station 19 at
which the valve 8 is press-fitted into the container. The packs then move to a gas
supply station 20 at which gas is pumped through the one-way valve 9 so as to
pressure the container 1. The gas may comprise filtered air or an inert gas such as
nitrogen. In an alternative arrangement the gas supply is replaced by a vacuum
20 pump and the containers are evacuated of air.

Thereafter, the pressurised containers 1 may be passed from the conveyor 13 to a
packing station (not shown) to be packed into larger containers for transport. In
order to improve the seal provided by the one-way valve 8, the exterior of the valve,
25 which may be formed in plastics material, may be heated in order to partially melt
the plastics material and close the central opening 10.

An alternative embodiment of the coating station 16 is shown in Figure 5 in which
the container 1 is passed through a curtain 21 of liquid coating material. The curtain
30 21 is emitted by a line of nozzles 22 and falls into a reservoir 23 to be pumped back
to the nozzles 22 by a pump, not shown. The conveyor 13 is configured in two parts
13a, 13b with the curtain 21 of liquid falling between them. Figure 5A illustrates an
uncoated container 1 approaching the coating station 16 and the curtain 21 of liquid

coating material. The container 1 is driven in to the curtain 21 by the conveyor part 13a so as to be coated with the coating material from the curtain 21 on all sides, including the underside, as illustrated in Figure 5B. The container 1 with a coating 6 of material from the curtain 21 then moves onto the conveyor part 13b and Figure 5C shows the fully coated container 1 moving toward the valve fitting station 19 shown in Figure 4.

Figure 6 illustrates an alternative way of creating the coating 6 on the container 1, in which container 1 on conveyor part 13a, is loosely pre-wrapped with a sheet of plastics material 24 in a non-sealed manner and then dropped into a tunnel 25 that is fed with an upward flow of heated air by a blower 26. A succession of containers 1 each wrapped with a sheet 24 are fed into the upper opening 25a of the tunnel and fall through the heated air onto conveyor part 13b to the tunnel opening 25b, to be fed to the valve fitting station 19 shown in Figure 4. The containers 1 free-fall under the effect of gravity through the heated air from the blower 26 and the wrapping 24 melts to form the sealed, airtight coating 6. The vertical arrangement of the tunnel 25 has the advantage that the containers 1 are unsupported by the conveyor 13 during the melting process, which facilitates formation of a continuous airtight coating 6 over the entire container 1. However, the tunnel 25 could be arranged in other ways, for example horizontal, with the conveyor running through it.

Another embodiment of a cigarette pack in accordance with the invention is illustrated in Figure 7. In this embodiment, the container 1 is of a similar construction to that shown in Figures 1-3, with a main body 2 and lid 3. However, the cigarettes 4 are contained within a flexible, sealed bag 27 that may be pressurised. The interior wrapping 5 of the previous embodiment is omitted and no exterior coating of plastics material 6 is provided. The cigarettes are packaged by placing them initially in the plastics bag 27 through an opening at the top, which is then heat-sealed close so as to produce a welded rib 28 along the top of the bag as shown in Figure 5. The bag 27 is then pressurised through valve 8 which in this example, is disposed at the bottom of the bag. The bag 27 may be pressurised with an inert gas or filtered air in the manner previously described. The sealed, flexible

bag 27 may be made of a polymer such as polyethylene or polypropylene as previously described and may include the aforementioned additive to render it biodegradable. A line of weakness 29 may be formed along the top of the bag to assist the user in opening it to provide access to the cigarettes 4. Also a sharp spike
5 30 may be provided within the container to allow the user to press the pressurised bag onto the spike in order to puncture the bag and deflate it. This embodiment has the advantage that the cigarettes can be packaged in a conventional container 1 made of SBS board without the need for an exterior, plastics transparent wrapping or the interior wrapping 5, and with the advantage that the cigarettes are kept fresh
10 and the overall package is biodegradable.

Many modifications and variation to the described embodiments will be evident to those skilled in the art. For example, the plastics material can be applied by methods other than those described, for example dipping. Also, whilst the
15 described packages are for tobacco industry products in the form of cigarettes, they may also be used for other such products and as used herein the term "tobacco industry product" refers to any item made in, or sold by the tobacco industry, typically including a) cigarettes, cigarillos, cigars, tobacco for pipes or for roll-your-own cigarettes, (whether based on tobacco, tobacco derivatives, expanded tobacco, reconstituted tobacco or tobacco substitutes); b) non-smoking products
20 incorporating tobacco, tobacco derivatives, expanded tobacco, reconstituted tobacco or tobacco substitutes such as snuff, snus, hard tobacco, and heat-not-burn products; and c) smoking cessation aids and other nicotine-delivery systems such as adhesive patches, inhalers, lozenges and gum. This list is not intended to be
25 exclusive, but merely illustrates a range of products which are made and sold in the tobacco industry.

Claims

1. A package comprising a closed container (1) that contains tobacco industry products (4), a coating (6) of plastics material that has been applied to the container
5 in a layer that provides an airtight seal between the interior and exterior of the container and a valve (8) to establish a pressure differential between the interior and exterior of the container, wherein the valve comprises a one way valve that has been push-fitted into an aperture in a wall of the container to permit establishment of the pressure differential between the interior and exterior of the container.
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2. A package according to claim 1 wherein the pressure differential comprises increased pressure within the container.
3. A package according to claim 1 wherein the container contains an inert gas.
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4. A package according to any preceding claim including an interior wrapping (5) between the container and the tobacco products.
5. A package according to claim 4 wherein the interior wrapping is bio-
20 degradable.
6. A package according to any preceding claim wherein the container comprises a main body (2) and a lid (3) that can be opened to provide access to the tobacco industry products, the layer of plastics material providing a seal between the main
25 body and the lid, the package further comprising a line of weakness in the layer of plastics material to facilitate opening of the lid.

7. A package according to claim 6 including a tear strip (7) or a line of reduced thickness in the plastics layer to provide the line of weakness.

- 5 8. A package according to any preceding claim wherein the plastics layer comprises at least one of:
- a) a polymer, for example polypropylene or polyethylene;
 - b) an additive to facilitate decomposition of the plastics material
 - c) an additive to enhance the airtight seal provided by the plastics material.

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9. A method of packaging tobacco industry products, comprising applying a coating of plastics material to a container containing the tobacco products, to render the container airtight, push-fitting a one-way valve into an aperture in a wall of the container, and establishing a pressure differential between the interior and exterior of the container through the one-way valve.

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10. A method according to claim 9, wherein the coating is applied by one of:
- a) spray-coating the exterior of the container with the plastics material
 - b) passing the container through a curtain of liquid coating material
 - c) dipping the container in the plastics material to form the layer.

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11. A method according to claim 9 wherein the coating is applied by wrapping the container with a sheet of meltable plastics material and melting the sheet to form the coating.

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12. A method according to claim 11 including passing the container through a tunnel fed with heated air to melt the wrapping.

13. A method according to claim 12 including allowing the container to free-fall
10 downwardly through the tunnel against an upward flow of the heated air.

14. A method according to any one of claims 9 to 13, wherein the container comprises a main body and a lid that can be opened to provide access to the tobacco industry products, the layer of plastics material providing a seal between
15 the main body and the lid, and including providing a line of weakness in the layer of plastics material to allow opening of the lid.

15. A method according to claim 14 including providing a tear strip on the container either before or after applying the plastics layer.

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16. A method according to any of claims 9 to 15 including pumping a gas into the container to create a positive pressure therein.

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17. A method according to any one of claims 9 to 16 including providing a) an additive in the plastics material to facilitate decomposition of the plastics material; and/or

b) an additive in the plastics material to enhance the airtight seal provided by the plastics material.

18. Apparatus for packaging tobacco industry products, the apparatus including a packaging device (12) operable to pack tobacco products into a container, a coating device (16, 17, 18) to coat the container with a plastics material in a layer that provides an airtight seal and a device for push-fitting a one-way valve into an aperture in a wall of the container for establishing a pressure differential between the interior and exterior thereof.

19. Apparatus according to claim 18 wherein the coating device comprises a spray coating device or the coating device is operable to create a curtain (21) of liquid coating material through which the container passes.

20. Apparatus according to claim 18 wherein the coating device is operable to wrap the container with a sheet (24) of meltable plastics material and melt the sheet to form the coating.

21. Apparatus according to claim 20 including a tunnel (25) fed with heated air to melt the wrapping.

22. Apparatus according to claim 21 wherein the tunnel is disposed vertically so that the container free-falls downwardly through the tunnel against an upward flow of the heated air.

23. Apparatus according to any of claims 18 to 22 including a gaseous supply source (20) for pumping gas into the container through the valve or a vacuum
5 pump for evacuating gas from the container through the valve.
24. Apparatus according to any one of claims 18 to 23 including a device for fitting a tear strip to the container.
- 10 25. Apparatus according to any one of claims 18 to 24 including a device for forming a line of weakness in the plastics layer on the container.