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(54) PACKAGE OF CIGARETTES COMPRISING MEANS FOR THE ABSORPTION OF FREE OXYGEN AND RESPECTIVE WRAPPING METHOD

ZIGARETTENPACKUNG MIT FÜR FREIER SAUERSTOFF ABSORBIERFÄHIGEN MITTELN UND JEWEILIGES VERFAHREN

PAQUET DE CIGARETTES COMPRENANT DES MOYENS POUR L'ABSORPTION D'OXYGÈNE LIBRE ET PROCEDE DE CONDITIONNEMENT CORRESPONDANT

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Description

TECHNICAL FIELD

[0001] The present invention relates to a package of cigarettes provided with means for the absorption of free oxygen, able to reduce the amount of oxygen within the package. In particular, the present invention relates to a package of cigarettes provided with a sealed envelope containing the group of cigarettes wherein the means for the absorption of free oxygen are arranged in fluid communication with the group of cigarettes to reduce the amount of oxygen within the sealed envelope.

[0002] In a further aspect, the present invention relates to a method for wrapping a package of cigarettes provided with means for the absorption of free oxygen within the package. In particular, the present invention relates to a method for coupling the absorbing means with a package of cigarettes arranging the same in fluid communication with the group of cigarettes.

PRIOR ART

[0003] To better preserve the organoleptic characteristics of the tobacco contained in cigarettes, it is known to produce packages of cigarettes, comprising an envelope of sealed type, formed by folding and heat-sealing a wrapping sheet of impermeable material about the group of cigarettes.

[0004] To obtain a correct heat sealing and at the same time protect the content, the envelope of said packages comprises a stiffening element in the inside thereof, preferably of cardboard, which encloses the group of cigarettes at least on the sides. Said element is used as a contrast means during the welding operations thus improving the sealing of the package. A further type of known sealed packages are the fluid tight packages. These are produced by using a wrapping method referred to as *"flow-pack",* wherein around a succession of groups of cigarettes a tubular wrapping is formed by means of a longitudinal welding of a continuous tape of wrapping material that is wound in a tube around the group. Subsequently, the tubular wrapping is sealed and cut transversely upstream and downstream from each group of cigarettes to obtain the single sealed inner packages. The latter type of sealed package described allows for an optimal preservation of the organoleptic characteristics of the tobacco of the group of cigarettes.

[0005] Regardless of the wrapping method used, the free oxygen in the atmosphere of the sealed package deteriorates, over time, the tobacco contained therein, this is because the oxidizing action of free oxygen affects the organoleptic qualities of the tobacco to the limit thus making the cigarettes no longer usable.

[0006] In order to protect the tobacco from oxidation, it is known to produce packages of cigarettes of sealed type and provided with a modified atmosphere in the inside thereof. This is typically of the partially or totally inert type and is obtained by means of the introduction of predetermined amounts of nitrogen in a gaseous state. In particular, the modified atmosphere is obtained by replacing the environment air with a gas mixture such as to enable the preservation of the wrapped product. The gases used are predominantly made of nitrogen and/or carbon dioxide and are typically introduced during the wrapping steps and before closing the package.

[0007] The protective atmosphere helps to prolong the cigarettes life and to preserve the organoleptic properties thanks to the inhibiting and bacteriostatic effect of the gases used.

[0008] The above-mentioned solutions related to generating a protected atmosphere before closing the package, however, have numerous disadvantages, especially when applied to the field of packaging cigarettes. In the case of not perfectly compact products such as cigarettes, which have gaps especially in the volume of the tobacco, part of the oxygen is trapped inside the product.

[0009] The evacuation of the oxygen by means of the traditional systems described above requires, therefore, a particularly long time in the order of tens of seconds to several minutes. Said evacuation times are, therefore, incompatible with the normal wrapping time.

[0010] Further disadvantage results from the need to arrange part of the product flow in an isolated environment and such as to allow the introduction of a protective atmosphere, in particular containing nitrogen. The flow portion to be placed within the isolated environment is, in particular, greater as faster the process is, up to the need to entirely obtain the flow in an isolated environment to maintain the current high speed standards, even up to 1000 packages of cigarettes per minute. The arrangement of the flow in a modified atmosphere is also particularly dangerous for the safety of the operators as well as particularly expensive in terms of quantity of stored and consumed inert gas and with respect to the support plants necessary to the management of the protected atmosphere, typically not in use on automatic machines for packaging cigarettes.

[0011] It would therefore be desirable to have a package of cigarettes capable of minimizing the above drawbacks. In particular, it would be desirable to have a package of cigarettes able to guarantee the quality and the inalterability of the group of cigarettes in the inside thereof for a long period of time.

[0012] Similarly, it would be desirable to have a method for wrapping cigarettes packages able to guarantee the quality and the durability of the cigarettes in the inside thereof for a long period of time and that it is, at the same time, inexpensive to produce.

[0013] The patent application DE2253268A1 describes a package containing an inner package enclosing a group of cigarettes and a substance that absorbs humidity to maintain a constant humidity within the sealed inner package; the substance that absorbs humidity is arranged in a heat-sealed bag and permeable to water vapour arranged alongside the inner package enclosing

the group of cigarettes.

DESCRIPTION OF THE INVENTION

[0014] The object of the present invention is to provide a package of cigarettes which has high chemical protection against the deterioration over time of the group of cigarettes and is, at the same time, inexpensive to produce.

[0015] In particular, object of the present invention is to provide a package of cigarettes able to preserve the group of cigarettes from oxidation.

[0016] A further object of the present invention is to provide a wrapping method for packages of cigarettes able to protect the contents from oxidation.

[0017] The purposes mentioned above are achieved by a package of cigarettes, according the accompanying claims.

[0018] The package comprises:

a group of cigarettes;
a stiffening element at least partially enclosing the group of cigarettes on two first and second opposite sides of the group of cigarettes;
a sealed envelope made from a sheet of heat-sealable type, the inner envelope enclosing the group of cigarettes and the stiffening element;
the package is characterized in that it comprises means for the absorption of free oxygen arranged in fluid communication with the group of cigarettes to reduce the amount of free oxygen within the sealed envelope.

[0019] Even more preferably, the envelope defines a chamber containing the group of cigarettes, the chamber being air-tight at atmospheric pressure, and wherein the absorbing means are arranged inside the chamber.

[0020] In this way, the action of reduction of free oxygen is carried out without the use of expensive plants and for a long period of time without affecting the cycle time for the package production.

[0021] In particular, the chamber has a protective atmosphere with a predetermined amount of oxygen and/or nitrogen and/or with a predetermined level of humidity.

[0022] In this way, the action of the absorbing means allows to maintain a level of oxygen and/or predetermined humidity inside the package.

[0023] Preferably, the heat-sealable sheet is folded into a U about the group of cigarettes and around the stiffening element so that the folded sheet comprises two opposite open ends projecting respectively from the first and second sides, and wherein
the envelope is sealed:

folding a first end portion of each of the open ends respectively on the first and second sides and a second end portion of each of the open ends respectively on the first end portions and subsequently heat-sealing the first and second folded end portions to each other; or
coupling a first and a second end portions of each of the first and second sides so as to be arranged opposite to each other and subsequently heat-sealing the first and second end portions to each other.

[0024] Preferably, the envelope comprises:

an extraction opening of the cigarettes;
an adhesive closure panel superimposed in a movable manner on the envelope at the extraction opening;
wherein the closure panel is movable between an open position, wherein the closure panel is at least partially detached from the envelope allowing access to the extraction opening, and a closed position, wherein the closure panel is superimposed to the envelope closing the extraction opening.

[0025] In this way, at each re-closure of the package it will be possible to reform an ideal atmosphere with a reduced quantity of free oxygen and/or with a predetermined level of humidity. Preferably, the means for the absorption of oxygen are interposed between the stiffening element and the envelope.

[0026] In this way, the absorbing means do not damage in any way the group of cigarettes contained inside the package.

[0027] Preferably, the absorbing means consist of a coating on at least a portion of the inner surface of the envelope or of an adhesive absorbing panel coupled to the envelope or to the stiffening element or consist of a breathable bag comprising powder or granular material capable of absorbing the free oxygen.

[0028] In this way, the coating or the adhesive panel allow to minimize the impact in terms of weight and volume of the absorbing means with respect to the package.

[0029] Preferably, the package comprises visual indicator means of the amount of oxygen able to change color based on the amount of free oxygen within the package,
wherein the envelope has at least one transparent portion, and wherein the visual indicator means are arranged at the transparent portion showing a default color when the absorbing means decrease to a predetermined amount the free oxygen within the package.

[0030] In this way, the action of the absorbing means is associated to suitable detecting means capable to indicate to the user the status of the internal_atmosphere of the package.

[0031] The purposes mentioned above are further achieved by a method for wrapping a package of cigarettes, according to the accompanying claims.

[0032] The wrapping method comprises the steps of:

forming a group of cigarettes;
superimposing a stiffening element at least partially

around the two opposite first and second sides of the group of cigarettes;
defining a partly wrapped envelope by wrapping the group of cigarettes and the stiffening element with a sheet of heat-sealable type;
sealing the partly wrapped envelope to form a sealed envelope; the method is characterized in that it comprises the step of coupling the means for the absorption of the free oxygen with the package and in fluid communication with the cigarettes before the sealing step.

[0033] In this way, it is possible to use traditional wrapping schemes to define the package and apply, for example by means of a labeler or a pusher, the means for the absorption of oxygen. The latter can be applied to the stiffening element or to the wrapping sheet defining the envelope, for example by gluing or by applying an adhesive panel.

[0034] Preferably, the step of sealing defines the envelope as a chamber air-tight at atmospheric pressure and containing the group of cigarettes,
wherein the coupling step arranges the absorbing means within the chamber, and
wherein the method comprises the step of conditioning the atmosphere of the chamber with a protective atmosphere containing a predetermined amount of oxygen and/or nitrogen and/or with a predetermined level of humidity.

[0035] Preferably, the step of coupling the means for the absorption of free oxygen to the package is made by coupling the absorbing means to the stiffening element or to the heat-sealable sheet or to the tape of wrapping material able to define the stiffening element or the heat-sealable sheet.

BRIEF DESCRIPTION OF THE DRAWINGS

[0036] Further characteristics and advantages of the present invention will become apparent from the description of preferred embodiments, illustrated by way of non limiting example in the accompanying figures, wherein:

Figure 1 is a front perspective view of a first embodiment of the package of cigarettes provided with means for the absorption of free oxygen, according to the present invention;
Figure 2 is a plan view from below of the package of cigarettes of Figure 1;
Figure 3 is a front perspective view of a second embodiment of the package of cigarettes provided with means for the absorption of free oxygen, according to the present invention;
Figure 4 is a plan view from below of the package of cigarettes of Figure 3.

PREFERRED EMBODIMENTS OF THE INVENTION

[0037] With reference to Figures 1 and 2, a package 1 of cigarettes comprising means for the absorption of free oxygen, according to the present invention is illustrated.

[0038] The package 1 comprises an envelope 11 which encloses a group 111 of cigarettes. To ensure greater structural rigidity and allow proper heat-sealing to the walls of the envelope 11, as further detailed in the following, the package 1 further comprises a stiffening element 21 partially enclosing the group 111 of cigarettes on two opposite sides of said group 111, specifically a first and second side. In particular, the stiffening element 21 is arranged on the front surface of the group of cigarettes and extend on opposite sides spaced apart from said front wall.

[0039] The envelope 11 is therefore defined by a sheet, or piece of tape, of wrapping material wrapped about said group 111 of cigarettes in turn enclosed by the stiffening element 21. The piece of tape of wrapping material used for wrapping is of heat-sealable material, preferably at least partially thermoplastic. Therefore, the envelope 11 thus defined is heat sealed after enclosing the group 111 of cigarettes and the stiffening element 21, defining a sealed envelope. In this way, the structural characteristics of the wrapped piece make the envelope 11 fluid-tight, at least at atmospheric pressure. This allows to isolate the group of cigarettes from the outer atmosphere once the packaging is completed. In particular, the sealed envelope 11 allows to preserve the content of the cigarettes thus avoiding the absorption or migration through the same of fluid substances deposited on its surfaces, such as for example water-based adhesives or the like.

[0040] The arrangement of the layers of cigarettes allows to obtain a substantially parallelepiped shape for the above mentioned envelope 11 during wrapping, with a front surface, a rear surface, a top surface, a bottom surface and two lateral surfaces. In the embodiment described therein, the front and lateral surfaces of the envelope are arranged at the front walls and first and second lateral walls of the stiffening element 21.

[0041] The terms "front", "rear", "top", "bottom", "lateral" and other terms used to describe the respective positions of the surfaces of the envelope and of the stiffening element refer to the package arranged in vertical position when frontally observed.

[0042] The wrapping of the wrapping sheet to form the envelope 11 is such as to define a first transverse welding on the package 1 at the rear surface of the same envelope 11 and two lateral folds of *"soap"* style, as later described in detail.

[0043] The extraction of the cigarettes 111 is made possible by defining a special extraction opening on the envelope 11. In the embodiment described therein, said extraction opening is obtained at the first access to the group 111 of cigarettes by the consumer at a specifically created weakening line 211. In particular, said weakening line 211 is made by means of a non-through cut made

on the outer surface of the envelope 11. The access to the group 111 of cigarettes is, therefore, obtained by partly removing the wrapping material of the envelope 11 from the portion of the envelope 11 circumscribed by the weakening line 211. In the embodiment illustrated in Figure 1, the removable wrapping material is formed in a position of the envelope symmetric with respect to the vertical central axis of the front surface.

[0044] To improve the grip of the cigarettes, the weakening line 211 extends in a portion of wrapping material of the front surface, in continuity with a portion of the same wrapping material of the top surface. In this way the removal of the wrapping material obtained by means of the weakening line 211 is adjacent from the front surface to the top surface so as to increase the grip area available to the user. Always to improve the grip of the cigarettes, also the stiffening element 21 is provided with a cut at the removable portion of the wrapping material.

[0045] In a further embodiment (not illustrated), the extraction opening can be formed by entirely removing the packing material from said surface, thus maintaining covered part of the group of cigarettes. Similarly, the portion enclosed by the weakening line may just be spaced and raised from the remaining portion of the envelope, leaving at least one side of the removable portion connected with the same envelope. Still in a further embodiment (not illustrated), the weakening line may define a removal of the front and/or top surfaces in a decentralized position with respect to the central axis of the same front surface. This allows, for example, to arrange the grip area at one end of the package rather than in the central traditional position, by only uncovering the cigarettes at the aforesaid end.

[0046] The package is completed by suitable means 51 for the absorption of free oxygen arranged in fluid communication with the group 111 of cigarettes to reduce the amount of free oxygen within the sealed envelope 11. In particular, said absorbing means 51 are arranged inside the air-tight chamber defined by the sealed envelope 11.

[0047] In the embodiment described herein, said absorbing means 51 are made by a container provided on the inside thereof with a chemically active element and able to combine with the free oxygen. In particular, the chemically active element is formed by iron powder. In further embodiments, said element could comprise in addition to the iron powder also sodium chloride and/or citric acid with a catalyzing function. Furthermore the content of the absorbing means may be defined by granules rather than by a material of liquid or semi-liquid type.

[0048] The container defining the aforesaid absorbing means 51 is in the shape of a bag, in particular heat-sealed on the four sides, made of gas-permeable material. When arranged in fluid communication with the group of cigarettes, the gas-permeable bag allows to put the free oxygen in communication with the contents therein.

[0049] The chemically active element contained inside the bag is, therefore, able to absorb free oxygen. In this way the oxygen content inside the package 1 is absorbed slowly after the complete packaging of the product, without imposing time constraints to the wrapping process. Furthermore, during the absorption and/or once completed the absorption the group 111 of cigarettes remains immersed in an atmosphere with a decreased quantity of free oxygen and consisting almost exclusively of nitrogen.

[0050] In the embodiment illustrated in Figure 1, the iron oxidizes until saturation and so captures the molecular oxygen (O_2), which constitutes about 21% of the environment air, leaving mostly inert nitrogen and a small amount of carbon dioxide. The absorbent capacity is directly proportional to the amount of powdered iron provided, while grain size, geometry, humidity and other factors affect only the reaction time. The latter should be from several hours to a few days, and is important for production purposes in the evaluation of the maximum time in which the absorbers can be left in the open air without losing their effectiveness, until the wrapping cycle is completed.

[0051] With a solution of the above type it is, therefore, possible to obtain oxygen levels below 0.05% inside the chamber formed by the sealed envelope 11, in packages provided with optimum sealing. In contrast, with the solutions used by the prior art, which provide conditioning the atmosphere with nitrogen during the packaging, the reachable values are higher than or equal to 1% but at the expense of long waiting time during conditioning of the packages (with consequent reduction in the yield in terms of number of packages produced per time unit). In the embodiment illustrated in Figures 1 and 2, the bag 51 constituting the means for the absorption of oxygen is interposed between the stiffening element 21 and the envelope 11. In this way, while being arranged in fluid communication with the group 111 of cigarettes it is not directly in contact with the same. This allows the absorbing means 51 to perform the function of capturing the free oxygen without causing physical damage to the fragile body of the cigarettes. Additionally, the action of absorbing means 51 may generate a moderate "vacuum" effect, as a result of the absorption in the solid form of about 21% of the volume of initial gas inside the package 1. This results in a better adhesion of the envelope 11 to the remaining components of the package 1, improving the aesthetic appearance thereof.

[0052] According to further embodiments not illustrated, the means for the absorption of free oxygen may be obtained by one or more self-adhesive panels, for example coated with the chemically activated material, applied to the envelope or to the stiffening element. In further embodiments, not illustrated, the means for the absorption of free oxygen can be obtained by means of a surface coating treatment (coating) formed directly on at least a portion of the wrapping sheet which defines the envelope or the stiffening element.

[0053] Finally, the package 1 further comprises visual indicator means of the amount of oxygen which act as

detectors and indicators of the amount of oxygen contained inside the package 1. Said indicator means are adapted to change color according to the quantity of free oxygen detected when arranged in fluid communication with the group 111 of cigarettes or inside the sealed chamber. In the embodiment described therein to allow the use of visual indicator means, i.e. to allow the user to easily view the color changes corresponding to the changes of status, the envelope 11 is made of completely transparent material and such as to allow to view the entire contents of the package 1, including the aforementioned indicator means. Moreover, to simplify the packaging process, the indicator means are integrated with the means 51 for the absorption of free oxygen.

[0054] The indicator means are adapted to display a predetermined color when the absorbing means 51 decrease the free oxygen within the package 1 by a predetermined amount. Preferably said decrease corresponds to a quantity of oxygen inside the package 1 equal to or below 0.05% of the quantity of gas contained in the inside thereof. Said indicator means allow, therefore, to read the contents of the quantity of oxygen provided in the volume enclosing the cigarettes without opening the package 1. In this way, the user can further verify through the content of oxygen absorbed whether the package is sealed or has openings such as to allow the introduction of air from the outside environment and, consequently, a greater, and inappropriate absorption, of the quantity of oxygen.

[0055] Alternatively, the envelope could be provided only with a transparent portion used for this purpose and, in said case, the indicator means are arranged at the transparent portion to be visible to the user.

[0056] In addition, the package 1 could have in its inside, in particular in the air-tight chamber 111 enclosing the group of cigarettes, a modified atmosphere different from the environment atmosphere. The modified atmosphere comprises a predetermined amount of nitrogen so as to be a protective atmosphere for the contained cigarettes. In addition or in alternative the protective atmosphere (modified) may comprise a predetermined amount of oxygen, in particular in an amount such as to be subsequently completely absorbed by the absorbing means 51. Furthermore additionally or alternatively, the conditioning of the protective atmosphere may provide a predetermined level of humidity such as to ensure the preservation of the tobacco organoleptic characteristics.

[0057] The production of a reclosable package of cigarettes according to the present invention can be performed by means of packing machines of known type, for example one of the models produced by G.D S.p.A.

[0058] The packing machine (not illustrated) is provided with a first unwinding unit of a reel of a wrapping tape, of heat-sealable type, suitable for the subsequent production of the envelope 11. Said first unwinding unit defines the non-through pre-cut portions, which constitute the weakening line 211, appropriately cutting at a predetermined pitch the above mentioned wrapping tape. The first unwinding line further comprises a cutting device for obtaining wrapping sheets from the tape provided with the pre-cut portions.

[0059] Downstream of, or parallel to, the first unwinding unit the packing machine is provided with a second unwinding unit of a reel of a wrapping tape, of paper type, suitable for the subsequent production of the stiffening element 21. Said second unwinding unit comprises a second cutting device for obtaining wrapping sheets from the unwound reel, in particular, said wrapping sheets being shaped to form the cut adapted to facilitate the extraction of the cigarettes, as previously described.

[0060] The wrapping method comprises, therefore, a step of forming the group 111 of cigarettes, wherein a third unit for forming the groups 111 of cigarettes defines the desired stratification. Subsequently, in a fourth coupling unit, the stiffening element 21 is superimposed partially around the formed group 111 of cigarettes, in particular on the front side of the above-mentioned group and on two first and second opposite sides of the same group, corresponding to the lateral surfaces of the group 111 of cigarettes. The coupling of said stiffening element 21 is preferably obtained when forming the group 111 of cigarettes by a suitable pusher. A seat for retaining the formed group 111 is adapted to accommodate said stiffening element 21 and a suitable pusher is adapted to enter the group 111 formed within said pocket, allowing to superimpose the stiffening element 21 on the group 111 of cigarettes at least at two opposite sides.

[0061] A fifth forming unit defines the envelope 11 partially wrapped by wrapping the group 111 of cigarettes and the stiffening element 21 with a sheet of heat-sealable type. Said fifth forming unit comprises a first transfer wheel which is rotatable about a respective horizontal axis of rotation. The latter receives in succession the groups 111 of cigarettes provided with the stiffening element 21 and transfers them to a second wrapping wheel having a number of peripheral pockets at a wrapping unit. At the second wrapping wheel, rotatable about its own respective vertical axis of rotation, each pocket receives the group 111 of cigarettes provided with the stiffening element 21 and the respective wrapping sheet obtained by the cut at pitch on the first unwinding unit. The rotation of the second wrapping wheel allows, therefore, to fold the wrapping sheet thus enclosing the above mentioned formed group 111 of cigarettes, to make the envelope 11 provided with the portion with the weakening line 211. In particular, the wrapping of the wrapping sheet takes place starting from the head of the cigarettes, so that said weakening line 211 is arranged at the tail of the cigarettes, which coincides with the filter portion.

[0062] The sheet of heat-sealable material, then, is folded into a U about the group 111 of cigarettes and around the stiffening element 21 so that the folded sheet comprises two opposite open ends projecting respectively from the first and second sides provided with the aforementioned stiffening element 21. Upon rotation in the second wrapping wheel follows, therefore, the comple-

tion of the couplings of the envelope 11 with the formation of the rear and lateral overlapping flaps of the same. In particular, the rear overlapping flaps are heat-sealed to each other to define a tubular wrapping.

[0063] The envelope 11 is sealed by folding a first end portion 311' of each of the open ends respectively on the first and second sides and a second end portion 311" of each of the open ends respectively on the first end portions. In a subsequent step, the envelope 11 partially formed (with the folds of the side flaps completed) is completed by sealing, in particular heat-sealing the first 311' and second 311" folded end portions to each other.

[0064] A coupling step of the means 51 for the absorption of free oxygen to the package 1, and in fluid communication with the first group 111 of cigarettes is made before sealing the envelope 11.

[0065] Said step is made by coupling the means 51 for the absorption of oxygen preferably to the stiffening element 21, before or after the combination with the group 111 of cigarettes. Alternatively, this step can be performed by coupling the absorbing means 51 with the heat-sealable sheet able to define the envelope 11. A further alternative may provide that the application of the absorbing means 51 is obtained directly on the tape of wrapping material suited to define, subsequently, the stiffening element 21 or the heat-sealable sheet of the envelope 11.

[0066] In the present embodiment, the absorbing means 51 being applied to the stiffening element 21, a sixth intermediate coupling unit is arranged downstream from the second unwinding unit and upstream from the fourth coupling unit. This allows to arrange the absorbing means 51 on the sheet suited to define the stiffening element 21. Alternatively, said fifth coupling unit may be arranged parallel to the second unwinding unit for coupling, at a predetermined pitch, the absorbing means 51 directly on the tape of wrapping material suited to define the stiffening element 21. Additionally, said fifth coupling unit may be arranged parallel to the first unwinding unit for coupling, at a predetermined pitch, the absorbing means 51 directly on the tape of wrapping material suited to define the envelope 11.

[0067] The package 1 is completed according to the present invention, and then provided with a sealed envelope 11 containing the means 51 for the absorption of free oxygen arranged in fluid communication with the group 111 of cigarettes. Additionally, the package may be provided with a protective container, preferably of paper material, obtained by feeding the envelope 11 formed on a further forming unit suited to fold a blank, enclosing the envelope in the inside thereof. The blank used may, therefore, define a package of *"soft-rigid"* type or a package of *"rigid hinge-lid"* type.

[0068] In case of the need to condition the inner atmosphere of the package 1 of cigarettes with a modified atmosphere different from the environment atmosphere, the machine can be provided with a cover carter in a portion thereof arranged at least at the portion suited to define the sealing step.

[0069] During the conditioning step the atmosphere of the package is changed by inserting the gas comprising a predetermined amount of nitrogen so as to define a protective atmosphere for the cigarettes content. In addition or alternatively, the introduced gas may comprise a predetermined amount of oxygen, in particular in an amount such as to be subsequently completely absorbed by the absorbing means 51. The introduction of conditioning gas may provide, in addition or alternatively, the conditioning of the humidity level to a predetermined value and so as to ensure to maintain the organoleptic characteristics of the tobacco, by providing the supply of dry or humidified air in the machine. Changing the humidity level can possibly be implemented as a result of measurement of the atmospheric humidity and of the air composition in the plant and/or based on data extrapolated from destructive random sampling.

[0070] With reference to Figures 3 and 4, a second embodiment of the package 2 of cigarettes sealed and provided with means for the absorption of free oxygen, according to the present invention is illustrated.

[0071] What has been disclosed above for the package 1 is applicable, *mutatis mutandis,* to the package 2 wherein the only difference lies in the different configuration of the folds suited to define the envelope 12. In particular, a package 2 of the type illustrated in Figures 3 and 4 can be obtained by means of a packaging machine of the *"flowpack"* type, i.e. *"form-fill-seal".*

[0072] The heat-sealable sheet defining the envelope 12 is folded into a U about the group of cigarettes 112 and around the stiffening element 22 so that the folded sheet comprises two opposite open ends projecting respectively from the first and second sides of the group 112 of cigarettes, and consequently from the stiffening element 22.

[0073] The envelope 12 is sealed by coupling a first 312' and second 312" end portions of each of the first and second sides so as to be arranged opposite to each other and subsequently heat-sealing the first 312' and second 312" end portions to each other.

[0074] According to a third embodiment (not illustrated), the package may be of reclosable type.

[0075] What has been disclosed above for the packages 1 and 2 is applicable, *mutatis mutandis,* to said type of package wherein after the first access to the group of cigarettes by the user, the envelope may be re-closed several times to preserve the remaining contents.

[0076] The package of reclosable type further comprises an extraction opening for the cigarettes, and an adhesive closure panel superimposed in a movable manner on the envelope at the extraction opening. In particular, the extraction opening can be defined by the portion circumscribed by the same weakening line formed on the envelope, as previously described for the packages 1 and 2.

[0077] The closure panel is, therefore, movable between an open position, wherein it is at least partially

detached from the envelope allowing access to the extraction opening, and a closed position, wherein the closure panel is superimposed to the envelope closing the extraction opening.

[0078] In a package of the aforementioned type, of the type sealed until the first opening and subsequently reclosable and optionally resealable, the means for the absorption of free oxygen may be configured to operate even after a number of short openings of the package, so as to decrease at each reclosing the amount of oxygen introduced during the extraction of the cigarette.

[0079] The production of the aforementioned package of cigarettes of resealable type can, therefore, be carried out on the same packing machine previously described but provided with an additional labeling device. The latter is provided with suitable unwinding and cutting means able to unwind a tape of wrapping material which defines, with cuts at a predetermined pitch, the adhesive closure panel used for reclosing the package. The production and application of said panel is of known type and will not be further detailed.

[0080] The packages of cigarettes provided with means for the absorption of free oxygen according to the present invention and described above have numerous advantages.

[0081] In the first place, it is possible to obtain a reduction or elimination of free oxygen present in the package after the packaging of the same. Moreover, the presence of means for the absorption of oxygen allows to obtain packages with decreased amount or absence of oxygen without destining a considerable part of the wrapping process to waiting time due to atmosphere conditioning, as takes place in the current solutions of the known art.

[0082] In addition, in the case of reclosable packages, it is possible to reduce the amount of free oxygen after each reclosure of the package, reconstructing, therefore, an atmosphere with a reduced oxygen supply even after the first opening.

[0083] Finally, the packages of cigarettes provided with the means for oxygen absorption described above can be manufactured in simple and inexpensive manner, by making minor modifications to standard packing machines. The production of the package does not require, therefore, the use of special packing machines of considerable design and manufacturing costs and, above all, does not require expensive and complex plants for the generation of modified atmosphere.

Claims

1. A package (1; 2) of cigarettes, comprising:

a group (111; 112) of cigarettes;
a stiffening element (21; 22) at least partially superimposed on said group (111; 112) of cigarettes on two opposite first and second sides of said group (111; 112) of cigarettes;
a sealed envelope (11; 12) made from a sheet of heat-sealable type, said envelope (11; 12) enclosing said group (111; 112) of cigarettes and said stiffening element (21; 22);
said package (1; 2) is **characterized in that** it comprises: means (51) for the absorption of free oxygen arranged inside the sealed envelope (11; 12) together with said group (111; 112) of cigarettes to reduce the amount of free oxygen within said sealed envelope (11; 12); and
visual indicator means of the amount of oxygen able to change color based on the amount of free oxygen within said package (1; 2) ;

wherein said envelope (11; 12) has at least one transparent portion; and
wherein said visual indicator means are arranged in correspondence with the transparent portion for showing a default color when said absorbing means (51) decrease said free oxygen within said package (1; 2) by a predefined amount.

2. A package (1; 2) according to claim 1, wherein said envelope defines a chamber air-tight at atmospheric pressure containing said group (111; 112) of cigarettes and said absorbing means (51) and has a protective atmosphere with a predetermined level of humidity.

3. A package (1) according to claim 1 or 2, wherein said sheet of heat-sealable type is folded into a U about said group (111) of cigarettes and around said stiffening element (21) such that said folded sheet comprises two opposite open ends projecting respectively from said first and second sides, and wherein said envelope (11) is sealed by:

folding a first end portion (311') of each of said open ends respectively on said first and second sides and a second end portion (311") of each of said open ends respectively on said first end portions (311') and subsequently heat-sealing said first (311') and second (311") folded end portions to each other; or
coupling a first (312') and a second (312") end portions of each of said first and second sides so as to be arranged opposite to each other and subsequently heat-sealing said first (312') and second (312") end portions to each other.

4. A package according to one or more of claims from 1 to 3, wherein the envelope comprises:

an extraction opening for said cigarettes;
an adhesive closure panel superimposed in a movable manner on said envelope at said extraction opening,
wherein said closure panel is movable between

an open position,
wherein said closure panel is at least partially detached from said envelope allowing the access to said extraction opening, and
a closed position, wherein said closure panel is superimposed to said envelope closing said extraction opening.

5. A package (1; 2) according to one or more of claims from 1 to 4, wherein said means (51) for the absorption of oxygen are interposed between said stiffening element (21; 22) and said envelope (11; 12).

6. A package (1; 2) according to one or more of claims from 1 to 4, wherein said absorbing means consist of a coating on at least a portion of the inner surface of said envelope.

7. A package (1; 2) according to one or more of claims from 1 to 4, wherein said absorbing means consist of an adhesive absorbing panel coupled to said envelope or to said stiffening element.

8. A package (1; 2) according to one or more of claims from 1 to 4, wherein said absorbing means consist of a breathable bag (51) arranged alongside said group (111; 112) of cigarettes, and comprising powder or granules of material capable of absorbing said free oxygen.

9. A package (1; 2) according to one or more of claims from 1 to 4, wherein said absorbing means are integral with said stiffening element.

10. A package (1; 2) according to one or more of claims from 1 to 4, wherein said absorbing means are integral with the sheet of heat-sealable type forming the sealed envelope (11; 12).

11. A method of wrapping a package (1; 2) of cigarettes comprising the steps of:

forming a group (111; 112) of cigarettes;
superimposing a stiffening element (21; 22) at least partially around the two opposite first and second sides of said group (111; 112) of cigarettes;
defining a partly wrapped envelope (11; 12) by enclosing said group (111; 112) of cigarettes and said stiffening element (21; 22) with a sheet of heat-sealable type; and sealing said partly wrapped envelope (11; 12) to form a sealed envelope;
said method is **characterized in that** it comprises the steps of:

arranging means (51) for the absorption of free oxygen within the envelope (11; 12), together with said group (111; 112) of cigarettes before said step of sealing; and
arranging visual indicator means of the amount of oxygen able to change color based on the amount of free oxygen within said package (1; 2);

wherein said envelope (11; 12) has at least one transparent portion; and
wherein said visual indicator means are arranged in correspondence with the transparent portion for showing a default color when said absorbing means (51) decrease said free oxygen within said package (1; 2) by a predefined amount.

12. Method according to claim 11, wherein the step of sealing defines said envelope (11; 12) as a chamber air-tight at atmospheric pressure and containing said group (111; 112) of cigarettes,
wherein said step of coupling arranges said absorbing means (51) within said chamber, and
wherein said method comprises the step of conditioning the atmosphere of said chamber with an atmosphere provided with a predefined level of humidity.

13. Method according to claim 11 or 12, wherein the step of coupling said means (51) for the absorption of free oxygen with said package (1; 2) is made by coupling said absorbing means (51) to said stiffening element (21; 22) or to said heat-sealable sheet or to the tape of wrapping material able to define said stiffening element or said heat-sealable sheet.

Patentansprüche

1. Zigarettenpackung (1; 2), umfassend:

eine Gruppe (111; 112) von Zigaretten;
ein Versteifungselement (21; 22), das zumindest teilweise auf der Gruppe (111; 112) von Zigaretten an zwei gegenüberliegenden ersten und zweiten Seiten der Gruppe (111; 112) von Zigaretten überlagert ist; und
eine versiegelte Hülle (11; 12), die aus einer Folie vom heißsiegelbaren Typ hergestellt ist, wobei die Hülle (11; 12) die Gruppe (111; 112) von Zigaretten und das Versteifungselement (21; 22) umschließt; wobei

die Packung (1; 2) **dadurch gekennzeichnet ist, dass** sie umfasst:

Mittel (51) zur Absorption von freiem Sauerstoff, die zusammen mit der Gruppe (111; 112) von Zigaretten in der versiegelten Hülle (11; 12) an-

geordnet sind, um die Menge von freiem Sauerstoff in der versiegelten Hülle (11; 12) zu verringern; und
optische Anzeigemittel der Menge von Sauerstoff, die basierend auf der Menge von freiem Sauerstoff in der Packung (1; 2) befähigt sind, ihre Farbe zu ändern; wobei

die Hülle (11; 12) mindestens einen durchsichtigen Abschnitt besitzt; und wobei
die optischen Anzeigemittel in Übereinstimmung mit dem durchsichtigen Abschnitt angeordnet sind, um eine Standardfarbe zu zeigen, wenn die Absorptionsmittel (51) den freien Sauerstoff in der Packung (1; 2) um eine vorgegebene Menge verringern.

2. Packung (1; 2) nach Anspruch 1, wobei die Hülle eine bei atmosphärischem Druck luftdichte Kammer definiert, die die Gruppe (111; 112) von Zigaretten und die Absorptionsmittel (51) enthält, und eine Schutzatmosphäre mit einem vorgegebenen Luftfeuchtigkeitsniveau besitzt.

3. Packung (1) nach Anspruch 1 oder 2, wobei die Folie vom heißsiegelbaren Typ in ein U um die Gruppe (111) von Zigaretten und um das Versteifungselement (21) gefaltet ist, derart, dass die gefaltete Folie zwei gegenüberliegende offene Enden, die von der ersten bzw. der zweiten Seite vorstehen, umfasst, wobei
die Hülle (11) versiegelt ist durch
Falten eines ersten Endabschnittes (311') von jedem der offenen Enden auf die erste bzw. die zweite Seite und eines zweiten Endabschnittes (311") von jedem der offenen Enden entsprechend auf die ersten Endabschnitte (311') und anschließend Heißsiegeln des ersten (311') und des zweiten (311") gefalteten Endabschnittes miteinander; oder
Koppeln eines ersten (312') und eines zweiten (312") Endabschnittes sowohl von der ersten als auch von der zweiten Seite so, dass sie einander gegenüber angeordnet sind, und anschließend Heißsiegeln des ersten (312') und des zweiten (312") Endabschnittes miteinander.

4. Packung nach einem oder mehreren der Ansprüche 1 bis 3, wobei die Hülle umfasst:

eine Entnahmeöffnung für die Zigaretten;
ein Haftverschlussfeld, das in einer beweglichen Weise bei der Entnahmeöffnung über die Hülle gelagert ist, wobei
das Haftverschlussfeld zwischen einer offenen Position, in der das Haftverschlussfeld von der Hülle mindestens teilweise getrennt ist, um den Zugang zur Entnahmeöffnung zu ermöglichen, und einer geschlossenen Position, in der das Haftverschlussfeld über die Hülle gelagert ist, um die Entnahmeöffnung zu verschließen, beweglich ist.

5. Packung (1; 2) nach einem oder mehreren der Ansprüche 1 bis 4, wobei die Mittel (51) zur Absorption von Sauerstoff zwischen dem Versteifungselement (21; 22) und der Hülle (11; 12) angeordnet sind.

6. Packung (1; 2) nach einem oder mehreren der Ansprüche 1 bis 4, wobei die Absorptionsmittel aus einer Beschichtung auf mindestens einem Abschnitt der Innenfläche der Hülle bestehen.

7. Packung (1; 2) nach einem oder mehreren der Ansprüche 1 bis 4, wobei die Absorptionsmittel aus einem Haftabsorptionsfeld, das an die Hülle oder an das Versteifungselement gekoppelt ist, bestehen.

8. Packung (1; 2) nach einem oder mehreren der Ansprüche 1 bis 4, wobei die Absorptionsmittel aus einer luftdurchlässigen Tasche (51), die längsseits der Gruppe (111; 112) von Zigaretten angeordnet ist und ein Pulver oder Granulate eines Materials, das freien Sauerstoff absorbieren kann, enthält, bestehen.

9. Packung (1; 2) nach einem oder mehreren der Ansprüche 1 bis 4, wobei die Absorptionsmittel mit dem Versteifungselement einstückig sind.

10. Packung (1; 2) nach einem oder mehreren der Ansprüche 1 bis 4, wobei die Absorptionsmittel mit der Folie des heißsiegelbaren Typs, die die versiegelte Hülle (11; 12) bildet, einstückig sind.

11. Verfahren zum Verpacken einer Packung (1; 2) von Zigaretten, das die Schritte umfasst:

Bilden einer Gruppe (111; 112) von Zigaretten;
Überlagern eines Versteifungselementes (21; 22) mindestens teilweise um die zwei gegenüberliegenden ersten und zweiten Seiten der Gruppe (111; 112) von Zigaretten;
Definieren einer teilweise verpackten Hülle (11; 12) durch Umschließen der Gruppe (111; 112) von Zigaretten und des Versteifungselementes (21; 22) mit einer Folie vom heißsiegelbaren Typ; und
Versiegeln der teilweise verpackten Hülle (11; 12), um eine versiegelte Hülle zu bilden; wobei

das Verfahren **dadurch gekennzeichnet ist, dass** es die Schritte umfasst:

Anordnen von Mitteln (51) zur Absorption von freiem Sauerstoff in der Hülle (11; 12) zusammen mit der Gruppe (111; 112) von Zigaretten vor dem Schritt des Versiegelns und
Anordnen von optischen Anzeigemitteln der

Menge von Sauerstoff, die basierend auf der Menge von freiem Sauerstoff in der Packung (1; 2) befähigt sind ihre Farbe zu ändern; wobei die Hülle (11; 12) mindestens einen durchsichtigen Abschnitt besitzt; und wobei die optischen Anzeigemittel in Übereinstimmung mit dem durchsichtigen Abschnitt angeordnet sind, um eine Standardfarbe zu zeigen, wenn die Absorptionsmittel (51) den freien Sauerstoff in der Packung (1; 2) um eine vorgegebene Menge verringern.

12. Verfahren nach Anspruch 11, wobei der Schritt des Versiegelns die Hülle (11; 12) als eine Kammer definiert, die bei atmosphärischem Druck luftdicht ist und die Gruppe (111; 112) von Zigaretten enthält, wobei der Schritt des Koppelns die Absorptionsmittel (51) in der Kammer anordnet und wobei das Verfahren den Schritt des Konditionierens der Atmosphäre der Kammer mit einer Atmosphäre, die mit einem vorgegebenen Luftfeuchtigkeitsniveau versehen ist, umfasst.

13. Verfahren nach Anspruch 11 oder 12, wobei der Schritt des Koppelns des Mittels (51) zur Absorption von freiem Sauerstoff mit der Packung (1; 2) durch Koppeln des Absorptionsmittels (51) an das Versteifungselement (21; 22) oder an die heißsiegelbare Folie oder an das Band von Verpackungsmaterial, das befähigt ist das Versteifungselement oder die heißsiegelbare Folie zu definieren, geschaffen wird.

Revendications

1. Paquet (1 ; 2) de cigarettes, comprenant :

un groupe (111 ; 112) de cigarettes ;
un élément raidisseur (21 ; 22) au moins partiellement superposé audit groupe (111 ; 112) de cigarettes sur deux premier et deuxième côtés opposés dudit groupe (111 ; 112) de cigarettes ;
une enveloppe soudée (11 ; 12) constituée d'une feuille de type thermosoudable, ladite enveloppe (11 ; 12) enfermant ledit groupe (111 ; 112) de cigarettes et ledit élément raidisseur (21 ; 22) :

ledit paquet (1 ; 2) est **caractérisé en ce qu'**il comprend :

des moyens (51) pour l'absorption d'oxygène libre agencés à l'intérieur de l'enveloppe soudée (11 ; 12) conjointement audit groupe (111 ; 112) de cigarettes afin de réduire la quantité d'oxygène libre au sein de ladite enveloppe soudée (11 ; 12) ; et
des moyens indicateurs visuels de la quantité d'oxygène aptes à changer de couleur sur la base de la quantité d'oxygène libre au sein dudit paquet (1 ; 2) ;

ladite enveloppe (11 ; 12) comportant au moins une partie transparente ; et
lesdits moyens indicateurs visuels étant agencés en correspondance de la partie transparente pour indiquer une couleur par défaut lorsque lesdits moyens d'absorption (51) diminuent ledit oxygène libre au sein dudit paquet (1 ; 2) d'une quantité prédéfinie.

2. Paquet (1 ; 2) selon la revendication 1, dans lequel ladite enveloppe définit une chambre étanche à l'air à une pression atmosphérique contenant ledit groupe (111 ; 112) de cigarettes et lesdits moyens d'absorption (51) et a une atmosphère protectrice avec un degré d'humidité prédéfini.

3. Paquet (1) selon la revendication 1 ou 2, dans lequel ladite feuille de type thermosoudable est pliée en un U autour dudit groupe (111) de cigarettes et autour dudit élément raidisseur (21) de manière que ladite feuille pliée comprenne deux extrémités ouvertes opposées faisant saillie respectivement depuis lesdits premier et deuxième côtés, et
ladite enveloppe (11) étant soudée en :

pliant une première partie d'extrémité (311') de chacune desdites extrémités ouvertes respectivement sur lesdits premier et deuxième côtés et une deuxième partie d'extrémité (311") de chacune desdites extrémités ouvertes respectivement sur lesdites premières parties d'extrémité (311") puis en thermosoudant lesdites première (311') et deuxième (311") parties d'extrémité pliées l'une à l'autre ; ou
en accouplant une première (312') et une deuxième (312") partie d'extrémité de chacun desdits premier et deuxième côtés de manière qu'elles soient agencées à l'opposé l'une de l'autre puis en thermosoudant lesdites première (312') et deuxième (312") parties d'extrémité l'une à l'autre.

4. Paquet selon l'une ou plusieurs des revendications 1 à 3, dans lequel l'enveloppe comprend :

une ouverture d'extraction pour lesdites cigarettes ;
un panneau de fermeture adhésif superposé de manière mobile sur ladite enveloppe au niveau de ladite ouverture d'extraction,
ledit panneau de fermeture étant mobile entre

une position ouverte, dans laquelle ledit panneau de fermeture est, au moins en partie, détaché de ladite enveloppe, permettant d'accéder à ladite ouverture d'extraction, et une position fermée, dans laquelle ledit panneau de fermeture est superposé à ladite enveloppe fermant ladite ouverture d'extraction.

5. Paquet (1 ; 2) selon une ou plusieurs des revendications 1 à 4, dans lequel lesdits moyens (51) pour l'absorption d'oxygène sont intercalés entre ledit élément raidisseur (21 ; 22) et ladite enveloppe (11 ; 12).

6. Paquet (1 ; 2) selon une ou plusieurs des revendications 1 à 4, dans lequel lesdits moyens d'absorption consistent en un revêtement sur au moins une partie de la surface interne de ladite enveloppe.

7. Paquet (1 ; 2) selon une ou plusieurs des revendications 1 à 4, dans lequel lesdits moyens d'absorption consistent en un panneau d'absorption adhésif accouplé à ladite enveloppe ou audit élément raidisseur.

8. Paquet (1 ; 2) selon une ou plusieurs des revendications 1 à 4, dans lequel lesdits moyens d'absorption consistent en un sachet respirant (51) agencé le long dudit groupe (111 ; 112) de cigarettes, et comprenant de la poudre ou des granules de matière apte à absorber ledit oxygène libre.

9. Paquet (1 ; 2) selon une ou plusieurs des revendications 1 à 4, dans lequel lesdits moyens d'absorption sont d'un seul tenant avec ledit élément raidisseur.

10. Paquet (1 ; 2) selon une ou plusieurs des revendications 1 à 4, dans lequel lesdits moyens d'absorption sont d'un seul tenant avec la feuille de type thermosoudable formant l'enveloppe soudée (11 ; 12).

11. Procédé de conditionnement d'un paquet (1 ; 2) de cigarettes comprenant les étapes consistant à :

former un groupe (111 ; 112) de cigarettes ;
superposer un élément raidisseur (21 ; 22) au moins partiellement autour des deux premier et deuxième côtés opposés dudit groupe (111 ; 112) de cigarettes ;
définir une enveloppe partiellement conditionnée (11 ; 12) en enfermant ledit groupe (111 ; 112) de cigarettes et ledit élément raidisseur (21 ; 22) avec une feuille de type thermosoudable ; et
souder ladite enveloppe partiellement conditionnée (11 ; 12) afin de former une enveloppe soudée ;

ledit procédé est **caractérisé en ce qu'**il comprend les étapes consistant à :

agencer des moyens (51) pour l'absorption d'oxygène libre au sein de l'enveloppe (11 ; 12), conjointement audit groupe (111 ; 112) de cigarettes avant ladite étape de soudage ; et
agencer des moyens indicateurs visuels de la quantité d'oxygène aptes à changer de couleur sur la base de la quantité d'oxygène libre au sein dudit paquet (1 ; 2) ;
ladite enveloppe (11 ; 12) comportant au moins une partie transparente ; et
lesdits moyens indicateurs visuels étant agencés en correspondance de la partie transparente pour indiquer une couleur par défaut lorsque lesdits moyens d'absorption (51) diminuent ledit oxygène libre au sein dudit paquet (1 ; 2) d'une quantité prédéfinie.

12. Procédé selon la revendication 11, dans lequel l'étape de soudage définit ladite enveloppe (11 ; 12) en tant que chambre étanche à l'air à la pression atmosphérique et contenant ledit groupe (111 ; 112) de cigarettes,
ladite étape d'accouplement agençant lesdits moyens d'absorption (51) au sein de ladite chambre, et
ledit procédé comprenant l'étape de conditionnement de l'atmosphère de ladite chambre avec une atmosphère pourvue d'un degré d'humidité prédéfini.

13. Procédé selon la revendication 11 ou 12, dans lequel l'étape d'accouplement desdits moyens (51) pour l'absorption d'oxygène libre avec ledit paquet (1 ; 2) est réalisée en accouplant lesdits moyens d'absorption (51) audit élément raidisseur (21 ; 22) ou à ladite feuille de type thermosoudable ou au ruban de matériau de conditionnement apte à définir ledit élément raidisseur ou à ladite feuille thermosoudable.

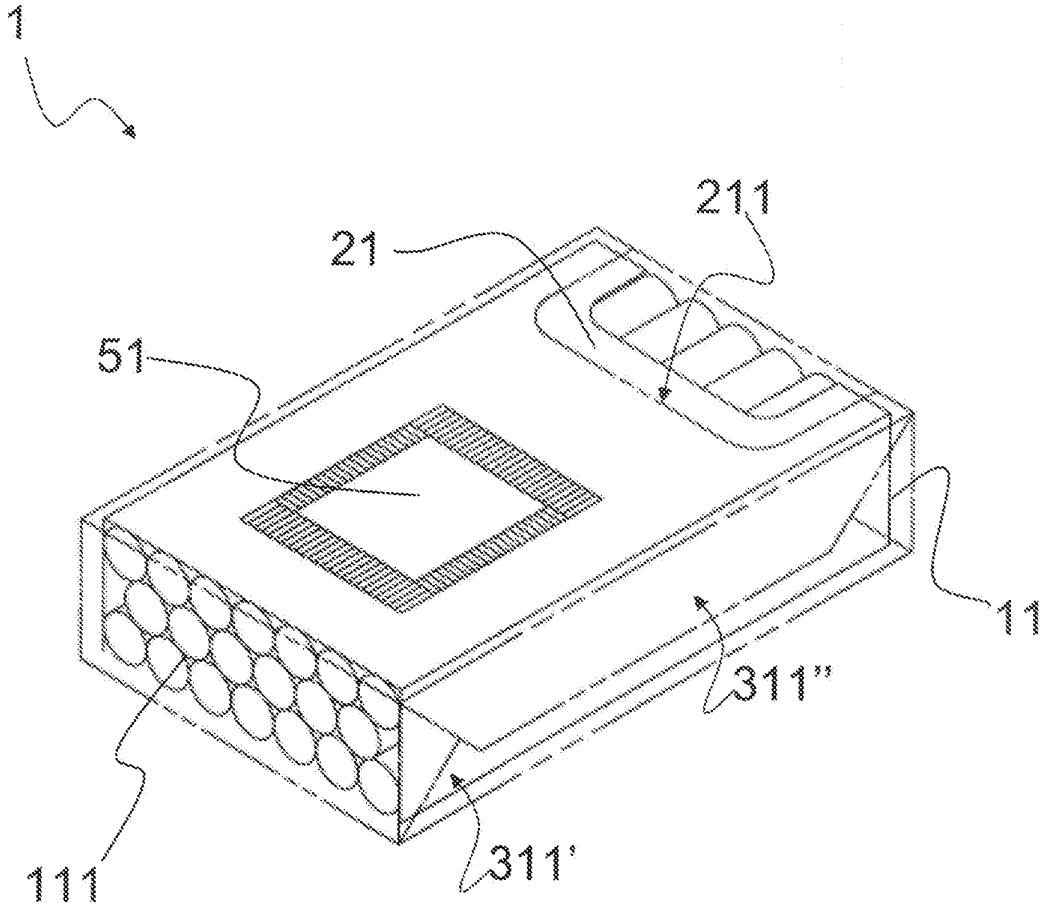

FIG. 1

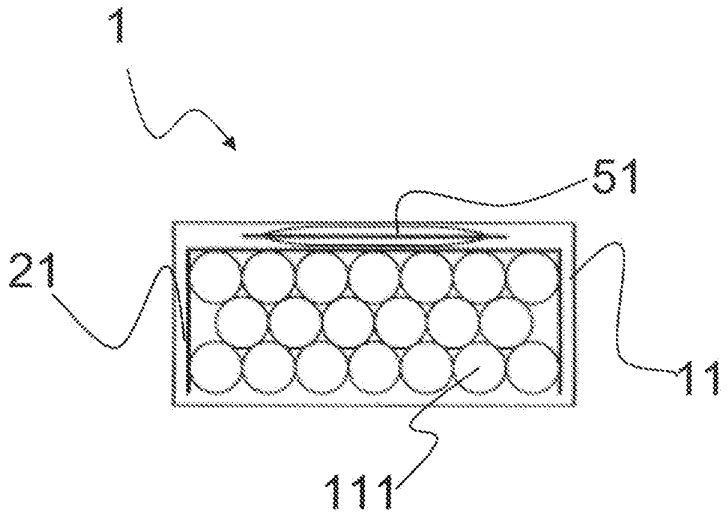

FIG. 2

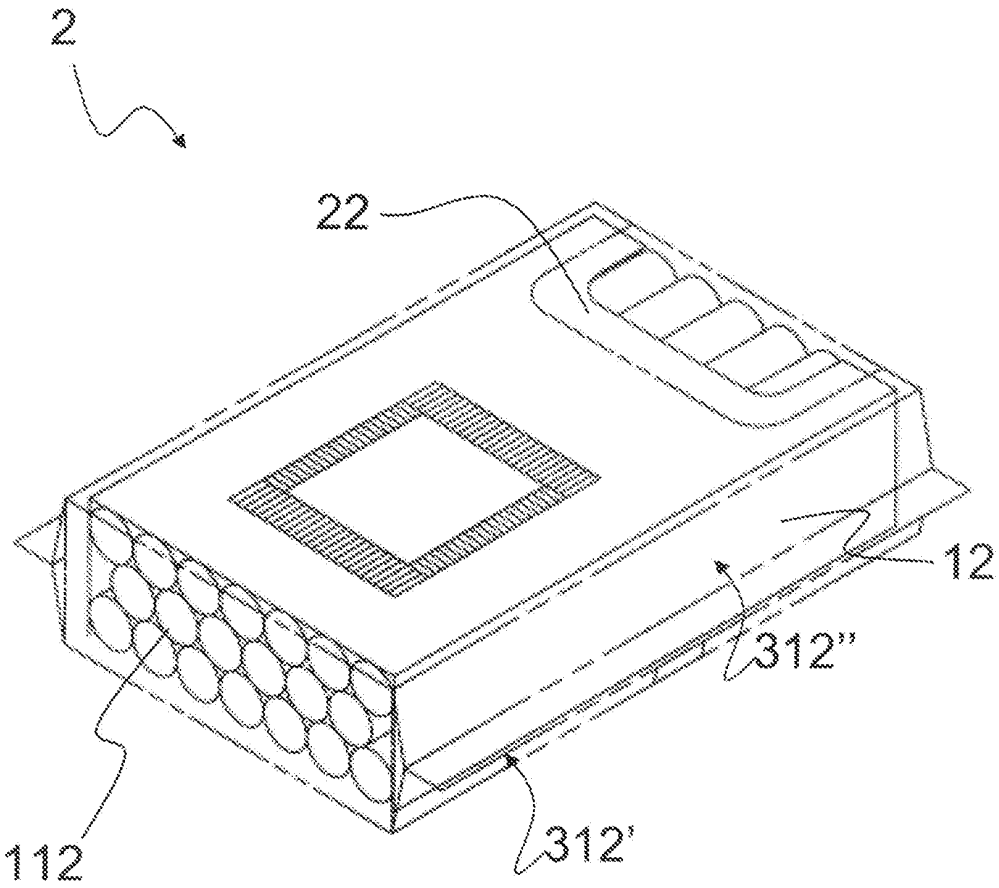

FIG. 3

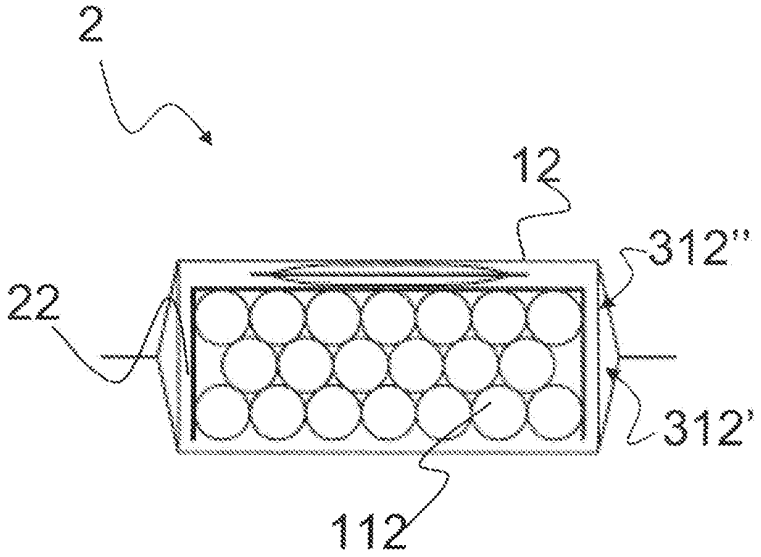

FIG. 4

REFERENCES CITED IN THE DESCRIPTION

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