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(54) **HANDLE FOR BOXES WITH A DETAIL IN ELASTIC PAPER MATERIAL**

(57) A handle for boxes is provided, which has a detail in elastic paper material, comprising two sheets (2, 3) of Kraft paper that are overlapped and joined to each other in which at least one of the two sheets has an opening (4) from which a strip (5) of elastic paper material protrudes, in which the strip (5) is locked at its ends (5a) between the two sheets (2, 3) of paper that are over-

lapped and joined, and is composed of a plurality of single sheets (6) of elastic paper material laminated or otherwise joined the one on top of the other to achieve a basis weight of more than 300 g/m², and in which the elongation of each of the single sheets (6) of elastic paper material in the processing direction and in the direction perpendicular to it is greater than 9%.

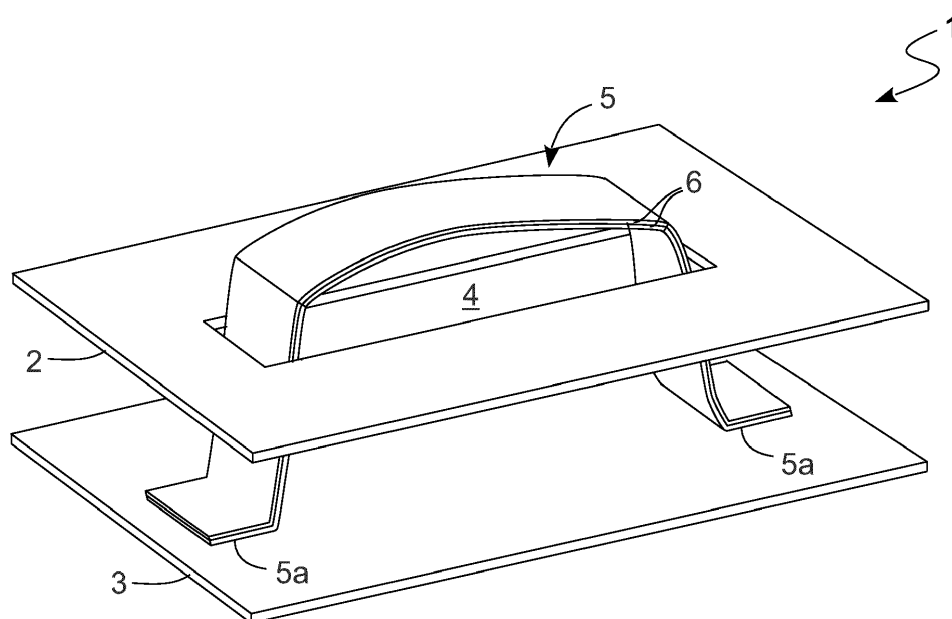


Fig. 1

Description

[0001] This invention relates to a handle for boxes that has a detail in elastic paper material, in which said elastic paper detail is a strip between two sheets forming the handle, where the latter is applied to said box, where the paper material forming the strip is of the type better described in claim 1.

[0002] Today, in the invention's reference sector, i.e. the production of handles for boxes used in the retail trade of any goods, said handles usually have a flat portion that is joined to the box by different means (often by gluing) and an element or detail that protrudes from the handle as needed: said strip that is grasped by the user to carry the whole box. In the context of this invention, reference will be made to a handle with a structure (Fig. 1 and 2) that is very similar to the one disclosed in the European patent EP2927146 B1, which is owned by the same applicant, but which, compared to the technology disclosed in the above-mentioned patent, will differ in the materials used to produce the handle strip applied to a box used for the retail trade of any goods.

[0003] Again, in the European patent EP3385442 B1, owned by BillerudKorsnas AB, a method for producing an elastic paper material is illustrated. This patent, in addition to not defining a specific use, provides a final product that is not suitable for the purpose, mainly due to its low basis weight (50-250 g/m²) that entails a tensile breaking load that is inadequate for application in the above-mentioned reference sector.

[0004] However, apart from the structure and production of the finished handle, in the box handle field, it is well known that the strips, the part of the handle that is used to carry the box, in use in the prior art have a number of drawbacks, which urgently need overcoming.

[0005] In this regard, they are often composed of polymer or organic materials (fabrics) precisely because of the high resistance to breakage that these small details (strips) must guarantee even with large weights for their size. This places eco-sustainability at the forefront of this packaging's problems (where often the body of the packaging is made of paper/cardboard), where, in addition to using heterogeneous materials glued or firmly joined to each other (and therefore difficult if not impossible to dispose of separately), they use polluting products (plastics) or products that are not very, if at all, recyclable (treated cottons) to produce the strip detail. Again, pursuing the issue of packaging eco-sustainability, one could think of using paper or cardboard to produce the strips of said handles for said boxes; however, paper or cardboard, while properly recyclable and made of the same material as the packaging, would not provide the strength that said handles need, so that said solution is unsuitable for the purpose.

[0006] Again with reference to the most common materials with which the strips of said handles are now produced (polymer materials or organic materials (fabrics)), they are not very adaptable to a change of requirements

due to a change of packaging or material. In this sense, the sizing of the plastic or fabric parts forming the strip would need to be reformulated and, also, it could change the handle manufacturing process (flat portions plus strip) in case of a substantial change in the size of the elements of the strip itself.

[0007] In this situation, the technical task underlying this invention is to provide a handle for boxes that has a detail in elastic paper material, in which said elastic paper detail is a strip with a higher strength than the other market alternatives.

[0008] Another purpose of this invention is to provide a paper material strip that can be more easily disposed of and recycled together with a paper or cardboard box or packaging to which said strip is applied.

[0009] In addition, another purpose of this invention is to provide a paper material strip that can be more flexible and adaptable to different applications (i.e. applications on different boxes with different weights).

[0010] The technical problem and specified purposes are achieved with a box handle with an elastic paper material detail, where said detail is a strip, which is held in place by the other elements of the handle.

[0011] In addition, said strip is preferably composed of an elastic paper material consisting of a plurality of single sheets of paper material laminated or otherwise joined to each other.

[0012] Even more preferably, said strip is composed of an elastic paper material consisting of a plurality of single sheets of elastic paper material where the final product, consisting of a plurality of single overlapping sheets, has a certain basis weight. Even more preferably, said strip is composed of an elastic paper material consisting of a plurality of single sheets of elastic paper material where each sheet of elastic paper material has a minimum elongation under stress of 9% compared to the resting position.

[0013] More preferably, said strip is composed of an elastic paper material produced from a special mixture of fibrous pulp and cationic starching agents.

[0014] The technical task and specified purposes are achieved with a box handle with a detail in elastic paper material as claimed in the appended claim 1.

[0015] Preferred technical solutions are set forth in the dependent claims.

[0016] The features and advantages of the invention will be apparent from the detailed description of preferred embodiments of the invention, with reference to the accompanying drawings, in which:

Fig. 1 shows a perspective, exploded view of the handle in which the components forming it are visible.

[0017] In this document, the measures, values, shapes and geometric references (such as perpendicularity and parallelism), when used with words like "about" or other similar terms such as "approximately" or "substantially", are to be understood as except for measurement errors or inaccuracies due to production and/or manufacturing errors and, above all, except for a slight divergence from

the value, measure, shape or geometric reference with which it is associated. For example, if associated with a value, such terms preferably indicate a divergence of no more than 10% from the value itself.

[0018] Furthermore, when terms such as "first", "second", "upper", "lower", "main" and "secondary" are used, they do not necessarily identify an order, relationship priority or relative position, but they can simply be used to distinguish different components more clearly from one another.

[0019] Unless otherwise stated, the measurements and data reported in this text shall be considered as performed in International Standard Atmosphere ICAO (ISO 2533:1975).

[0020] With reference to the figures, the reference number 1 globally denotes the box handle with a detail in elastic paper material according to the invention.

[0021] Though not shown in Figure 1, at the base of a handle 1, there is a box to which the handle 1 is applied by gluing one face of a sheet 3 to said box. Said handle 1 is, overall, composed of two sheets 2, 3 in which there is an opening 4 on at least one sheet 2 from which a strip 5 can protrude, to be grasped by a user who wants to carry the box. The strip 5 is locked at its ends 5a between the two sheets 2 and 3, glued together, to form a single handle element 1 applied to a box.

[0022] The two sheets 2, 3, which are components of the handle 1, can be made of different materials. In the preferred embodiment of this invention, said sheets 2, 3 are composed of Kraft paper (paper from the Kraft or sulfate process).

[0023] Surprisingly, it has been found that treated Kraft paper, like that illustrated below, in possession of good elasticity and the appropriate basis weight can withstand significant weights if used as a strip 5 for the handle 1 of a box. "Appropriate basis weight" needs to be specified since commercially produced Kraft paper, with good elasticity, usually has a basis weight of between 80 and 130 g/m². In fact, in the preferred embodiment of the invention, the strip 5 has more than two sheets 6 laminated or otherwise joined together, sheets 6 made from treated Kraft paper that will be illustrated below.

[0024] In addition, commercially produced Kraft paper, though robust, does not have the features of flexibility and elongation that are necessary to withstand and carry weights.

[0025] Every paper industry expert is familiar with the pulp production process called the Kraft process. Said process is also known as the sulfate process. The product resulting from this process is the so-called cellulose pulp or Kraft pulp. In the preferred embodiment, Kraft pulp is used since it instils the precisely processed finished product with high levels of tensile breaking load (i.e. in this case, the sheet 6 made of elastic paper material).

[0026] Different processes, and subsequent processing, of Kraft pulp are also known, which enable the production of paper sheets, including paper sheets with peculiar features, deriving from particular processing. In

short, the pulp is taken to the paper machine that manufactures the sheet. This machine is divided into two parts: the felting area, where the slurry loses water and the wet sheet is formed; and the drying area, where the sheet is dried, additionally smoothed, and rolled on a reel. Depending on the processing of the semi-finished product, a processing direction and a perpendicular direction may be defined on the sheet of paper produced. Some properties can be defined on these directions; these properties are different in the two directions since they are basically, usually anisotropic features. For example, the elongation, defined according to the ISO 1924-3 standard, is one of those properties that can be improved in the processing direction and in the perpendicular direction with the appropriate processing. In the preferred embodiment of this invention, the single sheet 6 that will form the strip 5 has an elongation equal to or above 9% under stress compared to the rest position.

[0027] Within the scope of this invention, only the key processing steps needed to obtain an elastic paper material suitable for the application mentioned above will be defined.

[0028] The processes that, starting from the Kraft pulp, lead to the production of a sheet 6 of elastic paper material can be summarised thus: a first step, where a refiner reduces the small pieces present in the Kraft pulp into smaller portions; a second, forming step (for example a thread-forming step) in the flow box, where the pulp fibres start to align along the machine direction giving the paper sheet its typical, mechanical property anisotropy; a third, pressing step, which may include wet and dry presses; and the last two steps involving the calendering and winding of the dry sheet, which complete the production of the sheet of elastic paper material around a reel.

[0029] In the preferred embodiment, the refining process is a high consistency refining of the fibres (HC refining) process. It has been found that this type of refining increases the possible elongation of the sheet 6, including in the direction perpendicular to the processing, providing the material with greater strength, including when the user grips the strip 5 to carry it.

[0030] In the preferred embodiment, the Kraft pulp introduced in this processing is preferably a soft/resinous wood pulp. Even more preferably, the composition in dry weight of the pulp is more than 90% soft/resinous wood pulp. This type of selection makes it possible to additionally improve the mechanical properties of the finished product, since this type of wood is formed from longer fibres and enables the production of a stronger paper.

[0031] In the preferred embodiment, the semi-finished elastic paper material is subject to the calendering process while it is still in a state with a high content of water, for example, a water content above 20%.

[0032] In the preferred embodiment, the starting pulp is Kraft pulp, in which the starching agent used is a cationic agent. More preferably, in the embodiment of this invention, said cationic agent is a cationic starching agent chosen from the following: aluminium sulphate,

polyamines, or a basic compound based on aluminium chloride (aluminium chlorohydrate).

[0033] Again, in a preferred embodiment of the invention, at least one step of the manufacturing is performed in a Clupak unit. The step in the Clupak unit increases the elongation capacity of the sheet 6 in elastic paper material in the processing direction.

[0034] The products, sheets 6 of elastic paper material, obtained with similar methods, designed as mentioned above to provide elastic, elongation, and tensile strength capacities, possess, as already discussed, basis weights similar to normal use sheets, approximately 100 g/m², which implies that said properties remain inapplicable to sectors where the load applied to the handle 1 is a heavy load for these sheets of material.

[0035] It is therefore necessary, for the application of a material that makes it possible to achieve the purposes of this invention, to additionally modify these sheets 6 of elastic paper material. One type of processing for modifying said sheets 6 is lamination, or the creation of a firm and stable connection through mechanical connections or gluing, of two or more sheets 6 of elastic paper material described above in order to achieve the tensile strength required by the specific application to box handles for carrying any goods. The implementation of this last step in the processing, starting from the single sheets 6 of elastic paper material, makes it possible to ensure the product is highly flexible in its use, being able in any case to increase the thickness of the strip 5 by joining several sheets 6 together, if the handle is applied to a box of different sizes or carrying different materials (i.e. heavier) without having to change the technology used or the shape or structure of the handle 1 where the strip 5 is inserted.

[0036] It should be noted that only a few preferred embodiments have been described and illustrated here, but that numerous variants, additions, modifications, and/or different combinations of the individual elements can be made, without deviating from the general innovative concept, nor going beyond its scope of protection, as is also apparent from the dependent claims.

[0037] The box handle with a detail in elastic paper material 1 according to the invention achieves important advantages.

[0038] In fact, the above-described handle 1 provides the handle detail for a box, used in the retail trade for any goods, with greater resistance to breakage.

[0039] In addition, it provides an environmentally sustainable alternative to the solutions currently on the market.

[0040] In conclusion, the handle 1 is made of an extremely flexible material from the point of view of its application to different packaging or boxes.

[0041] The invention is susceptible to variations falling within the scope of the inventive concept defined by the claims.

[0042] In this context, all details can be replaced by equivalent elements, and the materials, shapes, and di-

mensions may be any materials, shapes, and dimensions.

5 Claims

1. A handle (1) for boxes with a detail in elastic paper material comprising

- two sheets (2, 3) of Kraft paper that are overlapped and joined to each other in which at least one of said two sheets has an opening (4) from which a strip (5) of elastic paper material protrudes,
- said strip (5) being locked at its ends (5a) between said two sheets (2, 3) of paper that are overlapped and joined,

and said handle (1) being **characterized in that**

- said strip (5) of elastic paper material is composed of a plurality of single sheets (6) of elastic paper material laminated or otherwise joined the one on top of the other to achieve a basis weight of more than 300 g/m², and
 - the elongation of each of said single sheets (6) of elastic paper material in the processing direction and in the direction perpendicular to it is greater than 9%.
2. The handle (1) for boxes with a detail in elastic paper material according to claim 1, wherein said single sheets (6) of elastic paper material are manufactured using a Kraft pulp, produced using a soft/resinous wood pulp and a starching agent.
3. The handle (1) for boxes with a detail in elastic paper material according to claims 1 and 2, wherein the starching agent used in the manufacture of the single sheet (6) of elastic paper material is a cationic starching agent selected from: aluminium sulphate, polyamines, or a basic compound based on aluminium chloride (aluminium chlorohydrate).
4. The handle (1) for boxes with a detail in elastic paper material according to claims 1 and 2, wherein the initial pulp mixture is composed of more than 90% soft/resinous wood pulp.
5. The handle (1) for boxes with a detail in elastic paper material according to claim 1, wherein at least one step in the manufacturing of the single sheet (6) of elastic paper material is carried out in a Clupak unit.
6. The handle (1) for boxes with a detail in elastic paper material according to claim 1, wherein at least one step in the manufacturing of a single sheet (6) of elastic paper material consists of a high moisture

calendering process.

7. The handle (1) for boxes with a detail in elastic paper material according to claim 1, wherein at least one step in the manufacturing of the single sheet (6) of elastic paper material consists in a high consistency refining of the fibres.

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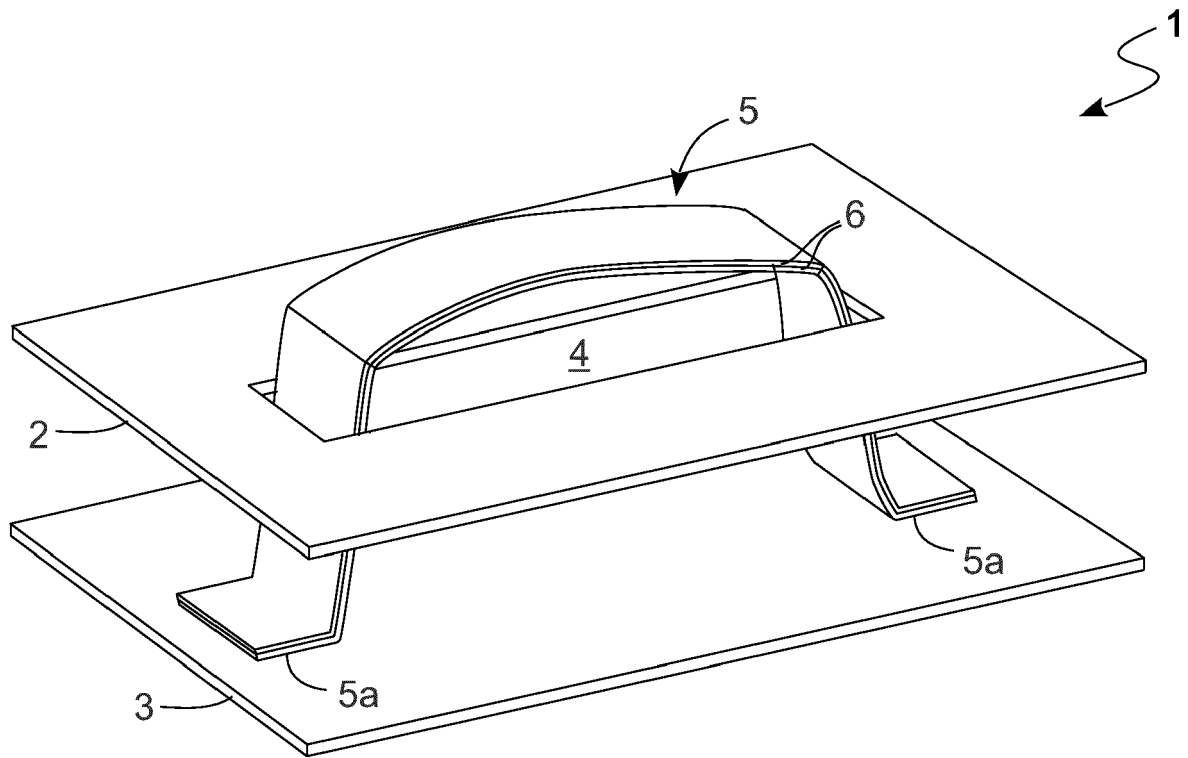


Fig. 1



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Application Number
EP 20 19 5322

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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