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(54) **CLOSING SHEET FOR WOUND PRODUCTS, MANUFACTURING METHOD FOR SAME AND MACHINE THAT EXECUTES SAID METHOD**

(57) The present invention relates to a closing sheet for wound products created from a recycled paper support with a hydrophobic varnish for preventing the curving caused by the short fibres of the recycled paper from which the support is made. The manufacturing method that allows obtaining said sheet involves a continuous

execution of the longitudinal cutting of the original roll, along the width of the sheet, and placing the tearing strip without rewinding between said two steps. The present invention also defines the machine that executes the aforementioned method.

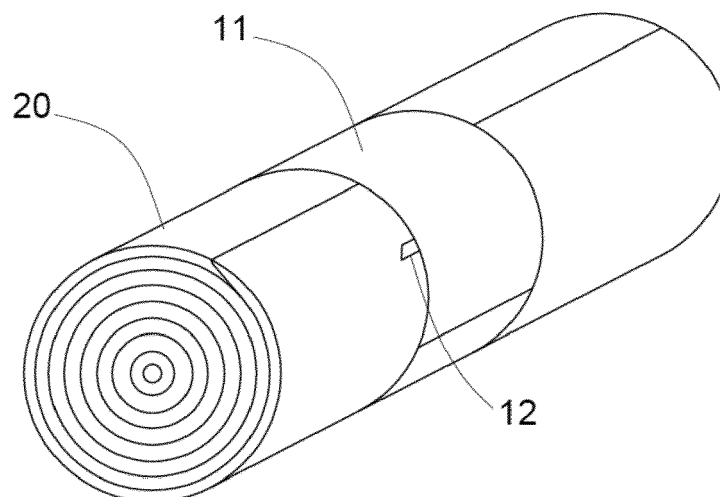


Fig. 2

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Description

[0001] The present invention relates to a closing sheet for wound products, such as those corresponding to rolls of trash bags, which allows keeping the winding together and comprise an opening system for removing said products.

[0002] The present invention also relates to a method for manufacturing said closing sheet as well as to the machine that executes said method.

Background of the invention

[0003] To close wound products, such as trash bag rolls, a sheet is normally used that surrounds said roll and closes on itself, preventing the winding from becoming undone until the final user decides to open the assembly.

[0004] Several methods can be used to open the assembly, generally by removing the end of the sheet that was closed on itself, or by a microperforation made to break a strip or line in the closing sheet, or by providing auxiliary strips for tearing the sheet.

[0005] The production methods for these systems that allow opening the assembly by undoing the union to the closing sheet may require installing additional opening elements, such as the auxiliary tearing strips, and involve at least two discontinuous steps, starting with the original roll on which the division must be made into several rolls cut to the specific width of the closing sheet. These steps are, on one hand, cutting the original roll into several rolls with a smaller width corresponding to the final width of the closing sheet, winding the newly obtained rolls again, and on the other hand fitting the auxiliary self-adhesive tearing strip, again winding the assembly.

[0006] These two discontinuous steps mean that tension problems must be considered in both processes and require different machines so that material must be transferred from one machine to the other.

[0007] Moreover, the manufacture of said closing sheets use conventional non-recycled and non-biodegradable materials, to allow obtaining high planimetry sheets, non-curved, that can be applied to a considerable width sheet and without necessarily involving a risk of curving of the material and therefore preventing problems in the final application.

Description of the invention

[0008] The aim of the present invention is to provide a closing sheet for a wound product, as well as a manufacturing method thereof, that solve the aforementioned drawbacks, with additional advantages as described below.

[0009] According to this aim, in a first aspect thereof, the present invention provides a closing sheet for wound products of the type fitted around said wound products and closed on itself, having at least one tearing strip

transverse to the direction in which the closing sheet is arranged around the wound products.

[0010] When defining the tearing strip as a strip arranged in a transverse direction, it should be considered that the strip is placed such that it cuts the width of the closing sheet; accordingly, a general terminology is used of a transverse arrangement of the strip with respect to the direction in which the closing sheet is wound, which is generally considered as a longitudinal direction. The terminology used of a "transverse" arrangement of the tearing strip includes any arrangement of said tearing strip in which the continuity of the sheet is broken in the direction in which said sheet is wound around the wound product.

[0011] This invention is characterised in that the closing sheet comprises a support that comprises a composition of recycled paper or recycled paper and biodegradable material, with said materials representing at least 75% of the total material of the support, wherein the paper support comprises at least one coating of a hydrophobic varnish on one of its faces.

[0012] When the present description refers to recycled paper, this refers to the composition of the support, including the specified percentage of paper formed by a paper recovery method, shredding and converting same to paper mass and then forming the specified substrate. The specified percentage of recycle paper greater than 75% is determined considering that at least 75% is obtained from recycled sources and allows obtaining a sufficient recycled majority of the composition out of all the material used to form the support.

[0013] Reference in the present description to recycled and biodegradable paper means, in addition to the aforementioned considerations regarding recycled paper, to the formation of the support including the specified percentage of paper made from raw material with a decomposition process into natural chemical elements, as per standard EN13432-2000.

[0014] The specified configuration allows obtaining a product made from recycled material or recycled and biodegradable material, with the resulting advantage of re-use of recycled materials and decomposition into natural elements. Said use of recycled paper material or recycled and biodegradable paper material has the drawback in the present application of making closing sheets that the paper support curves due to the short length of the fibres that make up said support made from recycled paper, as in the paper recycling process these fibres are shortened by the shredding of the recycled paper.

[0015] Advantageously, the use of a hydrophobic varnish allows obtaining a considerably higher planimetry of the support of the sheet, increasing the flatness of the width of the support having said hydrophobic varnish compared to the more curved disposition of the width of the support without said hydrophobic varnish.

[0016] This application of a hydrophobic varnish, water-repellent, allows increasing the flatness by more than 50% with respect to the curvature created at the width of

the support; the curving of the width is corrected by this percentage for nominal sheet widths of 6 to 19 cm. Said application of hydrophobic varnish increases the surface tension created by the coating layer of said varnish and thereby increases the tension in the fibres that make up the support of the sheet, preventing its curving.

[0017] The percentage increase in planimetry is calculated by comparing the nominal width of the sheet and the actual width without any tension exerted by means acting on same, proportionally relating said variation with that observed when using a support with and without varnish.

[0018] The greater the width of the sheet, the greater the curving action of the support, so that conventionally large widths are not used in the formats for said sheets. Having a greater width of the closing sheet without a curving effect, due to the composition and treatment of the sheet, advantageously allows offering a closing sheet with a greater width without said curving effect and therefore a greater surface on which to apply the desired printing.

[0019] The application of a hydrophobic varnish on the support creates a layer that prevents entry of moisture in the fibres that form the support. It has been confirmed that this reduction in the potential entry and absorption of moisture by the short fibres of the support made from recycled material prevents said fibres from curving.

[0020] Optionally, the hydrophobic varnish is applied on both faces of the paper support. This provides a greater surface tension in the layers of the coating that keeps the paper support fibres from curving at widths under 19 cm, providing a greater barrier against the entry of moisture in the support and its possible absorption by the fibres of the support.

[0021] Preferably, the paper support includes recycled paper in a percentage above 95%. This allows using recycled raw material with the resulting improved management of resources that are involved in the manufacture of said closing sheet.

[0022] According to a second aspect, the present invention proposes a method for manufacturing a closing sheet for wound products with a transverse tearing strip, which can preferably be as indicated in the preceding features of the present description of the invention.

[0023] This method is characterised in that the manufacturing method of closing sheets unifies in a single step, continuously and without rewinding, the substeps corresponding to dividing the width of the original roll of closing sheets into two or more new rolls to proceed, at least for one of said rolls created, to a module in which the self-adhesive tearing strip is applied, passing the content of the new split roll that will form the closing sheet through a pressure roller after the longitudinal cut, as well as through a pressure roller before and/or after said application module.

[0024] This unification of steps, not known in the prior art, requires the use of pressure rollers to maintain tension between the longitudinal cut and the module for ap-

plying tearing strips, according to experimentation performed, for the correct execution of the application, thereby also preventing potential lateral alignment problems that may occur after the cut and connection with said strip application module.

[0025] This process entails the difficulty of applying the transverse tearing strip in a continuous longitudinal displacement process, so that synchronisation when applying the tearing strip is essential. A correct synchronisation is advantageously achieved by placing a pressure roller after the longitudinal cutting module, as well as before and/or after said application module for the tearing strip.

[0026] In the present specification the term longitudinal cut is understood as the cut to a specific width of the sheet of the original roll to produce two or more new rolls with the same length, with a smaller width than the original roll.

[0027] This allows reducing the manufacturing time as it is not necessary to rewind the new roll generated by the longitudinal cutting of the original roll between said cutting and the application step of the tearing strip, with the corresponding transfers, loading and re-tensioning of the new roll.

[0028] Preferably, the method includes a preliminary step of conditioning the recycled paper support that will subsequently form the original roll of closing sheets, in which at least one of its faces is coated with a hydrophobic varnish such that after drying, it is wound and subsequently introduced in the step of cutting and tearing strip application.

[0029] This preliminary step is considered to occur before the generation of the original roll of the closing sheet, there being a discontinuity in the process between the application of the varnish that allows eliminating the curving of the closing sheet created with a support made from recycled paper.

[0030] In a possible embodiment of the invention, each of the new rolls of closing sheets created by cutting the original roll passes before rewinding through a module for applying the tearing strip before rewinding each of said new rolls.

[0031] This configuration implies that the method executes simultaneously the longitudinal cutting process and the application of the tearing strip in each of the new rolls created by said cutting, ending with the rewinding of each new roll with the tearing strip applied to it.

[0032] According to a third aspect, the present invention proposes a machine for manufacturing closing sheets for wound products that executes the manufacturing method indicated in the present description with the aforementioned features.

[0033] This machine is characterised by comprising, at least, one longitudinal cutting module for the original roll of closing sheets to the width defined by the user, at least one module for applying a tearing strip, without a rewinding element between these, wherein subsequently to the cutting and before and/or after the module for applying the tearing strip there is at least one pressure roller

through which the newly cut roll is made to pass.

[0034] This machine allows executing the two stages, longitudinal cutting and applying the tearing strip, such that there is no need for an intermediate rewinding that creates a discontinuity in the process to transfer the newly created roll to a machine in which the tearing strip is applied.

[0035] Preferably, the machine has as many modules for applying the tearing strip as new cut rolls are obtained from the longitudinal cutting of the original roll of closing sheets. This modular configuration allows extending the machine in modules to correspond to a module for applying the tearing strips to each division of the original roll, thereby obtaining a rewound finish with retaining strips applied for each division created from said original roll.

[0036] Also preferably, the machine has additional pressure rollers at least at the entry of the cutting module, which add to the effect of the pressure rollers arranged after the cutting module, as well as the pressure roller arranged before and/or after the module for applying the tearing strip. This arrangement allows maintaining tension in each of the new rolls and a lateral alignment prior to applying the tearing strip, and therefore enables a synchronised application of the tearing strips.

Brief description of the drawings

[0037] In order to better understand the description made, a set of drawings has been provided which, schematically and solely by way of non-limiting example, represents a practical case of embodiment.

Figure 1 is a schematic plan view of the closing sheet from the rear side thereof, on which the self-adhesive tearing strip is applied.

Figure 2 is a schematic plan view of a closing sheet that surrounds a roll of trash bags.

Figure 3 is a schematic view of the machine that executes the longitudinal cutting step of the original roll of closing sheets and the tearing strip application step on each newly created roll, with the subsequent rewinding after applying said tearing strip. In this side elevation view the same line shows the passage of the separate partitions from the cutting module as can be inferred in their supply to each module for applying the tearing strip, as well as in the outlet of each module to the rewinding, and in the presence of two rolls installed in each rewinding shaft, which provide in effect a separation of the four partitions from their cut in the initial cutting module.

Description of a preferred embodiment

[0038] Several embodiments are described below for the closing sheet for wound products, as well as for the

manufacturing method of said sheet and the machine that executes the method for obtaining said closing sheet, with reference to the figures described above.

[0039] As shown in figures 1 and 2, the closing sheet (10) for wound products, such as trash bag rolls (20), according to the present embodiment, is formed by a support (11) on which is applied, in the inner face thereof with respect to the product (20) surrounded thereby, a tearing strip (12) placed transversely to the winding direction of the bag roll (20).

[0040] Said closing sheet (10) incorporates means for closing the sheet around itself in order to hold same and hold the entire assembly. In this embodiment, a layer of adhesive applied to the entire sheet activated by contact with water is used so that, in the subsequent process of closing the wound product, the closing end (13) is wet on the sheet (10) itself.

[0041] The tearing strip (12) has a breaking strength and attachment strength to the support that are greater than the transverse breaking strength of the support (11), thereby allowing to cut the support (11) by stretching said strip (12) in the transverse direction, dividing the sheet (10) into two parts and allowing to open the bag roll (20).

[0042] The support (11) consists in 95% recycled paper with the remainder being biodegradable additives. A layer of hydrophobic varnish is applied to one of the faces of the support (11) thereby increasing its surface tension and preventing the entry of moisture in the support. This reduces the curving of the fibres due to moisture absorption.

[0043] Alternatively, the support (11) can comprise a biodegradable compound of made from recycled paper without additives.

[0044] Also, alternatively the composition of the support has a 75% recycled paper out of all the material of the support.

[0045] Similarly, in another embodiment the varnish can be applied to both faces of the support (11).

[0046] Said sheet (10) is manufactured by a method that is executed in a machine (100) specifically designed for such purpose. The method starts with an original roll (101) with a width containing a plurality of joined closing sheets (10).

[0047] The original roll (101) with the varnished and printed support (11), with the images associated with the final closing sheet (10), are placed in the machine (100) that will, in a continuous manner without rewinding said elements, split the width of the original roll (101) into four partitions (102) with a width corresponding to each closing sheet (10), in this case 15 cm.

[0048] Each of these new longitudinal partitions (102) are made to pass before they are individually rewinding through a module (103) in which the self-adhesive tearing strip (12) is applied, passing through a pressure roller (104) after the cutting module (110) and through another roller (105) after said application module (103). In this way, to operate continuously there are as many application modules (103) as partitions (102) are made in the

original roll (101).

[0049] Alternatively, a single application module (103) of the tearing strip (12) can be arranged in a machine (100), so that at least one of the partitions (102) would finish in a continuous manner the process of longitudinal cutting and application of the tearing strip (12), while the other partitions would be rewound to perform the process discontinuously.

[0050] To maintain tension in each of the partitions (102) and to align same, the machine has pressure rollers (106) arranged before the entry in the cutting module (110) as well as before application of the tearing strip (12).

[0051] Alternatively, additional pressure rollers may be arranged to help maintain tension and alignment of the partition (102) divided from the width of the original roll (101).

[0052] Despite the fact that reference has been made to a specific embodiment of the invention, it is evident for a person skilled in the art that the closing sheet for wound products, as well as the method for manufacturing said sheet and the machine that allows performing said method, is susceptible of numerous variations and modifications, and that all the aforementioned details can be replaced by other technically equivalent ones without detracting from the scope of the protection defined by the attached claims.

Claims

1. Closing sheet for wound products, of the type placed around a wound product and closing on itself, which comprises at least one tearing strip transverse to the direction surrounding the wound products, **characterised in that** the closing sheet (10) comprises a support (11) that comprises a composition of recycled paper or recycled paper and biodegradable material, in a percentage of said compositions of at least 75% of the support material, wherein the paper support (11) comprises at least one layer of a hydrophobic varnish coating on one of the faces thereof.
2. Closing sheet for wound products according to claim 1, wherein the hydrophobic varnish is applied on both faces of the paper support (11).
3. Closing sheet for wound products according to claim 1, wherein the paper support (11) is made from recycled paper in a percentage greater than 95%.
4. Manufacturing method for a closing sheet for wound products with a transverse tearing strips as indicated in claims 1 to 3, **characterised in that** the manufacturing method unifies in a single step, without performing the rewinding process between them, the division of the width of the original roll (101) of closing sheets into two or more new rolls (102), to transfer at least one of said rolls (102) thereby created to an

application module (103) of the self-adhesive tearing strip (12), passing the content of the new divided roll (102) that will form the closing sheet (10) through a pressure roller (104) after the longitudinal cutting (110), as well as through a pressure roller (105) before and/or after said application module (103).

5. Manufacturing method according to claim 4, wherein the method includes a preliminary step of conditioning the recycled paper support that will subsequently form the original roll (101) of closing sheets, in which at least one of its faces is coated with a hydrophobic varnish such that after drying it is wound and subsequently introduced in the step of cutting (110) and applying the tearing strip (12).
6. Manufacturing method according to claim 4, wherein each of the new rolls (102) of closing sheets created by cutting the original roll (101) passes before rewinding through an application module (103) of the tearing strip (12) before the rewinding of each of said new rolls (102).
7. Machine for manufacturing closing sheets for wound products that performs the method indicated in claims 4 to 6, **characterised in that** the machine (100) comprises at least one longitudinal cutting module (110) for the original roll (101) of closing sheets, according to the width defined by the user, with at least one application module (103) of a tearing strip (12), without a rewinding element between these, wherein subsequently to the cutting (110) and before and/or after the application module (103) of the tearing strip (12) there is at least one pressure roller (104, 105) through which the newly cut roll (102) is made to pass.
8. Manufacturing machine according to claim 7, wherein the machine has as many application modules (103) of the tearing strip (12) as there are newly cut rolls (102) obtained from the longitudinal cut (110) of the original roll (101) of closing sheets.
9. Manufacturing machine according to any of claims 7 or 8, wherein the machine has additional pressure rollers (106) at least at the entry of the cutting module (110).

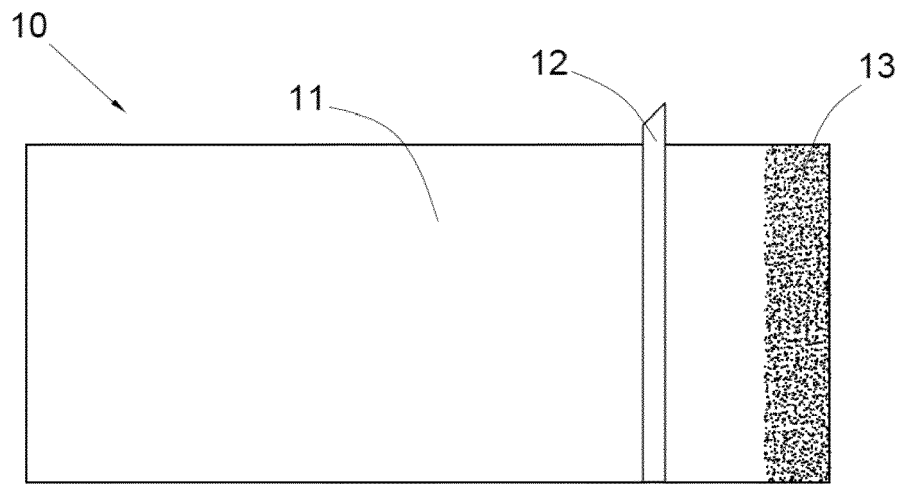


Fig. 1

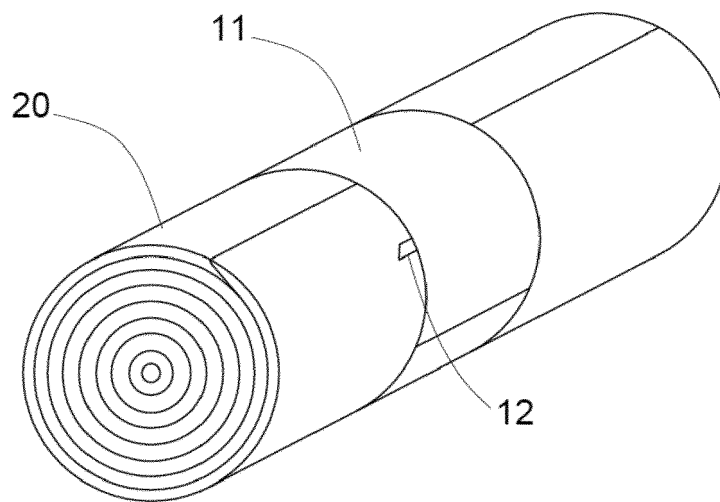


Fig. 2

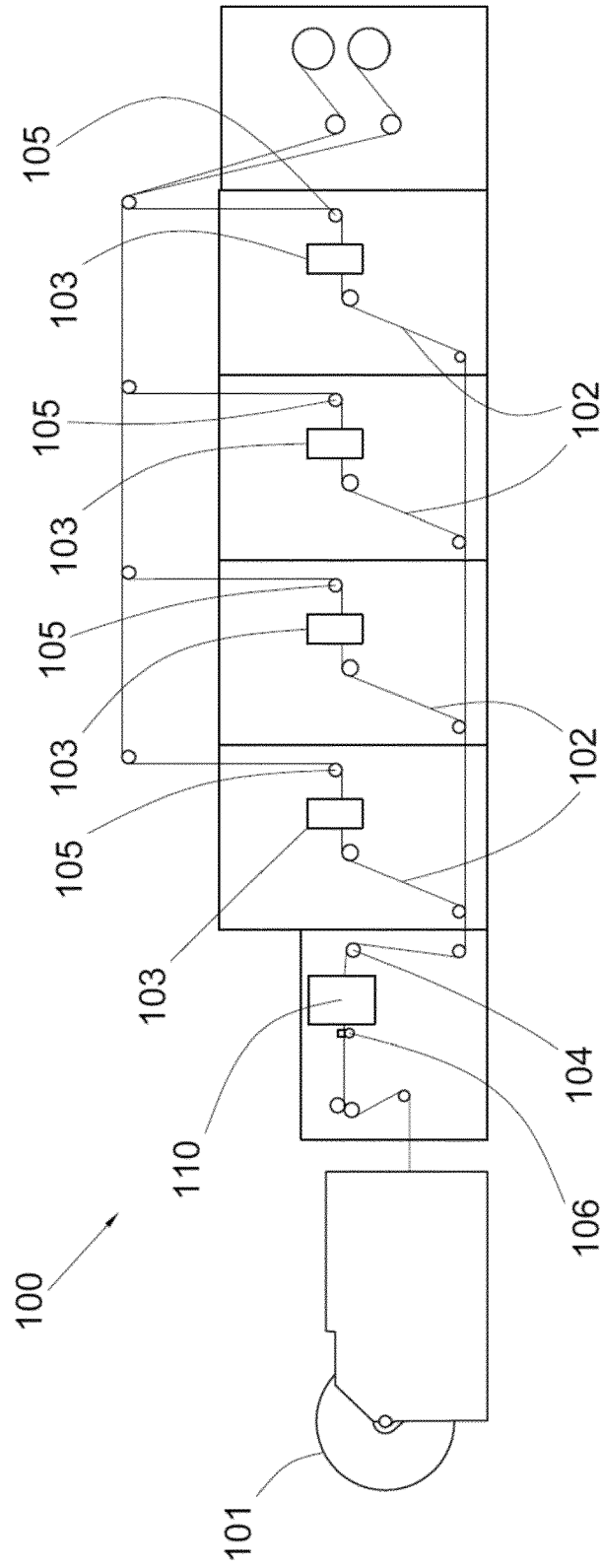


Fig. 3



EUROPEAN SEARCH REPORT

 Application Number
 EP 20 16 8797

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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 28 August 2020	Examiner Jervelund, Niels
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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