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(73) Patenthaver: **HAYAT KIMYA SANAYI ANONIM SIRKETI, Sepetlipinar Mahallesi Hayat Caddesi No: 2 , Basiskele, 41275 Kocaeli, Tyrkiet**

(72) Opfinder: **Aydin, Lutfi, Sepetlip nar Mahallesi Hayat Caddesi No: 2, Basiskele, 41275 Kocaeli, Tyrkiet**

(74) Fuldmægtig i Danmark: **Plougmann Vingtoft A/S, Strandvejen 70, 2900 Hellerup, Danmark**

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DESCRIPTION

TECHNICAL FIELD

[0001] The present invention relates to a converting machine having at least one embossing roll providing embossing to the outer layer of a cleaning paper by means of the recesses and tabs thereof provided on the outer wall; and at least one joining roll positioned at the vicinity of the embossing roll.

PRIOR ART

[0002] As in most cleaning papers, one of the basic customer perception in toilet papers is the volume of the toilet paper. As the volume and thus the comfort of toilet paper are increased, the weight of the paper is not increased and thus, fiber consumption and negative environmental effects are decreased.

[0003] In the production technology of multi-layer traditional toilet paper, embossing is applied to the outer layer, and intermediate adhesive is applied to the layer whereto embossing is applied, and said layer is joined to the other layer, and thus production is realized. Said process provides the paper to seen as having a bigger volume, however at the same time, leads to resistance loss. The process is applied in the converting step of the toilet paper. Decorative embossing is applied to a single outer surface, and volume and absorbing capacity are increased.

[0004] In application TR 2011/04324, three-layer cleaning papers where embossing is applied to both sides and the machine realizing said application are disclosed. Said application is valid only for three-layer cleaning papers. After the outer layers receive the adhesive, the adhesive may dry until the outer layers arrive at the joining unit and the embossing may disappear and the formation may be lost. Moreover, in the cleaning paper, the adhesion regions on the side of the outer layer facing the intermediate layer are not wide enough to provide the required formation.

[0005] In the application TR 2000/02524, toilet papers and towels whose both sides are embossed and the production method of said toilet paper and of said toilet towel are disclosed. In said application, decorative embossing application can be applied to a single outer layer of the toilet paper since there is a single adhesive unit, and both of the outer layers cannot be decorative patterned. In the decorative pattern on the side where adhesive application is not realized, volume is decreased, and the embossing on said surface becomes indistinct. Moreover, said system is not designed so as to meet the condition where continuous winding is desired, since when this system is used in mass production machines, the indistinct embossing remains on the upper surface, and an undesired condition occurs. This system is suitable for

start/stop machi nes.

[0006] In the patent application US57336223, the embossing method is described which is applied by using the end-to-end joining method. In this method, a different pattern cannot be applied to the two outer layers, and decorative embossing application cannot be realized.

[0007] In the patent application US2007184246, on which the preamble of claim 1 is based, a multiply web material comprising at least three plies, wherein a first and a second ply forming outer surfaces of the web material comprising decorative elements projecting towards the inside of the web material obtained by multiple embossing steps with varying embossing heights is disclosed.

[0008] In the patent application US2012255671, a method for producing a multiply web material wherein first, second and third plies are combined in a single step is disclosed.

[0009] As a result, because of the abovementioned problems, a solution is required in the related technical field.

BRIEF DESCRIPTION OF THE INVENTION

[0010] The present invention relates to a cleaning paper having decorative embossing on both sides and relates to a converting machine, in order to eliminate the abovementioned disadvantages and in order to bri ng new advantages to the related technical field.

[0011] The main object of the present invention is to provide a cleaning paper having volume increase by keeping the unit weight fixed without deteriorating comfort, to provide a converting machine producing said cleaning paper, and to provide a production method.

[0012] In order to realize the abovementioned object and all of the objects to be deducted from the detailed description below, the present invention is a converting machine for producing a cleaning paper which comprises a bottom outer layer, an upper outer layer, and an intermediate layer provided between the outer layers. Accordingly, the converting machine of the present invention comprises a first lamination unit comprising a bottom embossing roll provided with recesses and tabs on the outer wall for providing decorative embossing to the bottom outer layer and comprising one lamination mechanism provided so as to transfer adhesive to the side of the bottom outer layer facing the intermediate layer and a joining roll positioned at a vicinity of the bottom embossing roll for joining the intermediate layer with the bottom outer layer and a second lamination unit comprising one lamination mechanism provided so as to transfer adhesive outwardly towards the side of the upper outer layer facing the intermediate layer, an upper embossing roll provided with recesses and tabs on the outer wall for providing decorative embossing to the upper outer layer in a direction opposite to the direction of the decorative embossing provided to the bottom outer layer and a joining roll positioned at a vicinity of the upper embossing roll for joining the adherent bottom outer layer

and the intermediate layer with the upper outer layer, wherein the decorative embossing to the bottom outer layer is provided by the recesses of the bottom embossing roll and projects towards the outside of the cleaning paper; and the first lamination unit comprises a micro embossing roll and a press roll having an outer wall in contact with the outer wall of the micro embossing roll, the intermediate layer passing between the micro embossing roll and the press roll, the micro embossing roll being provided such that the bottom outer layer and the intermediate layer can pass between the bottom embossing roll and the mi cro embossi ng roll.

[0013] In a preferred embodiment of the present invention, the first lamination unit comprises a second press roll provided at a vicinity of the bottom embossing roll whose outer wall is in contact with the outer wall of the bottom embossing roll. Thus, it applies pressure to the bottom outer layer passing through the bottom embossing roll, and provides the embossing to be more effective.

[0014] Due to the micro embossing roll, micro embossing is provided to the intermediate layer.

[0015] In a preferred embodiment of the present invention, the micro embossing roll comprises pluralities of ridges in spot form on the outer wall thereof.

[0016] Due to the passing of the intermediate layer between the micro embossing roll and the press roll, the effect of the micro embossing provided to the intermediate layer is increased.

[0017] In a preferred embodiment of the present invention, the second lamination unit comprises a third press roll provided at a vicinity of the upper embossing roll, whose outer wall is in contact with the outer wall of the upper embossi ng roll.

[0018] In a preferred embodiment of the present invention, the lamination units comprise pluralities of transfer rolls positioned such that there is a certain distance in between and controlling the tension of the cleaning paper layers.

[0019] In a preferred embodi ment of the present i nventi on, an outer wall of the respective joining roll is in contact to the outer wall of the respective embossi ng roll. Thus, the adhering of the layers to each other is strengthened.

[0020] In a preferred embodiment of the present invention, the lamination mechanisms comprise an adhesive chamber wherein the adhesive is provided, an anilox roll provided at a vicinity of the adhesive chamber so as to receive the adhesive from the adhesive chamber, and a printing roll positioned between the anilox roll and the embossi ng roll.

[0021] In a preferred embodiment of the present invention, the distance between the lamination mechanisms and the part where the outer layers are joined to the intermediate layer is short such that the adhesive transferred to the side of the outer layers facing the intermediate layer does not dry in said distance.

[0022] In a preferred embodiment of the present invention, the anilox rolls comprise pluralities of cells on the surface thereof which are in micron level.

[0023] In a preferred embodiment of the present invention, there is an unreeling unit positioned before the lamination units and having at least one unreeling station.

[0024] In a further realisation of the present invention, a converting process performed by the converting machine for producing a cleaning paper comprises the process steps of providing embossing to the outer layer of a cleaning paper by means of the recesses and tabs of the outer wall of at least one of the bottom embossing roll and the upper embossing roll, and providing micro embossi ng to the intermediate layer by the micro embossi ng roll, and joining by passing of cleaning paper layers between said at least one embossing roll and the corresponding joining roll positioned at the vicinity of the embossing roll. As an improvement, the present invention comprises the steps of:

1. a) providing decorative embossing outwardly towards the bottom outer layer, transferring adhesive to the side of the bottom outer layer facing the intermediate layer by the first lamination mechanism, and providing micro embossing to the intermediate layer by the first lamination unit
2. b) providing decorative embossing to the upper outer layer in a direction opposite to the direction provided to the bottom outer layer, transferring adhesive to the side of the upper outer layer facing the intermediate layer by the second lamination mechanism and joining the upper outer layer with the bottom outer layer and the intermediate layer coming from the first lamination unit by the second lamination unit

[0025] In a preferred embodiment of the present invention, said step (a) comprises the following sub-steps:

1. i) providing decorative embossing outwardly on the bottom outer layer by means of the recesses and tabs provided on the bottom embossing roll as the bottom outer layer passes through the bottom embossing roll
2. ii) transferring adhesive towards the tabs of the bottom embossing roll by the first lamination mechanism and thus, transferring adhesive to the side of the bottom outer layer facing the intermediate layer
3. iii) providing micro embossing to the intermediate layer by passing the intermediate layer between a micro embossing roll and the first press roll having an outer wall in contact with the outer wall of the micro embossing roll
4. iv) passing the bottom outer layer and the intermediate layer between the bottom embossi ng roll and the joining roll and adheri ng the layers to each other
5. v) transferri ng the i ntermedi ate layer and the bottom outer layer to the second lamination unit by means of at least one transfer roll

[0026] In a preferred embodiment of the present invention, in said step (i), the bottom outer layer passes between the bottom embossing roll and the second press roll having an outer wall which is in contact with the outer wall of the bottom embossing roll and obtaining a decorative embossing by means of the pressure applied by the second press roll to the bottom outer layer.

[0027] In a preferred embodiment of the present invention, in said step (ii), the adhesive is transferred from the adhesive chamber positioned in the first lamination mechanism to the anilox roll provided at a vicinity of the adhesive chamber and is transferred from the anilox roll to the bottom outer layer by means of a printing roll provided between the bottom embossi ng roll and the anilox roll.

[0028] In a preferred embodiment of the present invention, the anilox roll receives the adhesive from the adhesive chamber to pluralities of cells in micron level provided on the surface and transfers the adhesive to the printing roll.

[0029] In a preferred embodiment of the present invention, in said step (iii), the micro embossing of the intermediate layer is realized by obtaining embossing by means of the presence of the pluralities of ridges in spot form provided on the outer wall of the micro embossing roll, and by means of the pressure applied by the first press roll to the intermedi ate layer.

[0030] In a preferred embodiment of the present invention, said step (b) comprises the following sub-steps:

1. i) providing decorative embossing outwardly by means of the recesses and tabs provided on the upper embossing roll on the upper outer layer as the upper outer layer passes through the upper embossi ng roll
2. ii) transferring adhesive to the tabs of the upper embossing roll by the second lamination mechanism and thus transferring adhesive to the side of the upper outer layer facing the i ntermedi ate layer
3. iii) joining the upper outer layer with bottom outer layer and the intermediate layer coming from the first lamination unit between the second joining roll and the upper embossi ng roll.

[0031] In a preferred embodiment of the present invention, in step (i), the upper outer layer passes between the upper embossi ng roll and the third press roll having the outer wall provided in contact with the outer wall of the upper embossi ng roll and decorative embossing is obtained by means of the pressure applied by the third press roll to the upper outer layer.

[0032] In a preferred embodiment of the present invention, in step (ii), the adhesive is transferred from the adhesive chamber, provided in the second lamination mechanism, to the

anilox roll provided at a vicinity of the adhesive chamber and is transferred from the anilox roll to the upper outer layer by means of a printing roll provided between the upper embossi ng roll and the anilox roll.

[0033] In a preferred embodiment of the present invention, the anilox roll takes the adhesive from the adhesive chamber to the pluralities of cells in micron level provided on the surface thereof and transfers the adhesive to the pri nti ng roll.

BRIEF DESCRIPTION OF THE FIGURES

[0034]

In Figure 1, a general schematic view of the related units of the subject matter converting machi ne is given.

In Figure 2a, the schematic representative view of the first lamination unit of the subject matter converting machine is given.

In Figure 2b, a schematic representative view of the second lamination unit of the subject matter converting machine is given.

In Figure 3a, a schematic view of the cleaning paper of the prior art is given.

In Figure 3b, a schematic view of the cleaning paper produced by the converting machi ne is given.

REFERENCE NUMBERS

[0035]

10 Unreeling unit

11 Unreeling station

20 First lamination unit

21 Bottom embossi ng roll

211 Outer wall

212 Recess

213 Tab

22 Press roll

221 Outer wall

23 Joining roll

231 Outer wall

24 Micro embossing roll

241 Outer wall

25 Press roll

251 Outer wall

26 Transfer rolls

27 Lamination mechanism

271 Adhesive chamber

272 Anilox roll

273 Printing roll

30 Second lamination unit

31 Upper embossi ng roll

311 Outer wall

312 Recess

313 Tab

32 Press roll

321 Outer wall

33 Joining roll

331 Outer wall

34 Transfer rolls

35 Lamination mechanism

351 Adhesive chamber

352 Anilox roll

353 Printing roll

40 Cleaning paper

41 Upper outer layer

411 Ridging region

412 Crushing part

413 Adhering region

414 Gap

42 Bottom outer layer

421 Ridging region

422 C rushi ng part

423 Adhering region

424 Gap

43 Intermediate layer

DETAILED DESCRIPTION OF THE INVENTION

[0036] In this detailed description, the subject matter cleaning paper, having decorative embossing on both sides, and the converting machine are described with references to examples which will not form any restricting effect for providing understandi ng of the subject matter in a better manner.

[0037] With reference to Figure 1, the converting machine generally comprises a first lamination unit (20) and a second lamination unit (30) at the continuation of the first lamination unit (20). Before the converting machine, there is an unreeling unit (10) providi ng transfer of the layers (41, 42, 43) of a cleaning paper (40). The unreeling unit (10) comprises at least one unreeling station (11). In the preferred application, there are three unreel i ng stations (11).

[0038] With reference to Figure 2a, in the first lamination unit (20), there is a steel bottom embossing roll (21) having recesses (212) and tabs (213) so as to provide a pattern to the bottom outer layer (42) of the cleaning paper (40) on the outer wall (211) thereof. On the upper side of the bottom embossing roll (21), there is a press roll (22) in rubber form whose outer wall (221) is in contact with the outer wall (211) of the bottom embossing roll (21) and there is a joining roll (23) in rubber form having an outer wall (231) which is in contact with the outer wall (211) of the bottom embossing roll (21) and positioned around the bottom embossing roll (21).

Since the joining roll (23) and the bottom embossi ng roll (21) are in contact, the layers (42, 43) can be held to each other. The first lamination unit (20) comprises a lamination mechanism (27) positioned at the opposite side of the bottom embossing roll (21) facing the joining roll (23).

[0039] On the lamination mechanism (27), there is a printing roll (273); an anilox roll (272) and an adhesive chamber (271), wherein the adhesive is provided, positioned side by side. The three sides of the adhesive chamber (271) are closed, and the unclosed side thereof faces the anilox roll (272). The surface of the anilox roll (272) is preferably coated with ceramic and there are cells (not illustrated in the figure) thereon which are in micron level. The printing roll (273) has a rubber structure and is positioned between the bottom embossing roll (21) and the anilox roll (272). The adhesive used can mix with water and does not give damage to the structure of the cleaning paper (40).

[0040] At the bottom side of the bottom embossing roll (21), there is a micro embossing roll (24) whose outer wall (241) does not contact the outer wall (211) of the bottom embossing roll (21) and provided such that the cleaning paper layers (42, 43) can pass through. On the outer wall (241) of the micro embossing roll (24), there are at least 30 ridges (not illustrated in the figure) in each cm2. The distance between the lamination mechanism (27) and the micro embossing roll (24) is short so as to prevent drying of the adhesive taken by the bottom outer layer (42) of the cleaning paper (40) until it is joined to the intermediate layer (43). Again at the bottom side of the micro embossing roll (24), there is a flat press roll (25) whose outer wall (251) is in contact with the outer wait (241) of the micro embossing roll (24). The first lamination unit (20) moreover adjusts and controls the tension of the cleaning paper (40) layers (42, 43), and comprises transfer rolls (26) providing transfer of the layers (42, 43).

[0041] With reference to Figure 2b, the second lamination unit (30) positioned at the continuation of the first lamination unit (20) comprises an upper embossing roll (31), and a press roll (32) having an outer wall (321) which is in contact with the outer wall of the upper embossing roll (31). Moreover, on the second lamination unit (30), there is a rubber joining roll (33) having an outer wall (331) which is in contact with the outer wall (311) of the upper embossing roll (31) and positioned at any region around the upper embossing roll (31). The upper embossing roll (31) comprises recesses (312) and tabs (313) on the outer wall (311) so as to provide pattern to the upper outer layer (41). Moreover, on the second lamination unit (30), there is a lamination mechanism (35) comprising an anilox roll (352) and a printing roll (353) positioned side by side. On the lateral side of the anilox roll (352), there is an adhesive chamber (351). The lamination mechanism (35) provided in the second lamination unit (30) is the same embodiment as the lamination mechanism (27) provided in the first lamination unit (20). The surface of the anilox roll (352) is preferably coated with ceramic, and there are cells (not illustrated in the figure) thereon in micron level. In the second lamination unit (30), there are transfer rolls (34) providing layer transfer by adjusting and controlling the tension of the layers (41, 42, 43) of the cleaning paper (40).

[0042] The process applied in the converting machine whose structural details are given above

is realized as follows. In the preferred application, decorative embossing is applied to the toilet paper having at least three layers. With reference to Figure 1 and 2a, first of all, the bottom outer layer (42) of the toilet paper coming from the unreeling stations (11) placed in the unreel i ng unit (10) passes through the transfer rolls (26), and passes between the press roll (22) and the bottom embossing roll (21). Here, a pattern, whose ridges are facing outwardly, appears on the bottom outer layer (42) thanks to the recesses (212) and tabs (213) of the bottom embossing roll (21), and a decorative embossing is formed. The press roll (22) applies pressure to the bottom outer layer (42) passing above the bottom embossing roll (21), and provides application of the pattern to the bottom outer layer (42). The bottom outer layer (42), advancing by taking a pattern from the bottom embossing roll (21), passes between the bottom embossing roll (21) and the printing roll (273) placed on the lamination mechanism (27). Meanwhile, the anilox roll (272) provided on the lamination mechanism (27) takes the adhesive provided in the adhesive chamber (271) onto the cells provided thereon, and transfers the adhesive to the printing roll (273). The printing roll (273) transfers the adhesive to the tab (213) parts of the bottom embossing roll (21). Thus, the tabs, provided on the face of the bottom outer layer (42) facing the intermediate layer (43), are adhered. The recesses (212) of the bottom embossing roll (21) provide the decorative embossi ng of the bottom outer layer (42) facing outwardly.

[0043] The bottom outer layer (42), passing through the lamination process, continues to advance, and enters between the micro embossing roll (24) and the bottom embossing roll (21). At the same time, the intermediate layer (43), coming from the unreeling station (11), is transferred between the press roll (25) and the micro embossing roll (24) and the transfer rolls (26). The intermediate layer (43), passing through the micro embossing roll (24), has a micro embossing in spot form by means of the presence of the ridges in spot form provided on the micro embossing roll (24) surface. The intermediate layer (43), coming from the micro embossing roll (24), begins joining with the bottom outer layer (42) between the bottom embossing roll (21) and the micro embossing roll (24). While the intermediate layer (43) and the bottom outer layer (42) are passing between the joining roll (23) and the bottom embossing roll (21), they adhere to each other thanks to the presence of the adhesive provided on the bottom outer layer (42) and thanks to the pressure applied by the joining roll (23) to the bottom embossing roll (21). The presence of the adhesive provides verticality to the bottom outer layer (42) and provides volume by preventing collapsing. Moreover, they make the decorative embossing more apparent. In alternative applications, the intermediate layer (43) can be guided towards the joining roll (23) without using micro embossing roll (24) or by passing through a flat roll, and an intermediate layer (43) without embossing can be obtained.

[0044] With reference to Figure 1 and Figure 2b, the bottom outer layer (42), joining to the intermediate layer (43), passes through the transfer rolls (34) and arrives at the second lamination unit (30). The upper outer layer (41) is transferred to the second lamination unit (30) from the unreeling station (11) by means of the transfer rolls (34). The upper outer layer (41) firstly passes between the upper embossing roll (31) and the press roll (32). Here, a pattern, whose ridges are facing outwardly, begins forming on the upper outer layer (41) thanks to the recesses (312) and the tabs (313) of the upper embossing roll (31), and a

decorative embossing is formed. The press roll (32) applies pressure to the upper outer layer (41) passing above the upper embossing roll (31), and provides the pattern to be applied to the upper outer layer (41). Adherence is obtained by transferri ng the adhesive, transferred by the anilox roll (352) to the printing roll (353) in the lamination mechanism (35) in the tabs of the upper outer layer (41) where pattern is formed facing the intermediate layer (43), by the printing roll (353) to the tabs (313) of the upper embossing roll (31). The recesses (312) of the upper embossing roll (31) provide the decorative embossing of the upper outer layer (41) facing outwardly. The adherent bottom outer layer (42) and the intermediate layer (43) coming from the upper outer layer (41) and the first lamination unit (20) pass through the joining roll (33) and the upper embossing roll (31) and afterwards they are joined. After the conversion process, the three-layered toilet paper is subject to winding process such that the bottom outer layer (42) coming from the first lamination unit (20) is on the inner side and such that the upper outer layer (41) coming from the second lamination unit (30) is on the outer side. The realized winding process continues as a continuous process.

[0045] When the pattern, applied in the outer layers (41, 42), is desired to be changed, embossing rolls (21, 31), having different recesses (212, 312) and tabs (213, 313), are used.

[0046] Since one of the items illustrating the pattern, preventing collapse and providing the volume is the intermediate adhesive, the outer layer (41, 42), facing the intermediate adhesive, should join with the intermediate layer (43) before the adhesive dries. Therefore, the distance between the lamination mechanism (27, 35) and the part where the outer layer (41, 42) and the intermediate layer (43) are joined should be substantially short.

[0047] In alternative applications, the toilet paper may have up to 9 layers. In the intermediate layer (43), no change is realized and a single layer is used. The number of layers to be described as the bottom outer layer (42) and the upper outer layer (41) can be increased up to 4. In this case, the adhesive, transferred from the lamination mechanism (27, 35), is completely provided in the tabs of the outer layers (41, 42), taking pattern from the embossing rolls (21, 31), facing the intermediate layer (43). The effectiveness of the adhesive coming from the lamination mechanisms (27, 35) can be provided 4 times in the tabs facing the intermediate layer (43) from the outer layer (41, 42). When more than 4 layers are desired to be used in a single outer layer (41, 42), a change is required in the process parameters.

[0048] With reference to Figure 3b, the toilet paper, produced by means of said converting machine and converting process, comprises a bottom outer layer (42) contacting the skin, the upper outer layer (41), and the intermediate layer (43) provided between the outer layers (41, 42). The preferred application is for a 3 layered toilet paper. Decorative embossing application is provided outwardly on the outer layers (41, 42) of the toilet paper. The outer layers (41, 42) comprise pluralities of ridging regions (411, 421) provided outwardly according to the embossing received from the embossing rolls (21, 31), gaps (414, 424) provided between the ridging region (411, 421) and the intermediate layer (43), crushing regions (412, 422) provided by the tabs (213, 313) of the embossing roll (21, 31) and adherence regions (413, 423) formed by the crushing parts (412, 422) on the sides of the outer layers (41, 42) facing the

intermediate layer (43). The width of the adherence regions (413, 423) is smaller than the width of the ridging regions (411, 421). In the preferred application, the width of the ridging regions (411, 421) and the width of the adherence regions (413, 423) are adjusted such that the crushing parts (412, 422) and the gaps (414, 424) have a quadrangular cross section having inclined corners. According to Figure 3a and 3b, when embossing application is realized in a single outer layer (41, 42), while the width between the two outer layers (41, 42) is equal to A, the width becomes equal to B when embossing application is realized in the two outer layers (41, 42) and it is always valid that B>A. The ridging regions (411, 421) of the outer layers (41, 42) are provided in an opposite manner outwardly and the gaps (414, 424) of the toilet paper provide a volume increase.

[0049] Below, a table is given illustrating the comparison between a three-layered toilet paper where double-sided decorative embossing application is realized and a toilet paper where decorative embossing is not applied to both sides.

Table 1.

	Layer (lamination weight) (g/m^2)	Dry Resistance (N/m) (MD)	Thickness (MIC)	Softness (%)	Water Absorption Duration (sec)
Single sided decorative embossing application	56	394	577	77	4,1
Double sided decorative embossing application	56	411	610	93	3,2

[0050] The example work data realized are given in Table 1. According to Table 1, the toilet paper, decorative embossing is applied to both sides, has a minimum 4 % more dry resistance when compared with the toilet paper where embossing is not applied, the softness thereof is increased by 20 % at least and the volume thereof is increased by 7 % at least. The double-sided decorative embossing application decreases water absorption duration by 2 % at least when compared with the single-sided embossing application, and provides the toilet paper to absorb the water in a more rapid manner. In the toilet paper, where double surface embossing application is realized, the product diameter is kept fixed by means of 20 % lamination volume increase, and at least 10 % less fiber usage is provided. Moreover, the effect of toilet papers on the environment is decreased and saving from fiber usage is provided.

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not

form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

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- TR200002524 [0005]
- US57336223B [0006]
- US2007184246A [0007]
- US2012255671A [0008]

Patentkrav

1. En konverteringsmaskine til fremstilling af et rengøringspapir (40), som omfatter et nederste ydre lag (42), et øverste ydre lag (41), og et mellemste lag (43) der er forsynet mellem de ydre lag (41, 42), konverteringsmaskinen, omfatter

en første lamineringsenhed (20), omfattende en nederste prægningsrulle (21) forsynet med udsparinger (212) og faner (213) på den ydre væg (211) til at forsyne dekorativ prægning til det nederste ydre lag (42), en første lamineringsmekanisme (27), forsynet for at overføre klæbemiddel til siden af det nederste ydre lag (42), der vender mod det mellemste lag (43),

og en første sammenføjningsrulle (23), placeret i nærheden af den nederste prægningsrulle (21) for at sammenføje det mellemste lag (43) med det nederste ydre lag (42); og

en anden lamineringsenhed (30), omfattende en anden lamineringsmekanisme (35), forsynet for at overføre klæbemiddel udad mod siden af det øverste ydre lag (41), der vender mod det mellemste lag (43), en øverste prægningsrulle (31), forsynet med udsparinger (312) og faner (313) på den ydre væg (311) for at give det øverste ydre lag (41) dekorativ prægning i en modsat retning end den dekorative prægnings retning, der er forsynet til det nederste ydre lag (42) og en anden sammenføjningsrulle (33), placeret i nærheden af den øverste prægningsrulle (31) for at sammenføje det vedhængende nederste lag (42) og det mellemste lag (43) med det øverste ydre lag (41), **kendetegnet ved at** den dekorative prægning til det nederste ydre lag (42) er forsynet af udsparingerne (212) af den nederste prægningsrulle (21) og projekterer mod ydersiden af rengøringspapiret (40); og **ved at** den første lamineringsenhed (20) omfatter en mikroprægningsrulle (24) og en første presserulle (25), der har en ydre væg (251), som er i kontakt med mikroprægningsrullens (24) ydre væg (241), det mellemste lag (43), der passerer mellem mikroprægningsrullen (24) og presserullen (25), der er forsynet således, at det nederste ydre lag (42) og det mellemste lag (43) kan passere mellem den nederste prægningsrulle (21) og mikroprægningsrullen (24).

2. En konverteringsmaskine ifølge krav 1, **kendetegnet ved at** den første lamineringsenhed (20) omfatter en anden presserulle (22) i nærheden af den

nederste prægningsrulle (21), hvis ydre væg (221) forsynes i kontakt med den nederste prægningsrulles (21) ydre væg (211).

3. En konverteringsmaskine ifølge krav 1, **kendetegnet ved at** mikroprægningsrullen (24) omfatter flerheder af kamme i pletform på den ydre væg (241) deraf.

4. En konverteringsmaskine ifølge krav 1, **kendetegnet ved at** den anden lamineringsenhed (30) omfatter en tredje presserulle (32) i nærheden af den øverste prægningsrulle (31), hvis ydre væg (321) forsynes i kontakt med den øverste prægningsrulles (31) ydre væg (311).

5. En konverteringsmaskine ifølge enhver af de foregående krav, **kendetegnet ved at** lamineringsenheder (20, 30) omfatter flerheder af overførselsruller (26, 34), der er placeret sådan at der er en vis distance imellem og kontrollerer spændingen af rengøringspapirets (40) lag (41, 42, 43).

6. En konverteringsmaskine ifølge krav 1, **kendetegnet ved at** en respektiv ydre væg (231, 331) af den respektive sammenføjningsrulle (23, 33) er i kontakt med den respektive prægningsrulles (21, 31) ydre væg (211, 311).

7. En konverteringsmaskine ifølge krav 1, **kendetegnet ved at** lamineringsmekanismerne (27,35) hver omfatter et respektivt klæbemiddelkammer (271, 351) hvor klæbemidlet er anbragt, en aniloxrulle (272, 352) anbragt i nærheden af det respektive klæbemiddelkammer (271, 351) så det modtager klæbemidlet fra det respektive klæbemiddelkammer (271, 351), og en respektiv printrulle (273, 353) placeret mellem den respektive aniloxrulle (272, 352) og den respektive prægningsrulle (21, 31).

8. En konverteringsmaskine ifølge krav 7, **kendetegnet ved at** distancen mellem den respektive lamineringsmekanisme (27,35) og den del, hvor de ydre lag (41, 42) er sammenføjet til det mellemste lag (43) er kort, så klæbemidlet, der er overført til siderne af de ydre lag (41, 42), der vender mod det mellemste lag (43), ikke tørrer ud i førnævnte distance.

9. En konverteringsmaskine ifølge krav 7, **kendetegnet ved at** aniloxrullerne (272, 352) omfatter flerheder af celler på overfladen deraf, som er i mikroniveau.

10. En konverteringsmaskine ifølge enhver af førnævnte krav, **kendetegnet ved at** omfatte en afrulningsenhed (10), der er placeret før lamineringsenhederne (20, 30) og ved at have mindst en afrulningsstation (11).

11. En konverteringsproces, udført af konverteringsmaskinen, til at forsyne et rengøringspapir (40) ifølge enhver af de foregående krav, der omfatter procestrinene at forsyne prægning til det ydre lag (42, 43) af et rengøringspapir (40) ved hjælp af udsparingerne (212, 312) og faner (213, 313) på den ydre væg (211, 311) af mindst en af den nederste prægningsrulle (21) og den øverste prægningsrulle (31), og forsyne mikroprægning til det mellemste lag (43) ved hjælp af mikroprægningsrullen (24), og sammenføjning ved at passere lag (41, 42, 43) af rengøringspapir (40) mellem mindst en af førnævnte prægningsrulle (21, 31) og den tilhørende sammenføjningsrulle (23, 33), der er placeret i nærheden af mindst en af førnævnte prægningsrulle (21, 31),

kendetegnet ved at omfatte trinene:

a) forsyne dekorativ prægning udad mod det nederste ydre lag (42), ved overførsel af klæbemiddel til siden af det nederste ydre lag (42), der vender mod det mellemste lag (43) ved den første lamineringsmekanisme (27) og fremstilling af mikroprægning til det mellemste lag (43) ved den første lamineringsenhed (20),

b) forsyne dekorativ prægning til det øverste ydre lag (41) i en retning, der er modsat den retning, der er givet til det nederste ydre lag (42), overførsel af klæbemiddel til det øverste ydre lag (41), der vender mod det mellemste lag (43) ved hjælp af den anden lamineringsmekanisme (35) og sammenføje det øverste ydre lag (41) med det nederste ydre lag (42) og det mellemste lag (43), der kommer fra den første lamineringsenhed (20) ved den anden lamineringsenhed (30).

12. En konverteringsproces ifølge krav 11, **kendetegnet ved at** førnævnte trin (a) omfatter de følgende undertrin at:

i) forsyne dekorativ prægning udad på det nederste ydre lag (42) ved hjælp af udsparingerne (212) og fanerne (213), der er forsynet på den nederste prægningsrulle (21), når det nederste ydre lag (42) passerer gennem den nederste prægningsrulle (21)

ii) overføre klæbemiddel mod den nederste prægningsrulles (21) faner ved den første lamineringsmekanisme (27) og dermed overførsel af klæbemiddel til siden af det nederste ydre lag (42), der vender mod det mellemste lag (43)

iii) forsyne mikroprægning til det mellemste lag (43) ved at passere det mellemste lag (43) mellem mikroprægningsrullen (24) og den første presserulle (25), der har den ydre væg (251) i kontakt med mikroprægningsrullens (24) ydre væg (241), hvor mikroprægningsrullen (24) er forsynet således at det nederste ydre lag (42) og det mellemste lag (43) kan passere igennem den nederste prægningsrulle (21) og mikroprægningsrullen (24)

iv) passere det nederste ydre lag (42) og det mellemste lag (43) mellem den nederste prægningsrulle (21) og sammenføjningsrullen (23) og klæbe lagene (42, 43) sammen

v) overføre det mellemste lag (43) og det nederste ydre lag (42) til den anden lamineringsenhed (30) ved hjælp af mindst en overførselsrulle (34).

13. En konverteringsproces ifølge krav 12, **kendetegnet ved at** i førnævnte trin (i), passerer det nederste ydre lag (42) mellem den nederste prægningsrulle (21) og den anden presserulle (22), den ydre væg (221), som er i kontakt med den nederste prægningsrulles (21) ydre væg (211) og får en dekorativ prægning ved hjælp af trykket, der påføres af den anden presserulle (22) til det nederste ydre lag (42).

14. En konverteringsproces ifølge krav 12, **kendetegnet ved at** i førnævnte trin (ii), er klæbemidlet overført fra klæbemiddelkammeret (271), der er placeret i den første lamineringsmekanisme (27) til aniloxrullen (272), der er forsynet i nærheden af førnævnte klæbemiddelkammer (271), og overføres fra førnævnte aniloxrulle (272) til det nederste ydre lag (42) ved hjælp af printrullen (273), der er forsynet mellem den nederste prægningsrulle (21) og førnævnte aniloxrulle (272).

15. En konverteringsproces ifølge krav 14, **kendetegnet ved at** førnævnte aniloxrulle (272) modtager klæbemidlet fra førnævnte klæbemiddelkammer (271) til flerheden af celler i mikroniveau, der er forsynet på overfladen og overfører klæbemidlet til førnævnte printrulle (273).

16. En konverteringsproces ifølge krav 12, **kendetegnet ved at**, i førnævnte trin (iii), er prægning på det mellemste lag (43) realiseret ved hjælp af tilstedeværelsen af flerheden af kamme i pletform, forsynet på mikroprægningsrullens (24) ydre væg (241) og ved hjælp af trykket, der påføres af den første presserulle (25) til det mellemste lag (43).

17. En konverteringsproces ifølge krav 11, **kendetegnet ved at** trin (b) omfatter følgende undertrin:

i) forsyne dekorativ prægning udad ved hjælp af udsparingerne (312) og fanerne (313), der er forsynet på den øverste prægningsrulle (31) på det øverste ydre lag (41), når det øverste ydre lag (41) passerer gennem den øverste prægningsrulle (31)

ii) overføre klæbemiddel til fanerne (313) på den øverste prægningsrulle (31) ved den anden lamineringsmekanisme (35) og overføre dermed klæbemiddel til siden af det øverste ydre lag (41), der vender mod det mellemste lag (43)

iii) sammenføje det øverste ydre lag (41) med det nederste ydre lag (42) og det mellemste lag (43), der kommer fra den første lamineringsenhed (20) mellem den anden sammenføjningsrulle (33) og den øverste prægningsrulle (31).

18. En konverteringsproces ifølge krav 17, **kendetegnet ved at** i trin (i), passere det øverste ydre lag (41) gennem den øverste prægningsrulle (31) og den tredje presserulle (32), som har den ydre væg (321) i kontakt med den øverste prægningsrulles (31) ydre væg (311) og dekorativ prægning opnås ved hjælp af trykket, der påføres af den tredje presserulle (32) til det øverste ydre lag (41).

19. En konverteringsproces ifølge krav 17, **kendetegnet ved at** i trin (ii), er klæbemidlet overført fra klæbemiddelkammeret (351), der er forsynet i den anden lamineringsmekanisme (35), til aniloxrullen (352), der er forsynet i nærheden af førnævnte klæbemiddelkammer (351) og overføres fra førnævnte aniloxrulle (352) til det øverste ydre lag (41) ved hjælp af printrullen (353), der er forsynet mellem den øverste prægningsrulle (31) og førnævnte aniloxrulle (352).

20. En konverteringsproces ifølge krav 19, **kendetegnet ved at** førnævnte aniloxrulle (352) tager klæbemidlet fra førnævnte klæbemiddelkammer (351) til flerheden af celler i mikroniveau, der er forsynet på overfladen af dette, og overfører klæbemidlet til førnævnte printrulle (353).

DRAWINGS

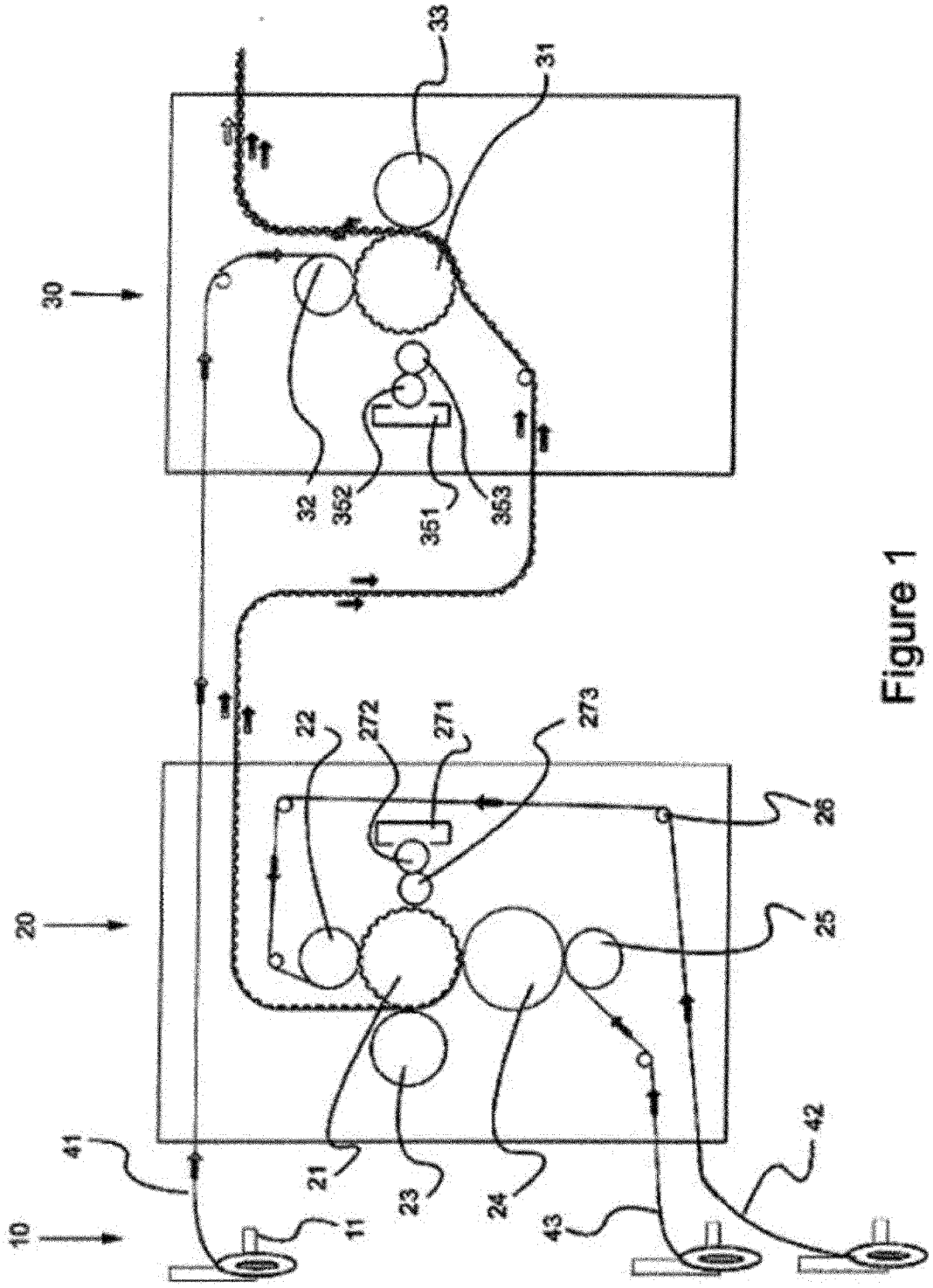

Figure 1

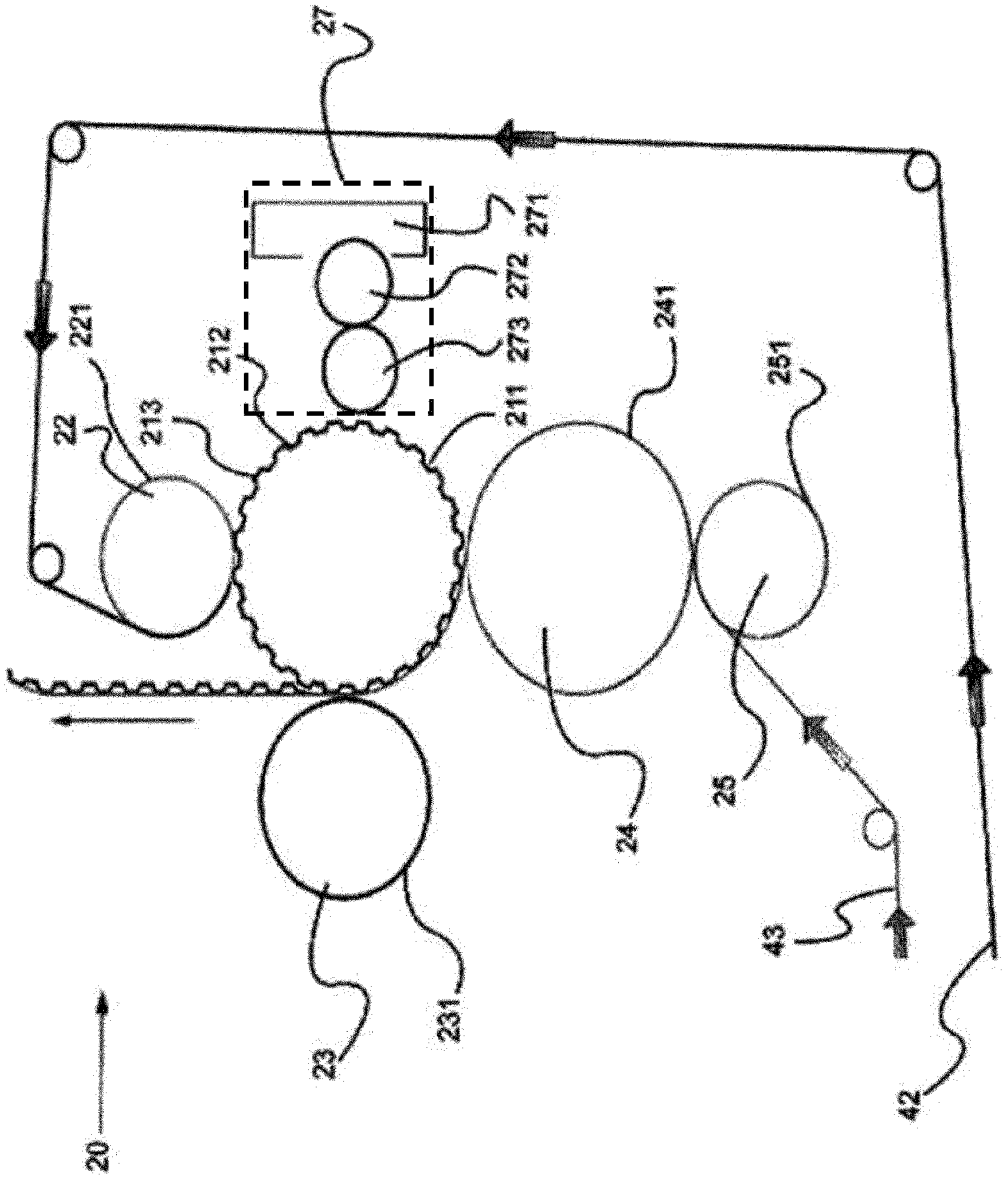

Figure 2a

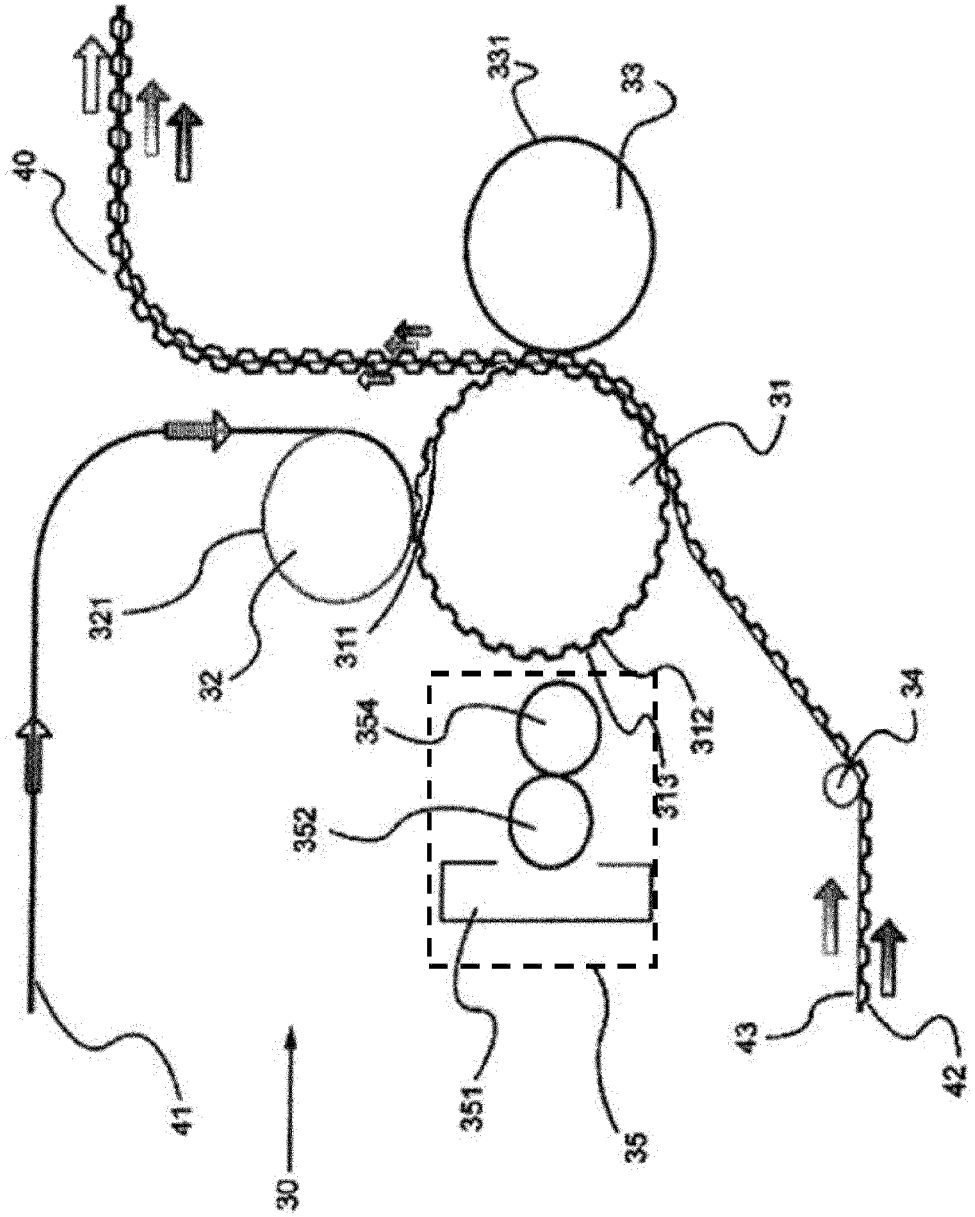

Figure 2b

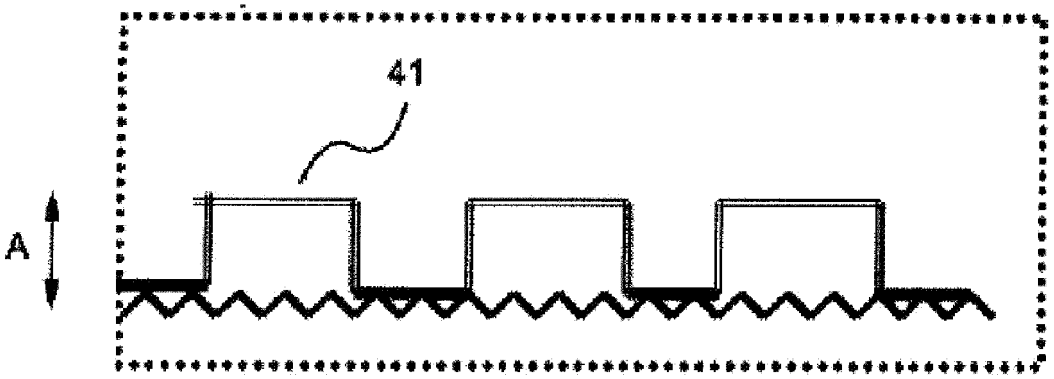

Figure 3a

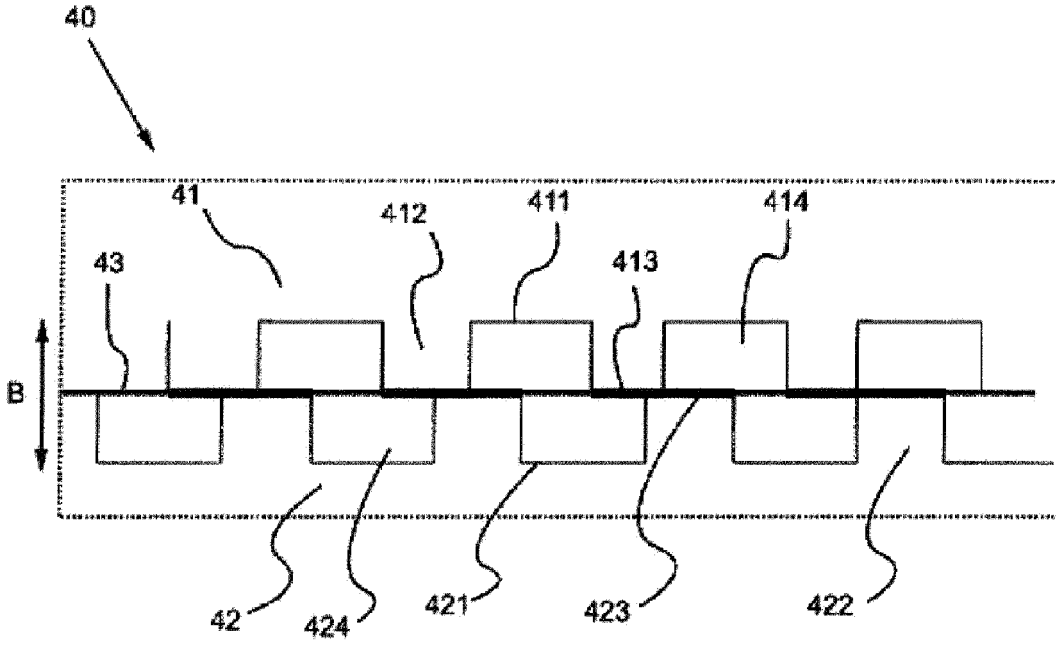

Figure 3b