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(71) Applicant: **International Paper Italia S.R.L.**
20882 Bellusco (MB) (IT)

(72) Inventor: **Margnini, Fabrizio**
00040 Pomezia (RM) (IT)

(74) Representative: **Biallo, Dario et al**
Barzanò & Zanardo Milano S.p.A.
Via Borgonuovo, 10
20121 Milano (IT)

(54) Machine for the waterproof treatment of a blank for making a container for foodstuffs transport and process for waterproofing said blank

(57) The present invention refers to a machine (20) and to a process for waterproofing a blank (10) for making a container for foodstuffs transport, in which the blank (10) comprises at least one plane inner sheet (11) made of paper material adapted to come into contact with foodstuffs, comprising a first coating waterproof layer (14) made with a hot glue; at least one plane outer sheet (12) made of paper material opposite to the inner sheet; and, at least one corrugated sheet (13) made of paper material interposed between the inner sheet (11) and the outer sheet (12). The waterproofing of the blank (10) is performed by means of two spreading rollers (22) which apply the hot glue simultaneously on the plane inner sheet (11) and on the plane outer sheet (12) of the blank.

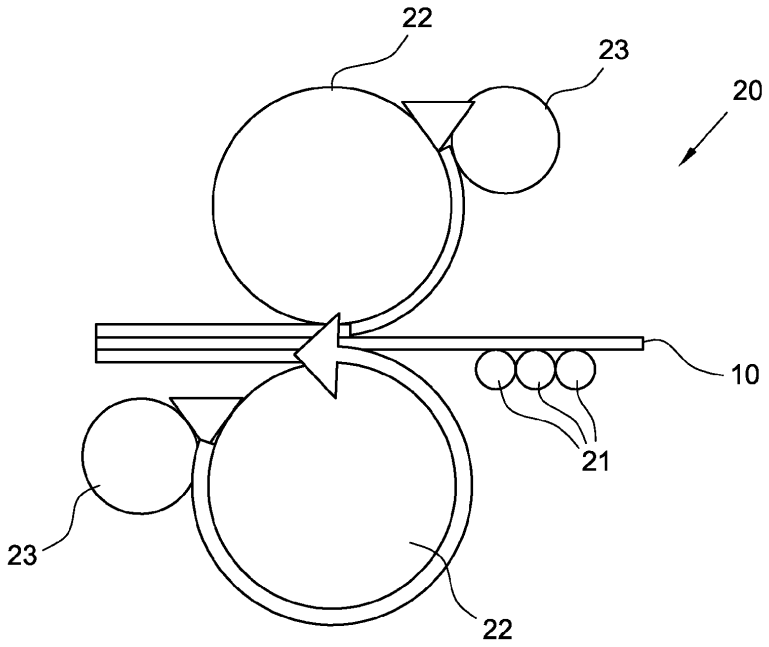

Fig. 3

EP 2 759 488 A2

Description

[0001] The present invention refers to a machine for the waterproof treatment of a blank for making a container for foodstuffs transport.

[0002] A process for the waterproof treatment of a blank for making a container for foodstuffs transport also forms a purpose of the present invention.

[0003] In particular, the blank subject of the present invention is intended to be used for producing boxes, commonly known at present, for fruits, poultry products, dairy products and generally moist and wet foodstuffs.

[0004] Such boxes are generally made of blanks made of paper material which are folded to make containers open at the top part, which containers, once filled, are stacked on each other before being transported to the sale points.

[0005] Thus, these blanks have to be simultaneously rigid so as to bear the weight of the foodstuffs contained therein and lightweight so as to facilitate the transport thereof.

[0006] For such purposes, the blanks currently used for making the aforementioned containers generally comprise at least one plane inner sheet made of paper material intended to come into contact with foodstuffs, at least one plane outer sheet made of paper material opposite to the inner sheet and at least one corrugated sheet made of paper material interposed between the inner and the outer sheet and fixed to the them by means of gluing.

[0007] The corrugated sheet confers rigidity and sturdiness to the blank while simultaneously remaining foldable and lightweight.

[0008] In order to contain fresh, moist and wet foodstuffs such as fruits, vegetables or poultry products, the containers are required to not absorb water so as to maintain their mechanical resistance, rigidity and weight characteristics.

[0009] Thus, it is currently known to treat the blanks with mixtures based on paraffin which allows to reduce the absorption of water by the paper material they are made of.

[0010] In particular, the paraffin is spread on the corrugated sheet or on the inner sheet.

[0011] The larger the amount of paraffin spread, the more the blank is the capability to be waterproof. However, the use of a high amount of paraffin reduces the gluing force between the flaps of the blank required for forming the box itself.

[0012] For this reason, it is known to spread paraffin according to quantities such as to ensure an efficient gluing without ensuring appropriate waterproof.

[0013] In addition, it should be observed that the performance of an ink printing on a blank is strongly reduced by the presence of paraffin, given that the inks are generally water-based and the paraffin prevents it from being correctly absorbed by the paper. Thus, there is the tendency to avoid the treatment of the sheet to be printed, generally the outer sheet, using paraffin. In addition, the paraffin spread on the outer and the inner sheet makes the containers slippery, hence it may compromise their use on conveyor belts or, in particular cases, the stability thereof when stacked.

[0014] In addition, it should be considered that the waterproofing of the blanks using paraffin is quite long and complex in that it requires machineries and particularly complex application systems.

[0015] The main purpose of the present invention is to overcome the previously mentioned drawbacks.

[0016] A purpose of the present invention is to provide a simple and inexpensive machine and process for the waterproofing of blanks.

[0017] Another purpose of the present invention is to provide a machine and a process for the quick waterproofing of blanks.

[0018] Another purpose of the present invention is to provide a blank for making a container for foodstuffs transport capable of guaranteeing high waterproof characteristic.

[0019] Another purpose of the present invention is to provide a blank for making a container for foodstuffs transport capable of allowing an easier and more stable stacking with respect to the known containers.

[0020] These and other purposes according to the present invention are attained by a machine, a process and a blank as outlined in the claims that follow.

[0021] The features and the advantages of the machine and the process for the waterproof treatment of the blanks according to the present invention shall be more evident from the following exemplifying and nonlimiting description with reference to the attached schematic drawings wherein:

- figures 1a and 1b are two sectional schematic views of a blank for making a container for foodstuffs transport according to the present invention;
- figure 2 is a perspective schematic view of a detail of a machine for the waterproof treatment of the blank of figure 1;
- figure 3 is a side schematic view of a detail of the machine of figure 2 in an operating step thereof.

[0022] With reference to the figures, a blank for making a container for foodstuffs is shown, indicated in its entirety with 10.

[0023] Such blank 10 comprises, as observable in figure 1a, at least one plane inner sheet 11, at least one plane outer sheet 12 opposite to the inner sheet 11 and at least one corrugated sheet 13, 16 interposed between the inner sheet 11 and the outer sheet 12.

[0024] In the embodiment illustrated in figure 1b, the blank 10 comprises two corrugated sheets 13 and 16 separated from each other by a plane intermediate sheet 17. In particular, the first corrugated sheet 13 is interposed between the inner sheet 11 and the plane intermediate sheet 17 while the second corrugated sheet 16

is interposed between the plane intermediate sheet 17 and the outer sheet 12.

[0025] In any case, the aforementioned sheets 11, 12, 13, 16, 17 which form the blank are preferably made of paper material and they are glued to each other.

[0026] In particular, the at least one plane inner sheet 11 is adapted to come into contact with foodstuffs, while the at least one plane outer sheet 12 is suitable for being ink-printed with decorative patterns.

[0027] At least one plane inner sheet 11 comprises a first coating waterproof layer 14 made with a hot glue.

[0028] Such hot glue is a mixture preferably made up of polar and non-polar polymers, resins and waxes.

[0029] Such coating waterproof layer 14 may advantageously come into contact with foods given that it is not toxic; at the same time, it guarantees a high waterproof degree ensuring that the container made through the blank 10 remains rigid and compact over the entire duration of its use.

[0030] In particular, the previously described blank 10 made of paper material has a COBB index, i.e. the water absorption index equivalent to about 15 g/m^2; such COBB index is measured using measurement methods according to the per se known TAPPI 441 standard.

[0031] Otherwise, the untreated blanks have a COBB index equivalent to 150 g/m^2; the blanks known at the state of the art, in which the corrugated sheet is treated using paraffin, are characterised by a COBB index equivalent to about 110 g/m^2.

[0032] Preferably, the at least one plane outer sheet 12 comprises a second coating waterproof layer 15 made with the aforementioned hot glue.

[0033] Thus, besides the increase of the waterproof degree of the blank 10, the friction coefficient of the surface of the outer sheet 12 is also increased. This allows a safe grip on the containers which can thus be easily gripped and stably stacked before being transported to the different sellers.

[0034] In addition, the second coating layer 15 does not affect the tightness of the ink printing of any decorated patterns.

[0035] Additionally or alternatively to the provision of the second coating waterproof layer 15, the at least one corrugated sheet 13, 16 comprises a third coating layer (not illustrated) made using paraffin.

[0036] Should the blank 10 comprise the two corrugated sheets 13 and 16 and the plane intermediate sheet 17, one or more of such sheets may comprise such third coating layer.

[0037] Such further coating layer allows to increase the waterproofness of the blank and thus to reduce the COBB index.

[0038] The blank 10 according to the present invention may be made by means of a machine for the waterproof treatment 20 which will be described hereinafter.

[0039] A blank, not treated on the surface, is introduced in such machine 20 so that the machine 20 makes the first 14 and possibly the second 15 coating layer on the blank 10.

[0040] It should be observed that, should the blank 10 comprise the third coating layer of paraffin, the third coating layer is made on the corrugated sheet 13 before the latter is glued to the inner 11 and the outer 12 sheets to make the body of the blank 10.

[0041] Similarly, with reference to the embodiment illustrated in figure 1b, the third coating layer of paraffin is made on at least one of the corrugated sheets 13 and 16 and/or on the plane intermediate sheet 17 before the latter are glued to the remaining sheets making the blank 10.

[0042] The machine 20 comprises means 21 for supporting and transporting the blank to be treated, for example one or more conveyor belts or rollers.

[0043] Furthermore, the machine 20 comprises at least two motor-driven spreading rollers 22 suitable for spreading the hot glue on the at least one plane inner sheet 11 so as to make at least the first coating layer 14.

[0044] In particular, the two motor-driven spreading rollers 22 may also be arranged to also make the second coating layer 15.

[0045] Still with reference to figures 2 and 3, the two spreading rollers 22 are opposite to each other to border an intermediate gap suitable for being engaged by at least one blank 10 during the spreading of the hot glue. According to such structural configuration the spreading rollers 22 simultaneously spread the hot glue on the plane inner sheet 11 and on the plane outer sheet 12 making the respective coating layers 14, 15. The center to center distance between the two spreading rollers 22 may be advantageously varied so as to allow the treatment of blanks of different thickness. Actually, the spreading of the hot glue occurs by means of direct contact with the blank which is allowed to pass through the two spreading rollers 22.

[0046] The machine 20 further comprises at least two motor-driven doser rollers 23 suitable for dosing the hot glue on the at least two spreading rollers 22, at least one device (not illustrated) for delivering the aforementioned hot glue on such at least two doser rollers 23 and a central processing and control unit (not illustrated) configured for activating the machine 20.

[0047] In particular, the doser rollers 23 are arranged with respect to the corresponding spreading rollers at a distance such to allow the passage of the glue from one roller to the other.

[0048] Preferably, such distance can vary according to the amount of glue intended to be spread on the blank 10. The variation is advantageously performed by means of spindles driven by the central processing and control unit.

[0049] Actually, in such case the machine 20 comprises means (not illustrated) for adjusting the distance between the at least two doser rollers 23 and the at least two spreading rollers 22, and the central processing and control unit is also configured for driving such adjustment means so that the amount of the glue spread on the blank 10 is substantially equal to a predetermined value.

[0050] To make the first coating layer 14 the glue is applied on the spreading roller which comes into contact with the inner sheet 11.

[0051] Otherwise, should the second coating layer 14 be also made, the glue is applied on both spreading rollers 22. The device for delivering the glue preferably comprises a device for melting the hot glue provided with a nozzle through which the hot glue is made to drip on the doser rollers 23.

[0052] The dosing of the hot glue is driven by the central processing and control unit which controls the delivery device so that the delivered amount of hot glue is substantially constant and equivalent to a predetermined value.

[0053] According to the present invention, the at least two spreading rollers 22 are made of rubber material.

[0054] The use of rubber material, preferably resistant to temperatures, allows to reduce the vertical stress on the blank 10 which passes through the spreading rollers 22, so as to mantain the mechanical characteristics thereof, and simultaneously allow to obtain the most homogeneous spreading on a non-perfectly planar surface, like the one typical of corrugated cardboard. Preferably, the at least two doser rollers 23 are made of steel and they are cylindrical-shaped.

[0055] Preferably, such doser rollers 23 are provided with an oil heating system (not illustrated) arranged to heat the surface thereof. In particular, such heating system may be obtained by means of a plurality of channels made in the body of the doser rollers 23, in which the hot oil flows.

[0056] In a possible embodiment of the present invention, the central processing and control unit is also configured for controlling the oil temperature. In such case, the heating system is provided with one or more temperature sensors (not illustrated) suitable for detecting the heating oil temperature.

[0057] Thus, the processing and control unit provide a feedback control of the oil temperature according to the detections of such sensors.

[0058] A process for waterproofing at least one blank 10 also forms a purpose of the present invention.

[0059] The process firstly comprises, a step of arranging at least one blank 10 to be made waterproof, preferably a plurality of blanks 10 to be supplied consecutively to the previously described machine, then, a step of spreading, by means of the aforementioned spreading rollers 22, a hot glue on at least the plane inner sheet 11, preferably also on the plane outer sheet 12, so as to make the respective coating layers 14, 15. Advantageously, the spreading of the hot glue is performed simultaneously, by the spreading rollers 22, on the plane inner sheet 11 and on the outer sheet 12 of the respective blank 10.

[0060] In detail, the spreading of the hot glue on each blank 10 being supplied is performed by advancing each blank 10 between the spreading rollers 22, each of which engages the respective sheet 11, 12 so as to deposit and spread the hot glue thereon.

[0061] The description above clearly outlines the characteristics and the relative advantages of the machine and the process according to the present invention.

[0062] Actually, the use of a hot glue for making coating layers of the surfaces of the inner and outer sheet allows to obtain a high waterproof degree thus simultaneously allowing an easy gluing between the various flaps of the blank, so as to make the container for foodstuffs transport.

[0063] The application of such hot glue on the outer sheet of the blank maintains the possible decorative printing on such sheet clear and durable over time, in that it forms a protective layer for the printing itself. In addition, such second coating layer reduces the slipperiness of the blank thus allowing a safe grip of the container made using the blank.

[0064] Lastly, it is possible to guarantee a cost saving given that the application of paraffin is no longer required. Lastly, it is clear that the process and the machine thus obtained can be subject to many changes and variants, all falling within the inventive concept; moreover, all details can be replaced by technically equivalent elements. In practice the materials used, as well as the dimensions, may vary according to the technical requirements.

Claims

1. Machine (20) for the waterproof treatment of a blank of the type comprising at least one plane inner sheet (11) made of paper material being adapted to come into contact with foodstuffs; at least one plane outer sheet (12) made of paper material opposite to said inner sheet (11), at least one corrugated sheet (13, 16) made of paper material interposed between said inner sheet (11) and said outer sheet (12);
said machine comprising:

   - means (21) for the support and transport of said blank to be treated;
   - at least two motor-driven spreading rollers (22) suitable for spreading a hot glue on at least one from among said plane inner sheet (11) and said plane outer sheet (12) so as to make a coating layer (14, 15), said spreading rollers (22) being made of rubber material;
   - at least two motor-driven doser rollers (23) suitable for dosing said hot glue on said at least two spreading rollers (22);
   - at least one device for delivering a hot glue on said at least two doser rollers (23);
   - a central processing and control unit configured for activating said machine (20).

2. Machine (20) according to claim 1 comprising means for adjusting the distance between said at least two doser rollers (23) and said at least two spreading rollers (22), and wherein said central processing and

control unit is also configured for driving said adjustment means so that the amount of said hot glue spread on said blank is substantially equal to a predetermined value.

3. Machine (20) according to claim 1 or 2 wherein said at least two doser rollers (23) are provided with an oil heating system arranged to heat the surface of the same.

4. Machine (20) according to claim 3 wherein said central processing and control unit is configured for controlling the temperature of said oil.

5. Machine (20) according to any one of claims 1 to 4, wherein the two spreading rollers (22) are opposite to each other to border an intermediate gap suitable for being engaged by at least one blank (10) during the spreading of the hot glue, said spreading rollers (22) simultaneously spreading the hot glue on the plane inner sheet (11) and on the plane outer sheet (12) to obtain respective coating layers (14, 15).

6. Process for the waterproofing of a blank (10) of the type comprising at least one plane inner sheet (11) being adapted to come into contact with foodstuffs; at least one plane outer sheet (12) made of paper material opposite to said inner sheet (11), at least one corrugated sheet (13, 16) made of paper material interposed between said inner sheet (11) and said outer sheet (12); said method comprising the following steps:

arranging at least one blank (10) to be made waterproof;
spreading, using at least two spreading rollers (22) made of rubber, a hot glue on at least one from among said plane inner sheet (11) and said plane outer sheet (12) of said blank (10) so as to make a coating layer (14, 15).

7. Process according to claim 6, wherein the spreading of said hot glue is performed simultaneously on the plane inner sheet (11) and on the outer sheet (12) of said blank (10).

8. Process according to claim 7, wherein the spreading of said hot glue on said blank (10) is performed by advancing the latter between said spreading rollers (22), each spreading roller (22) engaging a respective sheet (11, 12) of said blank (10) for spreading the latter with said hot glue.

9. Blank (10) for making a container for carrying foodstuffs, comprising:

- at least one plane inner sheet (11) made of paper material adapted to come into contact with foodstuffs, said inner sheet (11) comprising a first coating waterproof layer (14) made with a hot glue.
- at least one plane outer sheet (12) made of paper material opposite to said inner sheet (11), said outer sheet (12) comprising a second waterproof coating layer (15) made with a hot glue;
- at least one corrugated sheet (13, 16) made of paper material interposed between said inner sheet (11) and said outer sheet (12);

characterised in that it is made by means of a machine according to any one of claims 1 to 5 and/or through a process for waterproofing according to any one of claims 6 to 9.

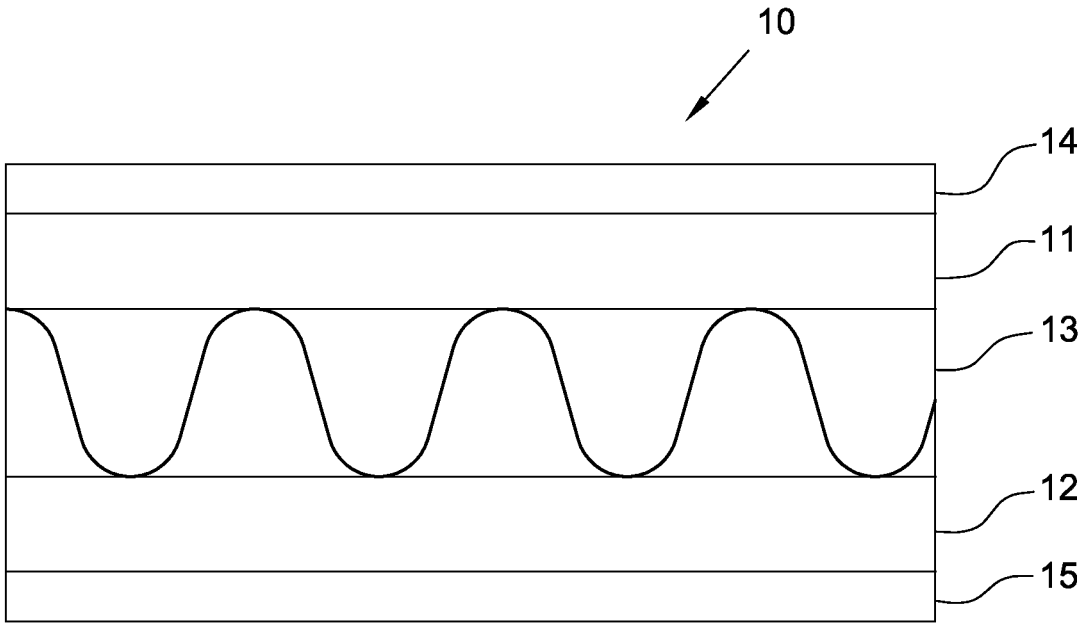

Fig. 1a

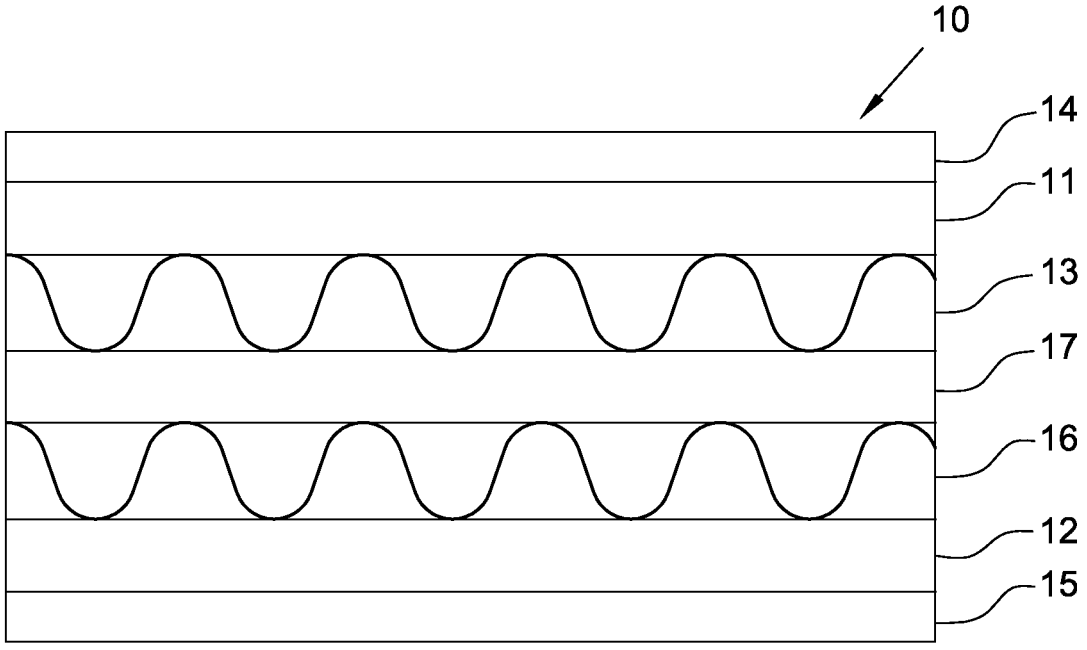

Fig. 1b

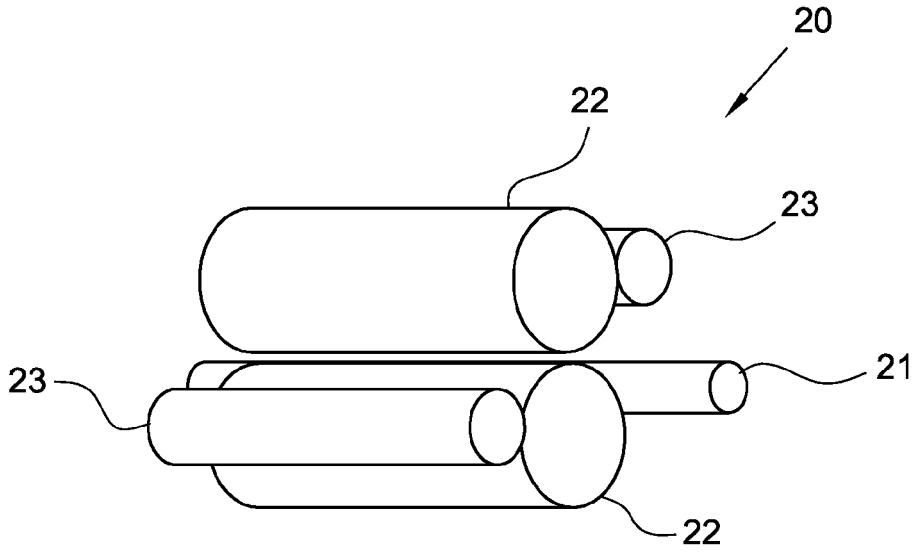

Fig. 2

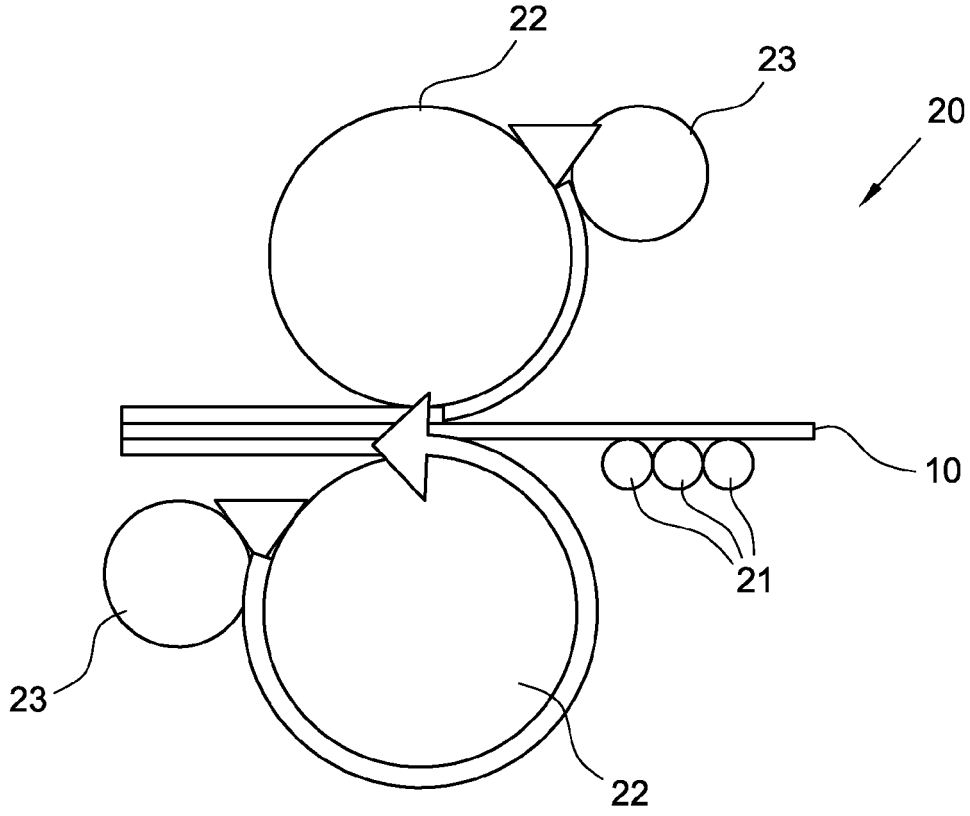

Fig. 3