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(54) MACHINE FOR PRODUCING CONTAINERS WITH EMBOSSING FOR POURABLE FOOD PRODUCTS

(57) The invention relates to a machine (1) for producing containers for pourable food products starting from a band (N) of a packaging material.

The machine (1) comprises: a feeding station (2), in which the band (N) of packaging material is fed along an advancing direction (D).

Downstream of the feeding station (2), the machine (1) comprises:

- a first sealing station (7), in which the band (N) is sealed in such a way to form a tube;
- a filling station (8), in which the tube is filled with a food product.

In particular, between the feeding station (2) and the filling station (8), the machine (1) comprises embossing means (4) that can be activated for embossing the band (N).

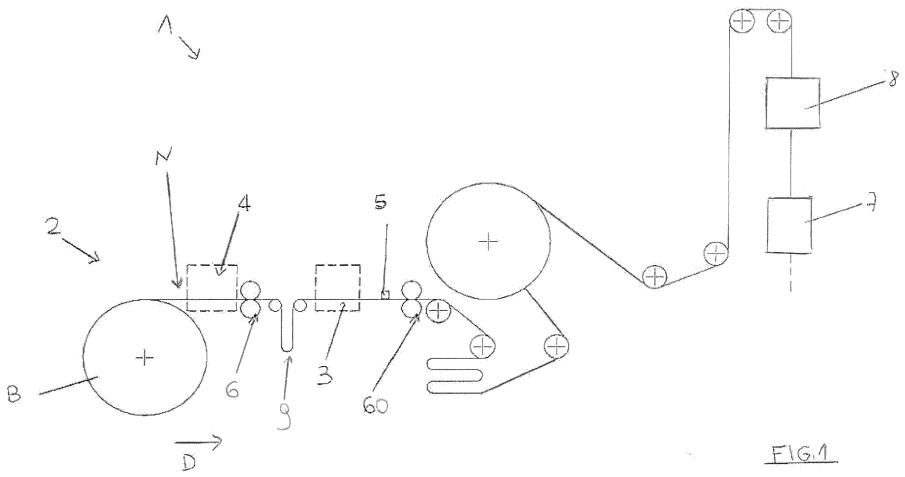

FIG.1

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Description

[0001] The present invention falls within the technical field of containers for pourable food products. In particular, the invention relates to a machine for producing embossed containers for pourable food products.

[0002] The containers for pourable food products (fruit juices, milk, various types of sauces, etc.) are obtained starting from a continuous band of packaging material usually formed by a plurality of layers of different materials coupled together (usually paper, aluminum and heat-sealable plastic material, such as for example polyethylene).

[0003] A machine intended for making such containers comprises a feeding station, in which a band of packaging material is fed, and in particular is unwound from a reel. The machine further comprises, downstream of the feeding station, a creasing station, in which creasing lines are made on the band.

[0004] Then, the band is sterilized by passing it within a tank containing hydrogen peroxide, and then is closed at a sealing station of the machine, so as to form a tube having an open end. The open tube arrives at the filling station where is filled with the food product.

[0005] The filled tube is carried to a second sealing station of the machine, where it is sealed in order to form closed wrappers which are then separated by suitable cutting means. Once separated, the closed and sealed wrappers (having a "pillow shape") are conveyed to a folding station in which they are manipulated in order to obtain their final shape. The band unwound from the reel in the feeding station generally has various kinds of prints and/or decorative patterns, in order to lend optimal aesthetic appearance to the containers formed by this band.

[0006] Generally, decorative patterns are made, for example, by embossing the band in order to impress thereon various types of marks and/or symbols. These decorative patterns, as well as the prints, are made by the paper mills providing the band reels to be processed. However, the above described solution has some drawbacks.

[0007] In fact, the reels of embossed band produced by the paper mills are highly expensive.

[0008] Moreover, the above mentioned solution does not provide high flexibility, in that if the production of embossed containers would be switched to the production of non-embossed containers (or vice versa), the reel of embossed band must be necessarily removed from the machine and replaced by a reel of non-embossed band (or vice versa). Object of the present invention is to overcome the above described drawbacks.

[0009] This object is achieved by a machine for producing containers with embossing for pourable food products according to the accompanying claims.

[0010] Advantageously, the machine according to the present invention allows the in-line embossing of the band, i.e. during the production of the containers themselves, so that the availability of embossed reels is no more required. Therefore, compared to the known art, costs associated with these embossed reels are reduced.

[0011] Additionally, the invention provides greater flexibility with respect to the prior art, since it is possible to decide whether or not to emboss the band of material even during the production of the same containers after loading the reel in the machine, without having to replace the reel.

[0012] Further advantages of the invention will be made apparent in the following discussion, with the aid of the accompanying figures, in which:

- figure 1 is a partial schematic view of a machine for producing containers with embossing for pourable food products according to the present invention, according to a first embodiment;
- figure 2 shows a view similar to that of figure 1, according to a second embodiment of the invention.

[0013] Referring to the accompanying figures, a machine for producing containers with embossing for pourable food products according to the present invention is denoted by the reference 1. The pourable food containers are obtained starting from a band N of packaging material.

[0014] The machine 1 comprises a feeding station 2, in which the band N is fed along an advancing direction D. For example, at the feeding station 2 the band N is wound so as to form a reel B.

[0015] Downstream of the feeding station 2, the machine 1 comprises a first sealing station 7 (schematically shown), in which the band is sealed so as to form a tube; and a filling station 8 (also schematically shown), in which the tube is filled with a food product through a respective open end.

[0016] In particular the machine 1 comprises, between the feeding station 2 and the filling station 8, embossing means 4 that can be activated for embossing the band N.

[0017] With embossing is meant the process through which a material is pressed in order to impress thereon a given pattern (i.e. one or more signs or marks), or in any case to impart to at least one surface of the material a series of recesses and reliefs. Advantageously, thanks to the embossing means 4, the particularly high costs of purchasing and storing embossed reels can be cut.

[0018] Furthermore, the machine 1 is flexible, since it is possible to decide on case by case basis whether to make the embossing of the band or not, by activating or not the embossing means 4. Therefore it is possible to switch from the production of containers with embossing to the production of containers without embossing (and vice versa) without having to replace the reel B of band N from the machine 1.

[0019] For example, the embossing means 4 comprise at least one pair of embossing rollers (schematically depicted in figures), between which the band N is fed.

[0020] According to the preferred embodiment of the invention, the embossing means 4 comprise: a first em-

bossing group that can be activated for making a first embossing on the band N, and a second embossing group that can be activated for making a second embossing different from the first embossing, on the band N.

[0021] Advantageously, this preferred solution provides high flexibility. In fact in addition to the above described advantages, different embossing patterns, i.e. different impressed decorative patterns, can be obtained on a same reel B. As a result, the production of a first type of containers with a first embossed decorative pattern can be changed to the production of a second type of containers with a second embossed decorative pattern without having to replace the reel B of band N on the machine 1. This aspect turns out to be particularly advantageous if the demand varies with respect to market forecasts: in fact, this embodiment allows quick response to changes in demand, thereby eliminating the storage of embossed band reels that may remain unused.

[0022] On the contrary, with the machines of the prior art the production of embossed containers is not very flexible: in fact, if the production must be changed from a first type of containers with a first decorative pattern to a second type of containers with a second embossed decorative pattern, the band reel currently in the machine must be replaced with another band reel. This operation involves prolonged machine down times.

[0023] Additionally, with known solutions (such as the one described in the introduction) it is problematic to cope with changes in demand. In fact, manufacturers of containers are inclined to buy and store specific quantities of embossed reels, in order to meet the demands of the market, taking into account any demand peaks. However, in case of changes in demand with respect to market forecasts, the demand can not be met quickly and efficiently. Furthermore, with known solutions high costs are involved in storing in warehouse reels unused for a long time.

[0024] In the machine 1 according to the invention, for example, there may be at the same time the first embossing group and the second embossing group and they can be activated either alternatively (i.e. one by one) or in combination with one another, depending on needs. In this case, the time required to switch from a first type of container with embossing to a second type of container with embossing is significantly reduced. According to a variation, on the machine 1 there may be the first embossing group alternatively to the second embossing group, that is, they can be replaceable with one another (i.e. removable from the machine 1). This allows the overall dimensions of the machine 1 to be reduced.

[0025] Clearly, there can also be more than two embossing groups.

[0026] Referring to the attached figures, the machine 1 comprises at least one first creasing station 3, in which crease lines are made on the band N.

[0027] As an alternative, the creasing lines may be already provided on the band N once the latter is arranged in the feeding station 2.

[0028] Creasing lines are lines which are impressed on the material in order to allow the obtainment of a container having predetermined shape at the end of the respective manufacture.

[0029] The band N is made up of a material formed, for example, by a plurality of layers of different materials coupled together (usually paper, aluminum and heat-sealable plastic material, such as polyethylene).

[0030] For example, the embossing means 4 are arranged downstream of the first creasing station 3. This ensures that the embossing of the band N does not affect the implementation of the creasing lines.

[0031] According to an alternative, the embossing means 4 are arranged between the feeding station and the first creasing station 3.

[0032] According to another variation, the embossing means 4 are arranged at the first creasing station 3. This means that, in this case, the creasing lines and the embossing of the band N are simultaneously made.

[0033] Referring to figure 1, the machine 1 may further comprise a paper buffer storage 9 arranged between the embossing means 4 and the first creasing station 3. Thanks to the paper buffer storage 9 any tension that could arise on the band N between the embossing means 4 and the first creasing station 3 can be avoided and/or loosen. Such tension could damage the band N thus jeopardizing the integrity of the container to be made.

[0034] For example, considering the case in which the embossing means 4 include embossing rollers and the first creasing station 3 includes creasing rollers, if there was the need to regulate (or reset) in an opposite direction the two groups of rollers (the embossing and the creasing ones), these tension could arise. Additionally, the paper buffer storage 9 is advantageous if each roller group was to be set at a different time from the other (specifically, when it does not contact the band N, i.e. does not engage the band N).

[0035] It is therefore possible to independently regulate the embossing means 4 and the means that perform the creasing in the first creasing station 3, without the risk of damaging the band N.

[0036] Still referring to figure 1, the machine 1 further comprises first driving means 6 to drive the band N, the means being able to be motorized and arranged between the embossing means 4 and the paper buffer storage 9. The first driving means 6 to drive the band N ensure that the band N is properly taut during embossing operations and that it is advanced up to the paper buffer storage 9.

[0037] Referring to figure 2, the machine 1 further comprises a second creasing station 30 arranged downstream of the first creasing station 3 and the embossing means 4.

[0038] For example, the first creasing station 3 and/or the second creasing station 30 may comprise creasing rollers and/or creasing plates.

[0039] The machine 1 may further comprise a second sealing station (not shown), in which the filled tube is sealed to form a plurality of closed wrappers; the second

sealing station is arranged downstream of the feeding station 2, the first sealing station 7 and the filling station 8.

[0040] Additionally, the machine 1 may comprise at the second sealing station, or downstream of the latter, cutting means (not shown), in order to separate the filled and closed wrappings.

[0041] The machine 1 may also comprise a sterilizing station (not shown), for example comprising a tank containing hydrogen peroxide, in which the band N is passed before being filled.

[0042] The band N may comprise a reference graphic mark, which is, for example, a nick printed on the band N itself. The reference graphic mark is arranged at a predetermined position of the band N. The reference graphic mark may represent one or more characteristics of the band N itself, such as for example the possible location of a decorative print.

[0043] The machine 1 may comprise a control and regulation group (not shown) connected to the embossing means 4 and able to regulate the activation and/or position thereof. The control and regulation group comprises at least one electronic control.

[0044] Furthermore, the machine 1 may comprise sensing means 5 (for example optical means) suitable for sensing the position of the cited reference graphic mark and for transmitting the sensed position to the control and regulation group. The control and regulation group can regulate the activation and/or the positioning of the embossing means 4, depending on the detected position. The control and regulation group comprises for example an encoder.

[0045] Advantageously, the embossing can be optimally carried out thanks to the sensing means 5, which sense the reference graphic mark, and to the control and regulation group. In fact, by detecting the position on the band N of the reference graphic mark, the position in which the embossing must be carried out can be precisely determined with respect to the reference graphic mark itself (i.e. with respect to the band N).

[0046] For example, if there is a decorative print on the band N, the embossing can be made on specific points of the print in order to obtain a particular aesthetic appearance for the container.

[0047] According to an alternative, the reference graphic mark could be part of the decorative print of the band N.

[0048] In the case in which the embossing means 4 are embossing rollers and in which the pattern to be embossed is not directly related to the size of the band and the respective unwinding, the control and regulation group allows the regulation of the phase of the roll by correctly positioning the latter. This allows the same embossing rollers to be used for bands having different sizes and/or characteristics.

[0049] Clearly, also the creasing operations can be managed similarly to what mentioned for the embossing operations, independently from the latter or in combination therewith. This implies that either a further control and regulation group may be provided to control the first creasing station 3 (and/or the second creasing station 30), or the embossing operations may be managed by the same control and regulation group organizing the embossing operations (as previously described).

[0050] Referring to the attached figures, the sensing means 5 are arranged downstream of the embossing means 4 and the first creasing station 3. The machine 1 comprises second driving means 60, able to be motorized, to drive the band N. The sensing means 5 are preferably arranged near the second driving means 60 to drive the band N: this guarantees that the reference graphic mark is sensed when the band N is taut and not subject to any waviness or creping that may occur upstream of the embossing means 4 and/or the first creasing station 3.

[0051] As an alternative, the sensing means 5 can be arranged upstream of the embossing means 4.

[0052] Referring particularly to figure 1 in which there are, at the same time, also the fist driving means 6, the second driving means 60 and the paper buffer storage 9 (whose functions have been previously described), the control group is suitably designed to verify also the position/state of these elements, and consequently activate and/or regulate the first embossing means 4, the first driving means 6, the first creasing station 3 and the second driving means 60.

[0053] Furthermore, the machine 1 may comprise verifying means (not shown, for example optical means) arranged downstream of the embossing means 4, in order to verify the embossing made.

[0054] For example, the embossing means 4 may be designed to make reference embossed marks that are read, as a control, by verifying means.

[0055] Moreover, a machine of the known art can be modified by implementing the same with the embossing means 4. Advantageously, this option provides existing machines with added value, without having to purchase a new machine.

[0056] It is understood that the foregoing has exemplifying and non-limiting meaning, so that possible variations fall within the scope of the present invention, according to the protection scope conferred by the claims.

Claims

1. A machine (1) for producing containers for pourable food products starting from a band (N) of a packaging material, the machine (1) comprises:

   - a feeding station (2), in which the band (N) is fed along an advancing direction (D);

   and, downstream the feeding station (2), it comprises:

   - a first sealing station (7), in which the band (N)

is sealed in such a way to form a tube;
- a filling station (8), in which the tube is filled with a pourable food product; **characterized in that** it comprises, between the feeding station (2) and the filling station (8):
- embossing means (4), that can be activated for embossing the band (N).

2. The machine according to claim 1, in which the embossing means (4) comprise a first embossing group that can be activated for making a first embossing on the band (N), and a second embossing group that can be activated for making a second embossing, different from said first embossing, on the band (N).

3. The machine (1) of the preceding claim, in which the first embossing group and the second embossing group can be activated alternatively or in combination therewith.

4. The machine (1) according to anyone of the preceding claims, comprising, downstream the feeding station (2), at least a first creasing station (3), in which creasing lines are made on the band (N).

5. The machine (1) according to claim 4, in which the embossing means (4) are arranged between the feeding station (2) and the first creasing station (3).

6. The machine (1) according to claim 4, in which the embossing means (4) are arranged downstream the first creasing station (3).

7. The machine (1) according to claim 4, in which the embossing means (4) are arranged at the first creasing station (3).

8. The machine (1) according to any claims from 4 to 7, further comprising a second creasing station (30), arranged downstream the first creasing station (3) and the embossing means (4).

9. The machine (1) according to anyone of the preceding claims, in which the band (N) comprises at least a reference graphic mark; and in which the machine (1) further comprises: a control and regulation group, connected to the embossing means (4) and able to regulate the activation of the embossing means (4); sensing means (5), suitable for sensing the position of the cited reference graphic mark and for transmitting said sensed position to the control and regulation group; the control and regulation group regulating the activation of the embossing means (4) depending on said sensed position.

10. The machine (1) according to anyone of the preceding claims, further comprising verification means, positioned downstream the embossing means (4) for verifying the embossing made by the embossing means (4) on the band (N).

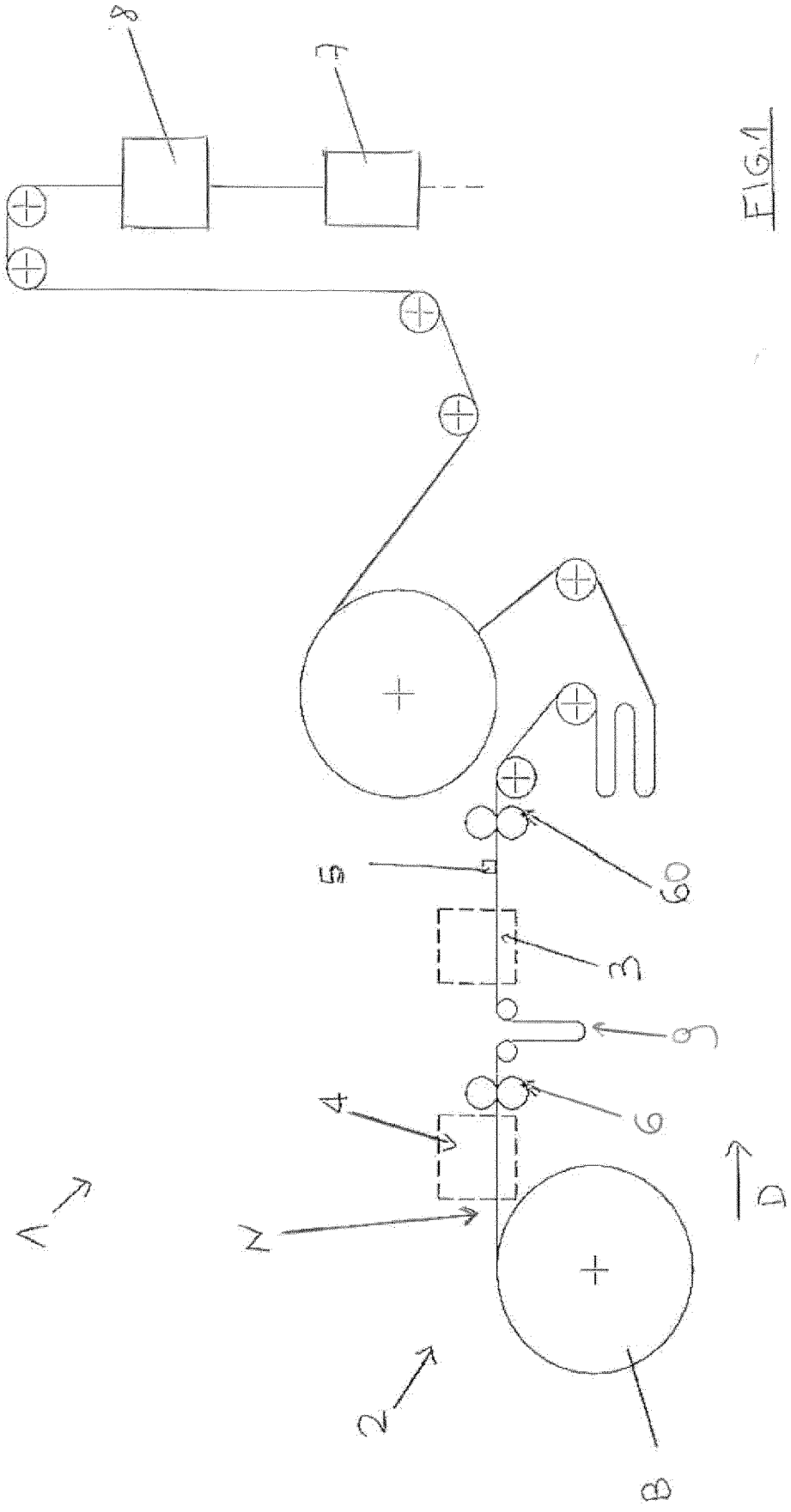

FIG.1

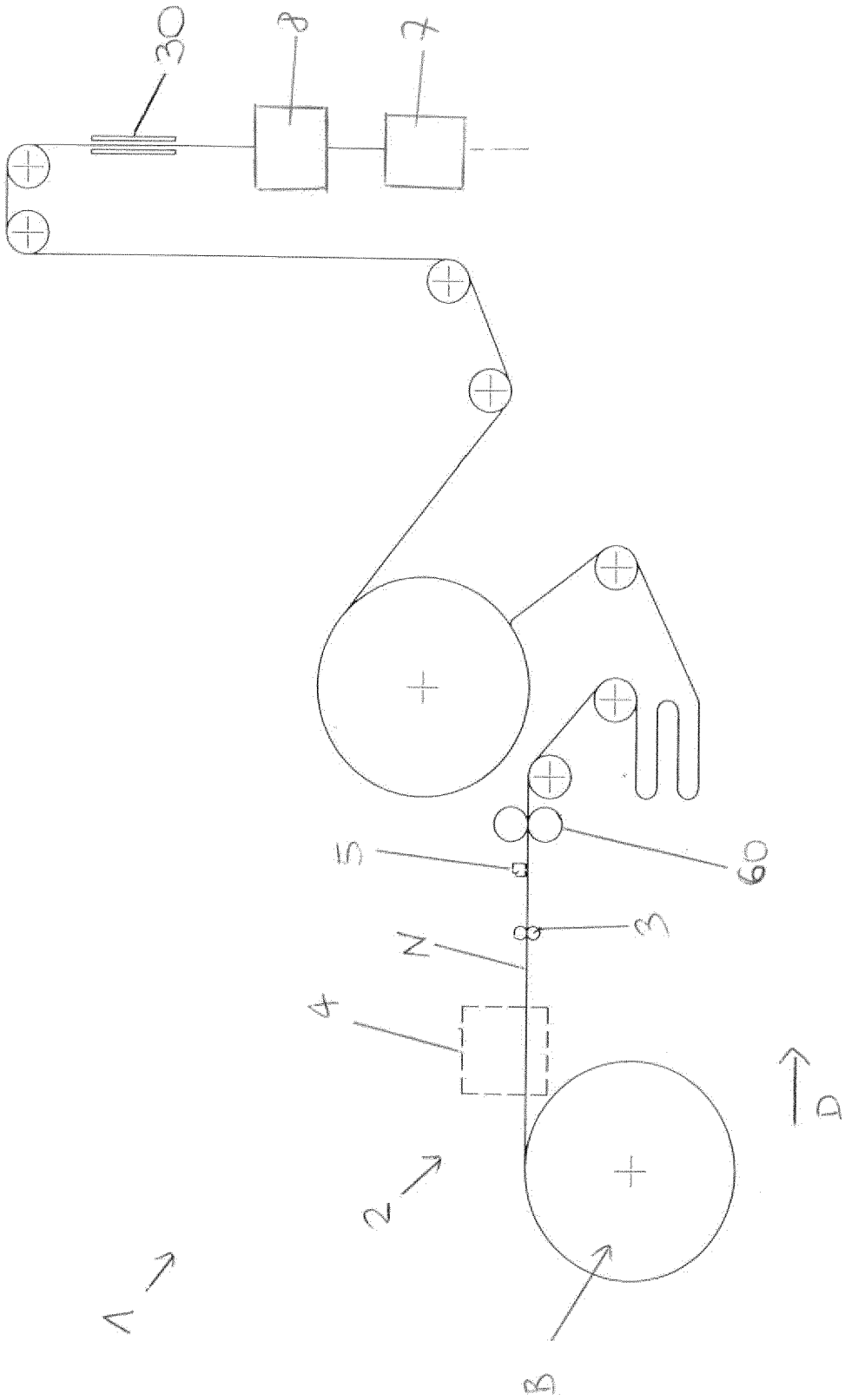

FIG.2

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EUROPEAN SEARCH REPORT

Application Number
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	18 April 2017	Cardoso, Victor

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