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(54) **Transfer device for tissues, napkins and the like**

(57) A transfer device for tissues, napkins and the like, comprising at least one drum (3) which rotates about its own axis and is provided with retention means (4) which are adapted to retain products (2) such as tissues, napkins and the like so that they adhere to its outer surface (5) along at least one portion of its rotation, and at least one star conveyor (6) which is affected peripherally by a plurality of receptacles (7) for the insertion of the products (2) and for the release of the products (2) at subsequent production stations, the transfer device further comprising at least one element (8) for rotationally entraining the products one by one, which is arranged substantially between the drum (3) and the star conveyor (6) and is adapted to follow the insertion of each of the products (2) within the receptacles (7).

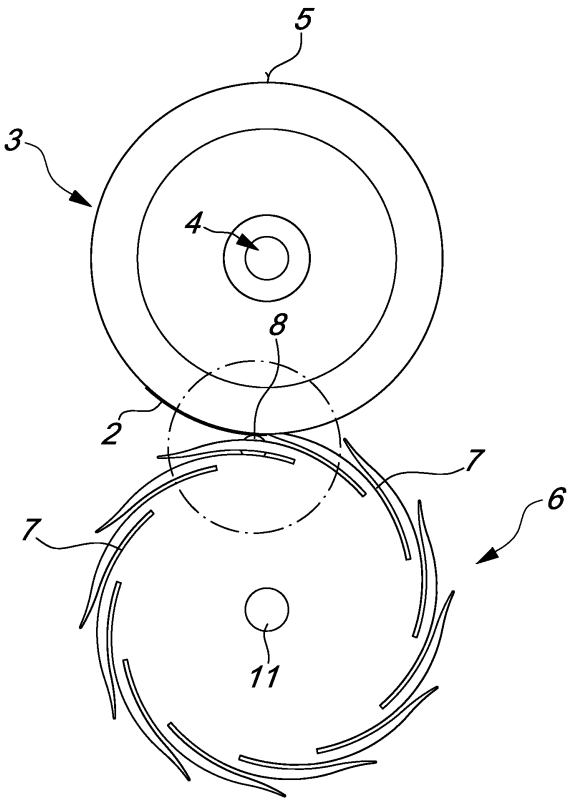


Fig. 2

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Description

[0001] The present invention relates to a transfer device for sheet products, such as tissues, napkins and the like.

[0002] The production lines of paper-like products, such as tissues, napkins and the like, of all sizes, are usually provided, predominantly in the final steps of the production process, with at least one drum, which rotates about its own axis and is provided internally with elements for providing a partial vacuum of appropriate value: said partial vacuum is adapted to retain, by way of appropriately provided openings, the products so that they adhere to its outer surface, so as to perform, in association with other elements, one or more folds according to a predefined order or in any case other final operations of the process.

[0003] The products which adhere to the outer surface of the drum are usually then picked up by belt assemblies which convey them, on their upper portions, toward a station for stacking the products on each other for packaging in packs, said station usually comprising at least one star conveyor whose rotation axis is parallel to the rotation axis of the drum and which is provided with a plurality of peripheral receptacles in which the products are inserted and from which they are then deposited one by one on a movable supporting surface, which forms the stack which will then be packaged in a pack.

[0004] The need is currently felt, for many reasons, to eliminate the step of conveying the products by means of the belt assemblies. First of all, the need is in fact felt to make production lines cheaper and constructively simpler; secondly, the need is felt to increase the transfer rate of the products from the drum to the star conveyor.

[0005] The aim of the present invention is to meet the mentioned requirements, by providing a transfer device for tissues, napkins and the like which allows to convey the products directly from the partial vacuum drum to the stacking star conveyor without the need for intermediate conveyor assemblies.

[0006] Within this aim, an object of the present invention is to provide a device having a structure which is simple, relatively easy to provide in practice, safe in use, effective in operation, and has a relatively low cost.

[0007] This aim and these and other objects which will become better apparent hereinafter are achieved by the present transfer device for sheet products such as tissues, napkins and the like, which comprises at least one drum which rotates about its own axis and is provided with retention means which are adapted to retain products such as tissues, napkins and the like so that they adhere to its outer surface along at least one portion of its rotation, and at least one star conveyor which is affected peripherally by a plurality of receptacles for the insertion of the products and for the release of said products at subsequent production stations, characterized in that it comprises at least one element for rotationally entraining the products one by one, which is arranged substantially between said drum and said star conveyor and is adapted to follow the insertion of each product within said receptacles.

[0008] Further characteristics and advantages of the invention will become better apparent from the following detailed description of a preferred but not exclusive embodiment of a transfer device for tissues, napkins and the like according to the invention, illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figure 1 is a perspective view of a transfer device according to the invention;
Figure 2 is a side elevation view of the device;
Figure 3 is a detail view of Figure 2;
Figure 4 is a front view of the device;
Figure 5 is a bottom view of the device.

[0009] In the exemplary embodiment that follows, individual characteristics may actually be interchanged with other different characteristics that exist in other exemplary embodiments.

[0010] Moreover, it is noted that anything found to be already known during the patenting process is understood not to be claimed and to be the subject of a disclaimer.

[0011] With reference to Figure 1, the reference numeral 1 generally designates a transfer device for sheet products, such as tissues, napkins and the like according to the invention.

[0012] The device 1 is extremely versatile and is absolutely general in its application, since it can be used in production lines of tissues, napkins and the like having the most disparate characteristics.

[0013] The products 2 processed by the device according to the invention can be constituted by tissues, napkins and the like of various sizes, with any arrangement of folds and with any number of plies. The materials of which said products are made also may be any, although usually they are paper-like or similar materials.

[0014] The device comprises advantageously a drum, generally designated by the reference numeral 3, which rotates about its own axis and is associated with means for rotary actuation and is supported in fixed portions of the production line. For the sake of simplicity in understanding, the means for the rotary actuation of the drum and the fixed parts of the production line are not shown in the figures but are however of a substantially known and traditional type.

[0015] The rotating drum 3 is provided with retention means, generally designated by the reference numeral 4, which are adapted to retain the products 2 so that they adhere to the outer surface 5 of the drum 3 along at least one portion of their rotation, as will become better apparent hereinafter.

[0016] The device further comprises a star conveyor, generally designated by the reference numeral 6, which is affected peripherally by a plurality of receptacles 7 for

the insertion of the products 2 conveyed by the drum 3 and is also adapted for releasing the products 2, accommodated in the receptacles 7, at subsequent production stations. Said production stations are constituted generally by at least one station for stacking the products 2 on each other so that they can be then packaged in packs.

[0017] The device further comprises advantageously at least one element 8 for rotationally entraining the products 2 one by one, which is arranged substantially between the drum 3 and the star conveyor 6 and is supported by fixed parts of said device: the entrainment element 8 advantageously allows to achieve the guided following of each of the products 2 in their insertion within the receptacles 7.

[0018] The star conveyor 6 comprises at least one pair of mutually opposite flat and parallel disks 9, 10, each of which is affected by respective receptacles 7 which are mutually angularly equidistant and have an inlet portion which has a larger cross-section in order to facilitate the insertion of the products 2; the disks 9, 10 are rigidly keyed along a same actuation shaft 11. The entrainment element 8 is preferably arranged in the space comprised between the disks 9, 10.

[0019] The rotary entrainment element 8 is constituted preferably by at least one head, which is made of a material which has a high friction coefficient for the products, for example rubber or the like.

[0020] The head of the entrainment element 8 can be for example substantially cylindrical (Figure 3), so as to determine contact with the drum 3 along the respective generatrices, or can have any other geometry suitable for this purpose.

[0021] The retention means 4 for retaining the products on the outer surface 5 of the drum 3 are of the type, i.e. comprise apparatus, adapted to create an appropriate partial vacuum within said drum, such as to retain the products 2 which adhere to the outer surface 5: said apparatus of the retention means comprise for example a circuit which is connected to a vacuum pump which is connected to openings formed along the outer surface 5 of the drum 3.

[0022] The outer surface 5 of the drum 3 is affected preferably by, i.e. has formed thereon, at least one pair of circumferential grooves 12, 13, within which the peripheral edges 14 of the disks 9, 10 engage, so as to create a sort of interpenetration between the star conveyor 6 and the drum 3, facilitating the insertion of the products 2 in the receptacles 7.

[0023] The operation of the transfer device according to the invention is intuitive. The products 2, which arrive from other production stations (for example the folding stations and others) are retained one by one by adhesion to the outer surface 5 of the drum 3, which by rotating (for example counterclockwise in Figure 2) conveys said products at the region of interpenetration with the star conveyor 6. The retention means 4, by way of the action of appropriately provided valves formed in the partial vacuum circuit, release the products 2, which are therefore followed, substantially at the same peripheral speed as the drum 3, by the rotary entrainment element 8 so as to enter the receptacle 7.

[0024] The products 2 loaded in the star conveyor 6 are then deposited at a subsequent production station, for example the station for stacking said products on each other, and are then packaged.

[0025] It has thus been shown that the invention achieves the intended aim and objects.

[0026] The transfer device according to the invention allows to perform transfer from the drum to the star effectively and reliably, without the presence of belt conveyance means and the like, which are often expensive and have an excessively limited production capacity.

[0027] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims.

[0028] All the details may further be replaced with other technically equivalent ones.

[0029] The embodiment of the present invention shall be carried out in the most scrupulous compliance with the statutory and regulatory provisions related to the products of the invention or correlated thereto and following any required authorization of the corresponding competent authorities, with particular reference to regulations related to safety, environmental pollution and health.

[0030] In practice, the materials used, as well as the shapes and the dimensions, may be any according to requirements without thereby abandoning the scope of the protection of the appended claims.

[0031] The disclosures in Italian Patent Application No. BO2006A000290 from which this application claims priority are incorporated herein by reference.

[0032] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A transfer device for sheet products, such as tissues, napkins and the like, comprising at least one drum (3) which rotates about its own axis and is provided with retention means (4) which are suitable to retain products (2) such as tissues, napkins and the like so that they adhere to its outer surface (5) along at least one portion of its rotation, and at least one star conveyor (6) which is affected peripherally by a plurality of receptacles (7) for the insertion of the products (2) and for the release of said products (2) at subsequent production stations, **characterized in that** it comprises at least one element (8) for rotationally entraining the products one by one, which is arranged

substantially between said drum (3) and said star conveyor (6) and is adapted to follow the insertion of each of the products (2) within said receptacles (7).

2. The device according to claim 1, **characterized in that** said star conveyor (6) comprises at least one pair of flat disks (9, 10) which are mutually parallel and opposite and are each affected by said receptacles (7) and rigidly keyed along a same actuation shaft (11), said rotary entrainment element (8) being arranged between said disks.

3. The device according to claims 1 and 2, **characterized in that** said rotary entrainment element (8) comprises at least one head, which is made of a material having a high friction coefficient with respect to the products (2) and is supported in fixed parts of said device.

4. The device according to one or more of the preceding claims, **characterized in that** said retention means (4) are of the type adapted to produce a partial vacuum within said drum (3) and are connected to openings formed in said outer surface (5).

5. The device according to one or more of the preceding claims, **characterized in that** said outer surface (5) of said drum (3) is affected by at least one pair of circumferential grooves (12, 13), within which the peripheral edges (14) of said disks (9, 10) engage.

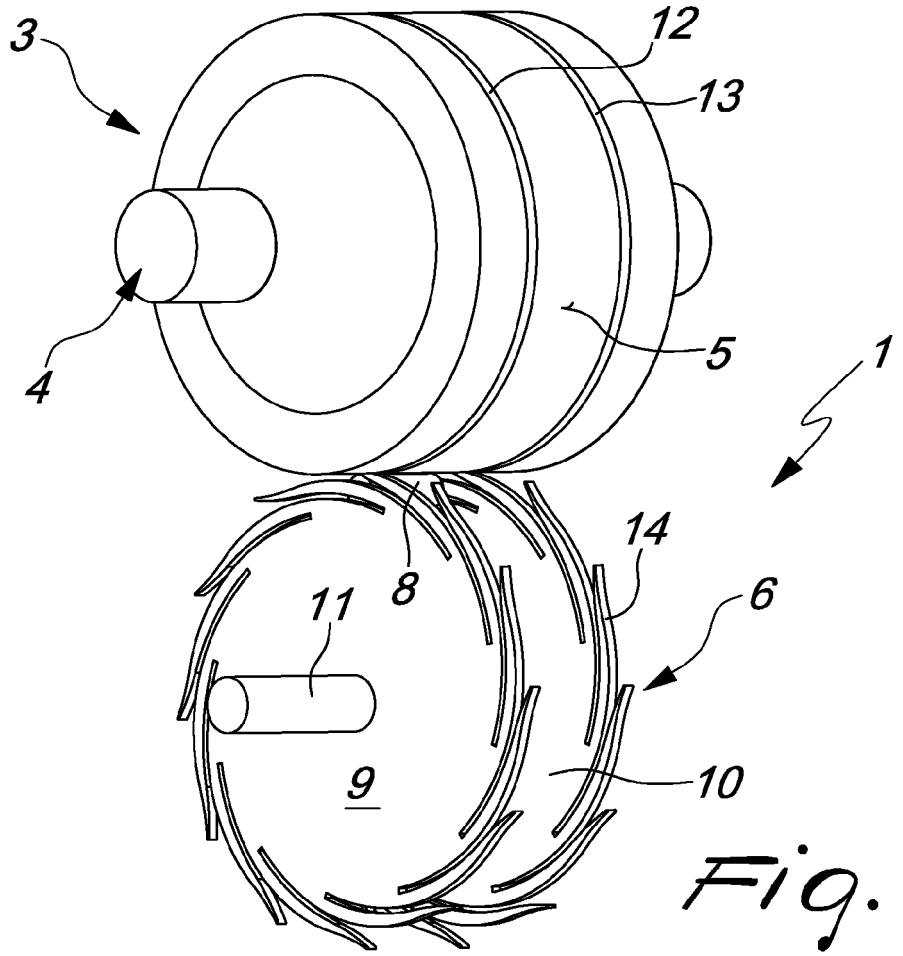


Fig. 1

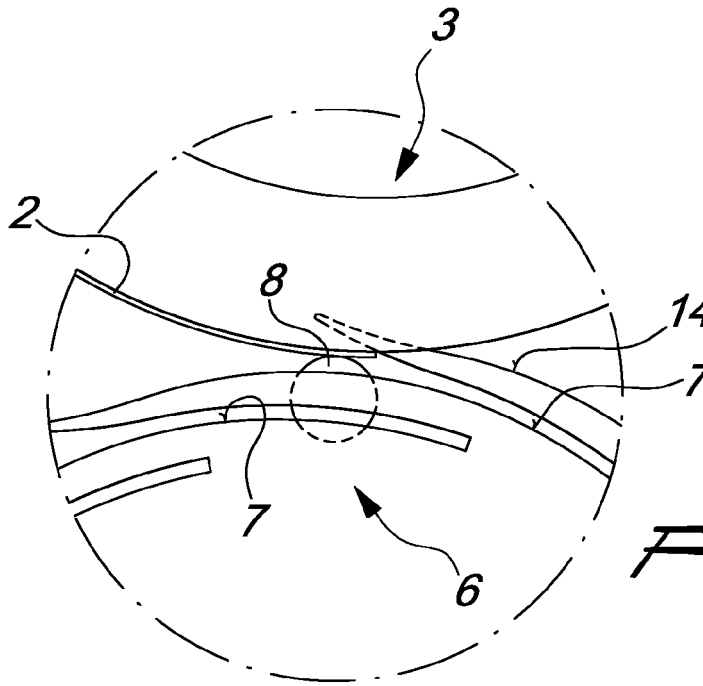


Fig. 3

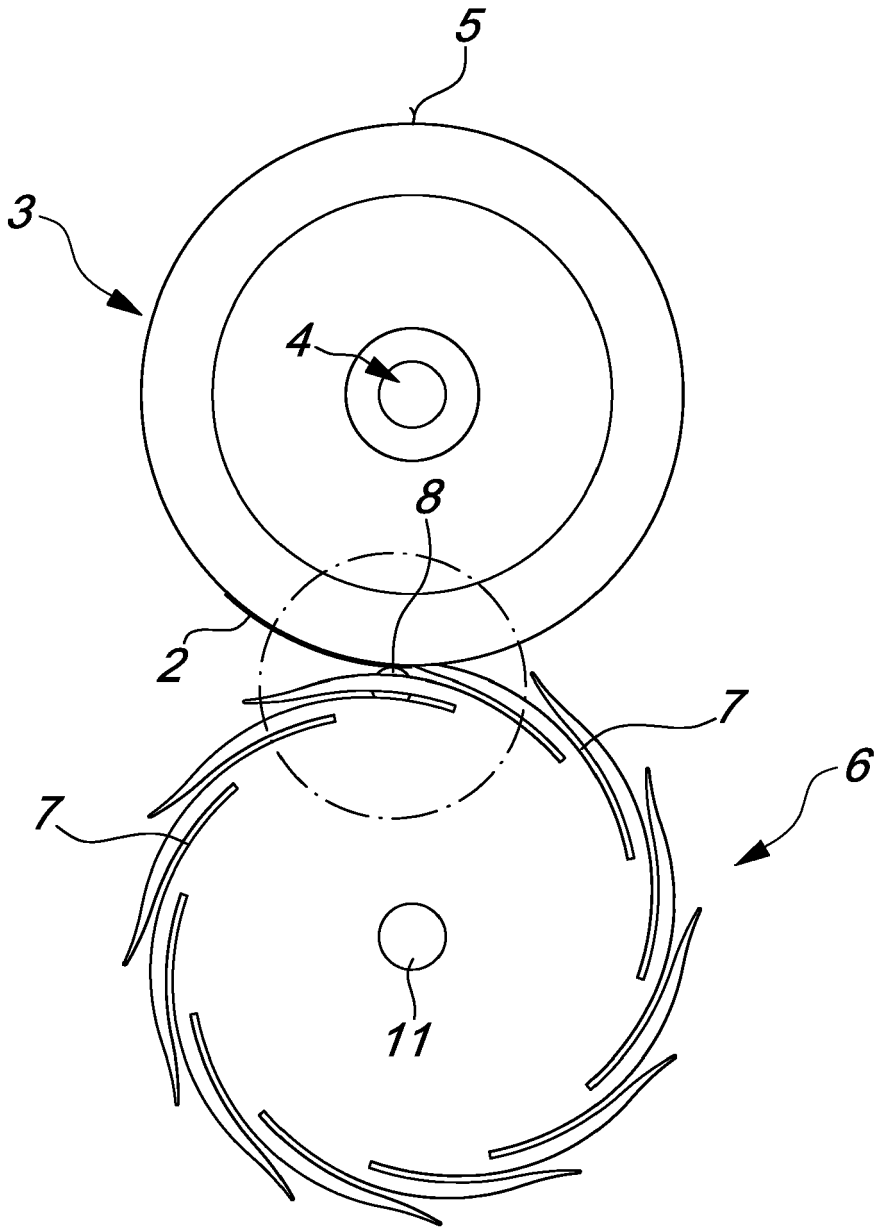


Fig. 2

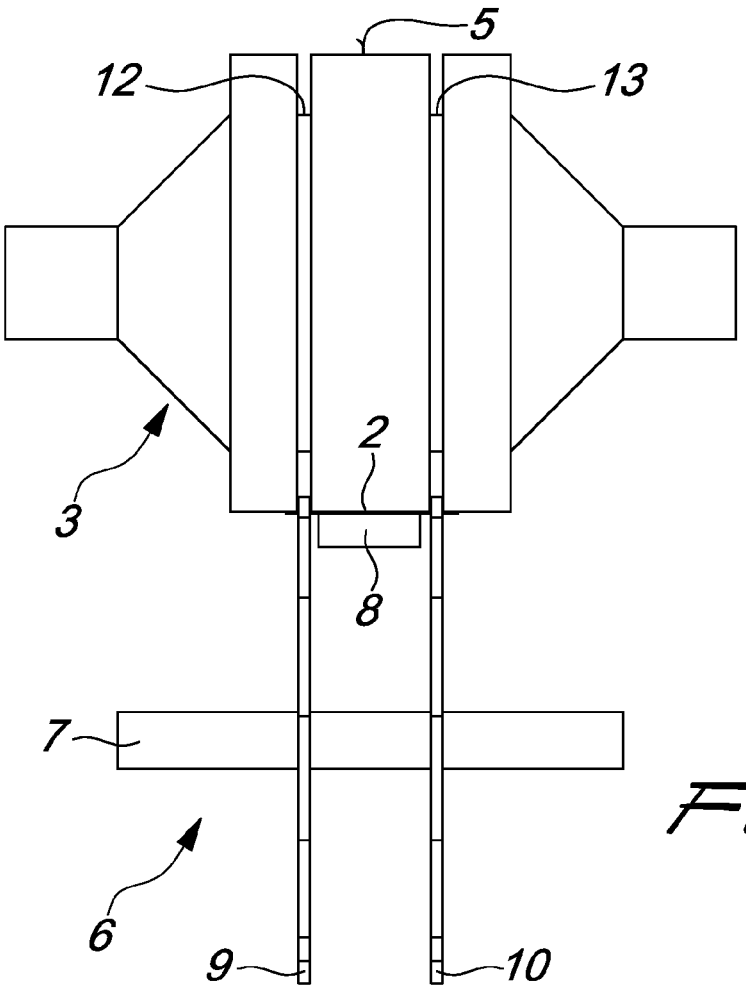


Fig. 4

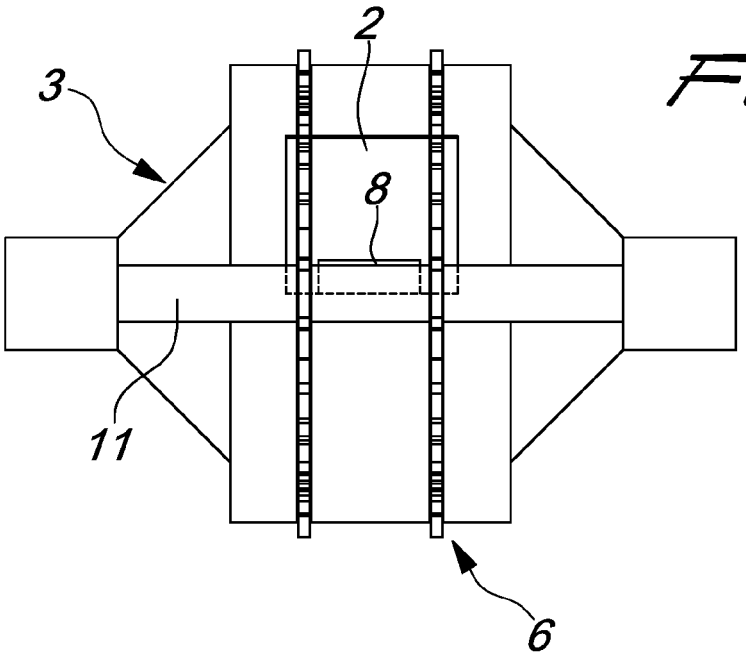


Fig. 5

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EUROPEAN SEARCH REPORT

Application Number
EP 07 10 5719

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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
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