Title: DEVICE FOR TRANSFERRING ARTICLES FROM A MAGAZINE TO A CONVEYOR

Abstract: In a device for taking articles from a magazine and transferring them to a conveying line, a rotating drum (10), rotating on an axis (11) crosswise to the conveying line (4), in a direction (B) concordant with the direction (A) of the conveying line (4) forward movement, has a series of rotating gripping groups (12), regularly spaced apart at the edge of the rotating drum and driven to rotate in an opposite direction and in a suitable step relation with respect to the rotation direction (B) of the rotating drum (10), so as to perform a complete turn between a position, in which a single article (2) is taken from a magazine and a position, in which the article (2) is transferred to the conveying line (4). Suction cups (24) are carried oscillating by the gripping groups (12) for gripping the articles (2), while a stem (21) maintains the suction cups (24) in a configuration substantially radial with respect to the rotating drum (10).
For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.
DEVICE FOR TRANSFERRING ARTICLES FROM A MAGAZINE TO A CONVEYOR

FIELD OF THE INVENTION

The present invention relates to a device for taking articles from a magazine and transferring them to a conveying line.

PRIOR ART

In different technical fields, for example in the packaging field, series of articles must be taken from a magazine and transferred to a conveying line, to bring them to subsequent work stations.

For this purpose, there are devices provided with gripping means and operated with a reciprocation motion between an articles taking over position, at a magazine, and a position, in which the articles are released onto the conveying line.

However, known transferring devices, operating in accordance with different working modes, do not meet completely the requirements for an efficient use, high working speed and functional simplicity imposed by the currently used automatic machines.

A specific need encountered in the field in question is the possibility of a quick and easy change of the size of the articles to be transferred.

SUMMARY OF THE INVENTION

The main object of the present invention is to resolve the above problem by proposing a device, which allows
simple and rapid taking over of articles from a magazine and transferring of the just taken articles to a conveying line.

Within the scope of this last mentioned object, another object of the present invention is to propose a device, whose structure is of simple, and whose operation is reliable and the use versatile.

The above mentioned objects are obtained in accordance with the contents of claims, by a device for taking articles from a magazine and for transferring the just taken articles to a conveying line, characterized in that it includes a drum, rotating about an axis arranged crosswise to the conveying line, in a direction concordant with the forward movement direction of said conveying line; a series of gripping groups rotatably carried, regularly spaced apart, at the edge of said rotating drum and driven to rotate in the opposite direction and in a suitable step relation with respect to the rotation direction of the rotating drum, so as to perform a complete turn between a position, in which a single article is taken from a magazine and a position, in which said article is transferred to said conveying line; gripping means carried oscillating by said gripping groups for gripping said articles; means for maintaining said gripping means in a configuration substantially radial with respect to said rotating drum.

**BRIEF DESCRIPTION OF THE DRAWINGS**

The characteristic features of the invention will be pointed out in the following, with particular reference to the enclosed drawing tables, in which:
- Figure 1 is a schematic lateral view of the proposed device for taking articles from a magazine and for transferring the taken articles to a conveying line;

- Figure 2 is a schematic view of operating means of the proposed device;

- Figure 3 is a section view of the proposed device, taken along the plane III-III in Figure 1;

- Figures 4A, 4B, and 4C, are schematic lateral views of the proposed device, during subsequent working steps.

DESCRIPTION OF THE PREFERRED EMBODIMENTS OF THE INVENTION

With particular reference to the above figures, the reference number 1 indicates the device for taking articles 2 from a magazine 3 and for transferring the articles 2 to a conveying line 4, which moves continuously, in the direction indicated by arrow A.

The conveying line 4 has a series of transversal sectors 5, regularly spaced apart, aimed at defining respective seats for housing the articles 2 to be conveyed.

The articles 2 to be withdrawn, generally in flat form, are packed arranged in the magazine 3, suitably inclined with respect to the horizontal plane of the conveying line 4.

The taking and transferring device 1 includes a rotating drum 10, rotatably carried by a shaft 11, so as to rotate in a direction indicated with arrow B, concordant with the direction A of the forward movement of the conveying line 4, about a horizontal axis, which is transversal to the forward movement direction of the conveying line 4.
The drum 10 carries gripping groups 12, which are regularly spaced apart along the drum edge and which are aimed respectively at taking single articles 2 one by one from the magazine 3 and at transferring the articles 2 to the conveying line 4.

In the shown case, there are three of the gripping groups 12, distanced by angles of 120° one from another.

However, a different number of the gripping groups can be provided, in relation to the device use needs.

The gripping groups 12 include respectively an arm 13 rotatably mounted on the edge of the drum 10, on a pin 14, whose axis is parallel to the rotation axis of the drum 10:

Pulleys 15, on which a transmission belt 16 is mounted, are fastened to the pins 4 of the arms 13.

Moreover, the pulley 15 of only one of the above pins 14 allows coupling with another transmission belt 17, which winds on a stationary pulley 18, arranged in coaxial relation with the drum 10 (see Figures 2 and 3).

A suitable transmission ratio, in the amount of 3:1 in the shown case, is determined between the pulley 15 and the stationary pulley 18, so as to make each arm 13 perform as many turns as there are gripping groups 12, within one complete rotation of the drum 10.

Therefore, in the shown case, the arms 13 of the gripping groups 12 perform three complete turns, in the direction opposite to the rotation direction B of the drum 10, within one complete rotation of the drum 10.

An annular body 20 is mounted, oscillating on a pivot 19, on each arm 13, suitably spaced apart from the pin 14.
A stem 21 is guided, sliding freely, within the annular body 20.

The stem 21 is hinged on a relevant fulcrum 22 to the drum 10, close to the shaft 11.

The body 20 carries a projecting bar 23, geometrically coupled with a suction cup gripping member 24.

The position of the suction cup gripping member 24 is suitably adjustable on the bar 23, in relation to the size of the articles 2 to be transferred.

In the following, operation of the described device will be explained beginning from the step, in which an article 2 is removed from the magazine 3 by a gripping group 12, which in this step is situated in front of the magazine 3 (see Figure 1).

In this step, the arm 13 of the relative gripping group 12 is arranged in a position substantially radial to the rotating drum 10 and perpendicular to the articles 2 arranged in a pack in the magazine 3.

Therefore, the suction cups gripping member 24 removes the first article 2 of the above pack of articles situated in the magazine 3.

The rotation of the drum 10 causes the simultaneous rotation of the arms 13 of the gripping groups 12 in the direction C opposite to the rotation direction of the drum 10.

This rotation is determined, with the suitable transmission ratio, by the transmission belt 17, mounted on the stationary pulley 18, arranged in coaxial relation with the drum 10.

The rotation of the arm 13 causes the stripping of the article 2, gripped by the suction cups gripping member
24, from the magazine 3 and brings it close to the drum 10 (Figure 4A).

At the same time, the stem 21, sliding inside the annular body 20, causes the oscillation of the annular body 20 with respect to the arm 13, so as to maintain the orientation of above body 20 substantially radial and consequently, the tangential orientation of the just taken article 2 with respect to the rotating drum 10.

The arm 13 performs gradually a one turn rotation, while the combined oscillation movement of the body 20 maintains the just taken article 2 in the above mentioned tangential orientation with respect to the rotating drum 10, as seen in Figures 4B and 4C, which show two subsequent moments of the rotation.

When the one turn rotation has been completed, the arm 13 of the gripping group 12 with the taken over article 2 is brought again to the position substantially radial to the rotating drum 10.

In this configuration, the article 2 is transferred to the conveying line 4 (see again Figure 1).

The re-alignment of the arm 13 with the axis of the stem 21, radially to the rotating drum 10, makes the suction cups gripping member 24 go down toward the conveying line 4.

Obviously, the transferring of the articles 2 by the gripping groups 12 occurs in suitable step relation with the forward movement of the conveying line 4.

Therefore, the proposed device fulfills the object to take articles from a magazine and to transfer them to a conveying line in a simple and rapid way.
It is to be noted that the device allows to change the size of articles to be transferred, in an easy and rapid way, since it is possible to adjust the position of the suction cups gripping member 24 without acting on other means of the same device.
CLAIMS

1. A device for taking articles from a magazine and transferring these articles to a conveying line, characterized in that it includes:

a rotating drum (10), rotating about an axis (11) crosswise to the conveying line (4), in a direction (B) concordant with the direction (A) of the conveying line (4) forward movement;

a series of gripping groups (12) rotatably carried regularly spaced apart at the edge of said rotating drum (10) and driven to rotate in opposite direction and in a suitable step relation with respect to the rotation direction (B) of the rotating drum (10), so as to perform a complete turn between a position, in which a single article (2) is taken from a magazine and a position, in which said article (2) is transferred to said conveying line (4);

gripping means (24) carried oscillating by said gripping groups (12) for gripping said articles (2);

means (21) maintaining said gripping means (24) in a configuration substantially radial with respect to said rotating drum (10).

2. A device as claimed in claim 1, characterized in that said gripping groups (12) include respectively an arm (13) rotatably mounted, at the edge of said drum (10), on a pin (14), whose axis is parallel to the rotation axis of the drum (10), with a gripping member (24), mounted on said arm (13), oscillating on a fulcrum (19), suitably spaced apart from the pin (14).
3. A device as claimed in claim 1, characterized in that said gripping group (12) are driven into rotation in the direction opposite to the rotation direction (B) of said rotating drum (10), by motion transmission means (16, 17), which couple respective pulleys (15), mounted in coaxial relation with articulation pins (14) of said gripping groups (12), to a stationary pulley (18), mounted coaxial to said rotating drum (10).

4. A device as claimed in claim 3, characterized in that said motion transmission means (16, 17) include a flexible transmission member (16), mounted on said pulleys (15), set on the articulation axis of said gripping groups (12), and a further flexible transmission member (17), mounted on one of said pulleys (17) of the gripping groups (12) and on said stationary pulley (18).

5. A device as claimed in claim 4, characterized in that a suitable transmission ratio is determined between said pulley (15) and said stationary pulley (18), so as to make each of said gripping groups (12) perform as many turns as there are gripping groups (12), within one complete rotation of the drum (10).

6. A device as claimed in claim 5, characterized in that said transmission ratio is equal to 3:1.

7. A device as claimed in claim 1, characterized in that said means (21) for maintaining said gripping members (24) in a configuration substantially radial to said
rotating drum (10) include respectively a stem (21),
hinged on a relative pivot (22) to said rotating drum
(10) and guided to slide freely within a body (20)
carrying said gripping member (24).

8. Device as claimed in claim 7, characterized in that
said body (20) is mounted oscillating on a respective arm
(13) of said gripping groups (12), in a region
corresponding to a pivot (19), suitably spaced apart from
a pin (14), on which the arm (13) is hinged to said
rotating drum (10).

9. A device as claimed in claim 9, characterized in that
said body (20) carries said gripping member (24) in an
adjustable position on a geometrical coupling projecting
bar 23.
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 B65G47/84

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B65G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic database consulted during the international search (name of database and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Further documents are listed in the continuation of box C. Patient family members are listed in annex.

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* "O" document referring to an oral disclosure, use, exhibition or other means
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