METHOD AND ~~DEVICE~~ FOR HANDLING BAGS COMBINED INTO BUNDLES

Description

The invention relates to ~~an apparatus~~ for handling bags, in particular wicketed bags, combined into bundles and for feeding the bags to a packaging machine, according to the preamble of claims 1 and 2. The invention also relates to a corresponding apparatus according to the preamble of claims 7 and 8.

In particular for packaging hygiene products, such as diapers or sanitary napkins, the products are packaged in so-called wicketed bags. Such bags are distinguished by having, in an upper region, holes for handling the bags.

In practice, bundles of bags are fed manually one after the other, by an operator, to a packaging machine. It is possible here for the bundles to be fitted onto receiving pins of a conveyor of the packaging machine, for example by way of holes in the bags.

A disadvantage of this procedure resides in the fact that, if the bundles are fed manually, the speed of the packaging machine is restricted. This is because the operator can place the bundles in position only during a brief standstill period of the appropriate conveyor. In the case of appropriately high production speeds of the packaging machine, the standstill period of the conveyor is correspondingly short, and therefore the operator quickly reaches the limits of his capabilities.

Taking this as the departure point, it is an object of the invention to provide methods and apparatuses of the type mentioned in the introduction which ensure that

- the bundles ~~(13)~~ to be arranged on bag holders of the magazine, wherein preferably a plurality of bag holders are arranged in a plane of the magazine, and wherein the magazine also preferably has a plurality of planes with bag holders,

- the bags ~~(10)~~ on the bag holders of the magazine to be presented one after the other, by appropriate relative movement of the magazine, for transfer to a feed conveyor, which transfers the bags to receiving pins of a cyclically driven conveying device of the packaging machine, in which the bags are then filled.

Further details and advantageous configurations of the method according to the invention can be gathered from the dependent claims and the rest of the description.

A preferred development of the method provides that, prior to being transferred to the receiving pins of the conveying device, the bags are smoothed, preferably such that the bundles on the bag carriers are drawn in a hanging state over a mechanism, in particular a ramp, located in the conveying path of the bags and are smoothed in the process. This makes it readily possible to counteract the formation of folds in the bags.

A preferred embodiment of the invention provides that the bag carriers are arranged such that they can be displaced along guide means, in particular running rails, wherein the guide means are inclined, at least in certain regions, in the direction of the packaging machine, and therefore the bag carriers with the bags are moved by gravitational force along the guide means in the direction of the packaging machine, and in that the bag carriers, at least in the region of the conveying device, are moved along the guide means in the direction of the receiving pins by a conveying mechanism, in particular a driver chain, and are positioned appropriately above said pins in order for

- the packaging machine to have arranged upstream of it a magazine for supplying the bags in a plurality of bundles,

- the bundles to be arranged on bag carriers in each case such that the bag carriers extend through suspension holes in the bags,

- it to be possible for the bag carriers with the bags located thereon to be fed from the magazine to the packaging machine,

- it to be possible for the bundles to be transferred from the bag carriers directly to appropriately arranged receiving pins of a cyclically driven conveying device of the packaging machine in order then to be filled in the packaging machine.

This solution likewise has the advantage that the bundles are fed automatically to the packaging machine. The mechanical feeding operation also makes it possible to realize very short standstill periods in the region of the conveying device. In particular it is possible for the bags to be supplied in the magazine irrespective of the standstill periods of the conveying device.

Here too, an alternative solution or an alternative magazine as claimed in claim 8 is characterized in that

- the packaging machine ~~(11)~~ has arranged upstream of it a carousel-like magazine ~~(51)~~ for supplying the bags ~~(10)~~ in a plurality of bundles ~~(13)~~,

- the bundles ~~(13)~~ are arranged on bag holders ~~(52)~~ of the magazine ~~(51)~~, wherein preferably a plurality of bag holders ~~(52)~~ are arranged in one plane of the magazine ~~(51)~~, and wherein the

magazine ~~(51)~~ also preferably has a plurality of planes with bag holders ~~(52)~~,

- the bags ~~(10)~~ on the bag holders ~~(52)~~ of the magazine ~~(51)~~ can be positioned, by appropriate relative movement of the magazine ~~(51)~~, for transfer to a feed conveyor ~~(63)~~, wherein the feed conveyor ~~(63)~~ has receiving pins ~~(28)~~ for transferring the bags ~~(10)~~ to a cyclically driven conveying device ~~(29)~~ of the packaging machine ~~(11)~~, in which the bags ~~(10)~~ are then filled.

Further details and advantageous configurations of the apparatus according to the invention can be gathered from the dependent claims and the rest of the description.

In order to transport the bags, it may preferably be provided that the bag carriers are mounted in a displaceable manner on guide means, wherein the guide means are inclined, at least in certain regions, in the direction of the conveying device such that the bag carriers can be moved by gravitational force with the bags in the direction of the conveying device, and that a separating device for the bag carriers, which are fed essentially in a close-packed manner, is arranged in the region of the guide means, and that, following the separating device, the bag carriers can be fed to the receiving pins individually by means of a conveying mechanism.

The bag carriers can be fed to the packaging machine such that the conveying device has a driver belt for transporting the bundles preferably in a transverse direction in particular in a horizontal plane, wherein the driver belt has spaced-apart receiving pins for engaging in the suspension holes in the bags, and wherein at least one supporting means, in particular two pivoting arms, is/are arranged in the conveying path of the bundles, above the receiving pins, the

Figure 1 shows a plan view of a packaging machine with an upstream magazine for bags (first exemplary embodiment),

Figure 2 shows a side view corresponding to arrow II in figure 1,

Figure 3 shows a vertical section taken through part of the apparatus along section line III-III in figure 2,

Figure 4 shows a three-dimensional illustration of the region of the vertical section according to figure 3,

Figures 5 and 6 show a detail of the apparatus in the region V-VI in figure 2,

Figures 7 to 10 show a detail of the apparatus in the region VII in figure 6 during different phases of the feeding operation of the bags,

Figure 11 shows a horizontal section along section line XI-XI in figure 9,

Figure 12 shows a horizontal section along section line XII-XII in figure 10,

Figure 13 shows a detail in the region ~~13~~ in figure 9,

Figure 14 shows a plan view of a packaging machine with an upstream magazine for bags (2nd exemplary embodiment),

Figure 15 shows a vertical section taken through the apparatus according to figure 14 along section line XV-XV in figure 14, and

of which the bag carrier 15 is rotated, during transportation in the conveying direction, until the free end 16 of the same is oriented downward and rests on a receiving pin 28.

By virtue of the pivoting arm 33 being pivoted out of the region above the conveying device 29, the bags 10 of the bundle 13 can drop onto the receiving pins 28. The bags 10 then rest on a horizontal transporting path 38, which is arranged at a distance above the conveying device 29 and along which the bags 10 are transported in the conveying direction of the conveying device 29. The transporting path 38 has a longitudinal ~~cut~~ 39, through which the receiving pins 28 pass in order to accommodate the bags 10. The longitudinal ~~cut~~ 39 runs parallel to the conveying direction on the conveying device 29.

The bags 10 are transported, on the one hand, by the receiving pins 28, which can be moved in the conveying direction via the conveying device 29. Also provided is a further conveying means 40 to the side of the transporting path 38, it being possible for said further conveying means to be an endless conveyor with drivers 41 arranged on the circumference of the ~~conveyable article~~. The conveying means 40 is driven synchronously with the conveying device 29, wherein the drivers 41 are oriented such that they butt in each case against a side edge of the bags 10 which is directed transversely to the conveying direction. This means that the bundle of bags 10 is moved in the conveying direction not just in the region of the suspension holes 12, but also at a distance therefrom, in the vicinity of the underside of the bags 10. This can prevent the bags 10 from becoming skewed during transportation along the transporting path 38.

A further measure to ensure that the bags 10 are fed, as far as possible, without any folds being formed resides in the arrangement of a mechanism for smoothing

the bags 10. A ramp 42 with an obliquely directed or upwardly sloping front side is provided in this case. During the feeding operation, the bundles 13 of bags 10 are drawn over the ramp 42 and are smoothed in the process (figures 7 to 9).

Following transfer of the bundles 13 to the receiving pins 28, the ramp 42 can be lowered in the vertical direction in order not to stand in the way of the bags 10 being transported away (figure 10). The ramp 42 preferably also has depressions 43, in order to guide the bag carriers 15. A pneumatic cylinder 44 or a correspondingly suitable mechanism may be provided for moving the ramp 42 in the vertical direction.

Figure 13 shows a further beneficial detail of the apparatus. Accordingly, the free end of the receiving pins 28 is pointed and can be positioned in a form-fitting manner in an end-side recess 45 in the region of a free end 16 of the bag carriers 15. This provides for reliable positioning of the free ends 16 of the bag carriers 15 on the receiving pins 28 and thus for straightforward transfer of the bags.

Once the bags 10 have been transferred to the ~~driver~~ pins 28 of the conveying device 29, the bag carriers 15 are raised in order to allow the bags 10 to be transported away from the feeding station 32. The raising action is brought about, in the present case, in that laterally projecting pins 46 are fitted on the bag carriers 15, said pins engaging in a guide track 47 during the operation of feeding the bag carriers 15 into the transfer position. By virtue of the guide track 47 being raised by means of a lifting cylinder 48 (figure 10), the free end 16 of the bag carriers 15 is lifted off from the receiving pins 28 and the bag carriers 15 are pivoted slightly about the spindle 17 in the process.

relative movement of the magazine (51), for transfer to a feed conveyor (63), wherein the ~~feed conveyor (63)~~ has receiving pins (28) for transferring the bags (10) to a cyclically driven conveying device (29) of the packaging machine (11), in which the bags (10) are then filled.

9. The apparatus as claimed in claim 7, characterized in that the bag carriers (15) are mounted in a displaceable manner on guide means, wherein the guide means are inclined, at least in certain regions, in the direction of the conveying device (29) such that the bag carriers (15) can be moved by gravitational force with the bags (10) in the direction of the conveying device (29), and in that a separating device (21) for the bag carriers (15), which are fed essentially in a close-packed manner, is arranged in the region of the guide means, and in that, following the separating device (21), the bag carriers (15) can be fed to the receiving pins (28) individually by means of a conveying mechanism.

10. The apparatus as claimed in claim 7 or one of the further preceding claims, characterized in that the conveying device (29) has a driver belt for transporting the bundles (13) preferably in a transverse direction in particular in a horizontal plane, wherein the driver belt has spaced-apart receiving pins (28) for engaging in the suspension holes (12) of the bags (10), and wherein at least one supporting means, in particular two pivoting arms (33), is/are arranged in the conveying path of the bundles (13), above the receiving pins (28), the bundles (13) resting on the supporting means prior to being transferred to the receiving pins (28) and it being possible for the supporting means, following the feeding operation of a bundle (13), to be moved out of the region of the

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of which the bag carrier 15 is rotated, during transportation in the conveying direction, until the free end 16 of the same is oriented downward and rests on a receiving pin 28.

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The bags 10 are transported, on the one hand, by the receiving pins 28, which can be moved in the conveying direction via the conveying device 29. Also provided is a further conveying means 40 to the side of the transporting path 38, it being possible for said further conveying means to be an endless conveyor with drivers 41 arranged on the circumference of the conveyor belt. The conveying means 40 is driven synchronously with the conveying device 29, wherein the drivers 41 are oriented such that they butt in each case against a side edge of the bags 10 which is directed transversely to the conveying direction. This means that the bundle of bags 10 is moved in the conveying direction not just in the region of the suspension holes 12, but also at a distance therefrom, in the vicinity of the underside of the bags 10. This can prevent the bags 10 from becoming skewed during transportation along the transporting path 38.

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relative movement of the magazine (51), for transfer to a feed conveyor (63), wherein the conveying device (29) has receiving pins (28) for transferring the bags (10) to a cyclically driven conveying device (29) of the packaging machine (11), in which the bags (10) are then filled.

9. The apparatus as claimed in claim 7, characterized in that the bag carriers (15) are mounted in a displaceable manner on guide means, wherein the guide means are inclined, at least in certain regions, in the direction of the conveying device (29) such that the bag carriers (15) can be moved by gravitational force with the bags (10) in the direction of the conveying device (29), and in that a separating device (21) for the bag carriers (15), which are fed essentially in a close-packed manner, is arranged in the region of the guide means, and in that, following the separating device (21), the bag carriers (15) can be fed to the receiving pins (28) individually by means of a conveying mechanism.

10. The apparatus as claimed in claim 7 or one of the further preceding claims, characterized in that the conveying device (29) has a driver belt for transporting the bundles (13) preferably in a transverse direction in particular in a horizontal plane, wherein the driver belt has spaced-apart receiving pins (28) for engaging in the suspension holes (12) of the bags (10), and wherein at least one supporting means, in particular two pivoting arms (33), is/are arranged in the conveying path of the bundles (13), above the receiving pins (28), the bundles (13) resting on the supporting means prior to being transferred to the receiving pins (28) and it being possible for the supporting means, following the feeding operation of a bundle (13), to be moved out of the region of the