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(54) Title: METHOD AND APPARATUS FOR HANDLING OF ITEMS DELIVERED FROM PARALLEL LINES AND TO BE GROUPED AS PORTIONS OF DIFFERENT ITEMS

(57) Abstract: In order to transfer articles such as edible ice products of different characters delivered from several parallel production or packing lines into packable groups of such articles it is known to convey the articles on respective accumultion conveyors and to collectively transfer the items from the respective end positions on these conveyors to a common conveyor system for bringing each set of articles thus transferred to be fed to a cartonizer line. According to the invention it is advantageous to use but a single accumulation conveyor, to which the articles are supplied in respective feeding stations arranged longitudinally interspaced along a rear feeding stretch of the conveyor, and to control the article supply in such a manner that each set of different articles is built up serially at a delivery end of the conveyor. The said collective article transfer may then be effected set by set in order to isolate successive groups of articles for cartonizing.

Method and apparatus for handling of items delivered from parallel lines and to be grouped as portions of different items.

The present invention relates to the handling of items, primarily individually-packaged edible ice products such as ice lollies, which in respectively different characters are delivered from a multi-line production or packaging machine, and which thereafter are desired to be grouped in portions consisting of one or more of each of the relevant characters. It is a concrete starting point for the invention that it is desired to provide carton packages with a content of e.g. 3-4 different items, primarily with individual packages of different appearance, which in the following are characterised by different colours or types (A,B,C), in that here the extent to which the items in these different packages are identical or of different kinds is less decisive. In principle, the problem presents itself in the same way in cases where items of different kinds are concerned which can possibly be packed in identical individual packages.

Consequently, the relevant task will be to gather the items delivered from the parallel lines into equal groups of single items from each of the lines, with the view to the transfer of these groups to respective receiving units, preferably portion cartons. There is no immediate problem whatsoever involved in solving this problem, but it very quickly becomes problematic when various additional factors have to be taken into consideration, primarily that for various reasons production stoppages of shorter or longer duration can arise in one or even more of the delivery lines, e.g. when breakage occurs in an associated line of packaging material in connection with a so-called flow-packing of the items.

This will already require that in order to ensure that the portion cartons are not transferred with deficient

item portions, a distinct buffer capacity and/or ejection units for items to be rejected, re-circulated or separate collection must be arranged in the individual lines. This can also be arranged in a multiplicity of ways, but the invention is based on one of the concrete methods which have found widespread application in practice, namely the use of transport means of the "floating pocket" type. This means that the items from the different delivery lines are transferred to respective, transverse, further-transporting accumulation conveyors, and brought to support units which are friction-driven on these conveyors in such a manner that, at a delivery end thereof, they can be packed closely together, so that at these delivery ends there will constantly exits items which then, by use of suitable lifting-over means, can be gripped and transferred transversely for placing in groups in respective cartons delivered on a conveyor.

Brief production stoppages in the different delivery lines can hereby be absorbed, while for stoppages of long duration there can be arranged ejection means for items to be discarded, or accumulation stations in connection with the transverse-leading conveyor sections which deliver the items to the respective "float pocket" conveyors.

It is a plant of precisely this type which is the starting point for the invention, in that with the invention it has been realised that this type of plant can be modified in an advantageous manner, namely among other things for the simplification of the said lifting-over means, and in achieving that use shall be made of only a single float pocket conveyor, in the followed referred to as the slide conveyor with associated slide trays for receiving the individual items.

According to the invention, between the said delivery lines and the relevant slide conveyor, respective transfer conveyors extend which open out in mutually separated delivery areas seen in the longitudinal direction of the slide

conveyor, each of which has means for controlled delivery of the foremost item to a slide tray in the relevant position. Correspondingly, means are provided at each of these positions for the controlled retention and individual release of the slide trays in and from these item receiving stations. By means of a related control unit, it is hereby possible to achieve that different items from the delivery zone are fed forward on the slide conveyor in the desired grouped sequence, for example A,B,C+A, B,C etc. in the case of three different product types, and since these groups will or can be constantly delivered up towards a fixed "end station" on the slide conveyor, it will be relatively simple to arrange a repeated lateral transfer of these groups to the carton line. This task will be considerably easier and safer to solve than where a lateral transfer must be arranged from several different slide conveyors lying at different distances from the carton line.

The above-mentioned problem with regard to local production stoppages can be overcome by the leading-out of items from the conveyor sections which are inserted between the discharge lines and the individual feeding-in positions along the slide conveyor.

The invention will afford the considerable advantage that plant which has been originally acquired for the handling of just a single or two different product types, can be extended relatively easily and cheaply for the handling of one or several additional product types, since use can continue to be made of the single existing slide conveyor, and merely adding extra conveyor means between added supply lines and the existing slide conveyor, i.e. the plant according to the invention will to a considerable degree be flexible with regard to various user requirements.

In the following, the invention is explained in more detail with reference to the drawing, in which

fig. 1 is a schematic perspective view of a plant according to the invention, and

fig. 2 is a side view of the plant's slide conveyors and the overlying delivery lines.

In fig. 1 there is shown a packaging machine 2 from which three delivery lines A,B and C extend, which seen from above are parallel, while in relation to the horizontal they are inclined in different direction, so that their delivery ends lie in the same vertical plane but at different heights therein. The delivered items 4 are fed in on the respective transverse conveyor belts a, b and c, which convey the items forward and down to respective delivery stations A1, B1 and C1 immediately above a slide conveyor 6 which is equipped with a number of friction-driven slide trays 8.

As described in more detail below, these slide trays serve to feed the respective items 4A, 4B and 4C to the delivery end of the slide conveyor, and in such a way that at this end there are gathered groups of items in precisely the relevant sequence. As shown by the arrow 10, the foremost of these groups are transferred laterally to a cartoniser unit which, on a parallel belt 12, conveys open cartons 14 into which item groups are lowered, or possibly inserted in connection with cartons lying sideways. As shown by the arrow 18, the thus "assortment-filled" cartons can thereafter be led away for closing and delivery.

At each of the delivery ends a1, b1 and c1 of the conveyors a, b and c, there is placed a stop 20, possibly in the form of a sluice-wheel, which is operated from a control unit and which can be controlled to deliver items one at a time. Correspondingly, at each of these delivery ends there is a stop 22 operated from a control unit for the friction-driving of the slide trays 8, namely so that these can be stopped in and released from precisely those positions in

which they can receive items 4 from the overlying conveyors a, b or c.

It will hereby be possible for the control unit to direct the supply sequence in such a manner that

1) empty slide trays can be directed forward to any of the delivery positions a1, b1, c1, i.e. by deactivation of the above-mentioned stop 22 for the slide trays 8, and
2) a selective supply of individual items 4 can be arranged to the respective, temporarily stopped slide trays 8 in each of the relevant positions.

The result is that by means of the control unit, not only can a feeding of an empty slide tray 8 to each of the stop units 22 be arranged, i.e. while the upper stop 20 blocks for the release of items, but also a controlled delivery of items to the slide trays thus delivered, and a subsequent release of the slide trays in such an order that the sequences ABC-ABC--- are formed up against a releasable stop 24.

In fig. 1 it is shown with the arrow 26 that in connection with the conveyors belts a, b, c, there can be arranged respective connection lines to not-shown accumulation or rejection areas for the cases in which operational disturbances arise as mentioned above.

In principle, instead of the slide tray conveyor 6, use can be made of an accumulation conveyor of any other type, including with direct friction under-support of the items 4, whereby it will merely be considerably more difficult to control the items in a secure manner.

It must be mentioned that the feeding of the items 4 into the slide trays 8 does not necessarily have to be effected from above, cf. fig. 1, in that the feeding of the items can well take place from the side of the conveyor, such as this is shown by the supply lines 30 indicated by the stippled lines in fig. 1.

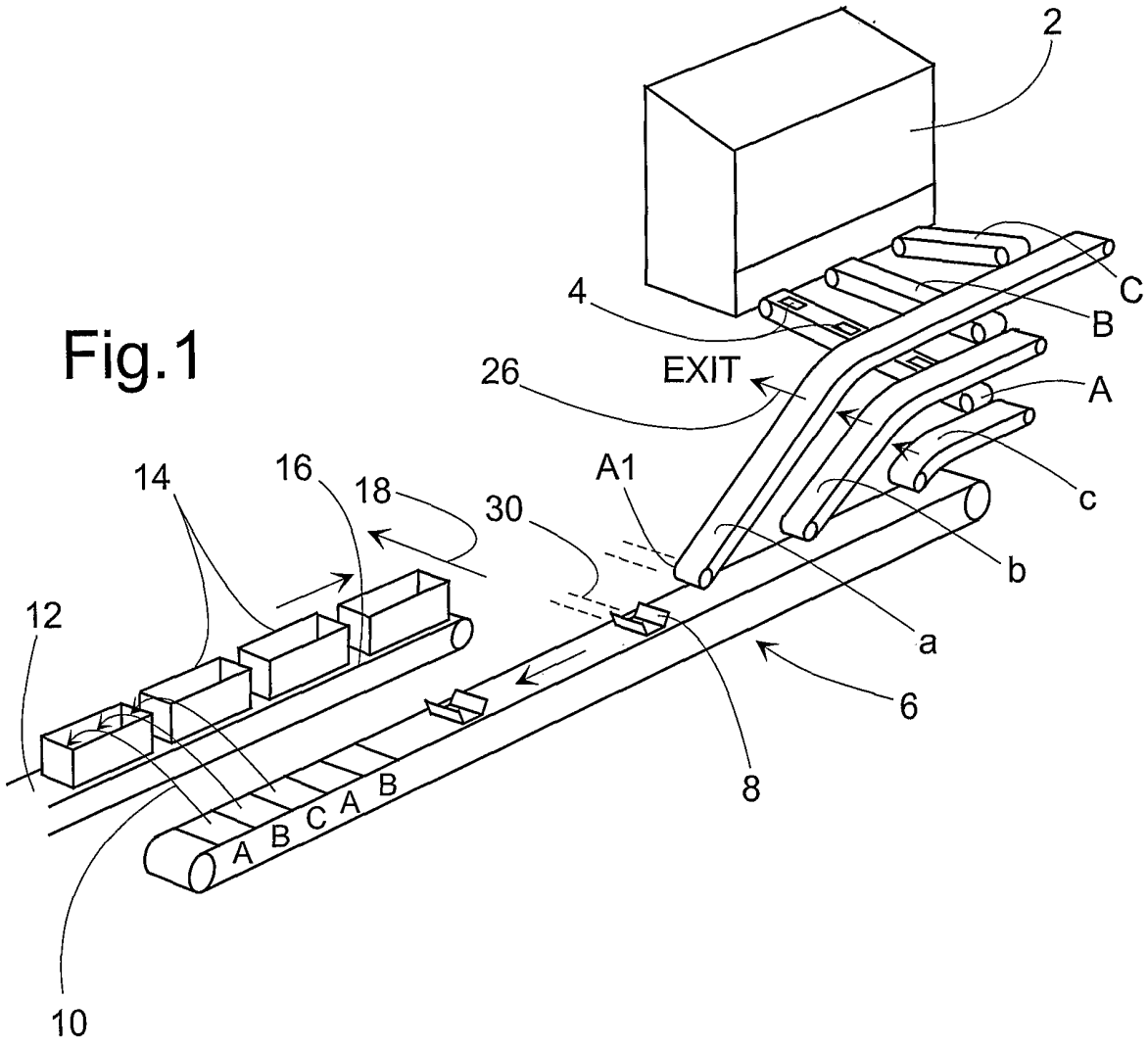
C L A I M S

1. Method of handling items, primarily individually-packed edible ice products such as ice lollies, which from parallel supply lines are delivered in respectively different configurations for grouping together in portions consisting of one or more of each of the relevant configurations, by which method the items are brought to accumulation means for floating friction conveyance of the items or by support trays for these ("Floating Pocket Conveyor Means") for selective delivery of the different items to a common transfer area, from which they are transferred in desired portion formations to conveyor means for the further conveyance of the successively transferred portions, chiefly for the carton packaging of these portions, c h a r a c t e r i s e d in that the items of different character are delivered to respectively different feeding stations arranged with mutual axial distance in connection with one and the same accumulation conveyor, and that a selective control respectively of stop means (22) for releasable retention of an item or a slide tray (8) in each of the feeding stations, and feeding means (20) for the controlled supply of respective individual items to the conveyor, is effected in such a manner that part rows of the respective different items are fed serially on to the conveyor, said part rows or items being brought from the conveyor at a delivery end thereof for collective delivery to said conveyor means for further transport of the individual item portions.

2. Plant for the execution of the method according to claim 1, and equipped with the handling and control means disclosed therein.

1/1

Fig.1


2
4
C
B
A
26
EXIT
c
b
a
A1
14
16
18
30
12
6
8
10
A B C A B
A B C

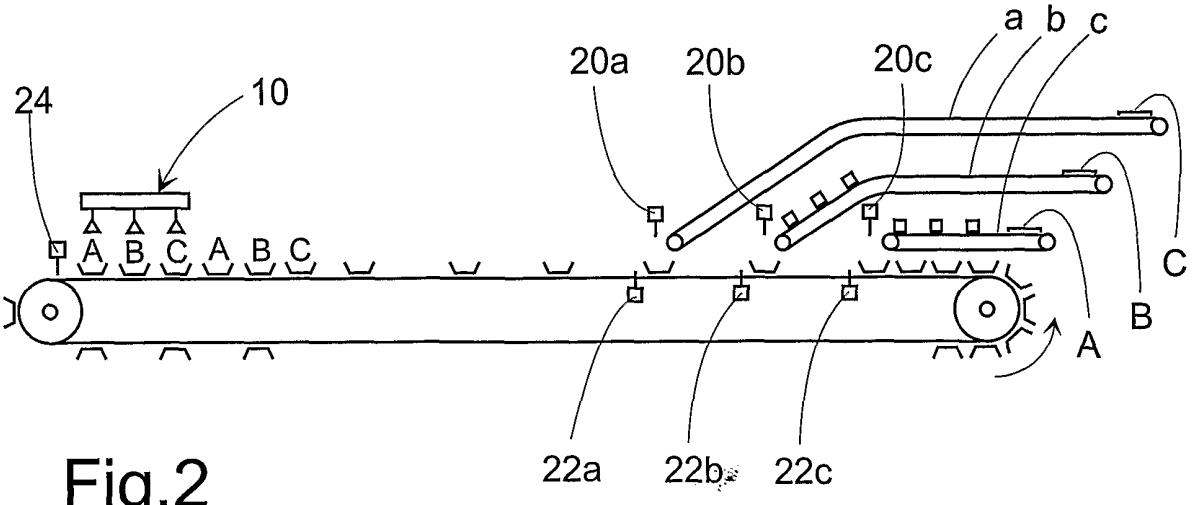

a b c
20a
20b
20c
24
10
A B C A B C
C
B
A
22a
22b
22c

Fig.2