United States Patent [19]

Luckett

[11] **3,897,875**

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[54] **SORTING CONVEYORS**

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[52] **U.S. Cl.** **209/124;** 198/209; 198/158

[51] **Int. Cl.**[2] **B07C 7/00**

[58] **Field of Search** ..... 209/74, 124, 122; 198/155, 198/158, 209, 25; 214/11 R, 16 B

[56] **References Cited**

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3,750,879	8/1973	Luckett et al.	209/124

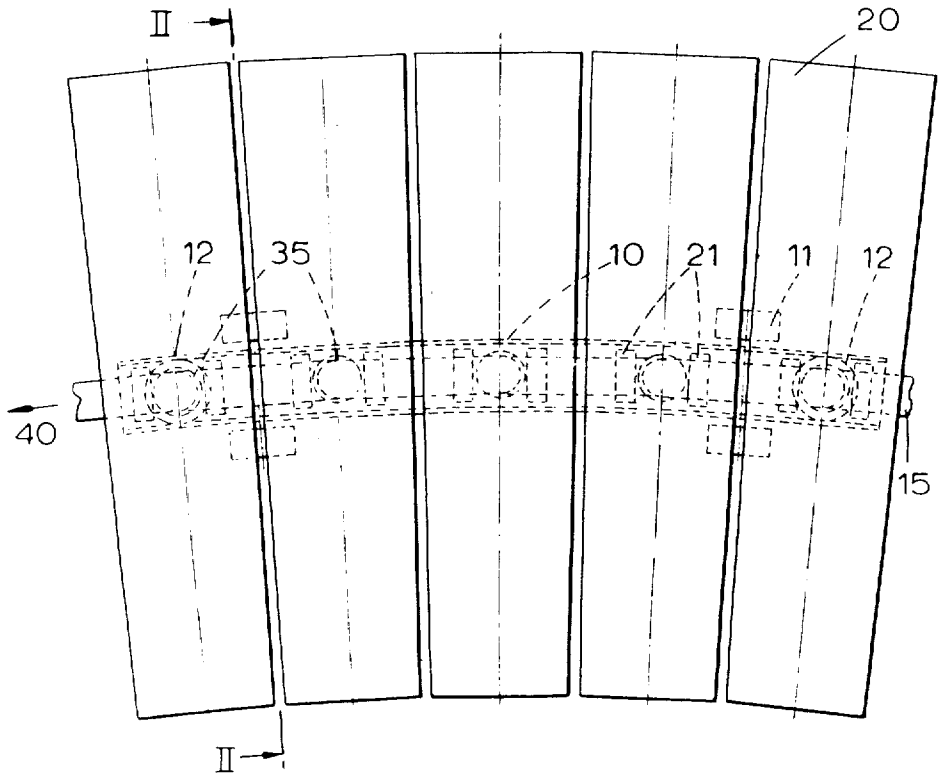
Primary Examiner—Allen N. Knowles

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[57] **ABSTRACT**

The invention relates to a circular sorting conveyor of the kind which includes at least one circular carousel comprising a number of radially extending, tiltable, segmentally shaped panels or slats which are moved unidirectionally about a circular path. Means are provided for tilting a selected panel or a number of adjacent panels so that an article resting on any panel or panels tilted, can slide on to a discharge chute or apron arranged internally of the circular path of movement of the panels. Each individual panel or slat is mounted upon a pivot having an axis which is downwardly inclined in the unidirectional circular movement of the panels or slats, with the object of obviating any tapered configuration arising in the gap between adjacent panels, where the adjacent panels are in a substantially horizontal disposition or are in a tilted disposition.

10 Claims, 3 Drawing Figures



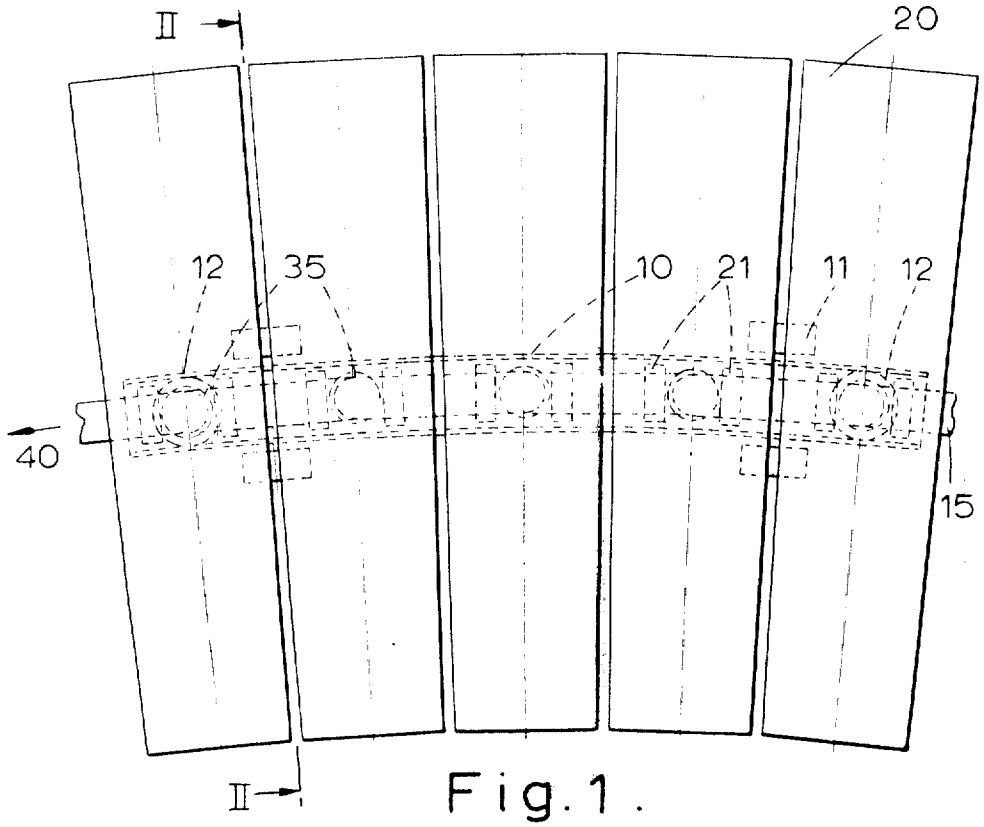


Fig. 1.

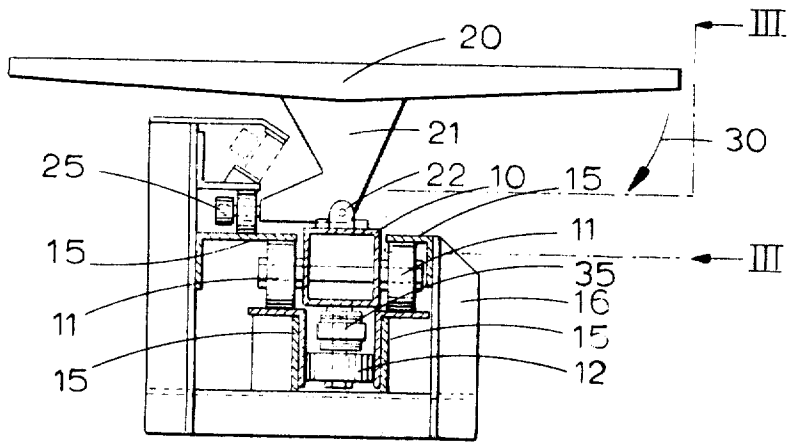


Fig. 2.

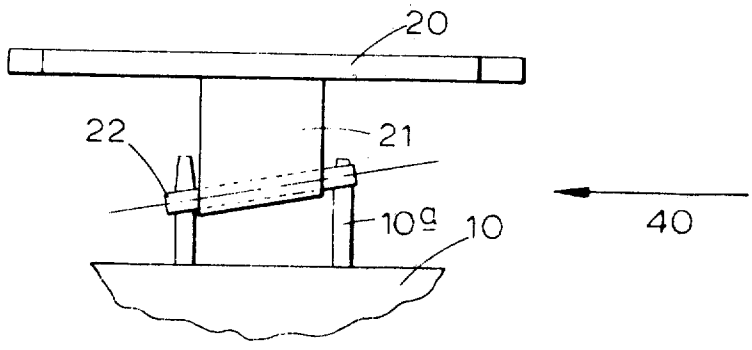


Fig. 3.

SORTING CONVEYORS

This invention relates to sorting systems and in particular to modifications or improvements of the circular sorting device described in United States Patent Specification No. 3,750,879.

In the aforementioned Specification there is described a sorting device including a circular carousel comprising a ring on which a plurality of radially extending segmental panels are mounted for movement therewith which ring is caused to rotate substantially about its axis, characterised in that each segmental panel is pivotally mounted on the ring so as to be tiltable about a generally horizontal axis lying at right angles to the radius of the ring on which that respective segmental panel is located, the tilting axis of each panel being located below the load bearing surface of the panel so that when the panel is tilted from the horizontal, all parts of the load bearing surface of the panel are moved radially outwardly of the carousel, there being also conveyor feed means arranged to feed articles on to the carousel, there being disposed about the periphery of said carousel a plurality of chutes and wherein means are provided for selectively tilting individual segmental panels or groups of segmental panels while any segmental panel selected is adjacent a selected chute to cause an article carried on such selected panel or panels to leave the carousel and enter the respective chute.

In this known arrangement the individual panels are all mounted on a common ring which in turn is revolved to effect circular movement of the panels.

It has also been proposed to provide a circular sorting conveyor of the kind which includes at least one circular carousel comprising a number of radially extending tiltable segmental panels or slats which are arranged for movement about a circular path there being means for tilting a selected panel or number of adjacent panels so that an article resting on the selected panel or panels can slide on to a discharge chute there being a number of such discharge chutes being arranged internally or externally of the circular path of movement of the panels characterised in that a plurality of such adjacent panels are mounted in common upon a wheeled carriage and a number of such carriages are constrained to follow a circular path on guide tracks, the carriages being so linked together that all the panels of the circular sorting conveyor are substantially evenly spaced from one another.

In this arrangement each panel is pivotally mounted on its carriage so as to be tiltable from a normal disposition radially inwardly or outwardly of the circular path followed by the linked carriages and switch gear is provided at certain locations about said circular path for effecting such tilting movement while stabilizing tracks are engaged by the panels to hold the latter by their normal and tilted dispositions as may be desired.

The carriages may be linked together by a common chain which may be driven to convey the carriages along their circular paths. Alternatively, linear motors may be employed to drive the carriages.

Both in the case where a number of adjacent segmental panels are mounted in common upon a wheeled carriage and in the case where all the panels are mounted in common upon a circular ring which in turn is revolved to effect circular movement of the panels, if the circular path of movement of the panels is relatively

large, as is the case with large sorting devices, a correspondingly large space will exist within the circular path of movement of the panels.

It is accordingly advantageous with such relatively large sorting devices to arrange the discharge chutes within the circular path of movement of the panels and further, to arrange that the panels are tilted radially inwardly of their circular path of movement when it is desired to discharge a parcel carried on a panel or a group of adjacent panels.

However, when the panels are each tilted inwardly from a substantially horizontal disposition about a pivot axis, which is also substantially horizontal, in the tilted condition a gap will exist between adjacent segmental panels, while in the inwardly tilted disposition such gap is tapered and decreases in width towards its inner regions between the adjacent panels. The fact that such gap is tapered leads to the possibility of articles carried on the panels becoming trapped in the tapered gap between tilted adjacent panels.

The present invention has for its particular object to overcome the problem described above with reference to circular sorting devices having segmental panels which are arranged to tilt inwardly of the circular path of movement of the panels.

According to the present invention there is provided a circular sorting conveyor of the kind which includes at least one circular carousel comprising a number of radially extending, tiltable, segmental panels or slats, which are arranged for movement unidirectionally about a circular path, there being means for tilting a selected panel, or a number of adjacent selected panels, so that an article resting on the selected panel or panels can slide on to a discharge chute or apron arranged internally of the circular path of movement of the panels, characterised in that each individual segmental panel or slat is mounted upon a pivot about which it is tiltable inwardly of the circular path of movement of the panel, from a substantially horizontal disposition, the axis of such pivot being downwardly inclined in the direction of the unidirectional circular movement of the panels.

When the panels are each arranged to pivot about an axis which is downwardly inclined as above described, the gap between adjacent panels can be maintained at a substantially similar dimension, both when the adjacent panels have their upper surfaces disposed substantially horizontally and also when the adjacent panels are tilted.

It is true that the trailing edge of a particular segmental panel will be higher in the tilted disposition than the leading edge of the next following segmental panel. However, as the panels are progressively tilted on reaching a given discharge point, this will result, in the case of a package which extends over two or more adjacent panels which are tilted, in the package being separated from the panels, which in itself will augment the tendency of the packages to slide off the panels as they are tilted.

The invention will be described by way of example with reference to the accompanying drawings in which:

FIG. **1** is a plan view; while

FIG. **2** is a view taken on the line II—II of FIG. **1**; and

FIG. **3** is a side view taken on the line III—III of FIG. **2**.

Referring now to the drawings and first, in particular to FIG. **1**, **10** generally represents a carriage of arcuate shape supported on two pairs of wheels **11** adapted to

rotate about generally horizontal axes, the carriage **10** is also guided by wheels **12** rotating about axes at right angles to the axes of rotation of the wheels **11**, the wheels **11** and **12** are, as shown in FIG. **2**, constrained to move along tracks generally designated **15** mounted on a frame generally designated **16**, the carriage **10** in the embodiment shown, means **5** segmental panels **20** each supported on a pedestal **21** which is pivotal about an axis indicated at **22**.

Guide roller means **25** control the tilting action of the panel **20** as indicated by the arrow **30**. The guide roller means **25** being moveable from the position shown in full lines in FIG. **2** to the position shown in dotted lines, for example by switch gear as defined in Patent Specification No. 3,750,879 above referred to.

The carriage **10** is appropriately linked to an adjacent carriage by a chain engaging trunnions **35**.

A continuous chain may link all the carriages **10** which support the panels **20** which extend continuously in a circle.

The chain may be driven to effect movement of the unlinked carriages **10** or alternatively linear motors may be employed to drive the carriages.

In the arrangement shown the segmental panels **20** are arranged to be tilted inwardly of their circular path of movement which is in the direction of arrow **40** shown in FIG. **1**.

Referring now to FIG. **3**, **20** again represents a segmental panel or slat carried on a pedestal **21** which is tiltable about a pivot **22** carried by bearings **10***a* mounted on a carriage **10**.

40 again represents the circular path of movement of the panels **20** and of the carriages **10**.

According to the invention, it is provided that the axis of the pivot **22** is downwardly inclined in the direction **40** of the unidirectional circular movement of the panels, such a downwardly inclined axis of the pivot **22** is shown in somewhat exaggerated form in FIG. **3** by appropriately arranging the downward inclination of the pivot **22** in relation to the shape of the segmental panels **20** and the radius of the circular path of movement **40** of the panels. An arrangement can be obtained in which the gap between adjacent panels remains substantially the same both when the panels have their upper surfaces disposed substantially horizontally, and when adjacent panels are tilted, considering the dimension of the gap when seen from a position at right angles to the upper surface of the panels.

In fact the trailing edge of a given segmental panel will be higher than the leading edge of the next following adjacent segmental panel when both segmental panels are in their tilted dispositions.

However, the tapered gap between adjacent panels is avoided by the present invention.

I claim:

1. A circular sorting conveyor of the kind which includes at least one circular carousel comprising a number of radially extending, tiltable, segmental panels or slats, which are arranged for movement unidirectionally about a circular path, there being means for tilting at least one selected panel, so that an article resting thereon can slide on to a discharge chute or apron arranged internally of the circular path of movement of the panels, characterized in that each individual segmental panel or slat is mounted upon a pivot about which it is tiltable inwardly of the circular path of movement of the panels, from a substantially horizontal disposition, the axis of such pivot being downwardly inclined in the direction of the unidirectional circular movement of the panels.

2. A circular sorting conveyor according to claim **1** characterised in that a plurality of such panels are mounted in common upon a wheeled carriage and a number of such carriages are constrained to follow a circular path on guide tracks, the carriages being so linked together that all the panels of the circular sorting conveyor are substantially evenly spaced from one another.

3. A conveyor according to claim **2**, characterised in that each panel is pivotally mounted on its carriage so as to be tiltable from a normal disposition radially inwardly of the circular path followed by the linked carriages and switch gear is provided at certain locations about said circular path for effecting such tilting movement while stabilizing tracks are engaged by the panels to hold the latter both in their normal and tilted dispositions.

4. A conveyor according to claim **3** wherein the carriages are linked together by a common chain.

5. A conveyor according to claim **4** wherein the common chain is driven to move the carriages along their circular paths.

6. A conveyor according to claim **4** wherein linear motors are employed to drive the carriages.

7. A conveyor according to claim **1** wherein the individual panels are all mounted on a common ring which in turn is revolved to effect circular movement of the panels, each panel being pivotally mounted on the ring so as to be tiltable radially inwardly of the ring about an axis which lies at right angles to the radius of the ring but which is downwardly inclined towards the direction of rotation of the ring.

8. A conveyor according to claim **1** including feed means arranged adjacent the circular array of segmental panels.

9. A conveyor according to claim **8**, wherein the feed means is arranged internally of the circular array of segmental panels.

10. A conveyor according to claim **8**, wherein the feed means is arranged externally of the circular array of segmental panels.

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