

TITLE OF INVENTION**TIPPING DEVICE****BACKGROUND OF THE INVENTION****(a) Field of the Invention**

The present invention relates to a tipping device that tips over the conveyed object at a 90-degree junction between one conveyor and a second conveyor, and in particular, relates to a tipping device that allows conveyed objects to pass by the tipping device on the second conveyor without crushing the object. The tipping device returns to its rest position automatically.

(b) Description of Prior Art

Tipping devices are placed normally at the junction of two conveyors. The first conveyor (hereinafter known as the "induction conveyor") meets the second conveyor (hereinafter known as the "takeaway conveyor") at a 90-degree angle. Objects of various shapes, sizes, degrees of hardness and weights are conveyed, one at a time, from the induction conveyor to the takeaway conveyor. Conventional tipping devices are either vertically mounted or mounted at an inclined angle. These devices can be cone-shaped or pipe-shaped, and may rotate around an axis of rotation.

Objects on the induction conveyor can be in a standing position, with their height dimension bigger than the width and/or length dimension(s). The purpose of the tipping devices is to tip over these objects as the objects are injected from the induction conveyor onto the takeaway conveyor. Objects that are tipped over have lower center of gravity, and this is critical to the smooth transportation of the objects if the conveyor(s) downstream of the takeaway conveyor is(are) at declined or inclined angles.

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It is common to have an arrangement where more than one induction conveyor feed a single takeaway conveyor.

There are a number of drawbacks with conventional tipping devices. The pipe-shaped tipping devices are normally not effective in the tipping action. However, the pipe-shaped tipping devices allow objects, coming from an upstream position on the takeaway conveyor, to pass by them without crushing the objects and hence do not damage the objects. The Cone-shaped tipping devices are able to tip objects effectively. However, as the shaft on which a cone-shaped turning wheel rotates about it is mounted rigidly, objects coming from an upstream position on the takeaway conveyor could be crushed as they pass the rigidly mounted tipping device and the objects can be damaged.

SUMMARY OF INVENTION

With the foregoing in mind, it is an object of this invention to provide a tipping device which is effective in tipping over an object being conveyed from an induction conveyor to a takeaway conveyor, and at the same time, the tipping device does not crush objects coming from an upstream position of the takeaway conveyor as the objects pass the said tipping device by having the tipping device flexibly mounted and not rigidly mounted.

The preferred embodiment of the present invention is to provide a tipping device comprising a shaft with an upper part, a middle part and a lower part; a self-adjustable angular device through which the middle part of the shaft is mounted; a compression spring with the top end thereof secured to the lower part of the shaft and the bottom end thereof secured to a fixed support; and a coned-shape wheel mounted on the upper part of the shaft and which is able to rotate freely on the shaft; thereby, the tipping device is inclined at an angle with

the lower part thereof at the junction of the induction and takeaway conveyor, and the upper part thereof protruding over the takeaway conveyor, and the direction of inclination is at 90 degrees to the direction of travel of the takeaway conveyor.

BRIEF DESCRIPTION OF THE DRAWINGS

Some of the objects of the invention having been stated, other objects will appear as the description proceeds, when taken in connection with the accompanying drawings in which:

Fig. 1 is a schematic perspective of the tipping device demonstrating the process of tipping an object moving from the induction conveyor to the takeaway conveyor in accordance with the present invention;

Fig. 2 is a top view showing an object moving on the takeaway conveyor towards the tipping device in accordance with the present invention;

Fig. 3 is a sectional view along line A-A of Fig. 2, showing an object moving on the takeaway conveyor towards the tipping device in accordance with the present invention;

Fig. 4 is a top view showing the object passing the tipping device without being crushed in accordance with the present invention;

Fig. 5 is a sectional view taken along line A-A of Fig. 4 showing the object passing the tipping device without being crushed in accordance with the present invention;

Fig. 6 is a top view showing the tipping device returning to its original 'rest

position' after the object has passed by the tipping device in accordance with the present invention; and

Fig. 7 is a sectional view along line A-A of Fig. 6, showing the tipping device returning to its original 'rest' position after the object has passed by the tipping device in accordance with the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

While the present invention will be described more fully hereinafter with reference to the accompanying drawings in which a preferred embodiment of the present invention is shown, it is to be understood that the invention is not limited to the embodiment described below. Rather it is recognised that one skilled in the art could conceive alternative embodiments.

In accordance with the present invention, the tipping device is positioned normally at the junction of two conveyors (6,7). As shown in Fig. 1, the first conveyor (6) (hereinafter known as the "induction conveyor") meets the second conveyor (7) (hereinafter known as the "takeaway conveyor") at a 90-degree angle.

Referring now more particularly to the accompanying drawings, the tipping device contemplated by this invention is shown and is generally denoted by reference numeral (100), comprising a shaft (1) with an upper part, a middle part and a lower part; a self-adjustable angular device (2) through which the middle part of the shaft (1) is mounted; a compression spring (3) with the top end thereof secured to the lower part of the shaft (1) and the bottom end thereof secured to a fixed support (4) mounted adjacently to the compression spring (3); a coned-shape wheel (5) rotatably mounted on the upper part of the shaft (1),

thereby, the tipping device (100) is inclined at an angle with the lower part thereof at the junction of the induction conveyor (6) and takeaway conveyor (7), and the upper part thereof protruding over the takeaway conveyor (7), and the direction of inclination of the tipping device is at 90 degrees to the direction of travel (8) of the takeaway conveyor (7).

Again, referring to Fig. 1, an object (9) is originally on the induction conveyor (6). During the injection of the object (9) from the induction conveyor (6) to the takeaway conveyor (7), the perpendicular motion of the takeaway conveyor (7) to the induction conveyor (6) causes the object (9) to be pulled towards the tipping device (100) as shown by object (10). The Tipping device (100) then provides a counter force to the object (10), causing the object (10) to begin to tip. The compression spring (3) provides sufficient force on the shaft (1) and hence the cone-shaped wheel (5) to cause the object (10) to tip. The object (10) shows the tipping action starting to take effect. The object (11) shows the result of a successful tipping action.

Referring to Figs. 2 and 3, an object (12) is moving from an upstream position of the takeaway conveyor (7) towards the tipping device (100) which is in its rest position. In Figs. 4 and 5, the object (12) passes by the tipping device (100) without being crushed. This is achieved by the self-adjustable angular device (2) acting as a pivot, and the force of the object (12) on the tipping device (100) causes the tipping device (100) to flex around the said pivot in a direction away from the takeaway conveyor (7). The degree of flexing is controlled by the compression spring (3) which allows the tipping device (100) to flex sufficiently for the object (12) to pass by without exerting a crushing force on the object (12). In Figs. 6 and 7, the object (12) has passed the tipping device (100) and the compression spring (3) returns to its original position, thereby causing the tipping device (100) to return to its original rest position automatically about the pivot

created by the self-adjustable angular device (2).

In accordance with the present invention, the compression spring (3) acts in combination with the self-adjustable angular device (2) so as to give sufficient reaction to tip an object moving from the induction conveyor (6) to the takeaway conveyor (7); and is sufficiently flexible to allow the object to pass the self-adjustable angular device (2) without exerting a crushing force on the object; and causes the tipping device (100) to return to its rest position after every tipping action and every passing of the objects under it.

In accordance with the preferred embodiment of the present invention, the tipping device (100) effectively tips over an object being conveyed from an induction conveyor (6) to a takeaway conveyor (7). At the same time, the tipping device (100) does not crush objects coming from an upstream position of the takeaway conveyor (7) as the objects pass the tipping device (100). The tipping device (100) returns automatically to its rest position after every tipping action and every passing of an object passing by it on the takeaway conveyor (7).

Having thus described a specific preferred embodiment of the present invention, various alterations, modifications and improvements will readily occur to those skilled in the art. Such alterations, modifications and improvements are intended to be within the spirit and scope of the invention. Accordingly, the foregoing description is by way of example only, and is not intended to be limiting. The invention is limited only as defined in the following claims.



CLAIM

1. A tipping device, positioned at the junction of a first conveyor and a second conveyor, comprising
 - (a) a shaft having an upper part, a middle part and a lower part;
 - (b) a cone-shaped wheel rotatably mounted on the upper part of said shaft;
 - (c) a self-adjustable angular device acting as a pivot and mounted to the middle part of the shaft; allowing the tipping device many degrees of freedom of movement about the pivot; and
 - (d) a compression spring having a top end secured to the lower part of said shaft, and a bottom end mounted to a fixed support positioned at the junction of the first conveyor and the second conveyor,.thereby, the compression spring acts in combination with the self-adjustable angular device to give sufficient reaction force to tip an object moving from the first conveyor to the second conveyor, and is sufficiently flexible to allow the object to pass the self-adjustable angular device without exerting a crushing force on the object.