United States Patent

Harris

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[54] PACKING OR WRAPPING MACHINE OF THE MOULD WHEEL TYPE

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[30] **Foreign Application Priority Data**

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[52] **U.S. Cl.** **198/25,** 198/210

[51] **Int. Cl.** **B65g 29/00,** B65g 47/04

[58] **Field of Search** 198/25, 210

[56] **References Cited**

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Primary Examiner—Edward A. Sroka

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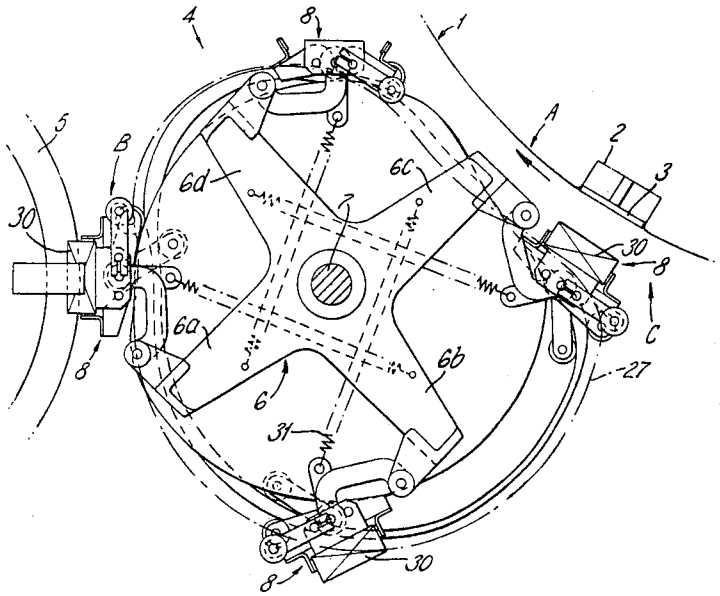
[57] **ABSTRACT**

Apparatus for transferring unwrapped cigarette packets from a wheel conveyor into the pockets of a mould wheel wrapping machine. The apparatus comprises a rotary four-armed spider between the two wheels with a carrier pivoted from the end of each arm of the spider. Each carrier has a cam follower to move it radially, a cam follower to pivot it bodily, and a cam follower to open and close grippers pivotally mounted on the carrier. Each cam follower coacts with a stationary cam.

4 Claims, 2 Drawing Figures



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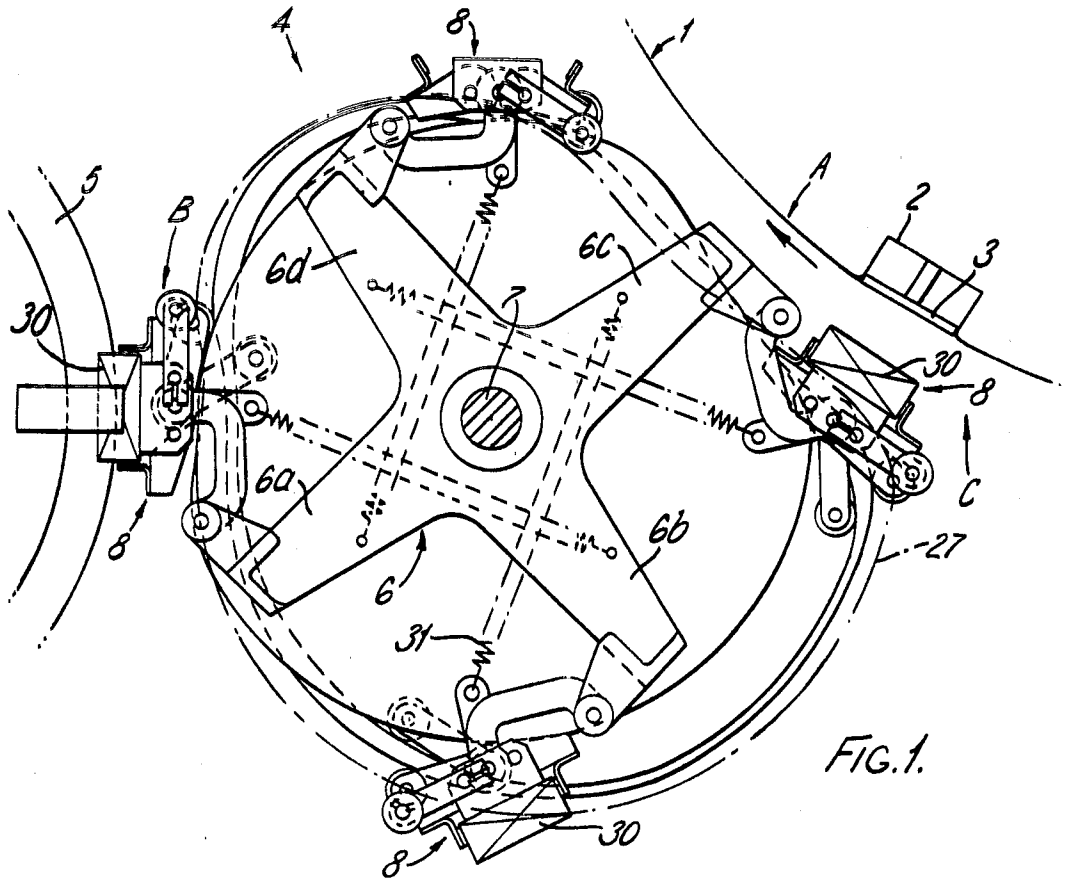

FIG. 1.

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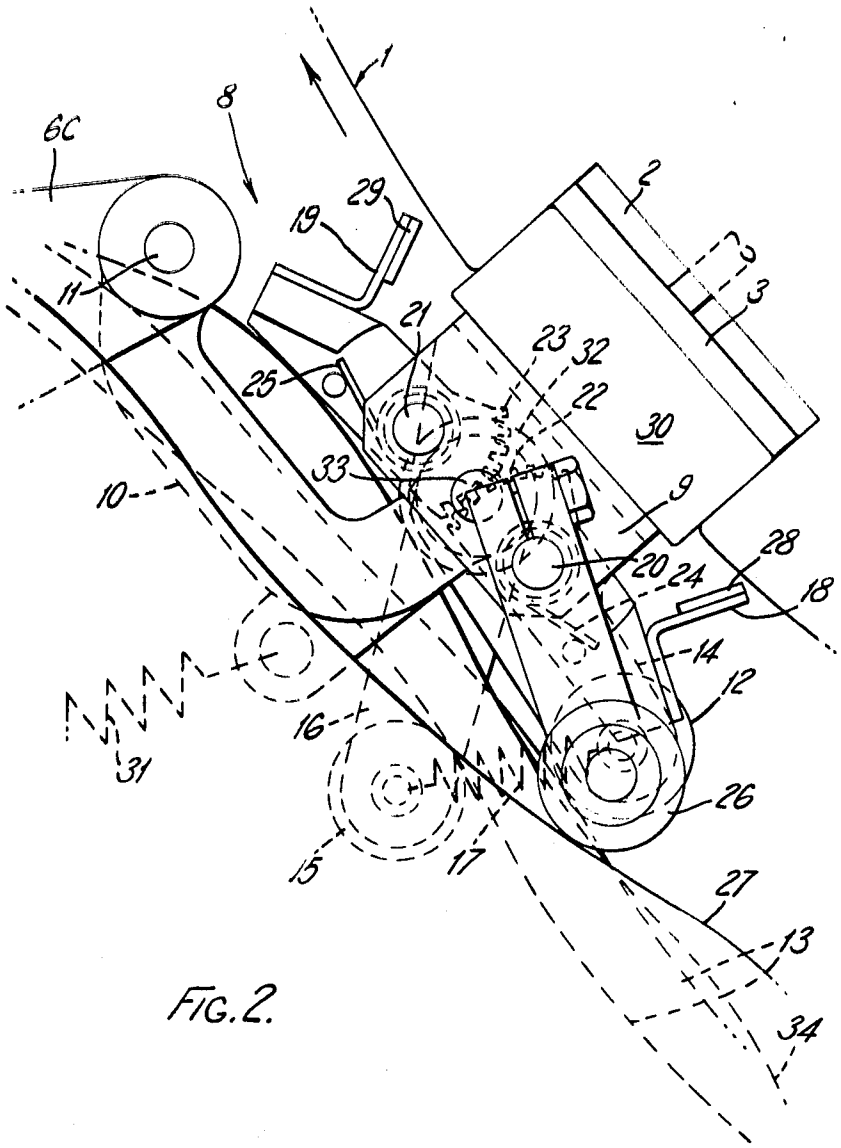
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FIG. 2.

PACKING OR WRAPPING MACHINE OF THE MOULD WHEEL TYPE

The present invention relates to apparatus for transferring articles from the surface of a first rotary conveyor to the surface of a second rotary conveyor and is applicable to supplying articles to a packing or wrapping machine of the mould wheel type such as described and shown in U.S. Pat. No. 3,380,227 dated 4.30.68. The machine therein described is for enclosing a rigid rectangular box, such as a packet of cigarettes, in an outer transparent wrapper.

According to the present invention there is provided apparatus for transferring articles from the surface of a first rotary conveyor to the surface of a second rotary conveyor disposed in the same plane and with the conveyors rotatable in the same sense so that the surface moves in opposite directions, comprising a rotor between the two conveyors and rotatable in the opposite sense an article carrier pivotally mounted on the rotor, cam follower means carried by the carrier, and stationary cam means, the shape of the cam means being such that the carrier moves out radially towards the article on the first conveyor and is pivoted to be substantially tangential to the surface of that conveyor, is retracted radially after the article has been picked up by the carrier means and is moved out radially towards the surface of the second conveyor and is pivoted to be substantially tangential to the surface of the second conveyor for the carrier means to deposit the article thereon.

The cam followers means may comprise first and second roller cam followers, and the cam means may comprise first and second stationary cams, the first cam follower being mounted with its axis coinciding with the axis of pivoting of the carrier and loaded into contact with the first cam by a spring, the second cam follower being mounted on the carrier at a position displaced in the direction of rotation of the rotor from the axis of pivoting of the carrier, and loaded into contact with the second cam by a spring, whereby the first cam and the first cam follower cause the carrier to move radially of the rotor and the second cam and the second cam follower pivot the carrier.

How the invention may be carried out will now be described, by way of example only, with reference to the accompanying drawings in which:

FIG. 1 is a diagrammatic representation of one embodiment of the invention; and

FIG. 2 is an enlarged fragmentary view of the general area indicated by A in FIG. 1.

In FIG. 1 a fragment of the periphery of a wrapping machine of the mould wheel type as disclosed in the aforementioned patent is generally indicated by the reference numeral 1, one of the recesses in the mould wheel being indicated by 2 and a plunger by which a wrapped packet is ejected from the mould wheel 1 being indicated by 3.

The apparatus according to the present invention is generally indicated by the reference numeral 4 and is designed to be loaded with unwrapped packets at an input station B and to feed the unwrapped packets into the recesses such as 2, in the mould wheel at an output station C. The unwrapped packets are received at the input station B by the apparatus 4 from a conveyor a portion of which is indicated at 5.

The apparatus 4 comprises a rotor in the form of a spider 6 which has four arms 6*a*, 6*b*, 6*c* and 6*d*, the spider 6 being rotatable about a shaft 7.

A carrier, generally indicated by 8, is mounted at the radially outward end of each arm 6*a*, 6*b*, 6*c* and 6*d*.

The carrier 8 is shown in more detail in FIG. 2, which, as stated earlier, is an enlarged fragmentary view of the area generally indicated by A in FIG. 1, but with the spider 6 and the mould wheel 1 advanced further than that shown in FIG. 1 into a position in which the carrier 8 at the end of the arm 6*c* is in register with the recess 2.

As the four carriers 8 are exactly the same only one will now be described in detail with reference to FIG. 2.

The carrier 8 consists essentially of a carrier body 9 upon which a first cam follower 32 is rotatable mounted, and an arm 14 integral with the body 9 and having a second cam follower 12 rotatably mounted at its free end. Cam follower 32 runs upon a first cam 34, against which it is biased by a tension spring 31, and cam follower 12 runs on the first and outer cam surface track of a double-sided cam 13; both cams are stationary and encircle the shaft 7 of spider 6.

An arm 16 pivoted at 33 to the body 9 carries a stabilizing roller 15 at its free end. The roller 15 runs along the inner track of cam 13 and is biased against cam follower 12 by a tension spring 17 so that the cam follower 12 is kept in rolling contact with the outer track of cam 13.

A link 10 pivoted at one end 11 to the radially outward end of the arm 6*c* is also pivoted at 33 to the body 9. Upon rotation of the spider 6 the carrier 8 is therefore drawn along behind the link 10.

It will be seen that the cam 34 determines the radial position of the carrier body 9, and that differential variations between cams 13 and 34 alter the attitude of the body 9 with respect to the mould wheel.

Two gripper members 18 and 19 respectively are pivotally mounted at 20 and 21 respectively to the carrier body 9. The gripper member 18 has a toothed segment 22 which meshes with a toothed segment 23 on the gripper member 19. A spring 24 urges the gripper member 18 in a clockwise direction about the pivot 20 and a spring 25 urges the gripper member 19 in an anticlockwise direction about the pivot 21.

The gripper member 18 has a third cam follower 26, in the form of a wheel or roller, rotatably mounted on it, the cam follower 26 being held by the spring 24 in contact with a third cam 27 which encircles the axis of rotation of the rotor 6, i.e. the shaft 7.

The gripper members 18 and 19 have jaws 28 and 29 respectively which are adapted to hold a packet on the carrier body 9. The opening and closing of the jaws 28 and 29 is effected by the cam follower 26 coacting with the cam 27 as the spider 6 rotates about the shaft 7.

The operation of the apparatus will now be described.

Consider a carrier 8 in the position of the carrier mounted on the arm 6*d* in FIG. 1. In this position the two jaws 28 and 29 are in their fully opened position. As the carrier rotates anticlockwise into the position occupied by the carrier on the end of the arm 6*a* in FIG. 1 the cam follower 26 coacts with the cam 27 to cause the jaws 28 and 29 to close towards one another around a packet 30 which is carried by the conveyor 5. While this is happening the cam followers 12 and 32 coact with cams 13 and 34 respectively to cause the carrier 9 to move substantially tangentially to the conveyor 5 in the region of the input station B in order to present the carrier and the jaws 28 and 29 in the correct position for receiving the packet 30.

As the carrier 8 and packet 30 come together the jaws 28 and 29 close towards one another to clamp the packet 30 therebetween and as the rotor 6 proceeds past the input station B the packet is released from the conveyor 5 and carried around the periphery of the rotor 6 towards the output station C.

As the packet 30 proceeds from the input station B to the output station C the cam followers 12 and 32 coact with the cams 13 and 34 respectively to change the attitude of the carrier with respect to the end of the rotor arm, as shown in the position 6*b* in FIG. 1.

When the carrier body 9 has reached the position shown at the end of arm 6*c* the attitude of the packet 30 is almost parallel to the recess 2 in the mould wheel 1 into which it is to be transferred. The rollers 12 and 32 coact with cams 13 and 34 respectively to ensure that this relative attitude is maintained while the spider 6 and mould wheel 1 rotate and the packet 30 moves into the recess of mould wheel 1. This position is shown in the enlarged view of FIG. 2 in which the cam 34 is shown acting on cam follower 32 to push the body 9 outwards, thus urging the packet further into the recess 2.

As soon as the packet **30** is located in recess **2** the cam **27** causes the cam follower **26** to move in a clockwise direction about the pivot point **20** and thus cause the two jaws **28** and **29** to open with respect to one another and release the packet **30**.

By means of the sequence of operations of the apparatus described above a packet **30** is thus removed from the conveyor **5** and transferred to the mould wheel **1**.

What I claim as my invention and desire to secure by Letters Patent is:

1. Apparatus for transferring articles from the surface of a first rotary conveyor to the surface of a second rotary conveyor disposed in the same plane and with the conveyors rotatable in the same sense so that the surface moves in opposite directions, comprising a rotor between the two conveyors and rotatable in the opposite sense, an article carrier pivotally mounted on the rotor, first and second roller cam followers carried by the carrier, and first and second stationary cams, the first cam follower being mounted with its axis coinciding with the axis of pivoting of the carrier and loaded into contact with the first cam by a spring, the second cam follower being mounted on the carrier at a position displaced in the direction of rotation of the rotor from the axis of pivoting of the carrier, and loaded into contact with the second cam by a spring, whereby the first cam and the first cam follower cause the carrier to move radially of the rotor and the second cam and the second cam follower pivot the carrier, the shape of the

cams being such that as the carrier moves towards the article on the first conveyor the carrier is pivoted to be substantially tangential to the surface of that conveyor, is retracted radially after the article has been picked up by the carrier and is moved out radially towards the surface of the second conveyor and is pivoted to be substantially tangential to the surface of the second conveyor for the carrier to deposit the article thereon.

2. Apparatus as claimed in claim **1** wherein the carrier comprises opposed pivoted grippers to grip the article therebetween, the grippers each having a gear segment, the gear segment being in mesh so that pivoting of one gripper causes pivoting of the other, a third cam follower being carried by one of the grippers and loaded into contact with a third stationary cam by resilient means, the third cam being shaped so that as the carrier approaches the first conveyor the grippers pivot away from each other to receive the article therebetween and then pivot towards each other to grip the article and that as the carrier reaches the second conveyor the grippers pivot away from each other to release the article.

3. Apparatus as claimed in claim **1** wherein the carrier is pivotally mounted at one end of an arm, the other end of the arm being pivotally mounted on the rotor.

4. Apparatus as claimed in claim **1** wherein a plurality of article carriers are equispaced around the rotor.

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