

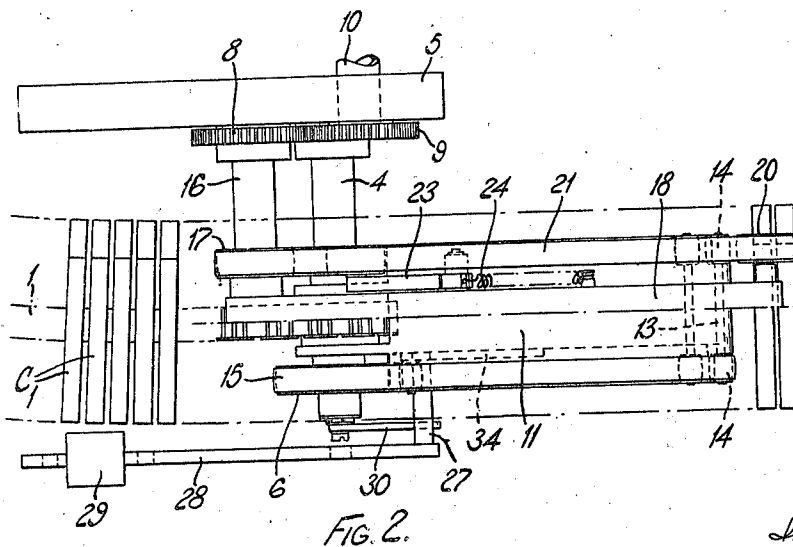
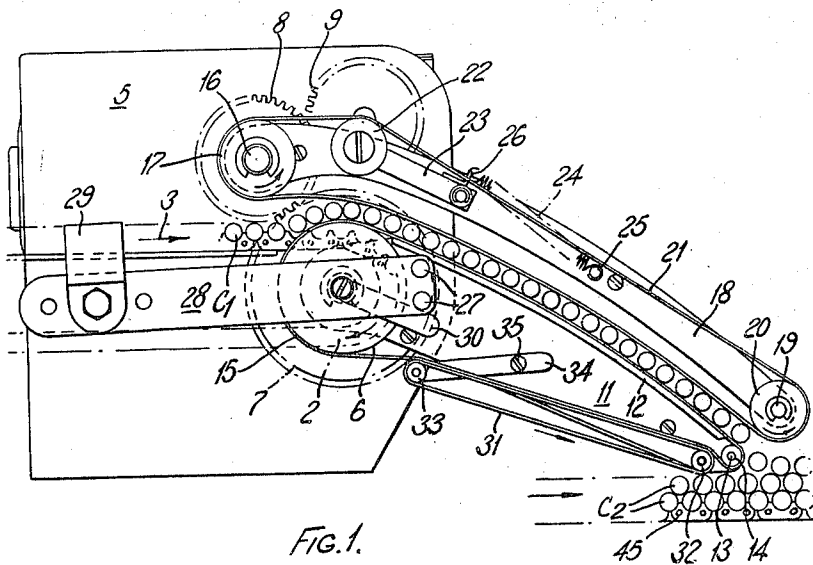
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APPARATUS FOR FEEDING CIGARETTES OR OTHER ROD-LIKE ARTICLES

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APPARATUS FOR FEEDING CIGARETTES OR OTHER ROD-LIKE ARTICLES

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Continuation of application Ser. No. 676,657, Oct. 19, 1967, which in turn is a continuation of application Ser. No. 561,547, June 29, 1966, both now abandoned. This application Oct. 22, 1968, Ser. No. 778,357

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6 Claims

ABSTRACT OF THE DISCLOSURE

A first, upper stream, one row high, of cigarettes moving in orderly, parallel fashion transversely to their lengths in a continuous stream is combined with a second, lower stream by a conveyor having two endless moving bands between which the cigarettes are gripped and caused to move along an arcuate path, thereby maintaining their alignment, which conveyor is pivoted about an axis at the upstream end and raised and lowered at the downstream end according to the height of the second stream to form a continuous bridge between the streams regardless of variations in the height of the second stream.

This is a continuation of our copending application Ser. No. 676,657, filed Oct. 19, 1967, now abandoned, which is in turn a continuation of our copending application Ser. No. 561,547, filed June 29, 1966, now abandoned.

BACKGROUND OF THE INVENTION

Field of the invention

This invention relates to apparatus for feeding rod-like articles especially cigarettes, and is more particularly concerned with feeding a stream of parallelly aligned articles from one level to another level which can vary in position. This is a useful operation to perform when combining two or more streams of cigarettes from cigarette-making machines into a single stream for packing.

Prior art

Apparatus has been proposed for combining an upper moving stream of articles with a lower moving stream of articles, the height of which lower stream is subject to variations, in which a transfer conveyor is arranged to be movable in position according to the height of the lower stream so as to provide a continuous bridge between the streams regardless of variations in height of the lower stream. However, prior proposals have been concerned with handling slow-moving streams of relatively large articles, such as apples and bottles, which can be allowed some degree of freedom of movement during their transfer from one stream to the other whereas cigarettes are conveyed at high speeds, of the order of several thousand per minute, and in a carefully ordered manner. Thus any apparatus for handling such streams of cigarettes must be capable of operating at high speeds without disturbing the ordered flow since any disturbance in the orientation of the cigarettes can lead to jamming.

SUMMARY OF THE INVENTION

Accordingly, the present invention provides apparatus for feeding parallelly aligned rod-like articles in a direction transverse to their axes and for joining a first stream of parallelly aligned articles at least one row high and moving in one direction with a further stream of paral-

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lelly aligned articles, whose height is subject to variation and which is moving in said direction to produce a combined stream of parallelly aligned articles moving in said direction, comprising first conveyor means to convey said first stream of articles to a position at which it joins with said further stream, which first conveyor means includes moving members to grip the articles in said first stream on opposed sides to maintain their parallel alignment during the conveyance of said first stream to said position, second conveyor means to convey said further stream of articles to said position and continuously to convey said combined stream of articles away from said position, and control means operative responsively to the height of the further stream of articles at said position and effective to maintain a substantially constant relationship between the height of the stream of articles at said position and the level at which articles in said first stream are delivered thereto by said first conveyor means.

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

FIGURE 1 is a side view of a preferred embodiment of cigarette feeding apparatus, and

FIGURE 2 is a plan view of the apparatus of FIGURE 1.

Referring to the drawings, a stream of cigarettes C_1 is conveyed by a first conveyor, in this case a chain conveyor indicated generally by chain lines bearing the reference number 1, from a cigarette source. The conveyor 1 passes around an idler pulley 2, and moves in the direction of arrow 3, the drive being on a sprocket at the other end of the conveyor 1. As can be seen in FIGURE 2 the chain conveyor 1 is a single chain which can be constrained to move in an arcuate path thus changing the direction of movement of the cigarettes.

The idler 2 is carried on a stub shaft 4 cantilevered from a side frame 5. The shaft 4 has fixed to it two pulleys of which one, 6, can be seen in both FIGURES 1 and 2. The pulleys 6 rotate in a clockwise direction as seen when looking at FIGURE 1, the drive being through a gear 7 fixed to the shaft 4, and further gears 8 and 9, the latter being keyed to a driving shaft 10. Carried on the shaft 4 is a body 11 having an arcuate top 12 (see FIGURE 1). At the other end of the body 11 an idler shaft 13 is carried in bearings and has fixed to it two idler pulleys 14. Endless bands 15 pass around the pulleys 6 and 14, these moving in a clockwise direction as seen when looking at FIGURE 1.

The gear 8 is fixed to a shaft 16 to which are also fixed two driving pulleys 17, one above each band 15. In FIGURE 2 only one of these pulleys 17 is shown since the lower half of the drawing is a plan view at a lower level. 18 is a central member cantilevered out from a bushing around the shaft 16. At the end of the member 18 a shaft 19 carries two idlers 20. Endless bands 21 pass around the pulleys 17 and 20 to define with the bands 15 an arcuate path for the cigarettes. Tensioning pulleys 22 carried on arms 23 are urged in a clockwise direction by springs 24 held in tension between pegs 25 and angles 26, the arm 23 being pivoted on the central member 18.

Fixed to the body 11 by means of two pins 27 is an arm 28 having an adjustable counterweight 29 riding thereon. A stop member 30 which is adjustably fixed to the end of the shaft 4 but which does not rotate with it prevents the arm 28 rising and thus the body 11 from falling. Below the bands 15 are tensioning bands 31 running over idlers 32 fixed to the body 11 and further idlers 33 fixed to arms 34 which are pivotable about pins 35 extending from the body 11.

A second conveyor 45, once more a chain conveyor conveys a further stream of cigarettes C_2 from a further

source, both sources being continuous rod cigarette-making machines.

The apparatus operates as follows. Cigarettes from the first source are carried in a stream a single row high on the first conveyor. The pulleys 6 which are positioned on either side of the chain conveyor 1 have a greater diameter than the sprocket 2 and thus the lower bands 15 lift the cigarettes from the recesses in the links of the chain 1. The top bands 21 which are pivotable about the axis of the shaft 16 run around a structure of such light weight that they sit lightly on top of the cigarettes C₁ and conduct them in an orderly array down the arcuate path outlined by the convexity of the lower bands 15. The bands 21 take the corresponding concave shape running on top of the cigarettes and the springs 24 tension the bands 21 so that the cigarettes are gripped between the two sets of bands 15 and 21.

The further stream of cigarettes C₂ from the further source is conveyed by the second conveyor 45 and is not necessarily in a single row. According to the quantity of cigarettes previously fed on the conveyor 45 the row may be in single, double as shown in FIGURE 1, triple or of an even higher order. The row need not necessarily be regular since the structure is designed to cope with a varying height of cigarettes. The lower set of bands 15 is pivoted about the axis of the shaft 4 so that the rollers 32 of the bands 31 which are the lowest members of the lower bands 15 always sit on top of the topmost cigarettes C₂ of the further stream. The rotation of the tensioning bands 31 helps to control the cigarettes C₂ and maintain them correctly aligned across the second conveyor 45.

Thus whatever the height of the cigarettes of the further stream, i.e. the cigarettes C₂, the apparatus is such that the cigarettes of the first stream, i.e. the cigarettes C₁, can be successfully joined to those of the further stream.

What we claim is:

1. Apparatus for feeding parallelly aligned rod-like articles in a direction transverse to their axes and for joining a first stream of parallelly aligned articles at least one row high and moving in one direction with a further stream of parallelly aligned articles, whose height is subjected to variation and which is moving in said direction to produce a combined stream of parallelly aligned articles moving in said direction, comprising first conveyor means to convey said first stream of articles to a position at which it joins with said further stream, said first conveyor means including transfer means comprising a first endless band, means constraining said first endless band to give it a generally arcuate configuration, a second endless band disposed such that one run thereof confronts the arcuate run of said first endless band, means for driving said endless bands such that said confronting runs move in the same direction, whereby said articles are conveyed along a generally arcuate path and pressed at opposite sides thereof by said confronting runs to maintain alignment of the articles in the stream, second conveyor means to convey said further stream of articles to said position and continuously to convey said combined stream of articles away from said position, and control means operative responsively to the height of the further

stream of articles at said position and effective to maintain a substantially constant relationship between the height of the stream of articles at said position and the level at which articles in said first stream are delivered thereto by said first conveyor means.

2. Apparatus as claimed in claim 1 wherein said first conveyor means comprises a first conveyor for feeding said first stream of articles to the confronting runs of said two endless bands.

3. Apparatus as claimed in claim 1 comprising movable mounting means for said transfer means whereby the latter can deliver articles in said first stream to said further stream at varying levels determined by the height of the further stream of articles at said position.

4. Apparatus as claimed in claim 1 wherein both of said first and second conveyor means feed the articles in a substantially horizontal direction with the first conveyor means operating at a higher level than the second conveyor means.

5. Apparatus as claimed in claim 1 in which one of the endless bands drives a control member to maintain alignment of the articles from said other source.

6. Apparatus for feeding parallelly aligned rod-like articles in a direction transverse to their axes and for joining a first stream of parallelly aligned articles at least one row high and moving in one direction with a further stream of parallelly aligned articles, whose height is subject to variation and which is moving in said direction to produce a combined stream of parallelly aligned articles moving in said direction, comprising first conveyor means to convey said first stream of articles to a position at which it joins with said further stream, said first conveyor means comprising a first conveyor and intermediate transfer means by which articles in said first stream are transferred from said first conveyor to join with said further stream, said transfer means comprising a pair of endless moving bands between which the articles are engaged and which are arranged to convey the articles around a curved path to said position, second conveyor means to convey said further stream of articles to said position and continuously to convey said combined stream of articles away from said position, and a control member driven by one of said endless bands and operative responsively to the height of the further stream of articles at said position and effective to maintain a substantially constant relationship between the height of the stream of articles at said position and the level at which articles in said first stream are delivered thereto by said first conveyor means to maintain alignment of the articles.

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