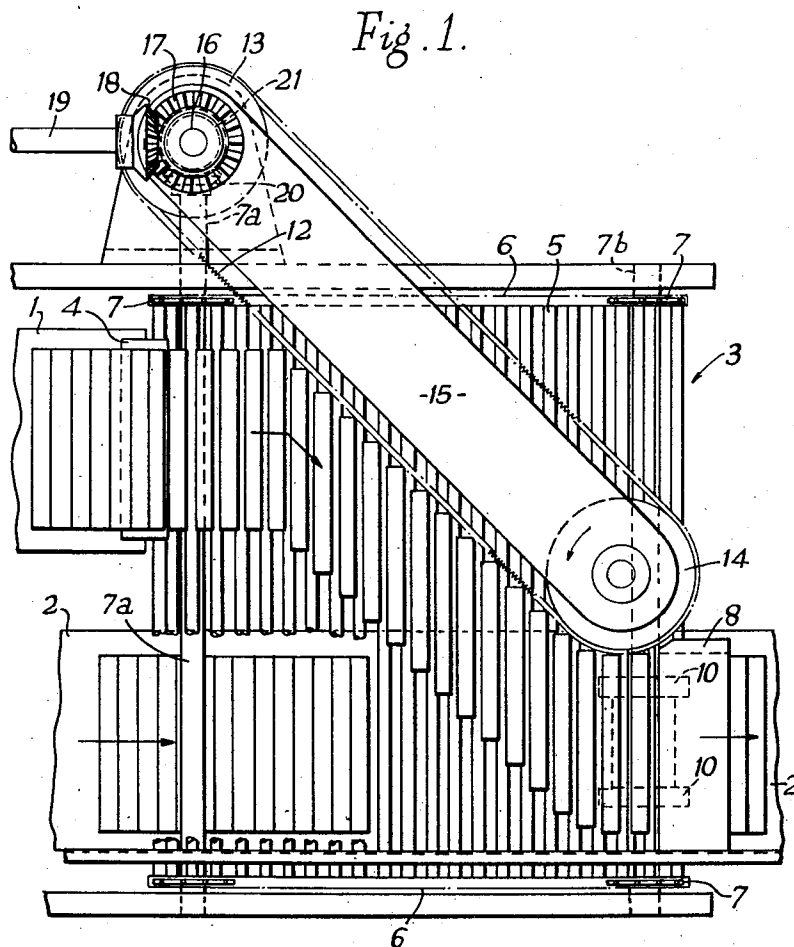


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APPARATUS FOR CONVEYING CIGARETTES

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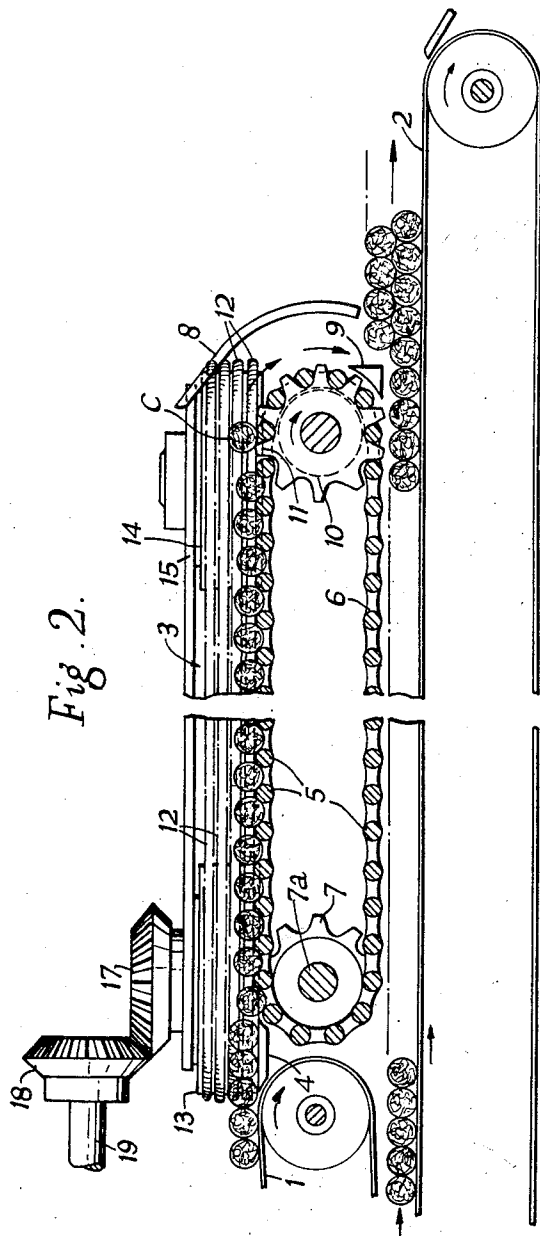
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APPARATUS FOR CONVEYING CIGARETTES

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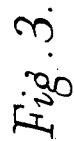
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APPARATUS FOR CONVEYING CIGARETTES

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10 Claims. (Cl. 198—32)

This invention concerns improvements in or relating to cigarette-feeding apparatus, for example in cigarette collecting mechanism, in which cigarettes are conveyed sideways in two side by side rows (for example as they issue from a cigarette-making machine) and in which it is required that the two rows should be brought into line with each other.

According to the present invention there is provided cigarette-feeding apparatus comprising two conveyors arranged to carry cigarettes sideways in two side-by-side rows, the said conveyors being arranged to convey the said rows in different paths such that cigarettes of one row are thereby laterally displaced relatively to the cigarettes of the other row, a transfer conveyor to receive cigarettes of the said one row, and means arranged to push the laterally displaced cigarettes of the said one row axially across the transfer conveyor to bring said one row into line with the other row. The said transfer conveyor may comprise a series of rod-like elements mounted for lateral movement and so disposed side by side as to form guideways along which cigarettes can slide axially.

The means to push cigarettes axially may comprise an endless movable element disposed obliquely across the path of the laterally displaced cigarettes on the transfer conveyor and movable with a component in the direction of and equal to the speed of the transfer conveyor, the said element being arranged to engage the ends of cigarettes and push them axially during their sideways movement.

The said two conveyors may be arranged to travel at different levels, thereby laterally displacing cigarettes of the said one row relatively to cigarettes of the said other row.

The conveyor carrying the said one row may be at a higher level than the other conveyor, the transfer conveyor extending over the said other conveyor, whereby the cigarettes which have been pushed across the transfer conveyor are positioned above the cigarettes on the said other conveyor. Means may be provided to feed cigarettes from the transfer conveyor on to the cigarettes carried by the said other conveyor.

The transfer conveyor may be located to carry cigarettes of the said one row through a position beyond the end of the conveyor carrying the said other row, whereby the cigarettes so carried by the transfer conveyor are laterally displaced relatively to cigarettes of the said other row. There may be provided a further conveyor to receive cigarettes from the transfer conveyor, and arranged to move in the reverse direction to that of the transfer conveyor whereby the cigarettes of the two said rows are conveyed in opposite directions towards each other with the two said rows in line with each other. The cigarettes of both rows may be fed from opposite directions to a common collecting station.

Further according to the present invention there is provided in cigarette feeding apparatus, a conveyor to carry cigarettes sideways in a row, said conveyor comprising a series of smooth parallel rod-like elements, endless conveyor means on which said rod-like elements are mounted for lateral movement, the said elements being so disposed side by side that a cigarette can be supported by and between each pair of adjacent elements, and means to push cigarettes axially across said conveyor so that each cigarette slides axially along the elements which support it, whereby the said row is displaced sideways considered in the direction of movement of the conveyor.

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rette slides axially along the elements which support it, whereby the said row is displaced sideways considered in the direction of movement of the conveyor.

Still further according to the present invention there is provided cigarette feeding apparatus in which cigarettes are fed from a source of supply to a collecting station, comprising a pair of conveyors arranged side by side, each said conveyor being arranged to feed cigarettes transversely of their axes, said cigarettes being arranged in a row parallel to each other, a collecting station, means to feed cigarettes from one of said conveyors directly to the collecting station at one side of the latter, the other of said conveyors extending beyond the said one conveyor to convey cigarettes towards the other side of the collecting station, means to reverse the direction of movement of the last-named cigarettes and to feed them to the collecting station at said other side of the latter.

The apparatus may comprise means to push the last-named cigarettes axially so as to form them into a row which is in line with the row carried by the said one conveyor. The apparatus may further comprise a transfer conveyor to receive the cigarettes which are to be pushed axially, said transfer conveyor comprising smooth parallel rod-like elements arranged to be moved laterally to continue the sideways feed of the cigarettes and so disposed side by side that a cigarette can be supported by and between each pair of elements, the apparatus further comprising means to push the cigarettes axially across said conveyor so that each cigarette slides axially along the elements which support it. The said pair of conveyors may be disposed at different levels, the conveyor carrying the cigarettes whose direction of movement is to be reversed being at the higher level, the apparatus also comprising a further conveyor below the said higher level and arranged to move in the reverse direction to that of the said two conveyors and to receive cigarettes from the higher level and feed them towards the collecting station at the said other side of the latter.

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 plan of cigarette-feeding apparatus;

FIGURE 2 is a sectional elevation of the apparatus shown in FIGURE 1; and

FIGURE 3 is a sectional elevation of an alternative arrangement.

Referring to FIGURES 1 and 2, conveyor means comprising a pair of side by side endless catcher bands 1 and 2 are arranged to receive cigarettes deflected sideways in pairs out of the rod line in a cigarette-making machine. The band 1 slopes upwardly so as to rise above the level of the band 2, as seen in FIGURE 2.

A transfer conveyor 3 extends beyond the conveyor 1 to receive cigarettes from the latter, a small bridge 4 being located between the conveyor 1 and the transfer conveyor 3. The conveyor 3 comprises a series of smooth round rods 5 arranged side by side parallel to one another and carried at their ends by a pair of endless chains 6. The chains pass over pairs of sprockets 7 mounted on shafts 7a, 7b supported in bearings on side frames 70 of the apparatus. The sprockets are arranged to rotate in the direction indicated by the arrow, FIGURE 2.

The rods 5 extend across the band 2, as can be seen in FIGURE 1 in which some of the rods are shown broken away so as partly to expose the band 2. The band 2, however, extends beyond the transfer conveyor 3.

A concave guide 8 is located above and beyond the forward end of the transfer conveyor, to guide cigarettes passing from the transfer conveyor to the band 2. A further guide 9 helps to control the fall of the cigarettes.

Between the sprockets at the forward end of the transfer conveyor 3 and mounted on the shaft 7b is a pair of

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toothed wheels 10 whose teeth engage between the rods 5 as shown in FIGURE 2. The rods 5 are spaced apart a suitable distance to permit cigarettes to nest between them as shown in FIGURE 2, a cigarette being supported by and between each pair of rods, and the teeth of the wheels 10 serve to raise the cigarettes from between the rods so as to ensure that they will fall freely away from the transfer conveyor. This lifting action is illustrated in FIGURE 2 where a tooth 11 is shown engaging a cigarette C.

Located above the transfer conveyor 3 is an endless moving transfer band device 12, FIGURE 1, which is arranged obliquely at an angle of 45° to the direction of movement of the conveyor 3. The device 12 consists of four bands of resilient coiled wire, which are easily extensible, and the turns of the wire provide numerous separate slat-like parts which can engage the ends of cigarettes which lie between the rods 5. The bands 12 pass about pulleys 13 and 14 mounted on a support 15 and arranged to be rotated in the direction shown by the arrow on the pulley 14. The pulley 13 is fixed on a shaft 16 on which is mounted a bevel gear 17 which is driven by a further bevel gear 18 carried by a shaft 19, which is itself driven from the main drive of the machine. The speed of rotation of the pulleys is such that the movement of that part of the band 12 which engages cigarettes has a component in the direction of movement of the transfer conveyor 3 which has the same speed as the latter. Thus the cigarettes whose ends are engaged by the band 12 are pushed axially across the transfer conveyor at the same time as they are carried sideways by the conveyor. The rods 3 form smooth guideways along which the cigarettes can slide axially without damage.

The transfer conveyor 3 is driven by means of a bevel gear 20 on the shaft 7a meshing with a further bevel gear 21 which is mounted on the shaft 16.

In operation, cigarettes are fed sideways in two rows on the bands 1 and 2, those on the band 1 being displaced laterally relatively to those on the band 2 by being raised above the level of those on the band 2, and passing over the bridge 4 on to the transfer conveyor 3, where each cigarette rests between two adjacent rods 5. These cigarettes are then engaged by the transfer band 12 which causes them to slide axially across the transfer conveyor until they are disposed above and in line with the row of cigarettes on the band 2. They are then engaged and lifted by the teeth of the wheels 10 and disengaged from the transfer conveyor, falling down between the guides 8 and 9 on to the row of cigarettes carried by the band 2.

Referring now to FIGURE 3, this illustrates an alternative arrangement in which cigarettes are fed to a collecting station at opposite sides of the latter. The collecting station is represented in FIGURE 3 as a well or chute 100 down which cigarettes are lowered in any suitable manner for delivery into a receptacle or receptacles.

Catcher bands 101 and 102 are, as in the construction previously described, arranged side by side, the band 101 sloping upwardly so as to rise above the level of the band 102. In this case, however, the band 101 extends beyond the band 102 and across the collecting station.

Beyond the band 101 is a transfer conveyor 103 which is similar in all respects to the transfer conveyor 3, FIGURES 1 and 2, and need not be described. A transfer device 112, corresponding to the device 12 shown in FIGURES 1 and 2, is located above the conveyor 103 and acts to push cigarettes axially across the latter in the same way as described above with reference to the construction already described.

A further conveyor 130 is located beneath the transfer conveyor 103. The conveyor 130 is constructed similarly to the conveyor 103, being formed by a series of rods 131 mounted on endless chains 132 which pass about sprockets 133 arranged to rotate in the direction shown by the arrow, so that the upper run of the conveyor 130 moves in the reverse direction to that of the conveyor 103.

At opposite sides of the collecting station 100 are pro-

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vided two rotatable paddle-wheels 135 and 137. The cigarettes carried by the band 102 pass over a ramp 136 to the wheel 135 which rotates so as to lower them into the chute 100, the cigarettes being stripped from the wheel by a guide 138.

At the other side of the collecting station, the cigarettes which have been carried in a row on the band 101 are pushed axially across the transfer conveyor by the transfer device 112 and are thus brought into line with the row of cigarettes on the conveyor 102. They are then delivered on to the conveyor 130, which reverses their direction of movement and carries them towards the collecting station in the reverse direction to that in which the bands 101 and 102 move. The cigarettes pass from the conveyor 130 to the paddle wheel 137 and are delivered thereby into the chute 100.

It will be seen that in both the constructions which have been described, the row of cigarettes carried on one band are laterally displaced relatively to the cigarettes of the other row, so that they can be pushed axially and brought into line with the said other row. In the construction shown in FIGURES 1 and 2, this is done solely by carrying one row at a higher level than the other. In FIGURE 3, the band 101 extends beyond the band 102 and the rows of cigarettes on the two bands are thereby laterally displaced relatively to each other. In addition the band 101 is at a higher level than the band 102, but the chief purpose of this, in the construction according to FIGURE 3, is to convey the cigarettes at a suitable level such that the conveyor 130, which feeds them to the collecting station, can be arranged at approximately the same level as the band 102. If desired, the band 101 could be arranged at the same level as the band 102, since the lateral displacement of the two rows of cigarettes relatively to each other is effected by extending the band 101 beyond the band 102.

What we claim as our invention and desire to secure by Letters Patent is:

1. Cigarette feeding apparatus comprising two conveyors arranged side-by-side to carry two rows of cigarettes sideways, a transfer conveyor arranged to receive cigarettes of one row and movable in a direction parallel with that of the said conveyors to feed the cigarettes of said one row sideways, said transfer conveyor extending in width across the paths of the said rows throughout its length, and means to push the cigarettes of said one row axially across said transfer conveyor to bring them into line with the cigarettes of the other row, wherein the said transfer conveyor comprises a series of rod-like elements disposed side by side across the width of the transfer conveyor to form guideways along which cigarettes can slide axially.

2. Apparatus as claimed in claim 1, wherein the means to push cigarettes axially comprises an endless movable element disposed obliquely across the path of the cigarettes on the transfer conveyor and movable with a component in the direction of and equal to the speed of the transfer conveyor, the said element being arranged to engage the ends of cigarettes and push them axially during their sideways movement.

3. Apparatus as claimed in claim 2, wherein the conveyor carrying the said one row is at a higher level than the other conveyor, and wherein the said transfer conveyor extends above and is movable in the same direction as the said other conveyor, whereby said one row of cigarettes is transferred to a position directly above said other row while traveling in the same direction.

4. Apparatus as claimed in claim 3, comprising means to feed cigarettes from the transfer conveyor on to the cigarettes carried by the said other conveyor.

5. Apparatus as claimed in claim 2 wherein said one row extends further than said other row in their direction of travel and said transfer conveyor is movable in the same direction, comprising a further conveyor to receive cigarettes from said transfer conveyor, said further con-

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veyor being movable in the reverse direction to that of the transfer conveyor whereby cigarettes of said one row are carried in the opposite direction toward and in line with said other row.

6. Apparatus as claimed in claim 5 wherein the conveyor carrying said one row of cigarettes and said transfer conveyor are arranged above the level of the conveyor carrying said other row of cigarettes whereby cigarettes are delivered by said further conveyor substantially at the same level as said other row of cigarettes.

7. Apparatus as claimed in claim 5, wherein the cigarettes of both rows are fed from opposite directions to a common collecting station.

8. Cigarette feeding apparatus in which cigarettes are fed from a source of supply to a collecting station, comprising a pair of conveyors arranged side by side, each said conveyor being arranged to feed cigarettes transversely of their axes, said cigarettes being arranged in a row parallel to each other, a collecting station, means to feed cigarettes from one of said conveyors directly to the collecting station at one side of the latter, the other of said conveyors extending beyond the said one conveyor to convey cigarettes towards the other side of the collecting station, means to push the last named cigarettes axially so as to form them into a row which is in line with the row carried by the said one conveyor, and means to reverse the direction of movement of the last-named cigarettes and to feed them to the collecting station at said other side of the latter.

9. Apparatus as claimed in claim 8, comprising a transfer conveyor to receive the cigarettes which are to be

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pushed axially, said transfer conveyor comprising smooth parallel rod-like elements extending across the conveyor and arranged to be moved transversely of their longitudinal axes to continue the sideways feed of the cigarettes and so disposed side by side that a cigarette can be supported by and between each pair of elements, the apparatus further comprising means to push the cigarettes axially across said conveyor so that each cigarette slides axially along the elements which support it.

10. Apparatus as claimed in claim 9, wherein the said pair of conveyors are disposed at different levels, the conveyor carrying the cigarettes whose direction of movement is to be reversed being at the higher level, the apparatus also comprising a further conveyor below the said higher level and arranged to move in the reverse direction to that of the said two conveyors and to receive cigarettes from the higher level and feed them towards the collecting station at the said other side of the latter.

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