March 19, 1940. J. W. CHALMERS ET AL 2,193,918

CONVEYER DEVICE

Filed April 13, 1939 3 Sheets-Sheet 1

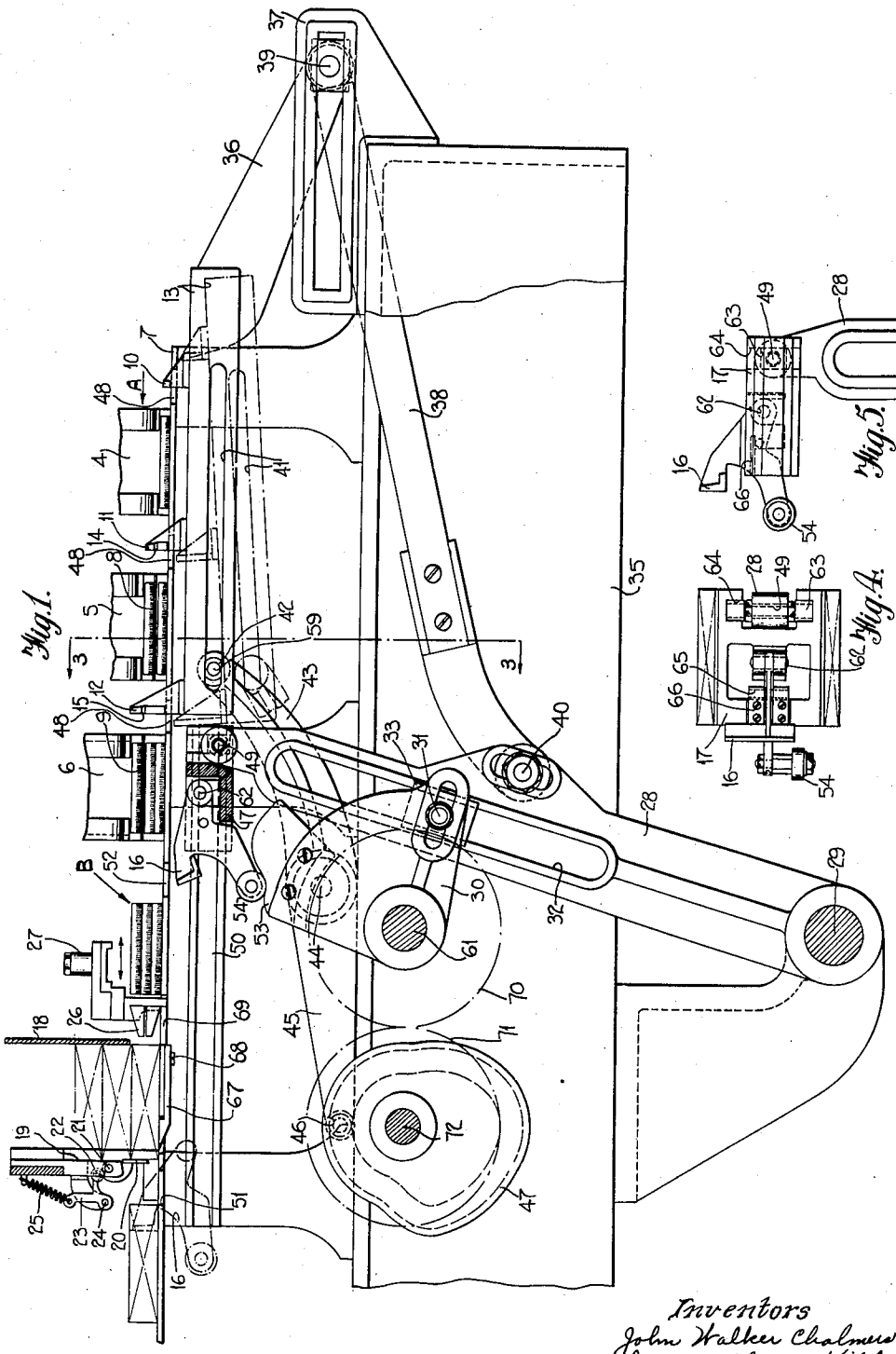

Fig. 1.

Fig. 5.

Fig. 4.

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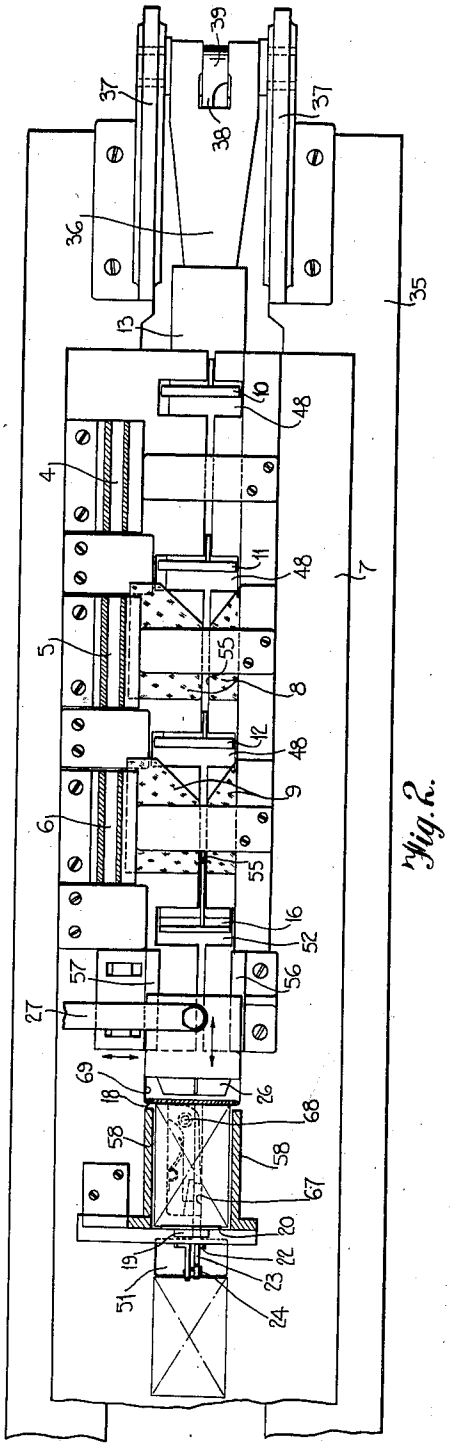

Fig. 2.

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Filed April 13, 1939 3 Sheets-Sheet 3

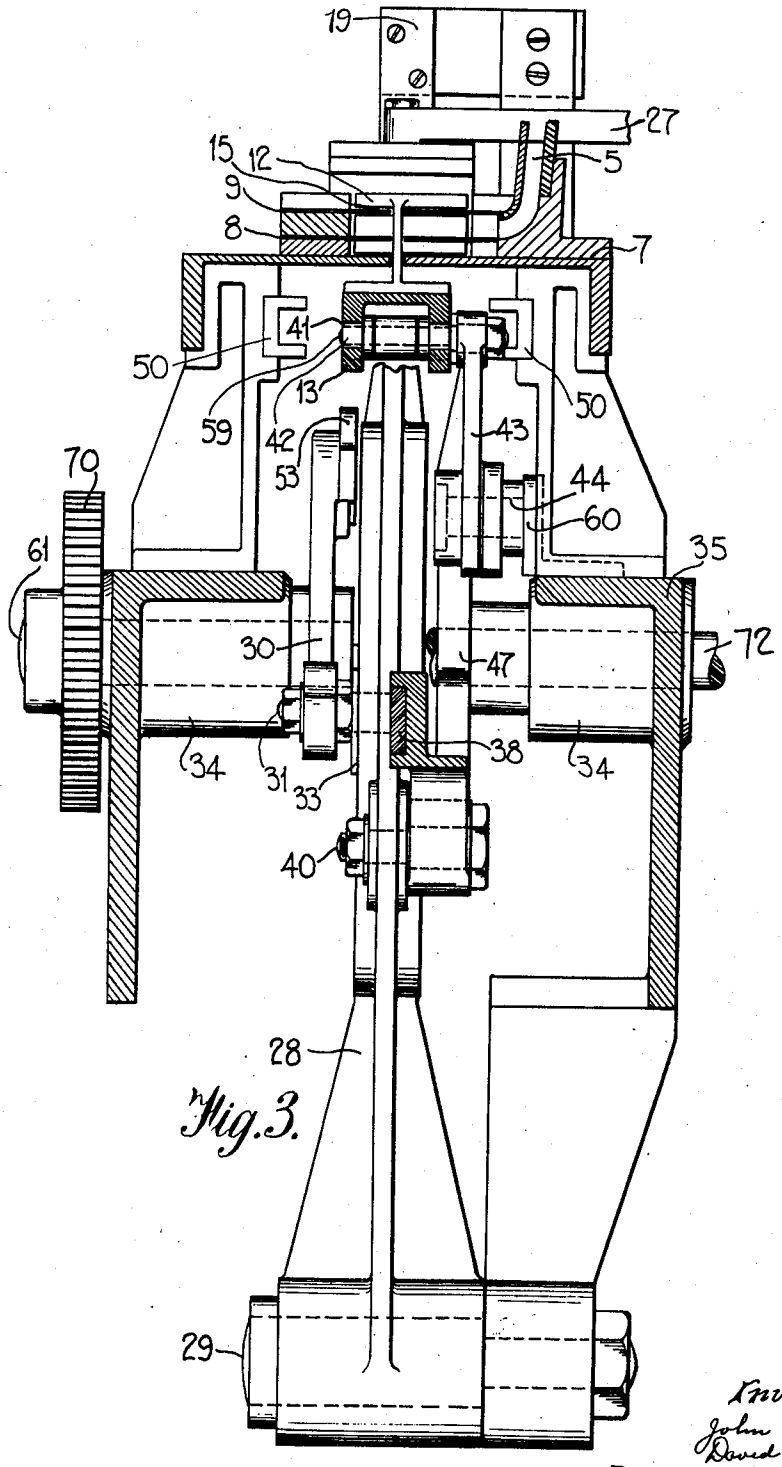

Fig. 3.

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UNITED STATES PATENT OFFICE

2,193,918

CONVEYER DEVICE

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In Great Britain May 2, 1938

6 Claims. (Cl. 226—5)

This invention is for improvements in or relating to conveyer devices.

Where herein the term "article" is used it is deemed to include a batch of articles, such for example as a batch of cigarettes.

It is an object of the invention to provide a conveyer device having pusher elements adapted successively to engage an article and to move the article along the bed of an automatic machine by different distances. According to one aspect of the invention this object is achieved by connecting the pusher elements with an oscillating pivoted operating member, the pusher elements being connected with the operating member at different positions between the bed and the pivot for the operating member.

One embodiment of the invention will be described by way of example with reference to the accompanying drawings, which show portions of a machine for packing batches of cigarettes and in which—

Figure 1 is a side elevation of the bed of a cigarette packing machine partly in section.

Figure 2 is a plan of Figure 1.

Figure 3 is a section of Figure 1 on the line 3—3.

Figures 4 and 5 are a plan and side elevation of one conveyer and its associated parts.

Like reference numerals refer to like parts throughout the specification and drawings.

The machine illustrated is intended for use in a construction in which a cigarette packing machine is operatively coupled with a cigarette making machine, and cigarettes are moved towards the packing machine from the cigarette making machine by a continuously moving endless band on which the cigarettes are arranged in three rows with the axes of the cigarettes disposed transversely to the direction of movement of the endless band. The endless moving band is arranged at a level which is above the bed of the cigarette packing machine.

Referring to the drawings, the three rows of cigarettes are delivered to the packing machine so that one row of cigarettes passes downwardly between one of the guides 4, 5 or 6. One end row of cigarettes is delivered to the surface of the bed 7 of the packing machine while the middle row and the other end row of cigarettes are delivered to supporting elements 8 and 9 arranged at different levels above the surface of the bed of the packing machine. The supporting elements 8 and 9 comprise plates disposed in planes parallel to the bed of the packing machine. The object of delivering the rows of cigarettes to different levels is to obtain a batch of cigarettes comprising three superimposed rows of cigarettes. A batch of cigarettes is assembled by means of a first conveyer comprising three pusher elements 10, 11 and 12 connected with a carrier 13, the pusher elements being arranged to move over the surface of the bed of the machine during the operative movement of the conveyer and to be moved beneath the surface of the bed of the machine during a part of its non-operative movement in the manner described below. The pusher elements 10, 11 and 12 are of different heights considered relatively to the bed 7 of the machine, the foremost pusher element 12, considered in the direction in which the cigarettes are moved by the first conveyer, as indicated by the arrow "A", Figure 1, being the highest pusher element, the height of such pusher element being substantially equal to the height of three superimposed rows of cigarettes. The rearmost pusher element 10 is of a height substantially equal to that of a single row of cigarettes, i. e., to the diameter of a cigarette, while the middle pusher element 11 is of a height substantially equal to the height of two superimposed rows of cigarettes. During the movement of the first conveyer device over the bed of the machine the rear-most pusher element 10 moves the row of cigarettes which is delivered on to the bed of the packing machine by the guides 4 lengthwise (i. e., in the direction of the longitudinal axes of the cigarettes) into position beneath the first supporting element 8 arranged above the bed of the packing machine. Simultaneously the middle pusher element 11 moves a row of cigarettes which is disposed beneath the supporting element 8 just mentioned together with a row of cigarettes supported thereby into position beneath the second supporting element 9 arranged above the bed of the machine. The third and highest pusher element 12 simultaneously moves two superimposed rows of cigarettes from beneath the second supporting element 9 together with the row of cigarettes supported thereby and moves the batch comprising three superimposed rows of cigarettes into position to be engaged by a second conveyer. The pusher pieces 12 and 11 are slotted at 14 and 15 respectively so as to permit a part of the pusher pieces to pass over the supporting elements which are slotted as shown at 55, Figure 2, while a part passes beneath the supporting elements. The position "B" to which a batch is moved by the pusher element 12 may be one in which the batch is located in a compression chamber of known construction and in which

the batch of cigarettes is compressed transversely to the direction of movement of the batch along the bed 7 in order to reduce the cross-sectional area of the batch. The compression chamber is indicated diagrammatically in Figure 2 where a fixed side member 56 and a side member 57 movable as indicated by a double headed arrow are shown. A movable top member is also provided, but this is omitted from the drawing for clearness, as the compression chamber forms no part of the invention.

The second conveyer device comprises a further pusher element 16 supported by a second carrier 17 and arranged to move the batch of cigarettes containing three superimposed rows from the compression chamber and to insert the compressed batch into the open end of a packet. The insertion of the batch into a packet may be effected in any known manner, the method illustrated being a convenient one.

The packets are superimposed in a magazine comprising a guide 18, a guide 19 and side guides 58, Figure 2. The packets may be automatically fed into the magazine, for example from a packet making machine or placed in by hand. The base of the guide 19 consists of a movable stop 20 pivoted at 21 and normally retained in the position shown by a roller 22 carried on a lever 23 pivoted at 24. The lever has a spring 25 attached thereto which presses the roller 22 into a small groove in the hinge member of the stop 20.

A batch of cigarettes at the position "B" is moved by the second conveyer 16, which is operated as described later, through a spring mouthpiece or funnel 26 of known construction, into the open mouth of the lowest packet in the magazine. When the batch has been completely inserted into the packet, continued movement of the conveyer 16 forces the stop 20 to turn on its pivot 21 against the influence of the spring 25 and the filled packet is pushed out of the magazine. The stack of empty packets then fall a distance equal to a packet thickness so that the next one is ready for the insertion of the next succeeding batch of cigarettes. The mouthpiece 26 is supported by a bar 27 operable by any suitable mechanism so that the mouthpiece moves to and fro as indicated by the double headed arrow in a slot 60 in the bed 7. The forward movement towards the packet mouth takes place while the batch is passing through the mouthpiece so that the latter is caused to enter the packet mouth and guide the cigarettes into it. When a filled packet is completely pushed out of the magazine the pressure of the roller 22 returns the stop 20 to the position shown in the figure.

The second conveyer is arranged to move the batches of cigarettes at each movement of the conveyer for a distance which is greater than the distance which the cigarettes are moved by the first conveyer at each operative movement thereof. The first and second conveyers are both connected with an operating member 28, consisting of a lever which is pivoted at a position 29 below the surface of the bed of the machine. The first and second conveyers are each connected with the operating member 28 at positions which are between the position 29 at which the operating member is pivoted and the surface of the bed 7 of the machine, the first conveyer being connected with the operating member at a position which is nearer to the pivot therefor than is the position at which the second conveyer is connected to the operating member as described in detail below. The operating member 28 is oscillated about its pivot by a crank 30, constructed in the form of a quadrant, the crank pin 31 of which is connected with a slot 32 formed in the operating member by means of a sliding block 33 so that the crank is movable relatively to the operating member during the oscillation of said member while the crank shaft 61 is rotatable in one of the fixed bearings 34, see Figure 3, formed in a support bed 35.

The carrier 13 of the first conveyer is connected with an arm 36 movable in guides 37 fixed on the support bed 35, the arm being connected by a link 38 with the operating member. The link 38 is pivoted at 39 to the arm 36 and at 40 to the lever 26. The carrier 13 is provided with a slot 41 in which a sliding bush 42 surrounding a pin 59 is arranged to slide. The pin 59 is mounted on one arm 43 of a double-armed lever pivoted at 44 to a bracket 60 mounted on the support bed 35. The other arm 45 of the lever carries a cam follower 46 which engages with a cam 47 arranged to oscillate the double-armed lever about the pivot therefor in timed relationship with the movement of the operating member so that at the appropriate times the article engaging portions of the pusher elements of the first conveyer are moved through slots 48 in the bed of the machine so as to be moved below the bed of the machine at the end of their operative movement, and to be projected above the bed of the machine prior to the operative movement. The slot 41 in the carrier permits the pin 59 carried by the arm 43 of the double-armed lever and which is located in the slot to move relatively to the carrier during the backward and forward movements thereof, and the pin serves as a support for the carrier during the operative movement of the conveyer. In Figure 1 the pushers 10, 11 and 12, the carrier 13 and the lever 43 are shown in full lines in the operative position of the pushers and in chain lines in the inoperative position thereof.

The carrier 17 supporting the pusher element 16 of the second conveyer is pivotally connected with the operating member at 49 as described in more detail below, and is guided for movement along the bed of the machine in guides 50, the pusher element being pivoted to the carrier 17 at 62 so that on its return stroke it engages with an edge of a slot 51 formed in the bed of the machine and is caused to turn about its pivot so that its article engaging portion is withdrawn below the bed of the machine at the end of its operative movement. At the end of the return stroke the pusher element 16 is projected upwardly through a slot 52 in the bed of the machine by means of a cam 53 rotatable about the axis of the rotatable crank shaft 61 and secured to the crank 30 for rotation therewith, the cam being arranged to engage with a roller 54 carried by the pusher element and to move the pusher element through the slot 52 in the bed of the machine so that on the forward movement of the second conveyer the pusher element is disposed for movement over the bed of the machine.

Referring to Figures 4 and 5, the pivot 49 at the end of the lever 46 consists of a pin the ends of which are rotatably mounted in slide blocks 63 which are movable in grooves 64 in the carrier 17. As the pusher 16 is moved from the position shown in full lines in Figure 1 to the position shown in chain lines, the blocks 63 slide up and down in the grooves 64. The pusher 16 is pro-

vided with a stop pin 65 which engages with stop plates 66 so that when the pusher is raised by the cam 53 its movement is restricted and the pusher therefore cannot move higher above the bed surface than its proper position. The pusher 16 is further controlled near the end of its operative stroke by a spring catcher 67 pivoted at 68 beneath the bed 7 which is slightly recessed as indicated in Figures 1 and 2. On its forward movement the pusher 16 causes the catch to swing on its pivot so that it is out of the way of the pusher, but on the return stroke the pusher strikes against the catch, and as the latter cannot move when pressed in this direction the pusher is forced to pass through the slot 51 and beneath the bed.

The operating member 28 and the cam 47 are driven in timed relationship, the shaft 61 having a gear 70 at its end which engages with a gear 71 on the end of the spindle 72 of the cam 47. The gear 70 engages with another gear (not shown) which is rotated by a shaft extending from the other part of the machine. For convenience the gears 70 and 71 are shown in Figure 1, being drawn as chain lines in the usual manner, though it will be appreciated that these gears are in front of that side of the bed 35 which is broken away in the figure.

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

1. In an automatic machine, a bed along which articles are moved at intervals, two conveyers successively to engage an article and move it along said bed, a pivoted operating member, means to oscillate said member about its pivot, each of said conveyers being connected with the operating member at different positions between the pivot therefor and the bed whereby during the operative part of a stroke the conveyers move an article different distances, and means to move the conveyers out of the path of an article during the inoperative part of a stroke.

2. In an automatic machine, a bed along which articles are moved at intervals, two conveyers successively to engage an article and move it along said bed, an operating member pivoted at a position below said bed, means to oscillate said member about its pivot, each of said conveyers being connected with the operating member at different positions between the pivot therefor and the bed whereby during the operative part of a stroke the conveyers move an article different distances, and means to move the conveyers out of the path of an article during the inoperative part of a stroke.

3. In an automatic machine, a bed along which articles are moved at intervals, two conveyers successively to engage an article and move it along said bed, a pivoted operating member, a rotatable crank connected with and movable relatively to said operating member to oscillate said member about its pivot, each of said conveyers being connected with the operating member at different positions between the pivot therefor and the bed whereby during the operative part of a stroke the conveyers move an article different distances, and means to move the conveyers out of the path of an article during the inoperative part of a stroke.

4. In an automatic machine, a bed along which articles are moved at intervals, two conveyers successively to engage an article and move it along said bed, an operating member pivoted at a position below said bed, a rotatable crank connected with and movable relatively to said operating member to oscillate said member about its pivot, each of said conveyers being connected with the operating member at different positions between the pivot therefor and the bed whereby during the operative part of a stroke the conveyers move an article different distances, a carrier to which a conveyer is pivoted, said carrier being pivoted to the operating member, means to move a conveyer below said bed at the end of an operative stroke, and a cam rotatable in timed relationship with said crank and adapted to rotate the conveyer about its pivot to project the conveyer above said bed prior to an operative stroke.

5. In an automatic machine, a bed along which articles are moved at intervals, a first conveyer including a plurality of pusher elements of different heights spaced apart from each other in the direction of their operative movement by substantially equal distances, an article feeding station particular to each pusher element, a second conveyer to engage an article delivered by the first conveyer, an operating member pivoted at a position below said bed, a rotatable crank connected with and movable relatively to said operating member to oscillate said member about its pivot, each of said conveyers being connected with the operating member at different positions between the pivot therefor and the bed whereby during the operative part of a stroke the conveyers move an article different distances, and means to move the conveyers out of the path of an article during the inoperative part of a stroke.

6. In an automatic machine, a bed along which articles are moved at intervals, a conveyer including a plurality of pusher elements spaced apart from each other in the direction of their operative movement by substantially equal distances, a slotted carrier for the pusher elements, a guide element, an arm connected with the carrier and pivotally mounted for movement relatively to said guide element, an operating member pivoted at a position below said bed, a rotatable crank connected with and movable relatively to said operating member to oscillate said member about its pivot, a link connecting said arm with the operating member at a position between the pivot therefor and the bed, a pivoted lever cooperating with the slot in said carrier, and a cam movable in timed relationship with said crank and operable to oscillate said pivoted lever whereby the article engaging portions of the pusher elements are withdrawn below the bed at the end of an operative movement and are projected above the bed prior to an operative movement.

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