April 27, 1965 G. F. PEMBROKE ET AL 3,180,067

CIGARETTE-COLLECTING MECHANISM

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FIG. 1.

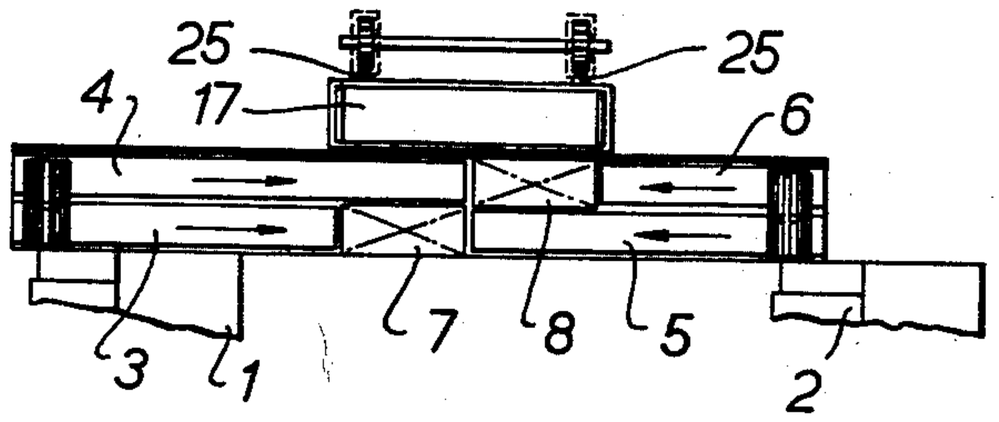

FIG. 3.

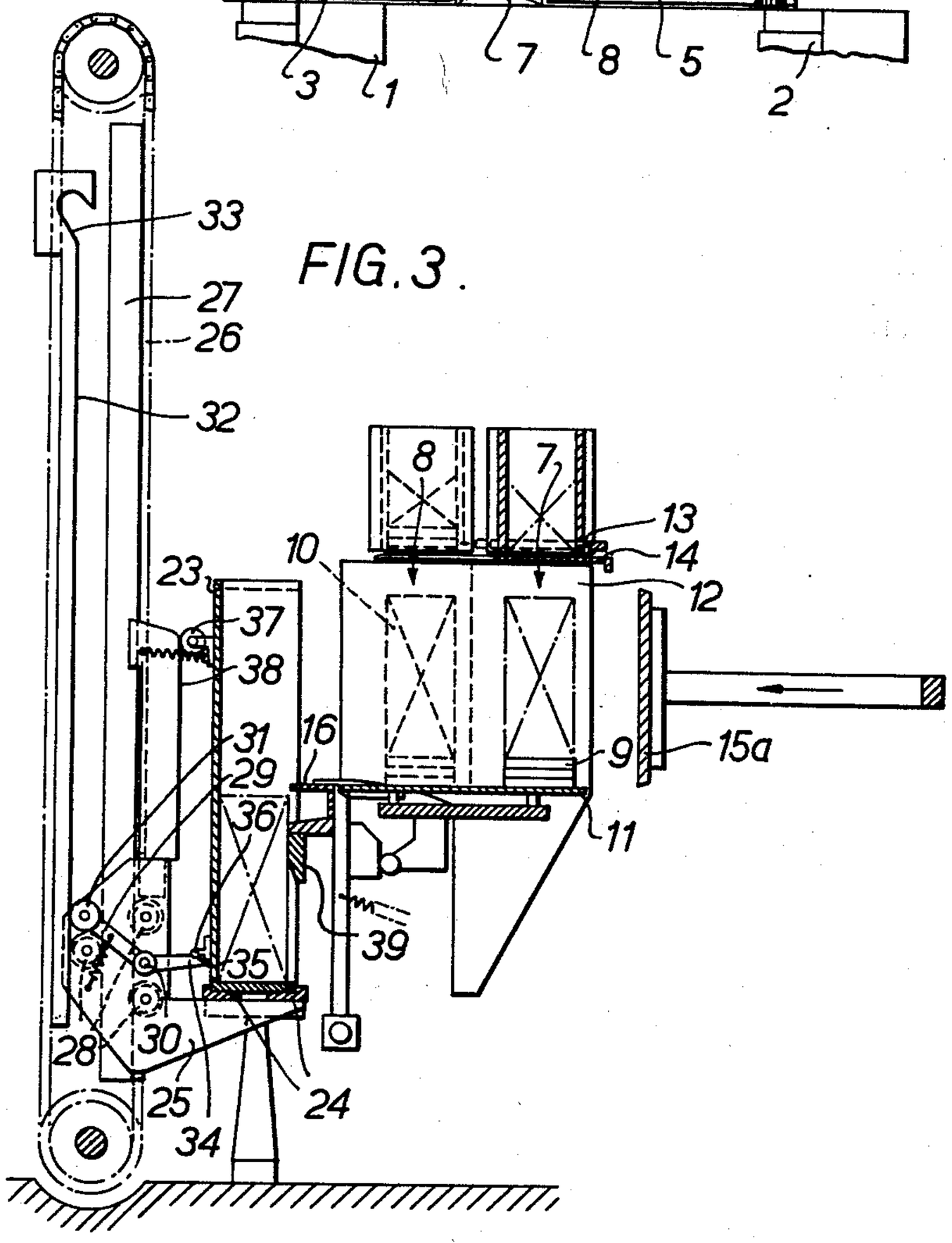

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FIG. 4.

FIG. 2.

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CIGARETTE-COLLECTING MECHANISM

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8 Claims. (Cl. 53—148)

This invention concerns improvements in or relating to cigarette-collecting mechanism for collecting cigarettes automatically into containers.

Containers used for collection of cigarettes in bulk are commonly known as "trays," and the word "tray" will be used herein, for convenience, as meaning any suitable container in which cigarettes can be held in stack-like arrangement.

It has previously been proposed to feed cigarettes downwardly into a fixed receptacle, (e.g., to form a stack) and then to push the cigarettes in the direction of their axes (e.g., to push a stack of cigarettes bodily) into an adjacent tray which is open at the front, i.e., at the side facing the fixed receptacle. For this purpose it has been proposed to use a tray having a back wall at the side of the tray remote from the recptacle, to provide support for the cigarettes pushed into the tray. Such a wall is referred to herein as a "back wall," since it is located at the back of the tray considered in the direction in which cigarettes are pushed into the tray.

Trays are also known, and in common use, which are open at both sides (i.e., which have no back wall). Such a tray may consist only of end walls and a base. For convenience such trays will be referred to herein as "open-sided trays."

According to the present invention there is provided cigarette-collecting mechanism, for use with open-sided trays (i.e., trays having no back wall), in which cigarettes are pushed axially into an open-side tray, and wherein there is provided a plate member arranged to be moved into association with a tray to serve as a temporary back wall thereof, and means operative to move the plate member into such association before filling of the tray commences, and to move it away from the tray when the latter has been filled.

The plate member may be carried by carrier members mounted on a support so as to be movable relative thereto, and so as to be capable of moving the said plate member into and out of association with the tray. The said support may be arranged to be moved up and down to raise and lower the tray, the said carrier members being arranged to move upwardly and downwardly with the said support.

The said carrier members may be pivotally mounted on the said support and arranged to be swung to move the said plate member into and out of association with the tray, and the swinging movements of the said carrier members may be controlled by a cam surface extending along the path of the said support as it moves upwardly and downwardly. There may be provided a further cam surface, e.g. on the said support, with which a cam follower connected to the said plate member cooperates, so as to effect control over movement of the said plate member relative to the said support.

Apparatus in accordance with the invention will now be described with reference to the accompanying drawings, in which—

FIGURE 1 is a diagrammatic plan view,

FIGURE 2 is an enlarged plan view of part of FIGURE 1, showing additional details,

FIGURE 3 is an end view, and

FIGURE 4 shows some of the mechanism illustrated in FIGURE 3, with parts in different positions.

In FIGURE 1, two cigarette-making machines are shown fragmentarily at **1** and **2**. Catcher bands **3** and **4** extend towards the right from the machine **1**, and similar catcher bands **5** and **6** extend towards the left from machine **2**.

Cigarettes coming from the two machines are delivered in any suitable way on to the catcher bands **3**, **4**, **5** and **6**, each of which carries a row of cigarettes transversely of their axes. Between the ends of the bands **3** and **5**, and lengthwise in line with them, is a receptacle **7** to receive cigarettes from the bands **3** and **5**. A similar receptacle is located between the ends of the bands **4** and **6**, the two receptacles being, as shown, offset from each other lengthwise. Cigarettes are fed from opposite directions by the pairs of bands, **3**, **5**, and **4**, **6**, into the receptacles **7** and **8** respectively, and are supported therein and form stacks **9** and **10** (FIGURE 2) on a platform **11**, FIGURES 2 and 3. This platform is formed in two separate parts since the two receptacles are divided by a vertical partition **12**. The platform is arranged to be gradually lowered downwardly through the receptacles **7** and **8**, in the manner disclosed in United States patent specification No. 2,919,529 and cigarettes fed into the receptacles form a stack in each receptacle. When the platform is near its lowermost position rows of needles **13** are projected into end faces of cigarettes to arrest downward movement of all cigarettes above a chosen level, and a support plate **14** is subsequently moved into the receptacles to support those cigarettes. The stacks of cigarettes still supported on the platform **11** continue to move downwardly until they reach the appropriate position from which they are to be transferred from the receptacles into a tray.

The arrangements whereby cigarettes are arrested and supported by needles **13** and the plate **14** are similar to those disclosed in United States patent specification No. 2,919,529 referred to above, but in the present case the needle rows and the support plate are stepped as illustrated in FIGURE 2.

A pusher device comprising two pusher plates **15***a* and **15***b* is arranged to move forwardly so that the plates **15***a*, **15***b*, which as seen in FIGURE 2 are in line with each other, move through the receptacles **7** and **8** respectively. The pusher plate **15***a* first engages the stack **9** and pushes it forwardly (i.e., axially of the cigarettes) until it is in line with the stack **10**, which is thereupon engaged by the pusher plate **15***b* and the two stacks are thereafter moved as a single stack across the platform **11** and a bridge member **16** into the tray **17**.

The pusher plates **15***a* and **15***b* are mounted on bars **18** carried by a cross-piece **19**, each end of which is fixed to a carriage **20** running along guide rods **21** on wheels **22**.

The tray **17** is an open-sided tray, and the mechanism includes a plate member **23** which can be moved into position to serve as a temporary back wall during the filling of the tray with cigarettes, to act as a support for the side of a stack of cigarettes in the tray and also as a stop to prevent cigarettes which have been pushed into the tray from continuing their forward movement and spilling out of the tray.

A tray to be filled is supported on support bars **24**, whose ends are fixed to brackets **25** carried by a chain

conveyor system **26**, the brackets being guided by guide rods **27** and wheels **28** on the brackets. The conveyor system **26** is arranged to be operated so as to bring the tray to two different filling levels whereby two successive batches or stacks of cigarettes are pushed into the tray, one on top of the other.

The temporary back wall plate **23** is carried by the brackets **25** in the following manner.

One arm **29** of a bell crank lever pivoted at **30** to a bracket **25** carries a roller **31** which runs along a cam track **32** as the tray is raised and lowered by the conveyor system **26**, the top end of the cam track **32** being recessed at **33**. The other arm **34** of the lever has a hooked end **35** in which is supported a short rod **36** fixed to the plate **23**.

A roller **37**, also fixed to the plate **23**, runs along another cam track **38** formed as an extension of the bracket **25**.

It will be understood that mechanism as just described is provided in association with each of the brackets **25**.

In operation, an empty tray is placed in position as shown in FIGURE 4, and the conveyor system **26** is then operated to lower the trays to a position at which its lower half is opposite the pushers **15***a*, **15***b*.

As the brackets travel downwardly the rollers **31** move out of the recesses **33** and thus turn the arms **34** about the pivots **30**. This causes the arms **34** to swing downwardly and towards the tray. The weight of the plate **23** causes it to drop with the arms **34**, and accordingly the rollers **37** move to the right, FIGURES 3 and 4, over their cam tracks **38**. These combined movements bring the plate into position within the tray to form a temporary back wall.

When the tray is in position, a stack of cigarettes is pushed into it from the receptacles **7** and **8**, filling the lower half of the tray. The brackets **25** are then lowered to bring the tray to the position shown in FIGURE 3. When further stacks of cigarettes have been formed in the receptacles **7** and **8**, they are moved, as a single stack, by the pushers into the upper half of the tray.

The filling of the tray having thus been completed, the conveyor system operates to move the tray upwards to the position shown in FIGURE 4. As the tray comes into this position, the rollers **31** enter the slots **33** and the plate **23** is thus swung away from the tray, the rollers **37** also riding up and away from the tray over their cam tracks **38**.

The bridge **16** is arranged to be moved prior to a filling operation, into a position to bridge the gap between the platform **11** and the base of the tray. Associated with the bridge is a block **39** which simultaneously moves forwardly, and on the second filling operation this block engages the side of the stack already in the tray (i.e., the end faces of the cigarettes) to ensure that the stack is kept in alignment during the filling of the upper half of the tray.

It will be appreciated that the plate **23** may be interchangable with plates of difference thicknesses so as to enable the mechanism to deal with cigarettes of different standard lengths. This makes it possible for a standard tray, wide enough to accommodate the longest cigarettes likely to be made, to be used for all sizes of cigarette, since the cigarettes can be centered in the tray by using a back plate **23** of suitable thickness, Alternatively the arms **34** could be interchangable with arms of different length, or the rods **36** fixed to the plates **23** could be adjustable, or different plates could have rods **36** spaced different distances from the plates.

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

1. Cigarette-collecting mechanism for use with open-sided trays, in which cigarettes are pushed axially into an open-sided tray, comprising a plate member arranged to be moved into association with a tray to serve as a temporary back wall thereof, carrier members by which

the said plate member is carried, a support on which the said carrier members are mounted so as to be movable relatively thereto and so as to be capable of moving the said plate member into and out of association with the tray, and means operative to move the plate member into such association before filling of the tray commences, and to move it away from the tray when the latter has been filled.

2. Mechanism as claimed in claim 1, wherein the said support is arranged to be moved up and down to raise and lower the tray, the said carrier members being arranged to move upwardly and downwardly with the said support.

3. Mechanism as claimed in claim 1, wherein the said carrier members are pivotally mounted on the said support and arranged to be swung to move the said plate member into and out of association with the tray.

4. Mechanism as claimed in claim 3, wherein the said support is arranged to be moved up and down to raise and lower the trays, and comprising a cam surface extending along the path of the said support as it moves upwardly and downwardly to control the swinging movements of the said carrier members.

5. Mechanism as claimed in claim 4, comprising a further cam surface, and a cam follower connected to the said plate member which co-operates with the further cam surface, so as to effect control over movement of the said plate member relative to the said support.

6. Cigarette-collecting mechanism for use with open sided trays, in which cigarettes are pushed axially into an open sided tray, comprising a movable support arranged to carry a tray to and away from a filling position, at which cigarettes are pushed axially into the tray, a plate member connected to the said support so as to be movable relatively thereto, so as to be capable of moving into and out of association with a tray carried by the support to serve as a temporary back wall of the tray, and arranged to move with the said support, and means operative to move the said plate member relatively to the said support into association with an empty tray carried by the said support as the latter is moved to the said filling position, at which the tray is filled, and out of association with the filled tray as the support is moved away from the said filling position.

7. Cigarette-collecting mechanism for use with open sided trays, in which cigarettes are pushed axially into an open sided tray, comprising a support arranged to be moved along a path between a first position, at which an empty tray can be received on the said support, and a filling position, at which cigarettes are pushed axially into the tray to fill the latter, so as to convey the empty tray from the said first position to the said filling position, and to return the filled tray from the said filling position to the said first position, a plate member connected to the said support so as to be movable relatively thereto, so as to be capable of moving into and out of association with a tray carried by the support to serve as a temporary back wall of the tray, and arranged to move along the said path with the said support, and means operative to move the said plate member relatively to the said support into association with an empty tray carried by the support as the latter is moved from the said first position to the said filling position, and out of association with a filled tray as the support is moved from the said filling position to the said first position.

8. Cigarette-collecting mechanism for use with open sided trays, in which cigarettes are pushed axially into an open sided tray, comprising a support arranged to be moved up and down to raise and lower the tray, a carrier member pivotally mounted on the said support, a plate member carried by the said carrier member so as to be movable relatively to the said support and arranged to move upwardly and downwardly with the said support, a cam surface extending along the path of the said support as it moves upwardly and downwardly, a cam fol-

lower connected to the said carrier member and arranged to cooperate with the said cam surface to swing the said carrier member so as to move the said plate member into and out of association with the tray to serve as a temporary back wall of the tray as the support moves along the said path, a further cam surface on the said support, and a cam follower connected to the said plate member and arranged to cooperate with the said further cam surface to control movement of the plate member relatively to the said support as the plate member is moved into and out of association with the tray.

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