May 29, 1934. G. D. HORGAN 1,961,047

MACHINE FOR PACKING CIGARETTES AND LIKE ARTICLES

Filed Feb. 25, 1931 3 Sheets-Sheet 1

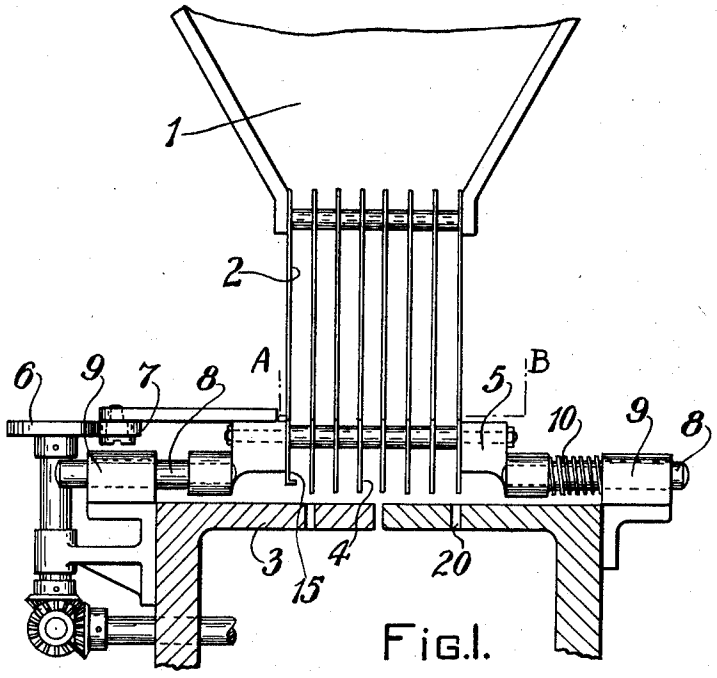


Fig. 1.

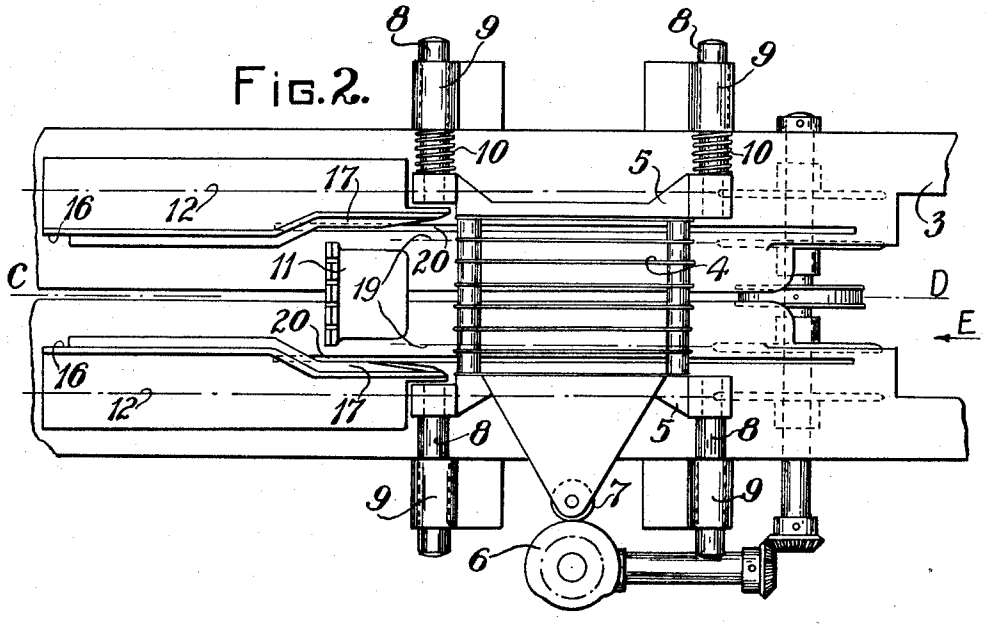


Fig. 2.

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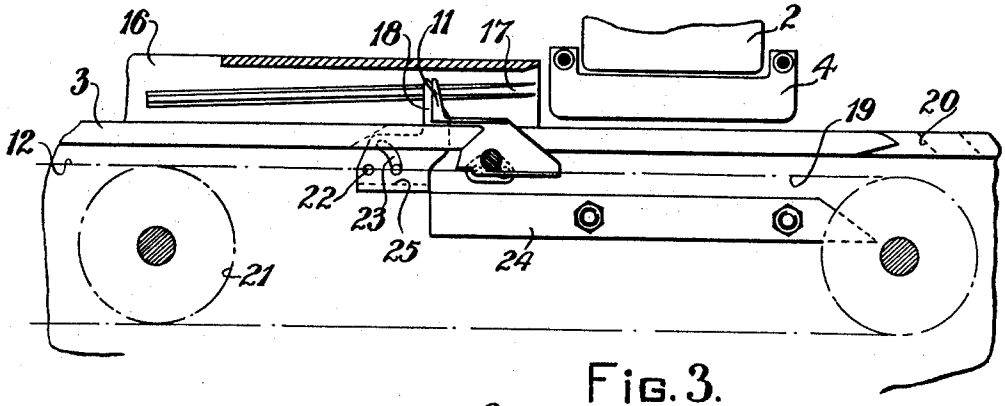
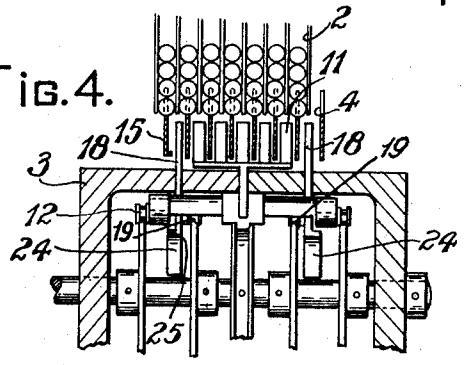


Fig. 3.

Fig. 4.



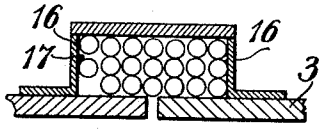


Fig. 5.

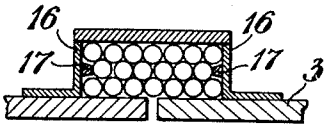


Fig. 6.

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MACHINE FOR PACKING CIGARETTES AND LIKE ARTICLES

Filed Feb. 25, 1931 3 Sheets-Sheet 3

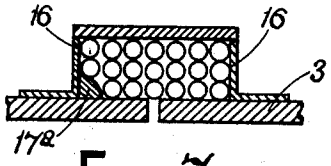


FIG. 7.

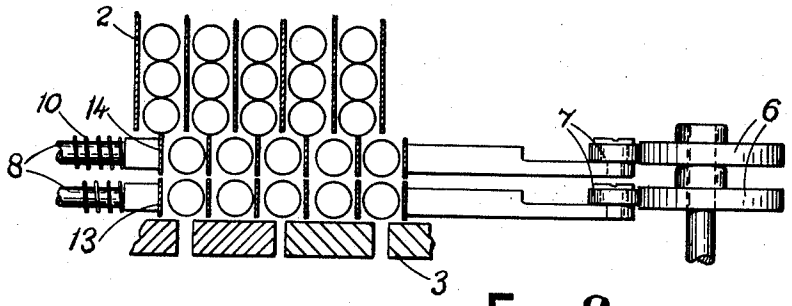


FIG. 8.

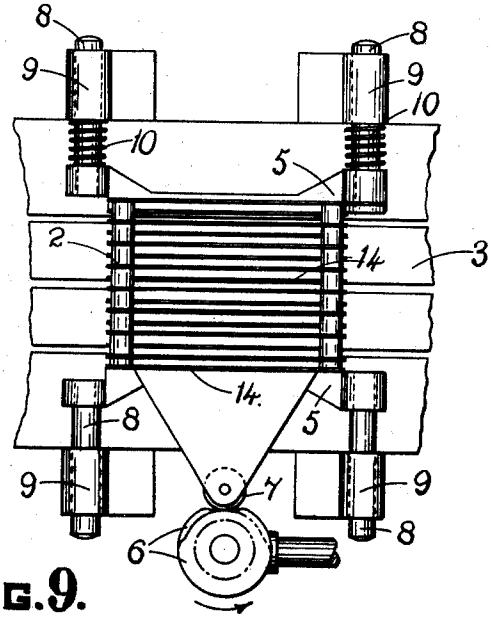


FIG. 9.

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UNITED STATES PATENT OFFICE

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MACHINE FOR PACKING CIGARETTES AND LIKE ARTICLES

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Application February 25, 1931, Serial No. 518,184
In Great Britain March 7, 1930

15 Claims. (Cl. 226—5)

This invention relates to machines for packing cigarettes and like articles, and has for its object to provide an improved form of apparatus for feeding cigrettes or like articles of the type wherein the cigarettes are contained in a hopper having an outlet provided with thin plates or vanes arranged to form vertical channels below the said hopper, and a conveyor operable automatically to remove the required number of cigarettes from said channels.

It is found in practice that when apparatus of the kind referred to is used to feed batches of more than one row of cigarettes from the channels at high speed, the tilting of the cigarettes in the channels as they fall after the passage of the pusher piece sometimes causes them to lodge or jam in the channels, thus preventing them from falling evenly or smoothly.

The present invention consists of a cigarette feeding apparatus of the type referred to having the lower extremities of the vanes formed independent of the upper portions thereof and carried in a frame movable automatically after receiving the cigarettes from the upper vanes into a position wherein the lower portion of each vane is arranged substantially intermediate of the upper portion of two adjacent vanes.

Further, the invention comprises a cigarette feeding apparatus of the type referred to wherein the channels are constructed of such a width as to permit the cigarettes to fall easily therein, and means are provided for closing the cigarettes into a compact batch after delivery from the vanes so that they may be carried along the bed by the pusher pieces of a continuous conveyor.

The invention also comprises means whereby the cigarettes may be lowered in a series of stages in order to prevent undue vibration of the cigarettes and consequent loss of tobacco.

Another feature of the invention comprises means for arresting the fall of the cigarettes in one of the outer channels so that if desired a batch consisting of a number of rows of varying numbers of cigarettes may be delivered, for example, a batch of cigarettes may be composed of two rows of seven cigarettes with a row of six cigarettes in between them, or in some cases, the row of six may be at the top or bottom of the batch where the style of packing permits.

The invention will be more particularly described with reference to the accompanying drawings, in which:—

Fig. 1 is an end elevation of a cigarette feeding mechanism constructed according to the invention.

Fig. 2 is a plan of Fig. 1 taken on the line A—B, with the movable frame carrying the lower vanes in a different position.

Fig. 3 is a section on line C—D, Fig. 2.

Fig. 4 is an end view of Fig. 2, partly in section, and taken in the direction of the arrow "E".

Figs. 5, 6 and 7 are details of a method of grouping cigarettes into batches having rows containing an unequal number of cigarettes.

Fig. 8 is a view of a modified form of the invention in which the cigarettes are lowered in two stages.

Fig. 9 is a plan of Fig. 8.

Referring to the drawings, the cigarettes are contained in a hopper 1 and pass down the channels between a number of vanes 2 which terminate some distance above the bed 3 of the packing machine as shown in Fig. 3.

Beneath the fixed vanes 2 are arranged a number of narrow vanes 4 mounted in a movable frame 5, thus forming a kind of grid. The grid is movable laterally by a cam 6 operating a cam roller 7 attached to the grid frame, the frame being guided by rods 8 moving in guides 9 fixed to the bed of the machine and the return stroke being effected by springs 10.

The frame carrying the vanes 4 is mounted above the bed as shown in Figs. 1 and 4, leaving sufficient space for the body of a pusher piece 11 carried on a continuous conveyor 12 to pass between the lower edges of the vanes 4 and the bed, the pusher piece being extended to the height of, for example, three rows of cigarettes and slotted to pass through the channels as shown in Fig. 4.

The grid carrying the narrow vanes is reciprocated beneath the main vanes by the cam mechanism, as previously described, the distance of movement being equal to half the pitch of the vanes.

The main vanes are displaced from alignment with the centre line of the bed of the packing machine by a distance equal to half the pitch of the vanes (see Fig. 1). In one position, therefore, the grid lies beneath the main vanes so that the channels are in line and become filled with cigarettes; the grid is then moved sideways carrying the cigarettes within its vanes a distance equal to half the pitch of the vanes, and into the path of the pusher piece. At the same time the filled grid supports the remaining cigarettes in the upper vanes 2 as the grid slides beneath them. This action is shown in Fig. 4 where the pusher 11 and a pair of auxiliary pushers 18 hereinafter described, are in the act of removing a batch of twenty cigarettes from the grid, which is simul-

taneously supporting the cigarettes remaining in the upper vanes. The cigarettes being removed have been omitted from Fig. 4 for the sake of clearness, but reference to Fig. 5 will show the exact arrangement of the batch. When the pusher piece has removed the batch of cigarettes, the grid returns to its position beneath the upper vanes and the cigarettes fall to fill the grid again.

It will be seen that the grid vanes support the cigarettes in the upper vanes along their entire length so that when the grid returns exactly beneath the upper vanes, the upper cigarettes fall quite parallel with the machine bed.

If desired, the fall of the cigarettes may be divided into stages to reduce the shock of falling and prevent tobacco from dropping out of the ends of the cigarettes.

One method of effecting this is shown by the apparatus in Figs. 8 and 9 which show a batch of two rows of cigarettes being assembled.

Referring to the drawings, it will be seen that two moving grids 13 and 14 are used and are operated by cams 6. In the position shown in Fig. 8, both grids are filled with rows of cigarettes and the pusher piece of the conveyor is about to pass through these two grids and carry away the two rows of cigarettes. Immediately the pusher piece has passed, the upper grid 14 moves to the left and a further row of cigarettes drops into the channels, being supported therein by the vanes of the lower grid 13. The latter then moves to the left and as soon as it is beneath the grid 14, the cigarettes fall again a distance of one row. Both grids are then simultaneously moved to the right into the position shown in the figure, ready for the passage of the pusher piece.

When it is desired to pack cigarettes in batches comprising rows of different numbers of cigarettes, one of the outer vanes is shaped as shown in Fig. 4.

When three rows of cigarettes are removed from the vanes, the lower row only consists of six cigarettes as the bottom of the outer vane 15 prevents the lowest cigarette in the outer vane channel from falling on to the bed of the machine.

After the batch of cigarettes has been removed from beneath the vanes it is carried between the guides 16 and a pair of narrow tapering projections 17 on the surface of the guides re-arrange the middle row of cigarettes in the manner shown in Figs. 5 and 6.

It will be understood that in some cases the cigarettes shown in Figs. 5 and 6 may be under considerable pressure so that the outer cigarette of the middle row does not fall of its own accord, but has to be pushed downwards by one of the projections 17 as shown at Fig. 5, the co-operating projection on the other guide subsequently forcing the six cigarettes into a symmetrical position as shown at Fig. 6.

When it is desired to pack the cigarettes with only six cigarettes in the bottom row it is merely necessary to provide a small guide or filler indicated at 17^a, Fig. 7 at the corner of the guide 16, the pusher piece being suitably shaped to clear this.

When it is desired to pack the cigarettes with only six cigarettes in the top row, the vane 15, Fig. 4, may be used to get an outside column of two cigarettes, and these may be permitted to drop on to the bed as soon as the batch has been removed from beneath the vanes.

In order to facilitate the fall of the cigarettes in the vain slots, these are preferably made considerably wider than the diameter of a cigarette and when the batch of cigarettes is removed from the channels it is necessary to use conveying means of a width equal to the width of the loose batch. A single conveyor of the necessary width would be too wide to pass through the guides 16 which close in the batch to the desired size, and to meet this difficulty the outer cigarettes on each side of the batch are carried along by auxiliary pusher pieces 18 formed of narrow plates and carried on chain conveyors 19 which are mounted inside of the main chain conveyors 12 (see Fig. 4).

After the cigarettes have been delivered into the tapering portion of the guide 16 so that they are bunched together closely enough for the main pusher piece to convey the same, the auxiliary pushers trip back when they reach the ends of the slots 20 formed in the bed 3 and in which they travel, and pass beneath the bed, afterwards making their return journey.

The forward end of the auxiliary pusher conveyor is carried on a sprocket 21, Fig. 3, from which view the action of these pushers will be easily understood.

The method of tripping the auxiliary pushers is shown at Fig. 3, from which it will be seen that the pusher 18 is hung on to the chain by a pivot 22 and has a slot 23 so that the pusher 18 is capable of swinging around the pivot 22. The guide 24 keeps the pushers in the upright position until the cigarettes are fairly within the guides 16 when the heel 25 of the pusher 18 leaves the rail 24 and drops downwards pivoting on the pin 22. In Fig. 3, the pusher 18 is just about to drop.

In some cases the auxiliary pushers may be arranged to close in towards the main pusher by fitting the auxiliary pushers on long pins on their chains on which they can slide and making the necessary slots in the machine bed taper inwards towards the central slot. This construction is chiefly for use where the amount of compression given to the cigarette batch is considerable.

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

1. In cigarette feeding apparatus, the combination with a plurality of vanes between which the cigarettes may pass, said vanes being interrupted to provide separate upper and lower vane sections, of means for displacing one of said vane sections laterally with respect to the other of said vane sections to impede the passage of cigarettes between the vanes.

2. In cigarette feeding apparatus, the combination with a plurality of vanes between which the cigarettes may pass, said vanes being interrupted to provide separate upper and lower vane sections, of means for displacing the lower of said vane sections laterally to block the passage of cigarettes between the vanes.

3. In cigarette feeding apparatus, the combination with a plurality of vanes between which the cigarettes may pass, said vanes being interrupted to provide separate upper and lower vane sections, of means acting automatically upon the filling of the lower vane section from the upper vane section to effect relative lateral displacement of said vane sections for temporarily blocking the passage of cigarettes into the lower vane section.

4. In cigarette feeding apparatus, the combination with a plurality of vanes between which the cigarettes may pass, said vanes being formed in relatively laterally displaceable upper and lower sections, of means for imparting relative displacement to said sections to position the

vanes in one of said sections intermediate the vanes in the other of said sections.

5. In cigarette feeding apparatus, the combination with a plurality of vanes between which the cigarettes may pass, said vanes being formed in relatively laterally displaceable upper and lower sections, of means for imparting relative displacement to said sections to position the vanes in one of said sections intermediate the vanes in the other of said sections, and a conveyor for withdrawing cigarettes from the lower section while the sections are thus relatively displaced.

6. In cigarette feeding apparatus, the combination with a plurality of vanes between which the cigarettes may pass, said vanes being formed in relatively laterally displaceable upper and lower sections, of means for imparting relative displacement to said sections to position the vanes in one of said sections intermediate the vanes in the other of said sections, and a conveyor for withdrawing cigarettes from the lower section while the sections are thus relatively displaced, said means acting to restore the vane sections to aligned position after withdrawal of cigarettes from the lower section.

7. In a cigarette feeding apparatus, the combination with a channel for receiving a batch of cigarettes, said channel comprising fixed guide members extending generally in the direction of the length of the cigarettes, of conveyor means for moving the cigarette batch endwise through the channel, said guide members converging in the direction of movement of the cigarettes to compact the batch, said conveyor means including an auxiliary member for engaging and moving the outer cigarettes on one side of the batch, and means for terminating movement of said auxiliary member in the direction of movement of said cigarettes as the latter pass within the converging portion of said channel.

8. In a cigarette feeding apparatus, the combination with a channel for receiving a batch of cigarettes, said channel comprising fixed guide members extending generally in the direction of the length of the cigarettes, of conveyor means for moving the cigarette batch endwise through the channel, said guide members converging in the direction of movement of the cigarettes to compact the batch, said conveyor means including an auxiliary member for engaging and moving the outer cigarettes on one side of the batch, and means for withdrawing said auxiliary member from the path of movement of said cigarettes as the latter pass within the converging portion of said channel.

9. In a cigarette feeding apparatus, the combination with a channel for receiving a batch of cigarettes, said channel comprising fixed guide members extending generally in the direction of the length of the cigarettes, of conveyor means for moving the cigarette batch endwise through the channel, said guide members converging in the direction of movement of the cigarettes to compact the batch, said conveyor means comprising a centrally disposed pusher piece and an auxiliary pusher piece located laterally thereof, said pusher pieces extending within said channel, and means for altering the position of said auxiliary pusher piece as the cigarettes are moved into the converging portion of said channel to permit the auxiliary pusher piece to clear the adjacent fixed guide member.

10. In a cigarette feeding apparatus, the combination with a channel for receiving a batch of cigarettes, said channel comprising fixed guide members extending generally in the direction of the length of the cigarettes, of conveyor means for moving the cigarette batch endwise through the channel, said guide members converging in the direction of movement of the cigarettes to compact the batch, said conveyor means comprising a centrally disposed pusher piece and auxiliary pusher pieces located laterally thereof, said pusher pieces extending within said channel, and means for altering the position of said auxiliary pusher pieces as the cigarettes are moved into the converging portion of said channel to permit the auxiliary pusher pieces to clear the adjacent fixed guide member.

11. In a cigarette feeding apparatus, the combination with a plurality of vanes between which the cigarettes may pass, said vanes being interrupted to provide at least three superposed vane sections, of means for imparting independent lateral displacement to said sections to align and disalign the vanes in the several sections, whereby the cigarettes may be permitted to pass into the two lower sections in succession.

12. In a cigarette feeding apparatus, the combination with a plurality of substantially parallel vanes spaced to permit cigarettes to fall therebetween, of a plurality of superimposed vaned sections disposed beneath said first named vanes, said first named vanes and said vane sections being relatively and independently laterally movable, whereby said first named vanes and either of said vaned sections may be placed in or out of alignment.

13. In cigarette feeding apparatus, the combination with a plurality of vanes through which cigarettes may be passed to align the same in transverse rows and vertical columns with more than two cigarettes in each column, of means associated with said vanes for blocking the delivery path in an outer column to obtain a lesser number of cigarettes therein, and stationary means through which the cigarettes are thereafter moved for altering the row alignment of cigarettes in the said outer column.

14. In cigarette feeding apparatus, the combination with a plurality of vanes through which cigarettes may be passed to align the same in transverse rows and vertical columns with more than two cigarettes in each column, of means associated with said vanes for blocking the delivery path in an outer column to obtain a lesser number of cigarettes therein, said means comprising an abutment in the lower row and the outer column, and stationary means through which the cigarettes are thereafter moved for altering the row alignment of cigarettes in the said outer column, said stationary means comprising an abutment positioned to extend within an intermediate row and the outer column.

15. In cigarette feeding apparatus, the combination with a plurality of vanes between which the cigarettes may pass, said vanes being interrupted to provide separate upper and lower vane sections having their adjacent portions normally in alignment, said vane sections being relatively movable to place the adjacent portions of the two sections out of alignment, and means for imparting such relative movement to the vane sections to block the passage of cigarettes from the upper section to the lower section.

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