

Oct. 8, 1963

A. SCHMERMUND

3,106,282

MACHINES FOR HANDLING CIGARETTES

Filed April 15, 1960

5 Sheets-Sheet 1

Fig. 1.

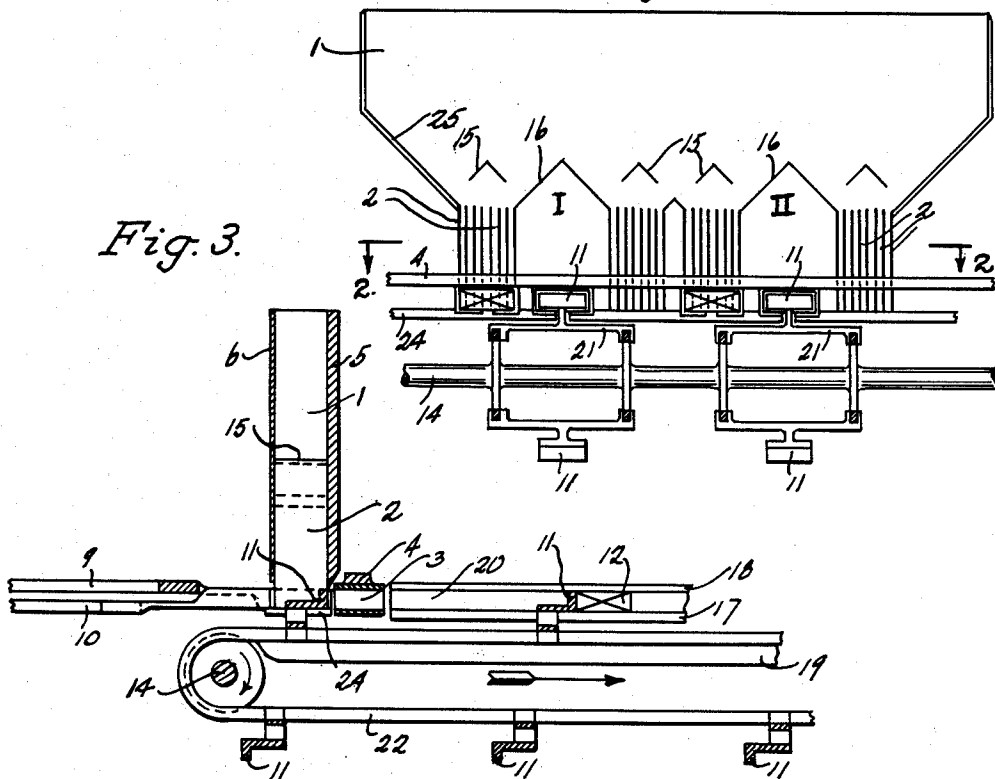


Fig. 3.

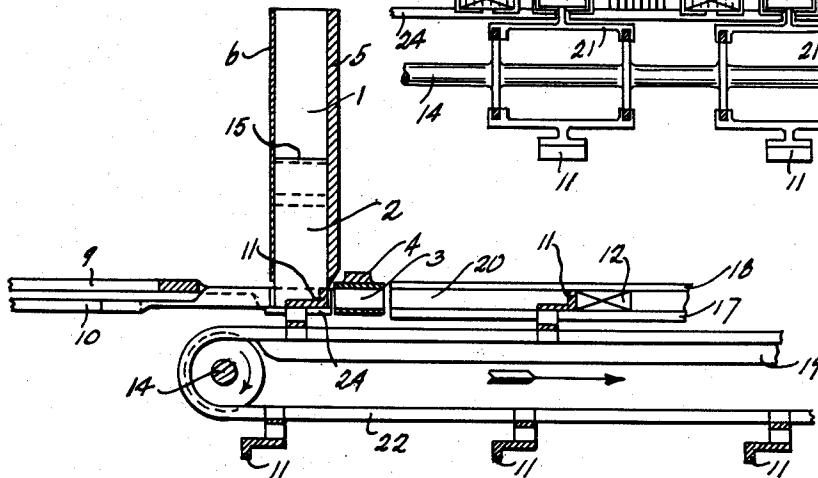
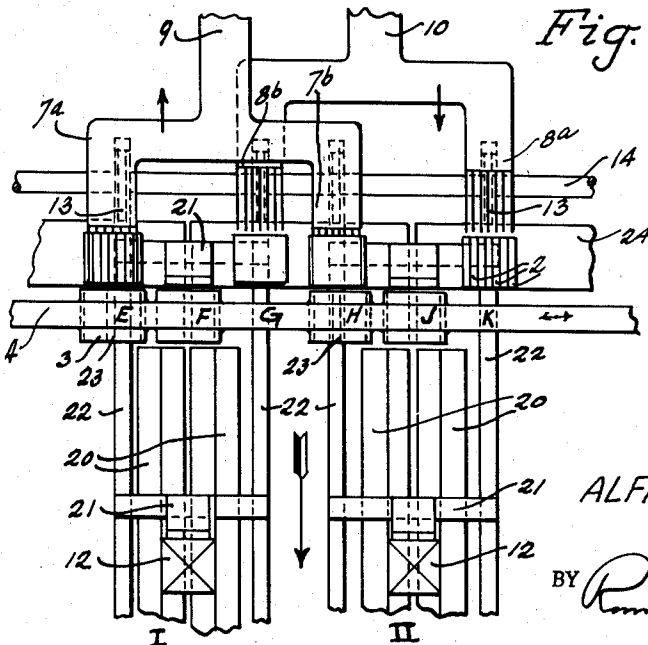


Fig. 2.



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Fig. 4.

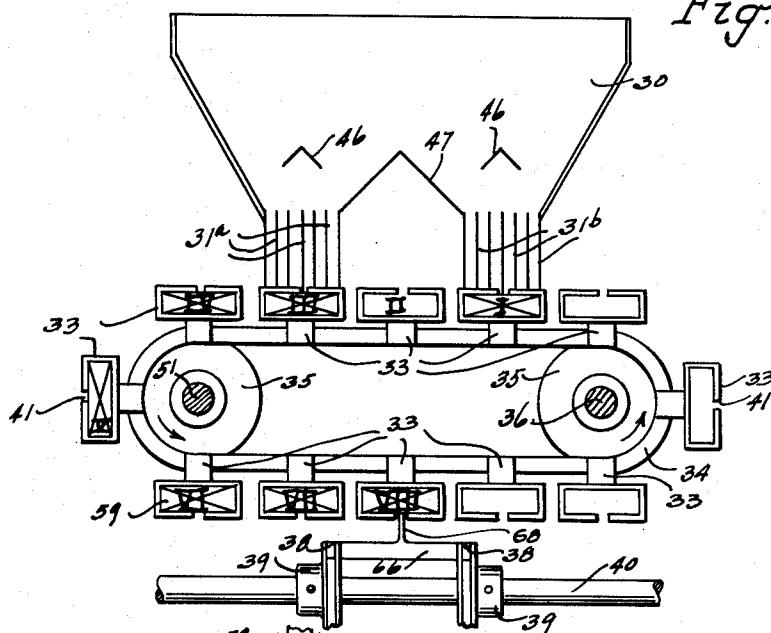
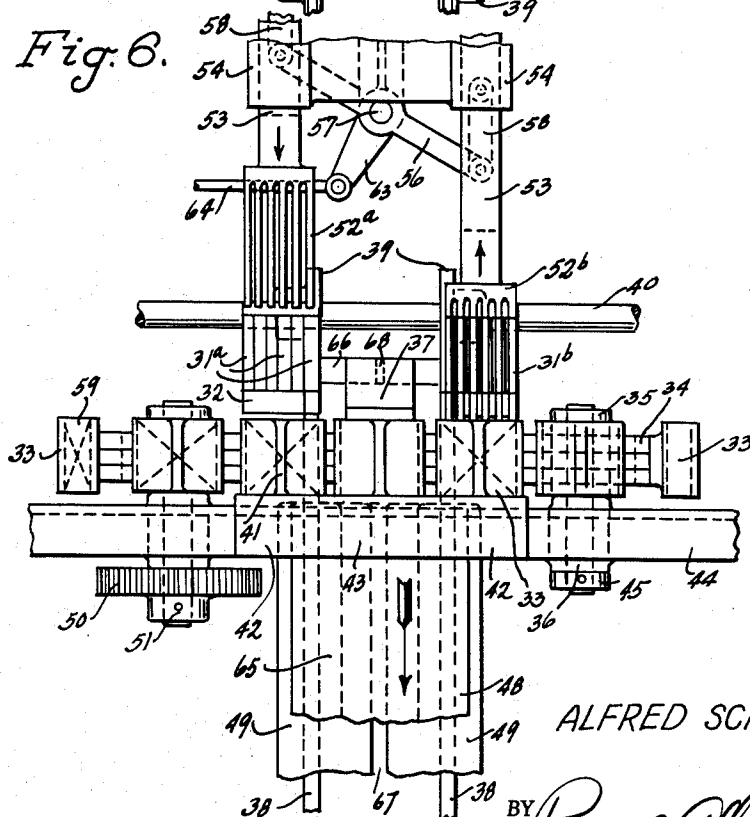


Fig. 6.



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Fig. 5.

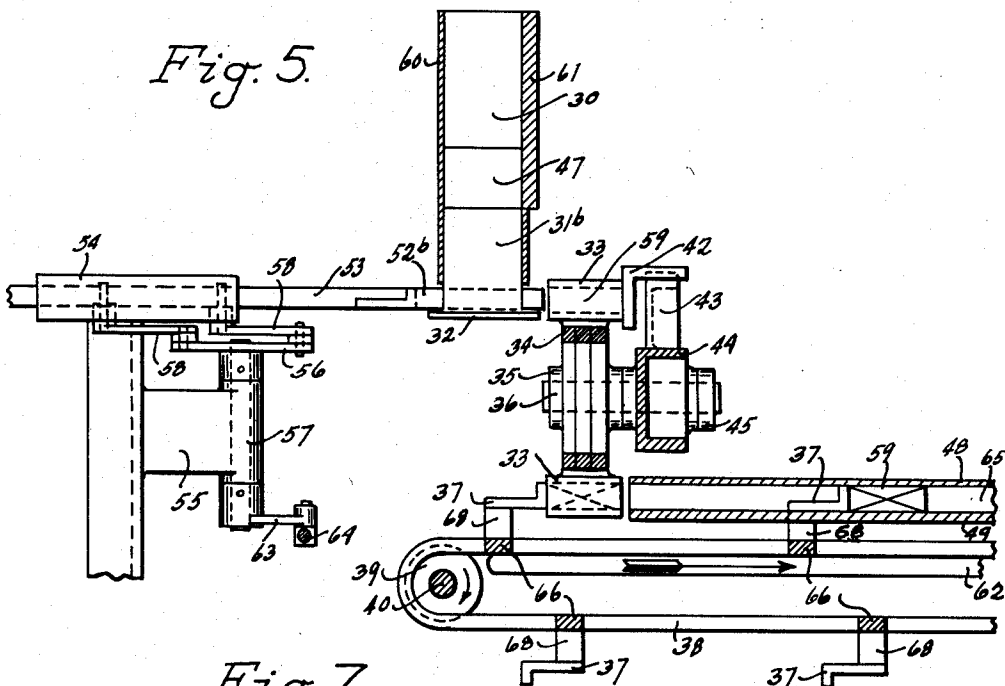
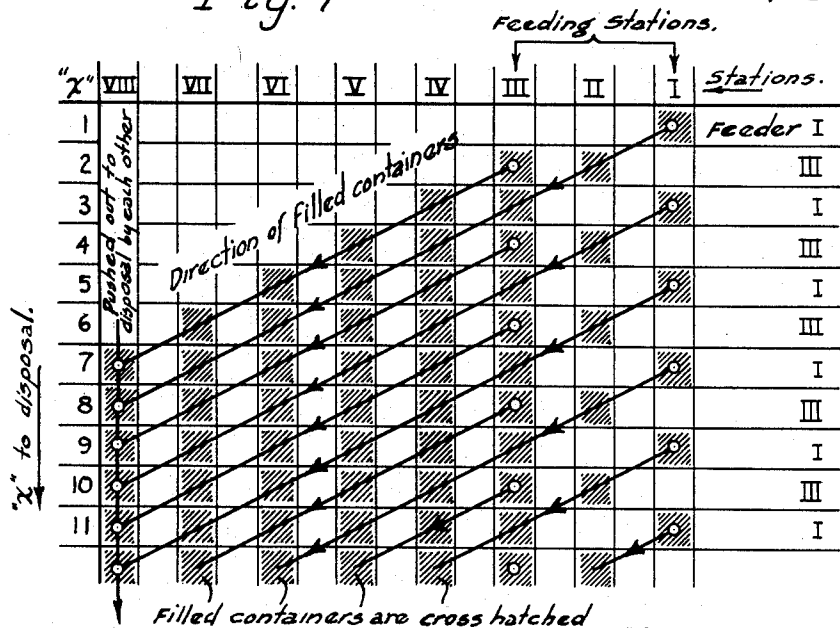


Fig. 7



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Fig. 8.

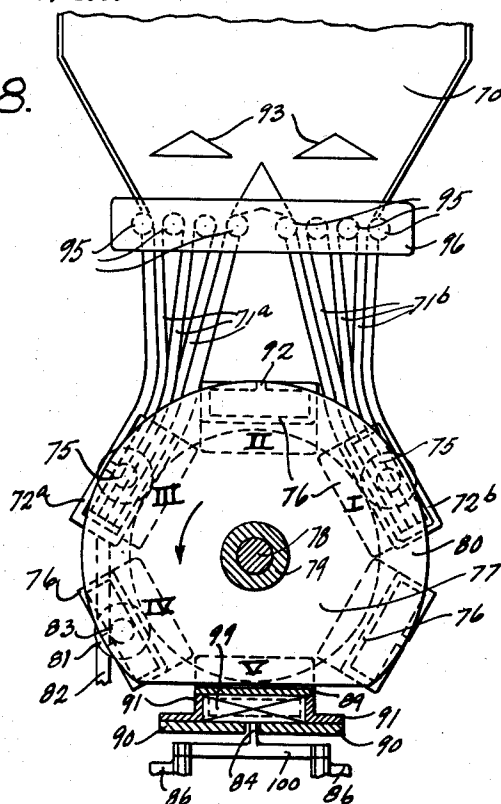
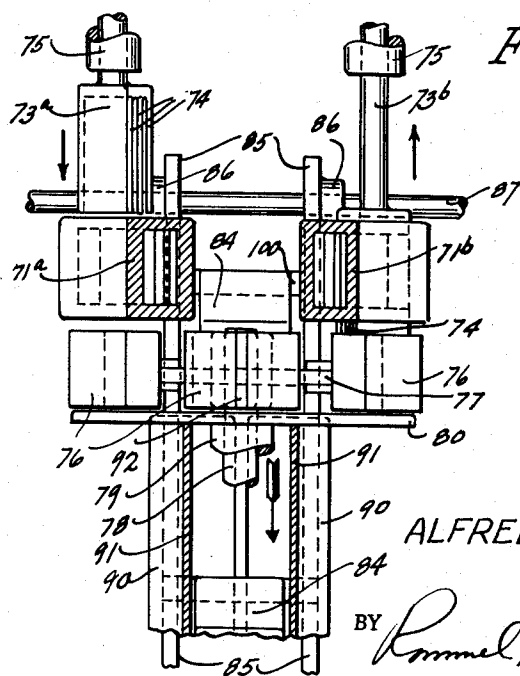


Fig. 10.



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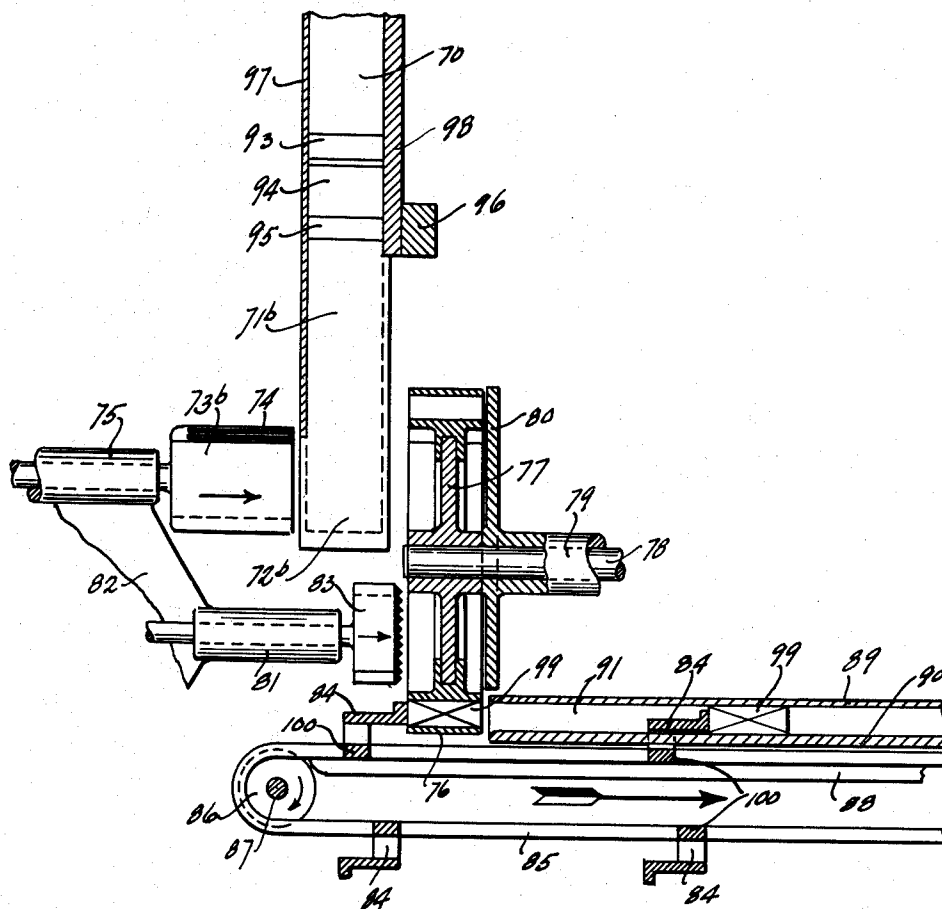
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Fig. 9.



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MACHINES FOR HANDLING CIGARETTES

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3 Claims. (Cl. 198—59)

This invention relates to machines for handling cigarettes, cigarillos, cigars or like elongated articles and more specifically to a device for supplying batches of predetermined numbers of cigarettes, cigarillos, cigars or like elongated articles from a magazine to a feed member.

In machines for packing cigarettes, the cigarettes to be packed are placed into hoppers from which they drop into counting chutes arranged there-beneath, the dropping being assisted by vibrating the chutes or hoppers, cigarettes being delivered in batches of predetermined numbers of cigarettes from the free ends of the chutes by means of slides or push members to conveyors or the like, and being fed to packing stations at which the batches of cigarettes are subjected to a desired treatment. Cigarette packing machines are also known in which batches of cigarettes, instead of being delivered to conveyors, are delivered to revolving drums where they are wrapped and packed. Machines have been proposed which operate with one to four conveyors which may be arranged parallel to one another. Such a multiple conveyor machine has an output which is a multiple of a machine having a single conveyor while the manufacturing costs for a multiple conveyor machine do not amount to a corresponding multiple of a single conveyor machine since many machine elements need not be provided separately for each conveyor but may be used for all the conveyors, or may be simply constructed at a larger scale. In an endeavor to increase the output of cigarette packing machines it has been found that the parts of a complete packing machine could operate at a greater speed than hitherto if it were possible to supply more cigarettes to them.

In previous cigarette packing machines, the cigarettes have to drop from the hoppers into the chutes under the action of gravity, while the cigarettes are subjected to mechanical forces whereby the number of cigarettes delivered from the chutes is limited by the speed of their movements. If the speed were increased, disturbances would be liable to occur owing to cigarettes becoming stuck, increased loss of tobacco, or the like, so that the output obtainable would be limited. Also the possibility exists that there will be a decrease in the quality of the packed cigarettes.

At present cigarette packing machines are limited to a speed of about 150 revolutions per minute of a main shaft, which corresponds to packing 150 batches of cigarettes per minute.

For overcoming this limitation it has been suggested to supply each layer of cigarettes separately by providing a machine with a plurality of hoppers and corresponding chutes side by side whereby the cigarettes of a batch to be packed will be collected layer by layer one on top of the other by means of, for example, a conveyor provided with collecting containers. Such a machine, however, is not of greater efficiency since all the parts of the machine have to run at a speed determined by the supply of the cigarettes and, in addition, requires a large space when, for example, three layers of cigarettes are to be superimposed for each batch. Even if each batch comprises only a single layer of cigarettes, the cigarettes have to be supplied from the chutes with a speed corresponding to the operating speed of the machine.

It is an object of the present invention to increase the output of machines for supplying batches of cigarettes for further handling such as packing the same.

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The invention consists in a device for supplying batches of predetermined numbers of cigarettes, cigarillos, cigars or like elongated articles from a magazine to at least one feed assemblage, comprising per feed assemblage two groups of counting chutes and two slides cooperating therewith, means being provided for operating the slides to supply the batches alternately from the two groups into containers of the feed assemblage, means being provided for discharging the containers at a place different from that at which the containers are supplied with the batches.

The feed assemblage may include a reciprocating member in front of exit openings of the chutes and having at least two containers; each of the containers being supplied while in one of its extreme positions and being discharged while in an intermediate position, containers in the two extreme positions being alternatively supplied.

Alternatively, the feed assemblage may comprise an endless conveyor passing in front of the chutes and movable in a step-by-step manner, the conveyor carrying the containers at distances from one another which correspond to the steps of movement, containers which are at a distance from each other corresponding to two steps or a multiple thereof being supplied while in front of exit openings of the chute and while the conveyor is at rest, and being alternately supplied, the containers being subsequently discharged outside the range of the chutes. Preferably, the conveyor is arranged horizontally, the containers being supplied while at the upper part of the conveyor and discharged while at the lower part thereof.

Still alternatively, the feed assemblage may comprise a drum in front of the chutes and revoluble in a step-by-step manner, the drum carrying the containers at distances from one another which correspond to the steps of revolving, containers which are at a distance from each other corresponding to two steps or a multiple thereof being supplied while in front of exit openings of the chute and while the drum is at rest, and being alternatively supplied, one cell after each step, the cells being subsequently discharged.

The means for operating the slides may comprise a crankshaft. The feed member may be operable by means of a crankshaft.

To make the invention clearly understood reference will now be made to the accompanying somewhat diagrammatical drawings, which are given by way of example and in which:

FIGURE 1 illustrates a first embodiment of the invention in front elevation.

FIGURE 2 is a cross sectional view taken along the line 2—2 of FIGURE 1.

FIGURE 3 is a side view of the embodiment of FIGURES 1 and 2.

FIGURE 4 is a second embodiment in front elevation.

FIGURE 5 is an elevation partly in section of the embodiment of FIGURE 4.

FIGURE 6 is a plan view of the embodiment of FIGURES 4 and 5.

FIGURE 7 is a diagram illustrating the operation of the embodiment of FIGURES 4, 5 and 6.

FIGURE 8 is a third embodiment in front elevation.

FIGURE 9 is a side elevation partly in section of the embodiment of FIGURE 8.

FIGURE 10 is a plan view partly in section of the embodiment of FIGURES 8 and 9.

The device illustrated in FIGURES 1, 2 and 3 comprises a frame structure supporting a magazine having a hopper 1 for loose cigarettes (which term is intended to embrace also cigarillos, cigars and like elongated articles), the hopper 1 having a funnel-shaped portion 25 and walls 5 and 6. In the hopper, roof-like separating members 16 are provided for guiding the cigarettes into groups of chutes 2, smaller roof-like elements 15 being

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provided for relieving pressure exerted by the cigarettes from the chutes 2 which, in use, are arranged so that cigarettes can pass through the chutes 2 under the action of gravity. Beneath the chutes 2, a bottom plate 24 is provided. Between the lower ends of the chutes 2 and the bottom plate 24, slides 9 and 10 are reciprocally provided and arranged on the frame structure to move in opposite directions. Each of the slides 9 and 10 is U-shaped at one end, the U-shaped ends 7a and 7b of slide 9 and the U-shaped ends 8a and 8b of slide 10 being slotted corresponding to the distances of the respective chutes 2 from one another, the slotted ends 7a, 7b, 8a and 8b extending into the range of the chutes and corresponding with regard to their width and height to cigarette batches to be supplied from the chutes 2. Two pairs of containers 3 are reciprocable by means of a reciprocable rod 4 mounted on the frame structure, the bottom of each container 3 having a slot 23 through which neck portions of push members 11 can pass, which are fixed by cross bars 21 to conveyors 22 forming endless feed members carried by the frame structure, each conveyor 22 passing around guide wheels 13 mounted on shafts 14 (only one of the guide wheels 13 and shafts 14 being shown in FIGURE 3). The top tread of the conveyor having supporting plates 19. Furthermore, longitudinal guide tubes comprising top and bottom plates 17 and 18 and lateral plates 20 are provided along which batches 12 of cigarettes can travel when pushed by the pushed members 11 to a station for further treatment such as packing.

The form of invention shown in FIGURES 1, 2 and 3 operates as follows:

The slides 9 and 10 by means of their slotted ends 7a, 7b and 8a, 8b respectively move alternately a batch 12 of cigarettes from the respective group of chutes 2 into containers 3 which, at this instant, are opposite the lower open end of the chutes 2. When the slide 9 is operated, it supplies two batches of cigarettes to two containers at stations E and H. Subsequently the supplied containers 3 are moved to the center of conveyors I and II respectively, whereupon by means of the slide 10 at the stations G and K containers are filled while at the stations F and J the containers 3 are discharged by means of push members 11 while passing through the respective containers 3. The reciprocable rod 4 and two containers 3 per conveyor I and II perform only a single movement during each working stroke of the device either in one or in the opposite direction.

The actuating mechanism for the rod 4 and for the slides 9 and 10 operates at each half stroke of the device while the numbers of cigarette batches discharged at the stations F and J onto the conveyors I and II equal the integral number of strokes of the device. Thus, with the device described it is possible to supply twice the number of cigarette batches onto the conveyors I and II without increasing mechanical forces acting on the cigarettes.

The embodiment illustrated in FIGURES 1, 2 and 3 comprises two conveyor assemblies I and II. Alternatively, it is possible to provide only a single conveyor or more than two conveyors in the device for moving cigarette batches to packing or the like stations or machines having more than two conveyors.

The form of invention shown in FIGURES 4, 5 and 6 comprises a hopper 30 for cigarettes, the said hopper having walls 60 and 61 and being provided with a roof-like separating member 47 and smaller roof-like members 46 for relieving the pressure of cigarettes from groups of chutes 31a and 31b. Underneath the chutes, a plate 32 is provided. Slotted ejecting members 52a and 52b are mounted on slides 53 movable in guides 54 and reciprocable in opposite directions by means of rods 58 and a lever 56 pivotally mounted on a shaft 57 carried by a frame 55, the lever 56 being oscillatable by a linkage 63 and 64 operable in any suitable known manner (not shown). In front of discharge openings of the chutes

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31a and 31b, an endless conveyor 34 is provided, carrying containers 33 fixed thereto and having slots 41 in their walls remote from the conveyor 34. The conveyor 34 is driven by a driving wheel 50 and is guided by rollers 35 rotatable about shafts 36 and 51 mounted on a frame 44 and held thereon by collar 45. The containers 33 are fixed to the conveyor 34 in the shape of roller chains moved by known means not shown in a step-by-step manner, the distance travelled by the conveyor during each step corresponding to the distance between the centers of adjacent containers 33. Adjacent the lower part of the conveyor at one of the places where each container comes to rest, a discharge assemblage is provided for feeding the batches of cigarettes from the containers 33 to a packing or disposal station, the feed assemblage comprising plates 49 along which the cigarette batches are moved by push members 37 after the batches have been removed by the push members 37 from the corresponding containers 33, for example at the station VIII while the conveyor 34 is stationary. The feed arrangement also comprises a cover plate 48, side plates 65 which are jointly mounted to the frame of the device and a tread supporting member 62.

Through a slot 67 between the plates 49 extends a neck portion 68 of each push member 37. A conveyor 38 to which at equal distances from one another the push members 37 are fixed comprises two roller chains carrying the push members 37 by means of transverse bar 66. The roller chains are endless and run around rollers 39 in the shape of chain wheels which are mounted on shafts 40 carried by the frame of the machine.

FIGURE 7 illustrates the manner in which cigarettes are supplied to the containers 33. The horizontal axis corresponds to stations I to VIII, which are also shown in FIGURE 4 and of which the stations I and III are the supply stations. On the vertical axis operating strokes are indicated, which are identical to the number of steps performed by the conveyor 34 moving the containers 33. The shaded fields provided with circles indicate the batch supply of cigarettes which takes place alternately either at the station I or at the station III. The arrows starting from said circles indicate the paths of the supplied containers through the stations I to VIII. It will be seen that after the seventh working stroke all the containers 33 arriving at the station VIII are filled.

The form of FIGURES 4, 5 and 6 operates as follows:

The device illustrated comprises a single conveyor for feeding batches of cigarettes to a packing or the like station, although more than one such conveyor could be provided. Cigarette batches 59 are alternately supplied at the stations I and II into a respective container 33 on the conveyor 34, which container lies, in each case, opposite the respective chutes, the batch supply to containers 33 being effected by means of the pusher members 52a and 52b respectively of the slides 53 which are moved in opposite directions by means of the linkage 63, 64 and the lever 56. Abutments 42, mounted on brackets 43 of frame 44, assure the correct position of the cigarette batches 59 in the containers 33 at the stations I and III. The conveyor 34 with the containers 33 is moved forward in the direction of the arrows inscribed in the rollers 35 in a step-by-step manner, one step at each stroke of the device. As indicated in FIGURE 7, a first container 33 at station I has been supplied during a first stroke of the device. The said container 33 travels to the station II during the second stroke. A container 33 now at the station III is supplied with cigarettes and travels at the next stroke to station IV. The container 33 originally supplied at the station I is now at the station III where at this instant of time no supply takes place since supplying is again performed at the station I. The same time, that is to say at stroke 3, an empty container is at station II which at the stroke 4 travels to the station III and is supplied at the station III. From FIGURE 7 it can be seen that after seven strokes all the containers ar-

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iving at the station VIII are supplied with cigarettes. At the station VIII, the batches of cigarettes of the containers arriving are discharged onto the plates 49 of a tubular guide since one of the push members 37 travels through each container 33 arriving at station VIII and pushes the cigarette batch 59 in the respective container 33 onto the feed plates 49 whence the batches of cigarettes 59 are fed to the packing or similar station.

The form of invention shown in FIGURES 8, 9 and 10 comprises a revolving circular drum 77 for containers 76. A cigarette hopper 70 cooperates with chutes 71a and 71b. A roof-like deflector plate 94 and smaller roof-like plates 93 for relieving pressure are provided in the hopper 70, a wall 98 of which is attached to a frame portion 96 of the device, an opposite wall of the hopper being indicated at 97. Rollers 95 are rotatable or oscillatable in known manner for vibrating the hopper whereby to facilitate the distribution of cigarettes in the chutes 71a and 71b. The rotatable drum 77 accommodates six containers 76. The drum 77 is operated in known manner in rotary steps of 60°. Alternately operable slotted slides 73a and 73b are slidable in guides 75 fixed to a frame part 82. The drum 77 comprises a plate (see FIG. 9) fixed to a shaft 78 mounted in a frame portion 80 having a sleeve bearing 79 for shaft 78 and which portion 80 at its periphery covers the containers 76 at one side to hold the batches in place. The containers 76 are provided at their outer surfaces with slots 92. Each time the drum 77 is at rest between two steps, two of the containers 76 are located in front of exit openings of the chutes 71a and 71b at locations 72a and 72b and are alternately supplied with cigarettes by the slides 73a and 73b. At the discharge location a batch of cigarettes 99 is discharged from each container 76 by means of a push member 84 of a feed assemblage. More specifically, the feed assemblage comprises a conveyor 88 mounted on rollers 86 fixed on shafts 87, plates 90, 90, guides 91, 91, a cover plate 89, a conveyor 85 and cross rods 100 for the push members 84. An electric control device 83 for the cigarette heads is provided and is mounted on the frame portion in a guide 81 in known manner. Such a control device may be provided at both sides.

The form of FIGURES 8, 9 and 10 operates as follows:

Cigarettes in the hopper 70 are vibrated by the rotating or oscillating rollers 95 provided on top of the entrance to the chutes 71a and 71b so that a continuous flow of cigarettes into the chutes 71a, 71b is assured. At the ends of the chutes 71a and 71b, the slides 73a, 73b operate alternately; each slide pushes only at each alternate working stroke with its slotted end 74 one batch of cigarettes 99 into one of the containers 76 of the rotatable drum 77. When a container 76 has been supplied with cigarettes at a station I, the said container is moved to the station II. Now, the container at station III is supplied and the container supplied at station III travels during the next stroke to station IV. The container supplied at station I arrives at station III, and supplying now takes place again at station I. From station III onwards in the direction towards stations IV and V all the containers are supplied with cigarettes which are removed at the station V by the push members 84 of the conveyor from the drum 76 at each step advance of the drum 77 onto the feed member 90 whence they are fed to a packing or disposal station.

Modifications of the three embodiments described are possible. For example, for discharging cigarette batches onto a feeding member the batches may be discharged into additional containers of a conveyor travelling transversely to the path of the first containers, or may be fed to one or more additional revolving drums.

It will be appreciated that in the embodiments illustrated the number of chutes has been doubled and operate alternately so that each ejecting slide operates only at every other step of the device and so that at each supply station only each second container is supplied while the

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alternating operation of two slides causes all the calls successively to be supplied so that each device has two ejecting slides but only a single discharge member for emptying the previously filled containers onto one feed member.

5 What I claim is:

1. In a machine for the handling of batches of elongated articles such as cigarettes, cigars and cigarillos the combination of a magazine having means therein for uniformly feeding articles in at least two divided paths, chutes for receiving the articles in such divided relation having discharge points, a step-by-step advancing frame having a plurality of containers mounted thereon each including a chamber open at the ends thereof and positioned upon said frame for step-by-step movement to align the chambers with the discharge points of chutes, a pair of ejector devices movably positioned with respect to the chutes for each ejecting the articles at the chute discharge points into a pair of containers, a pair of batch transfer assemblages having means thereon for moving the batches from the containers and transferring said batches to a remote location, each ejector device having means for simultaneous ejection of batches from a pair of spaced chutes and into the containers and the ejector devices operating alternately with respect to each other to eject batches from the chutes.

2. In a machine for handling batches of elongated articles such as cigarettes, cigars and cigarillos, the combination of a hopper provided with a plurality of article receiving chutes adapted to receive articles in magazine order therein, a step by step movable assemblage having containers thereon adapted to receive batches of said articles from said chutes, said step by step movable assemblage having a path of movement so as to receive in said containers batches of the articles from said chutes, a pair of ejectors, each ejector having two spaced ejector members thereon for ejecting simultaneously batches of cigarettes from said chutes into recurrently spaced containers, said ejectors being operated alternately so that the ejector members of one ejector are inoperative while the other is operating to eject batches, and vice versa, each of the two batch ejectors having a batch ejector member of the other ejector located between its own ejector members, and batch receiving guide means to move the batches from said containers and transfer them to desired locations.

3. In a machine for the handling of batches of elongated articles such as cigarettes, cigars and cigarillos, the combination of a hopper provided with a plurality of cigarette receiving chutes adapted to receive cigarettes in magazine order, a step by step movable reciprocatory member having relatively spaced containers thereon adapted to receive batches of articles from said chutes, said reciprocatory member having an intermittent back and forth motion to transfer batches from said chutes to a plurality of stations located between said chutes, a pair of ejectors each having two ejector members thereon for ejecting simultaneous batches of cigarettes from each of said chutes into containers of said reciprocating member, said ejectors being operated alternately so that while one is operating for batch ejection by its ejection members the other will be inoperative, and vice versa, each of the two batch ejectors having a batch ejector member of the other ejector located between its own ejector members, and transfer means for removing the batches of articles from the containers at said stations.

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