

Dec. 13, 1938.

R. V. CRAGGS

2,140,128

PNEUMATIC CONVEYER FOR CIGARETTE MACHINES

Filed Feb. 25, 1936

6 Sheets-Sheet 1

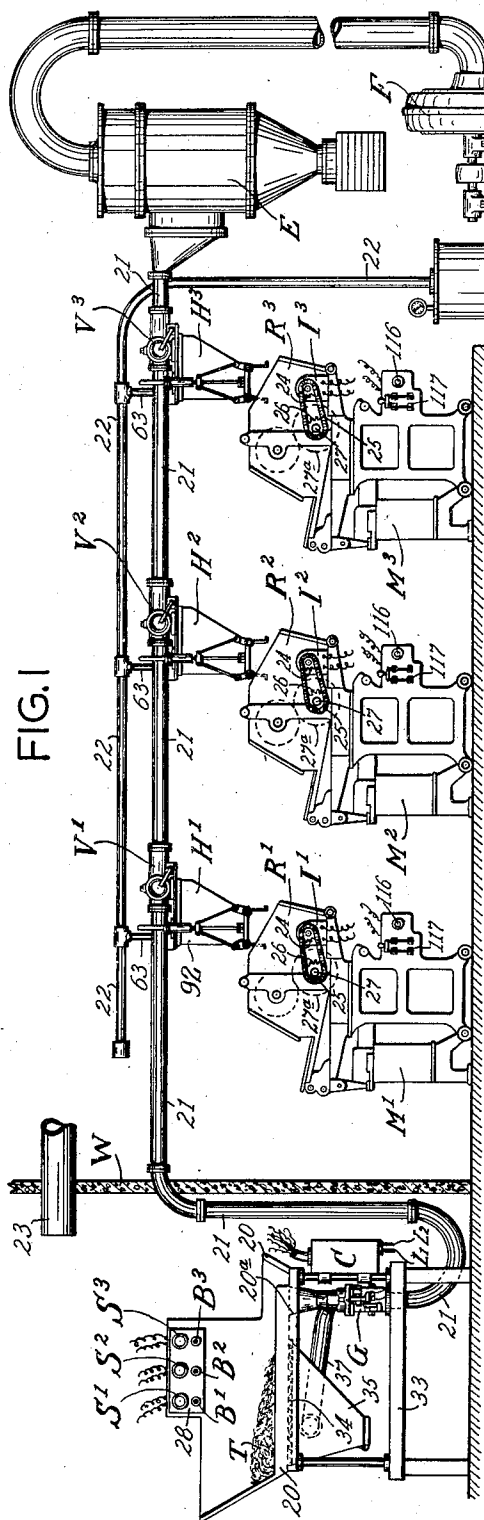


FIG. 1

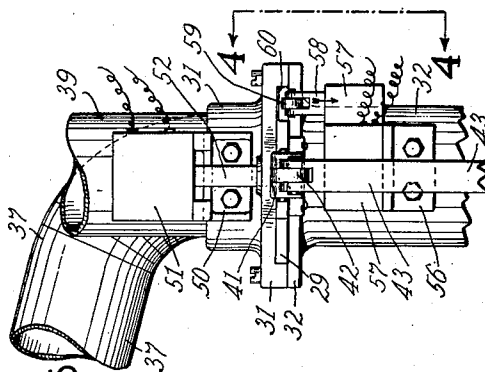


FIG. 5

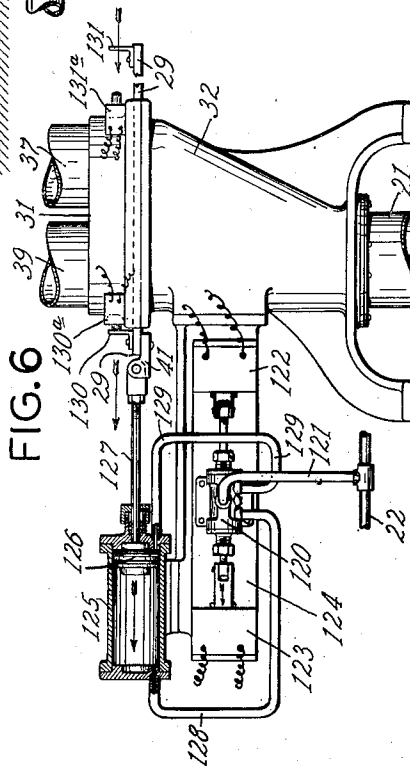


FIG. 6

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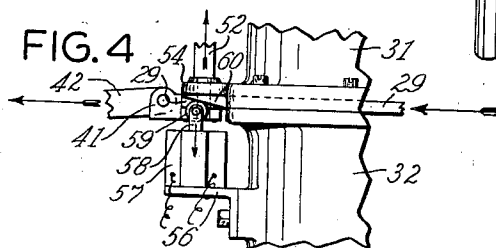
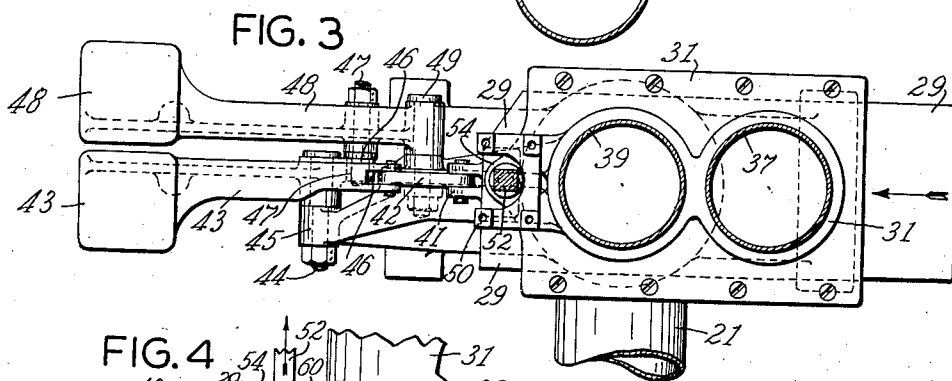
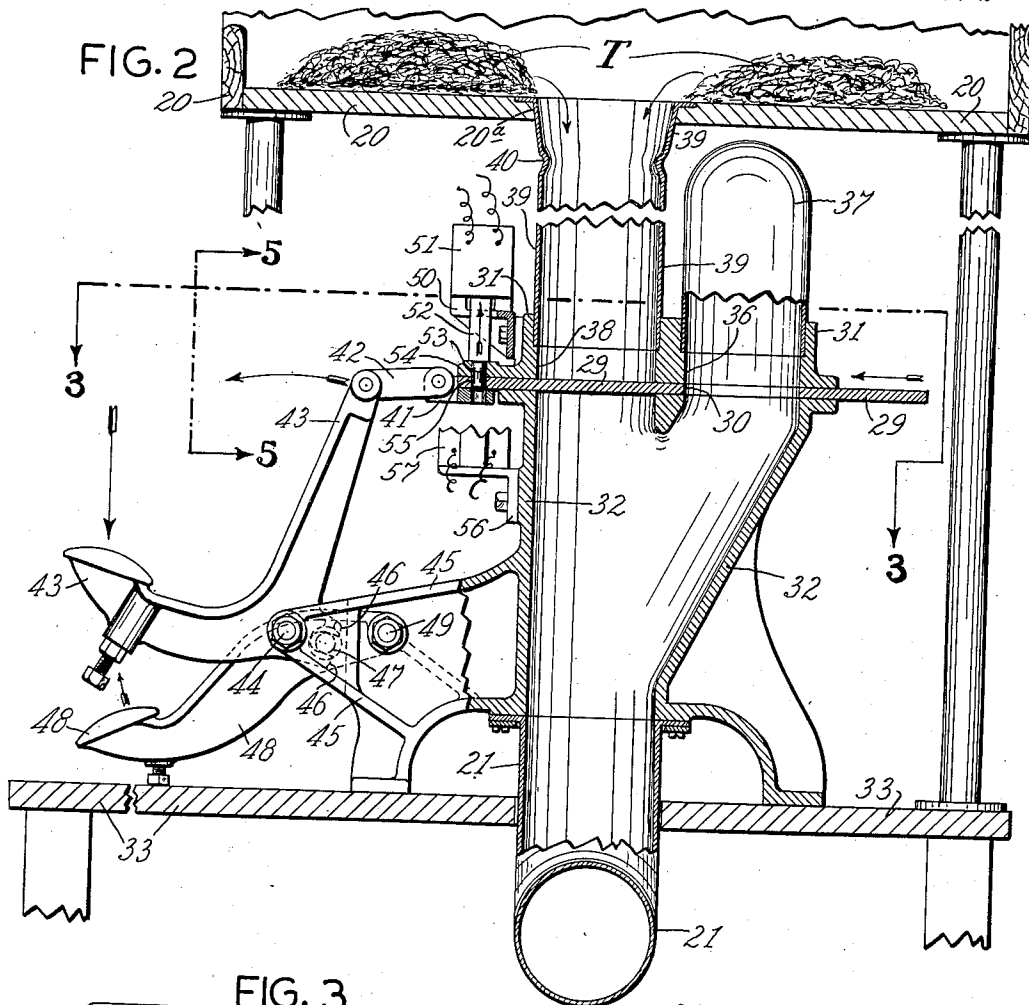
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PNEUMATIC CONVEYER FOR CIGARETTE MACHINES

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6 Sheets-Sheet 2



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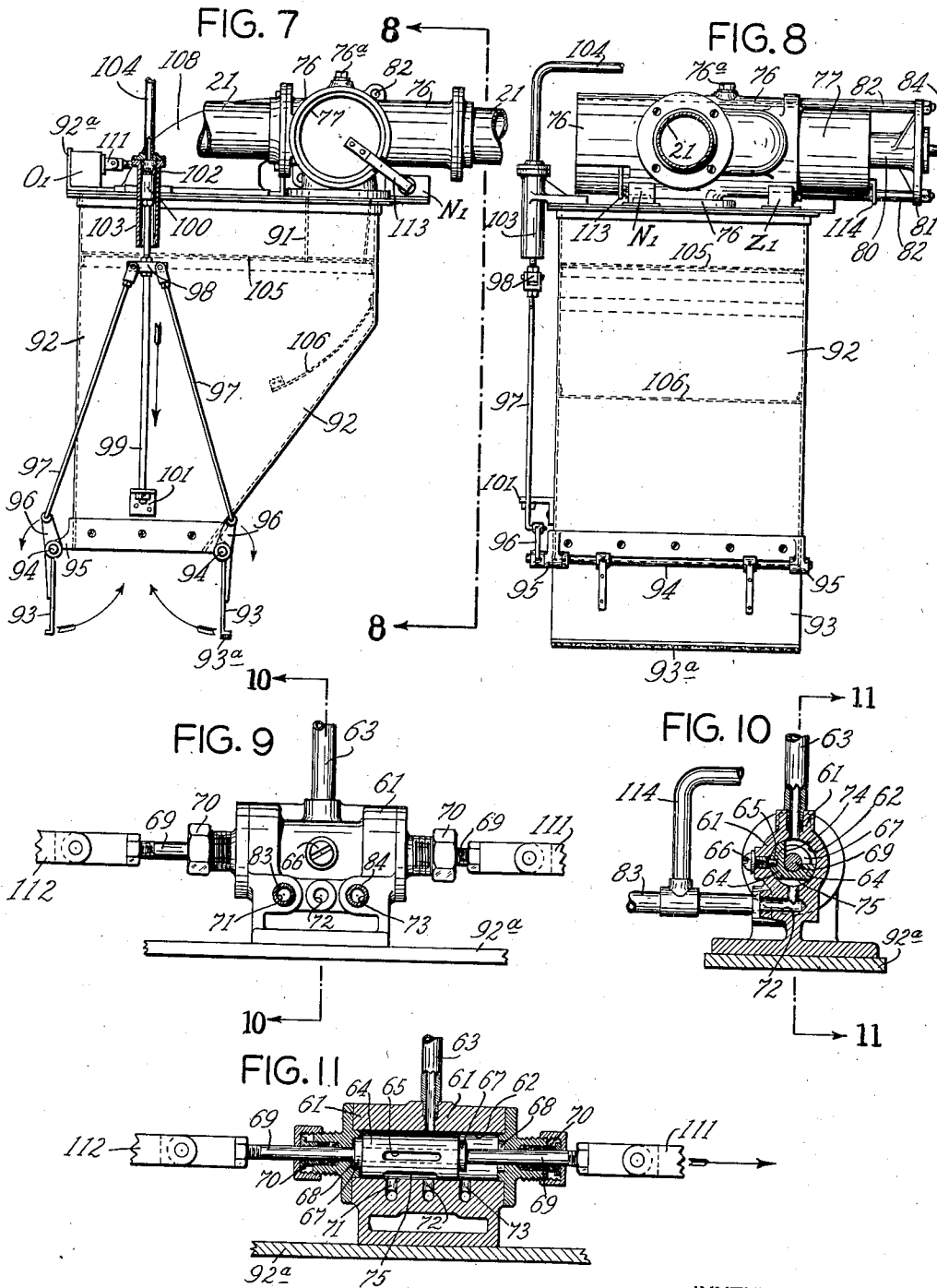
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PNEUMATIC CONVEYER FOR CIGARETTE MACHINES.

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PNEUMATIC CONVEYER FOR CIGARETTE MACHINES

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FIG. 11a

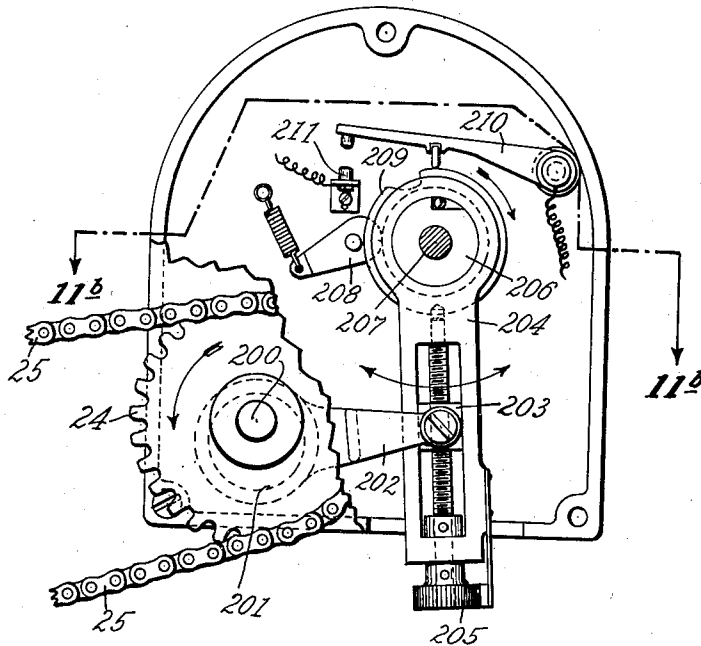
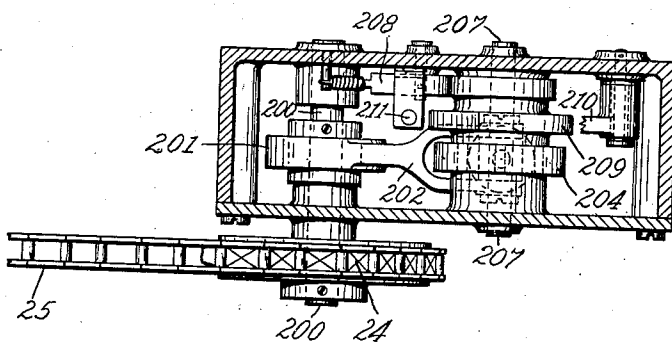


FIG. 11b



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FIG. 12

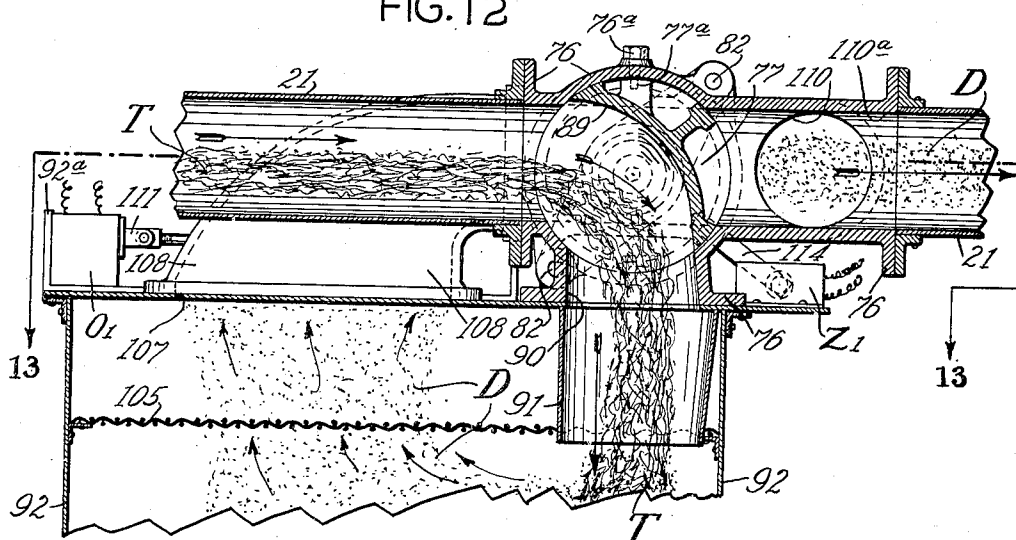
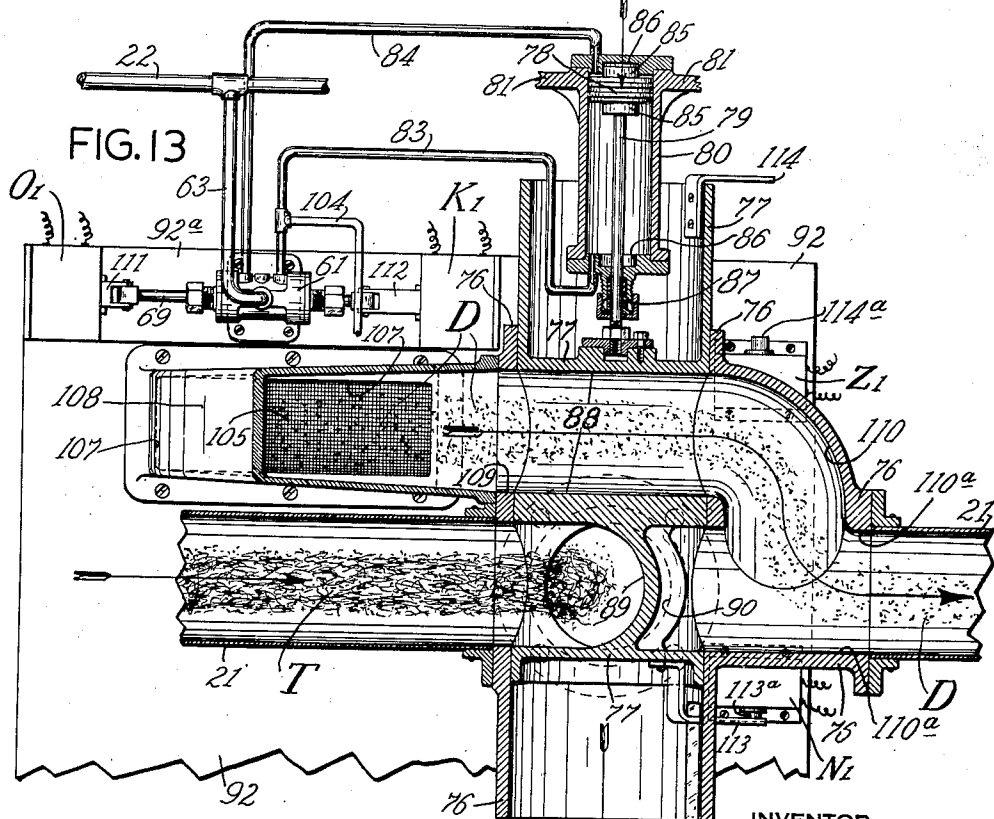


FIG. 13



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PNEUMATIC CONVEYER FOR CIGARETTE MACHINES

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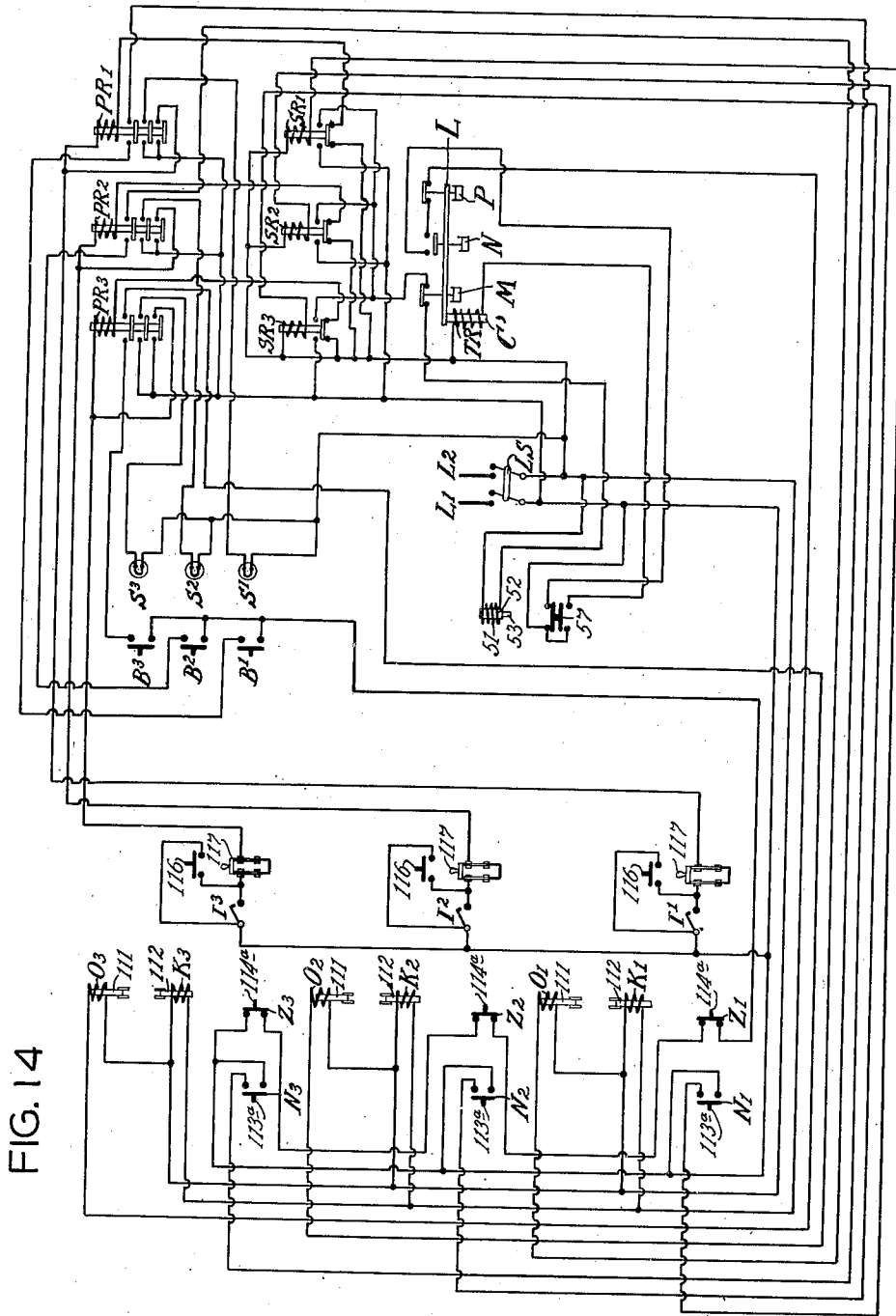


FIG. 14

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UNITED STATES PATENT OFFICE

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PNEUMATIC CONVEYER FOR CIGARETTE MACHINES

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Application February 25, 1936, Serial No. 65,676

7 Claims. (Cl. 302—28)

This invention relates to pneumatic conveyers, more particularly to tobacco conveyers for cigarette making machines in which the tobacco supply used during operation is fed from a storage chamber.

The main object of this invention is to convey disintegrated tobacco from its place of storage to the feed hoppers of a battery of cigarette making machines. Another object of this invention is to provide improved means for pneumatically conveying tobacco charges of desired volume at the required intervals, thereby keeping the supply of tobacco in the feed hoppers of the machines at approximately the same level at all times. To this end the individual machines are equipped with signals for apprising the attendant periodically that more tobacco is needed.

These objects may be achieved in the embodiment of the invention selected for illustration herein, by connecting the tobacco feed hoppers of the desired number of cigarette making machines by means of a single pipe line, the end of which is led to a continuously running suction fan, the discharge pipe of the latter being returned to the storage room. Above each feed chamber the pipe line is provided with an outlet to which is connected an automatically operated valve attached to a collecting chamber which may overlie the feed chamber of the cigarette making machine. Between the end of said pipe line and the suction fan is furthermore connected a dust collector and separator. The feed hopper of each cigarette making machine is equipped with a signalling device, the signal lamp of which is located on a control board attached to the feed table in the storage room. The tobacco is fed into an intake at the feed table in small charges and is then conveyed by means of suction through the feed line, the automatically operated outlet valve above each individual machine directing one charge at a time to its corresponding feed chamber.

In the hand feeding method commonly used heretofore, the shredded tobacco is conveyed from a storage room to each individual cigarette making machine by means of trucks or containers and the operator then takes the tobacco from the latter and refills the feed hoppers of said machines as often as circumstances require. This method of replenishing the tobacco feed hoppers during operation of course has a great many disadvantages, all of which may be entirely overcome by employment of the improved pneumatic conveyer system herein described. An important advantage of the latter is that the tobacco ar-

rives at the feed hoppers of the cigarette making machine in the same proper condition as it is kept in the storage room, without impairing its condition by the additional handling of the tobacco which is necessary with the hand feeding method. The elimination of additional handling of the tobacco not only results in a saving of labor but also effects a substantial saving of tobacco which usually is lost during such additional handling. The latter also causes an undesirable breakage of the tobacco shreds resulting finally in additional dust in the factory and also the creation of dust and "shorts" of tobacco in the cigarettes. With the improved pneumatic system no waste of tobacco can possibly occur and the same humidified conditioned air surrounds the tobacco during the entire conveying process, which at the same time removes all dust and cleans the tobacco before reaching the feed hoppers. Due to the electrical signal system attached to the latter, the attendant is notified when a certain amount of tobacco has been used up. A charge equal to this amount is then sent to the machine giving the signal, thus keeping the tobacco level in each individual feed chamber at approximately the same height with the result of producing uniform cigarettes at all times. In hand feeding, moreover, the feeding periods and the amounts of tobacco placed into the feed chambers are necessarily quite unequal and therefore the tobacco level is subject to great variations resulting in non-uniform products. The pneumatic feeding of small charges of tobacco assures a fluffiness and looseness of the tobacco when reaching the feed chambers, contrasted with a compact and a more or less compressed condition when hand feeding is employed. The improved pneumatic feed system also assures a great saving of floor space and equipment and the machine operator can devote his entire attention to the proper operation of one or more cigarette machines. With these and other objects not specifically mentioned in view, the invention consists in certain constructions and combinations hereinafter fully described and then specifically set forth in the claims hereunto appended.

In the accompanying drawings which form a part of this specification and in which like characters of reference indicate the same or like parts:

Fig. 1 is a side elevation of a battery of cigarette making machines equipped with the improved pneumatic tobacco conveying system;

Fig. 2 is a sectional end elevation of the tobacco intake valve and feed table;

Fig. 3 is a plan view of the tobacco intake valve and operating mechanism, taken on line 3—3 of Fig. 2;

Fig. 4 is a partial side elevation of the tobacco intake valve showing its connection with the time relay control switch, taken on line 4—4 of Fig. 5;

Fig. 5 is a partial front elevation of the intake valve;

Fig. 6 is a modification showing a side elevation, partly in section, of the tobacco intake valve in connection with an automatic operating mechanism;

Fig. 7 is a side elevation of a discharge chamber carrying the automatically controlled outlet or feed valve;

Fig. 8 is an end elevation of the same, taken on line 8—8 of Fig. 7;

Fig. 9 is a front elevation of the automatic pilot valve used for operating the feed valve;

Fig. 10 is a sectional side elevation of the pilot valve, taken on line 10—10 of Fig. 9;

Fig. 11 is a sectional front elevation of the same, taken on line 11—11 of Fig. 10;

Fig. 11a is a detail side view of the rotary switch;

Fig. 11b is a sectional view of the same taken on line 11b—11b of Fig. 11a;

Fig. 12 is a vertical sectional view of the outlet or feed valve;

Fig. 13 is a sectional plan view of the same, taken on line 13—13 of Fig. 12; and

Fig. 14 is a wiring diagram of the electrical system used in connection with the improved pneumatic tobacco conveyer.

Generally stated, in carrying the invention into effect the individual cigarette machines are equipped with signals for apprising the attendant more tobacco is needed, and mechanism is provided for supplying tobacco to the desired machine. In the best constructions contemplated, the signals each include a rotary switch driven from the respective machines and connected to an incandescent lamp at a point remote from the machines and the conveying mechanism may comprise a pneumatic conveyer operating to deliver the tobacco to collecting chambers overlying the individual machines whence they are dumped into the latter. The apparatus may be widely varied in construction for the specific construction selected to illustrate the invention is but one of many possible concrete embodiments of the invention. The invention therefore is not to be restricted to the particular embodiments selected to illustrate the invention.

Referring to Figure 1, the improved pneumatic tobacco conveyer consists of a feed table 20 which, by means of an intake G, is connected with a main conduit or pipe line 21 in which suction is created by a suction fan F located adjacent the outlet end thereof. Above each tobacco feed hopper R1, R2 and R3 of any suitable number of cigarette making machines M1, M2 and M3 respectively, is suspended a chute H1, H2 and H3 respectively. Each chute is connected to the main conduit 21 through a feed or discharge valve V1, V2 and V3 respectively. Each of said valves is automatically operated by control mechanism, hereinafter described, comprising a pilot valve actuated by compressed air supplied through a pipe line 22 from a source of compressed air such as a compressor A. Between the last discharge valve V3 on the conduit 21 and

the suction fan F there may be connected a dust collector and separator E of well known construction. In some factories it may be desirable to place the tobacco feed table 20 in an air-conditioned tobacco storage room within a wall W (Fig. 1). If desired, the conditioned air taken from the storage room may be returned thereto by connecting the exhaust pipe 23 of suction fan F to the said storage room (Fig. 1), or the fan F itself may be placed therein.

Each tobacco feed hopper R1, R2 and R3 is equipped with a rotary switch I1, I2 and I3 respectively. Each of the latter is provided with a sprocket 24 driven by a chain 25 from a sprocket 26 on the feed drum shaft 27 of its respective cigarette making machine. After a given number of revolutions of the feed drum 27a a certain amount of tobacco has been used by the respective cigarette making machine, and the rotary switch I1, I2 or I3 on the tobacco feed hopper R1, R2 or R3 respectively will close its respective circuit hereinafter described, through its corresponding signal light S1, S2 or S3 and the operator thereby is notified which machine requires tobacco. The signal lights S1, S2 and S3 are conveniently located on a control board 28 attached to a side panel of the feed table 20. When a signal flashes on the control board, the attendant has in readiness on the feed table 20, a measured amount of tobacco T which corresponds with the amount consumed in a given time in the machine from which the signal was transmitted, and presses one of the respective push-buttons B1, B2 or B3, each of which is connected to its corresponding lamp S1, S2 or S3 and with the control mechanism for the respective discharge valves V1, V2 or V3. The pressing of any of the buttons B1, B2 or B3 also releases a latch on the intake valve G as will be presently described. The main switch LS (Fig. 14) and the various relays used in operating the various circuits and controls are placed in a control box C (Fig. 2) attached to legs of the feed table 20.

The intake valve G may consist of a slide 29 (Figs. 2, 3, 4 and 5) provided with an aperture 30 and slidably mounted between the upper section 31 and lower section 32 of the intake housing mounted on platform 33 which also supports the feed table 20. The latter is also provided with a screen 34 set in an opening therein (Fig. 1) underneath which is mounted a dust-collecting chamber 35 communicating with a port 36 of the upper part 31 of the intake housing by means of a tube 37. Another port 38 of said upper housing-section 31 is connected to an opening 20a in feed table 20 by means of the intake pipe 39. The latter, in its upper portion, is provided with a constriction 40 for the purpose of preventing clogging of the traveling tobacco charges in any part of the main conduit 21 which communicates with the lower portion of the lower housing 32.

On one end of slide 29 is mounted a forked lug 41 which in the form of construction shown in Figs. 2-4 is connected by a link 42 to a pedal 43 fulcrumed on a stud 44 held by a lug 45 of the lower intake housing-section 32. Lever 43 is furthermore equipped with a forked lug 46 engaging with a stud 47 attached to a second pedal 48 pivoted to a stud 49 also held by lug 45 of lower housing 32. On a bracket 50 fastened to the upper housing-section 31 is attached a locking solenoid 51, the core 52 of which is provided with a latch 53. The latter is guided in a bore provided in a lug 54 of the upper housing-section 31 and engages, when in locking position, 75

with a hole 55 in slide-valve 29. A bracket 56 on the lower housing 32 carries a control switch 57 of the four-pole type comprising a vertical stem 58 (Figs. 4 and 5) which constitutes a contact-maker and carries a roller 59 engaging with a wedge-shaped recess 60 provided on the bottom of one end of the valve plate or slide 29.

When no tobacco is needed in any one of the feed chambers of the cigarette making machines, the port 38 of the intake valve is closed by moving the slide 29 (Fig. 2) into a position in which its aperture 30 registers with the port 36 of the housing, thereby drawing the air through the screen 34 of the feed table 20 and the intake valve into the feed line 21 and thus causing the tobacco T placed on the screen for the next charge to be partly freed from dust and "shorts" before entering the conveyer system. When the slide 29 is moved to bring its aperture 30 into communication with the port 38 of the intake valve, the charge of tobacco which may be manually introduced into the pipe 39 will be drawn through the intake valve and into the conduit 21.

Each tobacco charge is thus pneumatically conveyed through the feed pipe 21, and may be diverted into any one of the individual hoppers R1, R2 or R3 of the individual cigarette machines by the discharge valve V1, V2 or V3 respectively. Each of said valves is operated by a pilot valve illustrated in Figs. 9, 10 and 11. Each of the said pilot valves includes a cylinder 61 provided with a bore 62 which communicates with the compressed air pipe line 22 by a pipe 63. A piston 64 is slidably mounted in the bore of the cylinder 61, and in order to prevent the same from turning, is provided with a slot 65 with which engages a guide screw 66 threaded into the cylinder 61. At each end the piston 64 is equipped with a collar 67 fitting recesses 68 provided in the cylinder heads for the purpose of reducing the shock during the impact of the piston 64 therewith. The piston is mounted on and reciprocated by a rod 69, the ends of which project from the cylinder heads through packing glands 70. The bottom of the cylinder 61 is provided with three outlet ducts or ports 71, 72 and 73. The top of the piston 64 is cut away at 74 (Fig. 10), thus allowing the compressed air to enter the bore 62 of the cylinder at all times. The bottom of the piston is provided with a notch 75 disposed to alternately overlie the ports 71, 72 and the ports 72, 73 at the limits of its stroke.

Each of the discharge valves V1, V2 and V3 is enclosed in a housing 76 which may form a section of the main feed pipe 21 (Figs. 7, 8, 12 and 13) and communicates with its respective collecting chamber H1, H2 or H3. In each section 76 is slidably mounted a horizontal slide-valve 77 of cylindrical configuration connected to a piston 78 by a rod 79. The piston 78 is mounted within a cylinder 80 formed on a flange 81 attached to its respective section studs 82. One head of said cylinder 80 is provided with an inlet which is connected by pipe 83 to the port 71 in pilot valve cylinder 61. The other head of the cylinder is provided with an inlet connected to the port 73 by pipe 84. Each end face of the piston 78 is equipped with a collar 85 which engages with corresponding shoulders 86 provided in the cylinder heads for the purpose of taking up the shock of the piston 78 at the end of each stroke. Rods 79 protrude from their cylinders 80 through packing glands 87. Each discharge valve 77 is provided with a horizontal by-pass duct 88 of circular cross-section (Fig. 13) which,

when said valve is in "open" position, registers with the bore of the feed pipe 21 to which the respective pipe section 76 is connected, to permit passage therethrough of the tobacco. Each discharge valve 77 is furthermore provided with a discharge duct 89 which, when valve 77 is in "closed" position, diverts the tobacco charge T coming from feed table 20 via the feed pipe 21, through a discharge port 90 (Figs. 12 and 13) in its respective pipe section 76 and a funnel 91 into the respective collecting chamber H1, H2 or H3 attached to the pipe section 76. In order to prevent the discharge valves 77 from turning during their reciprocating motion, said valves are provided with a horizontal guide groove 77a (Fig. 12) into which projects a guide stud 76a set in the pipe section 76.

Each collecting chamber H1, H2 and H3 suspended over the tobacco feed chamber R1, R2 and R3 respectively, consists of a chute 92 provided at its bottom with a pair of trap doors 93 (Figs. 7 and 8), each of which is hinged on a shaft 94 loosely supported in bearing lugs 95 attached to housing 92. On one end of each shaft 94 is fastened an operating arm 96 linked by a connecting rod 97 to a cross bar 98 adjustably mounted on a vertical piston rod 99. One end of the latter is fastened to a piston 100, while the other end slides in a guide bracket 101 attached to the lower portion of the chute 92. At its top the piston 100 is equipped with a cup washer 102 and is vertically operated within a cylinder 103 mounted on the top of housing 92. The cylinder head on the upper end of cylinder 103 is provided with an inlet which, by means of a branch pipe 104, is connected to the pipe 83 (Fig. 13). Within the upper portion of the chute 92 is mounted a screen 105 through which the funnel 91 projects and the chute may be also provided with a baffle plate 106 (Figs. 7 and 8). The latter is provided, if desired, for the purpose of spreading the tobacco charge impinging thereon and directing the air stream conveying said charge, upward again through the screen 105 and an outlet 107 provided in the top of the chute 92. The outlet 107 communicates with an elbow 108 which communicates with a port 109 in valve housing 76. When the valve 77 is in "closed" position the by-pass duct 88 of the latter registers with said opening 109 and with a return duct 110 leading to the outlet 110a of housing 76 with which the next section of the main feed line 21 communicates (Fig. 13).

Whenever any of the discharge valves is in "closed" position, the tobacco charge T is conveyed by the air stream through the discharge duct 89 thereof into the chute 92 wherein it impinges on the baffle plate 106 whence the shreds of tobacco drop on to the trap-doors of the chute, which are closed as hereinafter described, and the air stream is re-directed upwardly together with the lighter dust particles through the screen 105, elbow 108, duct 88, duct 110 and port 110a back into the main feed pipe 21. The dust-laden air is then conducted to the dust collector and separator E wherein the dust particles settle out of the same, and the clean air is led back into the storage room through the exhaust pipe 23 of suction fan F.

When the feed drum 27a in any one of the feed hoppers R1, R2 or R3 of the cigarette making machines M1, M2 or M3, respectively, has performed a given number of revolutions, a corresponding quantity of tobacco has been consumed by the latter, and the rotary switch I1, I2, I3

or I3, respectively, establishes a contact in and closes a separate circuit connected in parallel to the two supply lines L1 and L2, thus energizing one of the respective three point relays PR1, PR2 or PR3 (Fig. 14), which in turn closes the circuit through the incandescent lamp S1, S2 or S3 respectively, on control board 28 of feed table 20 to flash a signal to the attendant, and also establish a contact in one of three other branch circuits connected in parallel through the switch LS with the supply lines. The attendant will then press one of the respective push-buttons B1, B2 or B3 in the latter circuits to close the same and effect the energization of one of the solenoids O1, O2 or O3 respectively. The cores 111 of each of the latter are connected to one end of the piston rod 69 of the respective pilot valves, while the other end of each rod 69 is connected to the cores 112 of the solenoids K1, K2 and K3 respectively. Each pilot valve and its corresponding solenoids O1 and K1, O2 and K2, and O3 and K3 are attached to brackets 92a which are fastened to the tops of the chutes 92.

As soon as one of the solenoids O1, O2 or O3 is energized, the respective core 111 pulls the piston rod 69 and thereby moves the piston 64 of the respective pilot valve over to one end of the cylinder 62 whereby the notch 75 in the bottom of the piston overlies the ports 72 and 73, allowing the compressed air entering the cylinder 62 from the pipe 63 to escape through duct 71 and pipe 83 into cylinder 80, the inrushing air forcing the piston 78 to the upper end of said cylinder 80. This movement of piston 78 causes the rod 79 to move the discharge valve 77 to the "closed" or discharge position, ready to divert the tobacco charge into the desired discharge chute 92. When, due to this position of piston 64, the compressed air is led from the cylinder 62 of the pilot valve through pipe 83 into cylinder 80, some of said air also enters a pipe 104 connected to pipe 83 and reaches the vertical cylinder 103 causing piston 100 to descend and thus to close the trap doors 93 of the discharge chute 92. Doors 93 then remain in a closed position as long as the discharge valve 77 is in "closed" position. The edge of one of the trap doors 93 (Figs. 7 and 8) of each of the housings 92 is equipped with a strip 93a of suitable packing material designed to abut the edge of the other door in order to obtain a tight seal between the doors 93 when the same are in closed position. While the compressed air, when entering cylinder 80 through the pipe 83 moves piston 78 to the upper end of said cylinder, the air above said piston escapes through the pipe 84 into the outlet duct 73 of the pilot valve. Duct 73 at this moment is connected by means of recess 75 in piston 64 with the outlet 72, allowing the air to escape out of the pilot valve.

One end of each of the discharge valves 77 is equipped with contact arms 113 and 114. The engagement of arm 113 with a push-button 113a (Fig. 13) of one of the limit switches N1, N2 or N3, when the respective valve 77 is in "closed" position, closes one of three more branch circuits connected in parallel with the lines L1 and L2 and energizes the respective secondary relay SR1, SR2 or SR3, thus opening a contact carried by the core of the same normally closing the circuit through the coil of the respective relay PR1, PR2 or PR3 and thereupon breaking the circuit through the respective signal lamp S1, S2 or S3 and the time-switch I1, I2 or I3. Upon being energized, the relay SR1, SR2 or SR3 closes subsidiary circuits also connected in parallel to the

lines L1 and L2 and the locking solenoid 51, thus energizing the latter. The armature 52 of the solenoid is thus raised, whereupon the locking latch 53 disengages from hole 55 in the valve 29. If the feed operator then depresses the pedal 43, the valve 29 will be shifted to such an extent that the port 38 of the valve-housing G registers with the aperture 30 of said valve plate 29, which may be called the "open" position, and thereby closes the port 36 of said intake. This operation of course transfers the suction from the screen 34 to the tobacco intake pipe 39 into which the operator then deposits the measured tobacco charge T kept in readiness on the feed table 20. The tobacco charge T is then conveyed, by means of the suction created by fan F, via the main feed pipe 21 and diverted through the discharge duct 69 of the respective valve 77 then in "closed" position, into the corresponding discharge chute 92, the trap doors 93 of which are then in closed position.

When the operator depresses the pedal 43 in order to shift the valve 29 to its "open" position, the roller 59 pivoted to the stem 58 of the control switch 57 rides over the wedge-shaped recess 60 of the valve 29 on to the bottom of the same, the stem 58 is depressed thereby closing the circuit through relay TR, which circuit is connected in parallel with the lines L1 and L2. The time relay TR (Fig. 14) is of the well known delayed action type.

In this manner the core C of the time relay, which carries a bar L which operates the contact makers M, N and P, is displaced sufficiently to cause the contact maker M to break the circuit previously closed through energization of the respective relay SR1, SR2 and SR3, and thus break the circuit through the locking solenoid 51, whereupon its core 52 with locking latch 53, due to their own weight, drop again, upon being thus released. The latch 53 then simply rides on the moving valve 29. After the tobacco charge T has been introduced into the intake pipe 39, the operator depresses the other pedal 48 which, of course, ascended during the downward motion of pedal 43, and the valve 29 is shifted back to its "closed" position wherein the latch 53 re-engages with the hole 55 of said valve 29, thereby locking the same. During the return motion of valve 29 the roller 59 re-engages with the wedge-shaped recess 60 in the valve, thus permitting the stem 58 of the control switch 57 to spring back to its original position and break the circuit through the time relay solenoid TR (Fig. 14).

The time relay TR is set in such a manner that the member L thereof closes the contact N, while allowing the contact P to remain closed, after a given interval which is equal to the time the tobacco charge T requires for traveling from the intake G to the furthestmost discharge valve V3, whereby a circuit is momentarily established to energize all the solenoids K1, K2 and K3, which by means of their cores 112 are connected to their respective pilot valves. Immediately thereafter the contact P is opened by the member L of the time relay and the solenoids K1, K2 and K3 are de-energized. All the pilot valves which were in closed position, of course remain undisturbed but the particular pilot valve connected with the particular discharge valve 77 just having received a tobacco charge, is actuated by means of its respective solenoid K1, K2 or K3. Thus the opening of the previously closed discharge valve 77 takes place when the piston 64

in the cylinder 62 of its respective pilot valve is displaced by the core 112 and piston rod 69 to the other end of the cylinder. The compressed air is guided from the pipe 63 into the cylinder 62 and out the duct 73 through the pipe 84 into cylinder 80. The piston 78 is thus forced to the opposite end of cylinder 80, thereby through rod 79, also moving the discharge valve 77 to its "open" position. The air in front of the moving piston 78 in cylinder 80 is displaced through pipe 83, duct 71, recess 75 and duct 72 to the exterior of the respective pilot valve. At the same time the compressed air in cylinder 103 which had previously displaced the piston 100 to a position wherein the trap doors 93 were maintained in closed position, escapes through pipe 104 into pipe 83 and thence into the cylinder 61 and out its duct 72. As soon as the air pressure in cylinder 103 is relieved, trap doors 93, due to their own weight and the weight of the tobacco delivered upon them, swing downwardly and the tobacco charge T drops into the corresponding feed hopper of the particular cigarette making machine. This movement of trap doors 93 through the linkage connecting the same to the piston 100 causes the latter to ascend and resume its position in the upper end of cylinder 103.

The contact arm 114 of discharge valve 77 engages, when it arrives at its "open" position, with a push-button 114a of the respective limit switch Z1, Z2 or Z3, thereupon re-establishing the circuit to the control buttons B1, B2 or B3 respectively. Therefore, if for any reason one of the discharge valves V1, V2 or V3 should fail to return to its original or "open" position, the circuit remains broken and the pressing of said control buttons will have no effect upon the system, wherefore no further tobacco charge can be sent through the system until the latter has been examined and the trouble corrected.

When all discharge valves 77 are in "open" position, the current of air passes through the bypass ducts 88 of said valves with which the various sections of feed line 21 are then in direct communication.

Each cigarette making machine M1, M2 and M3 is furthermore equipped with a push-button 116 connected in parallel with its respective time-switch, and a knife switch 117 connected in series with the latter (Figs. 1 and 14). Buttons 116 are provided for the purpose of permitting the machine operator to send in an additional signal to the attendant at the storage room in case the tobacco level in the feed hopper of his machine should run undesirably low before the respective time-switch forwards a signal. In case the tobacco level in any of the feed hoppers R1, R2 or R3, for some reason or another, should remain undesirably high, the machine operator simply disengages the knife switch 117 of the respective machine and no signal can be forwarded by the corresponding rotary switch until the circuit is re-established by re-engaging the respective knife switch 117.

Instead of using foot levers 43 and 48 to operate valve 29, the latter, if desired, may be operated automatically by employing an additional pilot valve 120 connected with the compressed air line 22 by means of pipe 121 (Fig. 6). Said valve 120, being of the same construction as the pilot valves controlling the discharge valves 77, need not be further described herein. It is deemed sufficient to say that the ends of its piston rod are connected to solenoids 122 and 123 attached together with the valve 120 to a

bracket 124 mounted on the lower intake valve housing 32, the solenoids 122 and 124 being connected in series with the set of solenoids O1, O2 and O3 and the set of solenoids K1, K2 and K3, respectively. Said bracket also carries a cylinder 125 having a piston 126, the protruding piston rod 127 thereof being connected with a forked lug 41 fastened on valve 29. Similarly to cylinder 80, each end of cylinder 125 is connected to separate outlet ducts in the pilot valve 120 by pipe 128 and pipe 129, respectively. The ends of valve 29 are equipped with contact makers 130 and 131, the latter depressing a push-button of a switch 131a when valve 29 is in open position while finger 130 depresses the button of a switch 130a when said valve is in closed position. Switches 130a and 131a in this modification may be connected in series with the solenoids 122 and 123 respectively. The switch 130a may be arranged, when depressed, to close the circuit through the coil of the time relay TR, and the switch 121a may be arranged to close a contact in the circuit through the contacts N and P. Accordingly, the time relay switch 57 used in the construction described may be eliminated. With this arrangement for operating the valve 29 automatically, the latch 53 as well as locking solenoid 51 of course are eliminated.

While in the foregoing description a group of cigarette making machines has been chosen to illustrate this invention, the same may be equally well employed for conveying any tobacco in disintegrated or non-disintegrated form from a feeding station to a single cigarette making machine, or to a group of packaging or other tobacco working machines.

Each cigarette machine may be equipped with a suitable form of adjustable rotary switch, as shown in Figs. 11a and 11b. The switch may comprise, as shown therein a shaft 200 on which the sprocket 24 is fastened; an eccentric 201 fastened on the shaft 200; an eccentric rod 202 provided at one end with an eccentric strap surrounding the eccentric 201 and pivotally connected at its other end to a squared block 203 fitting a slot in a rocker arm 204 and adjustable therein by a screw 205 to regulate the throw of the rocker arm. The hub of the latter constitutes the driving member of a ball or roller clutch 206 of well known one-way type, the driven member of which is fastened to a rocker shaft 207.

A yielding stop 208 bears against the periphery of the driven member of the clutch 206 and serves to maintain it stationary while the arm 204 swings in a counter-clockwise direction, whereby the cam 209 on the rim of said driven member is intermittently rotated in a clockwise direction step-by-step. Thus, the contact maker 210 will be periodically lowered by said cam to engage the contact 211 and establish circuits through the corresponding signal lamp S1, S2 or S3 and the relay PR1, PR2 or PR3. By turning the screw 205 the intervals at which these circuits will be closed may be varied.

What is claimed is:

1. The combination with a plurality of cigarette machines each having a tobacco feed, of a single main conduit into which disintegrated tobacco may be introduced, means for creating a current of air through said conduit to pneumatically convey the inserted tobacco, devices communicating with said tobacco feeds for diverting said current of air from said conduit in order to deliver the conveyed tobacco to the to-

5 bacco feed of any of said machines, said means including a fan arranged to exhaust air from said conduit, and said conduit being provided with an intake through which tobacco may be inserted, and a valve normally closing said intake and connected to said devices and controlling the same.

0 2. The combination with a plurality of collecting chambers, of a single conduit into which disintegrated tobacco may be introduced, means for creating a current of air through said conduit to pneumatically convey the inserted tobacco, and devices for diverting the current of air from said conduit into any one of said chambers in order to deposit the conveyed tobacco in the same, and then returning the diverted air current to said conduit, said chambers being provided with trapdoors movable into position to permit discharging of the tobacco collected therein, manually operable controls remote from said chambers for setting the desired device into operation, and mechanism actuated by said devices for closing the doors of the corresponding chamber when its respective device is set into operation.

15 3. The combination with a plurality of collecting chambers, of a single conduit provided with an intake into which tobacco may be introduced, means for creating a current of air through said conduit to pneumatically convey tobacco inserted through said intake, a valve normally closing said intake and movable into position to permit the insertion of tobacco into the intake, discharge valves disposed in said conduit and separately movable into closed position to divert the current of air through one of said collecting chambers and back to the conduit, electromagnetically controlled devices for moving the desired discharge valve into position to divert the tobacco into the corresponding chamber, manually operable switches remote from said chambers, electromagnetic circuits connecting said switches to said devices, whereby the desired device will be actuated when its switch is closed, and means set into operation by the opening of said intake valve for re-opening the closed discharge valve after an interval of time sufficient to permit conveying of the inserted tobacco to the discharge valve furthest from said intake.

20 4. The combination with a single conduit provided with an intake into which tobacco may be inserted, said intake having two branches, a screen covering the inlet of one of said branches, a valve movable into positions to put either of said branches into open communication with said conduit, and means for applying suction to the outlet end of said conduit to create a current of air through said conduit to cause removal of dust and "shorts" from shredded tobacco spread on said screen, or the pneumatic conveying of tobacco inserted through the other branch of said intake.

25 5. The combination with a single conduit provided with an intake into which tobacco may be inserted, said intake having two branches, a screen covering the inlet of one of said branches, a valve movable into positions to put either of said branches into open communication with said conduit, means for applying suction to the outlet end of said conduit to create a current of air through said conduit to cause removal of dust

and "shorts" from shredded tobacco spread on said screen, or the pneumatic conveying of tobacco inserted through the other branch of said intake, and a dust separator connected to a portion of said conduit beyond said machine.

5 6. The combination with a plurality of collecting chambers, of a single conduit into which disintegrated tobacco may be introduced, means for creating a current of air through said conduit to pneumatically convey the inserted tobacco, discharge valves disposed in said conduit and separately movable into position to divert the current of air into any one of said chambers, pneumatic devices for moving the desired valve into position to divert the tobacco into the corresponding chamber, and a manually operable electromagnetic device for setting any one of said pneumatic devices into operation, each of said chambers being provided with a door movable into position to permit discharging of the tobacco collected therein, and pneumatic mechanism controlled by the corresponding pneumatic device for closing the respective door when the desired valve is moved into position to divert the tobacco.

10 7. The combination with a plurality of cigarette machine feeds, of a tobacco receiving chamber for holding a supply of tobacco for each of said feeds, a single main tobacco conveying conduit, an intake opening into said conduit through which increments of tobacco may be introduced by an operator for forwarding to said chambers, by-passes for each of said chambers arranged in series along said conduit so as to establish an air passage from said conduit to each of said chambers, and thence back from said chambers to the conduit whereby delivery of tobacco to any one of the chambers does not interrupt the main flow of air through the conduit, means for continuously passing a current of air through said conduit from the intake portion thereof past said by-passes, means for diverting the air current from the conduit through anyone of said by-passes to deliver tobacco fed in at the intake opening to one of said chambers, mechanism adjacent said inlet opening and connected to said diverting means causing actuation of the same at the will of the operator, mechanism associated with said chambers for separating tobacco from the air current through the by-passes, a closure in the bottom of said chamber, and means controlled by the corresponding diverting means for opening said closure and depositing tobacco in the feed when the diverting means is inoperative and for closing said closure when the diverting means is operative, and means including a return conduit for recirculating air from one end of said main tobacco conveying conduit back into the other end of said conduit in a normally closed circuit so as to facilitate maintaining an atmosphere of substantially constant humidity within the conveying system in order to maintain the proper moisture content of the tobacco, and an air cleaner arranged to act on the recirculated air as the same is circulated from the portion of said main conduit beyond the last by-pass to the inlet end of said main conduit.

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