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FEEDING DEVICE FOR CIGARETTE PACKAGING MACHINES

Filed April 7, 1926

3 Sheets-Sheet 1

Fig. 1.

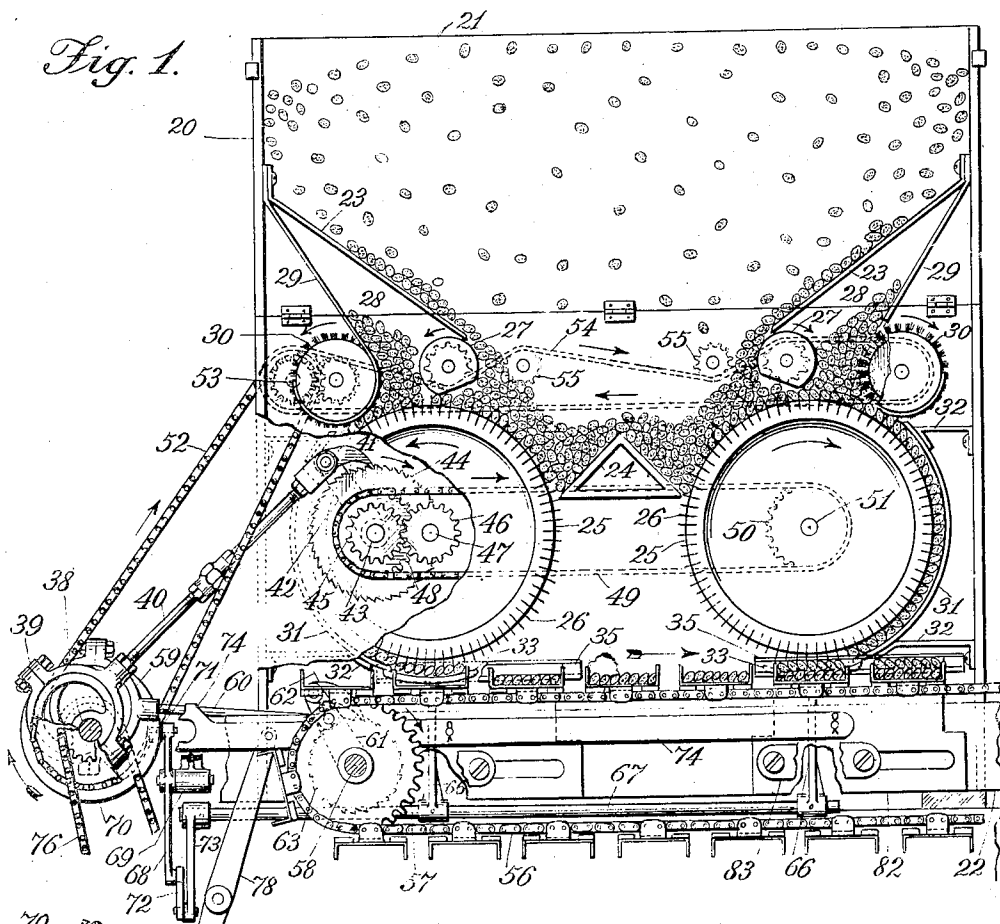
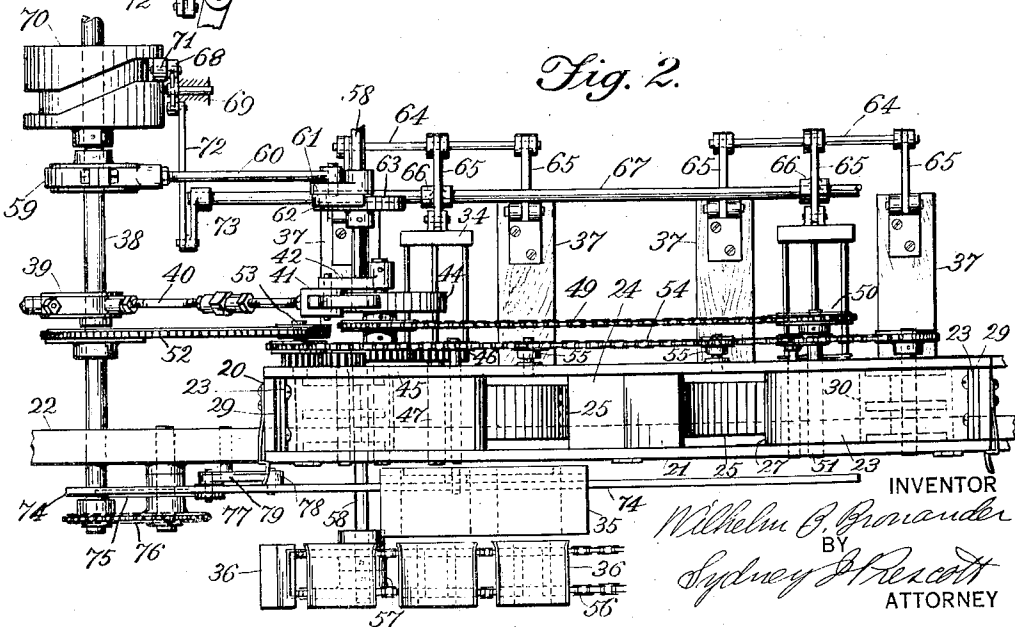


Fig. 2.



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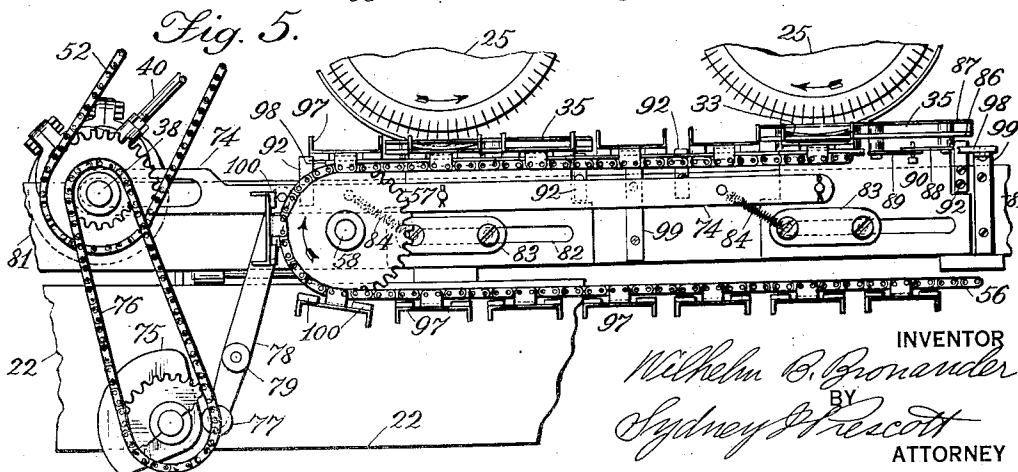
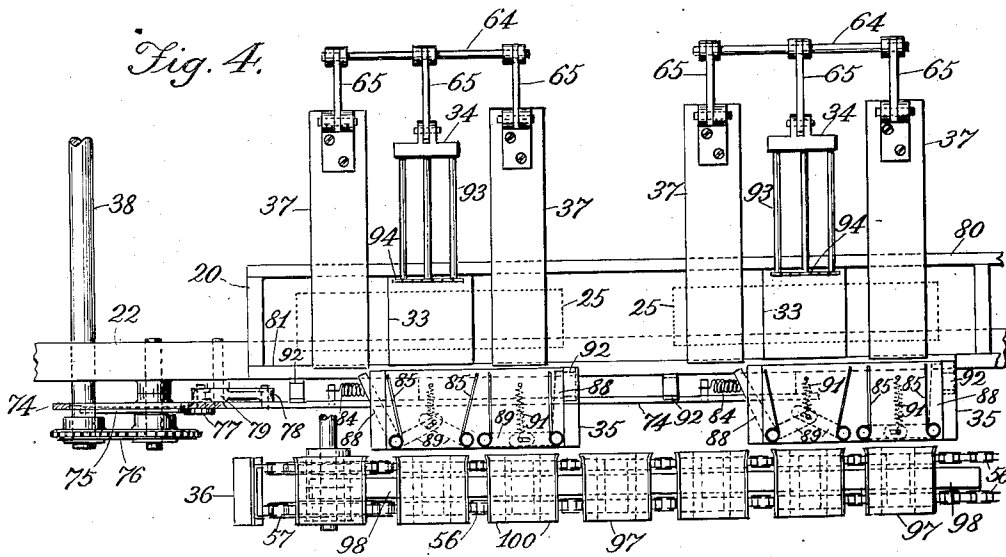
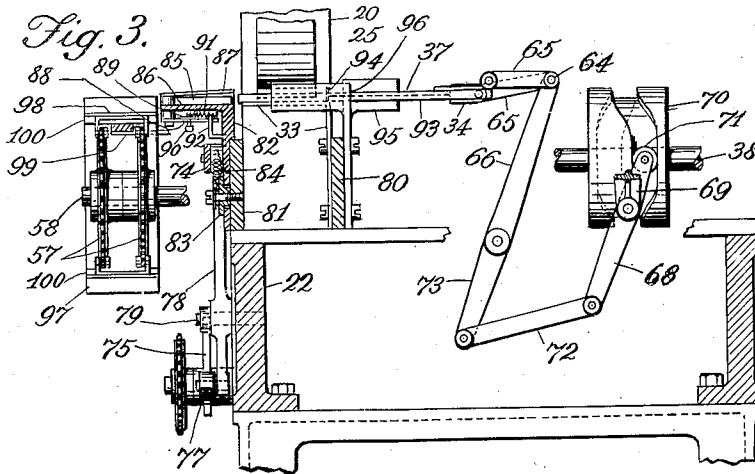
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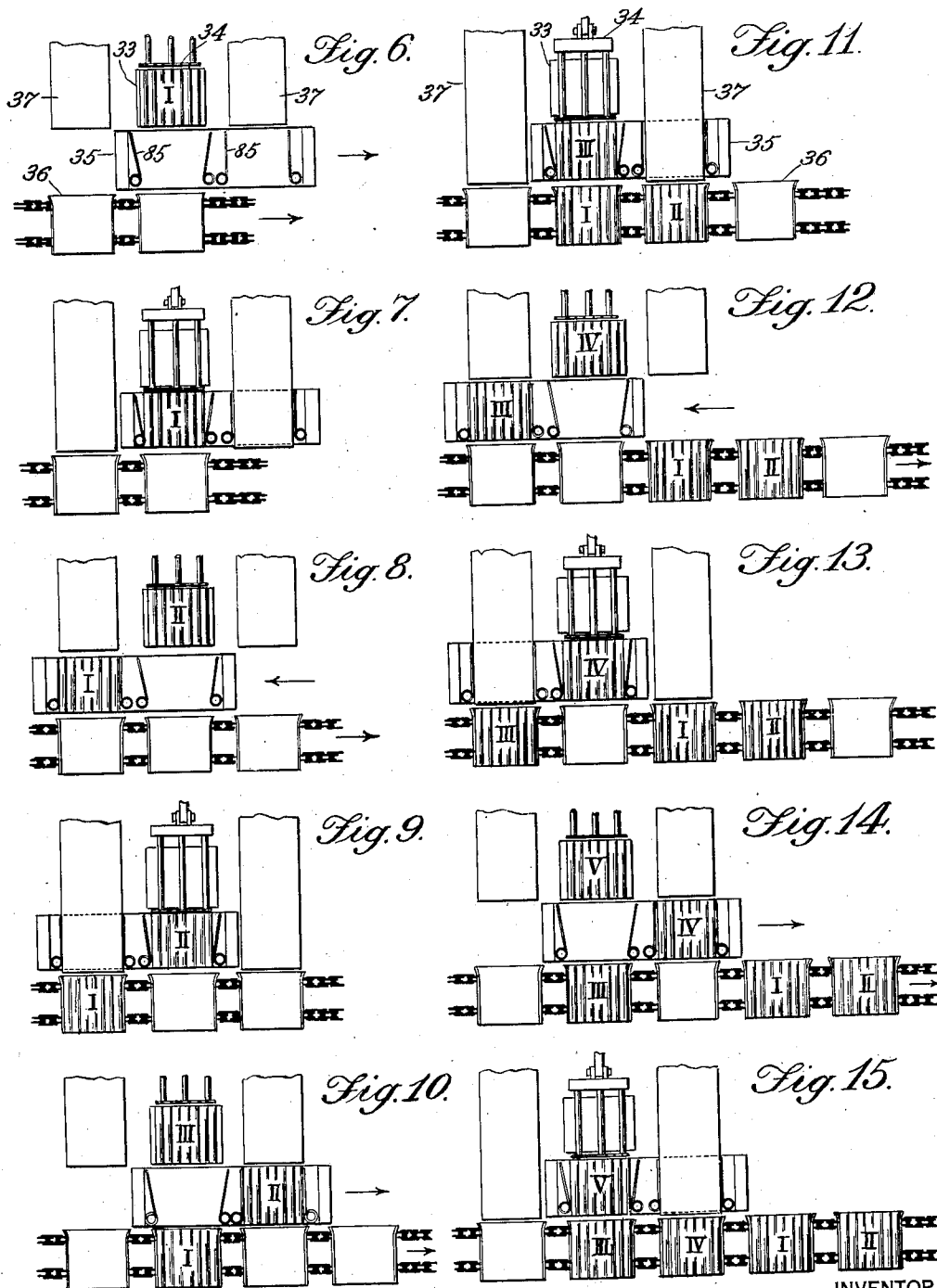
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FEEDING DEVICE FOR CIGARETTE-PACKAGING MACHINES.

Application filed April 7, 1926. Serial No. 100,261.

This invention relates to an improvement in a feed device for cigarette packaging machines, especially designed and adapted to feed oval cigarettes in groups into the receptacles of a conveyor, the cigarettes of each layer being delivered in lapped position ready to be made into a package or placed in a box.

In packaging oval cigarettes, the cigarettes are arranged in rows the cigarettes of each row being inclined in the same direction though the cigarettes in different rows are usually inclined in divergent directions. The main object of the present invention is the production of a feeding device which will properly arrange the cigarettes in accordance with the general practice in packaging oval cigarettes. A further object of the invention is the production of improved mechanisms forming various parts of the feeding device. A further object is the production of a device of the general character indicated, having extremely high capacity in order to deliver the groups of cigarettes to packaging machines of extremely high capacity. With these and other objects not specifically mentioned in view, the invention consists in certain combinations and constructions which will be hereinafter fully described and then specifically set forth in the claims hereunto appended.

In the accompanying drawings in which like characters indicate the same or like parts, Fig. 1 is a front elevation of the improved feeding device, certain parts being broken away, and showing the means employed for arranging the cigarettes in groups; Fig. 2 is a plan view of the structure shown in Fig. 1, and showing the arrangement of the drives for the various movable parts; Fig. 3 is a cross-sectional view, showing the cigarette compacting and delivering means; Figs. 4 and 5 are respectively plan and front elevations of the cigarette compacting and delivering means; and Figs. 6 to 15 are diagrams showing the successive steps in the operation of the cigarette compacting and delivering means.

In carrying the invention into effect, there is provided means for supporting a supply of cigarettes, means for forwarding cigarettes from said supporting means, means

whereby the forwarded cigarettes are arranged in rearwardly-inclined relationship, means for separating groups of cigarettes so arranged, means for compacting the groups of arranged cigarettes, and means for transporting the compacted groups and assembling them with other similarly arranged groups. In the best constructions contemplated, the means for supporting a supply of cigarettes comprises means for supporting a primary supply and a secondary supply, and the forwarding means always receives cigarettes from the primary supply, but only from the secondary supply when vacancies occur in the line of cigarettes forwarded from the primary supply; the forwarding means includes operative connections and a traveling member having a series of pockets, each of which is of a width permitting tilting but not rotation of a cigarette therein, so that the cigarettes may be tilted into rearwardly-inclined relationship but cannot be turned completely over; the means for separating groups of forwarded cigarettes from the line includes operative connections and a plunger pushing said groups out of the forwarding path; the means for compacting said groups includes operative connections and dual compacting devices so arranged that one is being charged while the other is being discharged, in order to attain high output; and a plurality of means are employed whereby groups of cigarettes are produced and delivered to transporting means including operative connections and a conveyor having a step by step movement past, and receiving groups from, said group producing means. All of the above means and devices may be widely varied in construction within the scope of the claims for the specific structure selected to illustrate the invention is but one of many possible concrete embodiments of the same. The invention therefore is not to be restricted to the precise details of the structure shown and described.

Referring to Figs. 1 and 2, the hopper 20, whose front wall 21 is preferably made of some transparent material such as glass or celluloid, so that the operator can watch the cigarettes and remedy any jamming or other trouble by opening the hinged flap

21, is attached to the frame-work 22 of the machine. The cigarettes to be packed are placed in the hopper and form a primary supply, and by sliding down the inclined side guides 23 and the triangular center guide 24 drop into the peripheral pockets of the partitioned turrets 25 which, in a step by step motion, turn in directions from the center of the hopper toward the ends. The pockets of the turret are of a width permitting tilting but not rotation of the cigarettes therein.

Above each turret, in a position slightly in advance of the vertical centerline of the wheel, and with its circumference in close proximity to the tops of the projecting partitions 26, is placed a small drum 27 extending over the entire inside width of the hopper space and having a portion of its periphery cut away or flattened so as to form a wedge-shaped pocket with the periphery of the turret 25. The drums 27 are revolved in the same direction as the corresponding turrets 25 so that their adjoining peripheries move in opposite directions, the flat surfaces of the drums 27 pushing back any cigarettes in excess of those in the line of turret pockets.

Having passed beyond the drum 27, the pockets of the turret 25 pass along the auxiliary feed chamber 28 formed below the side guides 23 by the partitions 29, and supporting a secondary supply of cigarettes. This chamber is supplied with cigarettes from the front, by opening the flap 21, in order that a cigarette may drop in any pocket of the turret 25 which may not formerly have received a charge, or whose charge may have been knocked out by the action of the drum 27.

The cigarettes in the pockets of the turret 25 are thereupon subjected to the action of drums 30 placed above the wheels 25 some distance beyond the vertical center line and revolving in the same direction as the respective drums 27. The drums 30 are provided with circumferentially projecting brushes which engage the cigarettes lying in the pockets of the turret 25 and tilt their exposed parts rearwardly, thus causing them to assume their lapping positions. In this position they are held, as the turret continues to turn, by the guards 31 surrounding the portion of the turrets 25 between the emerging points at the drum 30 and the discharging points at the bottom of the turrets, the guards 31 being supported by brackets 32 from the hopper frame and being so dimensioned that the desired number of cigarettes required for one row of the package to be formed will drop slightly upon the curved receiving table 33 attached to the frame at each step of the turret 25.

From the receiving table 33, the cigarettes are pushed by a plunger 34 into one of the

chambers of the two-chambered compactor 35 which has a reciprocative movement so that its two chambers can be charged alternately from the receiving table 33. In each of the two charging positions of the compactor, the chamber previously charged and now holding the cigarettes in compacted condition is opposite one of the receptacles of the endless conveyor 36, so that one of the two end-plungers 37 which move simultaneously with the center plunger 34 previously referred to, pushes the compacted layer of cigarettes into a conveyor receptacle.

The turrets 25 are driven from the main shaft 38 by means of an eccentric 39 connected, by the rod 40, with the pawl 41 supported on the arm 42 fulcrumed on the shaft 43; the latter carrying the gear 45 meshing with the gear 46 on the shaft 47 of the left-hand turret 25. A sprocket 48 on the shaft 43, through the chain 49, drives the sprocket 50 on the shaft 51 of the right-hand turret 25. The shaft 38, by means of the chain 52, drives the shaft 53 which is geared to the left-hand lapping drum 30. The right-hand lapping drum 30, and the clearing drums 27, are driven by the endless chain 54, which is turned in the direction of the arrows by a sprocket on the shaft 53 and runs over the adjustable idlers 55.

The conveyor chains 56, which run over the sprockets 57 mounted on the shaft 58, receive their step by step motion from the main shaft 38 by means of the eccentric 59, rod 60, arm 61, pawl 62 and ratchet 63.

The plungers 34 and 37, which are connected together by the rods 64 to which they are attached by links 65, are operated by levers 66 affixed to the shaft 67 which is rocked back and forth by the lever 68 fulcrumed in the bracket 69 and actuated by the cam 70 mounted on the main shaft 38, the cam-end of the lever 68 carrying the roller 71, and the free end being connected by the link 72 to the crank 73 attached to the rocking shaft 67.

The reciprocating motion of the compressors 35 is derived from the cam-operated rod 74 supported on the shaft 38, one end of the rod 74 being provided with a slot through which passes the shaft 38. The cam 75, (Figs. 3 to 5) driven by the chain 76 from the main shaft 38, actuates, through the roller 77, the lever 78 supported on the fulcrum 79 carried by the machine-base 22, the upper end of the lever 78 being pivoted to the rod 74.

The mechanism of the cigarette transfer from the receiving tables 33 to the compactors 35, and from the latter to the conveyor 36, is shown separately in Figs. 3 to 5; and diagrams illustrating the successive stages of the charge transfer are shown in Figs. 6 to 15.

The charge receiving tables 33, located be-

low the center of each turret 25, are fixedly attached to the rear cross-member 80 of the hopper frame, only being adjustable in height to a slight degree so as to enable adjustment of the device to conform with various thicknesses of cigarettes.

The compactors 35 are slidably mounted on the front cross-member 81 of the hopper frame, their vertical supporting walls 82 being slotted and held against the hopper frame by the guides 83 attached to the cross-member 81. Springs 84, fastened to guides 83 and actuating-rod 74 serve to keep the roller 77 of the operating lever 78 in contact with the cam 75. The two receiving chambers of each compactor are formed by movable side walls 85 pivoted near the delivery end of the compactor between its horizontal bottom 86 and its inclined top 87. Below the bottom wall 86, the two outside pivots of each compactor carry bell-cranks 88, and the two inside pivots carry simple levers 89, the free ends of the levers 89 being joined by slots and pins 90 with the inwardly-projecting arms of the bell-cranks 88. Springs 91, attached to the pins 90 and the compactor-base 86, keep the side walls 85 spread open when the bell-crank levers 88 are free to move. At both ends of the compactor-stroke, however, the outwardly projecting arms of the bell-cranks 88 engage stops 92 attached to the cross-member 81, thus moving the bell-cranks inward and closing the side-walls 85, thereby compacting the row of cigarettes contained in the respective chambers to the proper width prior to its being transferred into the conveyor receptacle which itself is made of the width required for packaging the cigarettes.

The center plunger 34, which consists of a number of horizontal rods 93 carrying at their forward ends a small vertical strip 94 provided with slots so as to enable it to pass through the pockets of the turret 25, is supported by the guide 95 attached to the rear member 80 of the hopper frame. The end plungers 37 are rectangular strips of wood or other light material having a cross section identical with the dimensions of one row of cigarettes, and are supported by guides 96 fastened to the rear member 80.

The conveyor receptacles 97, while being charged, are kept in alignment by the supporting strip 98 affixed between the conveyor chains 56 by means of brackets 99 to the cross member 81 of the hopper frame, the receptacles 97 for this purpose being provided with cross bars 100 which rest and slide on the strip 98 during the charging period.

The operation of the charge transferring device is as follows: When the turret 25 has made a half turn after the machine has been started, the first charge I is deposited upon the receiving table 33, as shown in Fig. 6.

The compactor at this time has moved into its forward position so that its rear chamber registers with the receiving table. At the next step of the machine, the plungers move forward, thereby pushing charge I into the rear pocket of the compactor which, in the forward position of the compactor, has its side walls 85 open, Fig. 7. Next, the plungers are drawn back, the compactor moves to the rear, the conveyor advances, and the turret turns, depositing a second charge II upon the receiving table, Fig. 8. In moving to the rear end of its stroke, the compactor engages with its rear stop 92 which closes the side walls 85 of the rear pocket and compacts charge I. While compactor and conveyor remain stationary, the plungers next move forward, thereby transferring the compacted charge I to the conveyor and the new charge II to the compactor, Fig. 9, the front chamber of the latter being opposite the receiving table with its side walls spread open. As, after retreat of the plungers, the compactor now moves forward, Fig. 10, charge II is compacted by the closing of the side walls on striking the forward stop. At the same time, charge III is deposited on the receiving table and charge I is moved forward. The plungers then come forward again, Fig. 11, transferring charge II to the conveyor and charge III to the compactor. Next, the plungers retreat, the compactor moves back, compacting charge III, the conveyor advances, and the turret delivers charge IV, Fig. 12. When the plungers next move back, and compactor and conveyor move forward, charge IV is compacted and charge V delivered, Fig. 14. The plungers then move forward again, transferring charge IV to the conveyor and charge V to the compactor, Fig. 15. The conveyor now carries four charges in the order II, I, IV, III, subsequent charges being delivered in the same order.

The charges thus far compacted consist of one layer of cigarettes only. But, as the conveyor passes the second turret, the same process of delivery is repeated so that then each conveyor receptacle has two charges, or two rows of cigarettes, which in the present case constitutes the complete contents of one package. If the package is to contain three rows of cigarettes, the hopper is associated with three turrets, and three compactors are used, so that the charging process above described is repeated three times to fully charge the conveyor receptacle for subsequent packaging.

What is claimed is:

1. The combination with a hopper for supporting a supply of cigarettes, of means for forwarding cigarettes from said supporting means, and means whereby the forwarded cigarettes are arranged in rearwardly-inclined relationship.

2. The combination with a hopper for supporting a supply of cigarettes, of means for forwarding cigarettes from said supporting means, means whereby the forwarded cigarettes are arranged in rearwardly-inclined relationship, and means for separating groups of cigarettes so arranged.

3. The combination with means for supporting a supply of cigarettes, of means for forwarding cigarettes from said supporting means, means whereby the forwarded cigarettes are arranged in rearwardly-inclined relationship, means for separating groups of cigarettes so arranged, and means for compacting the groups of arranged cigarettes.

4. The combination with means for supporting a supply of cigarettes, of means for forwarding cigarettes from said supporting means, means whereby the forwarded cigarettes are arranged in rearwardly-inclined relationship, means for separating groups of cigarettes so arranged, means for compacting the groups of arranged cigarettes, and means for transporting the compacted groups.

5. The combination with means for supporting a supply of cigarettes, of means for forwarding cigarettes from said supporting means, means whereby the forwarded cigarettes are arranged in rearwardly-inclined relationship, means for separating groups of cigarettes so arranged, means for compacting the groups of arranged cigarettes, and means for transporting the compacted groups and assembling them with other similar groups.

6. The combination with means for forwarding cigarettes, of means whereby the forwarded cigarettes are arranged in rearwardly-inclined relationship, means for separating groups of cigarettes so arranged, means for compacting the groups of arranged cigarettes, and means for transporting the compacted groups.

7. The combination with means for forwarding cigarettes, of means whereby the forwarded cigarettes are arranged in rearwardly-inclined relationship, means for separating groups of cigarettes so arranged, and means for compacting the groups of arranged cigarettes.

8. The combination with means for forwarding cigarettes, of means whereby the forwarded cigarettes are tilted in said forwarding means into rearwardly-inclined relationship, and means for separating groups of cigarettes so arranged.

9. The combination with means for forwarding cigarettes, of means whereby the forwarded cigarettes are tilted in said forwarding means into rearwardly-inclined relationship.

10. The combination with means for supporting a primary supply of cigarettes and a secondary supply of cigarettes, of means for forwarding cigarettes always received

from said primary supply but only from said secondary supply when vacancies occur in the line, and means whereby the forwarded cigarettes are arranged in rearwardly-inclined relationship.

11. The combination with a hopper supporting a primary supply and a secondary supply of cigarettes, of means for forwarding cigarettes always received from said primary supply but only from said secondary supply when vacancies occur in the line, and means whereby the forwarded cigarettes are arranged in rearwardly-inclined relationship.

12. The combination with a hopper supporting a primary supply and a secondary supply of cigarettes, of means for forwarding cigarettes always received from said primary supply but only from said secondary supply when vacancies occur in the line, and means for keeping said primary and secondary supplies separate, and means whereby the forwarded cigarettes are arranged in rearwardly-inclined relationship.

13. The combination with a hopper supporting a primary supply and a secondary supply of cigarettes, of means for forwarding cigarettes always received from said primary supply but only from said secondary supply when vacancies occur in said line, and a rotating device for restraining cigarettes out of the line which tend to pass from said primary supply to said secondary supply, and means whereby the forwarded cigarettes are arranged in rearwardly-inclined relationship.

14. The combination with a hopper supporting a primary supply and a secondary supply of cigarettes, of means underrunning said primary supply and said secondary supply for forwarding cigarettes always received by gravity from said primary supply but only from said secondary supply by gravity when vacancies occur in said line, and means whereby the forwarded cigarettes are arranged in rearwardly-inclined relationship.

15. The combination with means for supporting a supply of cigarettes, of means for forwarding cigarettes from said supporting means including operative connections, a traveling member having a series of pockets each of which is of a width permitting tilting but not rotation of a cigarette therein, and means whereby the forwarded cigarettes are arranged in rearwardly-inclined relationship.

16. The combination with means for supporting a supply of cigarettes, of means for forwarding cigarettes from said supporting means including operative connections, a rotating turret having a series of peripheral pockets each of which is of a width permitting tilting but not rotation of a cigarette therein, and means whereby the forwarded

cigarettes are arranged in rearwardly-inclined relationship.

17. The combination with means for supporting a supply of cigarettes, of means
5 underrunning said supporting means and receiving cigarettes therefrom by gravity and forwarding said cigarettes and including operative connections, a rotating turret
10 having a series of projecting partitions forming a series of peripheral pockets each of which is of a width permitting tilting but not rotation of a cigarette therein, and means whereby the forwarded cigarettes are arranged in rearwardly-inclined relationship.
15

18. The combination with means for forwarding cigarettes, of means whereby the forwarded cigarettes are arranged in rearwardly-inclined relationship including
20 means adjacent the path of the cigarettes and rearwardly tilting their exposed parts.

19. The combination with means for forwarding cigarettes, of means whereby the forwarded cigarettes are arranged in
25 rearwardly-inclined relationship including means having a substantially continuous member traveling in a direction opposite to that in which the cigarettes move and adjacent their path and rearwardly tilting their
30 exposed parts.

20. The combination with means for forwarding cigarettes, of means whereby the forwarded cigarettes are arranged in rearwardly inclined relationship including
35 operative connections, and a rotating brush adjacent the path of the cigarettes and rearwardly tilting their exposed parts.

21. The combination with means for forwarding cigarettes arranged in rearwardly
40 inclined relationship, of means for separating groups of forwarded cigarettes so arranged including operative connections,

and a plunger pushing said groups out of the forwarding path.

22. The combination with means for forwarding cigarettes arranged in rearwardly
45 inclined relationship, of means for separating groups of cigarettes so arranged including a table coacting with said forwarding means, and a cam-actuated plunger pushing
50 said groups transversely from said table and the forwarding path.

23. The combination with means for separating groups of cigarettes from a line, of means for compacting said groups including operative connections, and dual compacting devices so arranged that one is being charged while the other is being discharged.
55

24. The combination with means for separating groups of cigarettes from a line, of means for compacting said groups including operative connections, and two compacting devices movable from group receiving position to group discharging position.
60

25. The combination with means for separating groups of cigarettes from a line, of means for compacting said groups including operative connections, and two compacting devices reciprocating between a common group receiving position and two separated group discharging positions.
65

26. The combination with a plurality of means whereby groups of cigarettes are produced in which the cigarettes are arranged in divergent inclined relationship
75 in the several means, and transporting means including operative connections, and a conveyor having a step by step movement past and receiving groups from said group producing means.
80

In testimony whereof, I have signed my name to this specification.

WILHELM B. BRONANDER.