Feb. 13, 1923.

1,445,431

R. P. DE VRIES

CARTON FILLING OR PACKING MACHINE

Filed Aug. 17, 1921. 4 sheets-sheet 1

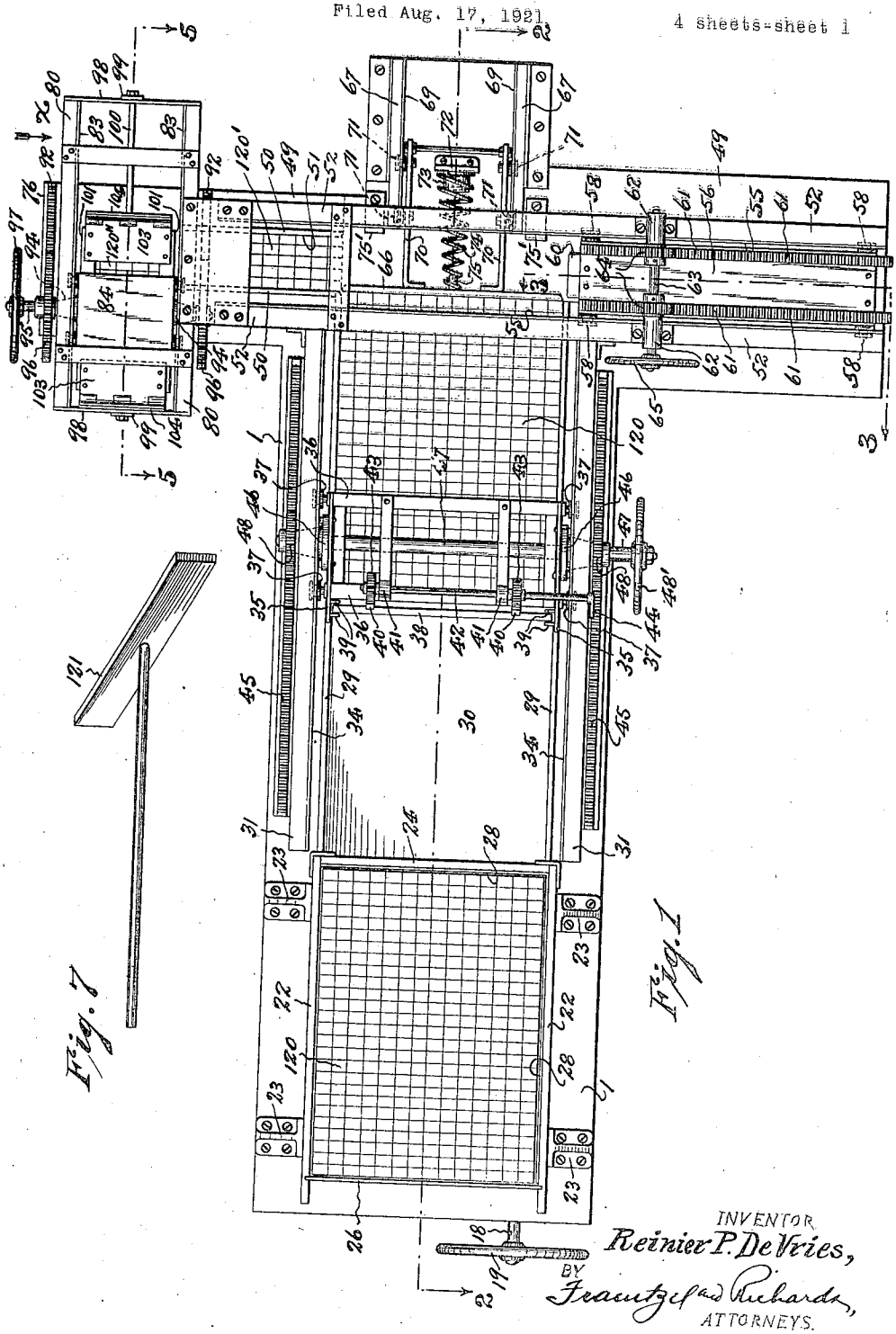


Fig. 1

Fig. 1

INVENTOR
Reinier P. De Vries,
BY
Fraser Tzel and Richards,
ATTORNEYS.

Feb. 13, 1923.

R. P. DE VRIES

1,445,431

CARTON FILLING OR PACKING MACHINE

Filed Aug. 17, 1921

4 sheets-sheet 2

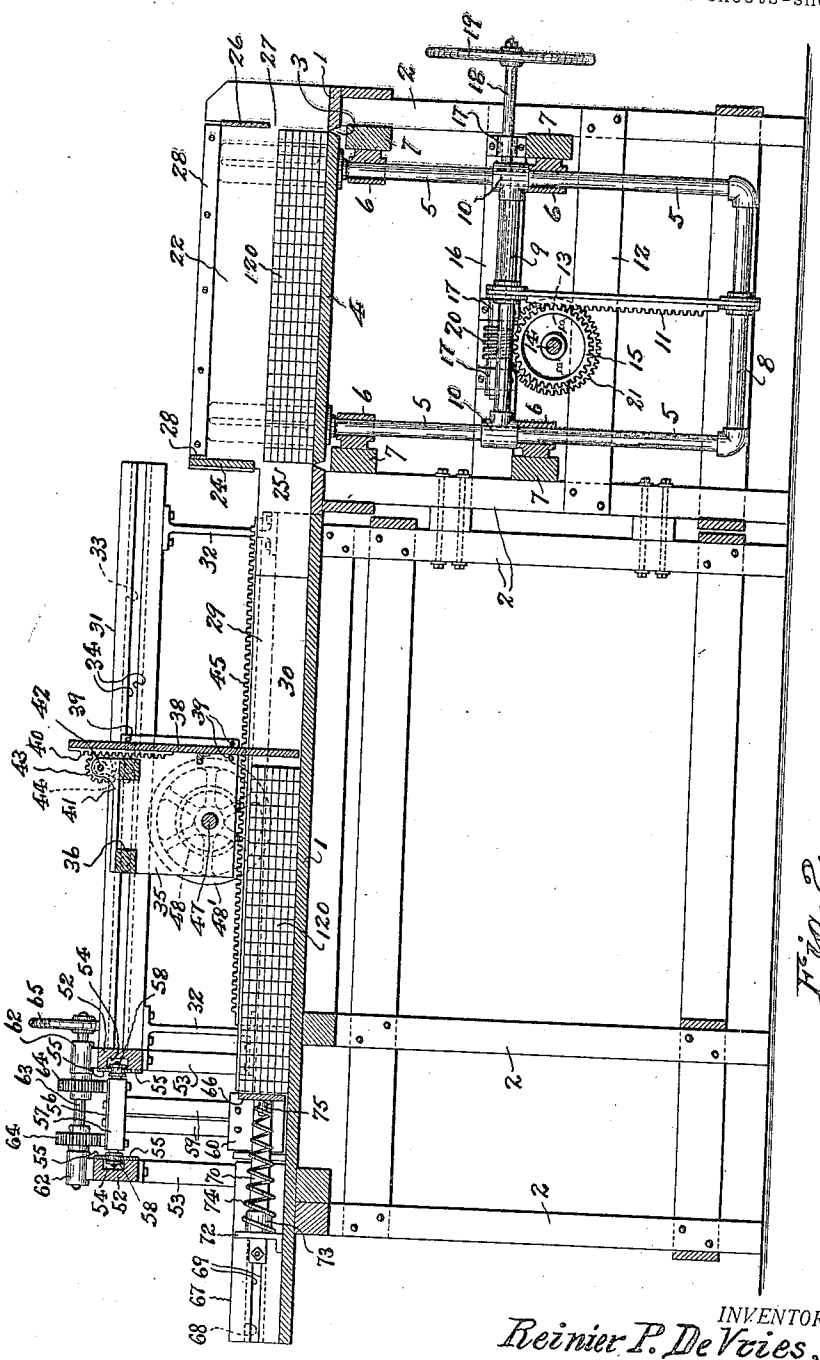


Fig. 2.

INVENTOR.
Reinier P. De Vries,
BY
Fraser & Richards
ATTORNEYS.

Feb. 13, 1923.

R. P. DE VRIES

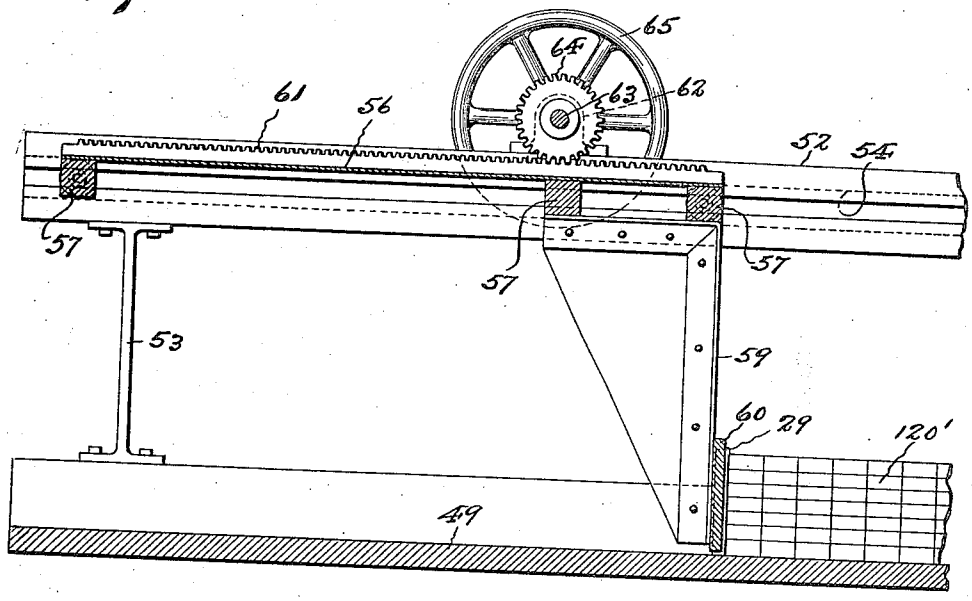
1,445,431

CARTON FILLING OR PACKING MACHINE

Filed Aug. 17, 1921

4 sheets-sheet 3

Fig. 3



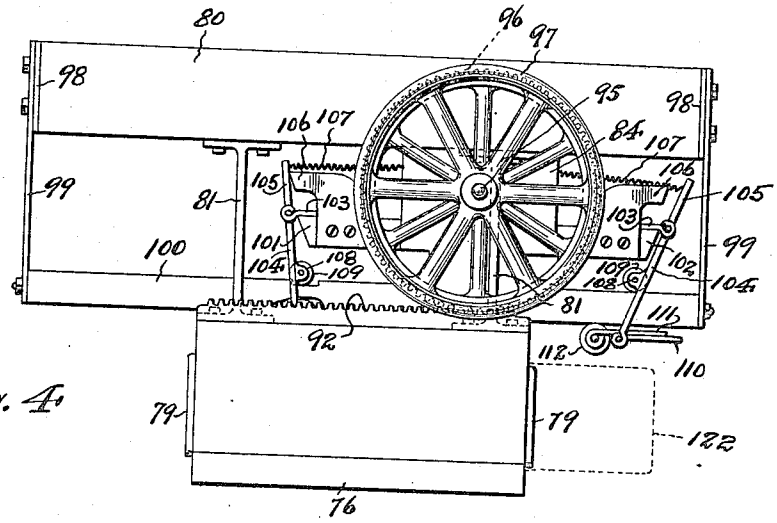


Fig. 4

INVENTOR.
Reinier P. De Vries
BY
Fraenzel and Richards,
ATTORNEYS.

Feb. 13, 1923.

R. P. DE VRIES

1,445,431

CARTON FILLING OR PACKING MACHINE

Filed Aug. 17, 1921

4 sheets-sheet 4

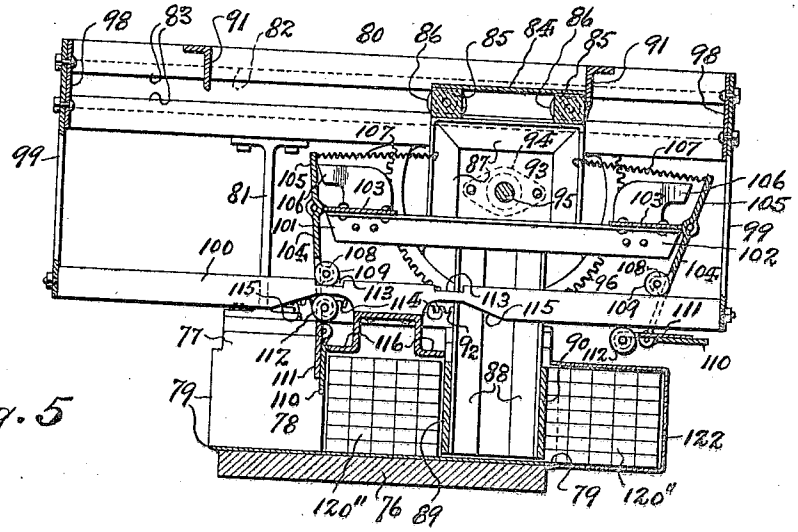


Fig. 5

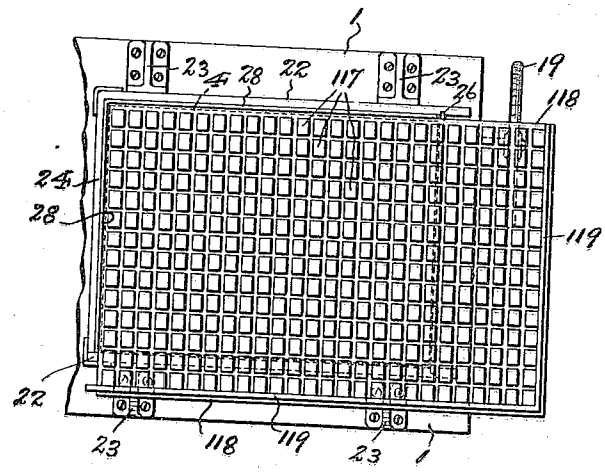


Fig. 6

INVENTOR.
Reinier P. De Vries,
BY
Fraser & Richards
ATTORNEYS.

Patented Feb. 13, 1923. 1,445,431

UNITED STATES PATENT OFFICE.

REINIER P. DE VRIES, OF CLIFTONDALE, MASSACHUSETTS.

CARTON FILLING OR PACKING MACHINE.

Application filed August 17, 1921. Serial No. 492,881.

To all whom it may concern:

Be it known that I, REINIER P. DE VRIES, a citizen of the United States, residing at Cliftondale, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Carton Filling or Packing Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to characters of reference marked thereon, which form a part of this specification.

This invention relates, generally, to carton or box filling machines; and the invention has reference, more particularly, to a novel construction of machine for assembling sugar tablets or cubes, or other articles of similar shape, in symmetrical piles, layer upon layer, and then subdividing said piles into unit masses of boxable size, and finally inserting such unit masses into the cartons or boxes adapted to receive and contain the same.

The invention, therefore, has for its principal object to provide a novel machine for assembling sugar tablets or cubes into layers, as they come from the molding machine trays, thereupon to build up a symmetrical mass layer by layer, and then to subdivide such mass by a series of forward feeding movements whereby said mass is successively reduced to unit masses of boxable size, and whereby each unit mass is finally delivered to and inserted within a carton or box in which the same is packed for distribution.

Another object of the invention is to provide novel means for controlling and retaining the sugar tablets or cubes against displacement or disarrangement during the feeding and subdivision operations whereby the initial mass is reduced to unit masses of boxable size.

Other objects of this invention, not at this time more particularly enumerated, will be clearly understood from the following detailed description of the same.

With the various objects of this invention in view, the same consists, primarily, in the novel carton or box filling machine hereinafter set forth; and, the invention consists, furthermore, in the novel arrangements and combinations of the various devices and parts, as well as in the details of the construction of the same, all of which will be more fully described in the following specification, and then finally embodied in the appended claims.

The invention is clearly illustrated in the accompanying drawings, in which:—

Figure 1 is a plan view of the complete novel carton or box filling machine, made according to and embodying the principles of this invention.

Figure 2 is a longitudinal vertical section of the same, taken on line 2—2 in said Figure 1.

Figure 3 is a detail transverse vertical section, taken on line 3—3 in said Figure 1, said view being drawn on an enlarged scale.

Figure 4 is a detail side elevation of the carton or box filling devices of the machine, viewed in the direction of the arrow x in Figure 1, said view being also drawn on an enlarged scale.

Figure 5 is a detail vertical longitudinal section of said carton or box filling devices of the machine, taken on line 5—5 in said Figure 1 and drawn on an enlarged scale.

Figure 6 is a detail plan view of the receiving end of the machine, illustrating how the trays of sugar from the molding machines are initially arranged preparatory to assembling the sugar tablets or cubes into symmetrical layers, and building up the same layer by layer into the desired initial mass operated upon by the carton or box filling machine.

Figure 7 is a perspective view of a push-bar device, used for transferring the initial mass of sugar tablets or cubes from the assembling table to the receiving runway of the machine.

Similar characters of reference are employed in all of the hereinabove described views, to indicate corresponding parts.

Referring now to said drawings, the reference character 1 indicates a table or bed supported by suitable standards or legs 2. Said table or bed is provided at its rearward or receiving end with a rectangular opening 3, in which is arranged a vertically movable elevator platform 4. Said elevator platform 4 is carried by a movable frame work consisting of vertical columns 5 which are vertically slidable in guides 6 suitably secured to and mounted in connection with transverse tie-bars 7 which are fastened upon certain of said standards or legs 2.

The lower ends of said columns 5 are connected together by a lower cross bar 8. An upper cross bar 9 interconnects said columns 5 at points intermediate the upper and lower ends of the same, said upper cross bar 9 being connected with said columns 5 by suitable coupling devices or T's 10, which when the elevator platform 4 is lowered to registered or alined relation to the plane of said table or bed 1, engage the lower pair of guides 6, thus serving as stops for determining such lowered and alined position of said elevator platform. Fixed to and extending between said lower and upper cross bars 8 and 9 is a vertical toothed rack 11. Secured to and extending between certain of said standards or legs 2 are longitudinally disposed tie-bars 12, upon which are fixed bearings 13 for journaling a transverse shaft 14. Fixed on said shaft 14 is a gear wheel 15 which meshes operatively with said toothed rack 11. Suitably located in connection with certain of said standards or legs 2 is another longitudinally disposed tie-bar 16 upon which are fixed bearing members 17. Journaled in said bearing members 17 is a longitudinal shaft 18, one end of which projects rearwardly beyond the rearward end of the machine. Fixed on said rearwardly projecting end of said shaft 18 is a hand wheel 19 for turning the same. Secured upon said shaft 18 is a worm 20, and secured upon said transverse shaft 14 is a worm gear 21 which meshes with said worm 20. From an inspection of Figure 2, more particularly, it will be seen that by turning said hand wheel 19, the shaft 18 may be rotated to transmit through said worm 20 and worm gear 21 a rotary motion to said shaft 14, whereby the gear wheel 15 is caused to rotate upon said rack 11, to thereby cause an upward or downward movement of said elevator platform 4, as may be desired.

Secured to the rearward or receiving end of the table or bed 1, on each side of the opening 3, are upwardly projecting longitudinal vertical walls or flanges 22, which are held in place by brackets 23, or by any other suitable means. Extending between the forward ends of said walls or flanges 22 is a transverse flange or wall 24 which is spaced above the level of the table or bed 1 so as to provide an open space or passage 25 intermediate the same and said table or bed 1. In like manner there is arranged for extension between the rearward ends of said walls or flanges 22 another transverse flange or wall 26, which is also spaced from the table or bed 1 to provide an intermediate passage or space 27. This latter transverse flange or wall 26 is preferably made of plate glass, so as to be transparent for purposes which will be subsequently more fully described. One side wall or flange 22 and the forward transverse flange or wall 24 are made slightly higher than the upper boundaries of the other side wall 22 and the transverse flange or wall 26, thus providing a right angled stop projection upon the inner sides of which is fixed a right angled clearance strip 28. Said flanges or walls 22, 24 and 26 together form a rectangular assembling frame or box into which, by an upward movement thereof, the elevator platform 4 may be caused to enter.

Fixed upon and extending longitudinally forward upon said table or bed 1 from said assembling frame or box, are a pair of vertical side walls 29, respectively alined with the side walls or flanges 22 of said assembling frame or box. Said side walls 29 with the intermediate table surface provide a runway or feed channel 30, through which the initial mass of assembled sugar tablets or cubes may be caused to move.

Means are provided for propelling the initial mass of assembled sugar tablets or cubes through the runway or feed channel 30. This means comprises a pair of longitudinal guide rails 31, which are elevated above the surface of the table or bed 1 by uprights or posts 32 upon which the same are supported. Said guide rails are provided with channeled ways 33 on their inner sides. Fixed to the inner sides of said guide rails so as to overlap the ways 33 are upper and lower track-plates 34. A carriage is provided for longitudinal movement in connection with said guide rails. This carriage comprises side plates 35 interconnected at their upper marginal portions by cross-bars 36. Said carriage is provided at each end with a pair of grooved traction wheels 37 which ride on said track-plates 34, whereby the carriage may be moved back and forth above said runway or feed channel 30. Supported by said carriage, so that its lower end extends transversely across said runway or feed channel 30, is a push-plate 38. Said push-plate 38 is mounted between the side plates 35 of said carriage, at the rearward end of the latter, and is arranged for vertical lifting movement between guide studs 39 fixed to said side plates 35. The means for raising and lowering said push-plate 38 comprises a pair of vertical toothed racks 40 fixed to the forward face of the same at its upper end. Supported upon and straddling said cross-bars 36, intermediate the ends of the same, are a pair of bearing members 41, in which is journaled a transverse shaft 42. Fixed upon said transverse shaft 42, in positions corresponding to the positions or spacing of said racks 40 of the push-plate 38, and so as to operatively mesh with said racks 40, are a pair of gears 43. One end of said shaft 42 is provided with a handle lever 44, by which the shaft may be turned, to cause said gears 43 to rotate against the racks 40 whereby the push-plate

38 may be moved vertically upward to withdraw its lower or operative end out of the runway or feed channel 30 when desired, and for a purpose presently to be more fully described. The means for causing the back and forth travel of the carriage, and the push-plate 38 carried thereby, comprises a pair of longitudinally extending stationary toothed racks 45 fixed to said table or bed 1 exteriorly of said runway or feed channel 30. Fixed to and projecting outwardly from said side plates 35 of the carriage are bearings or hubs 46 for journaling in connecting with said carriage a transverse shaft 47. Fixed on said transverse shaft 47, in positions corresponding to and so as to mesh with said racks 45 are gear wheels 48. One end of said transverse shaft 47 projects beyond a side edge of said table or bed 1, and fixed upon such end of said shaft is a hand wheel 48′ for turning the same. It will be apparent that when turned in one direction or the other, the shaft 47 will rotate the gear wheels 48 so that the same will travel on the racks 45, thus causing the carriage and its push-plate 38 to move longitudinally on the guide rails 31, according to the direction of rotation thus imparted to the shaft.

At the discharge end of said runway or feed channel 30, the table or bed 1 is provided with a transverse extension 49. Extending outwardly and at a right angle from one side of the discharge end of said runway or feed channel 30, and upon said extension 49 of the table or bed 1, are a pair of spaced transversely disposed vertical side walls 50, which form with the intermediate surface of said extension 49 a transverse runway or feed channel 51 of reduced width. Means are provided for propelling a detached mass or subdivision of the initial mass of assembled sugar tablets or cubes through this said transverse runway or feed channel 51. This means comprises a pair of transverse guide rails 52, which are elevated above the surface of the table or bed extension 49 by uprights or posts 53 upon which the same are supported. Said transverse guide rails are provided with channeled ways 54 on their inner sides. Fixed to the inner sides of said guide rails, so as to overlap the ways 54, are upper and lower track-plates 55. A carriage is provided for transverse movement in connection with said guide rails 52. This carriage comprises a top plate 56 having cross-bars 57 fixed to its under side. Fixed to the opposite ends of the outer cross bars 57 are grooved traction wheels 58 which ride on said track-plates 55, whereby the carriage may be moved transversely back and forth across the end of said main runway or feed channel 30, and thence over said transverse runway or feed channel 51. Connected with the cross bars 57 at the forward end of said carriage is a depending bracket member 59 to the lower end of which is fixed a push-plate 60, of proper width for entrance into and movement through said transverse runway or feed channel 51. The means for causing the travel of the transversely movable carriage, thus provided, in either direction, comprises a pair of tooth racks 61 extending longitudinally of said carriage in proper spaced apart relation, and fixed to the upper surface of said top-plate 56. Secured in a suitable location upon said guide rails 52, in opposed position, are a pair of fixed bearing members 62. Journaled in said bearing members 62 is a shaft 63. Fixed on said shaft 63, in positions corresponding to the positions or spacing of said racks 61, and so as to operatively mesh with the latter, are a pair of gear wheels 64. Fixed on one end of said shaft 63 is a hand-wheel 65, by means of which the shaft 63 and its gear wheels 64 may be rotated. It will be apparent that rotation of said gear wheels 64 in one direction or the other will transmit through the racks 61 propelling movement to said transversely movable carriage and its push-plate 60 in a corresponding direction.

Arranged opposite the discharge end of said main runway or feed channel 30 is a transversely disposed yieldable gate member 66, which at proper times closes the said discharge end of the runway or feed channel 30. Said gate member 66 is arranged to readily yield or give way to the pressure of the initial mass of assembled sugar tablets or cubes, when the latter is forced forwardly to move out of the discharge end of said runway or feed channel 30. To this end there are mounted on the forward end of the table or bed 1 a pair of longitudinal guide rails 67 provided in their inner faces with channeled ways 68. Fixed to the inner sides of said guide rails 67, so as to overlap the ways 68, are upper and lower track plates 69. Connected with the outer side or face of said gate member 66 are a pair of forwardly projecting longitudinal carriage bars 70, upon the outer sides of which are mounted pairs of grooved traction wheels 71 which ride on said track-plates 69. Secured upon said table or bed 1 is a post 72 provided with a seating boss 73 against which is seated and braced one end of a compression or push spring 74. Suitably secured to said gate member 66 is a seating boss 75 with which the opposite end of said push spring 74 is operatively engaged. When yielding to the pressure of the initial mass of sugar tablets or cubes, as the latter is propelled forwardly to pass out of the discharge end of said runway or feed channel 30, the gate member 66 is finally brought to rest against stops 75′ fixed on said table or bed 1, and when thus stopped, the said gate member 66 alines it-

self with the outermost wall 50 of the transverse runway or feed channel 51, thereby prolonging the latter across the discharge end of the main runway or feed channel 30.

At the forward end of the extension 49 of the table or bed 1 is an off-set longitudinal table extension 76 which crosses the discharge end of the transverse runway or feed channel 51. Mounted on this longitudinal table extension 76 are a pair of parallel side walls 77 providing a runway or delivery channel 78 open at its respective free ends, and projecting outwardly from each side of said transverse runway or feed channel 51 with which it communicates. Associated with the respective open discharge ends of said runway or delivery channel 78 are outwardly projecting box engaging lips 79 preferably made of sheet metal. Means are provided for alternately propelling toward the respective discharge ends of the runway or delivery channel 78 a mass of assembled sugar tablets or cubes detached from the mass of the latter as the same is fed into said runway or delivery channel 78 from the transverse runway or feed channel 51. The mass so detached forming a unit mass of proper boxable size, i. e., of proper dimensions to readily enter the box or carton to be filled. The propelling means thus cooperating with the runway or delivery channel 78, comprises a pair of longitudinal guide rails 80, which are elevated above the surface of the table extension 76 by uprights or posts 81 upon which the same are supported. Said longitudinal guide rails 80 are provided with channeled ways 82 on their inner sides. Fixed to the inner sides of said guide rails 80, so as to overlap the ways 82, are upper and lower track plates 83. A carriage 84 is provided for reciprocating longitudinal movement in connection with said guide rails 80. This carriage comprises a suitable pair of cross bars 85 having at their respective ends grooved traction wheels 86 which ride on said track plates 83. Secured to and depending from the underside of said cross-bars 85 is a frame-work 87, having downward extensions 88 which project into said runway or delivery channel 78, and upon the forward and rear sides of which are fixed the forward impelling push-plate 89 and the rearward impelling push-plate 90. Said push-plates 89 and 90 are properly sized to extend across said runway or delivery channel 78. Extending transversely between said guide rails 80, in proper locations, are stop-bars 91, which respectively limit the outward movement of the carriage 84 in each direction. The means for imparting movement to the carriage 84 comprises a pair of longitudinal toothed racks 92 suitably fixed to and elevated above the table, so that the inner rack crosses above the discharge end of the transverse runway or feed channel 51. Said carriage frame-work 87 is provided with side plates 93, to which are secured outwardly projecting bearings or hubs 94 for journaling a transverse shaft 95. Fixed on said shaft 95, in positions respectively corresponding to the positions of the racks 92, are gear wheels 96 which mesh with said racks 92. Fixed on the outer end of said shaft 95 is a hand-wheel 97 for rotating the shaft to in turn cause the gears 96 to roll on the racks whereby movement in a desired direction may be imparted to the carriage 84.

Interconnected between the laterally opposite ends of the guide rails 80 are transverse end plates 98, to which are respectively secured centrally disposed hanger members 99 for supporting a stationary trip-bar 100 in longitudinal central extension above said runway or delivery channel 78. Connected with the frame-work 87 of the carriage 84 are forwardly projecting arms 101 and rearwardly projecting arms 102. Secured to the forwardly projecting arms 101 is a pivot plate 103 to the outer free end of which is pivotally connected or suspended a trip-plate 104. Said trip-plate 104 has an upward extension 105 normally held against stop-pieces 106 fixed to said arms 101 by a pull spring 107. The lower end of said trip-plate 104 is provided, above said trip-bar 100, with bearing lugs 108 for journaling a roller 109 which rides upon the upper edge of said trip-bar 100. Pivotally connected with the lower end of said trip-plate 104, below said trip-bar 100, is a guard plate 110. Connected with said guard-plate is an upwardly projecting centrally disposed arm 111 which swings through the space intermediate the bifurcations of said trip-plate 104, and journaled on the upper free end of said arm is a roller 112 which rides upon the lower edge of said trip-bar 100. Said trip bar 100 is provided at its upper edge with a notch 113 in which said roller 109 rests when the carriage is moved to its rearward limit. The under side or edge of said trip-bar 100 is provided with a cutaway portion or seat 114 from the bottom of which extends outwardly an inclined way 115. When the carriage 84 occupies its rearward limit of movement, the roller 112 is lodged in said cutaway portion or seat 114, thus permitting the guard plate 110 to swing downward into vertical position, in which position it extends into said runway or delivery channel 78 being stopped against inward swinging by a stop member 116 secured to said trip-bar 100. When the carriage 84 is moved to its rearward limit, the forward impelling push-plate 89 is substantially alined with one side wall of the transverse runway or feed channel 51, while the depending guard-plate

110 is substantially alined with the opposite side wall of said runway or feed channel 51. Consequently as a mass of assembled sugar tablets or cubes is fed out of the discharge end of said runway or feed channel 51 into said runway or delivery channel 78 it passes between said push-plate 89 and said guard-plate 110, the guard-plate serving to hold the tablets or cubes from tumbling out of place, both during the movement of the mass into the runway or delivery channel, as well as when the forward delivery movement of the same through the latter is initiated. When it is desired to move the sugar forward through and discharge the same from the runway or delivery channel 78, it follows that the guard-plate 110 must be displaced to permit such movement. Such result is automatically accomplished by the forward movement of the carriage. The forward movement of the carriage causes the push-plate 89 to press against the mass of assembled sugar tablets or cubes extending across the runway or delivery channel 78, thereby initiating a forward outward movement of the same. At the same time, the forward movement of the carriage carries the trip-plate 104 outward also, but since the roller 109 meets with an initial resistance by reason of its engagement in the notch 113, the lower end of the trip-plate 104 is retarded long enough to permit the push-plate to move firmly against the sugar and start it forward, whereupon the roller 109 rides out of the notch 113, and at the same time the roller 112 strikes the inclined way 115, whereby it is pressed inwardly and downwardly to thereby swing upwardly and outwardly the guard-plate 110 to horizontal position so that the mass of sugar now under movement may pass beneath the same through the forward discharge mouth of the runway or delivery channel 78. As will be apparent from an inspection of Figures 4 and 5, more particularly, it will be seen that the automatic guard plate mechanism above described is duplicated at the rearward end of the carriage 84, the same being supported by the rearwardly projecting arms 102 above mentioned. For the purposes of identification of the detail structure of said rearward guard plate mechanism, the same reference numerals are applied thereto as to the forward guard plate mechanism. In operation the rearward guard plate mechanism functions as above described, when the carriage 84 is moved from its forward limit toward its rearward limit.

Having thus described in detail the various devices and parts making up my novel construction of carton or box filling machine, I will now briefly describe the operation of the same, when employed to assemble a mass of tablet or cube sugar, reduce said mass to boxable units, and then insert said boxable units into cartons or boxes prepared to receive the same.

The sugar tablets 117, or cubes as the case may be, are deposited from the molding machine upon trays 118 (see Figure 6), so that the tray carries a layer of sugar tablets each spaced or segregated from its fellows. After the tablets are dried, the trays are ready for removal to the packing machine. The first operation, is to raise the elevator platform 4 adjacent to the clearance strip 28 so that one side and end of the platform is bounded thereby and by the right angled stop projection formed by the upwardly projecting portions of one side wall 22 and the transverse flange or wall 26. The tray 118 is now placed upon the platform 4 in stopped relation as shown in Figure 6. The operator now makes use of a hand square 119, or even a straight edge, and slides the tablets 117 together both longitudinally and laterally against said clearance strip 28 to form a compact layer thereof, and then holding the tablets against movement by means of said hand square 119, slips the tray from beneath the tablets, leaving the compact layer thereof resting upon the elevator platform 4. The elevator platform 4 is now manipulated, by means of the operating mechanism therefor, to slightly lower the same to carry the layer of tablets thereon downward into the assembling frame, for a distance equal the thickness of the layer, and preferably somewhat more in the case of the first layer. The operator is aided in gaging the desired downward movement of the platform 4 by reason of the transparency of the flange or wall 26, whereby the operator is readily enabled to see just how far down the layer of sugar tablets has descended into the assembling frame. The operator now places a second tray of sugar on the first layer deposited upon the platform, and after compacting the tablets as above described, withdraws said tray, leaving a second layer of tablets imposed upon the first layer. The assembling frame, since it bounds the first layer of tablets, prevents any displacement of the same, when the second tray is withdraw. The platform is again lowered to withdraw said second layer of tablets into the embrace of the assembling frame, whereupon the operations are again repeated until a symmetrical mass of sugar tablets comprised of the desired number of layers of tablets is built up on the platform 1. The thickness of the clearance strip 28, against which the layers are formed, provides for such spacing of the mass of sugar built up, that as the same is withdrawn downwardly into the assembling frame it readily clears the sides of the latter without undue friction tending to disarrange the assembled mass. When the initial mass of tablets, as 120, is thus com-

pleted, the platform 4 is lowered to the plane of the table or bed 1, whereupon the assembled initial mass of tablets is transferred from the platform into the receiving end of the runway or channel 30. This latter operation is accomplished by means of push-bar 121 such as shown in Figure 7. The operator places this push-bar against the outer end of the initial mass 120 by passing the same through the space 27 beneath the flange or wall 26, and by then pressing forwardly with the same, slides the mass 120 through the space 25 beneath the flange, or wall 24 and thence into the runway or feed channel 30.

After the initial mass 120 is deposited in the runway or feed channel 30, the carriage upon which the push-plate 38 is mounted is moved rearwardly. Before starting this carriage rearward the handle lever 44 is operated to transmit a lifting movement to said push-plate 38, whereby the same is raised out of said runway or feed channel 30 and held in such raised position while the carriage travels rearward, thus causing the push-plate to pass over the mass 120 of sugar tablets, after which the push-plate 38 is lowered to position the same behind the rearward end of said mass 120. When the push-plate 38 is thus lowered into the runway or feed channel 30 behind the mass 120, the carriage is caused to move forward, whereby the push-plate engages the mass 120 and propels or slides the same forwardly through the runway or feed channel 30. This forward feeding movement of the mass 120 carries the forward end of the same outwardly through the discharge end of the runway or feed channel, pushing outward the yieldable gate member 66, so that a portion of the mass 120 is alined with the receiving end of the transverse runway or feed channel 51. The transverse runway or feed channel 51 is of a width approximating the depth of the cartons or boxes proposed to be filled, so that the width of the mass 120′ which is to be removed from the initial mass 120 will correspond substantially to the depth of the box or carton in which a portion thereof is to be ultimately delivered. The carriage supporting the push-plate 60, having been retracted before projection of the forward end of the mass 120 into alinement with transverse runway or feed channel 51, is now ready to be moved forward. The operator thereupon causes the forward movement of said carriage which forces the push-plate 60 forward into engagement with the mass 120′, thereby propelling or sliding the same forward so as to detach the same from the initial mass 120, and thereupon push the same into the transverse runway or channel 51. The forward end of the reduced mass 120′ is, by forward movement thus imparted thereto, projected out of the transverse runway or feed channel 51, into the runway or delivery channel 78 in front of the forward push-plate 89 of the carriage 84, as shown in Figures 1 and 5 more particularly. The runway or delivery channel is of a width approximating the length of the cartons or boxes proposed to be filled, so that the width of mass 120″ of assembled sugar tablets projected into said runway or delivery channel and adapted to be removed from the mass 120′ will readily move into the box or carton when impelled forward. The height of the mass corresponds to the width of the box or carton to be filled, so it will be apparent that the various feeding operations when successively continued will reduce the initial mass of assembled sugar tablets to boxable units.

Two operators may be employed to handle the boxes or cartons, and to operate the carriage 84 to move the boxable units of assembled sugar tablets into said boxes or cartons. One operator functions at the forward end of said runway or delivery channel 78 and one at the rearward end of the same. As indicated in Figure 5 a box 122 is telescoped over the lips 79 so as to register the open end of the same with one discharge end of the runway or delivery channel, whereupon the operator holds the box in place with one hand and manipulates the hand wheel 97 of the carriage 84 with the other, so as to propel a boxable unit 120″ into the box. In the meantime, the initial mass 120 and the mass 120′ are kept moving up step by step as required, so that by the time one box is filled, a succeeding boxable unit 120″ is moved into the runway or delivery channel on the opposite side of the carriage 84 and its push-plates, ready for the opposite operator to reverse the movement of the carriage 84 to feed the boxable unit into the box or carton positioned at the opposite end of the runway or delivery channel 78. The above described operations may be repeated indefinitely as long as a supply of sugar is maintained.

The operation of the guard-plates 110 has already been described, so further reference thereto will be unnecessary.

It will be understood that by the time a mass 120′ is entirely entered in the transverse runway or feed channel 51, and before the push-plate 60 is carried past the gate member 66, the carriage supporting said push-plate 60 is retracted to initial position, so that the spring 74 pressing upon the gate member 66 will move the same against the end of the mass 120 until the latter is again pushed forward to deliver a succeeding mass 120′ in behind the first delivered mass 120′, whereby a train of material is maintained in step by step movement through said runway or feed channel 51. In like manner as soon as a succeeding initial mass 120 of as-

sembled sugar tablets is prepared and delivered into the runway or feed channel 30, the carriage supporting the push-plate 38 is manipulated to propel the succeeding assembled mass 120 behind the preceding mass first delivered, so that a train of material is maintained in step by step movement through said runway or feed channel 30 as required.

From the above description it will be plain that the mechanism is of a very simple character, and yet well adapted to assemble into an initial mass the material operated upon, and then divide said mass by successive reductions into boxable units, which are thereupon delivered into the boxes or cartons made ready for their reception. The machine will enable a large quantity of material to be efficiently handled with dispatch, and with comparatively small labor expense.

I am aware that some changes may be made in the various arrangements and combinations of the various devices and parts of the present invention, as well as in the details of the construction thereof, without departing from the scope of the same as set forth in the foregoing specification, and as defined in the following claims. Hence, I do not limit my invention to the exact arrangements and combinations of parts as described in the foregoing specification, nor do I confine myself to the exact details of construction of the various parts as illustrated in the accompanying drawings.

I claim:—

1. In a machine of the kind described, a table, a vertically movable platform at the receiving end of said table, an assembling frame with which said platform cooperates, a main longitudinal feed channel formed on said table, means for feeding assembled material through said feed channel, a transverse feed channel of diminished size forming a junction with the discharge end of said main feed channel, means for detaching and feeding a portion of the assembled material through said transverse feed channel, a delivery channel crossing the discharge end of said transverse feed channel, means for detaching and moving through said delivery channel a portion of the assembled material discharged from said transverse feed channel, and means for operatively engaging a receptacle with the discharge end of said delivery channel to receive the portion of material discharged from the latter.

2. In a machine of the kind described, a table, a vertically movable platform at the receiving end of said table, an assembling frame with which said platform cooperates, and means mounted on said table to receive the initial mass of assembled material from said platform for propulsion therethrough whereby said initial mass is subdivided to reduce the same to successively formed boxable units, and means for delivering said boxable units into boxes.

3. In a machine of the kind described, a table, a vertically movable platform at the receiving end of said table, an assembling frame with which said platform cooperates, a main longitudinal feed channel formed on said table, guide rails above and paralleling said main feed channel, a carriage movable on said guide rails, a push-plate supported by said carriage for travel in said main feed channel, means for raising said push-plate out of said feed channel during the retractive movement of said carriage, means for propelling said carriage, a transverse feed channel of diminished size forming a junction with the discharge end of said main feed channel, transverse guide rails above and paralleling said transverse feed channel, a second carriage movable on said transverse guide rails, a push-plate supported by said second carriage for travel in said transverse feed channel, means for propelling said second carriage, a delivery channel crossing the discharge end of said transverse feed channel, a third set of guide rails above and paralleling said delivery channel, a third carriage movable on said last mentioned guide rails, a push-plate supported by said third carriage for travel in said delivery channel, means for propelling said third carriage, and means for operatively engaging a receptacle with the discharge end of said delivery channel to receive material discharged from the latter.

4. In a machine of the kind described, a table, a vertically movable platform at the receiving end of said table, an assembling frame with which said platform cooperates, a main longitudinal feed channel formed on said table, guide rails above and paralleling said main feed channel, a carriage movable on said guide rails, a push-plate supported by said carriage for travel in said main feed channel, means for raising said push-plate out of said feed channel during the retractive movement of said carriage, means for propelling said carriage, a transverse feed channel of diminished size forming a junction with the discharge end of said main feed channel, transverse guide rails above and paralleling said transverse feed channel, a second carriage movable on said transverse guide rails, a push-plate supported by said second carriage for travel in said transverse feed channel, means for propelling said second carriage, a yieldable gate member movable to close the discharge end of said main feed channel, stops on said table for limiting the opening movement of said gate member and alining the same with the outer side of said transverse feed channel, a delivery channel crossing the discharge end of said transverse feed chan-

nel, a third set of guide rails above and paralleling said delivery channel, a third carriage movable on said last mentioned guide rails, a push-plate supported by said third carriage for travel in said delivery channel, means for propelling said third carriage, and means for operatively engaging a receptacle with the discharge end of said delivery channel to receive material discharged from the latter.

5. In a machine of the kind described, a table, a vertically movable platform at the receiving end of said table, an assembling frame with which said platform cooperates, a main longitudinal feed channel formed on said table, guide rails above and paralleling said main feed channel, a carriage movable on said guide rails, a push-plate supported by said carriage for travel in said main feed channel, means for raising said push-plate out of said feed channel during the retractive movement of said carriage, means for propelling said carriage, a transverse feed channel of diminished size forming a junction with the discharge end of said main feed channel, transverse guide rails above and paralleling said transverse feed channel, a second carriage movable on said transverse guide rails, a push-plate supported by said second carriage for travel in said transverse feed channel, means for propelling said second carriage, a yieldable gate member movable to close the discharge end of said main feed channel, stops on said table for limiting the opening movement of said gate member and alining the same with the outer side of said transverse feed channel, a delivery channel crossing the discharge end of said transverse feed channel, a third set of guide rails above and paralleling said delivery channel, a third carriage movable on said last mentioned guide rails, a push-plate supported by said third carriage for travel in said delivery channel, means for propelling said third carriage, a movable guard plate carried by said carriage and off-set from the push-plate thereof to provide an intermediate space for the reception of material from said transverse feed channel, means for automatically removing said guard plate from the path of the material as the latter is propelled onward through said delivery channel by said third carriage and its push-plate, and means for operatively engaging a receptacle with the discharge end of said delivery channel to receive material discharged from the latter.

6. In a machine of the kind described, the combination with a table provided with an opening, of an elevator platform registerable in said opening, an assembling frame supported upon said table above said opening, means for raising and lowering said elevator platform into and out of said assembling frame, stop means associated with said platform raising and lowering means for limiting the upward movement of said elevator platform into said assembling frame, and a right angled upward projection connected with said assembling frame to bound one side and end of said elevator platform when in raised position.

7. In a machine of the kind described, the combination with a table provided with an opening, of an elevator platform, registerable in said opening, an assembling frame supported upon said table above said opening, means for raising and lowering said elevator platform into and out of said assembling frame, stop means associated with said platform raising and lowering means for limiting the upward movement of said elevator platform into said assembling frame, and a right angled upward projection connected with said assembling frame to bound one side and end of said elevator platform when in raised position, one side of said assembling frame being made of transparent material through which material deposited upon said elevator platform is visible when lowered by downward movement of the latter into the embrace of said assembling frame.

8. In a machine of the kind described, the combination with a table of a supporting frame-work therefor, said table having an opening therein, an assembling frame supported upon said table above said opening, an elevator platform registerable with said opening, guides connected with said frame-work, means for supporting said platform slidable in said guides, a rack connected with said supporting means, a shaft having a gear mounted thereon to mesh with said rack, transmission means for rotating said shaft and gear whereby said platform may be raised and lowered into and out of said assembling frame, stop means on said platform supporting means cooperating with the upper guides thereof for limiting the upward movement of said platform into said assembling frame, and a right angled upward projection connected with said assembling frame to bound one side and end of said platform when in raised position.

9. In a machine of the kind described, the combination with a table of a supporting frame-work therefor, said table having an opening therein, an assembling frame supported upon said table above said opening, an elevator platform registerable with said opening, guides connected with said frame-work, means for supporting said platform slidable in said guides, a rack connected with said supporting means, a shaft having a gear mounted thereon to mesh with said rack, transmission means for rotating said shaft and gear whereby said platform may be raised and lowered into and out of said

assembling frame, stop means on said platform supporting means cooperating with the upper guides thereof for limiting the upward movement of said platform into said assembling frame, and a right angled upward projection connected with said assembling frame to bound one side and end of said platform when in raised position, one side of said assembling frame being made of transparent material through which material deposited upon said elevator platform is visible when lowered by downward movement of the latter into the embrace of said assembling frame.

10. In a machine of the kind described, means providing a longitudinal runway, a transverse runway of reduced width adjoining the discharge end of said longitudinal runway, a yieldable gate member movable to close the discharge end of said longitudinal runway, and stops for limiting the opening movement of said gate member and alining the same with the outer side of said transverse runway.

11. In a machine of the kind described, means providing a longitudinal runway, a transverse runway of reduced width adjoining the discharge end of said longitudinal runway, a yieldable gate member movable to close the discharge end of said longitudinal runway, bracket arms for supporting said gate-member, rollers on said bracket arms, track rails on which said rollers ride, spring means for normally forcing said gate-member to closed position, and stops for limiting the opening movement of said gate member and alining the same with the outer side of said transverse runway.

12. In a machine of the kind described, the combination with a delivery runway, of means for feeding material thereto, a movable propelling means for discharging material from said delivery runway, said movable propelling means having a guard plate means off-set therefrom whereby the material to be discharged is delivered with said delivery runway intermediate said propelling means and said guard-plate, means for pivotally supporting said guard-plate, and a trip mechanism cooperating with said guard-plate upon operative movement of said propelling means to turn said guard plate out of the path of the material as the latter is propelled toward the discharge mouth of said delivery runway.

In testimony, that I claim the invention set forth above I have hereunto set my hand this 20th day of July, 1921.

REINIER P. DE VRIES.

Witnesses:

GEORGE R. WIGHT,

R. S. KENT.