Apr. 3, 1923. 1,450,423.

C. C. REESE ET AL.

SUGAR FEEDING MACHINE.

FILED OCT. 27, 1920. 4 SHEETS—SHEET 1.

Fig. 1.

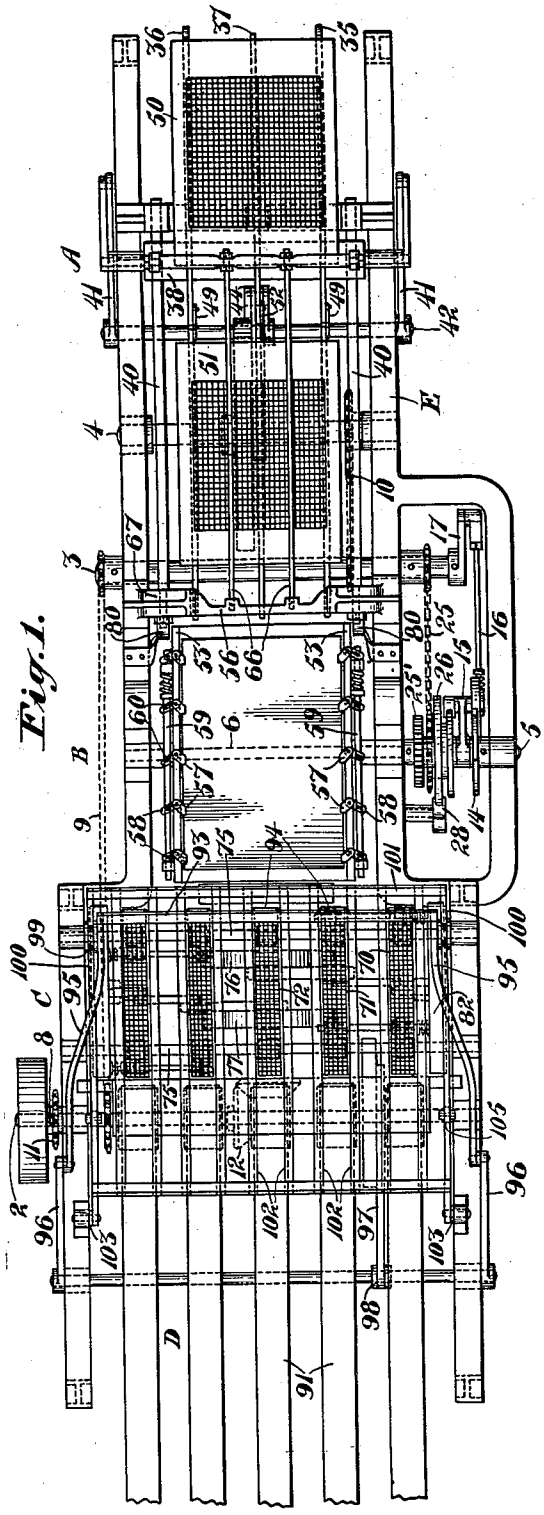
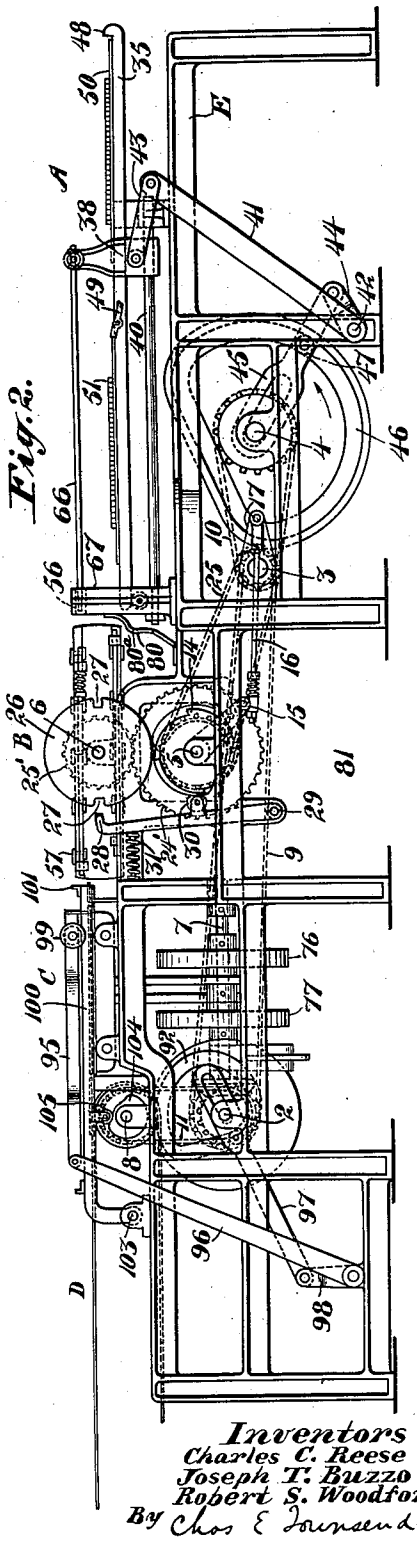


Fig. 2.



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Fig. 3.

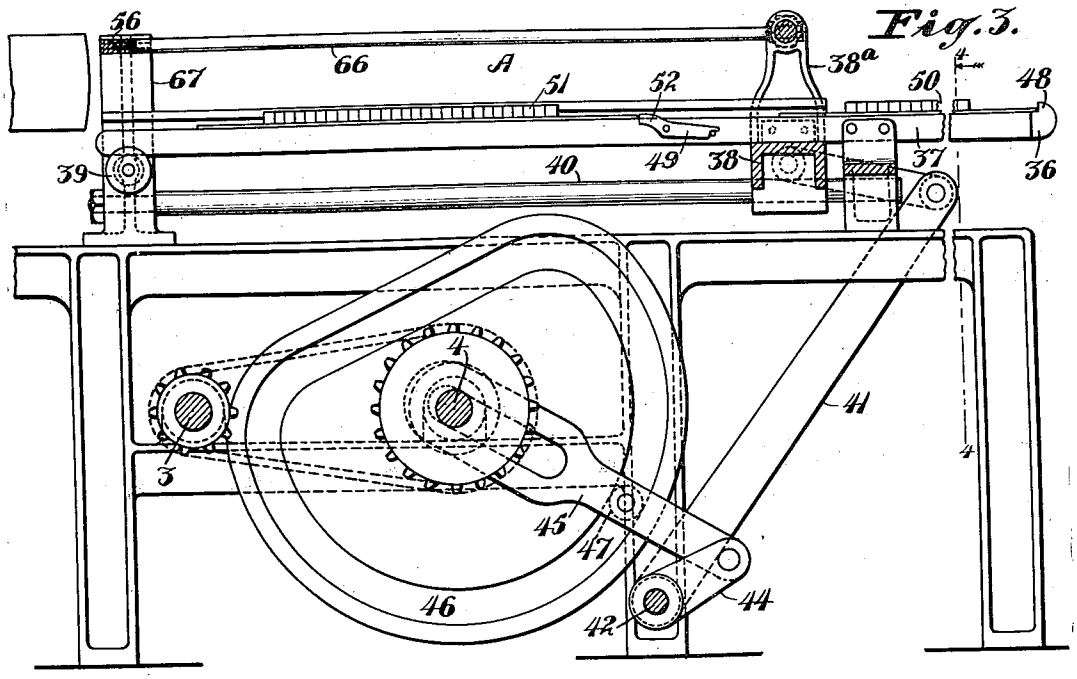
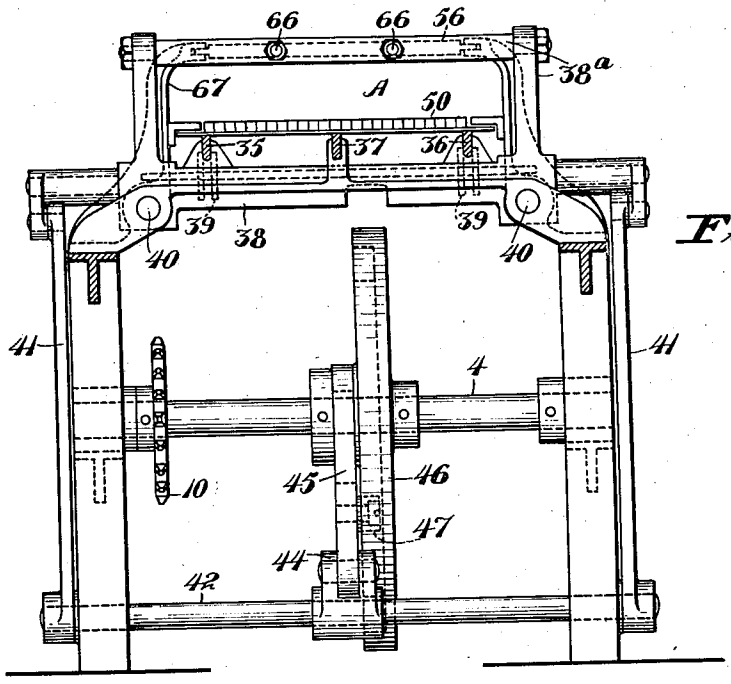


Fig. 4.



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SUGAR FEEDING MACHINE.

FILED OCT. 27, 1920. 4 SHEETS—SHEET 3.

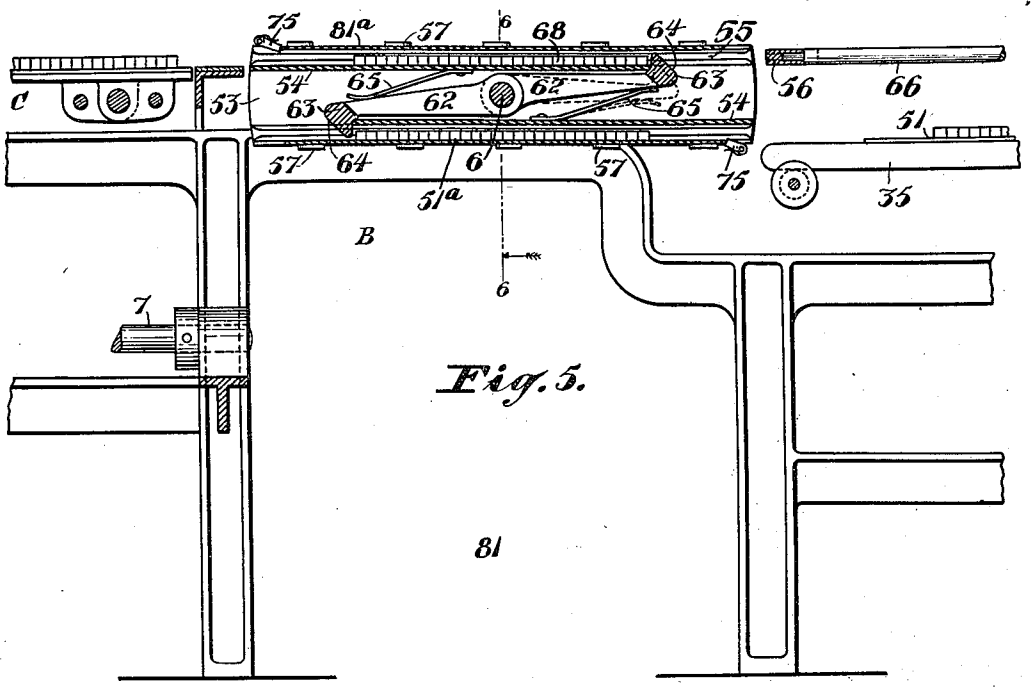


Fig. 5.

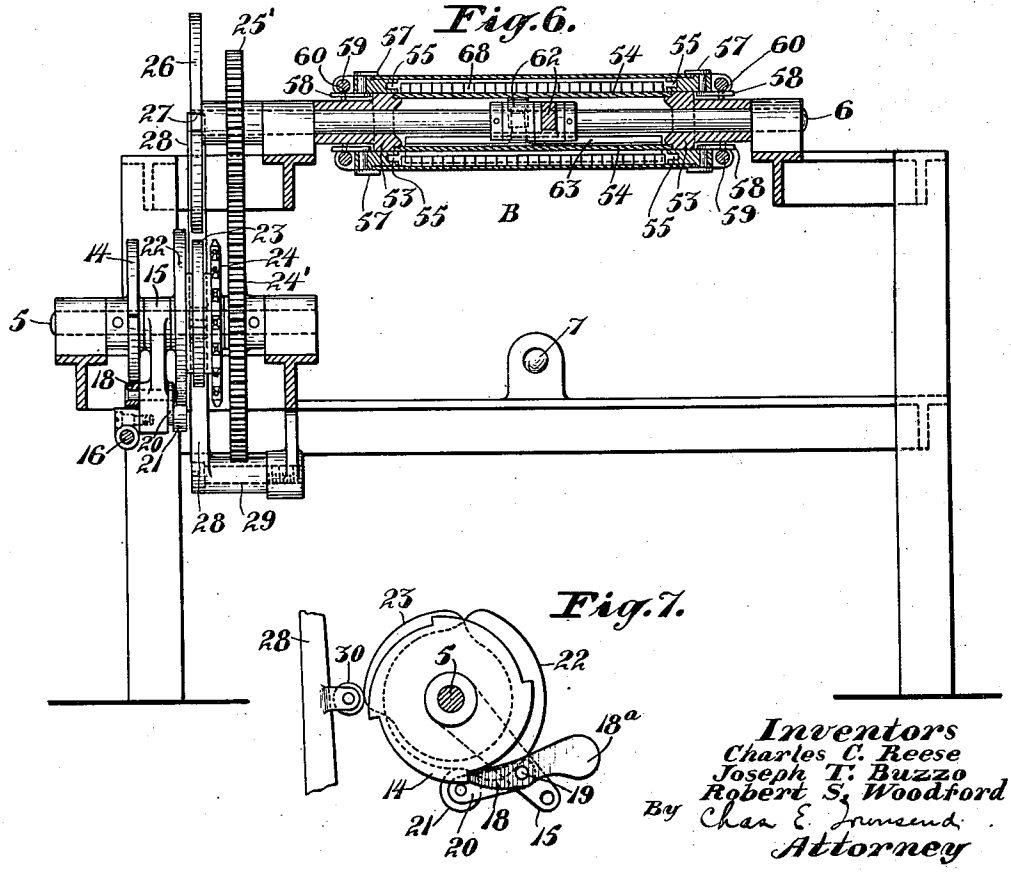


Fig. 6.

Fig. 7.

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FILED OCT. 27, 1920. 4 SHEETS—SHEET 4.

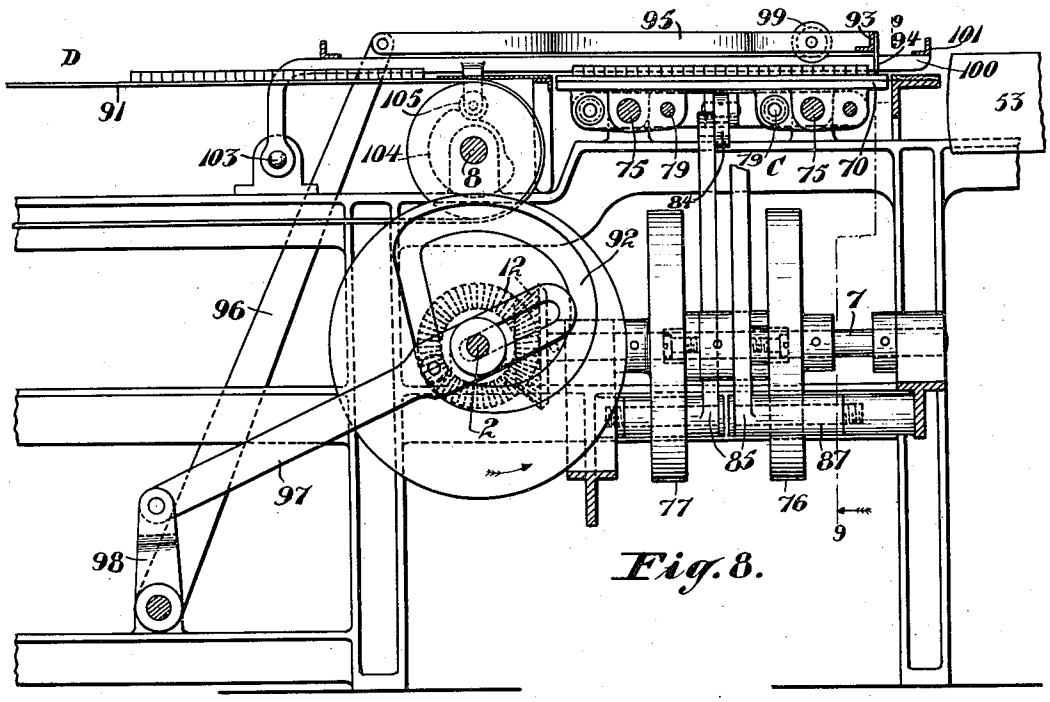


Fig. 8.

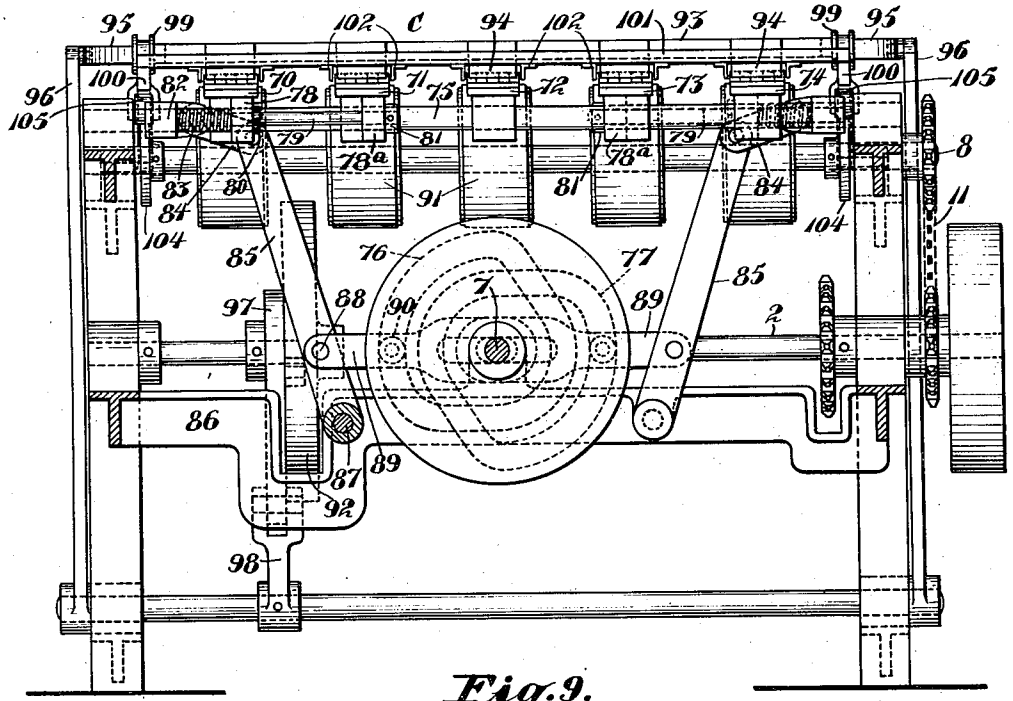


Fig. 9.

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Patented Apr. 3, 1923. 1,450,423

UNITED STATES PATENT OFFICE.

CHARLES C. REESE, OF SAN FRANCISCO, JOSEPH T. BUZZO, OF OAKLAND, AND ROBERT S. WOODFORD, OF CROCKETT, CALIFORNIA.

SUGAR-FEEDING MACHINE.

Application filed October 27, 1920. Serial No. 419,915.

To all whom it may concern:

Be it known that we, CHARLES C. REESE, of the city and county of San Francisco, State of California; JOSEPH T. BUZZO, of Oakland, Alameda County, State of California; and ROBERT S. WOODFORD, of Crockett, Contra Costa County, State of California, citizens of the United States, have invented a new and useful Improvement in Sugar-Feeding Machines, of which the following is a specification.

This invention relates to a sugar feeding and inspecting machine, and especially to a machine whereby sugar may be delivered to a series of feeding belts and a connected packing machine.

In the manufacture of cube sugar it is generally found that a certain percentage of the cubes are slightly broken or damaged during the several operations required, for instance when molding, drying, etc., such damage is more or less unimportant when the sugar is packed in barrels or like containers, but is decidedly objectionable where a high grade product is required and particularly when the cubes are assembled and packed in cartons.

One of the objects of the present invention is to provide a comparatively simple and efficient machine for use in conjunction with a cube sugar packing machine such as described in our copending application entitled, Sugar packing machine, filed September 7, 1920, Serial No. 408,489.

The machine forming the subject matter of the present invention is especially adapted to receive and deliver the sugar to the packing machine and simultaneously permits thorough inspection of the sugar and removal of damaged or broken cubes before delivery to the packing machine.

Another object of the invention is to provide a machine of the character described which is provided with means for turning the cube sugar, thus permitting inspection of all sides before delivery to the packing machine.

Another object of the invention is to provide means for arranging the cube sugar in such a manner that separated sections containing a single layer, and each layer a predetermined number of rows of cubes is formed, and in conjunction therewith to provide a plurality of conveyor belts one for each section of sugar and means for delivering the sugar to the respective belts.

Another object of the invention is to provide a machine of the character described which is automatic in operation throughout, and which does not require manual labor except for delivery of the sugar, inspection thereof and removal of broken cubes.

Further objects will hereinafter appear.

The invention consists of the parts and the construction, combination and arrangement of parts as hereinafter more fully described and claimed, having reference to the accompanying drawings, in which—

Fig. 1 is a plan view of the machine.

Fig. 2 is a side elevation of the same.

Fig. 3 is an enlarged detail view of the sugar receiving mechanism.

Fig. 4 is a vertical cross section taken on line 4—4, Fig. 3.

Fig. 5 is an enlarged longitudinal detail section of the sugar turning mechanism.

Fig. 6 is a central vertical cross section taken on line 6—6, Fig. 5.

Fig. 7 is a detail view of a part of the intermittent driving mechanism.

Fig. 8 is an enlarged detail side elevation of the sugar separating and discharging mechanism.

Fig. 9 is a cross section on line 9—9, Fig. 8.

The machine briefly described consists of four units, to-wit, a receiving unit, a turning unit, a separating unit and a discharging or feeding unit; the respective units being generally indicated at A, B, C and D. The several units are mounted in a common frame indicated at E and operate so to speak independent of each other and in successive order. The several units are driven from a common drive shaft 2 and are intemittent in operation. There are seven shafts employed, a main driving shaft 2, an intermediate driving shaft 3, and five driven shafts as indicated at 4, 5, 6, 7 and 8. The shafts 2, 3, 4, 7 and 8, are continuosly rotated or driven, while the shafts 5 and 6 are intermittently rotated. The intermediate drive shaft 3 is driven from the main shaft 2 through means of a sprocket chain drive as shown at 9. Shaft 4 is driven from the intermediate shaft through a sprocket chain drive 10. Shaft 8 is driven directly from the main drive shaft 2 by a sprocket chain drive 11

and the shaft 7 is also driven from the main drive shaft, but in this instance through a train of bevel gears as at 12. The shaft 5 is driven from the intermediate drive shaft 3. Shaft 3 rotates continuously as it is driven from the main drive shaft 2, but shaft 5 is only intermittently rotated and this is accomplished in the following manner:

Referring to Figs. 6 and 7, 14 indicates a ratchet gear which is secured on shaft 5. Turnably mounted on shaft 5 and disposed on one side of the ratchet gear 14 is a crank arm 15 to which an oscillating movement is transmitted through a link 16 and a crank arm 17. The crank arm is secured on the shaft 3 and rotates in unison therewith and therefore transmits one oscillation to the crank arm 15 once during each revolution of the shaft 3. Pivotally mounted on the crank arm 15 is a pawl 18. The pawl is secured on one end of a pin 19, on the opposite end of which is secured a trip lever 20. A roller 21 is journalled in the trip lever and is so positioned as to engage a cam 22. The cam 22, together with a cam 23 and a sprocket gear 24 are turnably mounted on the shaft 5 and are secured with relation to each other so that they will all rotate in unison. The sprocket gear 24 is driven from the intermediate drive shaft 3 by means of a sprocket chain 25. It can therefore be seen that the intermediate shaft performs three separate functions: first, that of driving the shaft 4; secondly that of transmitting an oscillating movement to the crank arm 15; and third, that of transmitting a continuous rotary movement to the cams 22 and 23 through means of the sprocket gear 24. The cam 22 serves the function of intermittently actuating the pawl 18, that is, the cam 22 will through the action of roller 21 and the trip lever 20 either hold the pawl in raised position so that no engagement is made with the ratchet gear 14, or it will release the trip lever and thereby permit a counterweight 18^a to swing the pawl into engagement with the ratchet gear and will therefore permit the pawl to form a driving connection between the crank arm and the ratchet gear which will rotate the same one-quarter of a revolution.

The intermittent drive transmitted to the shaft 5 through the mechanism just described is transmitted to the upper shaft 6 through means of a pair of gears 24′ and 25′. The gear 24 is secured on shaft 5 and the gear 25 on shaft 6. The gear ratio is one to two. It can therefore be seen that one-fourth of a revolution transmitted to shaft 5 will cause shaft 6 to rotate one-half of a revolution or one hundred and eighty degrees. This is of importance and will later be described. Also secured on shaft 6 is a locking disc 26. This disc is provided with notches in its opposite sides as at 27 and is normally engaged by a latch arm 28. This arm is pivotally attached to the frame as at 29 and carries a roller 30 adjacent its lower end which is engaged or actuated by the cam 23. The cam 23 cooperates with the cam 22 as it rotates in unison therewith and it serves the function of swinging the latch arm out of engagement with the disc 26 when the shafts 5 and 6 are partially rotated. The moment rotary movement has been transmitted or a moment previous thereto latch arm 28 is released and is therefore in readiness to return into engagement with the disc 26 or the notches formed therein the moment a one-half revolution has been completed; engagement of the latch with one notch or another being insured by interposing the spring 31 between the arm and the main frame as shown in Fig. 2.

The sugar receiving unit is actuated by the shaft 4. It consists of a receiving frame comprising a pair of side bars 35 and 36 and a central stationary bar 37. The side bars are secured at one end to a cross head 38 and are supported at their inner ends by rollers 39 journaled in a cross arm of the main frame. The cross head is slidably mounted on side rods 40 secured to the main frame and reciprocal movement is transmitted to the cross head and the side bars secured thereto by means of a pair of rocker arms 41 secured in a shaft 42, links 43, a crank arm 44, a link 45, and an internal cam 46 secured on shaft 4; movement being transmitted to the rocker arms by means of a roller 47 carried by the link 45 and projecting into the groove of the cam. The front ends of the side bars 35 are hook-shaped as at 48 and each side bar carries a pivotally supported latch 49. The frame consisting of the side bars 35 and 36 and the stationary central bar 37, is provided for the purpose of receiving the trays containing the cube sugar. The trays are placed on the forward ends of the side bars as at 50 and are retained against rearward movement by the hook-shaped ends 48. When reciprocal movement is transmitted to the cross head 38 and the side bars secured thereto the tray containing the sugar will be advanced from the position shown at 50 to a second position indicated at 51. A latch 52 carried by the central stationary bar 37 will here engage the tray and will secure it against rearward movement when the cross head and side bars return to the position shown in Figs. 2 and 3. A second tray is now placed on the side bars and this is advanced in the same manner. The latches 49 will during this movement engage the rear end of the tray previously placed on the frame as shown in Fig. 3, and will therefore advance this to the turning frame or unit generally indicated at B.

The turning frame is particularly illus-

trated in Figs. 1, 2, 5 and 6. The turning frame is supported on the shaft 6 and consists of a pair of side plates 53 and a top and bottom plate 54. The side plates are channeled as at 55 to form guides for a pusher plate 56 hereafter to be described. Pivotally mounted on each side plate 53 is a series of tray supporting latches 57 on which are formed slotted arms 58. Each side plate carries a sliding rod 59 on which is secured projecting pins 60. These pins engage the slotted arms 58, in other words projects through the same so that when an endwise movement is imparted to the rods 59, a rocking movement will be transmitted to the latches 57 to swing the same into or out of engagement with relation to the trays. Mounted between the plates 54, forming a part of the turning frame, are two sets of arms 62. These arms are freely turnable on the shaft 6 and each set of arms is connected by a cross bar 63. The forward face of each cross bar is bevelled or cam shaped as at 64 and each cross bar is normally held in engagement with its respective plate 54 by means of springs 65.

Referring to the previous description of the receiving frame A, it should be remembered that reciprocal movement is transmitted thereto. This reciprocal movement is not only employed for the purpose of imparting a forward step by step movement to the sugar delivering trays 50, but this reciprocal movement is also utilized for the purpose of delivering the trays in successive order to the turning frame, and furthermore serves as a means for removing the sugar from the turning frame and delivering it to the separating unit indicated at C.

Carried by the cross head 38 is an upper cross head 38a. This cross head straddles the receiving frame and serves as a support for a pair of rods 66; the forward ends of which are slidably mounted in a guide frame or cross arm 67 secured to the main frame. Secured to the forward ends of the rods 66 is a pusher bar 56. This bar is mounted in direct alignment with the guides 55 formed in the side plates of the turning frame and serves the function of removing the sugar indicated at 68, see Fig. 5, from the turning frame and delivering it to the separating unit indicated at C. The pusher bar 56 will during the forward reciprocal movement of the receiving frame enter the guide channels 55 and will thus sweep across the plate 54. This movement of the pusher bar 55 will push the sugar or advance in a forward direction over the plate 54 and will thus deliver it to the separating unit C, which consists of a series of movable or separable platforms such as indicated at 70, 71, 72, 73, and 74. Simultaneously with the removal of the sugar from the upper plate 54, forming a part of the turning frame, it should be obvious that a sugar carrying tray 50 will be advanced from the position shown at 51 to the position shown at 51a. In this position the tray and the sugar contained thereon is delivered to the lower side of the turning frame and is here supported by the latches 57; the tray being prevented from returning with the receiving frame, when this is withdrawn, by end latches 75. In other words, during each forward movement of the receiving frame, pusher bar 56 will first enter the guides 55 in the upper part of the turning frame and will by engagement with the cam face 64 depress the bar 63. It will then engage the sugar shown at 68 and remove it from the plate 54 by advancing it to the separating unit or the platforms indicated at 70, 71, 72, 73 and 74; a tray being at the same time delivered to the lower part of the turning frame where it will assume the position shown in Fig. 5; the tray being locked and secured against return movement by the latches 75. The moment a tray has been delivered, a one-half revolution will be imparted to the shaft 6 and the turning frame carried thereby. This turning movement is transmitted from the crank 17 and link 16 to the pawl 18. Pawl 18 will at this time engage the ratchet gear 14 due to the position of the cam 22 and will thereby impart one-fourth of a revolution to the shaft 5. This movement will again be transmitted through the gears 24 and 25' to shaft 6 and as the gearing is two to one, it is obvious that one-half of a revolution will be transmitted to the shaft 6 and that the sugar delivered to the lower part of the turning frame will now be inverted and turned and will assume the position indicated at 68, see Fig. 5. The latch arm 28 also operates at this time, that is cam 23 will release the latch arm 28 a moment previous to the engagement of the pawl 18 with relation to the ratchet 14 and it will swing back into engagement with the disc 26 a moment before a complete one-half revolution has been transmitted, thereby being in position to engage the notch 27 in the disc 26 the moment a one-half revolution has been transmitted. This is of importance as it is obvious that a perfect alignment of the turning frame with relation to the receiving frame and the pusher bar 56 is essential, such alignment is of course obtained by the notched disc and the cooperating latch 28. The turning frame in reality serves several functions, first that of receiving a tray advanced by the receiving frame; secondly that of inverting or turning the sugar, and third, that of releasing and automatically discharging the trays by which the sugar is delivered. This last function is accomplished as follows: If a tray is delivered to the lower part of the

turning frame, it is obvious that the sugar will be supported by the tray upon which it is delivered as long as the turning frame assumes the horizontal position shown in Fig. 5. The moment however one-half a revolution has been transmitted to the turning frame through shaft 6, it is obvious that the sugar will assume the position shown at 68, that is it will drop away from the tray upon which it was delivered and it will therefore be supported by the plate 54. The tray will of course have to be removed either manually or automatically as it would otherwise form an obstruction for the next tray to be delivered. In the present instance we have shown an automatic release. This release consists of a pair of cam bars 80 secured one at each side of the main frame in alignment with the respective rods 59. These cams engage the ends of the rods 59 during the turning movement of the frame and at a time when the one-half revolution has almost been completed. This engagement of the cams with the rods causes endwise movement of the same and therefore a rocking movement to the latches 57. These are swung out of engagement with the sugar tray at a time when it assumes the position on the bottom side of the turning frame and it therefore drops away from the latches and down between the sides of the frame into a space generally indicated at 81. A conveyor belt or chute not here shown may be arranged at this point to carry away the trays as they are released one by one with relation the turning frame. In other words, a tray will remain in the turning frame during approximately one complete revolution of the same as the tray is first delivered to the lower side of the turning frame. It next assumes the position indicated at 81ª in the upper part of the frame when a one-half revolution has been transmitted and it stays in the turning frame until approximately another one-half revolution has been completed, or until it again reaches the lower side of the turning frame as it is only released a moment previous to the second positioning of the turning frame. An offset on the cams indicated at 80ª transmits the endwise movement to the rods 59 and as these offsets are positioned directly below the turning frame, it can be seen that the release takes place just a moment before the last one-half revolution has been completed. It may therefore be stated that a tray is released once during one-half of a revolution and a new tray is delivered once during each one-half of a revolution.

The cross bars 63 serve only one function, to-wit, that of securing the sugar against endwise movement on the tray during the turning movement of the frame. Each cross bar is resiliently supported by the arms 62 and the springs 65, and as their forward faces are wedge shaped as at 64, it can readily be seen that they will be depressed to the dotted line position shown in Fig. 5 when the pusher bar 56 advances to discharge the sugar.

The sugar discharged from the turning frame, as previously stated, is delivered to the separating unit C or the platforms 70, 71, 72, 73 and 74. The function of the separating platforms and the mechanism for operating the same will now be described:

There are four movable or slidably mounted platforms and one stationary centrally positioned platform. The stationary platform indicated at 72 is secured to a pair of cross rods 75, while the remaining platforms are slidably mounted on the rods. The sliding platforms are arranged in pairs, one pair on each side of the stationary platform and reciprocal movement is transmitted thereto by means of a pair of internal cams 76 and 77. These cams are secured on the shaft 7 which is driven from the main driving shaft by means of the bevel gear train 12. The shaft is therefore continuously rotated and similarly the cams carried thereby. The several platforms shown in Fig. 9 are adapted to assume two positions, first, an assembled position where they all contact with each other and form a continuous receiving surface; and secondly a separated position such as shown in Fig. 9. In this instance we may assume that the sugar delivered from the turning frame assumes a single layer and that the cubes are arranged so that twenty-five rows are presented. The sugar of course is delivered to the platforms when they are assembled and it can therefore be seen that when the platforms are separated each platform will contain a single layer of sugar five rows wide, that is a line of separation is produced between each fifth row of sugar, thereby leaving five rows upon each platform. The separation of the platforms and the re-assembling of the same is accomplished in the following manner:

Formed under the platforms 70 and 71 are downwardly projecting lugs 78 and 78ª, one for each platform. Slidably mounted in said lugs is a rod 79 on which is secured two stop collars or nuts 80 and 81. Attached to the outer end of the rod is a cross head 82 and interposed between the cross head and the lugs 78, on platform 70, is a tension spring 83. Pivotally attached to the cross head 82 is a link 84, and connected with said link is a rocker arm 85 which is pivotally mounted on a cross arm 86 of the frame as at 87. Pivotally attached to the rocker arm 85, as at 88, is a link 89, the forward end of which is guided by the shaft 7 and carried by the link, and projecting into the cam groove 76 is a roller 90 through which an oscillating movement is transmitted to

the rocker arm and a reciprocal movement to the rod 79. The cam 77 operates a mechanism identical to that just described, that is the platforms 73 and 74 each carry a lug, a rod 79, a cross head, a link 83, a rocker arm 85 and a link 89 which is actuated by the cam 77. The cams 76 and 77 of course operate in opposition to each other and rotation will therefore cause the rocker arms to move to and away from each other in unison. Such oscillating movement is transmitted to the respective rods 79 and will in one instance, that is when the platforms are separated, cause the springs 83, interposed between the cross heads and the lugs 78, to move the platforms 70 and 74 inwardly or towards each other until they engage the platforms 71 and 73. Further movement will then cause the platforms 70 and 71 to move inwardly until the stationary platform 72 is reached, and similarly will cause the platforms 73 and 74 to move inwardly in unison until the opposite side of the stationary platform is engaged; the oscillating movement of the respective rocker arms 85 being slightly in excess of the actual movement required causes tension to be exerted on the springs 83 thereby securing the several platforms in close engagement with each other when assembled. Reverse movement of the rocker arms when they move apart will first cause the collars 80 on the respective rods 79 to engage the lug 78 and thereby slide the platforms 70 and 74 outwardly on the rods 75. Further movement will cause the collars 81 to engage the lugs 78^a on the platforms 71 and 73 and will then cause these two to move outwardly. When the limit of outward movement is reached, uniform spacing or separation between the platforms is obtained and the position assumed will be substantially that shown in Fig. 9.

As previously stated sugar is delivered to the respective platforms when these are assembled and separation of the sugar into sections each five rows wide is obtained when the platforms are separated. The reason for causing such separation is two-fold: first, it permits ready inspection of the sugar and removal of fractured or broken cubes; secondly, it permits delivery of separate sections of sugar to individual feed or conveyor belts such as indicated at 91, that is sugar may be delivered to one or more packing machines by providing the separating arrangement here shown, or it may be delivered to a packing machine which is capable of packing two, three, four, five or more cartons at one time.

By referring to the foregoing description it will be seen that we have first provided means for receiving the sugar delivering trays; secondly, advancing the trays and delivering the same to the turning frame; third, means for turning the frame and the sugar delivered thereto; fourth, means for discharging the empty trays; fifth, means for discharging the sugar when turned and delivering it to the receiving platforms when these are assembled; and sixth, that means have been provided for separating the platforms and the sugar delivered thereto. The final operation as far as this machine is concerned is that of transferring the sugar from the separating platforms to the respective conveyor belts 91. This is accomplished in the following manner: Mounted directly on the main drive shaft 2 is an internal cam 92. This cam actuates the mechanism whereby the sugar is transferred from the separating platforms to the conveyor belts 91. The transferring means consists of a cross bar 93, on which is secured a series of pusher plates 94. There are five pusher plates in this instance and they are so positioned that they will align with the respective separating platforms when they assume the position shown in Fig. 9. The cross bar 93 is secured between a pair of links 95. These links are attached at one end to rocker arms 96 and these rocker arms are in turn actuated by means of the cam 92, a link 97 and a crank arm 98, which is attached to the shaft upon with the rocker arms 96 are secured. An oscillating movement is transmitted to the rocker arms through the cam 92, the link 97 and the crank arm 98, and reciprocal movement is in turn transmitted to the links 95 and the cross bar and pusher plates carried thereby. Forward movement of the links 95 and the cross bar 93 causes the pusher plates to engage the respective sections of sugar and thereby moves each section as a body forwardly and finally deposits each section upon their respective conveyor belts 91, and as these belts are continuously driven by means not here shown, it can readily be seen that each section of sugar delivered will be instantly removed.

By referring to Fig. 8 it will be seen that the cross bar 93 and the links 95 supporting the same are carried at one end by rollers 99. These rollers are in turn supported upon a pair of track members 100 disposed one on each side of the machine. These track members are connected by cross bars 191 and the cross bars in turn carry angle plates 102, one pair for each separating platform. (See Fig. 9.) These angle plates form side guides for the sugar supported by the respective separating platforms and prevent the outermost rows of cubes in each section from being displaced during the transfer of the sugar from the separating platforms to their respective conveyor belts 91. The track members 100 are pivotally attached to the main frame at their forward ends at 103, and they are adapted to be

raised and lowered about this pivotal point by means of a pair of cams 104 secured one on each end of shaft 8. This shaft, as previously described, is driven from the main shaft by the sprocket chain 11 and the cams 104 will therefore intermittently raise and lower the track members 100 due to the fact that each track member carries a roller 105 which is engaged by the cams 104 during their rotation. The track members, together with the links 95, the cross bar 93, and the pusher plates 94, assume a raised position when the separating platforms are assembled and when the sugar is delivered thereto from the turning frame. The track members are however lowered the moment the platforms have become separated as shown in Fig. 9 and the angle plates 102 are thus lowered in a position where they will guide the sugar during its transfer from the separating platforms to the conveyor belts 91.

The entire mechanism as described is automatic in operation. The machine as a whole requires no attention and only requires two operators, one to deliver the sugar to the machine and a second operator to inspect the sugar and remove broken or damaged cubes. The cubes are first inspected when supported by the trays on the receiving frame and they are secondly inspected when turned, or when being removed by the conveyor belts 91. Ample opportunity is thus given the operator to inspect and remove damaged sugar.

It should be understood that the sugar delivered to the machine upon the trays is first assembled in such a manner that the individual cubes contact with each other; further, that a single layer of cube sugar is delivered by each tray. The cubes will of course present one surface which may be inspected when they are first delivered to the machine, and they will present the opposite surface when they are delivered to the conveyor belts 91, thus giving ample opportunity to inspect all sides of the cubes and thus permitting the removal of fractured or broken cubes. In other words the reason for turning sugar is to permit inspection of both sides thereof. Another reason for turning the sugar is caused by the fact that one side of the cubes presents a more or less glazed surface while the other surfaces are dull. The glazed surface is produced in the molding machine and it is desirable when packing the sugar that the dull surface be presented upwardly and the glazed surface downwardly as it materially improves the appearance of the sugar when packed. The reason for turning the sugar is therefore two-fold: first, to permit inspection of both sides, and secondly to turn the glazed surface downwardly and thereby improve the appearance of the sugar when packed.

While certain features of the present invention are more or less specific in structure and design, we wish it understood that varying changes may be resorted to within the scope of the appended claims, similarly that the materials and finish of the several parts employed, may be such as the experience and judgment of the manufacturer may dictate or varying uses may demand.

Having thus described our invention, what we claim and desire to secure by Letters Patent is—

1. In a machine of the character described a sugar receiving frame, a turning frame having upper and lower sugar holding means, means for transferring sugar from the receiving frame to the lower sugar holding means of the turning frame, and means for imparting a turning movement to the turning frame to turn the sugar.

2. In a machine of the character described a sugar receiving frame, a turning frame, means for transferring sugar from the receiving frame to the turning frame, means for imparting a turning movement to the turning frame to turn the sugar, a plurality of receiving platforms normally assembled to present a continuous receiving surface, means for transferring the sugar when turned from the turning frame to the receiving platforms, and means for separating the receiving platforms.

3. In a machine of the character described a sugar receiving frame, a turning frame, means for transferring sugar from the receiving frame to the turning frame, means for imparting a turning movement to the turning frame to turn the sugar, a plurality of receiving platforms normally assembled to present a continuous receiving surface, means for transferring the sugar when turned from the turning frame to the receiving platforms, means for separating the receiving platforms, a plurality of conveyor belts, one in alignment with each receiving platform, and means for transferring the sugar from the receiving platforms to the respective conveying belts.

4. In a machine of the character described a receiving frame, said frame adapted to receive cube sugar supported upon trays, a turning frame mounted adjacent the receiving frame, means for imparting a reciprocal movement to the receiving frame to advance the sugar tray thereon and to transfer the tray to the turning frame, means for securing the tray and sugar contained thereon against endwise removal when transferred to the turning frame, and means for transmitting a turning movement equal to 180° to the turning frame.

5. In a machine of the character described a receiving frame, said frame adapted to receive cube sugar supported upon trays, a turning frame mounted adjacent the receiv-

ing frame, means for imparting a reciprocal movement to the receiving frame to advance the sugar tray thereon and to transfer the tray to the turning frame, means for securing the tray and sugar contained thereon against endwise removal when transferred to the turning frame, means for transmitting a turning movement equal to 180° to the turning frame, means for removing the sugar from the turning frame when turned, and means for automatically releasing and discharging the tray upon which the sugar was delivered to the turning frame.

6. In a machine of the character described a receiving frame, said frame adapted to receive cube sugar supported upon trays, a turning frame mounted adjacent the receiving frame, means for imparting a reciprocal movement to the receiving frame to advance the sugar tray thereon and to transfer the tray to the turning frame, means for securing the tray and sugar contained thereon against endwise removal when transferred to the turning frame, means for transmitting a turning movement equal to 180° to the turning frame, means for removing the sugar from the turning frame when turned, means for automatically releasing and discharging the tray upon which the sugar was delivered to the turning frame, means cooperating with the turning frame for receiving the sugar discharged therefrom, said means adapted to separate the sugar into a plurality of sections each containing a predetermined number of cubes.

7. In a machine of the character described a receiving frame, a turning frame, a plurality of receiving platforms, a conveyor belt cooperating with each receiving platform, means for transmitting a reciprocal movement to the receiving frame, means for transmitting a reciprocal movement to the receiving platforms to alternately separate and assemble the same, and means for intermittently transmitting a turning movement to the turning frame, said turning movement being equal to a one-half revolution and taking place once during each reciprocal movement of the receiving frame and the receiving platforms.

8. In a machine of the character described, a main frame, a receiving frame, said frame comprising a series of reciprocating bars and a stationary bar, a sugar supporting tray adapted to be received and supported by the bars, means for transmitting a reciprocal movement to the reciprocally mounted bars, hook-shaped members on said bars adapted to advance the sugar supporting tray, means on the stationary bar for securing the tray against retrograde movement when advanced, a turning frame mounted in alignment with the receiving frame, latches on the reciprocating bars of the receiving frame adapted to impart a second advance movement to the sugar supporting tray, and also adapted to transfer it to the turning frame, a shaft supporting the turning frame, and means for transmitting a one-half revolution to the shaft and turning frame once during each reciprocation of the receiving frame.

9. In a machine of the character described, a main frame, a receiving frame, said frame comprising a series of reciprocating bars and a stationary bar, a sugar supporting tray adapted to be received and supported by the bars, means for transmitting a reciprocal movement to the reciprocally mounted bars, hook-shaped members on said bars adapted to advance the sugar supporting tray, means on the stationary bar for securing the tray against retrograde movement when advanced, a turning frame mounted in alignment with the receiving frame, latches on the reciprocating bars of the receiving frame adapted to impart a second advance movement to the sugar supporting tray, and also adapted to transfer it to the turning frame, a shaft supporting the turning frame, means for transmitting a one-half revolution to the shaft and turning frame once during each reciprocation of the receiving frame, means on the turning frame for securing the tray and sugar supported thereby against removal, other means on the turning frame for receiving the sugar, means cooperating with the turning frame for automatically releasing and discharging the tray, and means actuated by the receiving frame for discharging the sugar from the turning frame when the sugar has been turned.

10. In a machine of the character described a turning frame comprising a pair of end plates, a pair of sugar receiving plates secured between the end plates and interspaced with relation to each other, a plurality of latches arranged in pairs on each side of the end plates, a shaft supporting the several plates, means for intermittently imparting a one-half revolution to the shaft and the plates supported thereby, means for delivering a sugar supporting tray to the turning frame, said tray being secured by the latches, means for discharging the sugar from the turning frame when turned, and means for simultaneously swinging the latches to a position where the tray will be released and discharged.

11. In a machine of the character described the combination with the turning frame of a shaft supporting the same, a notched disc secured on the shaft, a latch member engageable therewith, means for intermittently transmitting a one-half revolution to the shaft, the turning frame supported thereby and the notched disc, means for intermittently swinging the latch into and out of engagement with the disc, means for delivering sugar to the turning frame,

and means for discharging it therefrom when turned.

12. In a machine of the character described a stationary receiving platform and a plurality of reciprocally mounted platforms arranged on each side thereof, a common support for the several platforms, and means for transmitting a reciprocal movement to the reciprocally mounted platforms to intermittently assemble and separate the same.

13. In a machine of the character described a stationary receiving platform and a plurality of reciprocally mounted platforms arranged on each side thereof, a common support for the several platforms, means for transmitting a reciprocal movement to the reciprocally mounted platforms to intermittently assemble and separate the same, means for delivering cube sugar to said platforms when assembled, a conveyor belt for each platform, said conveyor belts being so positioned as to align with the platforms when separated, and means for transferring the sugar from the receiving platforms to the respective conveying belts.

14. In a machine of the character described a stationary receiving platform and a plurality of reciprocally mounted platforms arranged on each side thereof, a common support for the several platforms, means for transmitting a reciprocal movement to the reciprocally mounted platforms to intermittently assemble and separate the same, means for delivering cube sugar to said platforms when assembled, a conveyor belt for each platform, said conveyor belts being so positioned as to align with the platforms when separated, means for transferring the sugar from the receiving platforms to the respective conveying belts, said means comprising a cross bar, a series of pusher plates on said bar, said pusher plates aligning with the receiving platforms when they are separated, means for transmitting a reciprocal movement to the cross bar and the pusher plates, and other means cooperating therewith forming guides for the sugar when transferred from the receiving platforms to the conveying belts.

15. In a machine of the character described a main frame, a pair of cross rods secured on the frame, a receiving platform secured on said rods, a plurality of receiving platforms slidably mounted on the rods on each side of the stationary platform, means for intermittently assembling and separating the slidably mounted platforms with relation to the stationary platform, a pair of track members one on each side of frame, guide members carried by the track members and adapted to align with the receiving platform when separated, means for intermittently raising and lowering the track and guide members carried thereby, a cross bar supported by the track members, means for transmitting a reciprocal movement thereto, a series of conveyor belts so positioned as to align one with each receiving platform when the receiving platforms are separated and a series of pusher plates carried by the cross bar, said plates also aligning with the receiving platforms when they are separated.

16. In a machine of the character described a turning frame, a shaft to which it is secured, means on the turning frame for receiving, supporting and securing sugar delivering trays, means for intermittently transmitting a one-half revolution to the shaft and the turning frame to turn the sugar and remove it with relation to the tray, means in the turning frame for receiving the sugar when removed with relation to the tray, means for removing the sugar with relation to said means when the sugar is turned, and means for automatically releasing the tray by which the sugar was delivered to the turning frame.

17. In a machine of the character described, a sugar receiving frame, a turning frame having upper and lower sugar holding means, means for transferring sugar from the receiving frame to the lower sugar holding means of the turning frame, means for removing sugar from the upper sugar holding means of the said turning frame, and means for imparting a turning movement to the turning frame to turn the sugar.

18. In a machine of the character described, a sugar receiving frame, a turning frame having upper and lower sugar holding means, means for transferring sugar from the receiving frame to the lower sugar holding means and for removing sugar simultaneously from the upper sugar holding means, and means for imparting a turning movement to the turning frame to turn the sugar.

19. In a machine of the character described, a sugar receiving frame, a turning frame having upper and lower sugar holding means, means for imparting a turning movement at intervals to the turning frame, means for transferring sugar from the receiving frame to one of the holding means of the turning frame and for simultaneously removing sugar from the other holding means thereof, and means for separating the sugar removed from the turning frame.

20. In a machine of the character described, a sugar receiving frame, a turning frame having upper and lower sugar holding means, means for imparting a turning movement at intervals to the turning frame, means for transferring sugar from the receiving frame to one of the holding means of the turning frame and for simultaneously removing sugar from the other holding means thereof, means for separating the

sugar removed from the turning frame, and a plurality of conveying means for carrying away the separated sugar.

21. In a machine of the character described, a sugar receiving frame, a turning frame having upper and lower sugar holding means, means for successively advancing trays of sugar on the receiving frame and for transferring the said trays, one at a time, to one of the sugar holding means of the turning frame, and means for simultaneously removing the sugar from the other sugar holding means of the turning frame.

22. In a machine of the character described, a sugar receiving frame, a turning frame having upper and lower sugar holding means, means for successively advancing trays of sugar on the receiving frame and for transferring the said trays, one at a time, to one of the sugar holding means of the turning frame, means for simultaneously removing the sugar from the other sugar holding means of the turning frame, and means for automatically discharging the trays successively after the sugar has been removed therefrom.

23. In a machine of the character described, a turning frame having upper and lower sugar holding means, means for intermittently imparting a turning movement to the frame to present the sugar holding means successively at the top, locking means for holding the frame in such position, and means for automatically unlocking the turning frame.

24. In a machine of the character described, a turning frame having upper and lower sugar holding means, means for intermittently imparting a turning movement to the frame to present the sugar holding means successively at the top, locking means for holding the frame in such position, said locking means comprising a locking disc having notches and a latch member engaging one of the notches, and means for automatically unlocking the turning frame.

25. In a machine of the character described, a turning frame having upper and lower sugar holding means, means for intermittently imparting a turning movement to the frame to present the sugar holding means successively at the top, locking means for holding the frame in such position, comprising a locking disc having notches and a latch member engaging one of the notches, and a cam arranged to engage the latch member for moving the same out of engagement with the locking disc to release the turning frame.

26. In a machine of the character described, a turning frame adapted to receive sugar, means for intermittently imparting a turning movement to the turning frame including a ratchet wheel, an oscillating arm, means for continuously oscillating the arm, means carried by the arm for engaging the ratchet wheel to impart rotary movement to the same, and means operating to hold the said engaging means out of engagement with the ratchet wheel at intervals.

27. In a machine of the character described, a turning frame adapted to receive sugar, means for imparting a turning movement to the turning frame including a ratchet wheel, an oscillatory arm, means for continuously oscillating said arm, means carried by the arm for engaging the ratchet wheel to impart rotary motion to the same, a trip lever connected with the said engaging means, and a cam controlling the movements of the trip lever.

28. In a machine of the character described, a turning frame adapted to receive sugar, means for imparting a turning movement to the turning frame including a ratchet wheel, a continuously oscillating arm, a pawl carried by the arm for engaging the ratchet wheel, a trip lever connected with the pawl, and a cam arranged to engage and control the movements of the trip lever to permit the pawl to engage the ratchet wheel at intervals.

29. In a machine of the character described, a turning frame, means for locking the turning frame including a latch member, a ratchet wheel connected with the turning frame for imparting rotary motion to the same, an oscillating arm, a pawl carried by the arm for engaging the ratchet wheel, a trip lever connected with the pawl, cams for engaging the trip lever and the latch member to control the pawl and to unlock the turning frame, and means for continuously rotating the cams and for continuously oscillating the said arm.

30. In a machine of the character described, a turning frame, means for locking the turning frame including a latch member, a ratchet wheel connected with the turning frame for imparting rotary motion to the same, an oscillating arm, a pawl carried by the arm for engaging the ratchet wheel, a trip lever connected with the pawl, cams for engaging the trip lever and the latch member to control the pawl and to unlock the turning frame, a rotating crank element connected with said arm, and gearing connected with the cams for continuously rotating the same.

31. In a machine of the character described, a main frame, a turning frame, a reciprocating frame slidable on the main frame for feeding sugar to the turning frame, a rocker arm connected with the receiving frame, a slidable link connected with the rocker arm for oscillating the same, and a cam for reciprocating the slidable link.

32. In a machine of the character described, a main frame, a turning frame, a reciprocating receiving frame slidable on

the main frame for feeding sugar to the turning frame, a cross head connected with the receiving frame, a pair of rocker arms pivotally connected with the cross head at the ends thereof, a central crank arm connected with the rocker arms, a slidable link pivoted to the crank arm, and a cam for reciprocating the slidable link.

33. In a machine of the character described, a main frame, a turning frame, a reciprocating receiving frame slidable on the main frame for feeding sugar to the turning frame, a cross head connected with the receiving frame, spaced rocker arms connected with the cross head, a crank arm connected with the rocker arms, a slidable link pivoted to the crank arm and provided with a slot, a shaft extending through the slot, and a cam mounted on the shaft engaging the link for reciprocating the same.

34. In a machine of the character described, a turning frame, a reciprocating receiving frame for feeding sugar to the turning frame, and a pusher bar carried by the receiving frame and movable over the turning frame to remove the sugar from the same.

35. In a machine of the character described, a turning frame provided with guides, a reciprocating receiving frame for feeding sugar to the turning frame, and a pusher bar carried by the receiving frame and movable into and out of the guides of the turning frame and over the latter to remove the sugar therefrom.

36. In a machine of the character described, a turning frame provided with upper and lower sugar holding means and having upper and lower guides associated with the same, a receiving frame, means for reciprocating the receiving frame to feed sugar to one of the sugar holding means, and a pusher bar carried by the reciprocating receiving frame and movable into and out of the guides of the other sugar holding means to remove the sugar from the turning frame.

37. In a machine of the character described, a turning frame provided with upper and lower sugar holding means and having upper and lower guides associated with the same, a receiving frame, means for reciprocating the receiving frame to feed sugar to the lower sugar holding means, and a pusher bar carried by the receiving frame and movable into and out of the upper guides to remove sugar from the upper sugar holding means.

38. In a machine of the character described, a turning frame having upper and lower sugar holding means and provided with upper and lower guides associated with the same, a receiving frame for feeding sugar to the lower sugar holding means, a main cross head having an upper cross head and connected with the receiving frame, a pusher bar carried by the upper cross head and movable into and out of the upper guides for removing sugar from the upper sugar holding means, and means for reciprocating the cross heads and for imparting at intervals a turning movement to the turning frame.

39. In a machine of the character described, a plurality of separable platforms arranged to receive sugar, means for separating the platforms and for bringing the same together, conveying means arranged to receive sugar from the platforms when the latter are separated, a pusher bar, and means for reciprocating the pusher bar over the platforms to transfer the sugar to the conveying means.

40. In a machine of the character described, a plurality of separable platforms arranged to receive sugar, means for separating the platforms and for bringing the same together, conveying means arranged to receive sugar from the platforms when the latter are separated, a pusher bar, means for reciprocating the pusher bar over the platforms to transfer the sugar to the conveying means, and means for moving the pusher bar toward and from the platforms.

41. In a machine of the character described, a plurality of separable platforms, means for separating the platforms and for bringing the same together, conveying means arranged to receive sugar from the platforms when the same are separated, a pusher bar, means for reciprocating the pusher bar over the separated platforms to transfer the sugar to the conveying means, a track for guiding the pusher bar, and means for moving the track and the pusher bar toward and from the platforms.

42. In a machine of the character described, a plurality of separable platforms, means for separating the platforms and for bringing the same together, conveying means arranged to receive the sugar from the platforms when the same are separated, a pusher bar, means for reciprocating the pusher bar over the platforms when the same are separated to transfer the sugar to the conveying means, pivoted track members forming guides for the pusher bar, and means for raising and lowering the track members to carry the pusher bar toward and from the platforms.

In testimony whereof we have hereunto set our hands.

CHAS. C. REESE.
JOSEPH T. BUZZO.
ROBERT S. WOODFORD.