

United States Patent

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[54] BIN TURNING MIXER

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[58] **Field of Search**.....259/81, 89; 217/56, 40 R;
73/421 R, 421 B; 214/701 Q

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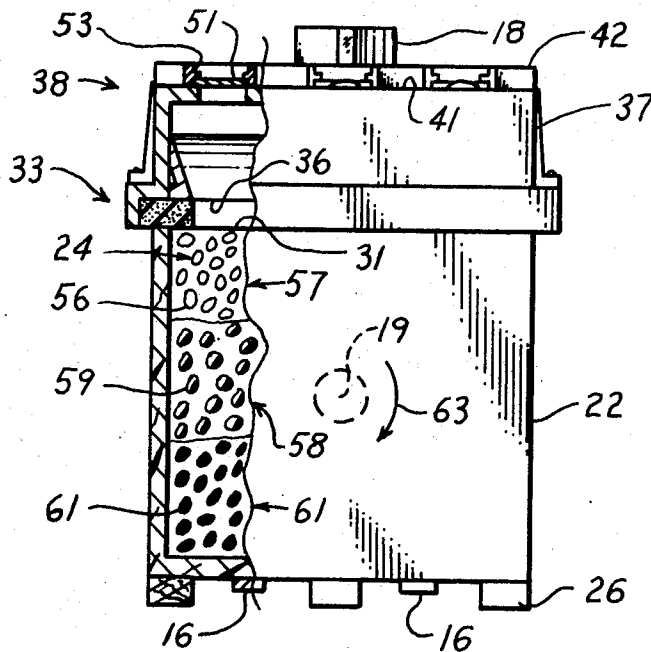
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[57]

ABSTRACT

A bin for mixing articles of fruit therein by turning the bin over and over. A square lid has depending walls with a sealing gasket on the lower edges of the four walls. The lid is placed with the gasketed walls in registry with the upper edges of a fruit handling bin containing prunes, or the like, having a bottom layer at relatively high moisture content, a central layer at an intermediate moisture content and a relatively dry top layer. The lifting forks of a rotating carriage fork lift vehicle are inserted under the bin and the bin clamping member is forcefully urged downwardly against the interposed bin and lid. The downward force is sufficient to effect sealing of the contents while the bin and the lid are rotated, thereby quickly mixing the three layers into one substantially homogeneous mass. The lid provides extra space so that the articles of fruit will more readily roll around to promote mixing. Means are provided in the lid for removing samples of fruit during the mixing process.

3 Claims, 6 Drawing Figures



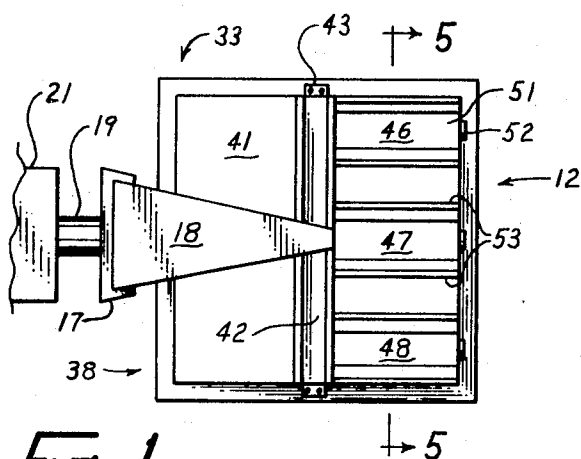


Fig. 1

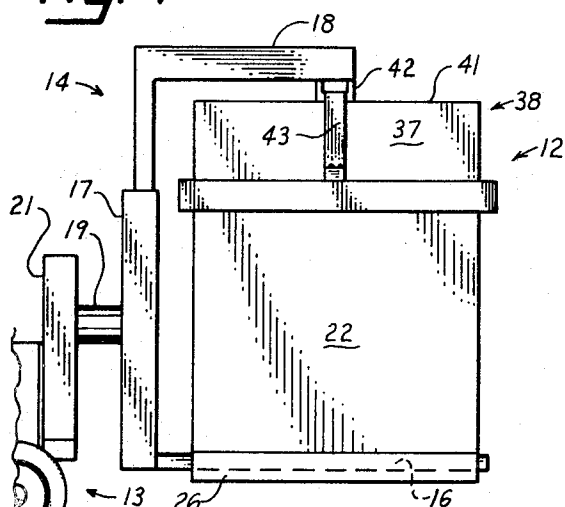


Fig. 2

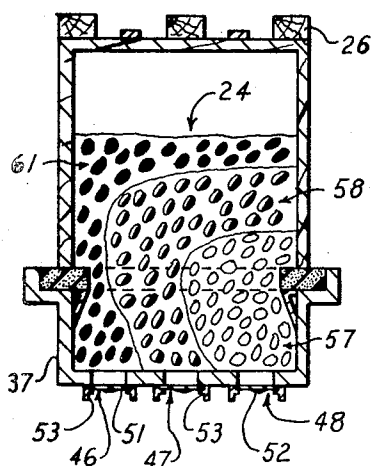


Fig. 3

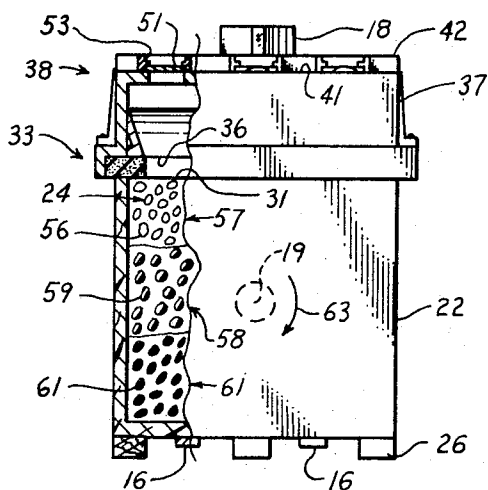


Fig. 4

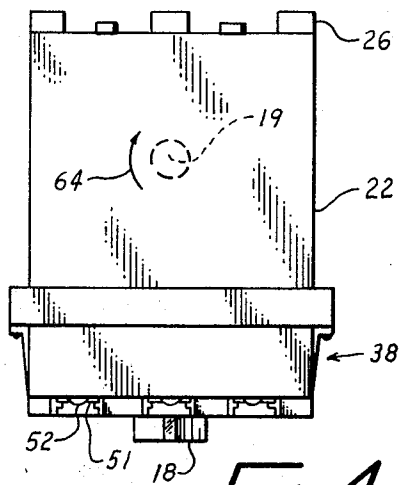


Fig. 5

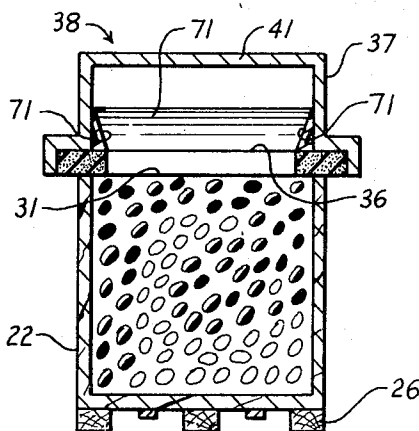


Fig. 6

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BIN TURNING MIXER

The invention relates to improvements in bin turning devices.

As is well known in various types of fruit processing, dehydration is an important step. Thus, in the prune industry, for example, it is necessary to remove from the prunes a substantial part of the moisture. The drying operation is carried out in large enclosures subjected to drying atmosphere. These facilities are commonly called dehydrators; and in the drying operation, large bins filled with prunes are placed within the dehydrator for several days, at the end of which time the prunes are at a reduced, substantially uniform moisture content. The bins filled with dehydrated prunes are thereupon moved to a storage area for subsequent disposition.

While awaiting subsequent disposition, which might not take place for a week or two, the prunes in the top layer continue to dry out, the middle layer of prunes might remain at about the same moisture content and the bottom layer of prunes might even gain in moisture content. In any event, the prunes become stratified as to moisture content, and, in the interests of moisture uniformity, mixing is required. Mixing, however, has heretofore presented a problem because in modern day fruit handling bins, the contents are in usually a 4 × 4 × 4 foot mass weighing several hundred pounds, making thorough mixing a difficult step.

It is therefore an object of the invention to provide a bin turning mixer which quickly and efficiently homogenizes a bin full of prunes, or the like, previously stratified into layers of differing moisture content.

It is another object of the invention to provide a bin turning mixer which is relatively inexpensive, light in weight and compact in size, yet which enables the operator of a dehydrating plant to mix a bin filled with prunes in a short time and with a minimum of labor.

It is a further object of the invention to provide a bin turning mixer which can be operated even by relatively unskilled personnel, yet provides a thoroughly mixed load.

It is yet another object of the invention to provide a bin turning mixer which enables the operator to sample the contents of the bin at different layers in order to determine the moisture content of the prunes at various locations within the load.

It is still another object of the invention to provide a bin turning mixer which can readily be adapted to all makes of bin-rotating, fork-lift vehicles.

It is an additional object of the invention to provide a generally improved bin turning mixer.

Other objects, together with the foregoing, are attained in the embodiment described in the following description and illustrated in the accompanying drawing, in which:

FIG. 1 is a fragmentary top plan view showing the fork lift clamping arm lowered into clamping position on top of the mixing lid;

FIG. 2 is a fragmentary side elevational view showing a fruit handling bin with the mixing lid installed thereon, preparatory to rotation;

FIG. 3 is a fragmentary front elevational view of FIG. 2, portions being broken away to show the stratification of the load prior to mixing;

FIG. 4 is a view comparable to FIG. 3 but with the bin in inverted position;

FIG. 5 is a sectional view, taken on the line 5—5 in FIG. 1, showing the approximate arrangement of the three moisture layers after 180° rotation from the base position shown in FIG. 3; and,

FIG. 6 is a view comparable to FIG. 5, but illustrating the distribution after the first complete rotation through 360°.

While the bin turning mixer of the invention is susceptible of numerous different embodiments, depending upon the environment and requirements of use, substantial numbers of the herein shown and described embodiment have been made and used, and all have performed in an entirely satisfactory manner.

The bin turning mixer of the invention, generally designated by the reference numeral 12 finds primary utility in conjunction with a conventional fork lift vehicle 13 provided with a clamping mechanism 14. The structure includes, in customary fashion, lifting forks 16 projecting forwardly from the bottom of a frame 17 slidably carrying a vertically movable clamping arm 18, the rotating mechanism being rotatably carried on a trunnion 19 extending forwardly from a vertically movable carriage 21 on the front end of the vehicle 13.

Supported on the lifting arms 16 is a standard 4 × 4 × 4 foot fruit handling bin 22, holding several hundred pounds of goods, such as prunes 24, nuts, and the like, which are to be mixed. Mounted fore and aft on the bottom of the bin 22 is a plurality of beams 26 serving in the nature of a bin-supporting pallet to accommodate the forks 16.

Arranged to register with the top four edges 31, or margin, of the four bin side walls is a sealing member 33, or gasket, of resilient material of considerable thickness, for example 2 inches, and substantial lateral width, for example 6 inches, so that great care need not be exercised in registering the sealing member on top of the bin.

The sealing member 33 is mounted along the bottom four edges 36 of four vertical side walls 37 of a lid member 38 with a horizontal top 41 stiffened transversely by a channel member 42 with vertical stiffening straps 43 on opposite sides of the lid 38.

Sampling gates 46, 47 and 48 are provided at spaced intervals across the lid 38, as appears most clearly in FIG. 1.

Each of the gates includes a sliding plate 51 and handle 52, the plate being guided in a pair of tracks 53 suitably formed of angle iron material.

FIG. 3 clearly indicates the tiers of prunes having differing moisture contents, the tiers being divided, for convenience, into the categories, dry prunes 56 in the top tier 57, these being indicated by hollow, circular-like members in the drawings.

In the middle tier 58, partially wet and partially dry prunes 59, are disclosed, the circular members being partially filled, as with moisture.

Lastly, in the bottom zone 61 there are still-wet prunes 62, shown as completely filled in, circular-like figures.

In order to mix up the stratified prune layers, the apparatus is rotated, as indicated by the arrows 63 and 64, about the axis of the trunnion 19.

Rotation through the first 180° causes the strata 57, 58 and 61 to assume the arrangement, shown in stylized fashion in FIG. 5. Such a pattern is not only susceptible

of demonstration, such as by substituting a transparent pane for a wall of the bin, but also by opening, one at a time, one of the sampling gates 46, 47 and 48, and ascertaining the moisture level of the prunes withdrawn through the gates.

After completion of the first rotation of 360°, the goods begin to assume the random disposition shown in FIG. 6.

Customarily, one additional rotation, taking another 10 seconds, would be made, at which time the prunes are thoroughly homogenized, or mixed.

It has been found that by providing an inclined plate 71 on the inside of each of the four walls 37 of the lid 38, as appears most clearly in FIGS. 3 and 6, the contents are channeled, or funneled, toward the center in upright posture and dispersed laterally in inverted attitude, thereby improving the performance of the apparatus in its mixing operation.

What is claimed is:

1. A bin turning mixer comprising in combination with a rotatable fork lift having a bin clamping arm:

- a. a lid member having a square top substantially coextensive in size with the upper margin of a bin, four side walls depending from said top, and a sealing member mounted on the lower edge of said side walls engageable with the upper margin of a bin for sealing the contents thereof;
- b. a plurality of sampling gates mounted on said lid member, said gates being capable of being selectively opened to withdraw samples of the contents of said bin; and,
- c. force distributing means on said lid member for engaging the bin clamping arm, said force dis-

tributing means including a channel member mounted on top of said lid, said channel member being oriented at right angles to the lifting force, and reinforcing members on said side walls, said force distributing means being effective to transmit the force exerted by said arm to said sealing member and thereby urge said sealing member into sealing engagement with the subjacent upper margin of the bin.

2. A bin turning mixer comprising in combination with a rotatable fork lift having a bin clamping arm:

- a. a hollow lid having a top substantially coextensive in size with the upper margin of a bin, and four side walls depending from said top to define therewith a covered mixing chamber capable of receiving a predetermined portion of the bin contents in inverted attitude of the bin;
- b. means on said lid for engaging the bin clamping arm; and,
- c. a sealing member mounted on the lower edges of said side walls engageable with the upper margin of the bin to seal the contents thereof as the bin is inverted and subsequently righted while said predetermined portion of the contents is correspondingly transferred into said mixing chamber and subsequently removed therefrom.

3. A bin turning mixer as in claim 2 further including a plurality of downwardly and inwardly inclined centering plates mounted on the inner surface of said side walls, said centering plates being effective to disperse laterally the contents of said lid in inverted attitude of the bin and to center the contents of said lid as the bin is rotated from inverted to upright attitude.