

Feb. 17, 1953

J. HERTRICH

2,628,719

CENTRIFUGAL APPARATUS DISCHARGER

Filed Nov. 29, 1946

4 Sheets-Sheet 1

Fig. 1.

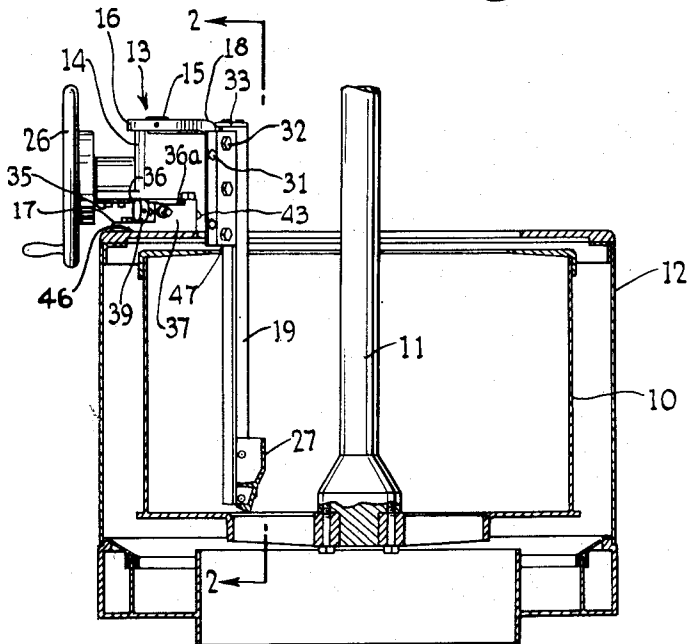


Fig. 2.

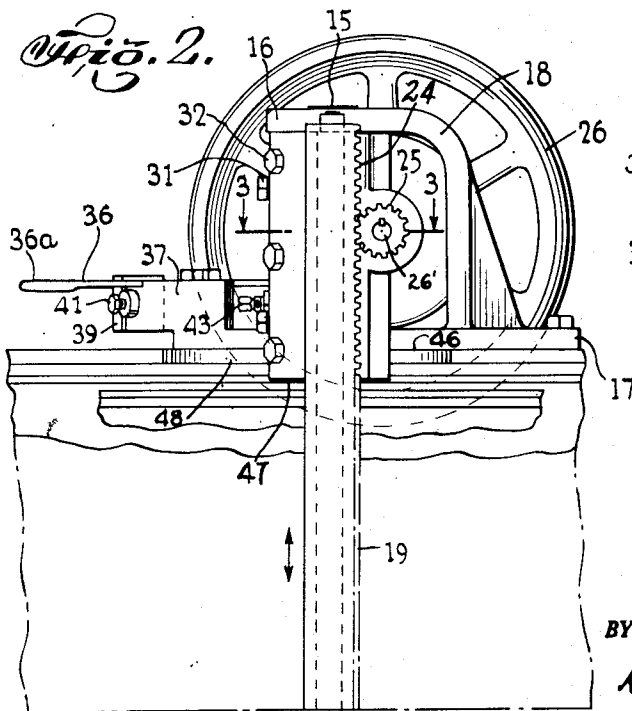
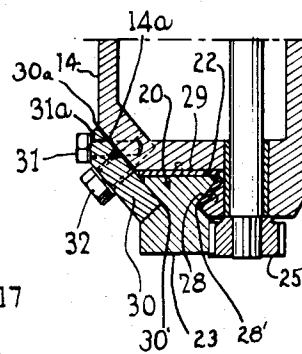


Fig. 3.



INVENTOR.
JOSEPH HERTRICH
BY
Hammond & Hittell
ATTORNEYS

Feb. 17, 1953

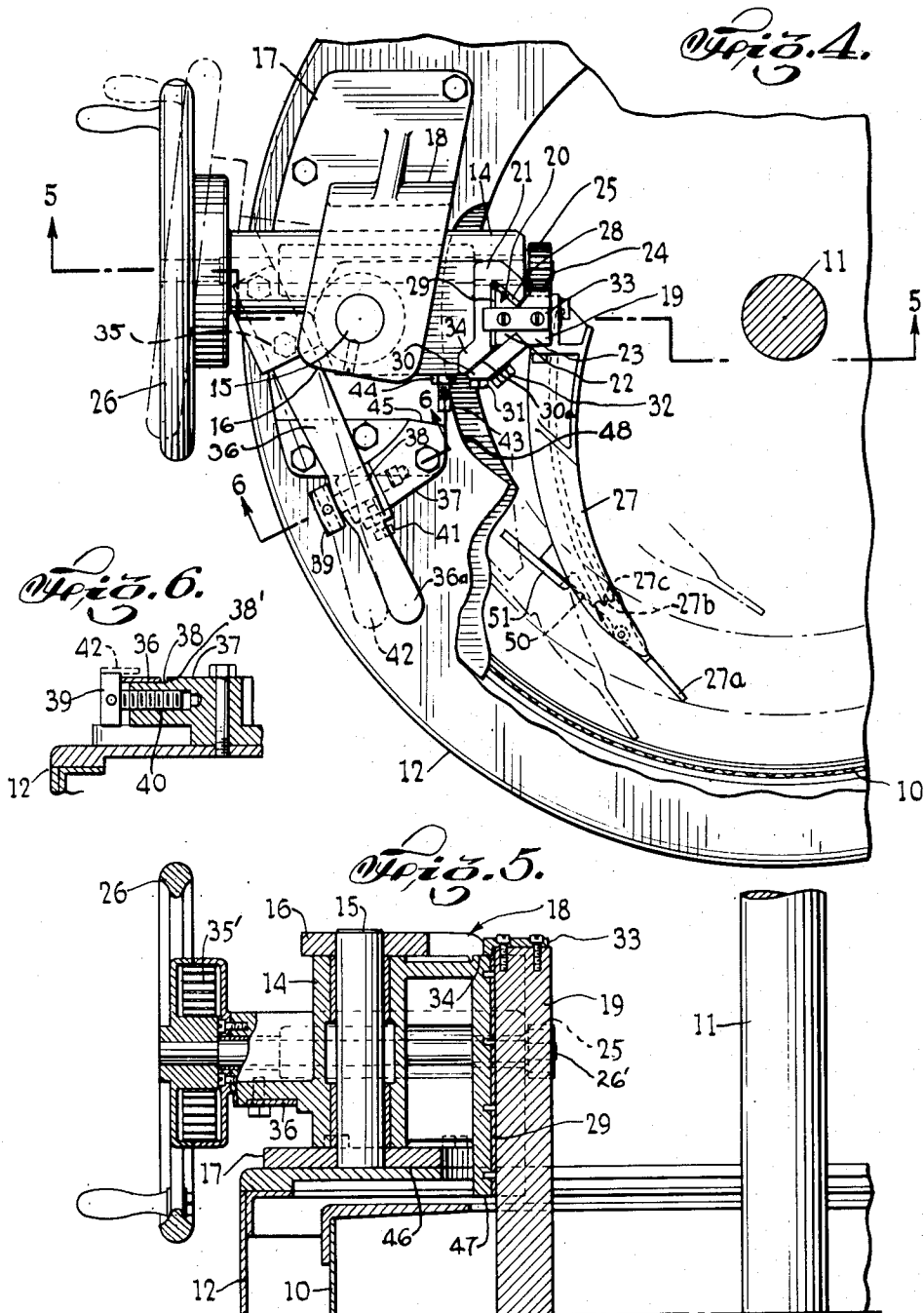
J. HERTRICH

2,628,719

CENTRIFUGAL APPARATUS DISCHARGER

Filed Nov. 29, 1946

4 Sheets-Sheet 2



INVENTOR.
JOSEPH HERTRICH
BY
Hammond & Littel
ATTORNEYS

Feb. 17, 1953

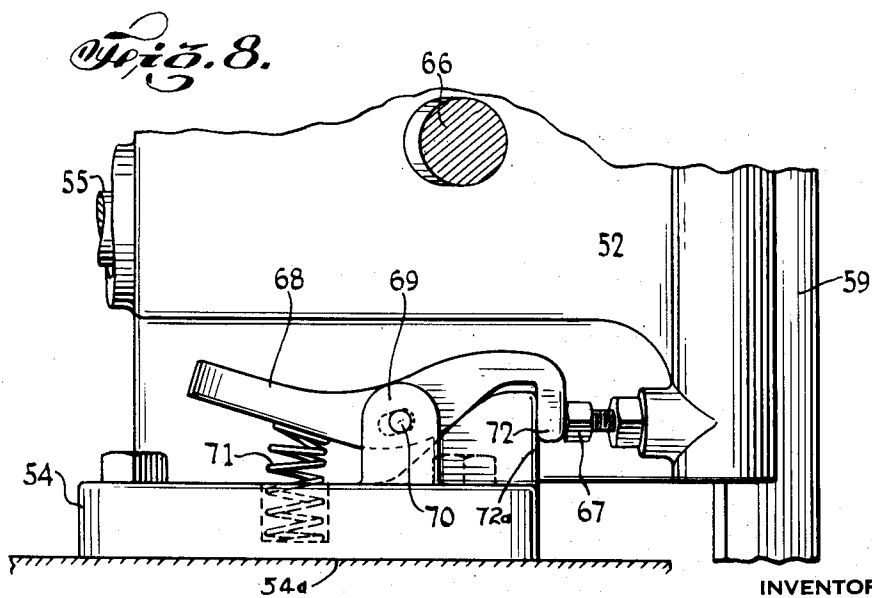
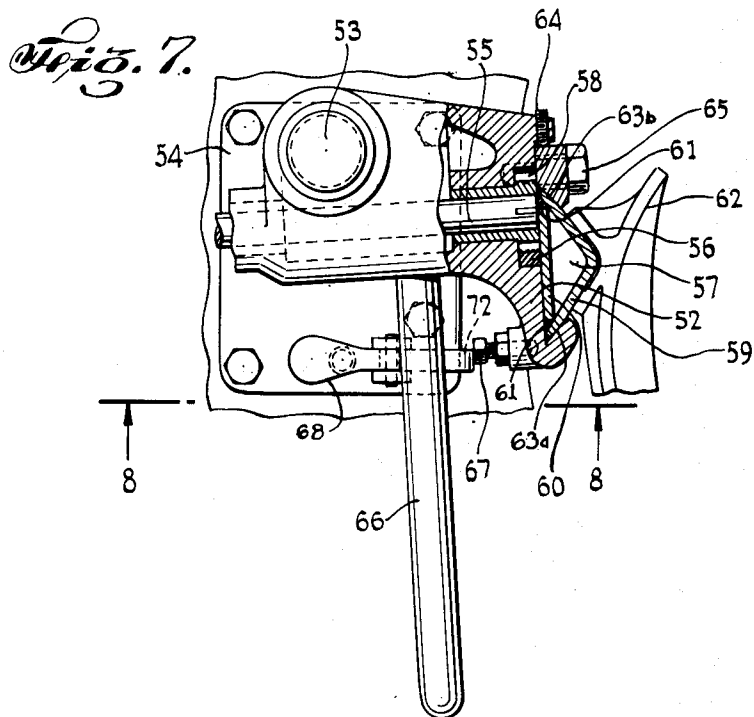
J. HERTRICH

2,628,719

CENTRIFUGAL APPARATUS DISCHARGER

Filed Nov. 29, 1946

4 Sheets-Sheet 3



INVENTOR
JOSEPH HERTRICH

BY
Hammond & Little
ATTORNEYS

Feb. 17, 1953

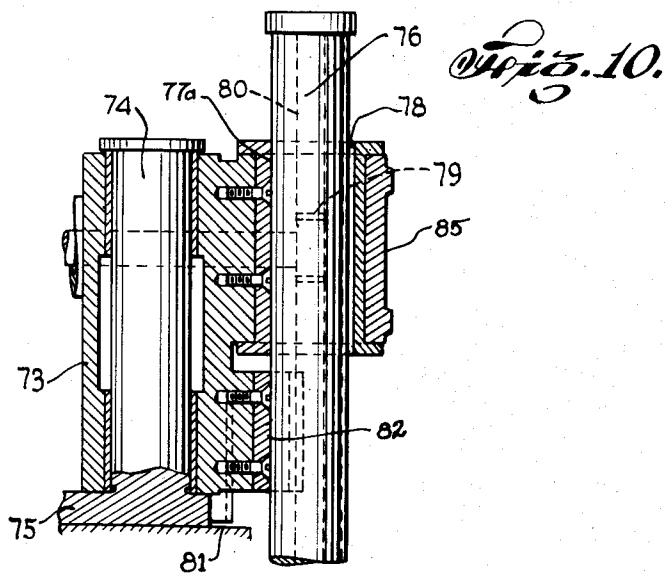
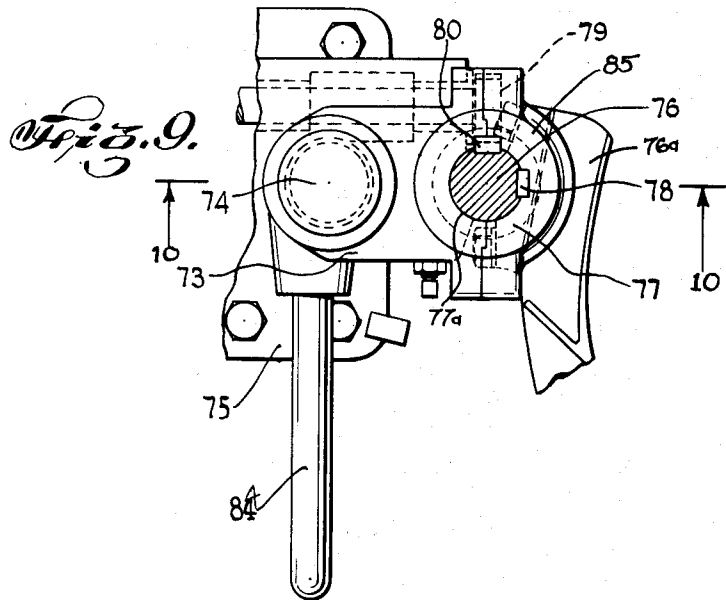
J. HERTRICH

2,628,719

CENTRIFUGAL APPARATUS DISCHARGER

Filed Nov. 29, 1946

4 Sheets-Sheet 4



INVENTOR
JOSEPH HERTRICH

BY *Hammond & Little*
ATTORNEYS

UNITED STATES PATENT OFFICE

2,628,719

CENTRIFUGAL APPARATUS DISCHARGER

Joseph Hertrich, Hamilton, Ohio, assignor to The
Western States Machine Company, Hamilton,
Ohio, a corporation of Utah

Application November 29, 1946, Serial No. 712,781

16 Claims. (Cl. 210—70)

1

This invention relates to a centrifugal apparatus and particularly to a discharger mechanism for removing material from gyratory centrifugal baskets of the type used in sugar mill operation.

Sugar centrifugals conventionally have a rotating basket and a discharger shoe which can be inserted into said basket so as to operate with a plowing action to cut the sugar from the basket wall, the tip of the discharger shoe entering a revolving layer of sugar on the basket wall and separating the sugar from said wall. One arrangement of a well-known discharger is shown in the patent to Roberts, No. 2,076,516.

When the discharger is not being used, the shoe is raised out of the basket and then moved laterally to a position over the curb and clear of the basket opening. Previous discharger devices have required considerable room over the centrifugal for installation because of the arrangement of the guide for the discharger shaft relative to the centrifugal casing and the mounting of the discharger shoe on the discharger shaft. The height necessary above the aforementioned centrifugal machine has included the height of the shoe and in addition thereto the height of the guide for the discharger shaft. Because of such a height requirement, frequently there has been insufficient room to install equipment where desired.

One of the objects of the present invention is to provide a centrifugal discharger apparatus which will allow installation of the centrifugal in a space having less height or headroom than previously has been possible.

Another object of the invention is to provide a superior control of the angular position of the discharger shoe both when in discharging position and when in a raised inoperative position.

A further object of the invention is to provide an improved discharger shaft guide bracket arrangement including easily adjustable bearing surfaces.

One of the features of the invention is to arrange the discharger shaft and guide therefor so that the discharger shoe can be raised above the lower face of the shaft guide and thereafter the shoe swung over the top of the casing. By such an arrangement, a reduction in height required for installation of the centrifugals is effected.

Another feature of the invention is the use of a compound motion handle for moving and positioning the discharger shoe in a horizontal plane

2

or a plane transverse to the vertical axis of the centrifugal. The handle is rotatable in said horizontal plane for moving the discharger shoe relative to said vertical axis, and then the handle and a stop are movable relative to each other in a plane angularly disposed to said horizontal plane for holding said handle and shoe in a predetermined angular horizontal position. The stop or recess with which the handle engages in said positioning or latching operation can be made readily adjustable so that the depth of the first cut of the discharger shoe can be varied as desired when the shoe is in a lowered position. The same stop or recess also can be used for holding the shoe in an inoperative position after the shoe has been raised out of the basket and swung over the curb. A second adjustable stop can be provided to limit the second cut of the discharger shoe after the handle has been disengaged from said first-mentioned stop and the handle rotated to move the shoe toward the basket wall thereby protecting the basket.

Another feature of the invention is the pivotal mounting of the shaft guide housing on the curb of the centrifugal or other suitable place with the center or axis of the discharger shaft offset from the center of said pivot, the shaft being non-rotatably mounted relative to the guide. In this manner, pivoting of the guide housing will control the position of the shoe relative to the basket wall and the vertical axis of the centrifugal.

The center of rotation of the discharger assembly can be located relative to the line of force of the sugar in the basket against the tip of the discharger shoe, so that the force tends only slightly to assist the shoe in digging into the sugar and so that most of the force of the rotating material is spent against a fixed pivot pin which supports the assembly.

Still another feature of the invention is the provision of readily adjustable liners or bearings in the shaft guide so that the clearance between the shaft and guide walls can be initially carefully set and then adjusted as the parts wear. This will serve to give additional stability to the discharger shoe as it is being operated.

These and other objects, features, and advantages of the invention will become apparent from the following description and drawings which are to be considered merely exemplary.

In the drawings:

Fig. 1 is an elevation, partially in section, showing the discharger assembled with the centrifugal basket and curb.

3

Fig. 2 is an enlarged fragmentary view taken along line 2—2 of Fig. 1.

Fig. 3 is an enlarged sectional view of the discharger shaft guide taken along line 3—3 of Fig. 2.

Fig. 4 is a fragmentary enlarged plan view of a portion of the apparatus of Fig. 1.

Fig. 5 is a fragmentary enlarged sectional view taken along the line 5—5 of Fig. 4.

Fig. 6 is a detailed sectional view taken along line 6—6 of Fig. 4.

Fig. 7 is a fragmentary plan view, partially in section, of a modified form of the apparatus.

Fig. 8 is an enlarged fragmentary view looking in the direction 8—8 of Fig. 7 showing the guide housing positioning means.

Fig. 9 is a fragmentary plan view of another modification of the invention.

Fig. 10 is a fragmentary sectional elevation of the device of Fig. 9 in the direction 10—10 of Fig. 9.

In a preferred embodiment of the invention, a conventional centrifugal basket 10 is suspended on gyratory basket spindle 11, a casing or curb 12 being provided in the usual manner for collecting centrifugally expelled liquid from basket 10. The discharger mechanism is indicated generally at 13, having a discharger shaft guide housing 14 pivotally carried by stub shaft 15, stub shaft 15 being carried by arm 16 and base 17 of bracket 18. Discharger shaft 19 is vertically slidable in guide passage 20 of shaft guide housing 14.

The discharger shaft 19 can comprise a dove-tail shaped portion 22 and a second dove-tail shaped portion 23 projecting laterally from the first dove-tail shaped portion. Said second portion 23 extends outside of the guide passage 20 of the discharger shaft guide housing 14 through the longitudinally or vertically extending slot defined by the outer edges 28' and 30' (Fig. 3) of guide passage liners 28 and 30, respectively.

The second dove-tail shaped portion 23 may have rack teeth 24 cut in one side thereof, said rack teeth being engageable by pinion 25 which is operable by handwheel 26 for the purpose of raising and lowering the discharger shaft. Handwheel shaft 26' is journaled in discharger shaft guide housing 14 and a spring 35' may cooperate with the wheel to counterbalance the weight of the shoe and shaft. The discharger shoe 27 is mounted in some suitable manner on the laterally extending portion 23 of the discharger shaft 19 so that the shoe may be raised above the bottom surface 47 of shaft guide housing 14. The discharger shoe 27 may be of conventional design as shown, for example, in the aforementioned patent to Roberts, No. 2,076,516. The shoe may take the form shown in Fig. 4, wherein a tip 27a pivoted on a vertical axis to the forward end of the shoe body has a rearward extension 27b yieldably positioned by a leaf spring 50, and the leaf spring is mounted on the shoe body by a plate 51 which is positioned so as to assist in preventing the shoe from digging too far into solids in the basket during the outward shoe movement. Spring 50 normally holds the tip extension 27b in engagement with an abutment 27c, with the tip 27a positioned as seen in Fig. 4, but the tip is movable inward from that position against the tension of the spring in the event of the shoe being moved so far outward as to press the tip against the basket screen.

In order to provide adjustment, guide passage 20 has hard surface liners 28 and 29 on two sides

4

of the dove-tail shaped portion of the guide passage, the other wall of the dove-tail shaped guide being formed by adjustable liner 30, said liner being adjustable so as to regulate the clearance between the guide passage and the discharger shaft 19, through a shim or shims 30a and adjusting screws or bolts 31 and 32 serving to position and lock liner 30. Adjusting bolt 32 passes through a slightly enlarged hole in liner 30 in a direction normal to the wall 14a of the guide. The adjusting bolt 31 is screw threadedly engaged in guide 14 in a direction substantially parallel to the face of liner 29, passing through an enlarged hole in liner 30, the head engaging beveled surface 31a of liner 30. As 30 is moved longitudinally toward the shaft, bolt 31 may be tightened to position the liner 30 in the desired longitudinal location relative to wall 14a where the forward end 30' of 30 holds shaft 19 with the desired pressure against the face of liner 28. Bolt 32 then may be tightened to lock the assembly and create the desired pressure of the shaft against the face of liner 29. By using different thickness shims, pressure of the shaft against liner 29 may be adjusted. Thus, it is evident that the liner 30 can be adjusted in two directions for regulating the fit of the discharger shaft 19 in the guide passage 20.

A stop plate 33 is mounted on the top of the discharger shaft 19, the lateral extension of said stop beyond the discharger shaft cooperating with the top surface 34 of the shaft guide housing 14 to limit downward movement of the shaft and shoe in the basket.

For the purpose of controlling the position of the discharger shoe in a horizontal plane, the discharger shaft guide housing 14 has operating arm 35 fastened thereto at 35, said arm cooperating with arm positioning bracket 37 and having at its end handle 36a. Movement of handle 36a will pivotally swing discharger shaft guide housing 14 about stub shaft 15 so as to change the angular position of the discharger shoe relative to the side of the basket 10 when the discharger shaft and shoe are in operative or lowered position, and also to swing the shoe over the curb when the shoe is in its upper position where it is high enough to clear the top 46 of the curb.

When the shoe is in a lowered position, such as indicated by the broken lines nearest to shaft 11 in Fig. 4, the arm 36 will be moved clockwise so as to move the shoe outward into a wall of solids rotating slowly with the basket in clockwise relation to shaft 11. Thus a swath of solids is cut out and discharged from the basket, and the outward shoe movement for this purpose may continue until the arm 35 reaches an intermediate cutting position in which it is engaged and retained in a latching recess 38 (Figs. 4, 6) formed in the arm positioning bracket 37 between shoulder 38' (Fig. 6) and adjustable stop screw 39. Adjustable stop screw 39 is screw threadedly mounted in hole 40 of the arm positioning bracket 37, a set screw 41 being provided for the purpose of locking the stop screw 39 in any adjusted position.

When it is desired to move the lowered shoe to a position closer to the basket wall as material is scraped from the basket, handle 36a may be lifted upwardly, there being sufficient resilience in said arm 35 to allow such movement, and then moved clockwise (Fig. 4) to the position shown in broken lines at 42 (Fig. 6), the arm then resting on top of stop screw 39 and the shoe tip being

5

next to the basket side wall as seen in the broken lines farthest from shaft 11 in Fig. 4.

In order to protect the basket wall, shaft guide housing stop screw 43 carrying lock nut 44 is screw threadedly engaged in shaft guide housing 14, said screw being cooperable with the surface 45 of the arm positioning bracket 37 so as to limit the movement of the discharger shoe toward the wall of the basket as the handle is swung in a clockwise direction to the broken line position 42.

When it is desired to raise the discharger shoe out of the basket and move it over curb 12 to an inoperative position, the handle is moved counter-clockwise (Fig. 4) until the shoe is in a position wherein it will clear the inner edges of the basket top and curb top as handwheel 26 is turned to raise the shaft 19 and discharger shoe upwardly out of the basket.

With the shoe in its upper position, handle 36a again may be moved clockwise until arm 36 is in position to drop into place in recess 38, thus latching the shoe in an inoperative position over the curb. A clearance cut 43 is provided in the top of the curb so that the bottom 47 of shaft guide housing 14 adjacent the guide passage may be swung without interfering with the curb as the shoe is swung over the curb, the shoe being above the lower face 47 of the shaft guide housing in the form shown in Figs. 1 to 5, inclusive, and above the upper face 46 of the curb. In this manner, the shoe is latched in its inoperative position over the curb and cannot be accidentally displaced.

When the shoe is to be lowered into the basket from an inoperative position over the curb, handle 36a is moved upwardly to lift arm 33 out of the latching recess 38 against the spring tension of the arm. The handle is then rotated in a horizontal plane while it is held in an elevated position relative to the stop, and rotation is continued until the shoe is in a position where it can clear the inner edge of the curb top and basket top as it is lowered by handwheel 26.

In a modified form of the invention, shaft guide housing 52 (Fig. 7) is pivoted on stub shaft 53 which is carried by bracket 54 fastened to the top of the curb 52a. Handwheel shaft 55 is journaled in guide housing 52 and can have a handwheel (not shown) mounted thereon in a manner similar to that described for Figs. 1 to 5. A rack 56 is mounted on one of the faces of the discharger shaft 57 and is engageable by pinion 53 fastened on handwheel shaft 55.

Discharger shaft 57 may be made of two strips of some suitable metal, such as stainless steel, welded together in the triangular form shown. Strip 59 is formed into an angle constituting two faces of the shaft with the third face 60 welded to angle 59 at 61. A discharger shoe 62 is mounted adjacent the lower end of discharger shaft 57. Discharger shaft 57 is vertically slidable in the guide passage defined between surface 63a and adjustable wedge block 63b, there being a passage or slot between the outer edges of said surface 63a and block 63b communicating with the guide passage. Block 63b may be adjustable by means of a series of vertically arranged adjusting screws 64 and locked in place by lock screws 65.

In order to pivot the guide shaft housing 52 to move the shoe in a plane transverse to the vertical axis of the centrifugal, arm 66 is mounted on guide shaft housing 52. Adjustable stop screw 67 carried on the guide housing 52 serves to limit the angular movement of the discharger

6

shaft guide housing 52 about pivot 53 in the manner about to be described. Stop arm 68 (Figs. 7, 8) is pivotally carried by pin 70 on supports 69 mounted on bracket 54. Spring 71 serves to urge the left-hand end (Fig. 8) of stop arm 68 upwardly and, therefore, the nose 72 of the stop arm into a downward position and in line with stop screw 67. When the arm 66 is operated to pivot the discharger shaft guide housing, thereby moving the discharger shoe toward the basket wall, movement of the guide shaft housing is limited at a predetermined position by contact of the stop screw 67 with the outer face of nose 72 of the pivoted stop arm. After the first cut into the sugar on the basket wall has been completed, the left-hand end of stop arm 68 can be depressed so as to raise nose 72 upwardly. Arm 66 can then be swung to move the guide housing until adjustable stop screw 67 contacts surface 72a of base 54, so as to permit the discharger shoe to take its final cutting position relative to and closely adjacent the basket wall.

Still another form of the invention is shown in Figs. 9 and 10 wherein the discharger shaft guide housing 73 is pivotally mounted at 74 on bracket 75 carried by the centrifugal curb. Cylindrical discharger shaft 76 is mounted in the discharger shaft guide 77, there being a spline or key 78 to prevent rotation of discharger shaft 76 relative to the guide 77. Guide 77 is made of two mating parts comprising a base secured to housing 73 and a cap 85 which is formed to receive the key 78. These parts form a cylindrical bearing surface 77a which defines the guide passage receiving shaft 76. A shoe 76a is mounted adjacent the lower end of said shaft. A bearing surface 82 extending below surface 77a can be employed to assist in supporting the shaft, a space or slot being left to the right (Fig. 10) of the surface 82, in the shaft guiding structure as a whole, so as to enable the discharger shoe to be raised above the upper surface 31 of the curb by reason of structure similar to slot 20 of Figs. 1-5. Pinion 79 engages rack teeth 80 cut in or fastened to the discharger shaft for raising and lowering the shaft.

The discharger shoe is mounted adjacent the lower end of discharger shaft 76 in a manner similar to the previously described forms of the invention. An arm 84 can be provided to pivot the discharger shaft guide housing 73 about pivot 74 so as to control the position of the shoe relative to the basket wall.

It is seen that the discharger shaft may take various cross-sectional forms and may be made hollow or solid. When the dove-tail or similar form is used, such as that seen in Figs. 1 to 8, the angle of the surfaces can be arranged so as to counteract efficiently the forces tending to turn the discharger shaft as the shoe cuts into the sugar.

By the construction described herein, other means for raising and lowering the shaft may be applied with ease, such as by connecting a hydraulic motor (not shown) or other hoisting means to the exteriorly extending portion of the discharger shaft.

It will be observed that the discharger shoe 27 (Figs. 1-6, inclusive) and shaft 19 and the shaft guide 14, arm 36 and handwheel 26 all turn as a unit about the vertical axis of the stub shaft 15 anchored by bracket 18. This axis may be disposed slightly inside (toward the basket spindle 11 from) the line of force or pressure of material in the basket 10 against the plowing tip or end

7

of the discharger shoe, so that only a small component of said force or pressure will assist the progressive movement of the shoe laterally into said material as each discharging operation proceeds, thus facilitating the work of the attendant of the machine. The major part of that force is spent against the fixed pivot at 15, so that the attendant is not required to resist the heavy pressure of the rotating material by the strength of his arm holding handle 36a, 66 or 84. Thus the discharger is not likely to be forced inadvertently too far or too heavily toward the basket screens.

It is to be understood that various modifications may be made in the details of construction without departing from the spirit of the invention as defined in the appended claims.

I claim:

1. A centrifugal basket discharger including a shaft guide housing having a non-circular-shaped cross-section vertical guide passage with a vertically extending slot communicating therewith, a discharger shaft having a similar non-circular cross-section vertically slidable in said guide passage and being non-rotatable relative thereto, said shaft having a portion extending laterally through said slot to the exterior of the housing, and a discharger shoe mounted on said lateral portion of the shaft adjacent one end of said shaft whereby said shoe can be raised above the lower face of said guide housing when said shaft is raised to an upper position.

2. A centrifugal basket discharger including a shaft guide housing having a dove-tail shaped guide passage therethrough with a vertical slot communicating therewith, a dove-tail shaped discharger shaft vertically slidable in said guide passage, said shaft having a portion extending laterally therefrom through said slot, a discharger shoe mounted adjacent one end of said shaft on said laterally extending portion, and means to raise said shoe above the lower face of said guide housing.

3. A centrifugal basket discharger including a discharger shaft guide housing having a longitudinally extending passage therethrough and a longitudinally extending slot communicating with said passage and extending outwardly therefrom, said housing having a lower face around said passage, a discharger shaft vertically slidable in said guide passage, said shaft having a portion extending through said slot exteriorly of said guide housing and longitudinally slidable in said slot, a discharger shoe mounted on said exterior portion of the shaft movable above the lower face of said housing, and traversing means operatively connected with said exterior portion of the shaft for raising and lowering said shoe above the lower face of the guide housing.

4. A centrifugal basket discharger including a discharger shaft guide housing having a vertically extending dove-tail shaped guide passage therethrough with a vertically extending slot communicating therewith and extending outwardly therefrom, a dove-tail shaped discharger shaft vertically slidable in said guide passage, said shaft having a portion extending laterally therefrom through said slot and vertically slidable therein, a discharger shoe mounted adjacent one end of said shaft on said laterally extending portion, a rack on said shaft exterior portion, and gear means mounted on said housing engageable with said rack for raising said shoe above the lower face of said guide housing.

5. A basket discharger for a centrifugal with

8

a basket and casing including a pivotally mounted discharger shaft guide housing having a dove-tail shaped guide passage therethrough with a vertically extending slot communicating therewith, a bracket adapted to pivotally mount said housing on the centrifugal casing, a dove-tail shaped discharger shaft vertically slidable in said guide passage, said shaft having a portion extending laterally therefrom through said slot and vertically slidable therein, a discharger shoe mounted adjacent one end of said shaft on said laterally extending portion, a rack on said shaft exterior portion, gear means engageable with said rack for raising said shoe above the lower face of said guide housing, and means to swing said housing about its pivot whereby said shoe can be moved transversely relative to a vertical axis of the centrifugal.

6. In a centrifugal with a suspended rotatable gyratory basket assembly and a casing therefor, a basket discharger including a pivotally mounted shaft guide housing having a vertical guide passage therethrough and a vertically extending slot communicating with said passage and extending laterally therefrom, said housing having a lower face around said guide passage, a discharger shaft vertically slidable in said guide passage, said shaft having a portion extending laterally through said slot and exteriorly of said guide housing, a discharger shoe mounted adjacent one end of said shaft on said laterally extending shaft portion, means to raise said shoe above the lower face of said guide housing, a handle for swinging said shaft guide housing in one plane, a stop for locating said handle and shoe in a predetermined position relative to the vertical axis of the centrifugal, said stop and handle being movable relative to each other whereby said shoe may be restrained in a predetermined position relative to the basket wall and restrained in a predetermined position relative to and over said casing when in an elevated position.

7. A centrifugal basket discharger including a shaft guide housing having a dove-tail shaped guide passage therethrough with a vertical slot communicating therewith and opening to the exterior of said housing, one of the side bearing surfaces of said passage adjacent said slot being adjustably mounted for movement in two directions, a dove-tail shaped shaft vertically slidable in said passage, the side surface of said shaft cooperating with said adjustable side bearing surface so that the clearance can be adjusted, said shaft having a portion extending laterally therefrom through said slot, and a discharger shoe mounted adjacent one end of said shaft.

8. A centrifugal basket discharger including a shaft guide housing having a vertical dove-tail shaped guide passage therethrough with a vertical slot communicating therewith, opening exteriorly of said guide housing, a triangular shaped discharger shaft vertically slidable in said vertical guide passage, said shaft having a portion extending laterally therefrom through said slot, a discharger shoe mounted adjacent one end of said shaft on said laterally extending portion, said shaft having means slidable in said slot and means to raise said shoe above the lower face of said guide housing.

9. In a discharger apparatus for a centrifugal including a basket that rotates on a vertical axis, has a centrally open top and lies inside a fixed casing having a centrally open top over the basket top, the combination comprising a ver-

tical pivot pin in fixed position on the casing top, a housing swiveled on said pin and having a forward portion overhanging the top openings of said casing and basket, a vertical shaft guide of non-circular cross-section in said forward portion, a discharger shaft of like cross-section slidable vertically but non-rotatable in said guide, said shaft carrying a discharger shoe on its lower end, means connected with said housing for swinging it about said pivot pin to move said shoe horizontally toward and away from the plane of the basket side wall, the shoe being disposed so as to engage and discharge solids rotating in the basket upon movement of said housing about said pivot pin in the same sense as the sense of the basket rotation, the axis of said fixed pivot pin being disposed slightly inside the line of pressure of material in said centrifugal basket against the discharger shoe, on the side of such line toward the basket axis, so that such pressure is mostly absorbed by said pin but serves to urge the discharger shoe lightly toward said side wall, and means connected with said shaft for sliding it vertically to move the shoe up and down.

10. In a discharger apparatus for a centrifugal including a basket that rotates on a vertical axis, has a centrally open top and lies inside a fixed casing having a centrally open top over the basket top, the combination comprising a vertical pivot pin in fixed position on the casing top, a housing swiveled on said pin and having a forward portion overhanging the top openings of said casing and basket, a vertical shaft guide of non-circular cross-section in said forward portion, a discharger shaft of like cross-section slidable vertically but non-rotatable in said guide, said shaft carrying a discharger shoe on its lower end, lever means extending laterally from said housing over the casing top approximately in line with the line of pressure of material rotating in the basket against the discharger shoe, said lever means being connected with said housing for swinging it about said pivot pin to move said shoe horizontally toward and away from the plane of the basket side wall, the shoe being disposed so as to engage and discharge solids rotating in the basket upon movement of said housing about said pivot pin in the same sense as the sense of basket rotation, the axis of said pivot pin being disposed slightly inside said line of pressure, on the side thereof toward the basket axis, so that such pressure is mostly absorbed by said pin but serves to urge the discharger shoe lightly toward said side wall, and means connected with said shaft for sliding it vertically to move the shoe up and down.

11. In a discharger apparatus for a centrifugal including a basket that rotates on a vertical axis, has a centrally open top and lies inside a fixed casing having a centrally open top over the basket top, the combination comprising a vertical pivot pin in fixed position on the casing top, a housing swiveled on said pin and having a forward portion overhanging the top openings of said casing and basket, a vertical shaft guide of non-circular cross-section in said forward portion, a discharger shaft of like cross-section slidable vertically but non-rotatable in said guide, said shaft carrying a discharger shoe on its lower end, means connected with said housing for swinging it about said pivot pin to move said shoe horizontally toward and away from the plane of the basket side wall, the shoe being disposed so as to engage and discharge solids rotating in the

basket upon movement of said housing about said pivot pin in the same sense as the sense of basket rotation, stop elements fixed respectively on the housing and above the casing top, said stop elements co-engaging to limit the swinging movement of the shoe toward the basket side wall, the axis of said pivot pin being disposed slightly inside the line of pressure of material in said basket against the discharger shoe, on the side of said line toward the basket axis, so that such pressure is mostly absorbed by said pin but serves to urge the discharger shoe lightly toward said side wall, and means connected with said shaft for sliding it vertically to move the shoe up and down.

12. In a discharger apparatus for a centrifugal including a basket that rotates on a vertical axis, has a centrally open top and lies inside a fixed casing having a centrally open top over the basket top, the combination comprising a pivot pin fixed vertically over the casing top, a housing swiveled on said pin and having a forward portion overhanging the top openings of said casing and basket, a vertical shaft guide of non-circular cross-section in said forward portion, a discharger shaft of like cross-section slidable vertically but non-rotatable in said guide, said shaft carrying a discharger shoe on its lower end, means connected with said housing for swinging it about said pivot pin to move said shoe horizontally toward and away from the plane of the basket side wall, stop elements fixed respectively on the housing and above the casing top, said stop elements co-engaging to limit the swinging movement of the shoe toward the basket side wall, the stop elements including two spaced abutments over the casing top, the first abutment being positioned to stop the swinging movement of the housing at an intermediate position where the shoe is away from the basket side wall, the other abutment being positioned to stop said movement when the shoe reaches said wall, and at least one of the stop elements being shiftable to render the first abutment inactive, and means connected with said shaft for sliding it vertically to move the shoe up and down.

13. A discharge apparatus as described in claim 12, wherein the shiftable stop element is a spring-biased detent mounted on the bracket and movable out of the path of the stop element fixed to the housing.

14. In a discharger apparatus for a centrifugal including a basket that rotates on a vertical axis, has a centrally open top and lies inside a fixed casing having a centrally open top over the basket top, the combination comprising a pivot pin fixed vertically over the casing top, a housing swiveled on said pin and having a forward portion overhanging the top opening of said casing and basket, a vertical shaft guide of non-circular cross-section in said forward portion, a discharger shaft of like cross-section slidable vertically but non-rotatable in said guide, said shaft carrying a discharger shoe on its lower end, lever means extending laterally from said guide over the casing top and in the general line of pressure of material rotating in the basket against the discharger shoe, said lever means being springable vertically and being connected with said housing for swinging it about said pivot pin to move said shoe horizontally toward and away from the plane of the basket side wall, stop elements including two spaced abutments over the casing top, the first abutment being positioned to stop the swinging movement of the housing at an

intermediate position when the shoe is away from the basket side wall, the other abutment being positioned to stop said movement when the shoe reaches said side wall, said springable lever being movable vertically to clear the first abutment, and means connected with said shaft for sliding it vertically to move the shoe up and down.

15. In a discharger apparatus for a centrifugal including a basket that rotates on a vertical axis, has a centrally open top and lies inside a fixed casing having a centrally open top over the basket top, the combination comprising a pivot pin fixed vertically over the casing top, a housing swiveled on said pin and having a forward portion overhanging the top openings of said casing and basket, a vertical shaft guide of non-circular cross-section in said forward portion, said guide having a side opening, a discharger shaft of like cross-section slidable vertically but non-rotatable in said guide, said shaft carrying a discharger shoe on its lower end, said discharger shoe being movable into said side opening when the lower end of the shaft is moved upwardly into said guide so that the shoe can be swung over the top of the casing, means connected with said housing for swinging it about said pivot pin to move said shoe horizontally toward and away from the plane of the basket side wall, and means connected with said shaft for sliding it vertically to move the shoe up and down.

16. A basket discharger for a centrifugal having a rotary basket and a surrounding fixed casing, including a base plate carrying a fixed vertical pivot and adapted to be fixed to the casing top, a shaft guide housing carried swingably on

said pivot, said housing having a lower face adjacent to said base plate and providing a vertical shaft guide extending at its lower end at least substantially to said lower face, a discharger shaft vertically slidable and non-rotatable in said guide, a discharger shoe mounted on one end of said shaft and shoe raising means connected with said shaft operable to raise the shoe to an upper position above said lower face of said shaft guide housing whereupon said shaft guide housing and discharger shoe may be pivotally swung over the top of said casing.

JOSEPH HERTRICH.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
373,443	Culver	Nov. 22, 1887
957,715	Roberts et al.	May 10, 1910
1,011,851	Roberts et al.	Dec. 12, 1911
1,113,233	Moore	Oct. 13, 1914
1,202,936	White	Oct. 31, 1916
1,205,128	Mackintosh	Nov. 14, 1916
1,326,411	Mackintosh	Dec. 30, 1919
1,377,141	Roberts et al.	May 3, 1921
1,385,982	Bryson	Aug. 2, 1921
1,388,173	Daniels	Aug. 23, 1921
1,609,754	McCollum	Dec. 7, 1926
1,957,472	Pankratz	May 8, 1934
2,076,516	Roberts	Apr. 16, 1937
2,249,210	Johnson	July 15, 1941
2,328,211	Harper et al.	Aug. 31, 1943