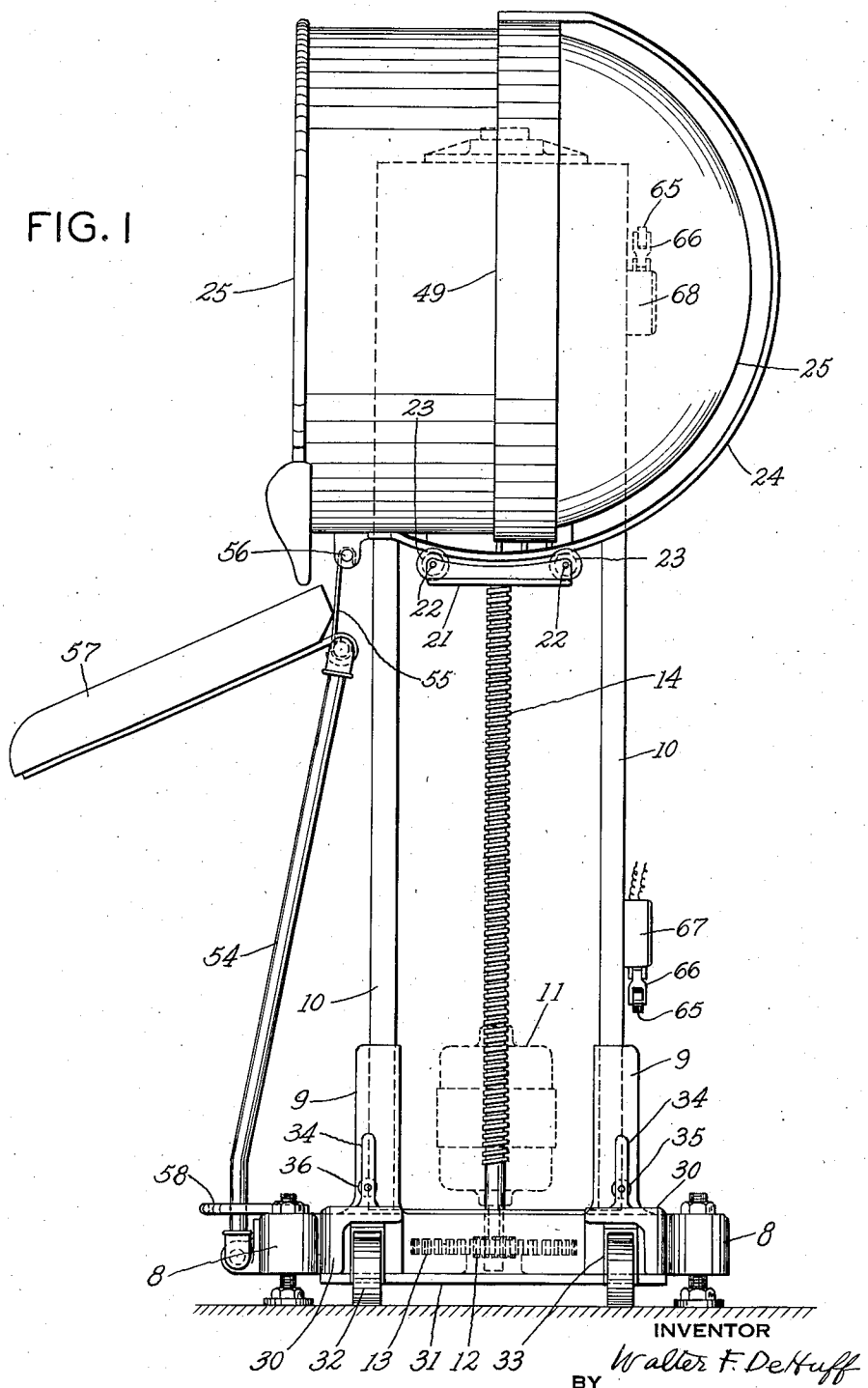
Jan. 9, 1940. W. F. DEHUFF 2,186,478

BOWL HANDLING MECHANISM FOR MIXING MACHINES

Filed July 10, 1936 3 Sheets-Sheet 1

FIG. 1



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BOWL HANDLING MECHANISM FOR MIXING MACHINES

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FIG. 1A

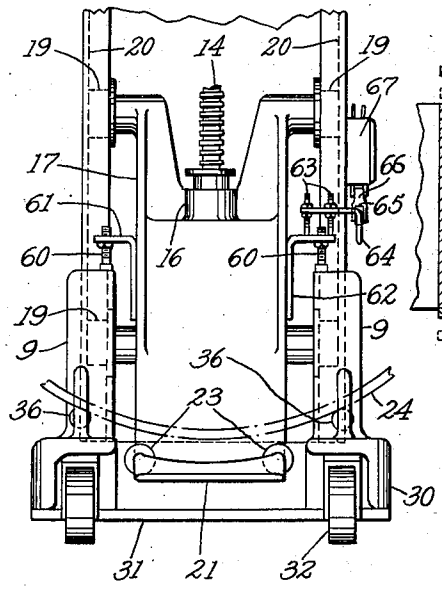


FIG. 2A

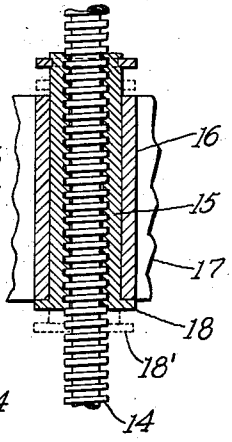
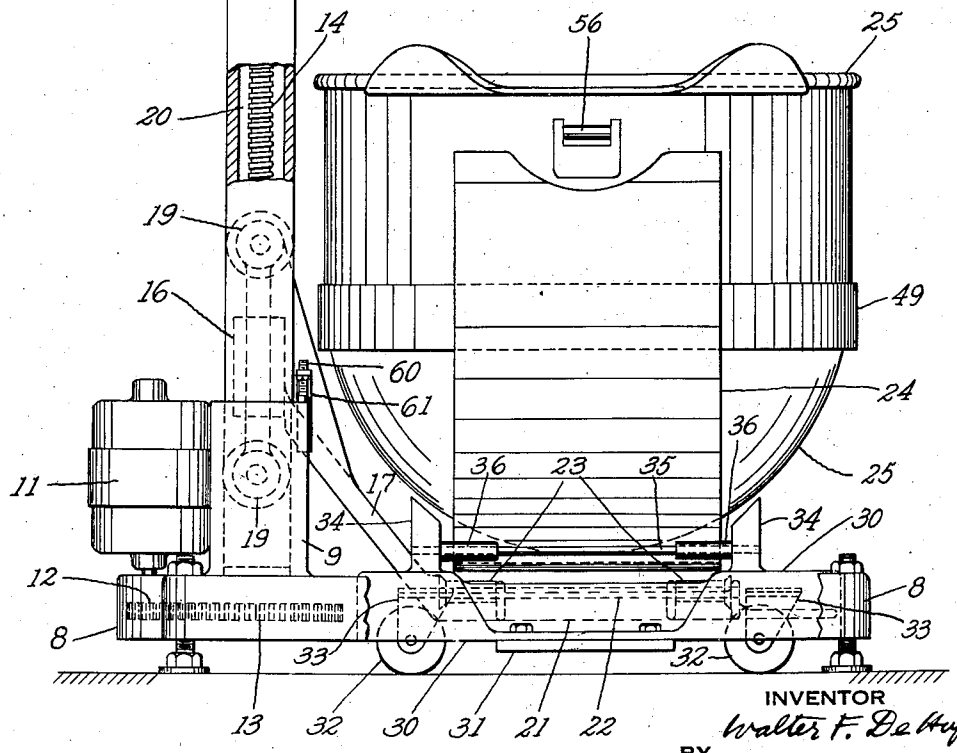


FIG. 2



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FIG. 3

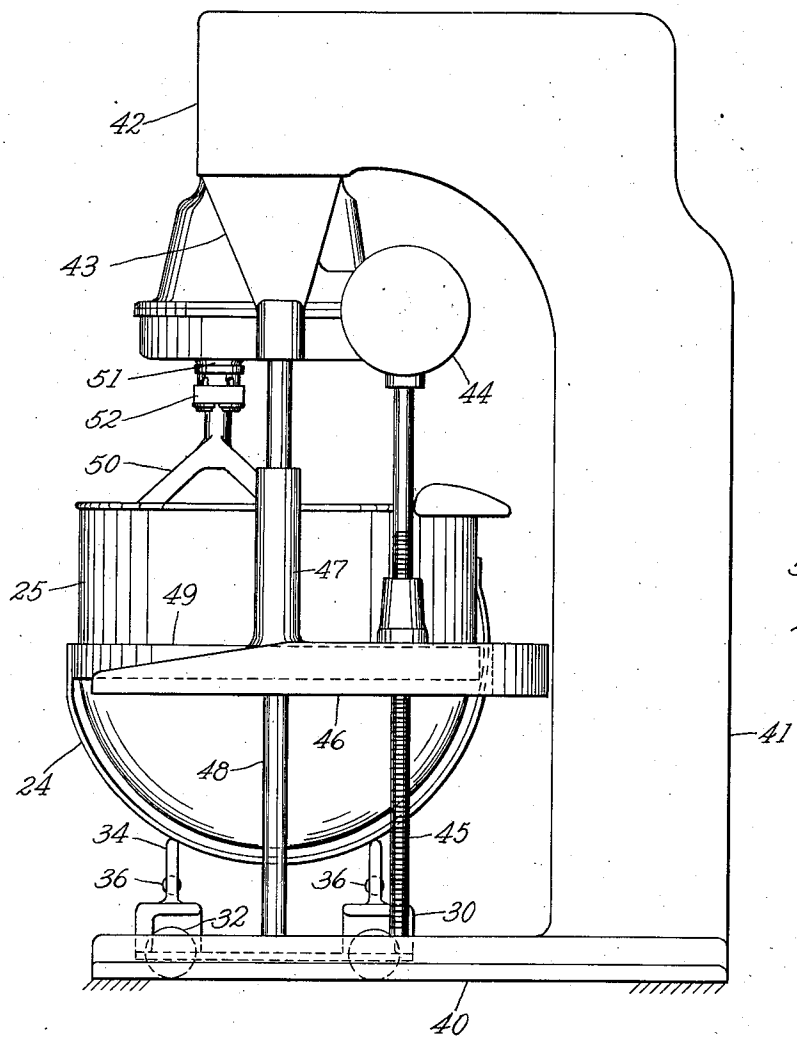
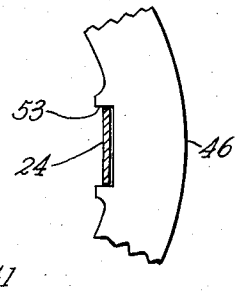


FIG. 4



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UNITED STATES PATENT OFFICE

2,186,478

BOWL HANDLING MECHANISM FOR MIXING MACHINES

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Application July 10, 1936, Serial No. 90,039

16 Claims. (Cl. 214—1.1)

This invention relates to bowl handling mechanism, and has special reference to apparatus in which bowls or similar vessels may be easily handled, regardless of size, both at the mixing machine, the emptying station and in the transfer to and from these points.

The present development of vertical type mixers has brought into use larger and larger bowls or vessels for handling larger batches and mixes. While in the handling of smaller containers some difficulty has been experienced, especially where man power has been depended upon, it is apparent that with larger sizes of bowls the difficulty is greatly increased and amounts to quite a problem. The size of the bowls and their weight, either empty or filled makes the provision of mechanical means necessary for their efficient and satisfactory use.

For ease of handling and general expediency, it is also important that all of the mixed batch be removed from the bowl as a whole, and for that reason it is desirable to provide mechanism for lifting a bowl to a point at which it can be tilted so that substantially all of the contents can be removed at one time.

It is an object of this invention to provide bowl handling mechanism which will make possible rapid and easy handling of bowls containing mixed batches of dough, cake and like products or other containers regardless of the size of the vessel.

It is an additional object to provide a novel type of bowl, especially adapted for use with a bowl handling device of the type disclosed herein in which means are provided for locating and tilting said bowl.

It is an additional object to provide a mixing bowl having a tilting medium carried thereon which makes said bowl easier to manipulate than bowls heretofore known, and especially with respect to large bowls.

It is a further object to provide means for handling bowls in which means are provided for elevating bowls to an elevation where they may be moved to contents discharging position.

It is a further object to furnish a device for handling bowls or like containers in which an elevating mechanism raises and lowers a bowl to and from discharging position, and means are provided for limiting the movement of the elevator at one or both positions.

An added object is the provision of mechanism for stopping over-run of the elevating elements of the bowl lifting structure thereby preventing damage to said structure.

A further object is to furnish an elevator having bowl seating and positioning members for insuring positive contact of said bowl during its movement to emptying position.

The invention also includes a transfer member having a bowl positioning seat wherein a bowl may be transferred to a contents removing location, tilted and the contents therein removed.

The invention also consists in a transfer device cooperating with the bowl handling elevator for positioning a bowl thereon after the mixing operation, in which the device comprises a truck having bowl guiding supports capable of movement beneath said elevator.

With these and other objects not specifically mentioned in view, the invention consists of the combination and constructions which will be hereinafter fully described, and then specifically set forth in the claims hereunto appended.

In the accompanying drawings:

Fig. 1 is a front view view of the bowl handling machine, showing the bowl in the "up" position;

Fig. 1A is a detail view of the same showing the bowl in the "down" position;

Fig. 2 is a side view of the machine;

Fig. 2A is an enlarged sectional detail view of the floating nut construction;

Fig. 3 is a side view of a mixing machine showing the bowl in up position; and

Fig. 4 is a detail view of the bowl locking means.

Referring to the drawings, the base 8 of the machine is equipped with slotted projections 9 which receive and support the upright frame 10. A motor 11, suitably attached to the frame 10, by means of the pinion 12 drives a gear 13 mounted on the lower end of a spindle 14. Spindle 14 engaging a floating nut 15, Fig. 2A, loosely mounted in the bearing 16 of the bowl elevator or saddle 17, by means of a flanged portion 18 engages the bottom of bearing 16 thereby lifting the elevator. Elevator 17 is provided with rollers 19, Figs. 1A and 2, which engage in the vertical tracks 20 of frame 10, thereby guiding said elevator during its up and down travel. The horizontal or base part 21, of elevator 17 supports a pair of shafts 22 carrying rollers 23 which are preferably flanged to engage the tilting band or track 24 which partly surrounds the mixing bowl 25, and act as guides as the bowl is being tilted. This band may be formed integrally with the bowl, or attached thereto in the manner shown.

The truck on which the mixing bowl is transported consists of a carriage 30 having a middle connecting portion 31, and rollers 32 carried by

swivels 33 attached to the four corners of the carriage. As shown in Figs. 1A and 2, the connecting part of the carriage, preferably, is so arranged that it can be slid beneath elevator 17 when a filled bowl is moved to position to be elevated and emptied. The bowl carrying truck is so constructed that it can be moved between and into engagement with the legs of the base 8, and thereby be located in fixed position by said legs against movement during all the time the bowl is handled by the elevator 21. It is to be noted that lugs 34 are provided both for the purpose of serving as bearings for shafts 35 which carry rollers 36 engaging the tilting band of the bowl, and also to act as positioning or locating members to prevent a bowl, as it is lowered in the bracket of the mixing machine for discharge therefrom onto the truck from upsetting and spilling its contents. By means of these lugs which are spaced near the band when the bowl is located on the truck, and by reason of their beveled faces (see Fig. 2), a bowl may be considered secure from overturning during its transfer to an elevator.

Referring to Fig. 3, the truck and bowl are shown in conjunction with a mixing machine of the type disclosed in my U. S. Reissue Patent 18,096 issued on June 9, 1931. The mixing machine comprises a U shaped base 40 which permits entrance of the truck and bowl, having a standard 41 extending vertically upward from one end thereof, and having a laterally extending head 42 extending from the upper end of standard 41. The lateral extending head may be formed as shown in the above mentioned patent, or as shown in Fig. 3, provided with two laterally extending arms 34, in which the mechanism for rotating member 50 is supported for operation in a housing integral with the head, and located midway between arms 34 which support guide rods 38 described further hereinafter.

Suitable gearing (not shown) enclosed in a housing integral with one of the arms 43 of head 42, is operated by a hand wheel 44 to rotate screws 45 which are threaded into the bracket 46 provided with hubs 47, mounted to slide on guide rods 48 extending vertically upward from the base 40 and suitably secured parallel to each other, to the arms 43.

While different devices may be employed to hold the bowl in mixing position, in the embodiment shown a bracket 46 is provided with an internal flange (not shown) adapted to engage a rib 49 suitably formed on or secured to the periphery of the mixing bowl 25, for the purpose of supporting and raising lowering said bowl relative to the beater 50 which is detachably secured to the beater spindle 51 by a coupling 52 which may be of the type disclosed in my U. S. Patent 1,792,363 issued February 10, 1931. Obviously, the bowl could be supported by trunnions or other like supporting means.

Upon the completion of the mixing operation the bowl 25 is lowered until the tilting band 24 rests on the rollers 36 of the truck, the beater then being detached from the spindle permitting the removal of the bowl and truck. During the mixing operation the bowl is held from turning by means of the engagement of band 24 with a locking device which in the embodiment shown is a slot 53 provided in the bracket 46, illustrated in Fig. 4.

The truck and bowl are then transported to the bowl handling machine, the truck moving relative to the elevator 17 which is then in its down position so that the elevator is located beneath the bowl, as illustrated in Figs. 1A and 2. When the elevator starts to ascend in order to raise the bowl to discharge position through rotation of the spindle 14, it is seen that the rollers 23 on elevator 17 will engage the tilting band 24 and thereby lift the same from rollers 36 of the truck. In order to tilt the bowl at the discharge position and remove the contents therefrom, the attendant manually moves a member 54 towards the bowl so that a tilting device, such as a hook 55, mounted on the member 54 is located to engage a cooperating element shown here as a stud 56 carried by the bowl. Through this arrangement after engagement of the hook with the stud the bowl in its further ascent gradually tilts, the band 24 thereon turning on rollers 23 of elevator 17, from the upright position of Fig. 2 to that disclosed in Fig. 1. In this latter position the dough is discharged into a chute 57 which directs the same to its next operation.

In descending, the bowl is returned to its upright position, the hook 55 is disengaged from the stud 56, member 54 swings outward by gravity, and stops against a strap 58 attached to the base 8 of the machine. In approaching its lowermost position, the elevator 17 again transfers the tilting band 24 of bowl 25 onto the rollers 36 of the truck, and continues to descend until stop screws 60, Fig. 1A, carried by angular brackets 61 and 62 attached to said elevator engage the projections 9. In this manner, the elevator always returns to a positive stopping position. Bracket 62 supports screws 63 which carry an adjustably mounted trip piece 64 engaging a roller 65 attached to a pivotally mounted arm 66 of a limit switch 67, and when arm 66 is actuated by this engagement it trips the limit switch, shutting off the power to motor 11 and thereby stops the rotation of spindle 14. Due to the fact that a certain period of time elapses before the motor stops after tripping of the switch, a floating nut construction is provided which takes up the over-run of spindle 14, thereby eliminating the possibility of damaging the machine. This floating nut 15, Fig. 2A, after the saddle has reached its lowermost position, due to the over-run of the motor and spindle 14, will travel freely in the bearing 16 of elevator 17 until the rotation of the spindle stops, the nut then being in a position 18' as indicated by dotted lines. When the machine is set in motion to lift the next bowl, the nut 15 will travel freely until reaching the bottom of bearing 16, the engagement of which will again lift the elevator and bowl.

A limit switch 68, Fig. 1, of the same type as switch 67, is provided at the upper part of frame 10 and serves to stop the motor when the bowl has reached its highest position, the stopping of the motor being accomplished by means of the engagement of trip piece 64 with roller 65.

While one embodiment of the invention has been shown and described, it is to be understood that various changes may be made in the structural details of the device without departing from the spirit and scope of the invention as set forth in the appended claims.

What is claimed is:

1. A readily portable mixing bowl for vertical mixing machines having a rounded bottom mixing portion and a cylindrical body portion extending upward therefrom, means carried by said bowl for supporting it in mixing position, and a track member formed as a unitary structure with the bowl, extending about the bottom and up the side portions thereof, at right angles to the rim

of said bowl, said member constituting a tilting device on which the bowl is adapted to be supported freely for rotation from a normally vertical mixing position to a horizontal discharge position, the track being so disposed that the bowl is stable in its various rotative positions when loaded and empty.

2. A portable mixing vessel for vertical mixing machines, having a rounded bottom portion and a cylindrical body portion extending upward therefrom, means carried by said vessel for supporting it in mixing position with respect to a mixing machine, an arcuate track formed as a unitary structure with said vessel being located about the bottom portion thereof, said track providing means whereby said vessel may be supported freely for tilting it to a position at which its contents may be removed, the track being so disposed that the vessel is stable in its various rotative positions and urged by a gravitational bias to an upright position, whether empty or loaded.

3. A mixing bowl for vertical mixing machines having a spheroidal bottom mixing portion, with a cylindrical body portion extending upward therefrom, means carried by said bowl for maintaining it in mixing position, and a band extending about the bottom and up the side portions thereof at right angles to the rim and forming a tilting device on which said bowl is moved to discharge its contents, the band being so disposed that the vessel is stable in its various rotative positions, having a gravitational bias to an upright position, whether loaded or empty.

4. A mixing bowl for vertical mixing machines having a rounded bottom mixing portion and a discharge lip adjacent the rim thereof, means carried by said bowl for supporting it in upright mixing position, and means carried by said bowl for tilting the same to discharge its contents, said means comprising a band member extending medially around the curved bottom and side portions at right angles to the rim thereof, and extending towards said discharge lip beyond its point of intersection with a diameter of the bowl which passes through the center of gravity thereof, said member being so disposed that when the bowl is tilted rotatively upon said member to a position at which its contents may be removed, the bowl will be engaged with any suitable underlying support exclusively by means of that portion of said band which extends from near said lip toward said point of intersection with said diameter.

5. A mixing bowl for vertical mixing machines having a rounded bottom mixing portion, and a cylindrical body portion extending upward therefrom, and a discharge lip adjacent the rim thereof, means carried by said bowl for supporting it in upright mixing position, comprising a metal band secured circumferentially around the side walls, a broad metal band secured to said first named band and extending around the medial portion of said curved bottom to a point beyond said circumferential band on the other side of the bowl, and being secured to the outer wall of the bowl at a region between said circumferential band and said lip, and means carried by said bowl for tilting the same to discharge its contents, said means comprising an element located on said bowl adjacent said rim for rocking said bowl on said mixing portion, said element being accessible, between said lip and said last named band, for ready attachment and detachment of a latch for tilting the bowl.

6. A bowl handling mechanism for a vertical mixing machine, comprising a base, frame members rising from said base and forming guides, a horizontally disposed elevator lift, means on said elevator lift cooperating with said guides to position the lift for lifting movement, spaced supports on said elevator lift forming a seat for handling a mixing bowl provided with a tilting device constituting a part thereof, means for removably positioning said bowl on said seat for rotation on said device, and means for moving said elevator lift and the bowl thereon to a position at which the contents of said bowl may be removed by rotation of the bowl only while said lift and seat retain their horizontal position.

7. An elevating mechanism for raising and lowering vertical mixing machine vessels comprising a frame, an elevator movable therein, and provided with a lift having a seat constructed and arranged to occupy a substantially horizontal position, a plurality of rollers in said seat, a mixing vessel to be emptied located on said seat, said vessel being formed with a tilting device constituting a part thereof arranged to engage and travel on said rollers to removably position said vessel on said seat for elevation therewith, and means to effect relative movement between said device and vessel positioned on said rollers to rock said vessel bodily on said device into discharging position while said seat remains in said horizontal position.

8. In a machine for handling mixing bowls, a frame, an elevator movable therein to and from receiving and discharge positions, a supporting surface for a bowl on said elevator, a plurality of flanged rollers mounted upon said surface, a mixing bowl located upon said rollers, a track extending around the bottom and up the sides of said bowl at right angles to the rim thereof, said track being adapted to fit between the flanges and cooperate with said rollers to provide positive guidance for said bowl when it is tilted on said rollers to emptying position.

9. In a machine for handling vertical mixing machine vessels, a frame, an elevator lift movable therein to transfer a vessel to and from receiving and discharging stations, spaced rollers on said elevator lift, and means for removably supporting said vessel for bodily rotation on said rollers into and out of discharge position, said means including a track on the exterior of said vessel cooperating with said rollers for allowing said vessel to be tilted thereon when the vessel has been lifted to the discharge station, and said discharge movement being accomplished solely by rotating said vessel on said rollers while they remain in a horizontal plane.

10. In a machine for handling bowls, a frame, an elevator lift mounted for movement in said frame to bowl receiving and emptying stations, a horizontal seat immovably mounted on said elevator lift for positioning a bowl for tilting, a bowl having tilting means forming a part thereof located rotatably upon said seat, and adapted to be emptied at said emptying station, a device mounted upon said frame for tilting said bowl on said seat without tilting the seat, said means cooperating with said said device as said bowl is being elevated to rotate said bowl on said means upon its seat to emptying position while said seat retains a horizontal position.

11. An elevating mechanism for handling mixing bowls having a spheroidal bottom mixing portion with a cylindrical portion extending upward therefrom comprising a frame, an elevator mov-

able therein and provided with a bowl seat, mechanism for operating said elevator, including a shaft, a plurality of rollers disposed in a horizontal plane on said seat, a mixing bowl positioned rotatably on said rollers, and means on said bowl engaging said rollers for locating said bowl for elevation and allowing said bowl to be moved on said rollers to emptying position, and means mounted in said elevator and cooperating with said shaft for taking up the over run thereof and preventing damage to said elevator when said mechanism is rendered inoperative at the limits of movement of said elevator.

12. In a mixing bowl elevating mechanism, the combination with a base and a frame secured thereto, of a bowl elevator movable therein, spaced flanged rollers mounted in said elevator and forming a guide for a bowl positioned thereon, and means forming a permanent part of said bowl engaging said rollers to locate said bowl for tilting on said rollers.

13. In a mixing bowl handling device, the combination with a mechanism for raising and lowering filled mixing bowls, of an elevator device provided with a plurality of supporting members, a bowl having tilting means forming a part thereof positioned on said members and cooperating with said members to locate said bowl for tilting, a tilting element carried by said bowl, and means mounted on said mechanism and coacting with said element to tilt said bowl on said means during, and exclusively by virtue of, the upward movement of said elevator, while said elevator device retains a horizontal position.

14. In a mixing bowl handling device, the combination with a mechanism for raising and lowering filled mixing bowls, of an elevator provided with a plurality of supporting elements, a bowl positioned on said elements, means forming a part of said bowl and rigidly secured thereto cooperating with said elements to locate said bowl for tilting on said means, a tilting element carried by said bowl, a device mounted on said mechanism and coacting with said element to tilt said bowl only on said means during the upward movement of said elevator, and means to stop the upward movement of said elevator after said bowl has been tilted.

15. In a mixing bowl handling machine, an elevator mechanism comprising a base, an upright frame and an elevator movable therein from bowl receiving to bowl discharging position, means to deliver a bowl to said elevator, said means including a truck detachably engaging with said base, comprising a pair of spaced carriages, an underslung member connecting said members, wheels mounted on the corners of said truck, vertical positioning elements mounted on said carriages, shafts mounted in said elements, rollers on said shafts on which said bowl is positioned, and wheels mounted on said truck for allowing said bowl to be moved onto said elevator whereby said connecting member moves under said elevator and said elements position said bowl over said seat.

16. In an elevating mechanism for handling mixing bowls, a frame, an elevator mounted for movement in said frame, a bowl positioned on said elevator and adapted to be tilted at the upper position of said elevator for emptying its contents, a tilting element carried by said bowl, a member secured to said frame, and adapted to be moved to and from said elevator as it is moving upward, a device mounted upon said member and adapted to engage said tilting element when said member is moved toward said elevator, whereby said device coacts with said element to gradually tilt said bowl as the elevator moves to its upper position, while the elevator retains a horizontal position.

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