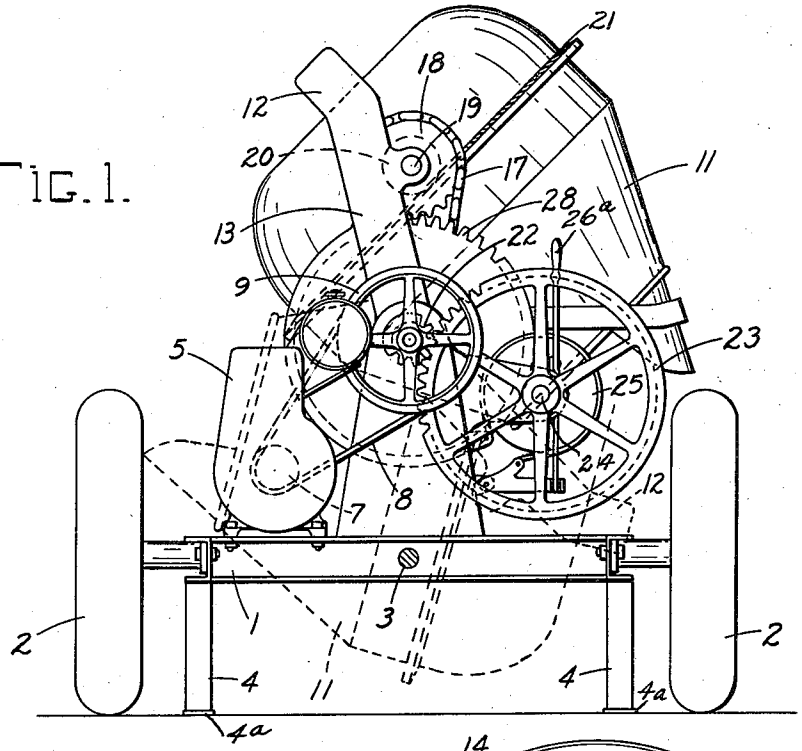
July 3, 1951 E. H. LICHTENBERG 2,558,765

HIGH-DISCHARGE AND LOW-CHARGING MIXER

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Fig. 1.



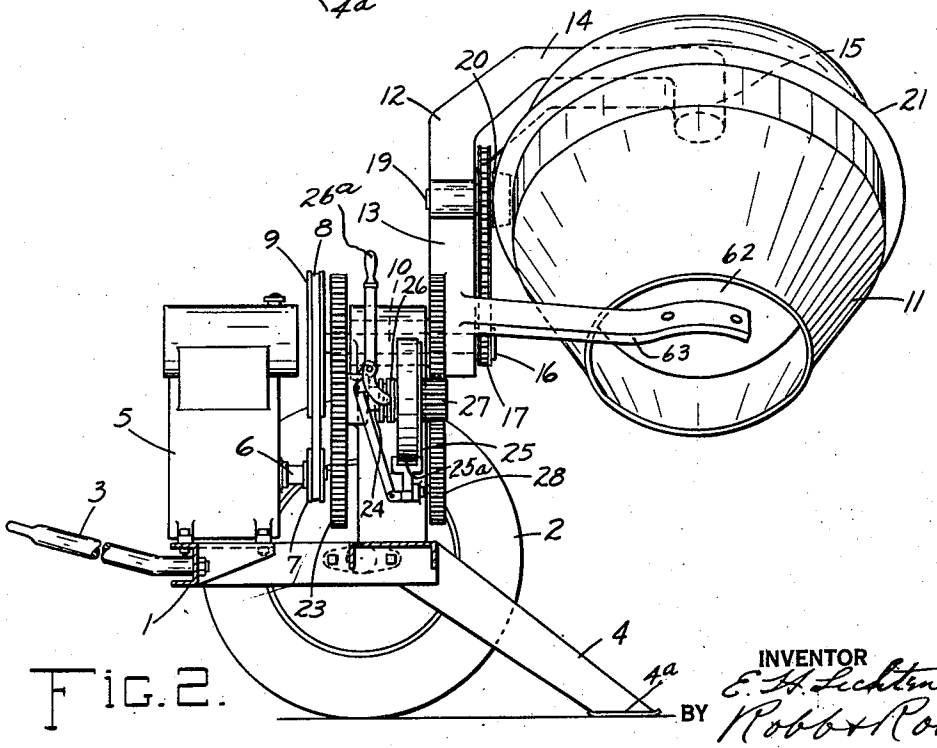


Fig. 2.

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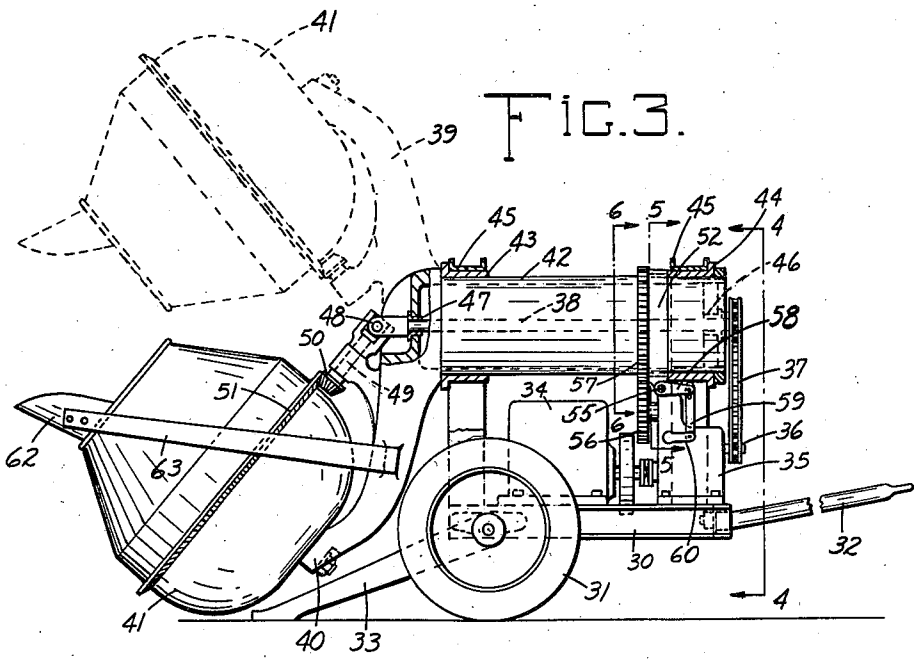


FIG. 3.

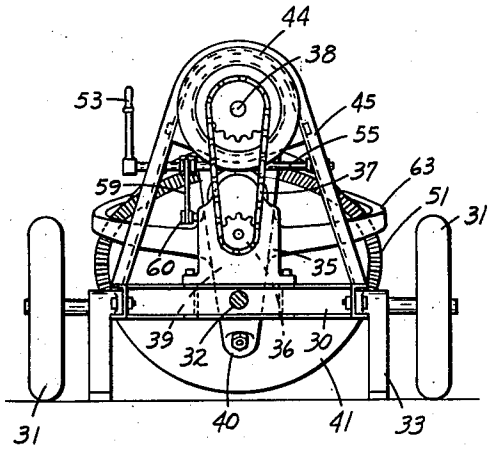


FIG. 4.

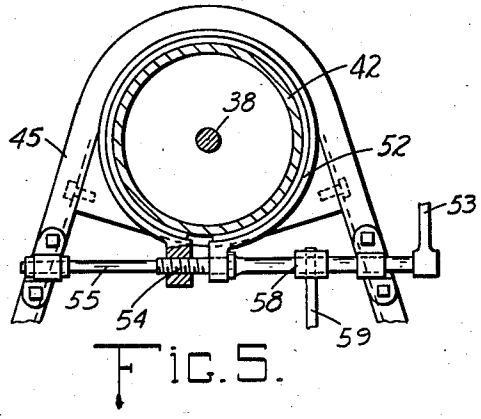


FIG. 5.

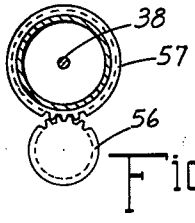


FIG. 6.

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UNITED STATES PATENT OFFICE

2,558,765

HIGH-DISCHARGE AND LOW-CHARGING MIXER

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Application August 6, 1946, Serial No. 688,613

5 Claims. (Cl. 259—161)

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My present invention comprises a novel type of low charging and high discharging mixing machine of a type commonly known as a tilting mixer.

In the customary forms of tilting mixers heretofore used in the art, there is employed a tilting mixing drum which tilts about a fixed axis and is normally closed at one end but open at the other end. The open end of the drum is used for charging and discharging the drum, charging when the said open end is tilted uppermost and discharging when the said open end is tilted in a downwardly inclined position of the drum, the body of which usually tapers toward said charging and discharging opening or end.

Now by reason of the fact that the tilting mixing drum usually tilts about a fixed axis, while it readily discharges when the open end is in a relatively low position, when the mixing drum is in a mixing and charging position, the opening through which the materials are charged into the drum is relatively high, necessitating that the user employ shoveling means or a loading skip in order to raise the material to the necessary height for charging the drum.

According to the improved construction of mixer of my present invention, however, I employ a drum carrier or arm for supporting the mixing drum, while being constantly rotated, either in a low charging position or in a high discharging position. The purpose of the provisions to the above end is to enable materials brought up to charge the drum, say in a wheelbarrow, to be directly charged into the drum from the wheelbarrow, without shovelling, and when the materials have been sufficiently mixed or agitated incident to the rotative movement of the drum, the latter may be shifted to a high discharging position and discharged into wheelbarrows directly according to present practice.

With the use of my present improvements in tilting mixers of the class referred to, the necessity for shovelling materials from the supply source or lifting them to a high point to charge into the open end of the drum, either by a shovelling means, or a loading skip of some kind, is entirely obviated.

I have embodied my invention in two preferred forms or types of construction, an understanding of which will be had upon reference to the following detail description, in conjunction with the accompanying drawings, in which:

Figure 1 is a rear view of a side discharge type of mixing unit of the tilting drum class, embodying the essential features of my invention.

Figure 2 is a side view of the same.

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Figure 3 is a side view of a modification of my invention in which the mixing drum may be characterized as an end charging and discharging type of drum, in relation to the mounting on the machine.

Figure 4 is a sectional view of the machine shown in the modification of Figure 3, on the line 4—4 of Figure 3.

Figure 5 is a sectional view taken on the line 5—5, approximately, of Figure 3.

Figure 6 is a sectional view of the trunnion operating gears and trunnion, taken about on the line 6—6 of Figure 3.

First referring to the construction of my invention embodied in Figures 1 and 2 of the drawings, it is noted that the frame construction of my mixing machine may be largely of conventional type, including the frame or chassis 1 mounted on rubber tired or otherwise equipped wheels 2. Extending in one direction from the portable frame or chassis is a tow pole 3 adapted to be hitched to a pulling machine or truck in the customary way, and extending from the chassis 1 in a direction opposite the tow pole 3 are the legs 4 having the feet 4a to rest upon the ground, said legs and feet being provided to prevent tipping of the machine rearwardly as seen in Figure 2.

On the chassis 1 is carried a suitable engine or motor 5 having its engine shaft 6 equipped with a pulley 7, or sprocket, if desired, which pulley 7 is connected by a belt or chain 8 with a driven pulley 9 elevated from the pulley 7 and mounted upon a mixing drum rotating shaft 10 carried by suitable bearings in the framework of the machine superposed upon the chassis 1. It is contemplated in the ordinary operation of the machine that the shaft 10 shall constantly rotate, and correspondingly constantly rotate the mixing drum 11.

The mixing drum 11 is carried by an angular arm 12 comprising a vertical portion 13 which is loosely mounted upon the shaft 10, and a horizontal portion 14 at the outboard end of which is provided a suitable bearing 15, or trunnion member, which constitutes the rotative supporting means for the drum 11. Fixed to the shaft 10 is a sprocket 16 connected by sprocket chain 17 to a sprocket 18, the sprocket 18 being mounted upon a suitable shaft 19 supported in a suitable bearing on the vertical portion of the arm 12. The shaft 19 not only carries the sprocket 18 fixed thereto, but also carries, keyed thereto, a bevel or similar gear 20 that engages a bevel ring gear 21 which encircles the drum 11 and is fixed thereto after known

manner of construction of tilting drums of the general class of my drum as used in tilting mixers.

Thus it will be seen that during the constant rotation of the shaft 10 the drum 11 will be correspondingly constantly rotated about the trunnion or axis 15 previously referred to.

As noted before, the arm 12 at its vertical portion is loosely carried by the shaft 10, said shaft thus providing only a bearing for the rotation of the arm 12 from the upper full line discharging position of Figure 2 to the lower charging position which is illustrated in dotted lines in Figure 1.

I provide suitable means for effecting the desired rotation of the arm 12 to carry the drum 11 from charging or low position to discharging or high position, during the rotation of the drum about the axis 15, and such means will now be described.

Fixed to the shaft 10 and therefore coaxial with the pulley 9 is a drive gear 22 which is a relatively small gear and meshes with the large driven gear 23. The driven gear 23 is mounted upon a suitable shaft 24 carried by the framework of the machine in a suitable bearing, and the shaft 24 has the gear fixed thereto and is equipped at its outer end with a loosely mounted brake and clutch drum 25 normally disconnected from the shaft 24 but adapted to be connected for rotation with the shaft by means of the clutch member 26 which is mounted upon said shaft 24 and splined thereto for sliding movement. The brake and clutch drum 25 is equipped with a driving pinion 27 at its outer side and which may be integral therewith, said pinion being adapted to engage at its teeth with a toothed sector 28 fixed to the arm 12 at the inner side of the latter by any suitable means such as bolts or the like.

The combined brake and clutch unit, including the drum 25 and the clutch member 26, may be generally of the type shown in Lichtenberg Patent No. 1,328,635 issued January 20, 1920, and therefore includes an operating lever 26*a* which, when moved in one direction, will clutch the brake drum 25 to the shaft 24 for turning with the latter, thereby to turn the pinion 27 and the gear member 28, and when said lever is moved in the opposite direction, the shaft 24 will be unclutched by the opposite movement of the clutch member 26 and the driving of the brake drum and the pinion 27 will be discontinued, and brake band 25*a* applied.

Of course, when the pinion 27 is driven it imparts movement to the gear or sector member 28 which in turn, being fixed to the arm 12, will rotate the arm 12 about the axis shaft 10. This rotation thus produced will turn the arm 12, and thereby rotate the axis arm 14 for the drum, so as to carry the drum 11 from a low charging position to a high discharging position, while the drum is continuously rotating. And when the drum has emptied of its material at its high discharging position, the release of the brake 25*a* by the lever 26*a* will permit gravitation of the drum under braking control to its lowermost, or charging, position. By reason of the use of the clutch and brake unit 25, 26, 25*a*, 26*a*, the clutch 26 may be engaged for the elevating movement of the drum and after discharge of the drum 11, the throwing out of the clutch will of course automatically apply the brake band 25*a* to the drum 25.

It will be quite apparent from the foregoing

that when the drum 11 is in its low charging position with its open end inclined upwardly, the batch of materials, properly proportioned, may be wheeled up to the drum in a wheelbarrow and dumped directly from the wheelbarrow into the drum. Likewise, by reason of the shifting of the drum to its higher discharge position, as described previously, the drum may be arranged in a reverse position, that is with its open end downwardly, at such an elevation that a wheelbarrow placed beneath the drum will receive the mixed materials therefrom. There is no need for using a loading skip with my invention, nor is there any requirement that the workmen filling the drum shall have to shovel the aggregates to be mixed therein and raise them manually to the height necessary to charge the drum when it has its charging opening uppermost, such position really being the mixing position, according to the known types of tilting drum mixers heretofore employed.

I next proceed with a description of the modification of my invention shown in Figures 3 to 6 inclusive of the annexed drawings.

In this construction the chassis of the mixer is designated 30, the supporting wheels 31, the tow pole 32, and the anti-tipping legs 33.

On the chassis 1 is supported the engine 34 connected by transmission gearing in a box 35 with the driving shaft 36 carrying a sprocket connected by sprocket chain 37 to a cooperating sprocket mounted on the front end of the mixer rotating driving shaft 38. In this construction of my invention the mixing drum carrying arm is designated 39 and is curved so that its mixer bearing and trunnion 40 extends at an angle to the arm 39 in such a manner that the drum designated 41 will assume substantially the angles required so that the drum charging opening inclines upwardly when the drum is in a charging position, and the discharging end of the drum inclines downwardly when the drum 41 is elevated to its discharging position at the higher elevation as indicated according to Figure 3 by the full and dotted lines showing positions of the drum.

The drum arm 39 that supports the drum 41 is carried by, or is a part of, the trunnion member 42 which is mounted in suitable encircling bearings 43 and 44 carried by the framework 45 of the machine. Turning of the trunnion member 42 will of course turn the arm supporting the drum after the manner illustrated in Figure 1 by dotted and full lines.

The drum rotating shaft 38 is mounted at one end, near the chain 37 in suitable bearing means 46 including a bearing which is supported by spider arms inwardly arranged in the front end of the trunnion member 42 which is hollow. The shaft 38 at the opposite end is mounted in a suitable bearing 47 provided on the arm 39 and at this end the shaft 38 is connected by a universal joint 48 with a driven shaft 49 having a bevel gear 50 which engages the bevel gear ring 51 encircling the drum 41.

As seen best in Figures 3 and 5, a brake band 52 surrounds the trunnion member 42 above the transmission gear box 35, and is operated for application of the brake band to the trunnion member by means of a hand lever 53, see Figures 3 and 5. A screw portion 54 of the lever shaft 55 will tighten the brake band 52 on the trunnion member 42 and hold said trunnion member with its arm 39 and mixing drum 41 in a stationary position. When the lever 53 is

moved in an opposite direction, the brake band 52 will be loosened and enable the free rotation of the trunnion member 42, as for the lowering movement of the drum 41 after it has been discharged.

The transmission gearing in the gear box 35 drives a lower gear 56 and an upper gear 57, the latter being mounted upon the trunnion member 42 and fixed to the latter. The gears 56 and 57 constitute the driving means from the engine 34 for turning the trunnion 42 and thereby rotating the arm 39 to raise and lower the mixing drum 41. A clutch throw arm 58 on the brake lever shaft 55 is adapted to operate the means for clutching the gears 56 and 57 to the engine shaft, including a link 59 and clutch arm 60. Thus, when the lever 53 is thrown into the direction of movement for actuating the clutch arm 60 to cause rotation of the drum by the arm 39 to its uppermost position, the brake 52 will remain released, and then when the arm 39 and the drum 41 reach their uppermost position, the reverse throw of the lever 53 to unclutch the gears 56 and 57 from the drive will enable the arm 39 to be held in its uppermost position of the dotted lines of Figure 3 by the application of the brake band 52, at which time the gears 56 and 57 will not be driven, of course, for the rotation of the trunnion member 42.

Generally speaking, therefore, the operation of the machine of Figures 3 to 6 inclusive is very similar to the operation of the machine described in relation to Figures 1 and 2, both machines having the same advantages, though the mechanical devices for controlling the operation of the two machines are somewhat different as set forth in the drawings. The link 59 is provided with a slotted connection to the arm 58 so that when the arm 58 is raised the clutching of the gears 57 and 56 will be performed, and when the arm 58 is lowered the brake band may be applied whilst the clutch means to the gears 56 and 57 is released.

The swinging arm in both constructions of my machine as described carries stationary bracket arms or members 63 which support a charging chute 62 fitting into the opening of the drum and about which chute the drum rotates. This chute is desirable to assist in charging the drum from a wheelbarrow filled with a batch of dry aggregates, when said wheelbarrow is tilted up to charge the drum with said aggregates, water being separately supplied to the drum. Under some conditions the chute 62 may be dispensed with.

The mounting of the drum 11 on the arm 13, and relation of the latter to its axis 10, are such that the weight of the drum will tend by gravitation to cause the drum to move from its dotted line position to its full line, as seen in Figure 3.

The brake and clutch unit 25, 25*a*, 26, 26*a* of Figures 1 and 2 is only generally shown because it may be of various types, one of which is exemplified in the Patent 1,328,635 before identified.

The clutch operated by arm 60, Figure 3, may be of any conventional type. Also, the mixer 41 is so mounted that it may make a complete revolution from charging to discharging, and back to charging positions. The return movement may be gravitative, too, under the control of the brake and clutch features employed for holding and actuating the drum.

Having thus described my invention, what I

claim as new and desire to secure by Letters Patent of the United States, is:

1. In a high discharge and low charging mixing machine, a supporting frame, a motor thereon, an arm mounted to swing about an axis to carry its free end from a low to a high position, and vice versa, a mixing drum on the free end of the arm and having a charging and discharge opening, means to rotate the drum, and means to drive the arm to carry the arm to a position in which the mixing drum opening is downward for discharging, and for controlling downward movement of the arm to carry same to a position with the drum opening upward for charging, the last means comprising operating devices to positively raise the drum, and means for releasing the drum from the drum-raising means and for controlling gravitation of the drum to low charging position, including manually controlled clutch driven means to raise the drum to discharge position, and brake controlling means for governing movement of the drum to low charging position.

2. In a high discharge and low charging mixing machine, a trunnion member, an up and down movable arm carried thereby movable in a vertical plane, and extending laterally from the trunnion member, a mixing drum open at one end for charging and discharging and having its opposite end rotative upon the free end of the arm, actuating means to move the trunnion to shift the arm to carry the drum from a lowered charging position with its opening facing upward to an elevated discharging position with the opening facing downward, brake means coacting with the arm to control its lowering movement, clutch means to render the actuating means effective, and means to rotate the drum on the arm.

3. In a high discharge and low charging mixing machine, a trunnion member, an up and down movable arm carried thereby movable in a vertical plane, and extending laterally from the trunnion member, a mixing drum open at one end for charging and discharging and having its opposite end rotative upon the free end of the arm, actuating means to move the trunnion to shift the arm to carry the drum from a lowered charging position with its opening facing upward to an elevated discharging position with the opening facing downward, brake means coacting with the arm to control its lowering movement, clutch means to render the actuating means effective, and driving means operated by the actuating means and passing through the trunnion, and gearing connecting the driving means to the drum to rotate the latter.

4. In a high discharge and low charging mixing machine, a trunnion member, an up and down movable arm carried thereby, movable in a vertical plane, a mixing drum having a charging and discharging opening, means for mounting said drum angularly on said arm, said opening lying between the trunnion and the mounting means, means to maintain said drum in a position with the said opening upward while the arm is lowered, means to rotate the drum on the arm for mixing operation, when the arm is lowered and stationary, and means to swing said arm to thereby carry the mixing drum from a lowered position with its said opening upward in charging position, to a higher position with said opening downward in discharging position.

5. In a high discharge and low charging mixing machine, a trunnion member, an up and

down movable arm carried thereby in a vertical plane, and extending laterally from the trunnion member, a mixing drum open at one end for charging and discharging, means for mounting said drum at an angle on the free end of said arm, with the opening therein lying between the trunnion and the mounting means, actuating means to move the trunnion to shift the arm to carry the drum from a lowered charging position with its opening facing upward to an elevated discharging position with the opening facing downward, means to hold the arm stationary, and means to rotate the drum while the arm is stationary.

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