March 14, 1944. E. H. LICHTENBERG 2,344,312

SKIP OR HOPPER AGITATING AND RAISING MEANS

Filed May 20, 1942 · 2 Sheets-Sheet 1

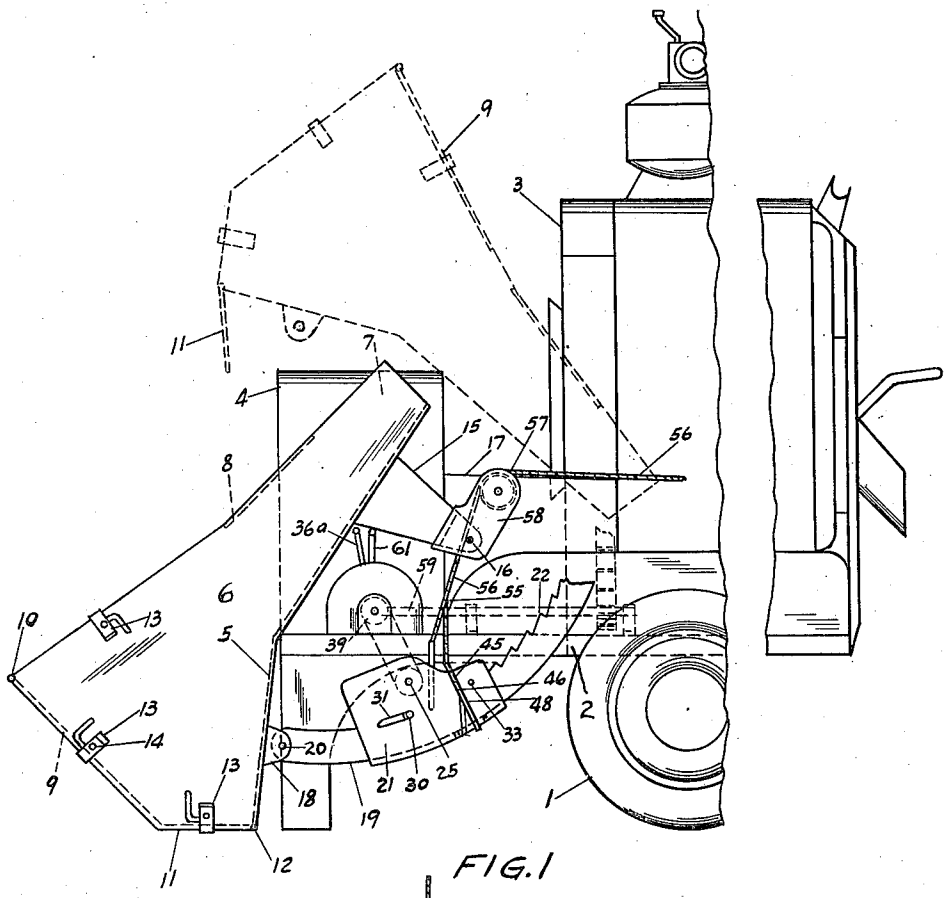


FIG. 1

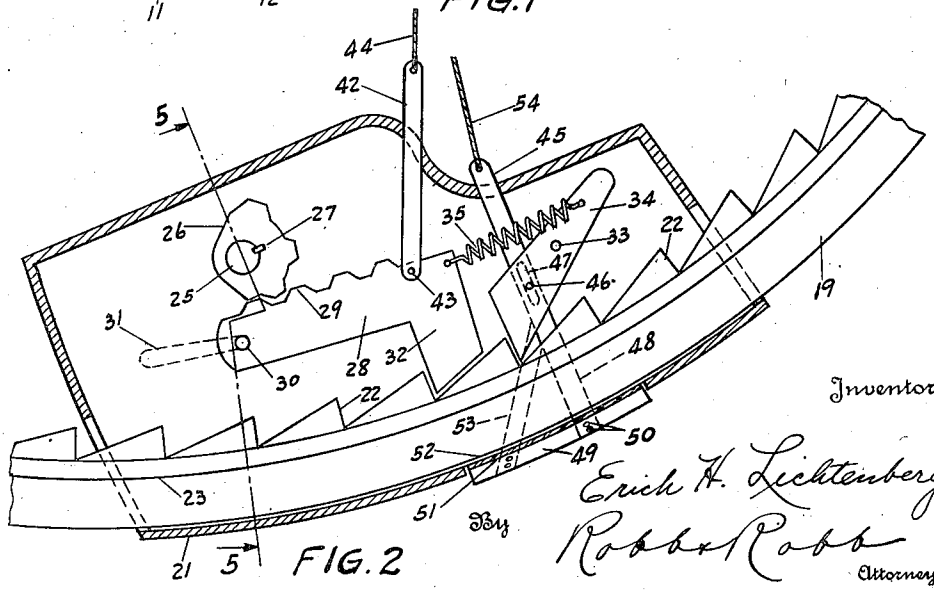


FIG. 2

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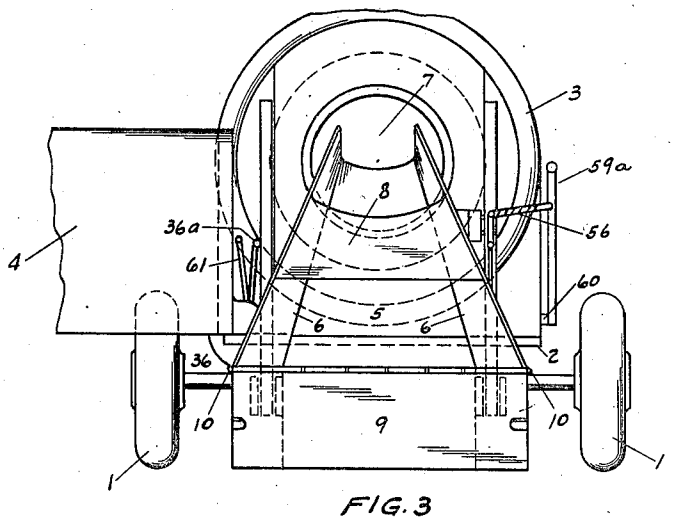


FIG. 3

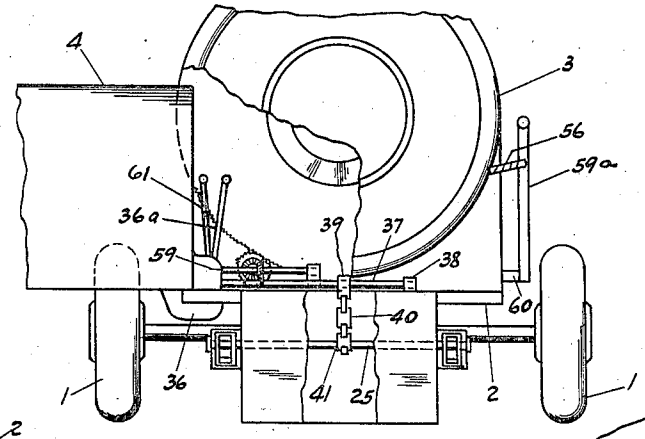


FIG. 4

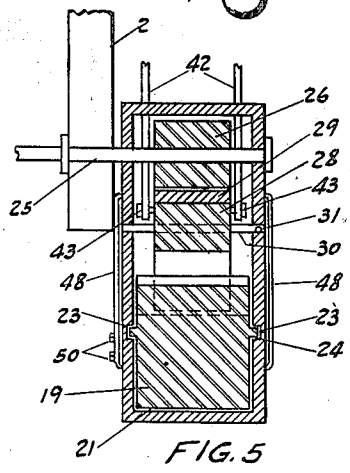


FIG. 5

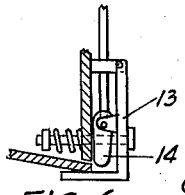


FIG. 6

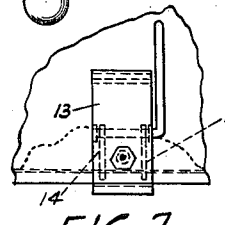


FIG. 7

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UNITED STATES PATENT OFFICE

2,344,312

SKIP OR HOPPER AGITATING AND RAISING MEANS

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Application May 20, 1942, Serial No. 443,796

9 Claims. (Cl. 259—167)

This invention appertains to charging means for concrete mixers, and, more particularly, to charging means adapted to be raised and lowered with respect to the drum in which the aggregates are mixed, or, under certain conditions, to remain in a raised position and be utilized as a hopper member when in that raised position.

A primary object of the invention is to provide a charging means adapted to be raised and lowered by means of a vibrating mechanism acting in a step by step movement, whereby the aggregate in the skip is flowed into the mixing drum by reason of the vibrating action imparted thereto, during the step by step movement, and at the end of the raising movement by continuing action of the raising means, to vibrate the skip.

Another object of the invention is to provide a novel form of skip adapted to normally be raised and lowered to perform the charging operation, and, under certain conditions, to remain in a raised position thereafter being utilized as a stationary hopper.

A still further object of the invention is to provide a novel form of raising instrumentality whereby the step by step movement may be effected, the step by step movement in turn performing the vibrating effect to assure the charging of all of the aggregate in the skip into the mixing drum.

Another object of the invention is to provide a novel driving arrangement for the various instrumentalities utilized, to perform the skip raising and lowering operations.

Further and more particular objects of the invention will be set forth in conjunction with the specification and claims appended hereto, and illustrated in the drawings.

In the drawings:

Figure 1 is a side elevational view of the machine embodying the novel skip or hopper construction previously referred to, and illustrating generally the raising instrumentalities, and the construction of the skip or hopper, the skip being illustrated in dotted lines in the raised position, in said position operating as a hopper under certain conditions.

Figure 2 is a sectional view of the pivoted saddle block through which a ratchet bar is controlled to perform the raising and vibrating action of the skip, and is greatly enlarged to more clearly illustrate the parts availed of therein.

Figure 3 is a rear view illustrating the skip in its lowered position, and the relationship of the same with respect to the mixing drum, and, likewise, showing the construction of the skip whereby the same may be converted into a hopper.

Figure 4 is a rear elevation of the concrete mixer, partly broken away, and illustrating the means of connecting the power plant with the mixing drum and with the raising and vibrating means for the skip, the view being somewhat fragmentary.

Figure 5 is a sectional view of Figure 2, taken about on the line 3—3 of Figure 2, showing the relationship of the driving mechanism for the ratchet bar, and certain other instrumentalities availed of in the pivoted saddle block.

Figures 6 and 7 are detail views of the latch construction availed of in conjunction with the skip, whereby the conversion into a hopper may be effected when desired.

Referring more particularly to Figure 1, the concrete mixer shown is of the type known as a portable type mounted on wheels 1, the said mixer including a main frame 2 supporting thereabove for rotating movement a drum 3, and having mounted at one side a power plant 4 adjacent the rear end of the frame 2 in any suitable manner.

The skip or hopper illustrated comprises a body including a bottom 5, and spaced sides 6, generally tapering towards the discharge end 7 of the said skip or hopper, in accordance with conventional practise, the said skip or hopper including a stiffening plate 8, connected at its ends to the sides 6, as illustrated in Figure 3.

The end opposite the charging end 7 will be termed the end opening for the purposes of this description, and is adapted to be closed by means of an end member 9 hinged at its upper edge and ends by means of a pivot 10 supported on the corners of the sides 6, in accordance with conventional practise in hinge construction, the said end member 9 being of substantially rectangular shape to close the opening. A similar hinge member 11 is provided adjacent the bottom 5 at the edge thereof, the said member 11 being adapted ot swing about the pivot 12 into the dotted line position shown in Figure 1. When the skip is availed of as a hopper, the said end member 9 is adapted to pivot about the pivot 10 into the position shown in dotted lines in Figure 1, to thereby close the charging opening of the skip.

Suitable latch members 13 are provided adjacent the edges of the end members 9 and 11 to releasably maintain the said members in the positions previously referred to, the said members being provided with cam means 14 for releasing the same when desired.

The skip is provided adjacent its discharge end with arms 15 substantially as shown in Figure 1, adapted to be pivotally supported at 16 on housing 17 connected to the frame 2, whereby the said skip may be moved into the dotted line position shown in Figure 1, by the novel vibrating and hoisting or raising means now to be described.

Adjacent the charging end of the skip and connected exteriorly of the bottom member 5 there-

of are ears 18 connected thereto and adapted to be pivotally engaged with an arcuate ratchet bar 19 by means of a pivot 20, the said ratchet bar being adapted to slide interiorly of a pivoted saddle block 21 under compulsion of certain ratchet means more clearly shown in Figure 2. The ratchet bar 19 is provided with toothed portions 22 adjacent the inner peripheral side thereof and includes guide members 23 adapted to slide in suitable slots 24 provided interiorly of the saddle block 21. The saddle block, as will be seen from a consideration of Figure 3, is comprised of a substantially rectangular housing pivotally supported on a shaft 25, the said shaft 25 being in turn carried by the frame 2 in any conventional manner. The shaft 25, in addition to providing a pivotal support for the saddle block 21, further is availed of to drive a gear segment 26 interiorly of the said saddle block and keyed to the shaft 25 as at 27.

The segment 26 is formed as illustrated in Figure 2 so as to effect an intermittent drive action of a click or lifting dog 28 formed with a rack portion 29 adapted to coact with the segment 26 in a manner to be described. The click or lifting dog 28 is adapted to reciprocate back and forth, and is guided in this movement by a pivot 30 engaging slotted portions 31 formed in the side members of the saddle block 21. The click or lifting dog 28 is formed adjacent one end with a tooth portion 32 adapted to operate the ratchet bar 19 in a manner to be described.

A detent or holding dog 34 is shown in Figure 2 as being pivotally connected at 33 with the side portions of the saddle block 21 and is adapted to engage the toothed surfaces of the ratchet bar 19 under compulsion of a spring 35. The spring 35 likewise is connected at one end with the click or lifting dog 28 for purposes that will be set forth hereinafter.

The action of the ratchet means previously described will be more clearly understood from consideration of the sequence of operation of the various parts now to be set forth. The shaft 25, upon which the segment 26 is drivably mounted, is adapted to be rotated, and during said rotation in a clockwise direction the segment coacts with the rack portion of the dog 28 and moves the said dog in a leftward direction, thereby likewise causing a leftward movement of the ratchet bar 19, and thus a raising movement of the skip is effected. The amount of movement in the leftward direction of the ratchet bar by means of the dog 28 may be calculated, to move the said bar 19 approximately the length of two teeth but not completely so, whereby when the untoothed portion of the segment reaches a substantially horizontal position, the dog 28 moves in a rightward direction under compulsion of the spring 35 very rapidly and the detent or holding dog 34, not having come under the shoulder of the second tooth, the said ratchet bar 19 will fall back slightly under the weight of the skip connected thereto and cause a jolting or vibrating action of the said skip.

It will be apparent that upon continuous operation of the gear segment 26, and the movement in a step by step manner of the ratchet bar 19 as described, the said movement is accomplished literally tooth by tooth although the movement of the ratchet bar is nearly the equivalent of the length of two teeth, and, therefore, the vibrating action or jolting action referred to takes place.

Since the skip is pivoted at 16 and the ratchet bar 19 is pivoted adjacent the other end of the skip, continuous movement of the ratchet means will effect the complete hoisting or raising movement of the skip until the toothed portions 22 on the ratchet bar come to an end near the end of the said bar, and thereafter, continued rotation of the gear 26 will effect merely a jolting or vibrating action on the skip, and assure the complete discharge of aggregates therein into the interior of the drum 3.

The driving action of the engine or power plant 4 is directed to the shaft 25 upon which the gear segment 26 is mounted through a conventional transmission 36, under the control of a clutch lever 36a. The shaft 37 extends from the transmission, as illustrated in Figure 4, and the said drive shaft 37 is supported on the frame in a bearing block 38. Suitably drivably mounted on the drive shaft 37 is a sprocket 39 adapted to have engaged therewith a chain 40, the said chain 40 in turn being engaged with a sprocket 41, suitably driving the shaft 25, which is connected with the gear segment 26.

Of course, under certain conditions, it may be desirable to provide a pair of saddle blocks adjacent the sides of the frame, as shown in Figure 4, to perform the raising or hoisting operation of the skip, as previously described, and in that event, a duplication of the mechanism shown in Figure 2 will be availed of, the shaft 25 for driving the said mechanism therein extending from side to side of the frame.

It is desirable necessarily to effect a releasing of the respective dogs 28 and 34. Therefore, links 42 pivotally connected at 43 with the lifting dog 28 are provided, the said links being adapted to move in slots formed in the upper wall of the saddle block 21, and in turn connected at their upper ends with a cable 44. Similar links 45, to those previously referred to, are provided to raise the detent or holding dog 34 out of engagement with a tooth 22, the said links 45 being pivotally connected at 46 to the said dog adjacent the sides thereof.

The pivot 46 extends outwardly through the outer walls of the saddle block 21, and through slots 47 provided therein, the said pivots 46 having engaged therewith at their outer ends, arms 48 adapted to extend over the outer surface of the saddle block, and connected at their lower ends with a brake pad or shoe 49, by means of screw bolts 50. The said brake pad 49 is provided with brake lining 51 adapted to coact with the outer peripheral surface 52 of the ratchet bar 19, the said pad operating in a cut-out portion of the saddle block 21 as shown in Figure 2, and in a manner to be described.

Additional bracing members 53 may be connected at their respective ends with the brake pad or shoe 49, and with the links 48 to more effectively afford a braking action, in a manner to be described.

The links 45, previously referred to, are connected adjacent their outer ends with a cable 54, the said cable 54 being spliced into the cable 44 above the saddle block, as shown in Figure 1 at 55. The cable thus formed is denoted 56 and extends upwardly over a pulley 57 rotatably supported on an arm 58 formed with the arm 15 of the skip, and substantially as shown in Figure 1, and thence forwardly to a suitable lever 59a accessible for operation and adapted to pivot on an arm 60 suitably supported on the frame 2.

As previously mentioned, when the ratchet bar has effected the complete raising and hoisting operation of the skip, and the contents of the

said skip have been discharged into the mixing drum 3, it is desirable to permit the skip to return to its lowered position by gravity, after effecting release of the dogs 38 and 34, the same being accomplished by means of the respective links and cable means, just previously referred to, as follows. The operator grasps the lever 59a and pulls it in a rightward direction, thereby causing the cable 56, reeved over the pulley 57, to lift the toothed portions of the dogs 28 and 34 out of contact with the teeth 22 of the ratchet bar 19, thereby permitting the weight of the skip to cause the same to return to the ground.

Since lack of control of the downward rate of movement of the skip would, under certain conditions, damage the same, the brake shoe and mechanism referred to may be brought into operation against the outer peripheral surface of the ratchet bar 19 by further pulling in a rightward direction on the part of the operator of the lever 59a, thereby causing the brake lining 51 to contact the peripheral surface of the ratchet bar 19, and retard the rate of descent of the skip. It will be seen that the action just previously referred to, whereby the skip is returned to the ground, is a dual control action to release the dogs and apply the brake or brakes as required.

In accordance with the well known practise of operation of this type of mixing machine, the drive for rotating the drum is effected from the power plant 4, in any well known manner, under the control of a lever 61, whereby movement of said lever in one direction operates a clutch and engages the drive shaft 59 connected by suitable gearing means with an external gear mounted on the periphery of the drum, and thereby the same is rotated. At this point, the normal practise in portable mixers of this type has been to shovel the aggregate into a hopper which is permanently fastened or fixed in a position to direct the aggregate into the interior of the drum. However, under many conditions, when it is desirable to speed up the operation of the mixer, a skip is necessary, and, therefore, the type of skip, previously referred to, has been provided, whereby the vibrating action of the raising instrumentalities is availed of to cause the aggregate to flow into the drum when the same has reached its discharging position.

It will likewise be apparent that under conditions where raising and lowering of the skip is not necessary, the said skip may be converted into a hopper, and if necessary, the vibrating instrumentalities may again be brought into play to assure the flow of aggregate into the mixing drum through the hopper.

Of course, when the aggregate has been thoroughly mixed in the drum 3, any suitable discharge means adjacent the other end may be availed of to direct the said aggregate into a wheelbarrow, or other place where it is to be used. A water tank is generally provided above the mixing drum to provide for a gravity flow of water into the interior thereof, and may be controlled in any well known manner.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States, is:

1. In combination, a skip adapted to receive and deposit aggregate, means for raising the skip, including a ratchet bar connected to the skip, a holding dog, a lifting dog, and intermittently operating gear means actuating said lift dog to move said ratchet bar and raise the skip.

2. In combination, a skip adapted to receive and deposit aggregate, ratchet means for raising the skip, including dogs and a ratchet bar engageable with said skip and dogs, and intermittent actuating means for one of said dogs to raise and hold the skip in raised position whilst imparting vibrating action to the skip.

3. In combination, a skip adapted to receive and deposit aggregate in said drum, ratchet means for raising the skip, including dogs and a ratchet bar engageable with said skip and dogs, and intermittent actuating means for one of said dogs to raise and hold the skip in raised position, and release means for said dogs to permit the skip to lower by gravity.

4. In combination, a skip adapted to receive and deposit aggregate in said drum, ratchet means for raising the skip, including dogs and a ratchet bar engageable with said skip and dogs, intermittent actuating means for one of said dogs to raise and hold the skip in raised position, release means for said dogs to permit the skip to lower by gravity, and brake means operable by said release means to control said skip during the lowering movement.

5. In combination, a skip adapted to receive and deposit aggregate in said drum, ratchet means for raising the skip, including dogs and a ratchet bar engageable with said skip and dogs, intermittent actuating means for one of said dogs to raise and hold the skip in raised position, release means for said dogs to permit the skip to lower by gravity, brake means comprising a brake shoe adapted to engage the ratchet bar and control the rate of lowering movement of the skip, and operating means for said brake shoe and release means.

6. In combination, a frame, a skip pivotally supported near one end on said frame and lifting means for the other end of said skip, comprising a ratchet bar connected to said skip at said end, ratchet means for operating said ratchet bar, and means for imparting step by step movement to said ratchet means, said step by step movement facilitating the discharge of aggregate from the skip and providing raising movement for said skip.

7. In a skip for concrete mixers or the like, in combination, a charging end, a charging opening adjacent said end, a discharge end, and means for converting the skip into a hopper, comprising members mounted at said charging end movable into positions to close said end in one position and in other positions to close said charging opening, said charging end thereby being opened to receive aggregate therethrough.

8. A combined skip and hopper construction, comprising a body, a charging opening in said body for receiving aggregate therethrough, an end opening adjacent said charging opening, a member engaged with said body, movable to a position to close said end opening during use of the body as a skip and at least partially close said charging opening in another position during use of the body as a hopper, said end opening in the body providing the charging opening whilst said charging opening is closed.

9. A combined skip and hopper construction as claimed in claim 8, wherein the member is pivotally connected with the body adjacent said charging opening and is adapted to swing into closed positions over said openings, and latch means are provided for retaining said member in either of said positions.

ERICH H. LICHTENBERG.

CERTIFICATE OF CORRECTION.

Patent No. 2,344,312. March 14, 1944.

ERICH H. LICHTENBERG.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 3, second column, lines 9, 17 and 27, strike out the words "in said drum"; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 16th day of May, A. D. 1944.

Leslie Frazer

(Seal) Acting Commissioner of Patents.