

Nov. 15, 1949

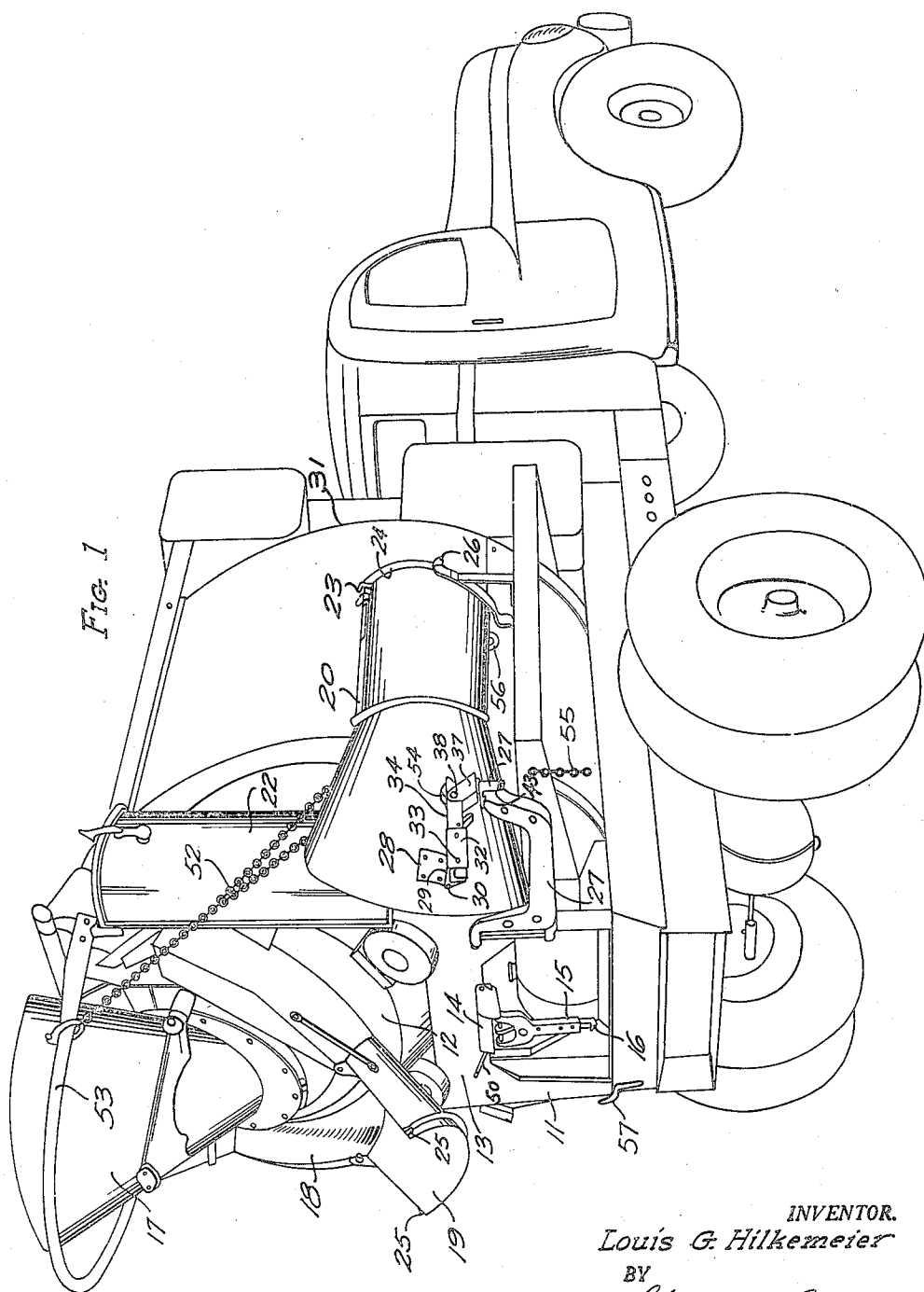
L. G. HILKEMEIER

2,488,292

CHUTE SUPPORT FOR CONCRETE MIXERS

Filed Jan. 30, 1946

6 Sheets-Sheet 1



INVENTOR.
Louis G. Hilkemeier

BY

George A. Evans
Attorney

Nov. 15, 1949

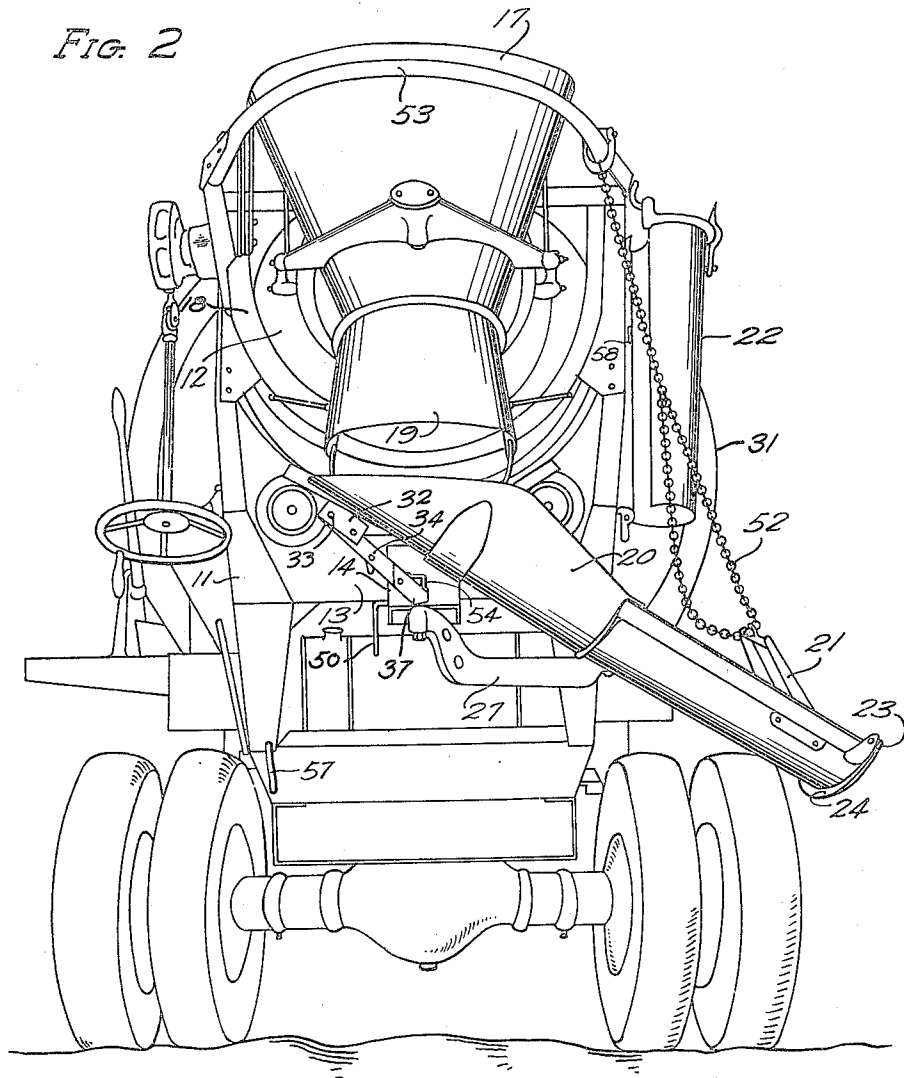
L. G. HILKEMEIER

2,488,292

CHUTE SUPPORT FOR CONCRETE MIXERS

Filed Jan. 30, 1946

6 Sheets-Sheet 2



INVENTOR.
Louis G. Hilkemeier
BY
George A. Evans
Attorney

Nov. 15, 1949

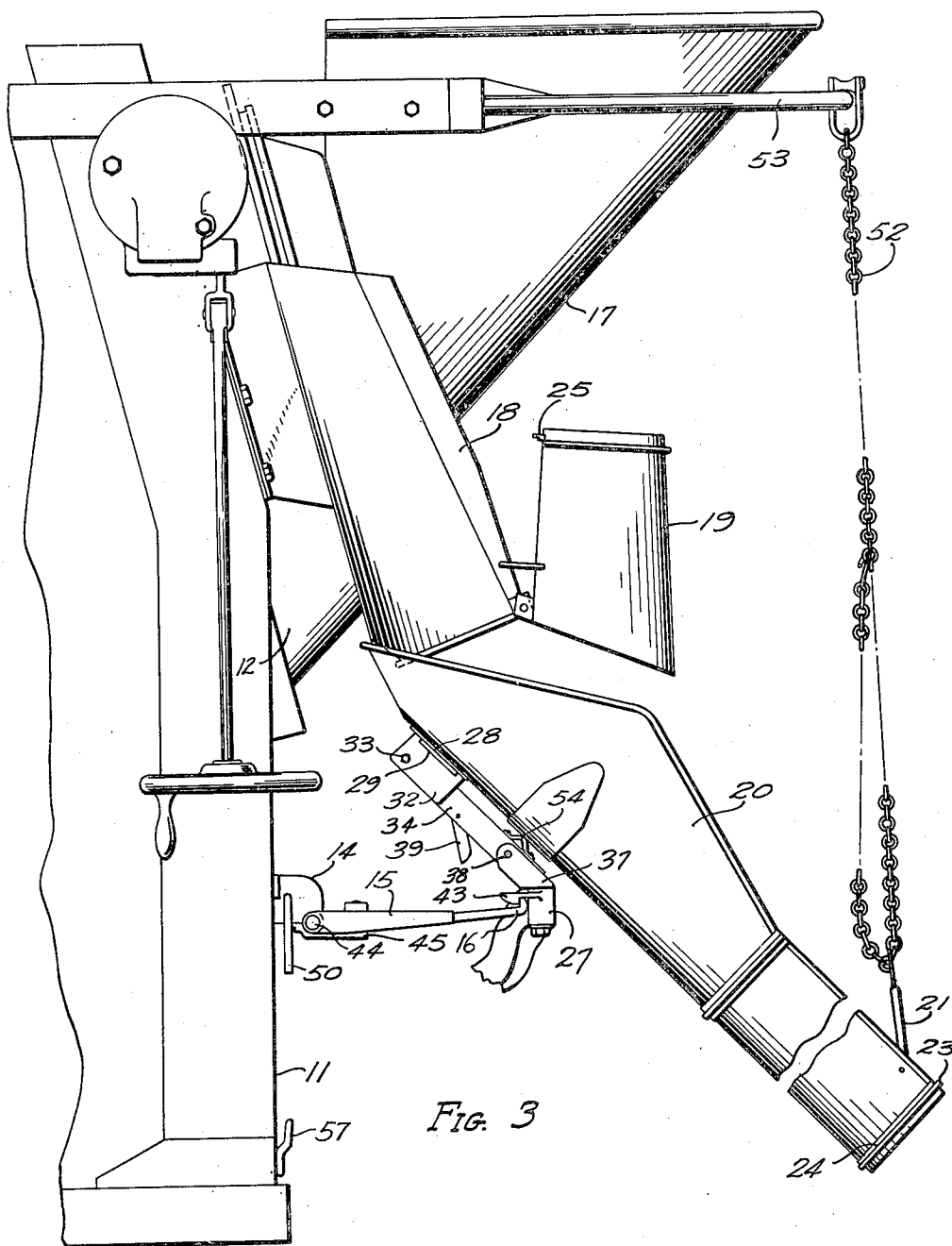
L. G. HILKEMEIER

2,488,292

CHUTE SUPPORT FOR CONCRETE MIXERS

Filed Jan. 30, 1946

6 Sheets-Sheet 3



INVENTOR.
Louis G. Hilkemeier
BY
George H. Evans
Attorney

Nov. 15, 1949

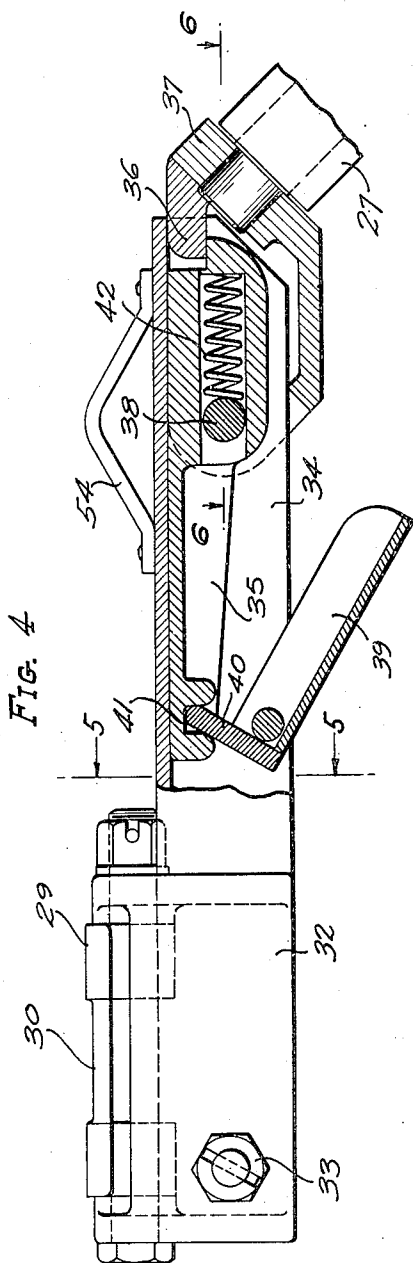
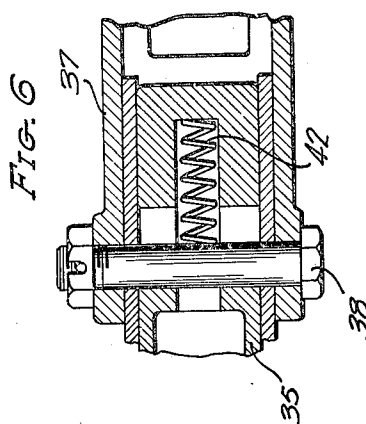
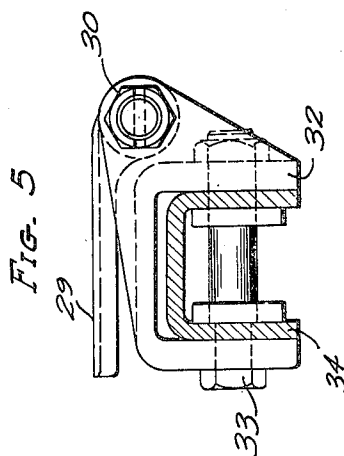
L. G. HILKEMEIER

2,488,292

CHUTE SUPPORT FOR CONCRETE MIXERS

Filed Jan. 30, 1946

6 Sheets-Sheet 4



INVENTOR.
Louis G. Hilkemeier
BY
George A. Evans
Attorney

Nov. 15, 1949

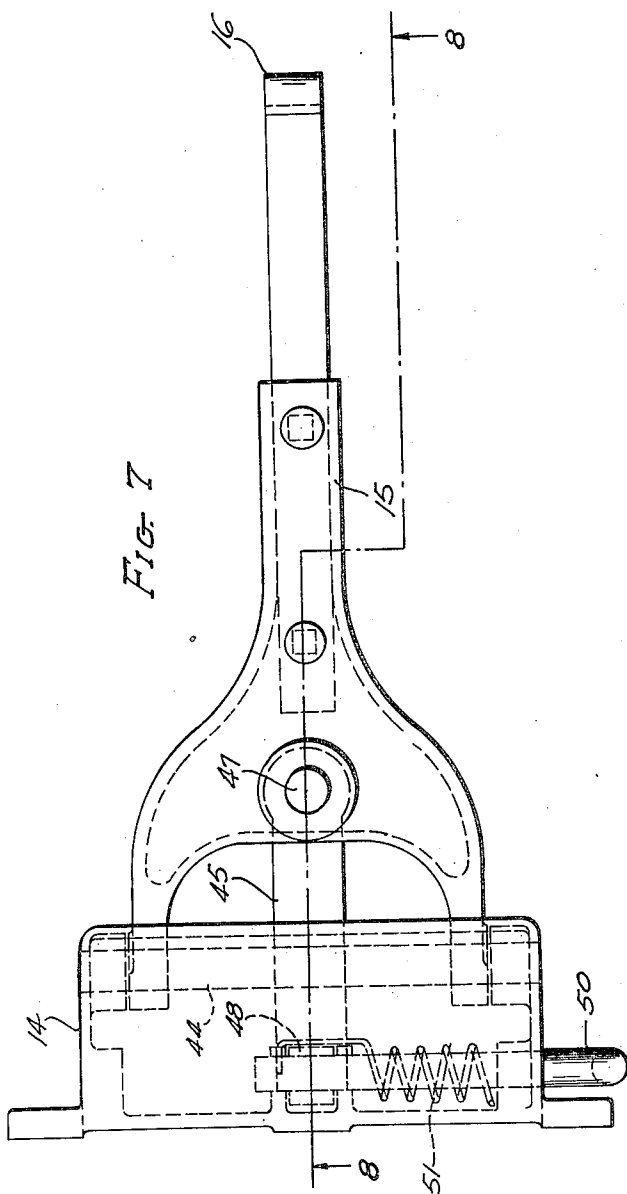
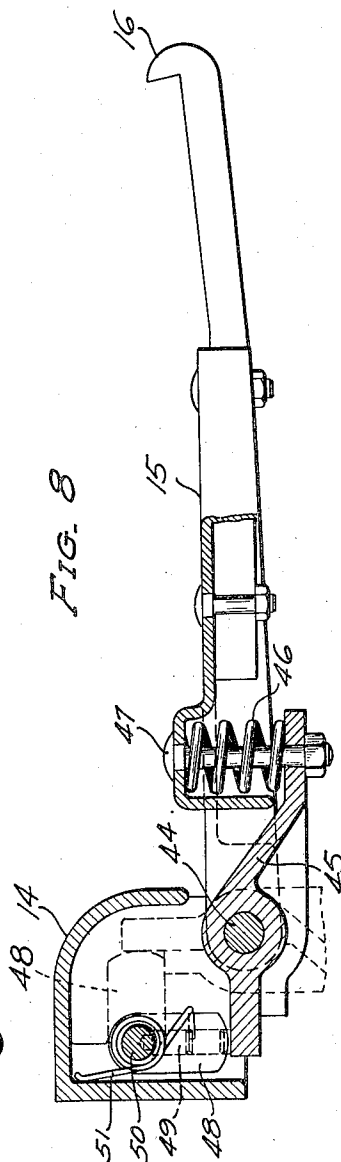
L. G. HILKEMEIER

2,488,292

CHUTE SUPPORT FOR CONCRETE MIXERS

Filed Jan. 30, 1946

6 Sheets-Sheet 5



INVENTOR.
Louis G. Hilkemeier
BY
George A. Evans
Attorney

Nov. 15, 1949

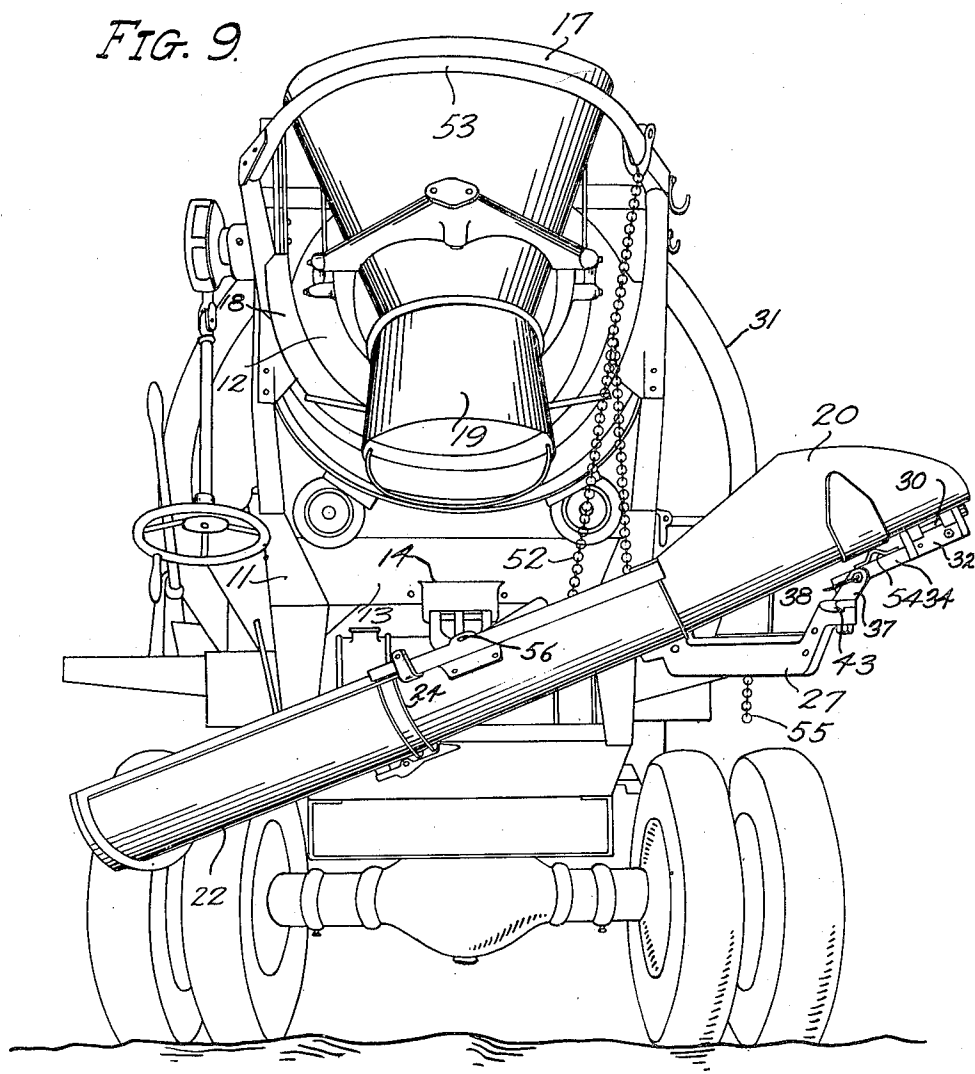
L. G. HILKEMEIER

2,488,292

CHUTE SUPPORT FOR CONCRETE MIXERS

Filed Jan. 30, 1946

6 Sheets-Sheet 6



INVENTOR.
Louis G. Hilkeimeier

BY

George A. Evans
Attorney

UNITED STATES PATENT OFFICE

2,488,292

CHUTE SUPPORT FOR CONCRETE MIXERS

Louis G. Hilkemeier, West Allis, Wis., assignor to
Chain Belt Company, Milwaukee, Wis., a corporation of Wisconsin

Application January 30, 1946, Serial No. 644,309

6 Claims. (Cl. 193—10)

1

This invention relates to supporting mechanism for distributing chutes such as are used to distribute concrete transported by truckmixers and the like. A distributing chute is usually permanently mounted on the truck in some convenient location near the discharge end of the mixer drum and when moved into operating position "chutes" the material from the mixer to the desired location such as the forms in which the concrete is being placed. It is desirable that the chute should be capable of easy manipulation, that it should be supported in a non-operative position such that it will not unduly increase the dimensions of the truck, that it should be firmly supported especially when in operative position and that it have a good angle of inclination even when being used over a wide spouting range.

It is an object of the present invention to provide a chute support which will answer the foregoing requirements and which will constitute an improvement over supports heretofore employed.

In the distribution of ready-mixed concrete there are many instances in which it is desirable to discharge the concrete directly, and without the use of a chute, into high forms or into buckets and high hoppers, and while the chute should be carried as a standard piece of equipment on the machine because of the many jobs where it will be used, it should be maneuverable to a non-operating position where it will not interfere with a direct pour.

When the chute is in use, it should be capable of manipulation so as to swing it in an arc and to raise or lower its discharge end, and it is highly desirable that in doing so the receiving end should not change its position from that which is most advantageous to receive the concrete from the drum.

Accordingly it is an object of the present invention to provide distributing mechanism including a chute which may be moved to a non-operating or transporting position, so as to enable direct pours, and which when in operating position, may have its discharge end raised or lowered without affecting the position of the receiving end of the chute.

One embodiment of the invention is illustrated in the accompanying drawings, wherein:

Fig. 1 is a perspective view from the rear of a transit concrete mixer showing the distributing chute in the position it may occupy during travel of the vehicle to and from the point of use;

Fig. 2 is a rear view of the machine shown in

2

Fig. 1 with the distributing mechanism in position to discharge concrete from the mixing drum;

Fig. 3 is enlarged detail view partly in section of the supporting swivel showing the extension arm locked integrally therewith;

Fig. 4 is an enlarged side view, partly in section of the mechanism which directly supports the chute;

Fig. 5 is a section taken on line 5—5 of Fig. 4;

Fig. 6 is a section taken on line 6—6 of Fig. 4;

Fig. 7 is an enlarged detail plan view of the locking bar when it is in position to lock the swivel arm of the chute support;

Fig. 8 is a section taken on line 8—8 of Fig. 7; and

Fig. 9 is a rear view, similar to Fig. 2, but with chute extension attached to the chute, and the chute with its extension carried crosswise of the drum at the rear of the truckmixer.

In the drawings, the numeral 11 designates the rear uprights of the frame of a concrete mixer preferably of the high discharge truckmixer type which is mounted on a truck for transporting and/or mixing concrete in transit. Rear uprights 11 are spaced apart sufficiently that the rear portion of the inclined-axis rotating mixing drum 12 may extend between them and overhang the frame as illustrated in the drawings. Beneath the drum and connecting the uprights 11 is a cross member 13 on which is mounted on the rearward side a bracket 14 carrying a locking bar 15 having a hook portion 16 at its outer extremity. The bar 15 is pivoted about a horizontal axis on the bracket 14 and in its operative position is substantially horizontal as illustrated in Fig. 3.

The rotatable drum 12 has an opening at its rear end through which its contents are discharged, said opening being normally closed by a charging hopper 17 having a port confining the opening. The hopper is retractable, however, to permit concrete to be expelled from the drum, the material being directed therefrom by a stationary receiving hopper 18 having its lower end open and in registry with the receiving end of the distributing chute when the latter is in distributing position. The receiving hopper 18 may be provided with a hinged sub-chute 19 which may be doubled back on the receiving hopper 18 into a non-operative position when the main chute is being used, or when the main chute occupies its inoperative position, the sub-chute may be employed to provide a short pour.

The main distributing chute 20, is of substantial length with its sides, which define a trough,

3

higher adjacent the receiving end to prevent spillage of concrete falling from the receiving hopper. Adjacent the discharge end of the chute 20, there is a pivoted bail 21 to which the chain supporting means are attached, the details of which will be hereinafter described. An extension spout 22, shown hanging from the side of the mixer in Fig. 1 may be quickly attached to the discharge end of the main chute to extend the length thereof. To accomplish this, a pin 23 extends upwardly from each side of the main chute near the discharge end, and correspondingly positioned apertures in the extension chute may be brought to register with the pins and the extension chute pivoted back until its receiving end is brought into abutment with a flange 24 surrounding the discharge end of the main chute 20. Alternately the extension chute may be attached directly to the sub-chute 19 which has similar pins 25 for this purpose. In the latter instance the main chute 20 must be removed so as not to interfere with the sub-chute 19 and extension chute 22.

During transportation of the concrete and also during employment of the sub-chute 19, the main chute 20 is disposed alongside the drum as shown in Fig. 1. In some respects this method of mounting follows the teachings of U. S. Patent No. 1,890,982 to Foster and Ball, but in other respects it is considerably different, as will be hereinafter pointed out. When non-operating, the outer end of the chute rests in a cradle 26 mounted on one of the side running boards disposed parallel to the axis of the mixer drum, and the inner end is supported by a swinging bracket or arm 27 pivotally mounted on one of the rear uprights 11. To bring the chute into distributing position, the arm 27 is swung through an arc of about 180° to the position shown in Fig. 2 and the inner end of the chute may be brought into position to receive concrete discharged through the receiving hopper 18 from the drum. The main chute in turn may be swung in an arc about the outer end of arm 27 due to the swivel connection and the mounting hereinafter described.

On the under side of the main chute and closely adjacent its receiving end is a stiffening plate 28 which is secured by rivets or otherwise to a mating plate 29 having ear portions at one side which serve as one part of a hinge joint 30 permitting pivoting of the chute away from its support about an axis parallel to its length but slightly offset with respect thereto. This arrangement permits the chute to be pivoted into a position with its open side facing the guard 31 on one side of the drum, and thereby the chute occupies less space during transportation trips because the sides of the chute do not extend over the running board on which it rests. When the chute is in use this pivot is inoperative, for the weight of the concrete maintains the chute on its supporting structure because of the location of the pivot to one side of the axis of the chute.

Plate 29 is hingedly connected by the joint 30 to a channel member 32 and when the chute is in operation the plate 29 is disposed parallel to the web of the channel. Channel member 32 is itself hinged by a pin 33 to a second channel member 34 arranged to nest within the channel 32 during the hinging motion.

The inner side of the channel member 34 forms a groove for a sliding latch 35 which engages a hook 36 on the swivel member 37, and said latch normally maintains the channel rigid with respect to the swivel. When so maintained,

4

the end of the chute may be raised or lowered and the chute will pivot about the pin 33. When, however, the chute is to be laid alongside of the drum it should be pivoted nearer to the swivel connection 37 rather than at the extremity of the extension arm formed by the channel 34, and hence the channel is not rigidly connected to the swivel but the latch 35 is pinned to the ears extending from the swivel 37, and the pin 38 which extends through apertures in the channel 34 and operates in an oblong slot in the latch 35 is rendered operable by disengaging the latch from the swivel. The latter, i. e., movement of the latch, is accomplished by a lever arm 39 pinned to the channel 34, said arm having an actuating dog 40 engaging a notch 41 in the latch 35 whereby the latch may be retracted from the hook on the swivel and the pivot 38 employed. As a result, the chute may maintain a horizontal position when being transported alongside the drum and the inner end of the chute will be only slightly higher than the swivel. This enables the chute to occupy a position below the most extended portion of the guard 31 previously referred to. The latch is normally maintained in position to catch the hook on the swivel, a compression spring 42 being carried in a recess in the latch bar for this purpose.

Referring again to the locking bar 15, it will be observed from Fig. 3 that the hook 16 on the end of the locking bar is disposed to engage a hook 43 extending from the end of the bracket 27, thereby fixing the swivel member 37 in definite operative position relative to the end of the drum.

The locking bar 15 may be carried in a vertical non-operating position, thereby reducing the possibility of its being damaged by unintended collision with other objects. In Figs. 7 and 8 there is shown in detail the mechanism for latching the locking bar in two positions, the dotted line position of parts shown in Fig. 8 illustrating its non-operating position.

As illustrated in these figures, the inner end of the bar 15 is bifurcated with the leg portions journaled on a rod 44 secured in the bracket 14. Also journaled on rod 44 and extending between the bifurcated legs of the bar 15 is a supporting member 45, one end of which yieldably supports the bar 15 through the medium of compression spring 46 and bolt 47. The opposite, or inner end of member 45 is free to pivot within the bracket 14, but its position within the bracket is controlled by a latch 48 secured by a set screw 49 to an L-shaped hand lever 50 journaled on the bracket 14. By swinging the lever 50 counter-clockwise, as viewed in Fig. 8, the supporting member 45 is permitted to swing to a vertical position, after which the latch 48 will drop to lock bar 15 in vertical or non-operating position as shown in dotted lines in Fig. 8. To move the bar to horizontal position, the hand lever is again raised, freeing the end of member 45 and permitting the bar 15 to be lifted to horizontal position. The hand lever is then dropped locking the bar in the full line position shown. A torsion spring 51 surrounding the horizontal portion of lever 50 constantly urges the latch 48 in both of its locking positions. The spring 46 constantly urges the hook 16 upward when it is in a raised position and maintains the locking engagement of hooks 16 and 43 when such an engagement is brought about by swinging the arm 27 into contact with the bar 15 when the latter is in horizontal position.

5

The outer end of the chute is supported by a chain 52 which is threaded through an opening in a bracket on the bail 21 and the hook on the end of the chain is connected at an intermediate point thereby enabling the chain to be locked in different positions of various chute elevations. The upper end of the chain is supported by a substantially semi-circular tubular member 53 the center of which is substantially in vertical alignment with the axis of the swivel member 37 when the latter is in locked position by bar 15, and with this arrangement, the chute may be swung on the swivel member 37 and the chain slid on the tube 53 to support the end of the chute at the same elevation in various positions.

Assuming the chute is resting on the cradle 26 alongside the drum 12, the operator lifts the outer end of the chute off from the cradle and then causes the arm 27 to swing into position where it may be locked with the bar 15, the latter being locked in horizontal position as previously described. Next the outer end of the chute is depressed causing the chute to pivot about the pin 38 and the latch 35 to slide back as it rides over the curved upper surface of the hook 36. The spring 42 snaps the latch into locking position and renders the pivot 38 inoperative. Should it now be desired to raise the end of the chute this is done by taking up the chain 52 which supports the outer end of the chute and during such movement pivoting occurs about the pin 33. Since the latter hinge is closer to the receiving or higher end of the chute, the outer end of the chute may be raised without sacrificing as much height as would occur if the pivot point were more intermediate the ends of the chute.

To return the chute to its original position alongside the drum, lever arm 39 is pressed toward the latch causing the latter to be retracted from the swivel hook and permitting the channel and the latch to pivot about the pin 38. The weight of the channel and its associated members along with the disposition of the weight of the chute when empty make it unnecessary for the operator to do more than retract the latch, to cause it to disengage the hook 36. Once the hook is disengaged, the chute rests on the channel, a stop 54 being conveniently located on the upper side of the channel near the swivel 37 for this purpose.

The chute may now be swung while in a substantially horizontal position, and after disengagement of the hook 16, by raising the hand lever 50, the arm 27 may be swung until it extends off to the side of the upright frame member supporting it. The chute is next pivoted about the hinge 30 and is laid alongside the drum and within the cradle 26.

The construction also enables the main chute to be carried behind the drum and transversely thereof, while the arm 27 and bar 15 are locked. In one instance the pivot 38 is maintained inoperative and the chute is pivoted about the swivel 37 until it is at right angles to the drum. It may be held in this position by a chain 55 secured to the running board carrying the cradle 26, the free end of the chain being inserted through a keyhole slot in a bracket 56 extending from one side of the chute, and when a chain link enters the neck of the slot, the adjacent coil link effectively engages the slot and supports the chute. When the concrete is distributed by the sub-chute 19 either alone or with the extension chute 22, the main chute 20 cannot be disposed in this

6

manner and is moved to the side of the drum as previously pointed out.

The chute may also be carried in back of the drum with the extension 22 attached to the chute, as shown in Fig. 9. In this instance, the bar 15 is disconnected from the arm 27, and the arm 27 is pivoted to the position it would occupy if the chute were to be laid alongside the drum on the running board. Instead of disposing the chute parallel to the axis of the drum, it may be arranged transversely thereof and since the receiving end of the chute is moved to the extreme right side of the truck when viewed from the rear, because of the movement of the arm 27, the extension 22 may be attached to the end of the chute and the extension will not protrude beyond the left side of the rear of the truck. To hold the chute in this position, a hook-shaped bracket 57 mounted on one of the rear uprights is employed and an ear 58 extending from the side of the extension 22 is hooked on this bracket. Thus the chute may be carried with the extension in position for immediate use which is a considerable advantage in those cases where in successive trips the extension is to be employed.

The invention having been described, what is claimed is:

1. In a transit concrete mixer having an end-discharge mixing receptacle and a frame, a bracket pivotally secured to said frame having a swivel bearing at its outer extremity, said bracket being pivotal from an operating position in which said bearing is disposed in line with material discharged from the mixer to a non-operating, transporting position approximately 180° therefrom, a swivel member pivotal about said bearing having a portion extending upwardly at an angle to the axis of rotation of said swivel member, a distributing chute, a support for the outer end thereof, and means supporting the inner end of said chute by said swivel member comprising a hinge about which said chute may pivot with the axis of the chute constantly intersecting the axis of said swivel, and a second hinge arranged parallel to the axis of the chute permitting the chute to turn on its side when in non-operating position.

2. Chute supporting mechanism for concrete mixers and the like comprising a swivel pivotal about a substantially vertical axis, an arm hingedly connected about a horizontal axis to the concrete receiving end of the chute and means for rendering the arm rigid with respect to the swivel when concrete is contained by said chute or pivotal with respect thereto about an axis parallel to said second mentioned axis but at a point removed from the receiving end of said chute more nearly adjacent said swivel.

3. Instrumentalities for supporting the inner end of a distributing chute on a body having a holding receptacle comprising a bracket pivotally mounted on the body with a swivel bearing adjacent its outer end, a swivel member journaled in said bearing having an arm extending from said bearing, an extension member pivotally secured to said arm, means rendering said extension member pivotable or rigid with respect to said arm, a supporting element pivotally connected to the extension member near the extremity of the latter and means connecting the inner end of the chute and the supporting member.

4. Instrumentalities for supporting the inner end of a distributing chute on a body having a holding receptacle comprising a bracket pivotally

7

mounted on the body with a swivel bearing adjacent its outer end, a swivel member journaled in said bearing having an arm extending at an angle to said bearing, an extension member pivotally secured to said arm, means rendering said extension member pivotable or rigid with respect to said arm, a supporting element pivotally connected to the extension member near the extremity of the latter, a bracket secured to the inner end of the chute and means pivotally connecting the bracket to the supporting member about an axis parallel to the chute but offset with respect thereto.

5. Apparatus for connecting a distributing chute to its supporting member comprising a bracket secured by a pivot to said chute, adjacent one end thereof, said pivot having an axis parallel to the axis of said chute but offset with respect thereto such that the weight of the chute renders the pivot inoperative when the chute contacts the bracket, and said bracket being secured by a second pivot to said supporting member, said second pivot having an axis perpendicular to the axis of said chute whereby the elevation of the other end of the chute may be varied.

8

6. Apparatus for supporting a distributing chute comprising a supporting member having a swivel bearing, a swivel member pivotal about said bearing and an extension member secured by a pivot to said swivel member, means for rendering operative or inoperative said pivot with respect to said swivel, a distributing chute connected near one of its ends to said extension member, said connection arranged to enable said chute to pivot about its connected end in planes parallel with and perpendicular to the axis of said chute.

LOUIS G. HILKEMEIER.

REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
1,221,756	Lichtenberg	Apr. 3, 1917
1,890,982	Foster	Dec. 13, 1932
1,946,222	Mandt	Feb. 6, 1934
2,257,161	Draeger	Sept. 30, 1941