March 23, 1954

C. GERST

2,672,966

CHUTE FOR CONCRETE MIXERS

Filed Feb. 14, 1952

5 Sheets-Sheet 1

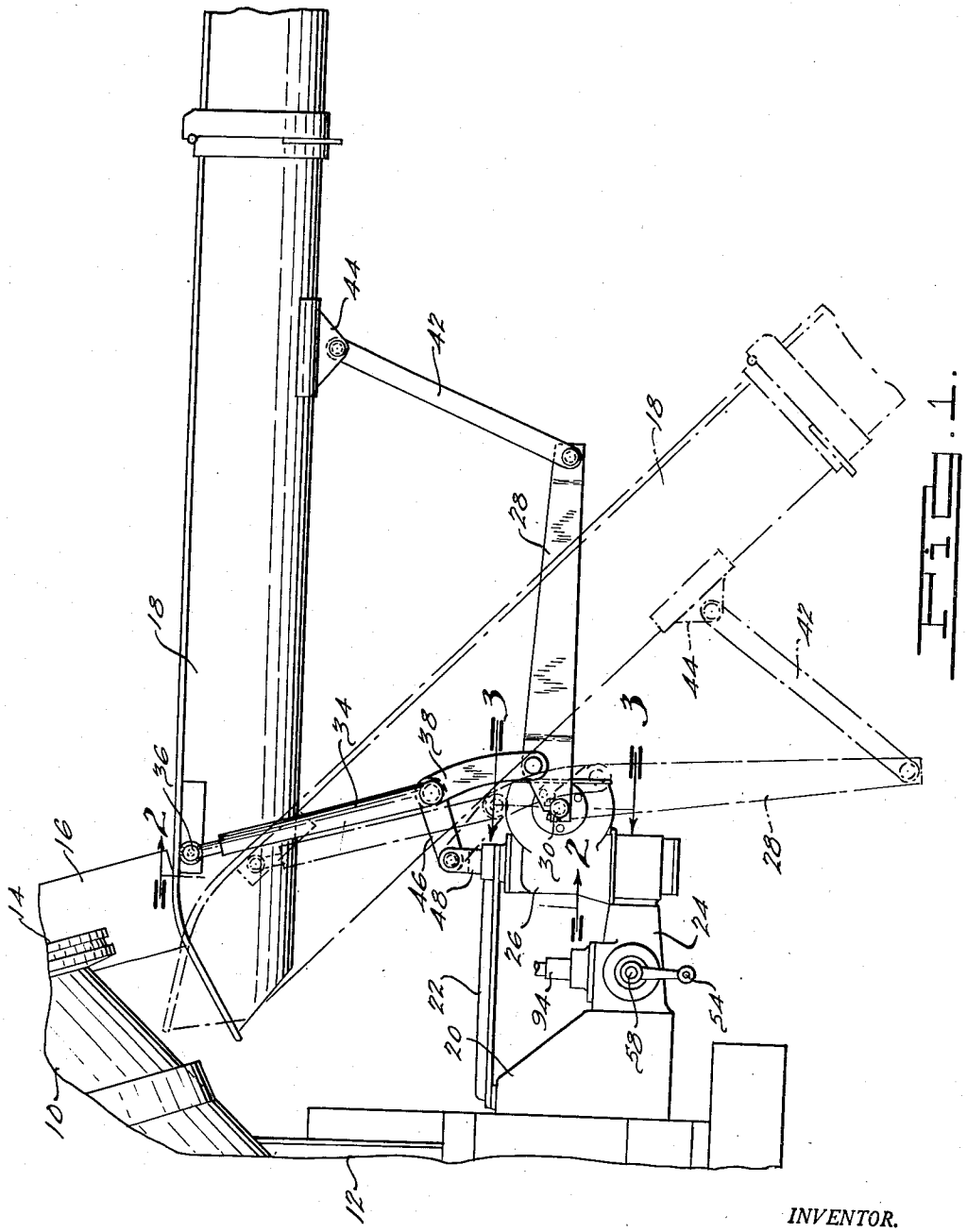


FIG. 1.

INVENTOR.

BY Chris Gerst.

E. J. Ballup

ATTORNEY.

March 23, 1954

C. GERST

2,672,966

CHUTE FOR CONCRETE MIXERS

Filed Feb. 14, 1952

5 Sheets-Sheet 2

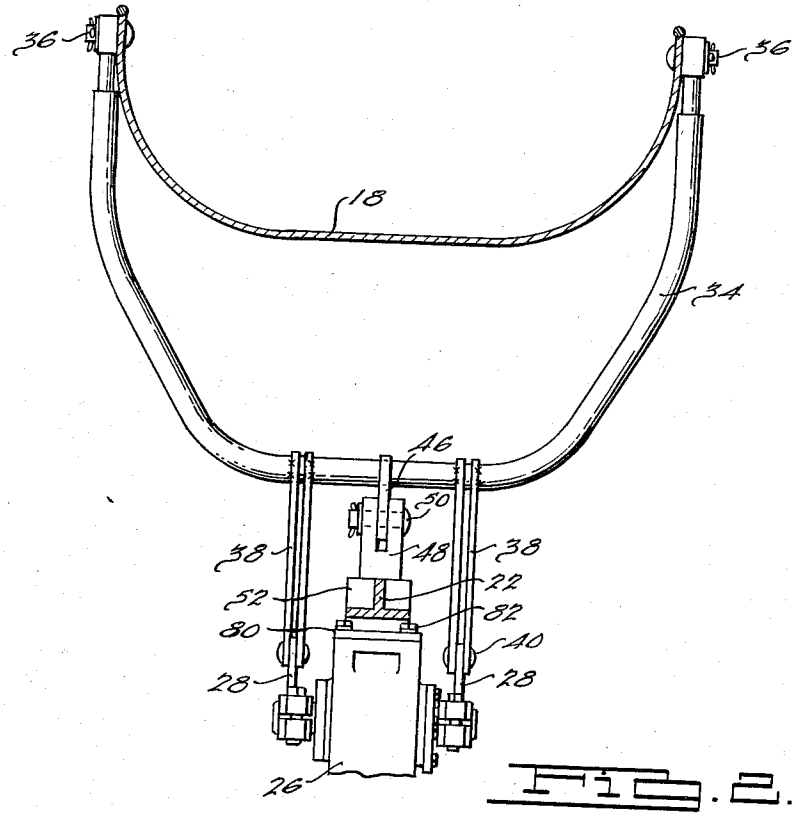


FIG. 2.

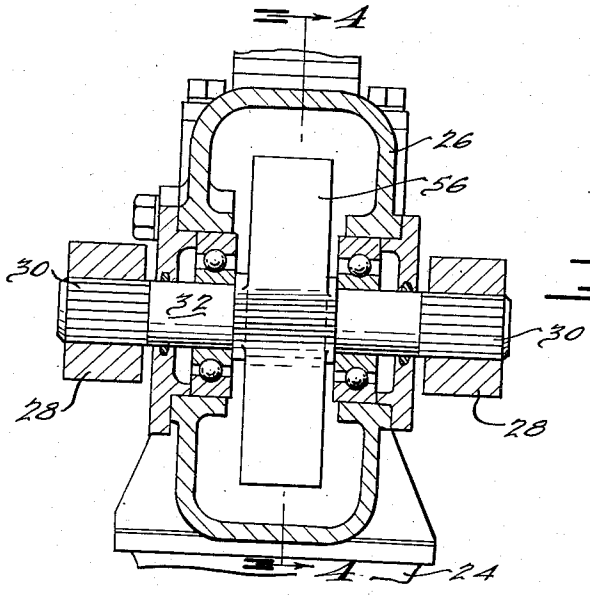


FIG. 3.

INVENTOR.

BY Chris Gerst.

E. J. Ballouf

ATTORNEY.

March 23, 1954

C. GERST

2,672,966

CHUTE FOR CONCRETE MIXERS

Filed Feb. 14, 1952

5 Sheets-Sheet 3

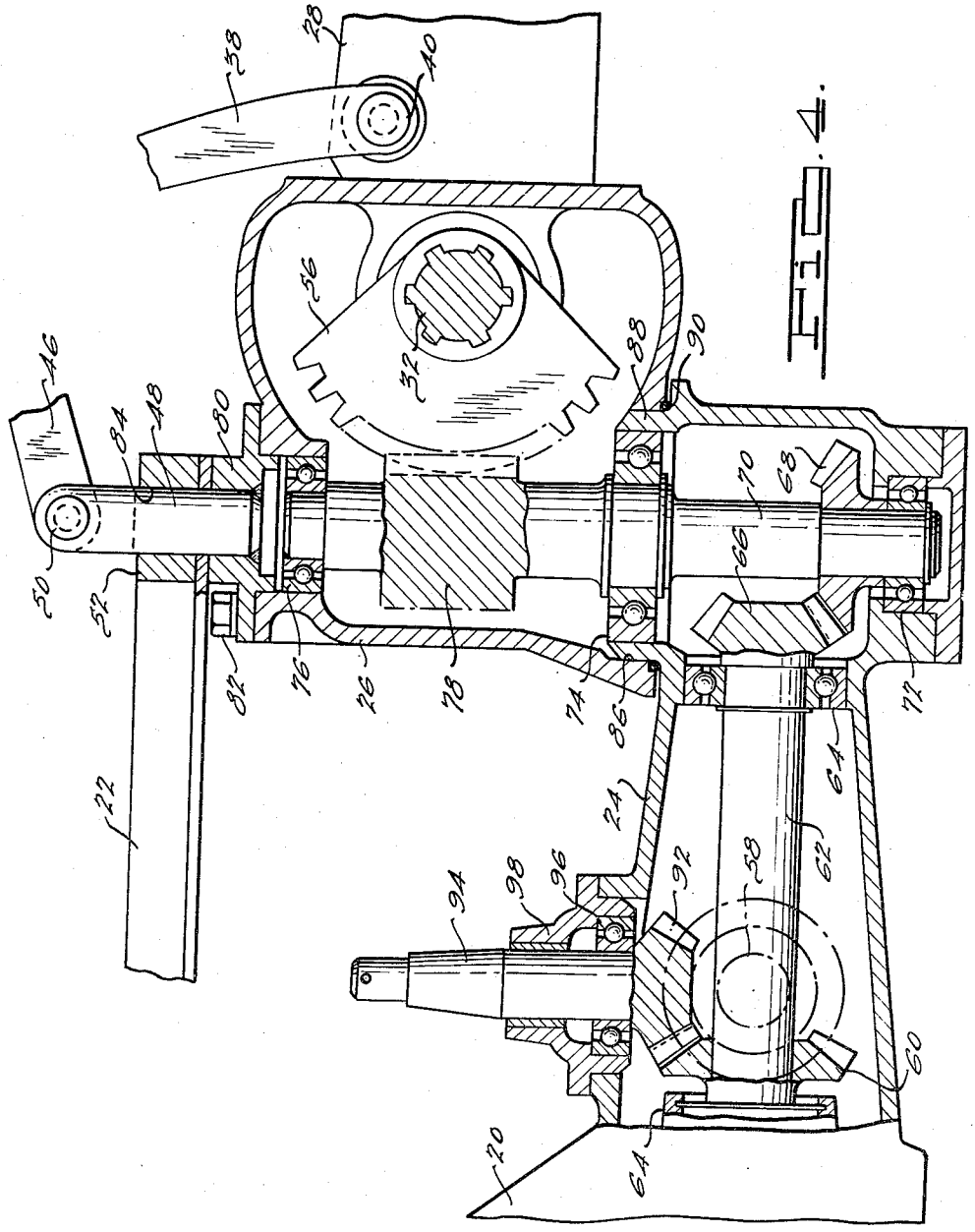


FIG. 4.

INVENTOR.

BY Chris Gerst.

E. J. Ballouf

ATTORNEY.

March 23, 1954

C. GERST

2,672,966

CHUTE FOR CONCRETE MIXERS

Filed Feb. 14, 1952

5 Sheets-Sheet 4

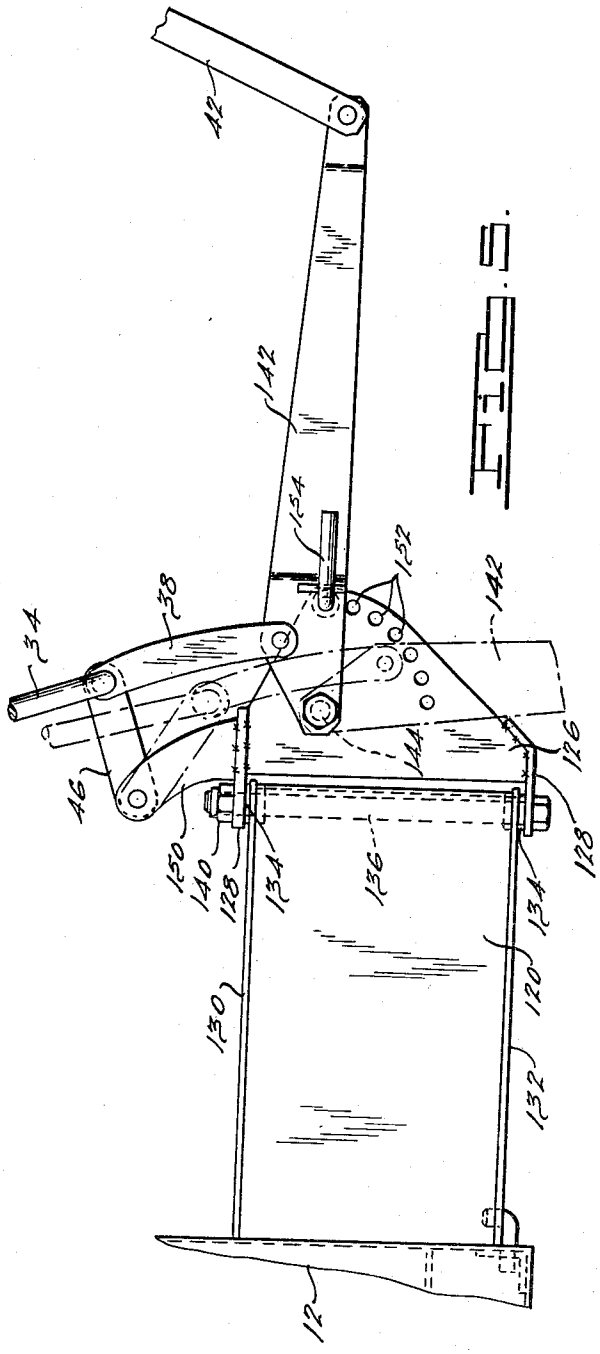


Fig. 5.

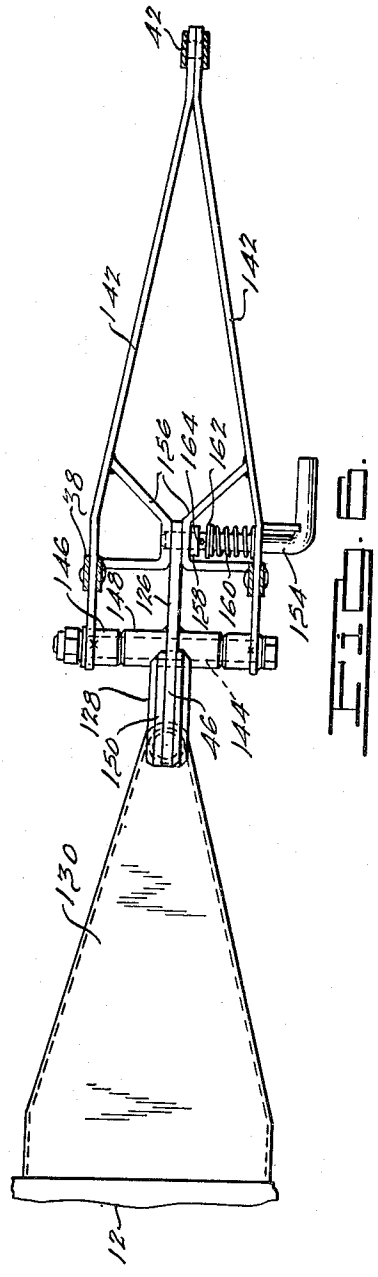


Fig. 6.

INVENTOR.

BY Chris Gerst.

E. J. Ballaff

ATTORNEY.

March 23, 1954 C. GERST 2,672,966

CHUTE FOR CONCRETE MIXERS

Filed Feb. 14, 1952

5 Sheets-Sheet 5

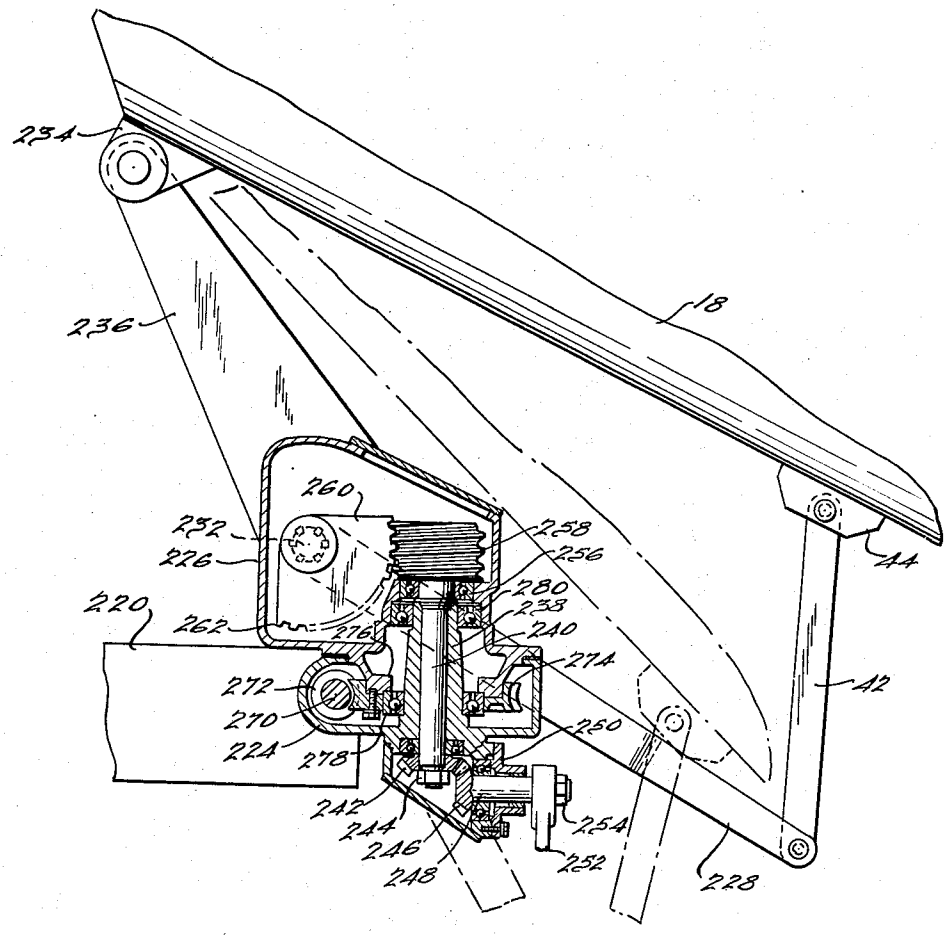


FIG. 7.

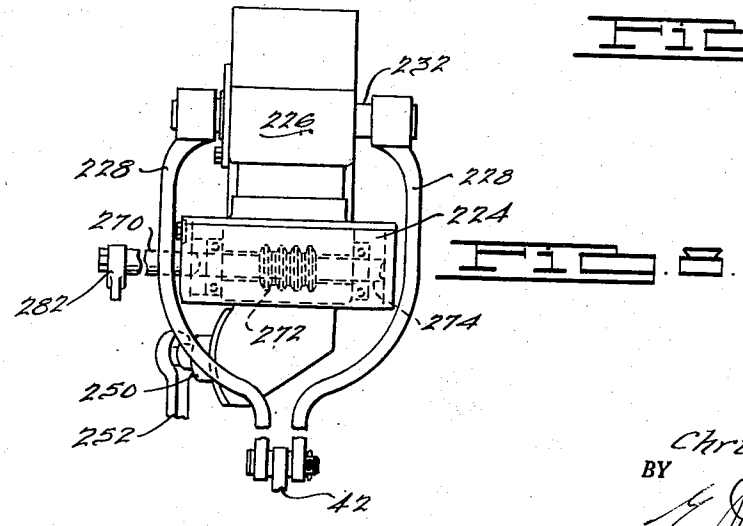


FIG. 8.

INVENTOR.
Chris Gerst.
BY
E. J. Ballentine
ATTORNEY.

Patented Mar. 23, 1954

2,672,966

UNITED STATES PATENT OFFICE

2,672,966

CHUTE FOR CONCRETE MIXERS

Chris Gerst, Detroit, Mich., assignor, by mesne assignments, to Le Roi Company, a corporation of Delaware

Application February 14, 1952, Serial No. 271,485

9 Claims. (Cl. 193—10)

1

This invention relates to concrete mixers of the transit type and has particular reference to certain improvements in the mounting means for the material receiving and distributing chute of such a mixer.

A concrete mixer of the type to which this invention pertains may include a mixing drum rotatably mounted about a rearwardly, upwardly inclined axis and having a discharge opening in the rear end of the drum through which the contents of the drum may be discharged upon reverse rotation of the drum. This invention contemplates a new and improved mounting means for the distributing chute which is arranged below the opening in the drum and adapted to receive and distribute the material discharged therefrom. The distributing chute is movable about both a vertical and a horizontal axis and the mounting means for the chute described herein provide for very quick and easy adjustment of the vertical and horizontal positions of the chute. The invention contemplates power operated mechanism for pivoting the chute about a horizontal axis, or for pivoting the chute about both a horizontal and a vertical axis. The use of the power transmitting means contemplated by this invention makes it possible to adjust the chute to any desired position with a minimum of time and effort. The use of a power lift and swivel arrangement also eliminates the need for adjustable links or clamps to maintain the chute in position, and thereby materially cuts down the time required for an operator to position the chute for discharge of the material in the drum, which is an important consideration in mixer design.

The principal object of the invention, therefore, is to provide a new and improved supporting means for the distributing chute of a transit mixer.

A further object of the invention is to provide a supporting structure for a distributing chute which incorporates means for moving the chute to any selected elevation.

Another object of the invention is to provide a manually operable power transmitting arrangement for adjustably supporting a distributing chute in a selected position.

A further object of the invention is to provide a supporting structure for a distributing chute embodying means for quickly and easily moving the chute to its desired position.

Other and further objects of the invention will be apparent from the following description and claims and may be understood by reference to the accompanying drawings, of which there are five

2

sheets, which by way of illustration show preferred embodiments of the invention and what I now consider to be the best mode in which I have contemplated applying the principles of my invention. Other embodiments of the invention may be used without departing from the scope of the present invention as set forth in the appended claims.

In the drawings:

Fig. 1 is a fragmentary side elevational view of a transit mixer provided with a distributing chute mounting means embodying my invention;

Fig. 2 is a fragmentary sectional view taken along lines 2—2 of Fig. 1;

Fig. 3 is a fragmentary sectional view taken along lines 3—3 of Fig. 1;

Fig. 4 is a sectional view taken along lines 4—4 of Fig. 3;

Fig. 5 is a fragmentary side elevational view of a modified form of the invention;

Fig. 6 is a top plan view of the mounting structure shown in Fig. 5;

Fig. 7 is a fragmentary view, partially in section, illustrating a further modification of the invention; and

Fig. 8 is an end elevational view of a portion of the structure shown in Fig. 7.

In Fig. 1 there is disclosed a portion of the rear end of a transit mixer including a drum 10 rotatably supported by the mixer frame 12 which may be mounted on a truck chassis. The drum 10 has an opening at the rear end thereof adapted to be closed by a door 14 during charging of the drum and during mixing of the contents of the drum, the door 14 being movable away from the drum so as to permit the discharge of the contents of the drum through the opening therein upon reverse rotation of the drum. The contents of the drum are discharged into a funnel-like structure 16 from which the contents are directed into a material receiving and distributing chute 18 which is arranged below the opening in the drum and adapted to receive and distribute the material discharged from the drum.

The chute 18 is supported for movement from the full line position shown in Fig. 1 to the dotted line position thereof about a horizontal axis and is supported for swiveling movement about a vertical axis. The supporting structure includes a frame member 20 adapted to be attached to the mixer in a suitable manner and includes an arm 22. A housing 24 is secured to the frame 20 and a rotatable housing 26 is rotatably mounted on the housing 24 for rotation about a vertical axis. The housing 26 forms a support member for a

pair of arms 28, one end of each of which is secured to one of the splined ends 30 of a horizontal shaft 32 rotatably mounted in housing 26. A U-shaped yoke member 34 is pivotally connected at its upper ends to the receiving end of the chute 18 as indicated at 36. Arms 38 are secured to the horizontal portion of the U-shaped yoke 34 as by welding, and in effect form integral extensions of the arms of the yoke 34. The arms 38 each have a pivotal connection indicated at 40 with one of the arms 28, the pivotal connection 40 being located between the shaft 32 and the other end of the arms 28.

The arms 28 may be bent, as is best shown in Fig. 6, so that their outer ends thereof may be secured together. A link 42 has a pivotal connection with the outer ends of arms 28 and is also pivotally connected to a bracket 44 secured to the under side of chute 18 adjacent its outer end. A link 46 is pivotally mounted on yoke 34 between the arms 38 and is also pivotally connected to the bifurcated end of a pin 48 by means of a cross pin 50, the pin 48 projecting upwardly from housing 26 and being rotatably mounted in a bearing 52 provided on the end of the upper frame arm 22. The above described linkage effects vertical movement of the chute 18 in a prescribed path upon swinging movement of arms 28. In the embodiment of the invention illustrated in Figs. 1–4, the chute 18 may be swiveled manually into any desired position but is provided with a power operated device for raising and lowering the chute.

The power operated means for raising and lowering the chute may comprise suitable gearing arranged within the lower housing 24 and rotatable housing 26 and adapted to be operated by a crank 54 projecting laterally from one side of the housing 24. Referring more particularly to Fig. 4, it will be seen that the shaft 32 to which the arms 28 are rigidly secured has a sector gear 56 secured thereto within the housing 26. The shaft 58 to which the crank 54 is secured projects into housing 24 and may be provided with a bevel gear on the inner end thereof adapted to mesh with a bevel gear 60 suitably secured to a shaft 62 journaled in bearings 64 mounted in housing 24. The other end of shaft 62 is provided with a bevel gear 66 arranged to mesh with the bevel gear 68 secured to the lower end of a shaft 70 journaled in ball bearings 72 and 74 mounted in housing 24. The upper end of the shaft 70 is journaled in a ball bearing 76 mounted in the upper end of housing 26, and the shaft 70 is supported for rotation within the housing 26 about a vertical axis. It will be apparent that rotation of crank 54 will effect rotation of shaft 70 by means of the gear arrangement just described.

The shaft 70 is provided with a worm gear portion indicated at 78 which is adapted to mesh with the teeth formed on sector gear 56 so that rotation of shaft 70 by means of crank 54 will effect oscillation of gear 56 thereby causing swinging movement of arms 28 which are connected to shaft 32 for movement therewith. Swinging movement of arms 28 as just described will cause vertical movement of chute 18 between the full line and dotted line positions thereof shown in Fig. 1.

The upper end of housing 26 within which the bearing 76 is arranged is provided with a cover member 80 secured to the housing 26 by a series of bolts 82. The pin 48 is secured to the cover member 80 and projects upwardly therefrom through an opening 84 provided in the bearing 52 mounted on arm 22.

The lower end of housing 26 is provided with a bore 86 having a finished surface and adapted to receive an upwardly projecting collar 88 formed on housing 24. Housing 26 is rotatably supported about the collar 88 of housing 24 and a suitable gasket or sealing member 90 may be arranged between the housing 24 and housing 26, as shown. Since shaft 70 is rotatably supported within housing 24, the housing 26, the shaft 32 and its sector gear 56, and the arms 28, as well as pin 48, will be free to rotate on housing 24 about the vertical axis of shaft 70 when the chute is manually swiveled to a desired position.

The gearing arrangement described permits the vertical position of the chute to be very quickly and easily adjusted and eliminates the need for adjustable links or clamps between the chute and its mounting structure. The chute will remain fixed at any elevation to which it is brought by means of the friction inherent in the gear arrangement previously described.

The crank 54 is shown as being located to one side of the housing 24 which is located at the center of the rear end of the mixer. In order to facilitate operation of the device in the event that crank 54 might at some time be inaccessible to the operator, an additional operating means might be provided which would be located at a different position on the mixer than the crank 54. Such an arrangement is partially disclosed in Figs. 1 and 4 and may include a bevel gear 92 adapted to mesh with gear 60 and mounted on shaft 94 journaled in bearing 96 which is mounted in a collar 98 suitably secured to housing 24. The upper end of shaft 94 may be connected in any suitable manner (not shown) to an operating lever or crank or hand wheel or the like which may be positioned in any desired location on the mixer or truck chassis.

Figs. 5 and 6 disclose a modified form of the invention. In this embodiment the frame member 120 is adapted to be secured to the mixer frame 12 in a suitable manner and a support member 126 is supported by the frame member 120 for rotation about a vertical axis. The support member 126 includes brackets 128 secured thereto at its upper and lower ends. The frame member includes upper and lower arms 130 and 132 having bearing blocks 134 secured thereto. The inner surfaces of the brackets 128 seat against the bearing blocks 134 and a vertically arranged shaft 136 is journaled in apertures provided in the brackets 128 and bearings 134. The shaft 136 is provided at its lower end with a head 138 and a nut 140 is threaded on to the upper end of the shaft for rotatably securing the support 126 to the frame 120.

Arms 142 are pivotally connected to support member 126 by means of a pin indicated at 144 which extends through an aperture in the support 126 and through aligned apertures in one end of the arms 142. The pin 144 is journaled in sleeves 146 and 148 suitably secured to arms 142 and support 126 respectively. The other ends of arms 142 are pivotally connected to a link 42 similar to the link employed in the embodiment of Figs. 1–4, the link 42 having a pivotal connection with the chute 18 adjacent its discharge end. In this embodiment the yoke member 34 is similarly connected to the chute 18 at its material receiving end, and arms 38 rigidly secured to yoke 34 are pivotally connected to arms 142 between the ends of the arms 142.

The support member 126 is provided with an integral bracket 150, and link 46 is pivotally connected to yoke 34 and to bracket 150. This embodiment of the invention is essentially similar to that disclosed in Figs. 1–4 except that the chute is adapted to be swung manually into a selected vertical position rather than by means of the power lift disclosed in Fig. 1. An adjustable connection between arms 142 and the support member 126 is provided, and this connection may comprise a series of apertures 152 in the support 126 and a pin 154 mounted on one of the arms 142 and receivable within one of the apertures 152 for fixing the chute at a selected elevation. The pin 154 projects through an opening in one of the arms 142 and through a similar opening provided in brackets 156 secured to the arms 142. The pin 154 is provided with a shoulder 158 for limiting the movement thereof under the influence of a spring 160 which is confined between the arm 142 and a washer 162 backed by a pin 164 extending through the pin 154. The pin 154 is biased into its locking position by a spring 160 and when it is desired to shift the elevation of the chute, the pin may be withdrawn from the aperture in the support 126 and the chute moved into the desired elevation, and subsequent to release of pin 154 will allow the same to project into another of the apertures 152 for locking the chute relative to the support 126.

A third embodiment of the invention is illustrated in Figs. 7 and 8, and in this embodiment power means are provided for both swiveling movement of the chute about a vertical axis and for swinging movement about a horizontal axis. A frame member 220 is adapted to be suitably secured to the mixer frame and a supporting housing 224 is suitably secured to the frame 220. A housing 226 is supported by the housing 224 and is rotatable relative thereto about a vertical axis. Arms 228 are rigidly secured to a shaft 232 which is journaled in housing 226. A link 42 has a pivotal connection with the outer end of arms 228 and with a bracket 44 secured to the under side of the chute adjacent its discharge end. The material receiving end of the chute is provided with a bracket 234 to which an arm 236 is pivotally connected at one end thereof, the arm 236 being suitably secured to or integral with the casting which forms the housing 226.

The lower housing 224 is provided with a vertically arranged portion 238 having a vertically arranged shaft 240 journaled therein. The lower end of the shaft 240 is provided with a bevel gear 242 retained thereon by a nut 244 and adapted to mesh with bevel gear 246 provided on the end of a shaft 248 journaled in a suitable bearing and extending through a cover plate 250 and provided at its outer end with a crank lever or the like 252 secured to the shaft by means of a nut 254. Rotation of crank 252 will effect rotation of shaft 240 by means of the intermeshing of bevel gears 242 and 246.

The upper end of shaft 240 is journaled in a bearing 256 mounted in housing 226, and a worm wheel 258 is formed on or secured to the upper end of shaft 240 and arranged within housing 226. The shaft 232 to which the arms 228 are secured has a sector gear 260 rigidly secured thereto and the teeth 262 of the gear 260 are adapted to mesh with the worm wheel 258 so that rotation of shaft 240 by means of crank 252 will effect oscillation of gear 260 and thereby cause swinging movement of arms 228 and corresponding vertical movement of chute 18. In Fig. 7 the shaft 248 is shown as being arranged in line with the axis of the mixer, although such showing is for purposes of clarity of illustration only, the shaft 248 actually being arranged so that it projects laterally from one side of the housing 224 as illustrated in Fig. 8.

A shaft 270 is journaled in housing 224 and is provided with a worm 272 adapted to mesh with the teeth of the worm wheel 274 which is secured to a flange 276 depending from housing 226 and arranged concentric with portion 238 of housing 224 and the shaft 240. A ball bearing 278 is interposed between the worm wheel 274 and the portion 238 of housing 224 on which the bearing 278 is mounted. A bearing 280 is also mounted on the upper end of portion 238 of housing 224, and housing 226 and the worm wheel 274 secured thereto are adapted to rotate on bearings 278 and 280 relative to housing 224 about the vertical axis of shaft 240 upon rotation of worm shaft 270 by means of a suitable hand wheel or crank 282 which may be secured thereto exteriorly of the housing 224.

The mounting means for the chute and the means of effecting both horizontal and vertical movement of the chute as disclosed in the modification shown in Figs. 7 and 8 provides an arrangement which permits very rapid adjustment of the chute to any desired position and one which requires a minimum of effort and time to be expended by the operator in discharging the contents of the drum to a desired location.

While I have illustrated and described preferred embodiments of my invention, it is understood that these are capable of modification and I therefore do not wish to be limited to the precise details set forth but desire to avail myself of such changes and alterations as fall within the purview of the following claims.

I claim:

1. In a concrete mixer having a rotatable drum provided with an opening through which the material in said drum may be discharged and a distributing chute arranged below said opening and adapted to receive and distribute the material discharged through said opening, mounting means for said chute comprising a frame member attached to the mixer, a housing supported by said frame member for rotation about a vertical axis, a horizontal axle rotatably mounted in said housing, an arm having one end thereof secured to said axle providing for swinging movement of said arm relative to said housing about a horizontal axis, a link pivotally connected to said chute adjacent the discharge end thereof and pivoted to the other end of said arm, a yoke pivotally connected to the material receiving end of said chute and pivoted to said arm intermediate the ends of said arm, a link pivotally connected to said yoke and to said housing for effecting vertical movement of said chute in a prescribed path upon swinging movement of said arm, a vertically arranged shaft rotatably mounted in said housing and having a worm gear thereon, a sector gear on said axle adapted to mesh with said worm gear for effecting swinging movement of said arm upon rotation of said shaft, and manually operable crank means operably connected to said shaft for effecting swinging movement of said arm thereby raising and lowering said chute.

2. In a concrete mixer having a rotatable drum

provided with an opening through which the material in said drum may be discharged and a distributing chute arranged below said opening and adapted to receive and distribute the material discharged through said opening, mounting means for said chute comprising a frame member attached to the mixer, a support member supported by said frame member for rotation about a vertical axis, an arm having one end thereof connected to said support member for swinging movement of said arm relative to said support member about a horizontal axis, a link pivotally connected to said chute adjacent the discharge end thereof and pivoted to the other end of said arm, a yoke pivotally connected to the material receiving end of said chute and pivoted to said arm intermediate the ends of said arm, a link pivotally connected to said support member and having a pivotal connection with said yoke between said chute and said arm for effecting vertical movement of said chute in a predetermined path upon swinging movement of said arm, and means connecting said arm and said support member for adjustably supporting said arm at a selected elevation.

3. In a concrete mixer having a rotatable drum provided with an opening through which the material in said drum may be discharged and a distributing chute arranged below said opening and adapted to receive and distribute the material discharged through said opening, mounting means for said chute comprising a frame member attached to the mixer, a housing supported by said frame member for rotation about a vertical axis, a horizontal axle rotatably mounted in said housing, an arm having one end thereof secured to said axle providing for swinging movement of said arm relative to said housing about a horizontal axis, means pivotally connecting said chute to said arm for effecting vertical movement of said chute in a prescribed path upon swinging movement of said arm, a vertically arranged shaft rotatably mounted in said housing and having a worm gear thereon, a sector gear on said axle adapted to mesh with said worm gear for effecting swinging movement of said arm and chute upon rotation of said shaft, and manually operable means connected to said shaft for effecting rotation thereof thereby effecting vertical movement of said chute.

4. In a concrete mixer having a rotatable drum provided with an opening therein through which the material in said drum may be discharged and a distributing chute arranged below said opening and adapted to receive and distribute the material discharged through said opening, mounting means for said chute comprising a frame member adapted to be attached to the mixer, a housing supported by said frame member for rotation about a vertical axis, an arm mounted on said housing for swinging movement about a horizontal axis, means pivotally connecting said chute and said arm for effecting vertical adjustment of said chute upon swinging movement of said arm, a shaft rotatably mounted in said housing for rotation about a vertical axis, gear means in said housing and fixedly connected to said arm, gear means on said shaft meshed with the gear means connected to said arm for effecting swinging movement of said arm upon rotation of said shaft, and manually operable means connected to said shaft for effecting rotation thereof thereby causing vertical movement of said arm and chute.

5. In a concrete mixer having an opening therein through which material in said drum may be discharged and a distributing chute arranged below said opening and adapted to receive and distribute the material discharged through said opening, mounting means for said chute comprising a frame member adapted to be attached to the mixer, a lower housing secured to said frame member, a housing rotatably mounted on said lower housing for rotation about a vertical axis, a vertically arranged shaft rotatably supported by said lower housing and projecting into said rotatable housing, a horizontal axle rotatably journalled in said rotatable housing, an arm having one end thereof secured to said axle providing for swinging movement of said arm about a horizontal axis, means pivotally connecting said chute and said arm thereby effecting vertical movement of said chute upon swinging movement of said arm, a sector gear secured to said axle within said rotatable housing, a worm gear on said shaft cooperable with said sector gear for effecting swinging movement of said arm and said chute upon rotation of said shaft, manually operable means operably connected to said shaft for effecting rotation of said shaft thereby causing vertical movement of said chute, said rotatable housing having a portion thereof depending into said lower housing, a gear wheel on said portion of said rotatable housing and concentric with said shaft, and manually operable gear means cooperating with said gear wheel and operable for effecting rotation of said housing about the axis of said shaft.

6. Supporting structure for the material distributing chute of a concrete mixer comprising a support member rotatable about a vertical axis, an arm pivoted at one end to said support for swinging movement about a horizontal axis, a link pivoted to one end of said chute and to the other end of said arm, a coupling member pivoted to the other end of said chute and to said arm, and a link pivoted to said support and to said coupling member for effecting vertical movement of said chute in a prescribed path upon swinging movement of said arm.

7. Supporting structure according to claim 6 including means associated with said arm and said support and operable for supporting said chute at a selected elevation.

8. Supporting structure according to claim 6 including gear means connected to said arm and adapted to effect swinging movement thereof, and manually operable means for operating said gear means.

9. Supporting structure according to claim 6 wherein said support is provided with a plurality of apertures therein, and including pin means movably mounted on said arm and receivable in said apertures for adjustably supporting said chute at a selected elevation.

CHRIS GERST.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
697,653	Norton	Apr. 15, 1902
1,476,892	Jaeger	Dec. 11, 1923
1,524,334	Brown	Jan. 27, 1925
2,257,161	Draeger	Sept. 30, 1941