May 5, 1964 R. E. SWARTHOUT 3,131,913

TILTABLE TRANSIT MIXER

Filed March 1, 1962 3 Sheets-Sheet 1

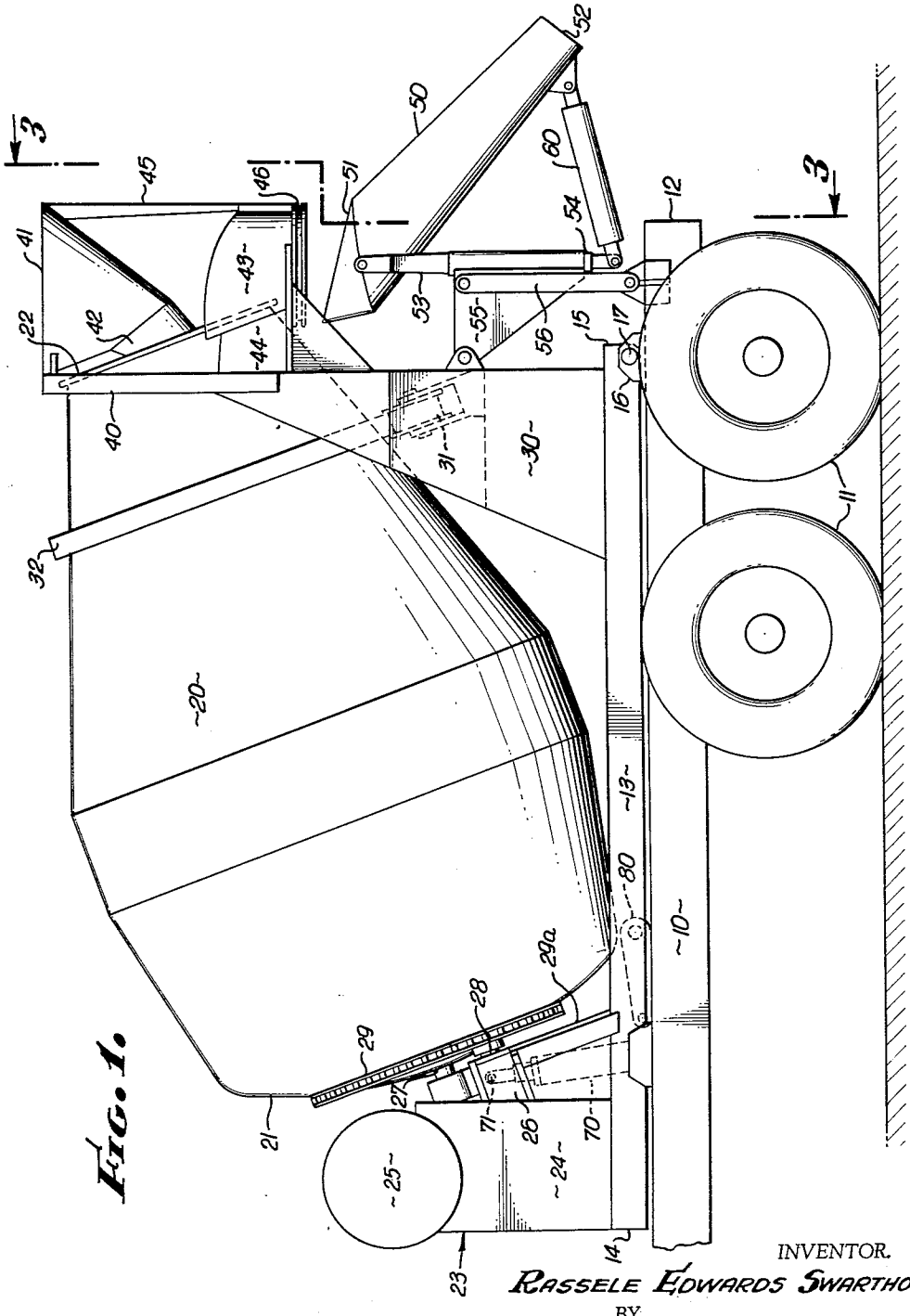


FIG. 1.

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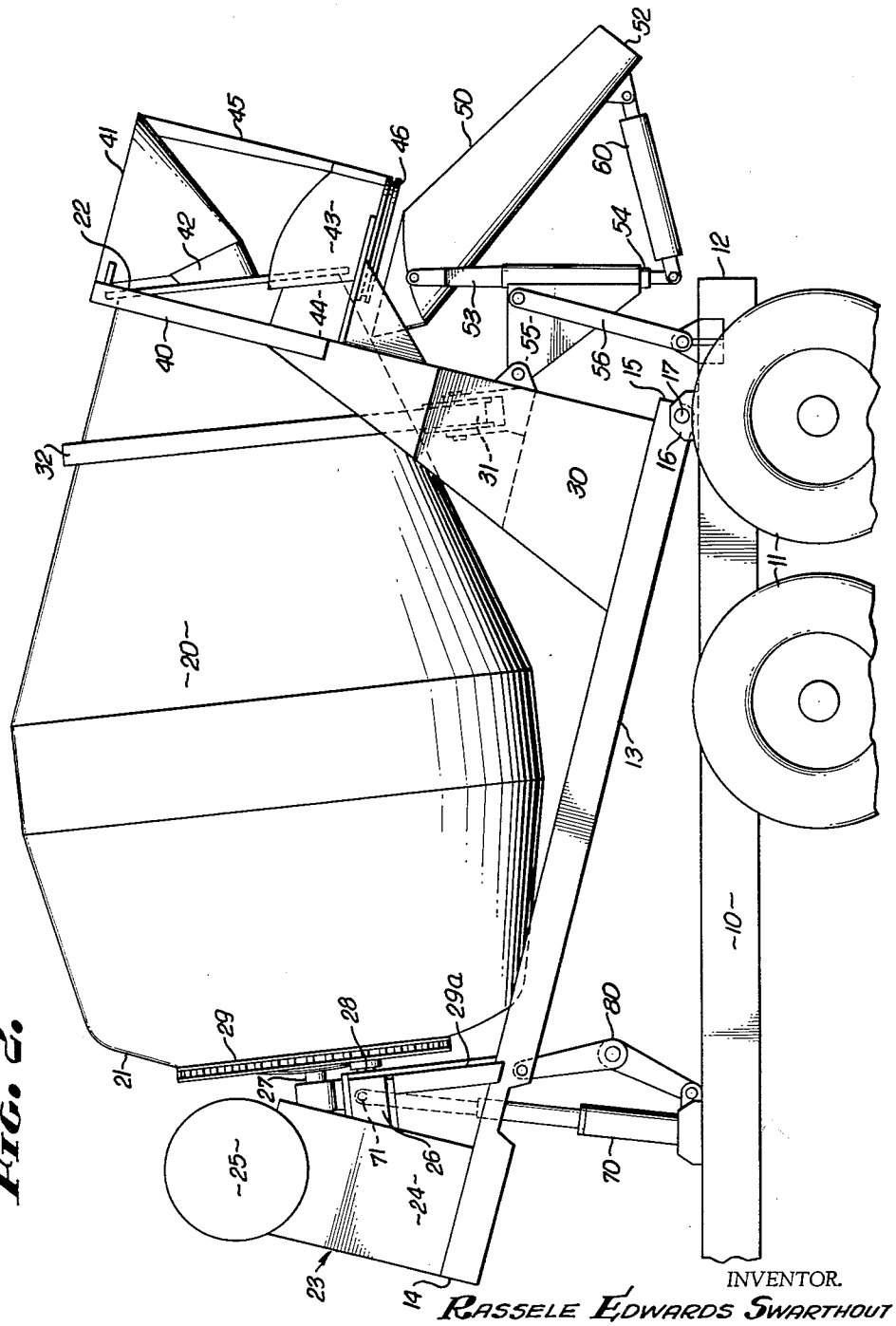


FIG. 2.

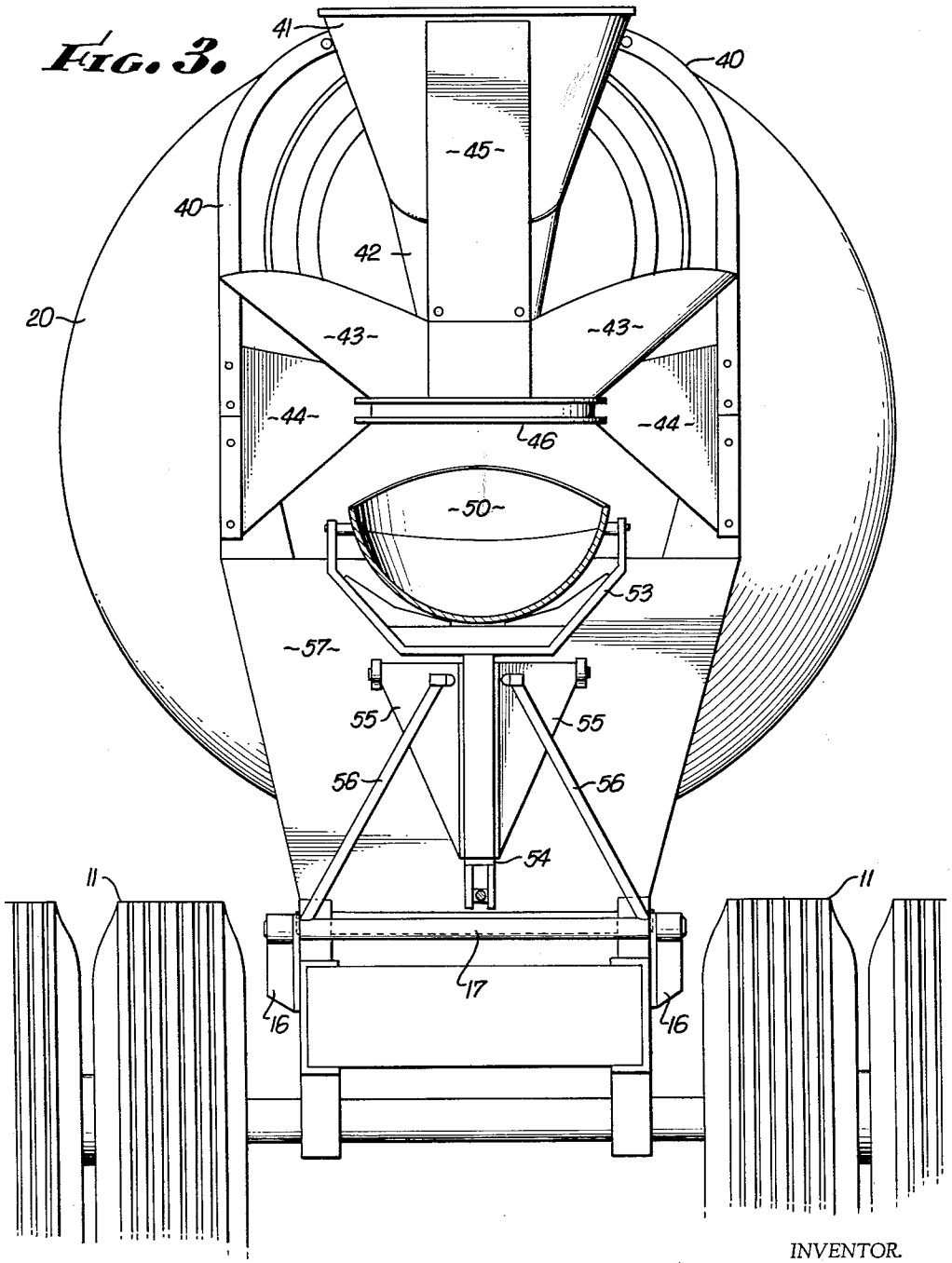
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FIG. 3.



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United States Patent Office 3,131,913 Patented May 5, 1964

3,131,913

TILTABLE TRANSIT MIXER

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Filed Mar. 1, 1962, Ser. No. 176,514
3 Claims. (Cl. 259—161)

This invention relates to a truck transit mixer, the cargo portion of which is tiltable so that rapid cargo discharge may be accomplished.

Transit mixers are widely used in the construction industry to provide continuous mixing of aggregate materials, such as wet concrete, during transportation of the materials from a bulk mixing plant to job sites. Generally, such a mixer provides a rotatable drum which has a fixed axis of rotation, the drum being disposed at an angle relative to the body frame of the truck, with an open loading and discharge end pointing rearwardly. The angle of the disposition of the drum is sufficiently sharp so that the cargo being mixed in the drum during transit will not slop or pour out of the open end of the drum.

Normally, agitator means are mounted internally in the drum and arranged so that when the drum is rotated in one direction, during transit, the aggregate drum cargo will be continuously mixed, and when the drum is rotated in the other direction, at arrival at a job site, the cargo will be discharged through the open end of the drum.

It is generally desirable to have the open discharge end of the drum disposed considerably elevated above ground level, not only to prevent inadvertent slopping and pouring during transit, but also to provide a high discharge point, principally so that the discharged material may be distributed over a wider area than is otherwise possible, and also so that the chute or other discharge means associated with the open end of the drum will be inclined at a sharp, downwardly directed angle toward the dump site, to aid in rapid, efficient disposition of the cargo after it leaves the open end of the drum. However, the merits of a sharp angle of disposition of the drum on the truck body and the high discharge point are offset by the added difficulty of moving the cargo in the drum upwardly toward the discharge point. This disadvantage becomes increasingly apparent if the cargo is a relatively dry mix, such as low slump concrete. When such mix is being discharged, the discharge process is often inordinately time-consuming.

It is therefore an object of the present invention to provide a transit mixer which, while retaining the required sharp drum angle and the high discharge point during transit, is tiltable when discharge is to be accomplished so that the drum angle is substantially reduced, while a high discharge point is maintained, thus permitting wide distribution of discharged cargo and rapid and efficient discharge.

It is another object of the invention to provide such a transit mixer in which the drum is effectively stabilized in elevated discharge position by a three-point suspension system.

It is a further object of the invention to provide such a transit mixer which may be easily and quickly adjusted from transit position to discharge position.

It is still another object of the invention to provide a transit mixer with a greater than normal angle of disposition in transit position, thus permitting the transportation of a larger pay-load, while still permitting more rapid discharge than is normally accomplished with a drum having a lesser transit angle.

With these and other objects in views, the invention consists of the construction, arrangement and combination of the various parts of the device whereby the objects contemplated are attained, as hereinafter set forth, pointed

out in the appended claims and illustrated in the accompanying drawings, in which:

FIGURE 1 is a side elevational view of the transit mixer of the present invention in lowered, transit position (the truck being illustrated as broken away);

FIGURE 2 is a view similar to FIGURE 1, but with the transit mixer in elevated, dumping position; and

FIGURE 3 is an enlarged view taken on the line 3—3 of FIGURE 1.

A truck body frame **10** is rearwardly supported by a rear wheel assembly **11**. Said truck body frame **10** has a rear end **12**, and said truck body frame **10** supports a subframe **13** which has a forward end **14** and a rear end **15**. Said subframe **13** is pivotally mounted on truck body frame **10** adjacent the rear end **15** of said subframe **13** and adjacent the rear end **12** of truck body frame **10**. Said subframe **13** is adapted to be seated on truck body frame **10** when the truck is in transit, as illustrated in FIGURE 1 of the drawings. Pivotal mounting of subframe **13** on truck body frame **10** may be accomplished by means of mounting plates **16** which support a transverse cross-bar **17**.

Rotatably mounted on subframe **13** is a rearwardly discharging transit mixer drum **20** having a forwardly disposed closed end **21** and a rearwardly disposed open loading and discharge end **22**. Power driving means **23**, which may consist of an internal combustion engine **24** and a fuel storage tank **25**, are mounted on subframe **13** adjacent forward end **14**.

A main bearing housing or block **26** protrudes rearwardly from power means **23** and supports a rotatable shaft **27**, angularly disposed and axially aligned with and mounted to drum **20** substantially at the center of closed end **21** of drum **20**. Block **26** is bored to receive and support a drive shaft **28**, which is powered by power means **23** and imparts rotating power to drum **20** by any suitable means, such as the well known chain and sprocket assembly **29** illustrated in the drawings. Additionally, block **26** may be supported on subframe **13** by legs **29***a*.

Open end **22** of drum **20** is rotatably supported in elevated position over rear end **15** of subframe **13** by stanchions **30**, on each of which is mounted a roller **31** which bears on annular ring **32** mounted on drum **20** adjacent open end **22** of drum **20**.

In order to maintain a high discharge point of drum **20**, even when closed end **21** of drum **20** is elevated, stanchions **30** (which also support loading and discharge means in association with open end **22** of drum **20**, as hereinafter described) are mounted closely adjacent to rear end **15** of subframe **13**, and more particularly, closely adjacent to the point of pivot of subframe **13** on body frame **10**, and open end **22** of drum **20** is disposed substantially in the vertical plane of the axis of pivot of subframe **13** on body frame **10**, so that, when end **21** of drum **20** is elevated, the lowering of open end **22** will be relatively small.

Stanchions **30** support a frame **40** which, as illustrated in FIGURE 3, as an example, but not by way of limitation, may be of inverted U-shaped configuration. Frame **40** is disposed adjacent open end **22** of drum **20**, and in turn supports a hopper **41**, which has loading chute **42** mounted thereon, said chute **42** being disposed in open end **22** of drum **20** so that material poured into hopper **41** at a bulk loading plant will be discharged into drum **20** to be mixed in transit.

A collector chute or discharge accumulator **43** may also be supported by stanchions **30** by any suitable means, such as by plates **44**, said discharge accumulator **43** being disposed adjacent to the lower edge of open end **22** of drum **20**. Discharge accumulator **43** may also be rearwardly supported on hopper **41** by a plate or rod **45** mounted thereon.

Plates **44** may also rotatably support a flared annular

ring member 46, which serves as the discharge point for material being unloaded from drum 20. It will be understood that in lieu of ring member 46, any other suitable member having a discharge opening may be provided, the function of such member being solely to direct cargo being discharged into the discharge chute hereinafter described.

Pivotally supported below member 46, in the manner hereinafter described, is a downwardly directed discharge chute member 50 having a cupped upper end 51 disposed below and spaced apart from member 46 so as to receive cargo pouring from open end 22 of drum 20 through member 46. Chute 50 has a lower end 52.

Upper end 51 of chute 50 is pivotally supported by a yoke 53, which is in turn supported by a rod or support means 54 rotatably mounted in suspended position (and supported by) a support member 55. Support member 55 is pivotally mounted on stanchions 30. Support member 55 may be braced additionally by legs 56 pivotally mounted on support member 55 and on body frame 10 adjacent rear end 12 of body frame 10.

As illustrated in the drawings, if desired, a transverse plate 57 may be mounted on stanchions 30, and support member 55 may be pivotally mounted thereon rather than on stanchions 30 directly.

A hydraulic jack 60 is pivotally mounted at one end thereof on rod 54, and is pivotally mounted at its other end to chute 50 adjacent lower end 52 of chute 50.

Pivotally mounted forward on body frame 10 and aligned with block 26 is a telescoping hydraulic jack 70. As illustrated, the upper end 71 of jack 70 is pivotally mounted on block 26, but it will be understood that jack 70 may be pivotally mounted on subframe 13, instead of on block 26, if desired.

Articulated joints or a torsion member 80 are pivotally mounted on body frame 10 at one end thereof, and on subframe 13 at the other end thereof, preferably adjacent the sides of body frame 10, and said articulated joints or torison member 80 act as a stabilizer for subframe 13. If desired, instead of having separate jointed members spaced apart from each other on opposite sides of body frame 10, one or both sections of said articulated joints 80 may be formed of heavy blocks.

Articulated joints or torsion members 80 are preferably mounted rearwardly of jack 70, in order to give greater stability to subframe 13.

In operation, when in transit position, subframe 13, with drum 20 rotatably mounted thereon, is seated on body frame 10, with jack 70 de-activated and in collapsed position, and with articulated joints 80 folded in position substantially parallel with body frame 10.

When the transit mixer arrives at the job site and the load of drum 20 is to be discharged, the truck is manipulated into position so that open end 22 is located in close proximity to the place where the drum load is to be dumped. It will be readily seen that, by reason of the angle of drum 20, open end 22 of drum 20 will then be disposed in elevated position, well above the place where the load is to be dumped.

Jack 70 is then activated to extend it, and forward end 14 (and, of course, closed end 21 of drum 20) will thus be raised, so that the angle of disposition of drum 20 relative to body frame 10 will be sharply reduced to any desired angle. In practice, it has been found advantageous to reduce this angle from its normal angle of, say 16° to 20°, to an angle of approximately 6°, particularly if low slump material is to be discharged.

It will be seen that by reason of the disposition of open end 22 of drum 20 substantially in the vertical plane of the axis of pivot of subframe 13, as the forward end 21 of subframe 13 is raised substantially, the lowering of open end 22 will be relatively small, and open end 22 will still maintain a highly elevated position above the dump site. It will also be seen that three-point suspension, and consequent substantial stability, is obtained by the bearing

of jack 70 on main bearing housing or block 26, and by the bearing of drum 20 on the pair of rollers 31, and that additional stability is provided by articulated joints or torsion members 80.

By operation of jack 60, the position of chute 50 relative to ring member 46 is adjusted to avoid abutment of ring member 46 on end 51 of chute 50.

In the usual manner, well known in the art, the direction of rotation of drum 20 is then reversed to effectuate discharge of drum load, and chute 50, having been placed in proper discharge position by activation of jack 60, discharge is quickly and easily accomplished, and wide cargo distribution is attained.

It will be seen that the discharge chute 50 being pivotally supported on the body frame and pivotally supported on the subframe, will be adjustably aligned with discharge accumulator and will maintain a substantially vertical attitude of the pivotal support of the discharge chute and maintain a relatively stable relationship between said chute and said accumulator so that efficient discharge is accomplished, regardless of the angle of disposition of drum 20 upon pivotal movement of the subframe relative to the body frame.

When discharge is completed, jack 70 is collapsed, and subframe 13 will be returned to its seated position on body frame 10, chute 50 being manipulated into proper transit position again by activation of jack 60.

Although the invention has been herein shown and described in what is conceived to be the most practical and preferred embodiment, it is recognized that departures may be made therefrom within the scope of the invention, which is not to be limited to the details disclosed herein, but is to be accorded the full scope of the claims so as to embrace any and all equivalent structures and devices.

What is claimed is:

1. A transit mixer which comprises: a truck body frame having a rear end; a subframe having a forward end and a rear end, said subframe being pivotally mounted on the body frame adjacent the rear end of said body frame and adjacent the rear end of said subframe, said subframe being fully supported on said body frame; a rotatable mixer drum mounted on said subframe, and having a closed end and an open end, said drum being disposed on the subframe with said closed end adjacent the forward end of said subframe, said drum being disposed at an angle relative to said body frame upwardly inclining toward said open end, and said open end being disposed in elevated position above the truck body frame, and disposed substantially in the vertical plane of the axis of pivot of said subframe on said body frame; means for elevating the forward end of said subframe so as to elevate the closed end of said drum and decrease said angle of disposition of said drum relative to said body frame, while substantially maintaining the elevated position of the open end of the drum above the body frame; a hopper mounted on the subframe externally of the open end of said drum and spaced apart therefrom; a loading chute mounted on said hopper and extending into the open end of the drum; a discharge accumulator mounted on the subframe and disposed below the open end of the drum; a discharge chute disposed below said discharge accumulator in aligned, spaced relationship to the discharge accumulator; and a pivotal support for said discharge chute, said support being pivotally mounted on the subframe and having additional means mounted thereon for pivotally moving said support and said discharge chute on the subframe upon pivotal movement of the subframe relative to the body frame so as to adjustably align the discharge chute with the discharge accumulator and maintain a substantially vertical attitude of the pivotal support of the discharge chute.

2. A transit mixer which comprises: a truck body frame having a rear end; a subframe having a forward end and a rear end, said subframe being fully supported on the

truck body frame and pivotally mounted on said truck body frame adjacent the rear end of said truck body frame and adjacent the rear end of said subframe; a rotatable mixer drum mounted on said subframe and having a closed end and an open end, said drum being disposed on said subframe with said closed end adjacent the forward end of said subframe, said drum being disposed in transit at an inclined axis angle relative to said body frame, said drum upwardly inclining toward said open end, and said open end being disposed a substantial distance above the rear end of said body frame and substantially in the vertical plane of the axis of pivot of said subframe on said body frame; means for elevating the forward end of said subframe so as to elevate the closed end of said drum and decrease said angle of disposition of said drum relative to said body frame while maintaining the open end of said drum in elevated position relative to said body frame; a loading hopper mounted on the subframe and disposed adjacent to the open end of said drum and extending into the open end of said drum; a discharge accumulator mounted on the subframe and disposed adjacent to and below the open end of said drum; a discharge chute disposed below and in spaced relationship to said discharge accumulator; a support member pivotally mounted on the subframe and on the discharge chute; and means for maintaining a substantially vertical attitude of the support member at all angles of disposition of the subframe relative to the body frame so as to maintain the discharge chute in dumping position relative to the discharge accumulator.

3. A transit mixer which comprises: a truck body frame having a rear end; a subframe having a forward end and a rear end, said subframe being fully supported on the truck body frame and pivotally mounted on said truck body frame adjacent the rear end of said truck body frame and adjacent the rear end of said subframe; a rotatable mixer drum mounted on said subframe and having a closed end and an open end, said drum being disposed on said subframe with said closed end adjacent the forward end of said subframe, said drum being disposed in transit at an inclined axis angle relative to said body frame, said drum upwardly inclining toward said open end, and said open end being disposed a substantial distance above the rear end of said body frame and substantially in the vertical plane of the axis of pivot of said subframe on said body frame; means for elevating the forward end of said subframe so as to elevate the closed end of said drum and decrease said angle of disposition of said drum relative to said body frame while maintaining the open end of said drum in elevated position relative to said body frame; a loading hopper mounted on the subframe and disposed adjacent to the open end of said drum and extending into the open end of said drum; a discharge accumulator mounted on the subframe and disposed adjacent to and below the open end of said drum; a discharge chute disposed below and in spaced relationship to said discharge accumulator; support means pivotally mounted on the discharge chute; a support member pivotally mounted on the subframe and on the support means; and means mounted on the support member for maintaining a substantially vertical attitude of the support means at all attitudes of the subframe.

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