

May 15, 1951

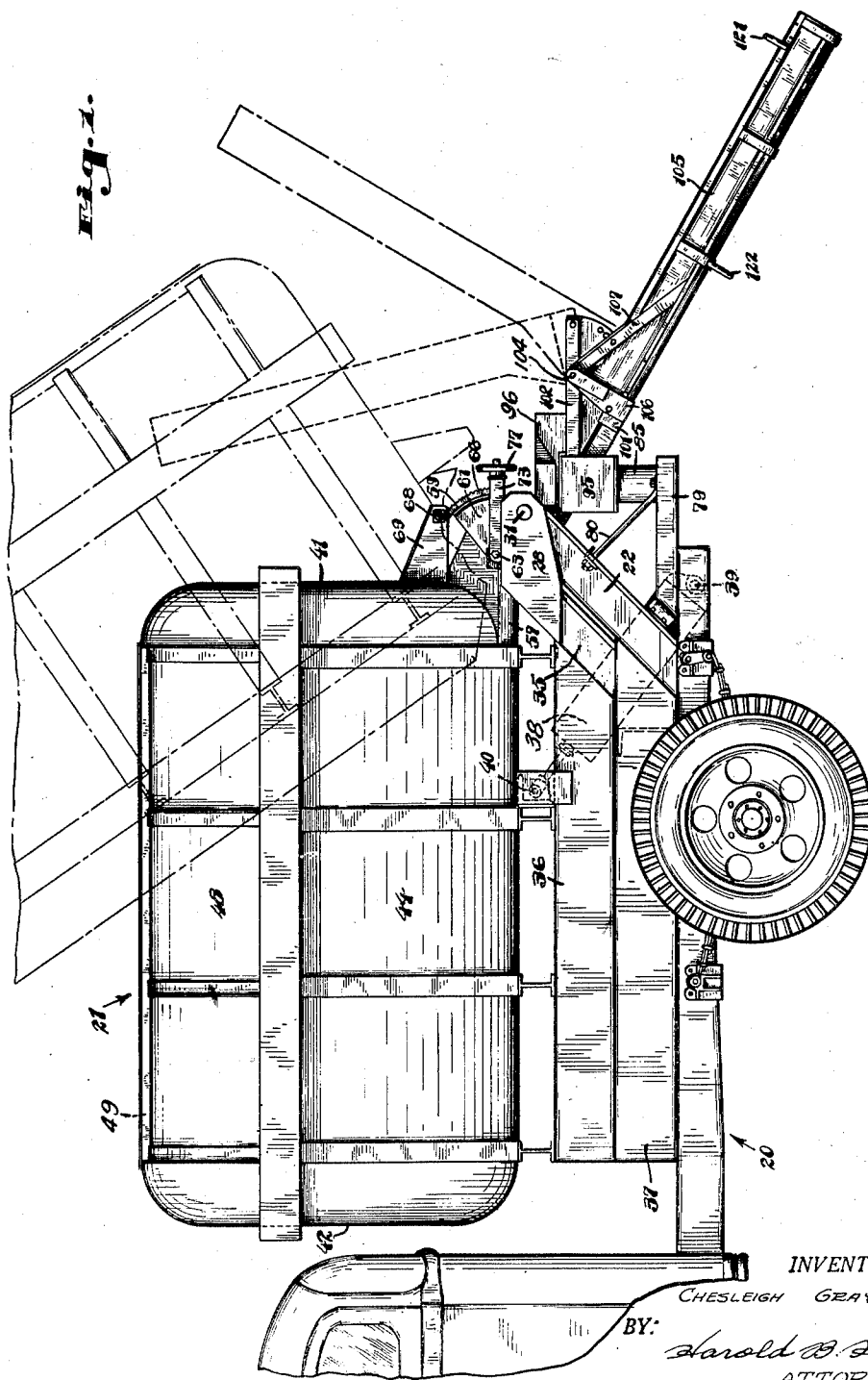
C. GRAY

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DUMP TRUCK FOR CONCRETE AND THE LIKE

Filed Aug. 6, 1947

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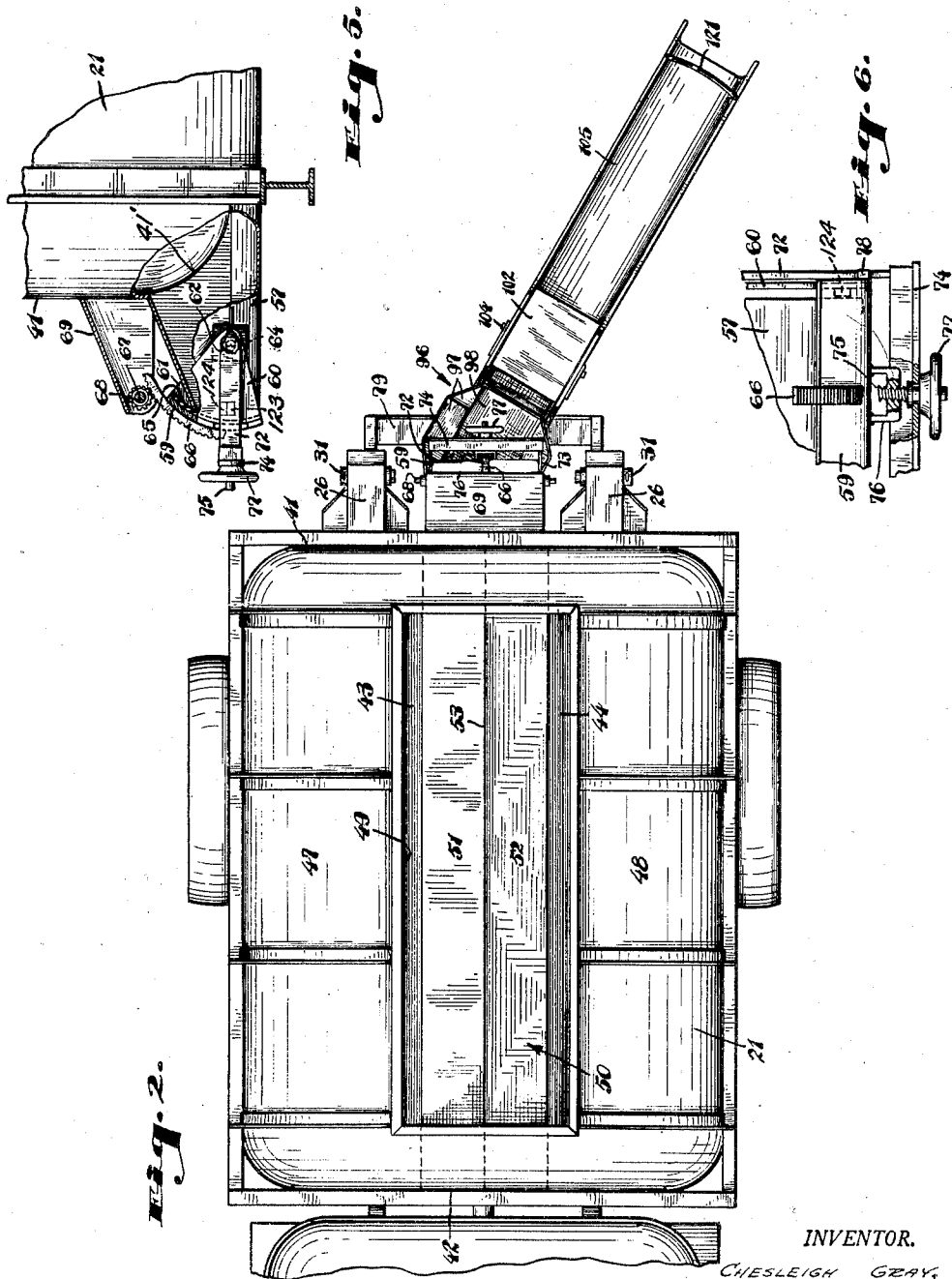
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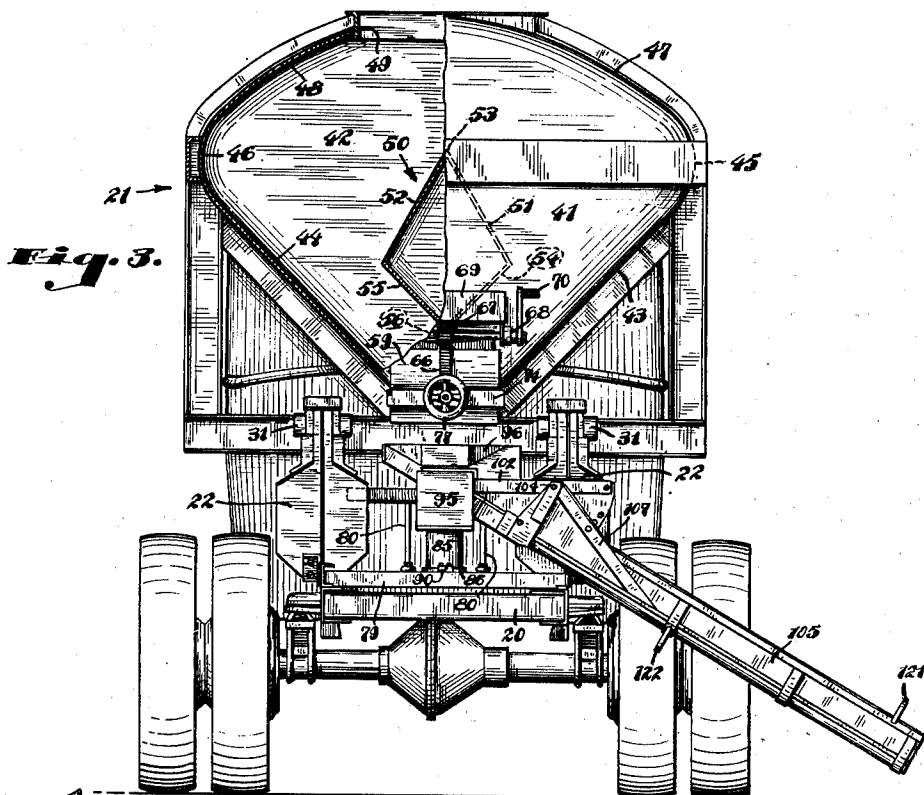
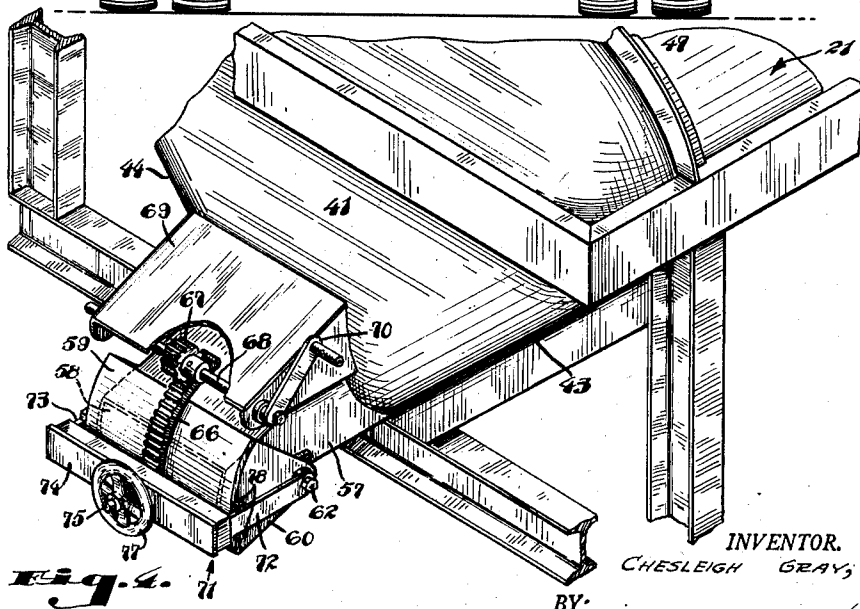
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5. Sheets-Sheet 3



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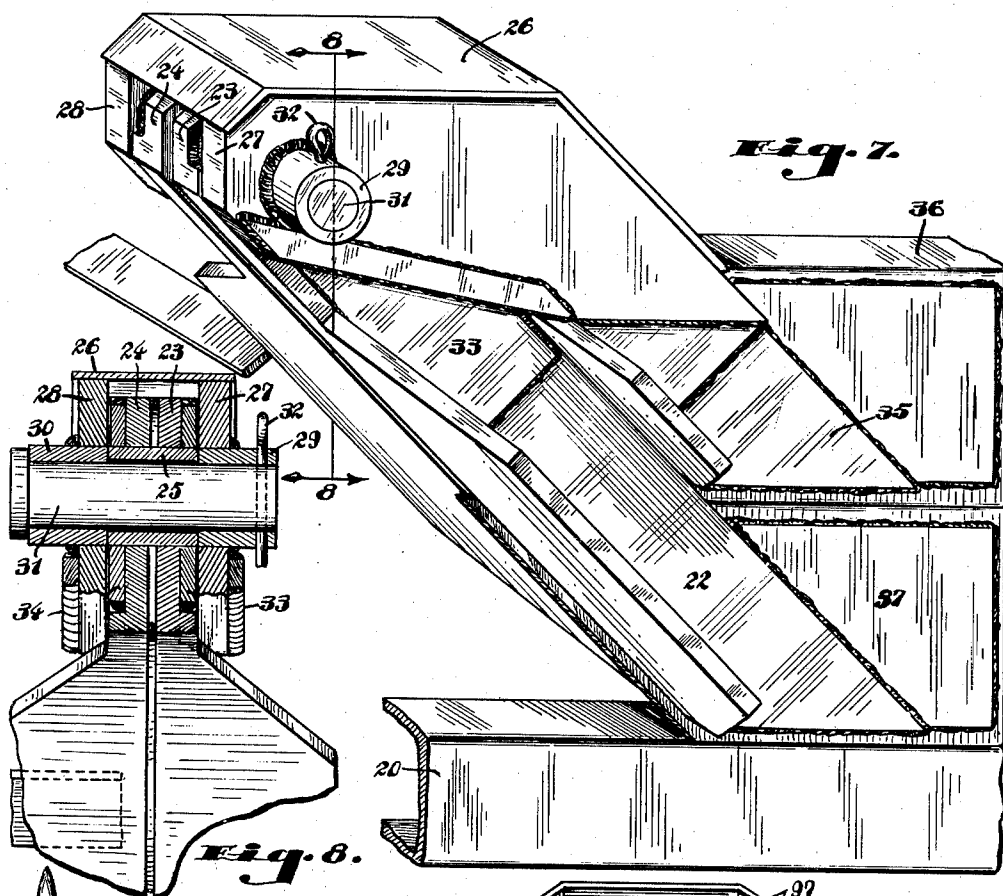
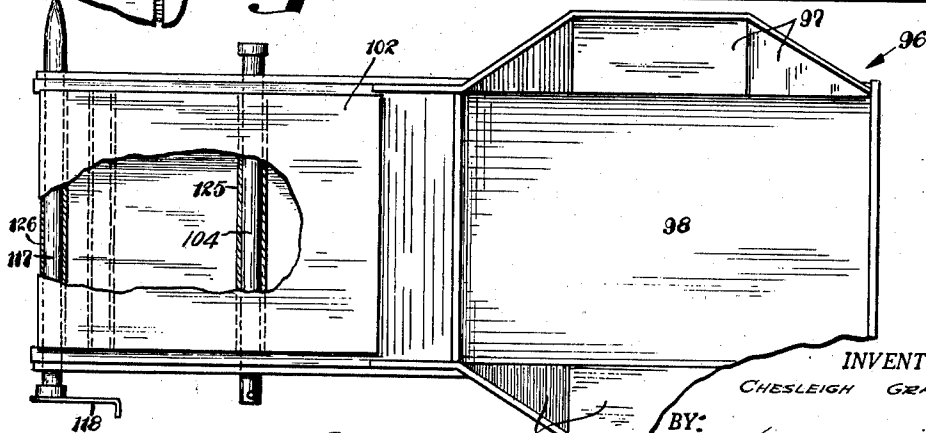


Fig. 12.

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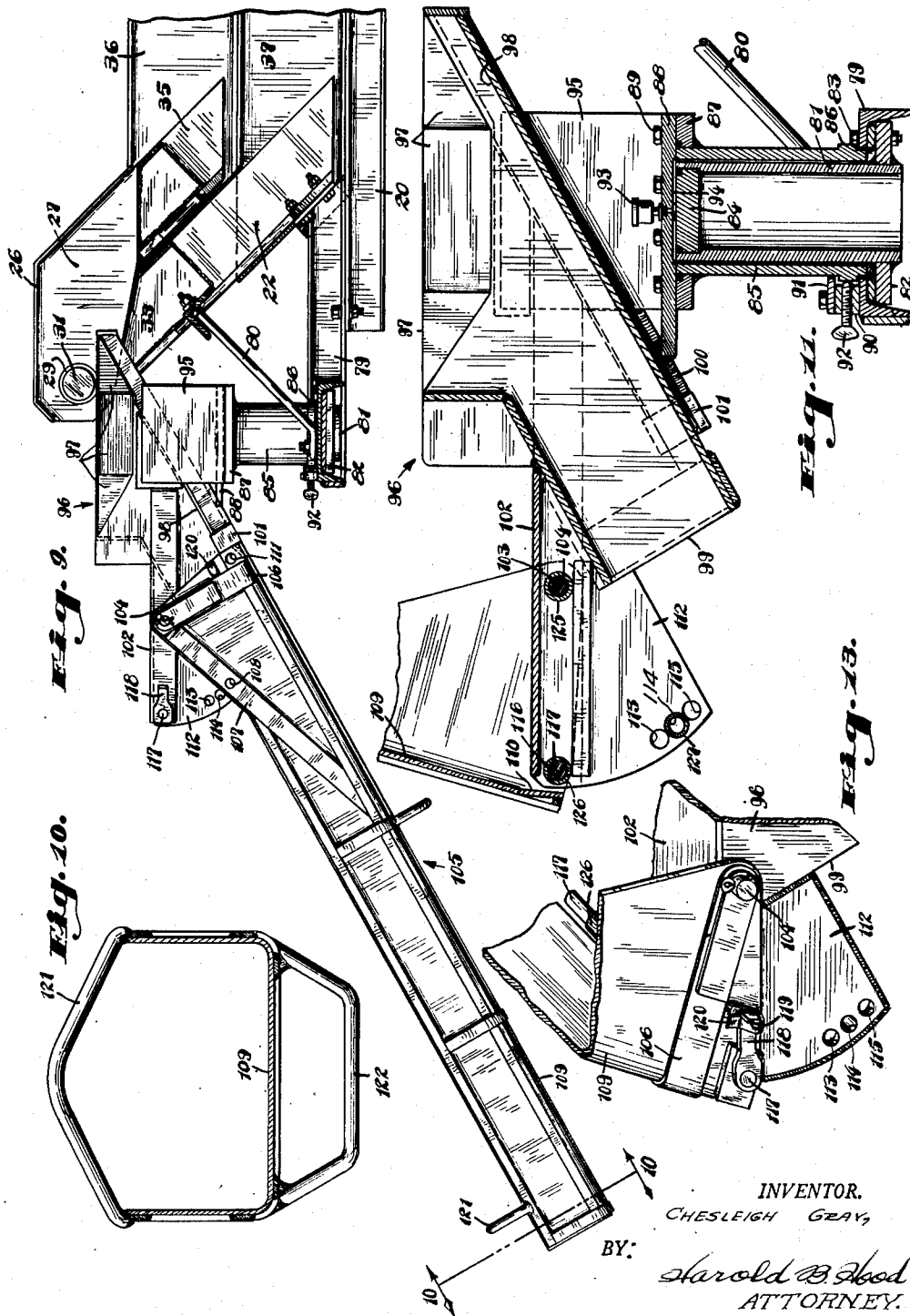
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UNITED STATES PATENT OFFICE

2,552,850

DUMP TRUCK FOR CONCRETE
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Application August 6, 1947, Serial No. 766,573

15 Claims. (Cl. 298—7)

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The business of supplying ready-mixed concrete for use on the job has been increasing in volume continuously for the past several years. It is customary to bring together the ingredients of concrete in suitable proportions and to mix the ingredients, at least partially, at large central plants, and then to charge suitable quantities into specially constructed trucks and to carry the concrete to the job. Until very recently, it has been essential to continue agitation of the concrete during transit from the central plant to the point of use in order to prevent separation of the ingredients, since transit, in non-agitating truck bodies, has invariably resulting in settling of the aggregates, and in travel of the water to the surface of the mass of concrete in a truck.

Quite recently, research and experimentation has resulted in methods of entraining air in green concrete through the use of suitable agents which can be controlled and which are found to have quite satisfactory results. The reason for developing the air-entrained process lies in the fact that it was discovered that, when air to the amount of three per cent or less is thus entrained in the green concrete, the concrete, after setting has improved resistance to cycles of freezing and thawing, while its flexural and compressive strengths are not appreciably affected.

It has been found that, when green concrete is thus provided with entrained air, the coarse aggregate is much more satisfactorily retained in suspension over substantial periods. I have found that green concrete with entrained air, fully mixed at the central plant, can be transported in non-agitating vehicles without substantial segregation of aggregates. It is obvious that, if fully mixed concrete can be transported in non-agitating vehicle bodies, lighter vehicle constructions can be used for delivering mixed concrete to the job, and power delivery means for effecting agitation during transit can be eliminated.

However, very special body construction is necessary if mixed concrete is to be transported without agitation, in order to guard against sticking, undue compaction of the concrete, and similar difficulties. It is essential, for instance, to provide a structure in which a relatively small discharge port may be sealed, during transit, against water escape. It is essential that the walls of the body shall converge upon the discharge port at an angle greater than the angle of repose of wet concrete. It is essential that there shall be no sharp corners in

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which concrete might wedge and stick. It is highly desirable that the body construction shall be such that a very high per cent of the load can be discharged through that port without tilting the body, in order that it may not be necessary to provide hoist equipment sufficiently powerful to lift a substantial proportion of the concrete load. It is highly desirable that the construction shall be such that the entire load can be discharged without the use of any mechanical means for forcing the concrete to flow from the body. It is desirable to provide means whereby the direction of flow of the concrete is varied at least once, and preferably twice, as it moves toward the discharge port, thus tending to remix the concrete. It is desirable to provide means whereby the discharge port may be partially or fully opened to control the rate of flow of concrete from the body. It is also desirable to equip the vehicle with a chute capable of swinging through a wide arc about a vertical axis, and capable, also, of some movement of its discharge end in a vertical plane; while concrete is flowing therethrough. It is also desirable to make it possible to remove the chute entirely from registry with the discharge port, in order that concrete may be delivered directly from the body to a point a maximum distance above the ground level. It is further desirable to provide means whereby the chute may be carried, during transit, in a position safely out of the way.

The primary object of the present invention, then, is to provide a truck body particularly adapted for transporting mixed concrete from a central plant, without mechanical agitation of the concrete during transit, and for delivering the concrete under optimum conditions at the point of use. Further objects have to do with the provision of the above-outlined desiderata and will appear in detail as the description proceeds.

To the accomplishment of the above and related objects, my invention may be embodied in the form illustrated in the accompanying drawings, attention being called to the fact, however, that the drawings are illustrative only, and that change may be made in the specific construction illustrated and described, so long as the scope of the appended claims is not violated.

Fig. 1 is a side elevation of a dump body constructed in accordance with the present invention and mounted upon a truck of standard construction, shown in fragmental elevation;

Fig. 2 is a top plan view thereof;

Fig. 3 is a rear end elevation thereof;

Fig. 4 is a fragmental view, in perspective, and upon an enlarged scale, showing some of the details of construction and operation of the discharge gate forming a part of my invention, parts being broken away for clarity of illustration;

Fig. 5 is a side elevation, partly in section, of the discharge gate and its operating means;

Fig. 6 is a fragmental plan view thereof;

Fig. 7 is an enlarged fragmental perspective view of one of the hinge assemblies through which the dump body is supported upon the truck chassis;

Fig. 8 is a transverse sectional view taken substantially on the line 8—8 of Fig. 7;

Fig. 9 is a side elevation, partially in section, showing a hopper and chute assembly forming a part of the present invention;

Fig. 10 is a section taken substantially on the line 10—10 of Fig. 9;

Fig. 11 is a fragmental longitudinal section taken upon a plane parallel with the plane of Fig. 9 and upon an enlarged scale;

Fig. 12 is an enlarged plan view of the hopper, the chute having been removed, parts being broken away for clarity of illustration; and

Fig. 13 is a fragmental perspective view, upon an enlarged scale, of the hinging and supporting means for the chute.

Referring more particularly to the drawings, it will be seen that I have illustrated, more or less diagrammatically, a truck chassis, indicated generally by the reference numeral 20, and a dump body indicated generally by the reference numeral 21. Inclined pillars 22 upon the chassis 20 are formed to provide parallel upstanding bearing plates 23 and 24 which support a journal sleeve 25. For each such hinge assembly, the body 21 is provided with a rearwardly projecting housing 26 having side plates 27 and 28 supporting, respectively, journal sleeves 29 and 30 which are adapted to be brought into registry with the sleeve 25. A hinge pin 31 is driven through each assembly of hinge sleeves, and a cotter pin 32, or the like, is passed through registering apertures in the sleeve 29 and the pin 31 to complete the hinge assembly. Spacer plates 33 and 34 will preferably be arranged in the manner clearly illustrated in Fig. 8.

Each body hinge assembly includes a foot 35 secured to a bed 36 upon which the body 21 is suitably secured, and adapted to rest upon the truck bed 37 in the manner clearly illustrated in Fig. 1. A fluid motor 38 has one end anchored at 39 upon the truck chassis and its other end anchored at 40 upon the body 21 in such a fashion that, when fluid is supplied to the motor, its ends will be separated to swing the body 21 about the axis of the hinge pins 31 and into the position illustrated in dotted lines in Fig. 1.

The body comprises end walls 41 and 42, and side walls 43 and 44, said end walls preferably being substantially vertical and the side walls converging downwardly toward a narrow, elongated floor or bottom for the body. The end walls and side walls merge with the bottom, and with each other, in curved surfaces in the manner clearly illustrated herein, and, at the levels 45 and 46, the respective side walls 43 and 44 recurve to joint converging top walls 47 and 48 which terminate at separated points to provide a charging port 49. The width of said port is any convenient value, and the length thereof is substantially coincident with the length of the body, as

is clearly to be seen from an inspection of Fig. 2. The walls 43 and 44 are primarily disposed in planes inclined to the body floor at equal obtuse angles less than the angle of repose of wet concrete, being, in the present illustrations, approximately 45°; and the end and lateral walls merge with said floor through curved surfaces similar to that illustrated at 41' in Fig. 5.

Extending from end to end of the body, and suspended above the bottom thereof, is a baffle indicated generally by the reference numeral 50, and comprising a beam, which may be hollow and whose transverse section comprises two isosceles triangles having a common horizontal base. The upwardly presented walls 51 and 52 of the baffle 50 converge upwardly to a sharp edge 53, while the lower walls 54 and 55 converge downwardly to a sharp edge 56. The maximum transverse dimension of the beam 50 is substantially equal to, or may preferably somewhat exceed, the transverse dimension of the floor or bottom of the body. Because of the provision of the baffle 50, undue compaction of concrete against the floor of the body is obviated, since the beam supports a substantial proportion of the weight of the column of concrete directly above the floor, so that the only weight impressed upon the floor itself is that made up of the vertical component of the converging portions of the column resting upon the walls 43 and 44.

As is clearly to be seen in Figs. 1, 4, and 5, a discharge passage 57 projects rearwardly from the rear end wall 41 of the body in a plane coincident with the floor of said body. Said passage terminates in a discharge port 58 whose mouth is curved about a horizontal axis in the manner to be seen in Figs. 4 and 5. A gate 59 is correspondingly curved for cooperation with the mouth of the spout 57 and is supported upon arms 60 and 61 projecting from its lateral edges, the free ends of said arms being supported upon oppositely projecting, aligned trunnions 62 and 63 mounted on the spout 57. As shown, particularly in Fig. 5, each such arm is provided with a slot 64 elongated in a line normal to the facing surface of the gate 59. It will be clear that this construction permits oscillation of the gate 59 about an axis coincident with the center of curvature of the mouth of the spout 57, and also permits bodily shifting of said gate in lines radial relative to that curvature. The inner surface of the gate 59 is provided with a coating 65 of rubber, or other similar compressible material, and it will be understood that, when the mouth 58 of the spout 57 is to be sealed, the gate 59 is pressed thereagainst with sufficient force to deform the rubber 65, thereby providing a waterproof closure.

I prefer to provide the gate 59 with a curved rack 66 for cooperation with a pinion 67 mounted upon a shaft 68 journaled in a shield or bracket 69 suitably supported upon the wall 41 of the body 21. A handle 70 may be mounted on the shaft 68 for operation of the pinion 67, to swing the gate 59 about the axis of the trunnions 62 and 63.

A yoke, indicated generally by the reference numeral 71, comprises parallel arms 72 and 73 journal mounted, respectively, on the trunnions 62 and 63, and joined by a stretcher 74 in which is journaled a screw shaft 75, said shaft being rotatable with respect to, but held against axial movement with respect to, said stretcher 74. As is shown in Fig. 6, the shaft 75 has threaded engagement with a bracket 76 fixed to the gate 59; and a handwheel 77 is secured to said screw shaft.

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Stops 78, fixedly projecting from at least one of the arms 60 and 61, straddle the associated yoke arms 72 and/or 73 to assist in operatively connecting the gate 59 and yoke 71. Obviously, rotation of the handwheel 77 in one direction will pull the gate 59 toward the stretcher 74 to clear the mouth 58 of the spout 57. Concurrently, the rack 66 is moved to meshing engagement with the pinion 67. Now, operation of the handle 70 in one direction or the other will swing the gate 59 about the axis of the trunnions 62 and 63, in one direction or the other. When the gate has been brought to desired position, the handwheel 77 will be turned in the opposite direction, thereby pushing the gate 59, upon a line radial with respect to the curvatures of said gate and the spout mouth, to press the rubber surface of the gate into contact with said spout mouth. Obviously, the gate may be stopped in completely overlapping relation with the spout mouth, or it may be stopped in a position clearing any desired proportion of the spout mouth and, through operation of the handwheel 77, may be pressed into sealing relation with the mouth of the spout in any selected position.

Suitably supported upon the chassis 20 and projecting rearwardly therefrom is a platform 79 (see Figs. 1, 9 and 11), said platform being braced by a pair of tie rods 80 extending between the outer end of said platform and the pillars 22. A cylindrical post 81, having a flange 82 welded to its lower end, is projected through an opening in said platform and is secured thereto by bolts 83, or other suitable fastening means, cooperating with the flange 82. The upper end of said post is closed by a block 84, and a cylindrical sleeve 85 is supported thereon. Near its lower end, the sleeve is formed with a peripheral flange 86, and a larger peripheral flange 87 is welded to said sleeve adjacent its upper end. A plate 88 is secured to said flange 87 by means of bolts 89 or other equivalent fastening means, said plate resting upon the flange 87, the block 84, and the upper end of the post 81. A block 90 is supported upon the platform 79 adjacent the sleeve 85 and carries a finger 91 overlying the flange 86 to prevent accidental upward movement of said sleeve 85. The block 90 further carries a thumb screw 92 which may be turned up against the flange 86 (whose peripheral surface may, if desired, be roughened), to hold the sleeve 85 in any desired position of rotational adjustment about the axis of the post 81.

A grease fitting 93 may be associated with an opening through the plate 88 which opening registers with intersecting grooves 94 in the lower face of the plate 88, said grooves being proportioned and designed to carry grease from the fitting 93 into the space between the external periphery of the post 81 and the internal periphery of the sleeve 85.

The plate 88 carries a pair of upstanding side plates 95 between which is supported a hopper, indicated generally by the reference numeral 96, and formed to provide converging walls 97. The hopper 96 is disposed beneath, and in registering association with, the body discharge port 58, and the converging walls 97 are designed to direct material flowing from said port 58 onto a downwardly and rearwardly inclined wall 98, and so to the discharge mouth 99 of the hopper 96. A plate 100 is fixed to said bottom wall 98 and is formed with an aperture adapted to receive the projecting end of the plate 88 and to be welded thereto. Immediately below the plate 100, a stop

strap 101 is fixed to the wall 98 in the manner clearly shown in Fig. 11.

A bracket 102 projects horizontally rearwardly from the upper wall of the hopper spout and is formed to provide a pair of aligned apertures 103 in which is fixed a guide tube 125 for the reception of a hinge pintle 104 whereby a discharge chute, indicated generally by the reference numeral 105, may be hinged to said bracket 102. The pintle 104 passes through aligned openings in a bracket 106, comprising a part of the chute 105, and suitably braced by bars 107 at opposite sides of the chute. At a point suitably spaced from the pintle 104, the bars 107 are formed with aligned apertures 108 for a purpose later to be described.

The chute proper may comprise a body 109 of sheet metal, bent to U-shape, as is clearly illustrated in Fig. 10. At its end adjacent the spout 99, the bottom wall of the chute is formed with an inclined extension 110 (Fig. 11) for a purpose which will later appear, and the chute is provided, adjacent the rearward end of said extension, with aligned apertures 111.

The parts thus described are so proportioned and designed that, when the chute is permitted to swing, by gravity, into the position illustrated in Fig. 9, the rearward end of the extension 110 will abut the downwardly presented edge of the stop strap 101, whereby the chute will be held against further counter-clockwise movement about the pintle 104. A pair of segment plates 112 are supported upon the bracket 102 and are provided with spaced aligned apertures 113, 114 and 115. When the chute is in the position of Fig. 9, the openings 103 in the braces 107 register with the openings 115 in the plates 112, and a locking bar 117 may, if desired, be passed through the aligned apertures to hold the chute positively in such position.

If it is desired to deliver concrete at a slightly higher elevation, the outer end of the chute 105 may be lifted, by grasping the handle bar 121, to bring the openings 103 into alignment with the apertures 114 in the plates 112. These apertures are joined by a fixed guide tube 127. The bar 117 may now be passed through the aligned apertures to hold the chute in the new position. It will be seen that, in that position, the extension 110 still underlies the bottom wall of the spout 99; and that, if the chute be adjusted to a still higher position, in which the bar 117 may be passed through the openings 108 and the apertures 113, the extension 110 will still underlie the extreme end of the hopper spout.

Since the chute is carried upon the bracket 102 which, in turn, is carried upon the hopper 96, it will be clear that the chute may be swung through a wide angle about the axis of the post 81 by rotational adjustment of the sleeve 85 upon the said post. The construction is such (see Fig. 2) that an adjustment somewhat in excess of 180° may be achieved.

It may be desirable, at times, to deliver concrete directly from the hopper spout to a form whose height may be above the highest position of operational adjustment of the delivery end of the chute 105. Under such circumstances, the chute may be swung to the dot-dash line position of Fig. 1, wherein the openings 111 in the chute 105 register with apertures 114 and guide tube 127. The chute may, of course, be held in this position by passing the bar 117 through the registering openings. In this position, the inner end of the chute is held entirely out of the way

of the hopper discharge spout, and yet the position of the chute is such as not to interfere with the dumping position of the body 21, illustrated in dotted lines in Fig. 1.

The transit position of the chute is illustrated in Fig. 1 in dotted lines, and in solid lines in Fig. 11. In this position, the openings 111 in the chute body 109 register with the openings 116 in the bracket 102, which are preferably joined by a guide tube 126, and the bar 117 is passed through said registering openings and said tube. In order to insure positively against dislodgement of the bar 117 in this position, said bar may be provided with a handle 118 having an angular projection 119, and the chute body may be provided with a hook 120 with which the handle 118 may be engaged, in the manner illustrated in Fig. 13, when the chute is in its transit position.

In order to facilitate movement of the chute to and from its transit position, the chute will preferably be provided with a second handlebar 122.

As is clearly shown in Figs. 5 and 6, a stop block 123 projects outwardly from at least one wall of the body spout 57 for engagement by a stop block 124 projecting inwardly from the gate arm 60 to limit downward movement of the gate 59.

I claim as my invention:

1. A body for a dump truck having lateral walls converging toward the bottom of said body and inclined to said bottom at obtuse angles less than the angle of repose of wet concrete, a discharge port near said bottom at one end of said body, a gate for said port, and a baffle stationarily mounted in said body above the bottom thereof and substantially coextensive with said bottom.

2. The body of claim 1 in which the upwardly-directed surface of said baffle comprises two downwardly diverging walls meeting at their upper edges, substantially in the vertical plane containing the longitudinal median line of the bottom of said body.

3. A body for a dump truck having an elongated, laterally narrow, horizontal bottom flanked by lateral walls upwardly diverging and inclined to said bottom at obtuse angles less than the angle of repose of wet concrete, end walls meeting said bottom and said lateral walls in curved surfaces, and baffle means extending between said end walls and sustaining a portion of the weight of material filled into said body.

4. The body of claim 3 in which said baffle means comprises a beam presenting a pair of upwardly and outwardly presented faces and a pair of downwardly and outwardly presented faces.

5. The body of claim 4 in which each pair of faces converges in a line located substantially in the vertical plane including the longitudinal median line of said bottom.

6. The body of claim 3 in which said baffle means comprises a beam whose transverse section presents two isosceles triangles having a common horizontal base and having their apices oppositely directed.

7. A body for a dump truck having an elongated, laterally narrow bottom, end walls meeting said bottom in curved surfaces, side walls flaring oppositely upwardly from said bottom and curving upwardly and inwardly from their laterally-most-remote levels, said side walls meeting said end walls and bottom in curved surfaces, and the upper edges of said side walls being spaced apart substantially throughout their lengths to provide a filling opening for said body substantially longitudinally coextensive with said body,

and baffle means disposed within said body between such filling opening and said bottom.

8. A body for a dump truck having lateral walls converging toward the bottom of said body at angles exceeding the angle of repose of wet concrete, a discharge port near said bottom at one end of said body, and a gate for said port comprising a curved closure, arms at the lateral ends of said closure, trunnions associated with said arms and supporting the same, a rack fixedly associated with said closure, and a pinion meshing with said rack for shifting said closure about the axis of said trunnions relative to said port.

9. The organization of claim 8 in which said arms are associated with said trunnions through slots in said arms radial with respect to said closure, and including means associated with said closure for shifting the same positively in the line of said slots.

10. In a dump body having a discharge spout, gate means for said spout comprising a pair of aligned trunnions projecting oppositely from opposite sides of said spout, a curved closure for said spout, a pair of arms at the lateral ends of said closure for supporting the same, each arm having a slot therein elongated in a line normal to said closure, each slot fitting on one of said trunnions, means for swinging said closure about the axis of said trunnions, and means for positively shifting said closure in the line of said slots.

11. The organization of claim 10 in which said last-named means is effective to shift said closure positively in either of two opposite directions in the line of said slots.

12. The organization of claim 10 in which said last-named means comprises a yoke oscillably supported on said trunnions for swinging movement with said closure and a screw journaled in said yoke on an axis parallel with said slots and held against axial movement relative to said yoke, said screw being threadedly associated with said closure.

13. The organization of claim 12 in which said closure is provided with a yielding surface facing the discharge end of said spout.

14. In a dump truck body having a discharge port and gate means therefor, a platform disposed beneath said port, a cylindrical post vertically supported upon said platform, a cylindrical sleeve journal-mounted on said post, means on said platform restraining said sleeve against vertical movement relative thereto, and a hopper supported on said sleeve in registry with said port.

15. The organization of claim 14 in which said hopper is provided with a downwardly inclined discharge spout, and including a chute supported for swinging movement about a horizontal axis above said spout.

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