April 6, 1954 G. MAXON, JR 2,674,489

DUMP TRUCK

Filed Sept. 25, 1946

3 Sheets-Sheet 1

Fig. 1.

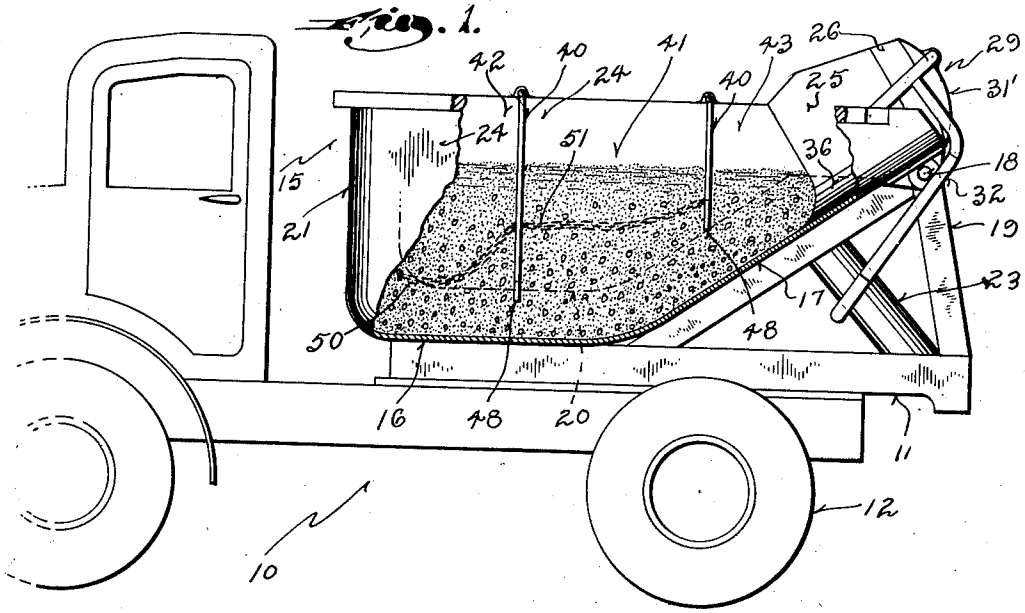


Fig. 6.

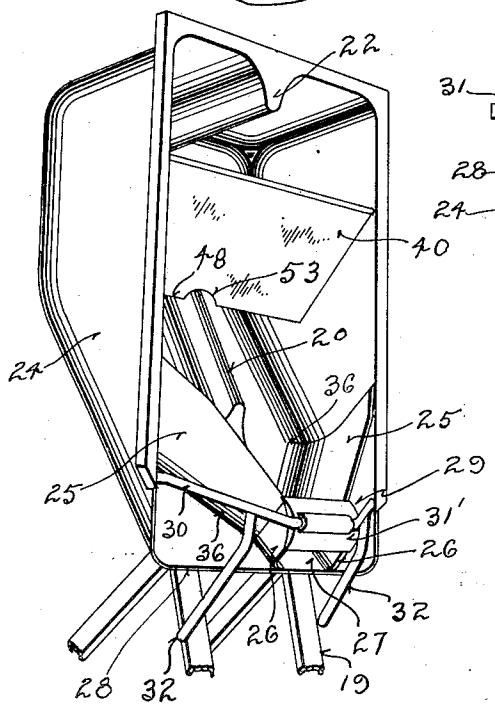
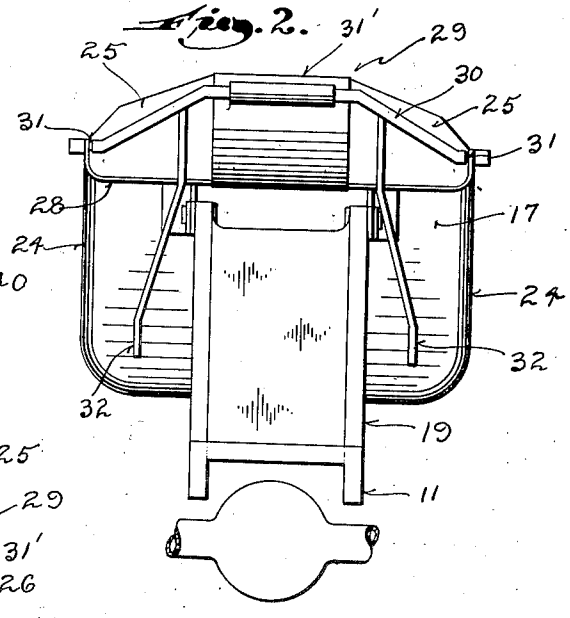


Fig. 2.



Inventor
Glenway Maxon, Jr.
By Dewitt Dorsey
Attorneys

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DUMP TRUCK

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Fig. 4.

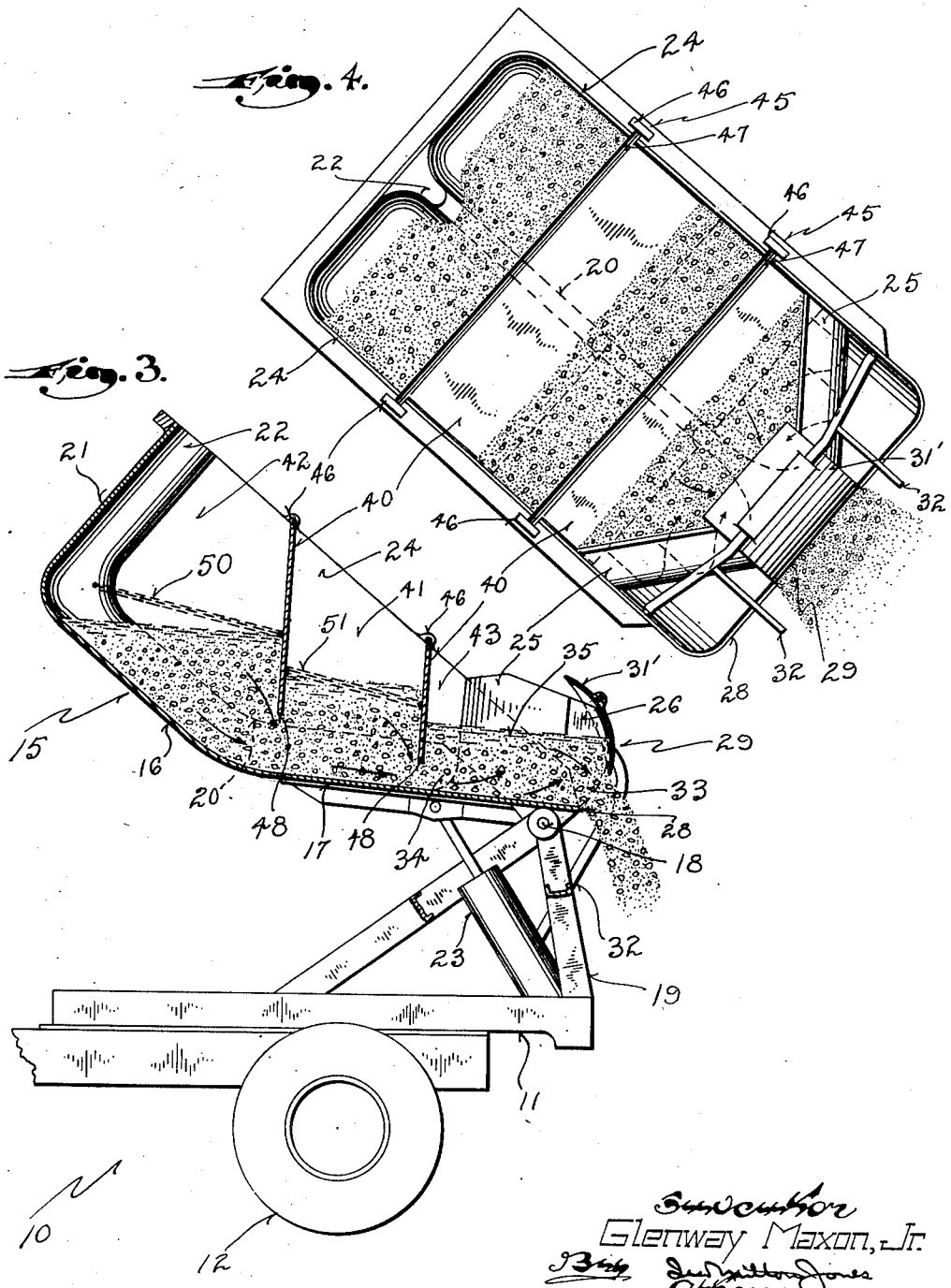


Fig. 3.

Inventor
Glenway Maxon, Jr.
By Smith, Jones & Attorneys

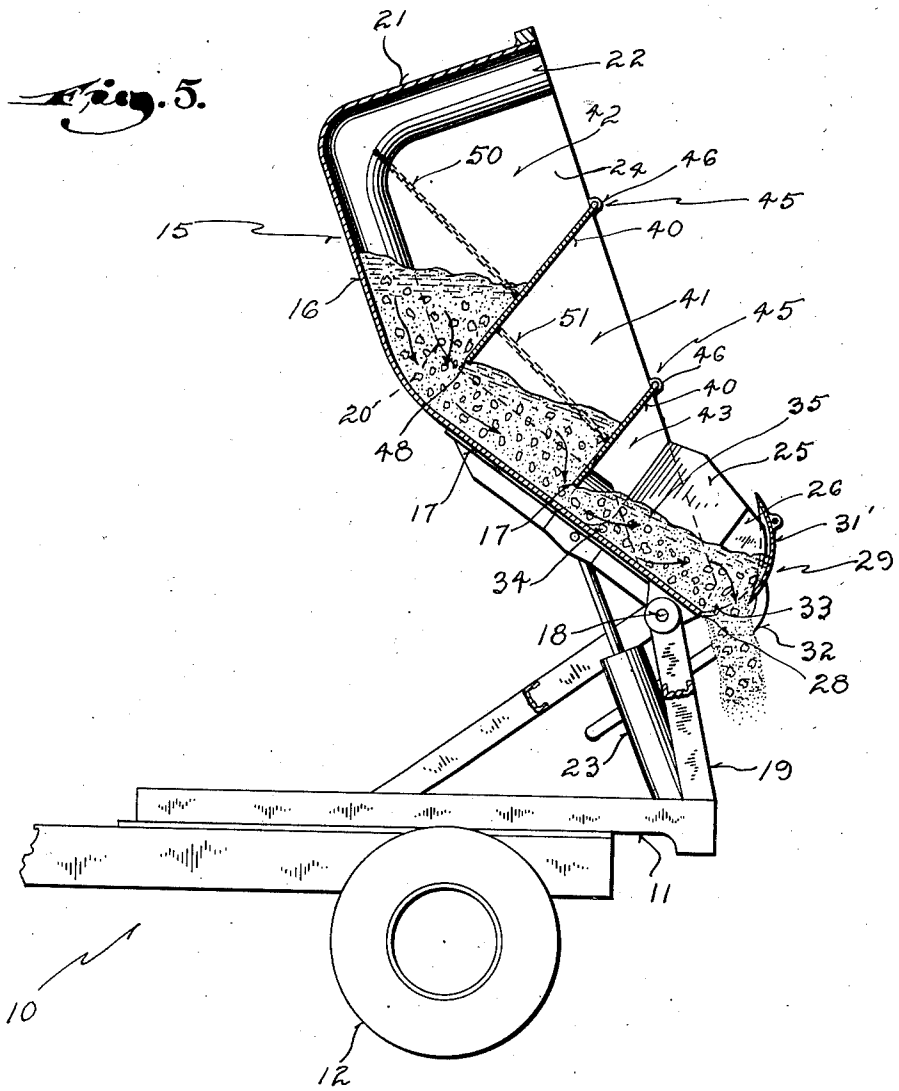
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DUMP TRUCK

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3 Sheets-Sheet 3

Fig. 5.



Inventor
Glenway Maxon, Jr.
By
Attorney

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2,674,489

UNITED STATES PATENT OFFICE

2,674,489

DUMP TRUCK

Glenway Maxon, Jr., Milwaukee, Wis.

Application September 25, 1946, Serial No. 699,163

13 Claims. (Cl. 298—17)

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This invention relates to dump trucks and refers more particularly to improvements in bodies for dump trucks of the type used for the transportation of semi-liquid materials such as freshly mixed concrete.

The transportation of freshly mixed concrete in dump truck bodies of the type herein concerned has one serious disadvantage which has heretofore been accepted as an undesirable but inherent feature of past bodies. This refers to the stratification or segregation of the aggregates which occurs during transportation of the freshly mixed concrete from one point to another and which results in the delivery at the point of use of an inferior mixture lacking uniformity.

Stratification or segregation occurs as a result of the bouncing and jarring to which the mixture is subjected during transit, and is characterized by the heavier solid materials such as stone and coarse gravel settling to the bottom of the body and the liquid materials rising to the surface of the body contents.

In dump trucks provided with tilting discharge type bodies of past construction, tilting of the body to a load discharging position invariably produced an initial discharge of all the more liquid materials at the surface of the load followed by discharge of the heavier solid aggregates which had settled to the bottom of the body during transit.

In many cases, however, the heavier aggregates adhered so firmly to the bottom wall of the body that scrapers had to be employed to dislodge the same. Mechanical agitation of the "mix" during transit heretofore constituted the only effort made to overcome segregation of the aggregates during transit, but this expedient requires costly and complicated mechanism.

Since the ratio of water to cement is an important factor determining the strength of concrete, it is highly important that the effects of segregation brought about by transportation of freshly mixed concrete in dump trucks of the character described be overcome.

With a view toward overcoming the effects of segregation of the aggregates during transportation of freshly mixed concrete in dump trucks, the present invention is based upon the generally accepted fact that the discharge of concrete from the bottom of conventional dump buckets produces a desirable mixing effect or "folding in" of the aggregates. For this reason bottom discharge buckets have met with favor for the transportation and placing of concrete in most any type of structure.

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It is accordingly one of the objects of this invention to provide a dump truck body of the tilting discharge type having means embodied therein to obtain the desirable mixing action inherent in bottom dump buckets and thereby effect a desirable remixing of the load as it is discharged from the body. In this connection it is more specifically an object of this invention to provide a body for dump trucks of the character described having means incorporated therein for assuring initial discharge of heavier aggregates which may have settled along the bottom of the body together with the more liquid constituents of the "mix" upon elevation of the body to a load discharging position so as to largely overcome the effects of segregation.

A further object of this invention resides in the provision of baffles to divide the body into transverse compartments having restricted communication with each other along the bottom wall of the body to produce a substantially compartment-by-compartment discharge of the body contents upon tilting of the body to a load discharging position, and which assure movement of the heavier aggregates which may have settled to the bottom of the body along the entire bottom wall of the body and the discharge of such heavier aggregates together with the more liquid constituents of the "mix."

Still another object of this invention resides in the provision of a body of the character described having means therein for bringing heavier aggregates that may have settled down during transportation, toward the surface of the drum contents as it is discharged from the body to thus remix the same with the more fluid aggregates that rose to the surface during the haul.

Another object of this invention resides in the provision of a novel gate controlled discharge chute for dump truck bodies of the character described by which assurance is had that heavier aggregates which may have collected along the bottom wall of the body are among the first to be discharged from the body upon tilting thereof to a load discharging position.

A further object of this invention resides in providing a dump truck body useful for the transportation of semi-liquid materials such as freshly mixed concrete with discharge means and transverse baffle means so cooperating with each other as to enable tilting of the body through an angle of about 90° to a substantially vertical load discharging position to assure discharge of heavy aggregates which may have collected on the bottom of the body while affording a controlled dis-

charge of the materials at all angles of tilt to largely overcome the effects of segregation.

Another object of this invention is to provide an improved body for dump trucks of the character described wherein the desirable feature of providing a bottom discharge for the body contents is obtained with discharge taking place at a high elevation above the ground.

With the above and other objects in view which will appear as the description proceeds, this invention resides in the novel combination and arrangement of parts substantially as hereinafter described and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the herein-disclosed invention may be made as come within the scope of the claims.

The accompanying drawings illustrate several complete examples of the physical embodiments of the invention constructed in accordance with the best modes so far devised for the practical application of the principles thereof, and in which:

Figure 1 is a side elevational view of a portion of a dump truck provided with the body of this invention with parts of the body broken away and shown in section to better illustrate the interior construction thereof;

Figure 2 is an elevaional view of the rear end of the body shown in Figure 1;

Figure 3 is a view similar to Figure 1 but showing the body in longitudinal section and partially elevated to load discharging position;

Figure 4 is a plan view of the body looking into the interior thereof while in its partially elevated position shown in Figure 3.

Figure 5 is a view similar to Figure 3 illustrating the body elevated to nearly its highest discharging position; and

Figure 6 is a perspective view of the body showing the same in its fully tilted position and illustrating a slightly modified interior construction.

Referring now more particularly to the accompanying drawings in which like numerals indicate like parts throughout the several views, the numeral 10 generally designates a truck chassis only the rear portion of which is shown. The truck itself is more or less conventional and includes the usual chassis side rails 9 supported at the rear by wheels 12. Mounted on the chassis is a supporting frame 11 which in turn tiltably supports the body 15.

The truck body 15 of this invention is similar to that forming the subject matter of the co-pending application of Glenway Maxon, Jr., Serial No. 573,857, filed January 22, 1945, now Patent No. 2,465,899, dated March 29, 1949, in that the bottom wall 16 of the body at the forward end thereof is adapted to rest directly on the supporting structure 11 while the rear portion 17 of the bottom wall is slanted upwardly and rearwardly at an angle to the horizontal to terminate close to the open top of the body. The slanting bottom wall 17, therefore, forms in effect a rear end wall for the body over the top edge of which materials contained in the body are adapted to be poured upon tilting of the body to a load discharging position.

The body is mounted for tilting motion about a pivot axis 18 located directly adjacent to the upper rear edge of the slanting bottom wall 17 at the extreme rear of the body as in the aforementioned co-pending application, and for this purpose a substantially A-shaped frame structure 19 is secured on the top of the supporting structure 11 at the back of the truck beneath the slanting bottom wall 17.

The body 15 is also provided with a longitudinal keel 20 extending centrally along the bottom wall of the body to add rigidity thereto and minimize lateral sloshing of semi-liquid materials transported in the body. As clearly shown in Figures 1 and 6 the keel 20 terminates short of the rear discharge end of the body but is continued to extend vertically along the front end wall 21 as shown at 22.

A hydraulic cylinder 23 connected between the rear of the supporting structure 11 and the slanting bottom wall 17 of the body provides means for elevating the body to discharging position and for controlling and lowering the body to its load carrying position.

Because of the fact that the pivot axis 18 is located directly adjacent to the upper rear edge of the slanting bottom wall 17, it will be apparent that the contents of the body discharge therefrom at a substantial elevation above the truck frame and consequently above ground level upon tilting of the body to a load discharging position.

The body of the truck is also provided with parallel opposite side walls 24 which have rearwardly and inwardly converging extensions 25 overlying the slanting bottom wall 17 defining the interior shape of the body at the rear thereof. These extensions 25 are preferably removably secured in position so that they may be removed when remixing of the body contents during discharge is not important. The rear end portions of these converging side wall extensions 25 have short parallel wall sections 26 leading rearwardly therefrom to terminate shortly beyond the upper rear edge 28 of the slanting bottom wall and to define a restricted discharge mouth 27 over said rear edge of the slanting wall 17.

The rearwardly and inwardly converging side wall extensions 25 and said parallel sections 26 extending rearwardly therefrom thus form a funnel-like discharge chute or spout through which the body contents gradually pass to be discharged from the truck body upon elevation of its front end to a load discharging position.

A gate structure 29 controls the discharge of materials from the body. This gate structure is pivotally supported from the parallel portions of the body side walls 24 or from the inwardly converging extensions 25.

As seen best in Figure 2 the gate structure comprises a tube 30 extending substantially transversely across the rear of the discharge mouth 27 and having a crank-like shape with its opposite ends bent downwardly and rearwardly to have trunnion portions 31 on their extremities freely rotatably received in suitable bearings in the side walls 24.

A plate 31' welded or otherwise fixed to the offset medial portion of the rod constitutes the gate per se, and this plate is curved concentrically with the axis of the trunnions 31 and is snugly slidable over the similarly curved rear edges of the wall sections 26 to close the discharge mouth when the lower edge of the gate is resting on the rear edge 28 of the slanting bottom wall.

A pair of downwardly depending levers 32 disposed at opposite sides of the discharge mouth provide handles by which the gate structure may be swung on its pivot axis to and from a posi-

tion closing the discharge mouth as shown in Figures 1 and 2.

Attention is directed to the fact that the discharge mouth 27 at the rear of the body is disposed lowermost when the body is tilted to a load discharging position as shown in Figures 3 and 5 and that the gate structure is adapted to be moved upwardly to only partially uncover the discharge mouth to thereby provide a restricted discharge port 33 well beneath the level of semi-liquid material being discharged from the body. Friction means (not shown) may be employed if desired to hold the gate in any desired position partially uncovering the discharge mouth.

With discharge controlled in this manner the materials are substantially "drawn off" from the body through a restricted discharge port located at a lowermost point of the body when the same is in an elevated discharging position.

In order to prevent the semi-liquid materials from spilling over the sides of the body at the rear thereof in the tilted position of the body, it will be noted that the side wall extensions 25 project a distance above the upper edges of the side walls 24.

With the particular location of the restricted discharge opening 33 the heavier solid materials indicated at 34 which may have become stratified and settled along the bottom wall of the body are among the first to discharge through the opening 33 with the body in its tilted discharging position, to thus become remixed with the more liquid aggregates 35 which are restrained from direct discharge by the partially open gate structure so that they cannot be immediately poured off the mix as was the case previously. Instead, some of the more liquid aggregates discharge through the restricted opening 33 together with the heavier aggregates 34 to result in a discharge action similar to that which takes place in bottom discharge dump buckets of the type previously discussed.

Remixing of any stratified or segregated aggregates is also accomplished to a considerable extent just prior to discharging by the rearwardly and inwardly converging side wall extensions 25 which it will be noted have their bottom portions curved inwardly as at 36 at their junctions with the slanting bottom wall 17.

This configuration of the side wall extensions 25 produces a mixing action which is illustrated in Figure 4 by arrows, and wherein the heavier aggregates moving along the slanting bottom wall 17 toward the restricted discharge opening are deflected upwardly upon contact with the curved bottoms 36 of the side wall extensions and folded over onto the more liquid materials which may have risen to the surface of the load being discharged.

In order to facilitate discharging and effect a further remixing of the materials which may have become segregated by transit, the interior of the body is formed into a plurality of longitudinally adjacent compartments having restricted communication with one another along the bottom wall of the body. This is accomplished by one or more partition-like baffles 40 extending transversely across the interior of the body intermediate its ends.

Two such baffles are shown in the Figures 1 to 5 embodiment, while but a single baffle is shown in the Figure 6 embodiment of the invention.

Where two baffles are employed the interior of the body is, of course, divided into three compartments; a central compartment 41 defined by the space between the baffles, and front and rear compartments 42 and 43, respectively, between the foremost baffle and the front end wall 21 of the body, and between the rearmost baffle and the gate structure 29 of the body. Where one baffle is employed, it is positioned substantially medially of the interior of the body.

The baffles 40 may be rigidly mounted inside the truck body but are more preferably pivotally supported from their top edges to swing an axes 45 located at the level of the upper edges of the body side walls. For this purpose bearing brackets 46 are mounted on the gunwale reinforcing the upper edges of the body side walls to rotatably receive the opposite ends of a rod or pipe 47 to which the baffles are welded or otherwise secured.

The lower edges 48 of the baffles are spaced a distance above the bottom wall of the body but lie well beneath the level of the body contents in the transit position of the body. The spacing of the bottom edges of the baffles from the bottom wall of the body affords restricted communication between the respective compartments as stated hereinbefore and assures that the heavier solid aggregates which may have settled to the bottom of the body during transit are among the first to empty from the respective compartments.

Thus, it is to be noted that the transverse walls of the compartments form downwardly converging hopper walls in the tilted load discharging position of the body, and that materials empty from the bottom of each of the compartments. The resulting compartment-by-compartment discharge of the body contents thus effects further remixing of the aggregates to largely nullify the effects of segregation during transit.

The forward baffle 40 is shown connected by means of a chain 50 with the front end of the body such as the keel portion 22, with the chain of such length as to restrain the baffle against swinging past a position at which it is substantially perpendicular to the bottom wall portion 17. In this manner restricted communication between the forward compartment 42 and the intermediate compartment 41 is maintained.

Rearward swinging of the rear baffle 40 is limited by a chain 51 connected to the front baffle, and the length of this chain is such that when the body is tilted to a load discharging position the two baffles are substantially parallel to each other.

Since the top edges of the longitudinal keel 20 inside the body project upwardly beyond the lower edge of the baffles, it will be noted that the medial portions of the baffles are notched as at 53 to clear the keel.

Inasmuch as the baffles divide the interior of the body into a plurality of compartments having restricted communication with each other along the bottom wall of the body, and have a limited rearward swinging movement, semi-liquid materials in the body are held at different levels in the different compartments as the body is elevated to a discharging position. This brings about a delayed compartment-by-compartment discharge with the materials emptying from all of the compartments, including the lowermost, from the bottom thereof. The baffles thus coact with the walls of the body to effect a remixing of the discharging body contents by gravity, that is, the relative motion between the material and the baffles and confining walls necessary to effect a mixing action, is brought about by gravity.

The described compartment-by-compartment discharge is somewhat akin to dumping the contents of a bottom-opening bucket into another such bucket and then again dumping the contents of the second bottom opening bucket. During each discharge the material is subjected to a mixing action by gravity.

From the foregoing description taken in connection with the accompanying drawings, it will be readily apparent that the improved body of this invention provides for controlled discharge of semi-liquid materials therefrom and assures a substantial degree of remixing of the materials during discharge of the same from the body.

What I claim as my invention is:

1. A dump truck of the type having a supporting structure and a body provided with discharge means at one end, said body being mounted from the supporting structure in a manner to be tiltable about an axis adjacent to its discharge end to enable the opposite end of the body to be elevated to a load discharging position, said dump truck being characterized by the provision of: a baffle mounted in the interior of the body and extending transversely thereacross, intermediate the ends of the body, to divide the body interior into adjacent compartments, said baffle being pivoted about an axis adjacent its upper edge to swing toward the discharge end of the body when the body is elevated to load discharging position; and means limiting swinging motion of the baffle to preclude it from swinging to a vertical position when the body is fully elevated and beyond a position at which the baffle is adapted to cooperate with the bottom wall of the body in said discharging position to provide opposite angularly converging hopper-like walls for the uppermost compartment and to provide restricted communication with the adjacent compartment through the space between the bottom of the baffle and the bottom wall of the body so that materials in said uppermost compartment empty from the bottom thereof for travel along the bottom wall of the body toward the discharge means of the body.

2. In a dump truck the combination of: a body having a bottom wall, at least the rear portion of which slants rearwardly and upwardly in the normal transit position of the body; means at the rear of the body defining a discharge port adjacent to the bottom wall; means tiltably supporting the body adjacent its rear discharge end from the supporting structure of the truck for elevation of the front of the body to enable semi-liquid material in the body to discharge at its rear end; baffle means extending transversely across the interior of the body intermediate its ends to define longitudinally adjacent compartments; means connecting said baffle means with the body for movement relative thereto, in consequence to tilting of the body to load discharging position, to a predetermined position in the body interior sloping downwardly and forwardly and affording restricted communication between compartments at either side of the baffle means along the bottom wall of the body and in which position the capacity of the compartment ahead of said baffle means is substantially increased so as to preclude spilling of its contents as the body is tilted to load discharging position.

3. The dump truck of claim 2 further characterized by the provision of flow directing means in the body at the rear thereof positioned in the path of materials flowing in a discharging direction along the slanting bottom wall toward the discharge port at the rear of the body for converging said materials toward said discharge port and for deflecting heavier materials flowing along said slanting wall upwardly for admixture with the lighter materials at the surface of the material being discharged.

4. A tilting rear discharge type body for dump trucks useful for the transportation of semi-liquid materials characterized by the provision of a baffle in the interior of the body which in the tilted load discharging position of the body divides the body interior into longitudinally adjacent compartments located substantially one above the other, and having restricted communication with each other beneath the lower edge of the baffle and along the bottom wall of the body, said baffle slanting downwardly and forwardly in said tilted position of the body and cooperating with the bottom body wall to provide opposite downwardly converging sides for the compartment ahead of it which funnel the material emptying therefrom into the compartment behind the baffle.

5. In a dump truck the combination of: a body mounted for tilting motion about an axis adjacent to the rear of the body so as to enable elevation of the front of the body to a tilted load discharging position; means fixed on the body at the rear thereof defining an upwardly and rearwardly slanting bottom wall and opposite inwardly and rearwardly converging side wall portions to provide a restricted funnel-like discharge spout for semi-liquid materials in the body, said rearwardly converging side wall portions of the body being curved at their junctions with the slanting bottom wall so as to deflect materials flowing along said slanting bottom wall in the elevated discharging position of the body upwardly toward the surface of the materials being discharged to effect a mixing action of the discharging materials; and a baffle pivotally mounted on the body and extending transversely across the interior of the body to divide the interior of the body into longitudinally adjacent compartments, said baffle having its bottom free to swing rearwardly of the body in consequence to tilting of the body, to enlarge the compartment ahead of it and thus prevent spilling of its contents; and means for precluding such swinging of the baffle beyond a predetermined position of downward and forward incline in the raised body at which the bottom edge of the baffle is spaced a limited distance from the bottom wall to assure that materials emptying from the compartment ahead of the baffle flow rearwardly along the bottom wall of the body toward said restricted discharge.

6. A dump truck suitable for hauling freshly mixed concrete, comprising: a body; means fixed with relation to the body defining a funnel-like tail portion at the rear of the body, the small end of the funnel being rearmost and providing a discharge port through which the body contents may be emptied; a gate carried by the body at its rear for movement to and from a position closing said discharge port; means mounting the body for rearward tilting so that upon elevation of its front end the contents of the body flow rearwardly by gravity toward said discharge port; power means for raising and lowering the front end of the body; and baffle-like flow obstructing means mounted on the body above the bottom thereof and in position to block direct rearward movement of the material occupying the upper portion of the

body in the tilted discharge position of the body and to deflect such material downward toward the bottom wall of the body and thus effect a remixing action as the body contents move by gravity toward said discharge port.

7. In a dump truck having a supporting structure, the combination of: a body pivotally mounted at its rear end from said supporting structure of the truck for elevation of the front end of the body to a load discharging position; a substantially upright baffle extending transversely across the interior of the body intermediate its ends with the lower edge of the baffle spaced a distance above the bottom wall of the body to define adjacent compartments in the interior of the body; means hingedly mounting said baffle on the body for swinging movement about a transverse substantially horizontal axis fixed with respect to the body and remote from said lower edge of the baffle to permit the lower free portion of the baffle to swing toward the rear of the body during tilting of the body to its load discharging position to thus effectively increase the capacity of the compartment ahead of the baffle and prevent spilling of its contents upon elevation of the body to its load discharging position; and means carried by the body operable upon the baffle upon tilting of the body to a load discharging position for precluding swinging of said baffle past a predetermined position between horizontal and vertical and in which position the baffle slopes downwardly and forwardly so as to maintain restricted communication between the compartment ahead of the baffle and the interior of the body rearwardly of the baffle and thereby insure materials adjacent to the bottom wall of the body being among the first to empty from said compartment for subsequent discharge from the body in the tilted load discharging position of the body.

8. In a dump truck for hauling and placing freshly mixed concrete: a tiltable body having a bottom wall and having a discharge port at its rear; means tiltably mounting the body adjacent to its rear end so that its front end may be elevated to cause the body contents to flow rearwardly toward said discharge port and to be discharged therethrough; imperforate flow obstructing means mounted in the upper portion of the body to prevent direct rearward flow of the upper portions of the body contents, and having a lower flow directing portion movable in the direction of such rearward flow of the body contents in consequence to tilting of the body to a discharging position; and means on the body for precluding movement of said lower flow directing portion in said rearward direction beyond a position at which it is spaced from the bottom wall of the body an amount to define the upper boundaries of a restricting port constraining the body contents ahead of the flow directing portion to flow along the bottom wall of the body as the body is emptied.

9. A dump truck suitable for hauling freshly mixed concrete having a rear discharge body mounted for upward and rearward tilting so that upon elevation of its front end the contents of the body flow rearwardly by gravity for discharge from the rear of the body, characterized by the provision of: imperforate flow directing baffle means mounted in the upper part of the body and spaced above the bottom thereof a distance to provide limited communication between the body portions at opposite sides of the baffle means, so

as to be in position to positively block direct rearward movement of material occupying the upper portion of the body forwardly of the baffle means, and to force such material to flow downwardly toward the bottom of the body and through said space beneath the baffle means as the entire body contents move by gravity toward the rear of the body in consequence to elevation of its front end.

10. A truck body for hauling mixed concrete or the like, comprising a container tiltable from hauling to discharging position, means mounting the container for tilting movements, a baffle mounted across the container to form front and rear compartments which are in communication with one another below the baffle when the container is in discharging position, said baffle being so shaped that its side edges closely adjoin the adjacent sides of the container when in discharging position, means for retaining the baffle in a fixed position against the pressure of the contents when in tilted discharging position, a discharge gate in the rear compartment, and means for moving the body into discharging position in which the body contents flow rearwardly toward said discharge gate and are discharged therethrough.

11. A truck body for hauling mixed concrete or the like, comprising a container tiltable from hauling to discharging position, means mounting the container for tilting movements, a baffle mounted across the container to form front and rear compartments which are in communication with one another below the baffle when the container is in discharging position, said baffle being so shaped that its side edges closely adjoin the adjacent sides of the container when in discharging position, means for retaining the baffle in a fixed position against the pressure of the contents when in tilted discharging position, a discharge gate in the lower portion of the rear wall of the rear compartment, and means for moving the body into discharging position in which the body contents flow rearwardly toward said discharge gate and are discharged therethrough.

12. A truck body for hauling mixed concrete or the like, comprising a container tiltable from hauling to discharging position, means mounting the container for tilting movements, a baffle mounted across the container to form front and rear compartments, and pivotally mounted to permit the bottom of the baffle to swing away from the bottom of the container when in tilted discharging position and thus provide communication below the baffle between the compartments, said baffle being so shaped that its side edges closely adjoin the adjacent sides of the container when in tilted discharging position, means for limiting the movement of the baffle, a discharge gate in the lower portion of the rear wall of the rear compartment, and means for moving the body into discharging position in which the body contents flow rearwardly toward said discharge gate and are discharged therethrough.

13. A truck body for hauling mixed concrete or the like, comprising a container tiltable from hauling to discharging position, means mounting the container for tilting movements, a baffle mounted across the container to form front and rear compartments which are in communication with one another below the baffle when the container is in tilted discharging position, means for retaining the baffle in a fixed position against the pressure of the contents when in tilted discharging position, a discharge gate in the rear com-

partment, a pivot for said body disposed below and rearwardly of said discharge gate, and means for moving the body about the pivot into discharging position in which the body contents flow rearwardly toward said discharge gate and are discharged therethrough.

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