Nov. 21, 1950 H. E. GETMAN 2,530,574

MATERIAL CONVEYING AND DUMPING VEHICLE

Filed April 16, 1948 3 Sheets-Sheet 1

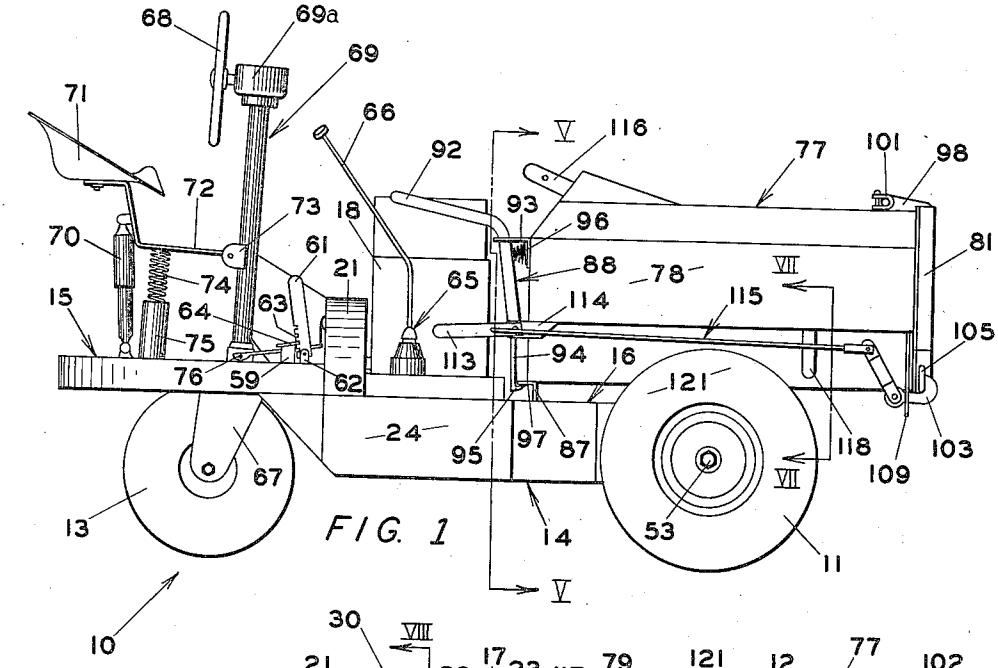


FIG. 1

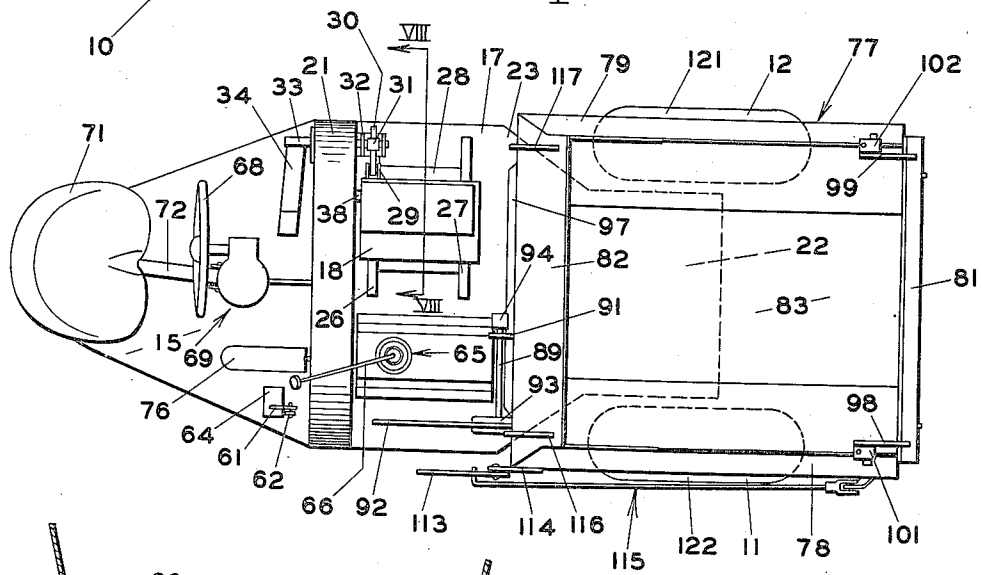


FIG. 2

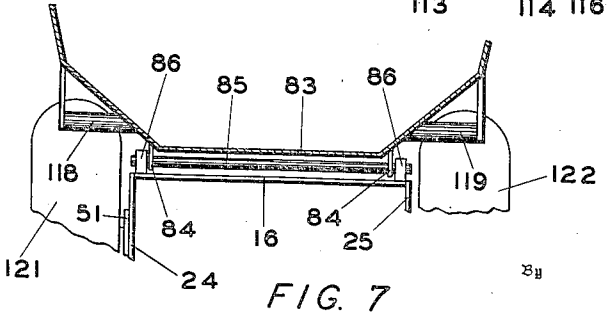


FIG. 7

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MATERIAL CONVEYING AND DUMPING VEHICLE

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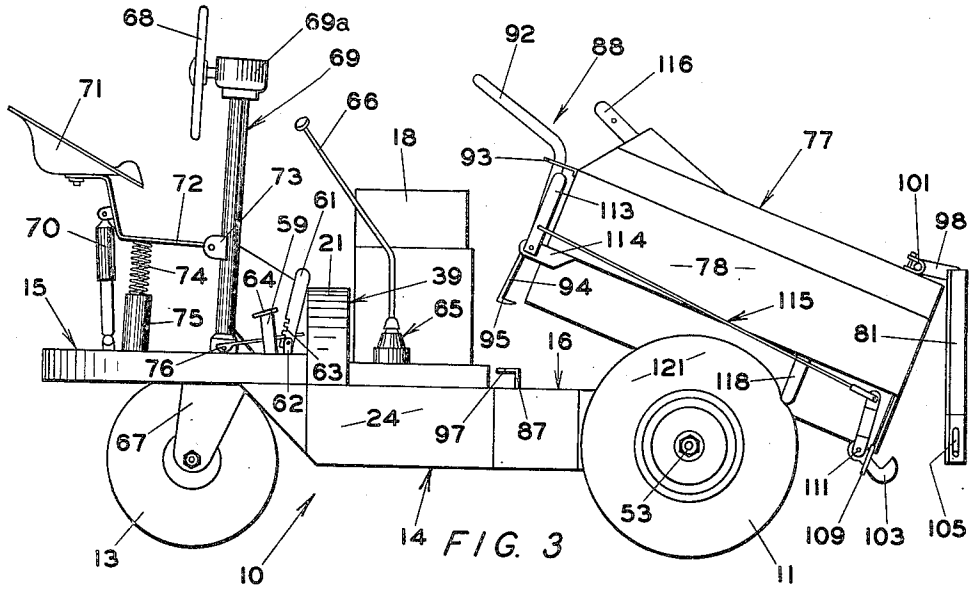


FIG. 3

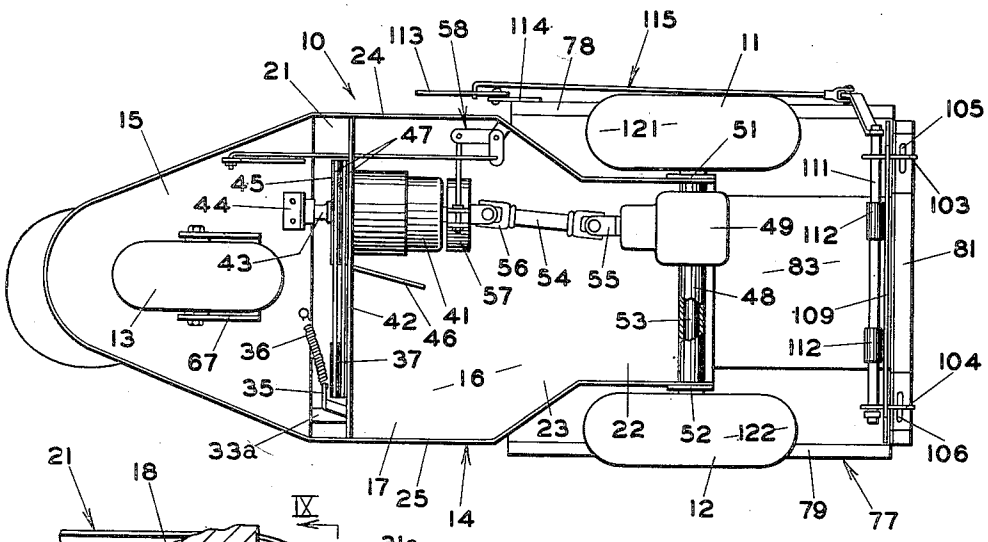


FIG. 4

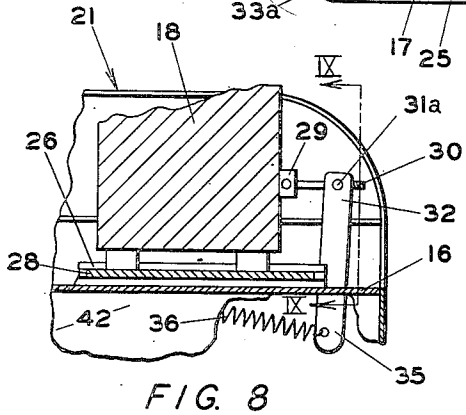


FIG. 8

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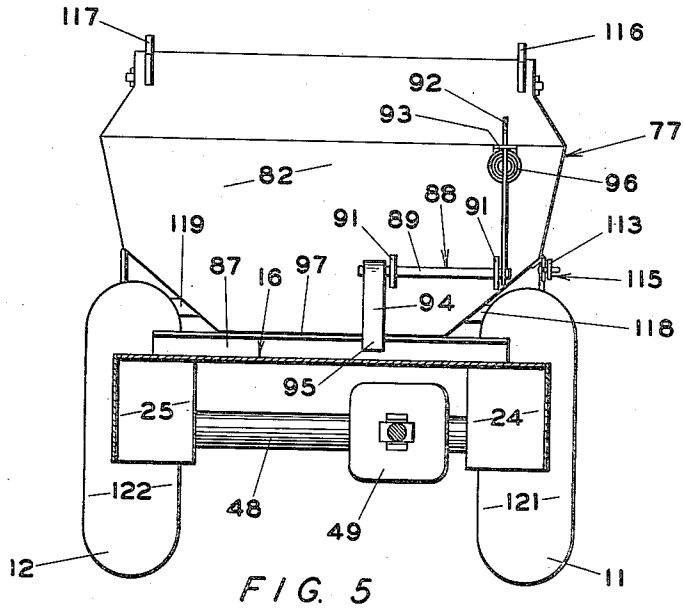


FIG. 5

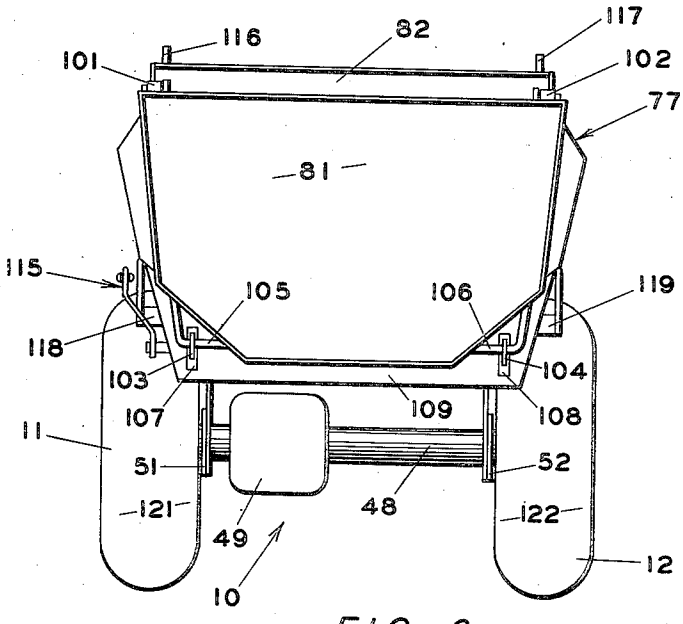


FIG. 6

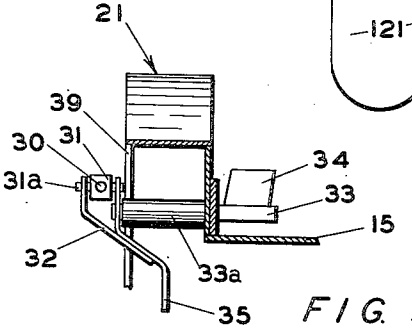


FIG. 9

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Patented Nov. 21, 1950

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UNITED STATES PATENT OFFICE

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MATERIAL CONVEYING AND DUMPING VEHICLE

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Application April 16, 1948, Serial No. 21,394

1 Claim. (Cl. 298—17)

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This invention relates in general to a self-propelled vehicle for conveying and dumping material, and relates specifically to an improved type thereof which is small and compact, easily maneuverable, inexpensive to build, and is in general satisfactory for carrying small loads around congested areas.

Since the development of high production concrete mixing equipment it has been desirable to provide a device for performing the general functions of a wheel-barrow, for both delivering sand, gravel and cement to a mixer and for carrying mixed concrete away therefrom to the point of use, by which device the effective work of one man could be substantially increased. To accomplish this, it has appeared that a materials conveying vehicle of lower cost, greater maneuverability, greater load capacity and greater sturdiness was needed than has heretofore been available even though attempts have already been made to solve the general problem.

It has been recognized that said conveyor vehicle should be power driven, should have space for a driver and a dump box which would be fully operable from the driver's position on the vehicle. It has been further recognized that such a conveyor vehicle must be sufficiently small and maneuverable for satisfactory operation within a building, without sacrificing the vehicle's load capacity.

Thus it is desirable that the general organization of the vehicle be such as to provide a device having the required characteristics. Particularly, it is desirable that inexpensive, but reliable clutch means be provided between the driving engine and the driven mechanism, and also that inexpensive, but reliable, means be provided to mount and actuate a self-dumping materials container, or box, with a minimum of strain upon the entire machine.

Accordingly, it is a primary object of this invention to provide an improved power driven vehicle for conveying and dumping material, wherein the dump box is mounted upon the leading end of the vehicle chassis.

A further object of this invention is to provide an improved conveyor vehicle, as aforesaid, upon which space is provided for a driver and from which space all controls are within easy reach.

A further object of this invention is to provide an improved conveyor vehicle, as aforesaid, which is small enough and maneuverable enough to be operated satisfactorily within a building, or other congested region, without sacrificing the vehicle's load capacity.

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A further object of this invention is to provide an improved conveyor vehicle, as aforesaid, whose dump box is cushioned upon and against the tread of the front wheels when said dump box is in the tilted position.

A further object of this invention is to provide an improved conveyor vehicle, as aforesaid, having a power unit which is laterally slidable with respect to said vehicle chassis whereby said power unit may be moved to tighten and loosen a power transmitting belt.

Other objects and purposes of this invention will become apparent to persons familiar with this type of equipment upon referring to the accompanying drawings and upon reading the following specification.

In meeting those objects and purposes heretofore mentioned, as well as others incidental thereto and associated therewith, I have provided a three wheeled power driven vehicle with a tilting dump box pivotally mounted upon the forward end of the vehicle chassis. A seat and steering apparatus are provided upon the rearward end of the chassis for a driver. The dump box is so positioned with respect to the front wheels that bumpers mounted on the sides of said dump box are cushioned against the tread of the tires, when the dump box is in the tilted position.

A transmission, which is suspended from and below the vehicle chassis, is belt driven by an engine slidably supported upon the upper side of the chassis between the dump box and the steering apparatus and laterally spaced from said transmission with respect to said chassis. The clutching mechanism is comprised of a pair of lateral slide rails, upon which said engine is slidably mounted, and includes a foot lever by means of which said engine may be moved on said rails, laterally with respect to said chassis, to release the tension upon the belt drive.

For illustrations of a preferred embodiment of the invention, attention is directed to the accompanying drawings in which:

Figure 1 is a side elevation view of the material conveying and dumping vehicle to which this invention relates.

Figure 2 is a top plan view of said vehicle.

Figure 3 is a side elevation view of said vehicle similar to Figure 1 except that the dumping box is in the tilted position and the parking brake is set.

Figure 4 is a bottom plan view of the said vehicle.

Figure 5 is a sectional view of the vehicle taken along the line V—V of Figure 1.

Figure 6 is a front elevation view of the said vehicle.

Figure 7 is a sectional view of a portion of the vehicle taken along the line VII—VII of Figure 1.

Figure 8 is a sectional view taken along the line VIII—VIII of Figure 2.

Figure 9 is a sectional view taken along the line IX—IX of Figure 8.

Construction

As illustrated in Figures 1 through 6 inclusive, the materials conveying and dumping vehicle to which this invention relates, has a chassis 10 comprised of a pair of front driving wheels 11 and 12, a rear turning wheel 13, and a frame 14, which frame is supported upon said driving and turning wheels. The frame 14 has a driver's platform 15, which, in this embodiment of the invention, is slightly higher than a dump box platform 16. The driver's platform 15 is at the rearward end of the conveying vehicle.

It will be understood that the words "rearward" and "rear," where occuring in this specification, relate to the leftward end of the vehicle or parts thereof, as shown in Figure 1. Furthermore, the words "front" or "forward" refer to the rightward end of the vehicle, or parts thereof, as shown in Figure 1.

The dump box platform 16 has a wide, or mid, section 17 upon the upper side of which a suitable power unit 18, such as a conventional gasoline engine, is mounted. The wide section 17 is separated from and secured to said driver's platform 15 by a drive housing 21. The dump box platform 16 has a narrow section 22 at the forward end of the frame 14 which narrow section is positioned between the driving wheels 11 and 12, and is separated from the wide section 17 by an integral, tapered section 23. The width of the narrow section is such, with respect to the width of the wide section, that the said drive wheels 11 and 12 fit alongside said narrow section without extending materially beyond the edges of the wide section.

The aprons 24 and 25 are secured, as by welding, to the longitudinal edges of the dump box platform 16 and depend substantially perpendicularly therefrom. The driver's platform, the dump box platform, the drive housing 21, and the aprons 24 and 25, are all preferably fabricated from steel plate of sufficient and appropriate gauge to meet the demands for strength imposed upon the vehicle of which the frame 14 is a part.

As shown in Figures 2 and 8, the power unit 18 is slidably supported upon a pair of lateral slide rails 26 and 27, which slide rails may be secured, as by welding, upon the wide section 17 of the dump box platform so that they are substantially perpendicular to the longitudinal axis of the frame. The said lateral slide rails may be provided with parallel grooves in their opposed sides, which grooves are slidably engaged by a slide plate 28 secured to the bottom of said power unit 18.

One end of a clutch link rod 30 (Figures 2, 8 and 9) is pivotally supported upon and secured to a link rod bracket 29, which bracket is secured, as by welding, to the frame of the power unit 18. The other end of the link rod 30 is threadedly received through an appropriate opening in a clutch pivot block 31, which block is rotatably supported within the clutch fork 32 by means of

a pair of pivot block pins 31*a*, which pins are secured to, or integral with, opposite sides of the pivot block 31.

The clutch fork 32 is secured, as by welding, to one end of a clutch shaft 33, which shaft is rotatably and horizontally supported, within a clutch shaft sleeve 33*a*. The sleeve 33*a* is secured to the drive housing 21 so that the end of the shaft 33, remote from the clutch fork 32, extends rearwardly over the driver's platform 15 where a clutch foot lever 34 is secured thereto. The sleeve 33*a* preferably, but not necessarily, lies within the drive housing 21.

The lower end of the clutch fork 32 (Figures 8 and 9), which extends below the clutch shaft 33, is bent rearwardly and then downwardly within the drive housing 21 to provide a clutch tension arm 35. The lower end of the clutch tension arm 35 is engaged by one end of a clutch spring 36, whose other end is anchored upon the frame 14.

The clutch spring 36 (Figure 8), which urges the lower end of the clutch tension arm 35 toward the center of the frame, tends to hold the clutch pedal 34 in a raised position and urges said power unit 18 toward the outer ends of the lateral slide rails 26 and 27. When the clutch pedal 34 is depressed, the clutch spring 36 is stretched and the clutch fork 32 and link rod 30 move the power unit 18 toward the inner ends of the lateral slide rails 26 and 27.

A driving sheave 37 (Figure 4) is secured to, and rotatable with, the drive shaft 38 of the power unit 18.

The drive housing 21 has a front sheet 39, which comprises a portion of the forward side of the housing 21, extends below the dump box platform 16 about the same distance as the aprons 24 and 25 and is secured to said platform and to the other parts of said housing in any convenient manner, as by welding. A transmission 41, of any convenient, conventional type, is secured to and supported upon the lower portion of said drive housing front sheet 39, which lower portion shall hereinafter be referred to as the transmission support plate 42. A transmission input shaft 43, which is operable at one end with said transmission 41, extends through the transmission support plate 42 and is rotatably supported at its other end upon an input shaft support bracket 44. A driven sheave 45 is supported upon and rotatable with said transmission input shaft 43 between the support plate 42 and the support bracket 44. Suitable bracing means, such as the support plate brace 46, may be provided for additional strength. Suitable belts 47, two belts in this embodiment, operably connect the driving sheave 37 to the driven sheave 45. The clutch spring 36 tends to urge the driving sheave 37 laterally away from the driven sheave 45, thereby imposing a tension upon the belts 47. Means, not shown, may be provided to render adjustable the tension imposed by the spring 36.

The tubular front axle housing 48, which supports the differential 49, is in turn secured to and supported upon the forward ends of the aprons 24 and 25, which aprons are braced at these points by means of the apron brace plates 51 and 52, respectively. Conventional front axle segments, of which one is indicated at 53, are rotatably supported within the front axle housing 48 (Figure 4). Said axle segments are engaged at their respectively remote extremities by the front driving wheels 11 and 12, which wheels may be secured thereto, and rotatable therewith, in any conventional manner, and at their adja-

cent ends by the operating parts of a conventional differential 49. A propeller shaft 54 having universal joints 55 and 56 operably connects the transmission 41 with the differential 49.

A suitable braking mechanism, including the brake drum 57, is appropriately supported upon the frame 14 for operable engagement of the drive shaft 54, preferably adjacent to the transmission 41 (Figure 4). Appropriate brake linkage 58 operably connects the brake drum 57 with a brake foot pedal 59 (Figures 1, 2, 3 and 4), which pedal extends through the driver's platform 15 in a suitable position for foot operation. A parking brake arm 61, which arm is pivotally supported at one end upon said driver's platform 15 by means of the parking brake bracket 62, is provided with a plurality of notches 63 along one edge thereof. When the brake foot pedal 59 is depressed sufficiently, the edge of the foot pedal 64 may be engaged by one of said notches 63 thereby holding said brake pedal in a braking or depressed position.

A gear shift assembly 65 (Figures 1, 2 and 3), including a gear shift lever 66, is mounted in the usual manner on the wide section 17 of the dump box platform 16 above the transmission 41 and functions conventionally.

The rear turning wheel 13 is rotatably supported within the turning fork 67, which fork pivotally engages and supports the under side of the driver's platform 15. The steering wheel 68 is operably connected to the turning fork 67 by means of suitable shafts and gears housed within the steering column 69, and the gear box 69a at the head thereof, which gears and shafts may be of any convenient conventional type. A driver's seat 71 may be secured, as by welding, to one end of a seat support arm 72, the other end of said support arm being pivotally secured to said steering column 69 by means of the seat support arm bracket 73.

A suitably resilient means such as the coiled seat spring 74 (Figures 1 and 3) may be secured at its upper extremity to said seat support arm 72, and supported at its lower end upon a seat spring support post 75, said support post being secured to said driver's platform 15 directly below the seat support arm 72. A convenient, conventional shock absorber 79 may be secured at its upper end to said seat support arm and secured at its lower end to the driver's platform 15.

An accelerator pedal 76 (Figures 1 and 2) is operably connected by any convenient means to said power unit for controlling the speed thereof.

A dump box 77 having side walls 78 and 79, a front gate 81 and an end wall 82 is pivotally supported upon the narrow section 22 and the tapered section 23, of the dump box platform 16 between the driving wheels 11 and 12 and overhangs said narrow section a distance such that its sides are approximately flush with the outer faces of the drive wheels.

The dump box bottom 83 (Figures 4, 5, 6 and 7) is provided with a plurality of tilt shaft brackets 84 having suitable openings within which a tilt shaft 85 is rotatably supported. A plurality of U-shaped tilt shaft support brackets 86, in which the tilt shaft 85 is rotatably and removably cradled, are secured, as by welding, to the narrow section 22 of the platform 16 adjacent to the forward edge thereof. The tilt shaft brackets 84 are preferably secured to the dump box bottom 83 slightly rearwardly of a point midway between the end wall 82 and the front gate 81 so that the dump box 77 may be caused to assume

the tilted position, as shown in Figure 3, upon release of the hereinafter described control mechanism, by the action of gravity alone.

When the dump box 77 is held, as hereinafter described in detail, in the horizontal position, that end of the dump box bottom 83 adjacent to the end wall 82, rests on a dump box support angle 87, which angle is secured, as by welding, to the top surface of the tapered section 23 of the dump box platform 16, substantially perpendicular to the longitudinal axis of the frame 14.

The dump box 77 is held in a substantially horizontal position by means of the dump box control mechanism 88 (Figures 1, 2, 3 and 5). The said dump box control mechanism has a release shaft 89, which is rotatably supported in a substantially horizontal position by means of the release shaft brackets 91, which brackets are secured, as by welding, to the end wall 82 of the dump box. A release handle 92 is secured at its lower end to one end of the release shaft 89, and is held in an upright position by means of the release handle guide 93, which guide is secured to the dump box end wall 82. The release handle 92 preferably has an approximately right angle bend intermediate its extremities causing the upper end thereof to extend back towards the driver's seat. A release hook arm 94, having a hook 95 at its lower extremity for engaging the rearwardly extending horizontal flange 97 of the dump box support angle 87, is secured to and suspended from the other end of the shaft 89. Therefore, the hook arm 94 may be caused to pivot about the axis of the release shaft 89 by moving the release handle 92.

A release handle spring 96 urges the release handle 92 away from the dump box end wall 82, thereby tending to urge the hook arm 94 towards the dump box end wall 82. Accordingly, when the dump box bottom 83 is bearing against the horizontal flange 97 of the dump box support angle 87, the release handle spring 96 tends to hold the hook 95 in engagement with the said horizontal flange. The hook 95 is preferably so constructed that it will automatically slip over the horizontal flange 97 into engagement therewith when the rear end of the dump box 77 is urged downwardly into the horizontal position.

The front gate 81 is horizontally hinged upon the forward end of the dump box 77 by means of the hinge arms 98 and 99 and the hinge brackets 101 and 102. The front gate 81 is held in a closed position by means of the gate hooks 103 and 104 (Figures 1, 3, 4 and 6), which hooks 103 and 104 releasably engage the gate pins 105 and 106, which pins are secured to the bottom of said front gate. The gate hooks 103 and 104 extend through suitable guide slots 107 and 108 in the hook guide plate 109 and are secured to and rotatable with a gate hook actuating shaft 111. The gate hook shaft 111 is rotatably supported within a plurality of hook shaft support sleeves 112, which sleeves are secured, as by welding, to the dump box bottom 83.

A gate release handle 113, which is pivotally supported upon the dump box side wall 78 near the rearward end thereof by any convenient means such as the gate release handle brackets 114, is operably connected to the gate hook actuating shaft 111 by means of the gate hook release linkage 115. It will be understood and recognized that the gate release handle 113 and gate hook release linkage 115 are mounted in this particular embodiment of the invention upon and adjacent to the dump box side wall 78 for illus-

trative purposes only. The said linkage and handle may be placed along the dump box side wall 79 without departing from the scope of the invention.

A pair of dump box handles 116 and 117 (Figures 1 and 2) are secured, as by welding, to the dump box end wall 82 to facilitate manual operation of the dump box 77, if and when necessary.

A pair of dump box bumpers 118 and 119 (Figures 1, 3 and 7) are attached, as by welding, to the dump box side walls 78 and 79, respectively, for the purpose of engaging the tread of the tires 121 and 122 on the front driving wheels 11 and 12, respectively, when the dump box 77 is released into the tilted position. Thus, the pneumatic tires 121 and 122 provide a resilient means for arresting yieldingly the pivotal movement of the dump box 77 when said dump box is urged from the horizontal position into the tilted position, whereby gravitational actuation of the dump box becomes feasible and is effected without unreasonable noise and mechanical shock.

Operation

It will be noted that the particular embodiment of the invention, hereinbefore described in detail and illustrated in the accompanying drawings, has been designed in the conventional manner to favor a righthanded operator. It will be recognized, of course, that such design is arbitrary and may be revised for a lefthanded operator without departing from the scope of the invention. It will be further noted that when an operator of the vehicle, to which this invention relates, sits upon the seat 71, all control mechanisms relating to the effective operation of the invention are within his reach. The operator actuates the accelerator pedal 76 or the brake pedal 59 with his right foot while operating the clutch pedal 34 with his left foot.

The clutch pedal 34 is normally held in a raised position by the clutch spring 36 (Figure 4), secured as above described. When the clutch pedal 34 is depressed, the power unit 18 is moved away from the adjacent edge of the dump box platform 16 by the clutch shaft 33, the clutch fork 32 and the link rod 30. As the power unit 18 moves along the lateral slide rails 26 and 27 away from said adjacent edge of the dump box platform 16, the driving sheave 37 which is secured to and rotatable with the power unit drive shaft 38 is accordingly moved toward the driven sheave 45. Thus, when the said clutch pedal is in the depressed position the center-line distance between the driving and driven sheaves is less than that required to produce sufficient engaging friction upon the belts 47. Therefore, even if the power unit 18 is running, the driving sheave 37 will not drive the driven sheave 45. When the clutch pedal 34 is released, the clutch spring 36 urges the power unit 18 back toward the said adjacent edge of the platform 16. The driving sheave 37 is thereby moved away from the driven sheave 45 so that the belts 47 are stretched firmly around the said sheaves, and power can again be transmitted by the sheaves and belts.

When the clutch pedal 34 is in the raised position, thereby creating an operable relationship between the driving sheaves 37 and the driven sheave 45 through the belts 47, the transmission input shaft 43, to which the driven sheave 45 is secured, is rotated and the transmission 41 is actuated. Depending upon the position of the gear shift assembly 65, the propeller shaft 54 may or may not be actuated. If the propeller shaft 54 is rotated, the differential 49, the axle segments and the drive wheels 11 and 12 are actuated, accordingly, in the conventional manner. The brake drum 57 (Figure 4), which is actuated by the brake pedal 59 through the brake linkage 58, may be operated independently of the remainder of the vehicle's mechanism in the conventional manner.

When the dump box 77 is in the horizontal position (Figure 1), that end of the bottom 83 adjacent to the dump box end wall 82 is held against the horizontal flange 97 of the dump box support angle 87 by the hook 95 of the dump box release mechanism 88 (Figure 5). Since the release hook arm 94 and release handle 92 are both secured to and rotatable with the release shaft 89, the release handle spring 96, which urges the release handle 92 away from the dump box end wall 92, urges the hook end 95 of the release hook arm 94 toward the dump box end wall 82, thereby tending to hold said hook 95 in engagement with the horizontal flange 97 of the support angle 87.

Because the tilt shaft 85 is preferably slightly rearward of a point midway between the dump box end wall 82 and the dump box front gate 81, the leading end of the dump box 77 will be moved downwardly by gravity for dumping as soon as the hook 95 is released by urging the release handle 92 toward the dump box end wall 82. The dump box 77 will tilt until the dump box bumpers 118 and 119 (Figures 3 and 7) engage the tread of the drive wheel tires 121 and 122, respectively. The pneumatic tires 121 and 122 yieldingly arrest the tilting motion of the dump box 77, without harmful effects upon either the box or its load.

The dump box front gate 81 may be released, as shown in Figure 3, by moving the gate release handle 113 from a horizontal position (Figure 1) to a vertical position (Figure 3). The gate hook release linkage 115, which connects the gate release handle 113 to the gate hook actuating shaft 111, rotates the shaft 111 so that the gate hooks 103 and 104 move downwardly away from engagement with the gate pins 105 and 106, respectively.

When the load has been removed from the dump box 77, the vehicle operator may manually return the dump box 77 to its horizontal position by grasping the dump box handles 116 and 117 and urging the rearward end of the dump box 77 downwardly, until the release hook arm 94 again engages the support angle horizontal flange 97. The hook 95 is preferably so shaped that it automatically slides over the free edge of the support angle horizontal flange 97 when the rearward end of the dump box 77 is urged downwardly.

When the dump box 77 is in the horizontal position, the front gate 81 bears substantially against the front end of the dump box. Therefore, the gate hooks 103 and 104 can be caused to engage the gate pins 105 and 106 by urging said hooks upwardly, which upward movement may be accomplished by moving the gate release handle 113 from the vertical position into a substantially horizontal position.

Although the above mentioned drawings and description apply to one particular preferred embodiment of the invention, it is not my intention, implied or otherwise, to eliminate other variations or modifications which do not depart from the scope of the invention unless specifically stated to the contrary in the hereinafter appended claim.

I claim:

In a dump truck a combination positively limiting the pivotal movement of the dump box and at the same time effecting the braking of the wheels of said truck comprising: a frame having a platform thereon and a pair of spaced, co-axial wheels secured thereto; a dump box having sidewalls, end walls and a bottom; a shaft transversely and rotatably secured to said bottom adjacent to one end wall for pivotably supporting said dump box upon said platform near one end thereof; a pair of horizontally, co-axial, L-shaped bumpers secured to said side walls in a plane perpendicular to said side walls and extending from the said side walls and intersecting the rotational planes of said wheels, said bumpers being spaced from the peripheries of said wheels when said dump box is in a horizontal position and said bumpers being engaged

by said wheels when said dump box is in a tilted position whereby pivotal movement of said dump box effecting such tilting is positively limited and braking of said wheels is effected.

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