Oct. 31, 1944. W. E. ROBERTS 2,361,654

BUILDER'S MATERIAL CONVEYANCE

Filed Nov. 21, 1941 3 Sheets-Sheet 1

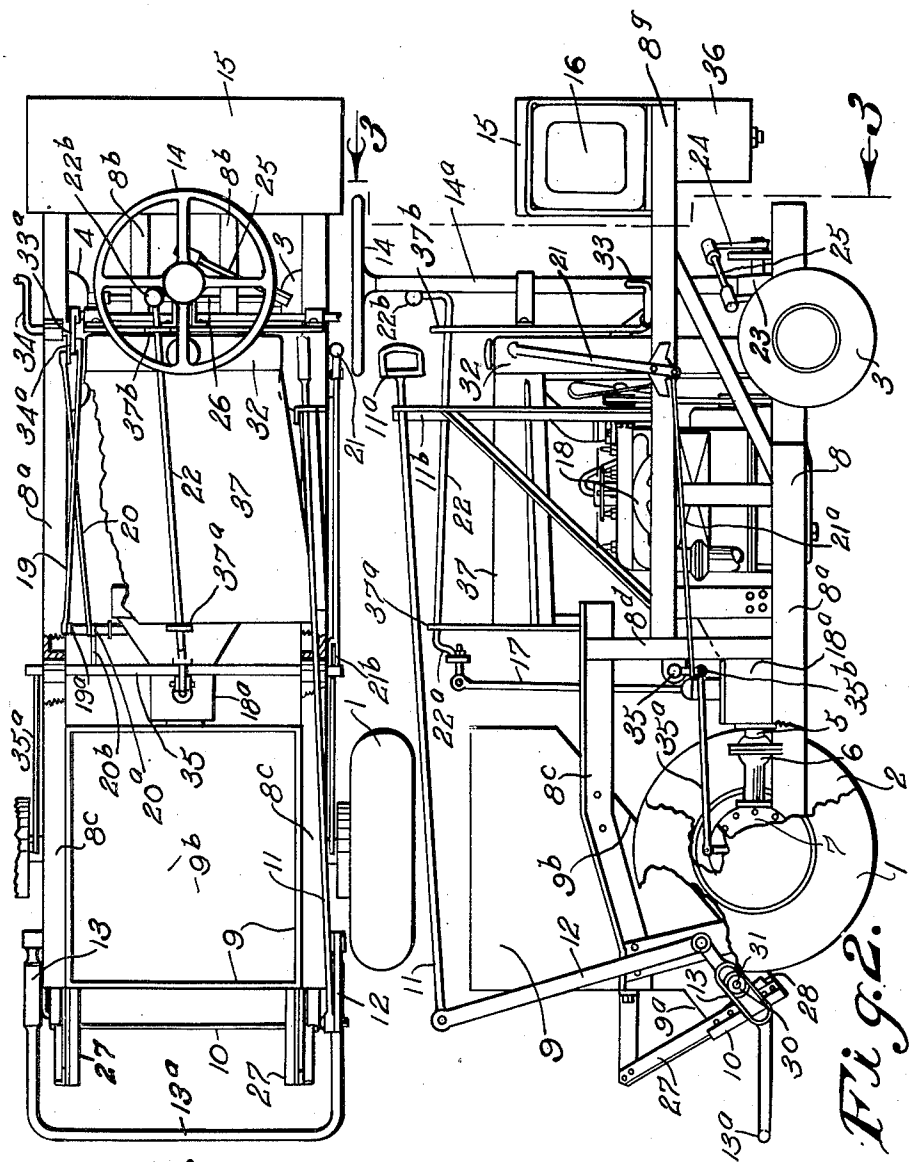


Fig. 1.

Fig. 2.

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BUILDER'S MATERIAL CONVEYANCE

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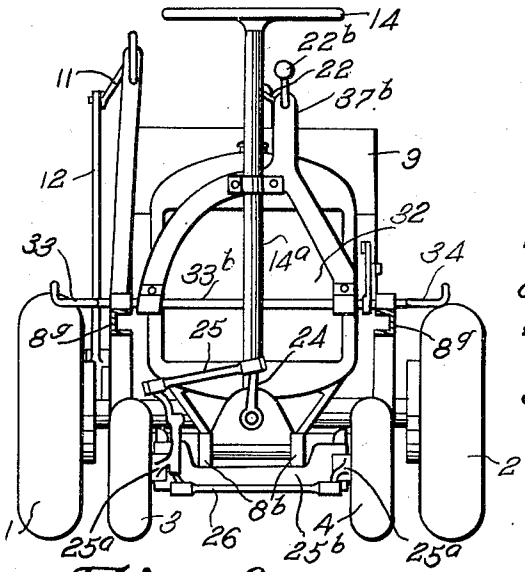


Fig. 3.

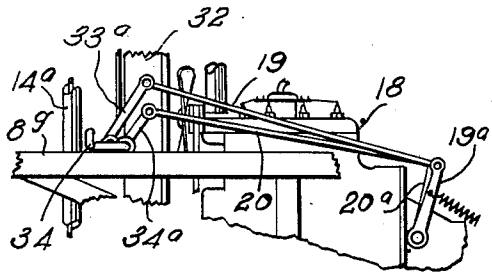


Fig. 4.

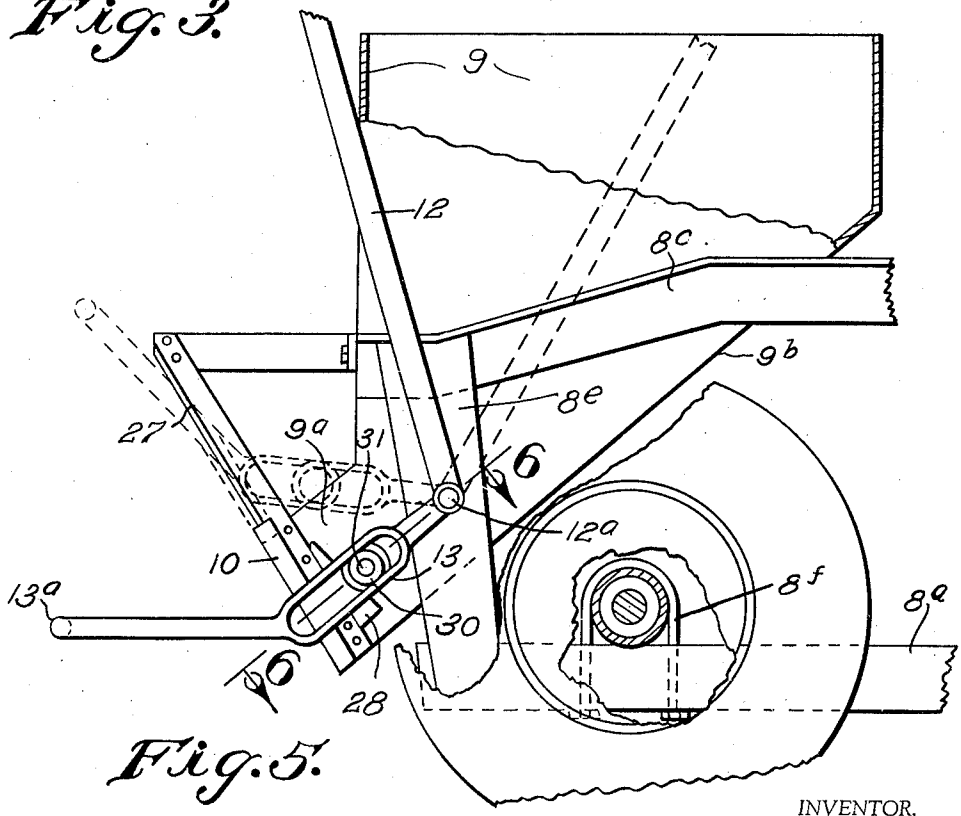


Fig. 5.

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BUILDER'S MATERIAL CONVEYANCE

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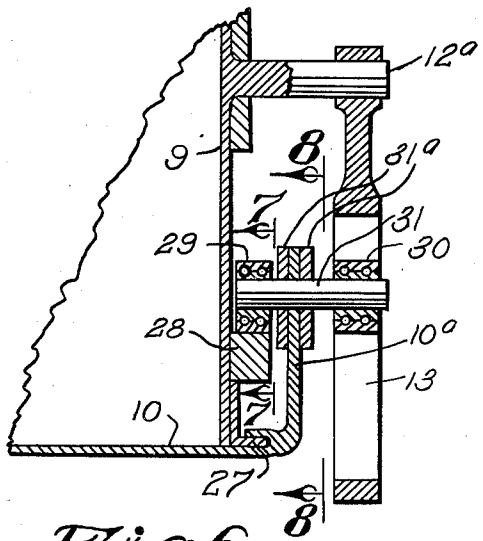


Fig. 6.

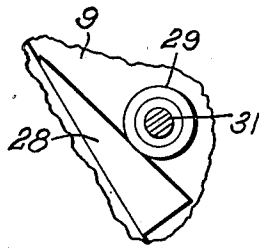


Fig. 7.

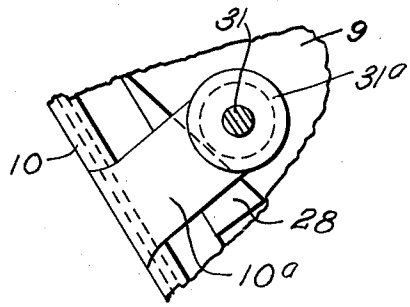


Fig. 8.

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2,361,654

UNITED STATES PATENT OFFICE

2,361,654

BUILDER'S MATERIAL CONVEYANCE

William E. Roberts, San Diego, Calif., assignor to Charles L. Hoskins, San Diego, Calif.

Application November 21, 1941, Serial No. 419,928

6 Claims. (Cl. 298—7)

My invention relates to a conveyance for conveying builders' material, particularly adapted for conveying sand, gravel, cement or the like from place to place, particularly adapted for large building construction where the material has to be transported a considerable distance and the principal object of my invention is improvements over Builders' material conveyance as set forth in the application of Herbert E. Moore and myself, which application resulted in Patent No. 2,222,086 issued November 19, 1940, and the principal objects of the improvements are:

First, to provide a conveyance of this class in which the hopper is stationary on the front of the vehicle and is provided with a gate for dumping material;

Second, to provide a conveyance of this class with a substantially direct connection of the engine with the drive shaft;

Third, to provide a novel dumping means for the hoppers;

Fourth, to provide a novel steering means for conveyances of this class;

Fifth, to provide a novel brake means for controlling the conveyance on ramps, inclines or similar places;

Sixth, to provide a novel frame for supporting the hopper;

Seventh, to provide a novel main frame structure;

Eighth, to provide a novel conveyance control means;

Ninth, to provide a conveyance of this class in which parts now in use for other purposes are readily adapted and applied to my completed structure;

Tenth, to provide a conveyance of this class which is easily controlled in substantially the same manner as an automobile;

Eleventh, to provide a novel conveyance of this class;

Twelfth, to provide a hopper gate of this class which may be operated from the rear by the driver or from the front in which case a desired quantity may be dumped; and

Thirteenth, to provide a conveyance of this class which is very simple and economical of construction, easy to operate, efficient in its action and which will not readily deteriorate or get out of order.

With these and other objects in view as will appear hereinafter, my invention consists of certain novel features of construction, combination and arrangement of parts and portions as will be hereinafter described in detail and particularly set forth in the appended claims, reference being had to the accompanying drawings and to the characters of reference thereon which form a part of this application in which:

Figure 1 is a fragmentary top or plan view of my builders' material conveyance showing portions broken away and in section to facilitate the illustration; Fig. 2 is a side elevational view thereof showing portions broken away and in section to facilitate the illustration; Fig. 3 is a rear end sectional view taken from the line 3—3 of Fig. 2; Fig. 4 is a fragmentary side elevational view of a portion of the power plant and control mechanism taken from the opposite sides from that of Fig. 2 of the drawings; Fig. 5 is an enlarged side elevational view of the hopper, the hopper support and hopper means control mechanism showing parts in section to facilitate the illustration; Fig. 6 is an enlarged fragmentary sectional view taken from the line 6—6 of Fig. 5 showing parts and portions in elevation to facilitate the illustration; Fig. 7 is a fragmentary sectional view taken from the line 7—7 of Fig. 6 and Fig. 8 is a fragmentary sectional view taken from the line 8—8 of Fig. 6.

Similar characters of reference refer to similar parts and portions throughout the several views of the drawings:

The traction wheels 1 and 2, steering wheels 3 and 4, engine drive shaft 5, universal joint 6, differential casing 7, supporting frame 8, hopper 9, hopper gate 10, hopper gate control rod 11, hopper gate control lever 12, crossheads 13, steering control wheel 14, seat 15, fuel tank 16, gear shift lever 17, power plant 18, control rods 19 and 20, brake lever 21, gear shift rod 22, steering gear 23, pitman arm 24, drag link 25, radius rod 26, hopper gate guides 27, gate wedge 28, rollers 29 and 30, roller shaft 31, engine radiator 32, clutch control lever 33, brake control lever 34, brake control shaft 35, balance weight 36 and engine hood 37 constitute the principal parts and portions of my builders' material conveyance.

The traction wheels 1 and 2 are the conventional type of automobile rear wheels provided with heavy pneumatic tires to facilitate their operation on ramps, floors, rough places, streets and the like. They are mounted on a conventional automobile rear axle with the conventional differential 7 and with the conventional drive shaft secured to the front portion of the differential in the conventional manner of con-

struction of automobile rear axles, differential and main shaft housing.

It will be here noted that the main bevel ring gear and differential casing are reversed so that they are on the opposite side of the driving pinion gear in the differential housing so that the wheels secured to the axles revolve in the reverse direction and it will also be noted that the axles and axle housings are shortened to provide a substantially narrow space between the traction wheels 1 and 2 so that the conveyance will pass through narrow doorways and other narrow places.

Positioned on the differential axle casing 7 near the brakes of the traction wheels 1 and 2 are main supporting frame members 8a, as shown best in Figs. 1, 2 and 5 of the drawings. These frame members 8a form the main support for the power plant consisting of the engine 18 which is any conventional engine with conventional transmissions and clutch 18a with the drive shaft 5 in connection therewith, all as shown best in Fig. 2 of the drawings and all of which are conventional.

Connected with the shaft 5 is a universal joint 6 which connects with the differential 7, it being noted that the shaft 5 and universal joint and shaft 6 are short and contracted so that there is only a short space between the engine, transmission and clutch and differential so that the power plant and traction wheels are in close contracted relation to each other, as shown best in Fig. 2 of the drawings.

The forward end of the frame members 8a are secured to the axle housing by means of U-bolts which extend over the axle housing and connect with the forward ends of the members 8a, as shown in Fig. 5. The ends of the members 8a are angled near the steering wheels 3 and 4 and rest on the front axle inwardly from said wheels some distance to permit the free action of the front wheels in steering, as shown best in Figs. 1 and 2 of the drawings.

The frame 8 is also provided with horizontal frame members 8c which are positioned above the frame members 8a and in spaced relation therewith. These frame members 8c, as shown best in Figs. 2 and 5 of the drawings are supported at their rear end portions by uprights 8d and these uprights 8d are welded intermediate the frame portions 8a and 8c, as shown best in Fig. 2 of the drawings.

As shown in Fig. 5 of the drawings, the front end of these horizontal frame members 8c are supported on uprights 8e which are welded in connection with the horizontal frame portions 8c and 8a. As shown in Fig. 5 of the drawings, the frame portions 8a are supported on the axle housing by means of the U-bolts 8f. The frame 8 is also provided with horizontal frame portions 8g which are positioned above the frame portions 8a in parallel spaced relation therewith, as shown best in Fig. 2 of the drawings.

Supported on the rear end of these frame members 8g is the fuel tank 16 and the seat 15 which is positioned thereover.

The horizontal frame portions 8c are provided to support the hopper 9. This hopper 9 is rigidly connected with the horizontal frame members 8c intermediate the same, as shown best in Fig. 1 of the drawings. This hopper 9 is provided with a chute portion 9a at its lower side portion and this chute 9a is in open communicative relation with the hopper gate 10 which is slidably supported on the hopper gate guides 27, as indicated by dash lines in Fig. 5 of the drawings. As shown in detail in Fig. 6 of the drawings, the hopper gate 10, at its opposite side fits over the angularly extending portions of the hopper gate guides 27. Connected with the hopper gate 10, at each opposite side edge is a control arm portion 10a which is rigidly connected with the roller shaft 31 by means of the washers 31a. This roller shaft 31 extends from opposite sides of the control arm 10a of the hopper gate 10 and supported on opposite ends of this roller shaft 31 are the roller bearings 29 and 30. The roller bearings 29, as shown in Fig. 7 is engageable with the tapered gate wedge 28. This roller 29 tends to force the lower edge of the hopper gate 10 inwardly as it progresses downwardly on the inclined surface of the gate wedge 26. The roller 30 is positioned in the crosshead 13 and is actuated by means of the hopper gate control lever 12 which is pivotally mounted on the journal member 12a, as shown best in Figs. 5 and 6 of the drawings. As shown by dash lines in Fig. 5 of the drawings, the hopper gate 10 is shifted away from the open side of the chute 9a when the hopper gate control lever 12 is shifted backwardly into the dash line position carrying with it the roller 30 which is on the roller shaft 31 in rigid connected relation with the control arm 10a of the hopper gate 10.

It will be noted that this hopper gate 10 is provided with a control arm 10a on each side edge thereof, as shown in Fig. 1 of the drawings. Each control arm 10a is connected with a roller shaft 31, together with rollers 29 and 30 and the gate wedge 28.

Interconnecting the crossheads 13 at opposite side edges of the hopper gate 10 is the bar 13a which serves as a handle for raising the hopper gate 10 from the front of the conveyance and also is arranged to synchronize the operation of the crossheads 13 when actuated by the hopper gate control lever 12. As indicated by dash lines in Fig. 5 of the drawings, the rollers 30 shift back and forth within the crossheads 13 as the hopper gate control lever 12 is actuated by the hopper gate control rod 11 which is a manual control rod pivotally connected to the hopper gate control lever 12 at its upper end, as shown best in Fig. 2 of the drawings. The opposite end of this hopper gate control rod 11 is reciprocally mounted in a bracket 11b and is provided with a handle 11a arranged to be grasped by the operator when it is desired to relieve the hopper 9 of the material carried therein. It will be noted that the hopper 9 is provided with an inclined lower side 9b upon which material gravitates toward the chute 9a of said hopper 9.

The steering control wheel 14 is a conventional automobile steering control wheel and is in connection with a conventional steering column 14a with which is connected the conventional steering gear 23 having a conventional pitman arm 24 secured on the operating shaft thereof, all as shown best in Figs. 2 and 3 of the drawings.

Pivotally connected with this pitman arm 24 is a drag link 25 which is connected with one of the steering knuckles 25a which are conventional automobile parts. Interconnecting the steering knuckles 25a is the radius rod 26 which is arranged to synchronize the operation of the steering wheels 3 and 4 in connection with the steering knuckles 25a. It will be noted that these steering knuckles 25a are connected with opposite ends of a conventional automobile axle which has been shortened. As shown in Fig. 2 of the drawings, this steering control wheel 14, together

with the vertical steering column 14a is positioned forwardly of the seat 15 and rearwardly of the engine radiator 32.

This engine radiator 32 is a substantial honeycomb radiator having water therein for cooling the engine 18.

Connected with this engine radiator 32 is one end of the engine hood 37 and this engine hood 37 extends forwardly from the engine radiator 32 and is supported on the rear end of the horizontal frame members 8c.

In connection with the engine transmission 18a is the gear shift lever 17. Pivotally connected with the upper end of this gear shift lever 17 is the gear shift rod 22 which extends over the engine hood 37 and is reciprocally mounted in brackets 37a and 37b, as shown best in Figs. 1 and 2 of the drawings. The rear end of this gear shift rod 22 is provided with an angularly and upwardly extending portion having a knob 22b thereon which may be grasped by the operator. A sideways motion of the gear shift lever 17 is accomplished by tilting the gear shift knob 22b to the right or the left which revolves the gear shift rod 22 which is provided with an angularly extending portion 22a at its forward end which acts as a crank for laterally shifting the gear shift lever 17. The forwardly and backwardly shifting operations of the gear shift lever 17 are accomplished by reciprocation of the gear shift rod 22 in the brackets 37a and 37b.

Connected with the engine 18 are the conventional clutch and brake levers of the conventional type used in connection with automobile engines. Connected with the clutch levers 19a is the control rod 19. This control rod 19 is connected at its opposite end with the lever 33a which is actuated in connection with the shaft 33b of the clutch control lever 33. This clutch control lever 33 is operated by the left foot of the operator in substantially the same relation as is the operation of the conventional automobile clutch. Connected with the brake lever 20a is the control rod 20. This control rod 20 is pivotally connected at its opposite end with the lever 34a actuated in connection with the brake control lever 34. This brake control lever 34 is operated by the right foot of the operator in substantially the conventional relation as in the operation of an automobile.

Connected with the brake lever 20a is a link 20b which is arranged to revolve the brake control shaft 35. This brake control shaft 35 is provided with conventional bell crank levers for operating the brake rods 35a as shown best in Fig. 2 of the drawings. These conventional brake control rods 35a are connected with the internal expanding brakes in connection with the traction wheels 1 and 2. As shown in Fig. 2 of the drawings, the brake lever is pivotally mounted on the frame member 8g and is an emergency brake lever operated by the left hand of the operator. Connected with this brake lever 21 is a rod 21a. The opposite end of this rod 21a is connected with the bell crank 35b of the brake control shaft 35. As shown in Fig. 1 of the drawings, this brake rod 21a is provided with a slotted portion 21b at its connection with the bell crank 35b providing a slidable relation of the bellcrank 35b within the slotted portion 21b of the rod 21.

The operation of my conveyance for builders' materials is substantially as follows: The engine 18 is first started and the operator then depresses the clutch control lever 33 and shifts the gear shift rod 22 forcing the gear shift lever 17 into the desired position selecting the desired transmission gear. The operator then releases the clutch control lever 33 and the power is transmitted to the traction wheels 1 and 2 which moves the entire conveyance.

It will be here noted that the transmission 18a is provided with three speeds forward and one speed in reverse providing variable speeds and gears for various operating conditions.

When it is desired to stop my conveyance, the brake control lever 34 is pressed downwardly by the right foot of the operator actuating the lever 34a together with the control rod 20 which forces the conventional brake lever 20a forwardly carrying with it the link 20b which rotates the brake control shaft 35 and the brake control shaft 35 operates the brake rods 35a applying the brakes in connection with the traction wheels 1 and 2. If the brake lever 21 is forced forwardly, the rod 21a acts on the bell crank 35b rotating the brake control shaft 35 and applying the brakes by means of the brake rods 35a. This brake lever 21 may be set to hold the brakes in applied position for holding my conveyance on an incline or in any desired stationary position. When the hopper 9 is full of material and it is desired to empty the material from the hopper 9, the handle 11a of the hopper gate control rod 11 is grasped and pulled backwardly which shifts the hopper gate control lever 12 to the dash line position, as shown in Fig. 5 of the drawings, carrying with it the hopper gate 10 and permitting the material to pass outwardly through the chute 9a of the hopper 9. When closing the hopper gate 10, the hopper gate control rod 11 is forced forwardly returning the hopper gate control lever to the solid line position and carrying the roller 21 downwardly on the inclined surface of the gate wedge 28 which forces the hopper gate 10 into closed tight fitting relation with the open side of the chute 9a and this roller 29 on the gate wedge 28 also tends to lock the hopper gate 10 in the closed position, as shown by solid lines in Fig. 5 of the drawings.

As hereinbefore described opposite edges of this hopper gate 10 are actuated by identical mechanism which is synchronized by the bar 13a, as shown in Fig. 1 of the drawings. This bar 13a is rigidly connected with the hopper gate control lever 12 and rigidly connects the crosshead 13 at opposite sides of the hopper gate 10.

The steering wheels 3 and 4 are secured on the steering knuckles 25a and are pivotally mounted in relation with the supporting axle 25b. The pivotal relation of the steering knuckles 25a is synchronized by the radius rods 26. The steering control wheel 14 is manually operated by the person driving my conveyance and the revoluble operation of this steering control 14 causes the steering gear 23 to shift the pitman arm 24 which operates the drag link 25 in connection with one of the steering knuckles 25a. Therefore this entire steering mechanism operates substantially the same as the conventional steering gear of an automobile with the exceptions that it turns the rear wheels rather than the front wheels. The steering control wheel 14, however, is revolved in a corresponding direction with the operation of an automobile steering wheel for a right or left hand turn.

Though I have shown and described a particular construction, combination and arrangement of parts and portions, I do not wish to be limited to this particular construction, combination and arrangement, but desire to include in the scope

of my invention the construction, combination and arrangement substantially as set forth in the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a conveyance of the class described, the combination of, a hopper provided with a chute and gate means in its lower side, said chute and gate means including guides, a slidable gate member mounted on said guides, a lever for shifting said gate on said guides, crossheads in connection with said lever and rollers engageable with said crossheads and connected with said gate.

2. In a conveyance of the class described, the combination of, a hopper provided with a chute and gate means in its lower side, said chute and gate means including guides, a slidable gate member mounted on said guides, a lever for shifting said gate on said guides, crossheads in connection with said lever and rollers engageable with said crossheads and connected with said gate, and a handle means in connection with said crossheads and extending from said hopper for raising and lowering said gate.

3. In a conveyance of the class described, the combination of, a hopper provided with a chute and gate means in its lower side, said chute and gate means including guides, a slidable gate member mounted on said guides, a lever for shifting said gate on said guides, crossheads in connection with said lever and rollers engageable with said crossheads and connected with said gate, a handle means in connection with said crossheads and extending from said hopper for raising and lowering said gate, and a handle controlled rod extending from said lever in opposed relation to said handle.

4. In a conveyance of the class described, the combination with a vehicle, of a hopper supporting frame secured on the front end of said vehicle, a hopper rigidly secured on the forward end of said frame provided with a chute and gate means at its lower front side, said chute and gate means including guides, a slidable gate member mounted on said guides, a lever for shifting said gate on said guides, crossheads in connection with said lever, and rollers engageable with said crossheads and connected with said gate.

5. In a conveyance of the class described, the combination with a vehicle, of a hopper supporting frame secured on the front end of said vehicle, a hopper rigidly secured on the forward end of said frame provided with a chute and gate means at its lower front side, said chute and gate means including guides, a slidable gate member mounted on said guides, a lever for shifting said gate on said guides, crossheads in connection with said lever, rollers engageable with said crossheads and connected with said gate, and a handle means in connection with said crossheads and extending forwardly of said hopper for raising and lowering said gate.

6. In a conveyance of the class described, the combination with a vehicle, of a hopper supporting frame secured on the front end of said vehicle, a hopper rigidly secured on the forward end of said frame provided with a chute and gate means at its lower front side, said chute and gate means including guides, a slidable gate member mounted on said guides, a lever for shifting said gate on said guides, crossheads in connection with said lever, rollers engageable with said crossheads and connected with said gate, a handle means in connection with said crossheads and extending forwardly of said hopper for raising and lowering said gate, and a handle controlled rod extending backwardly from said lever along said frame in opposed relation to said handle.

WILLIAM E. ROBERTS.