Dec. 18, 1956 G. H. SANDERSON 2,774,602

MATERIAL SPREADING APPARATUS

Filed Jan. 10, 1952 3 Sheets-Sheet 1

FIG.1.

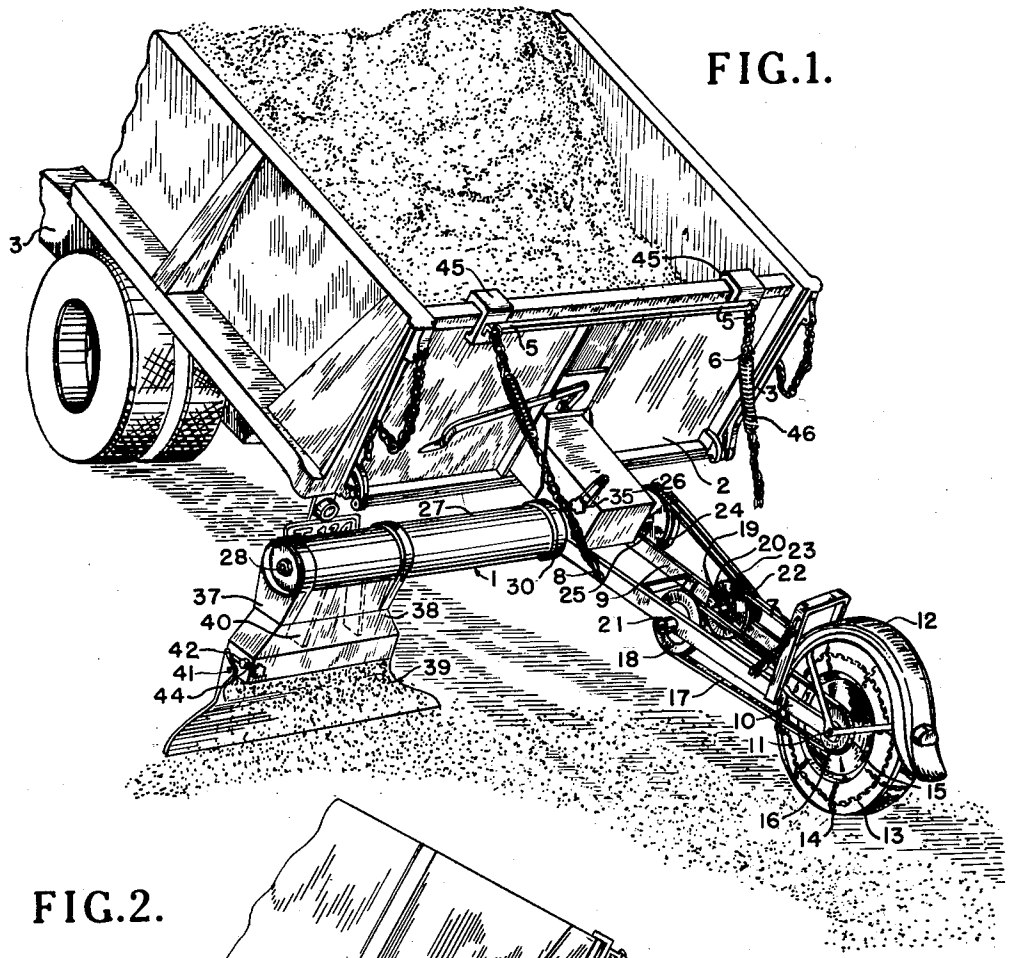
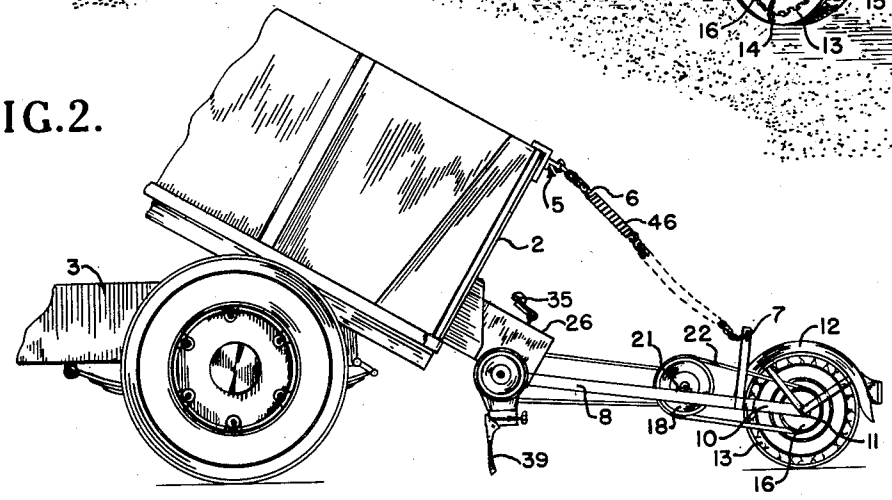


FIG.2.



INVENTOR.

George H. Sanderson

Dec. 18, 1956 G. H. SANDERSON 2,774,602

MATERIAL SPREADING APPARATUS

Filed Jan. 10, 1952 3 Sheets-Sheet 2

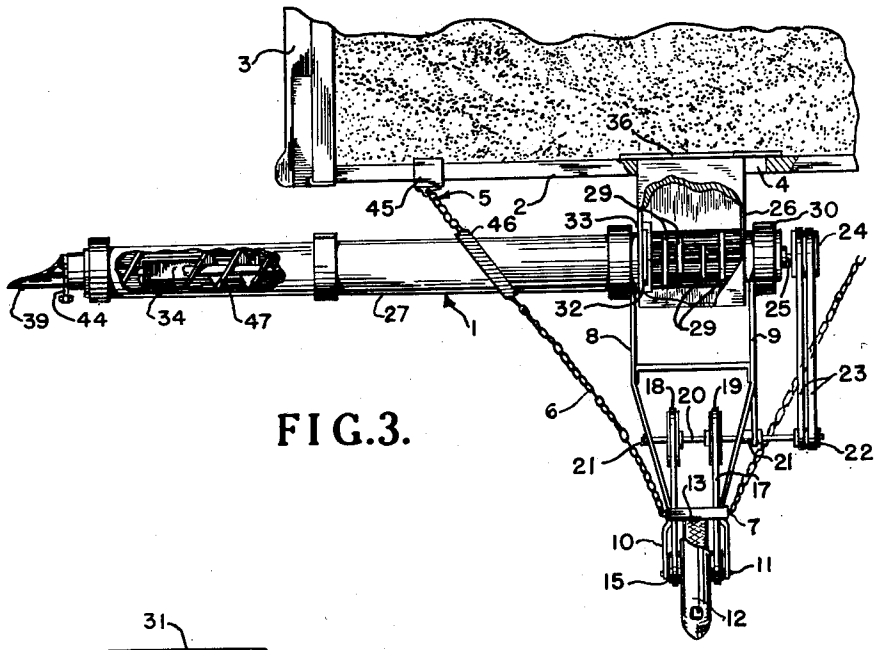


FIG.3.

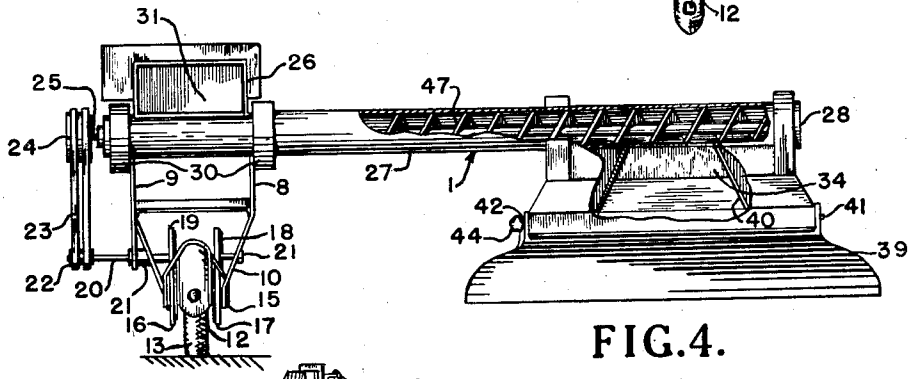


FIG.4.

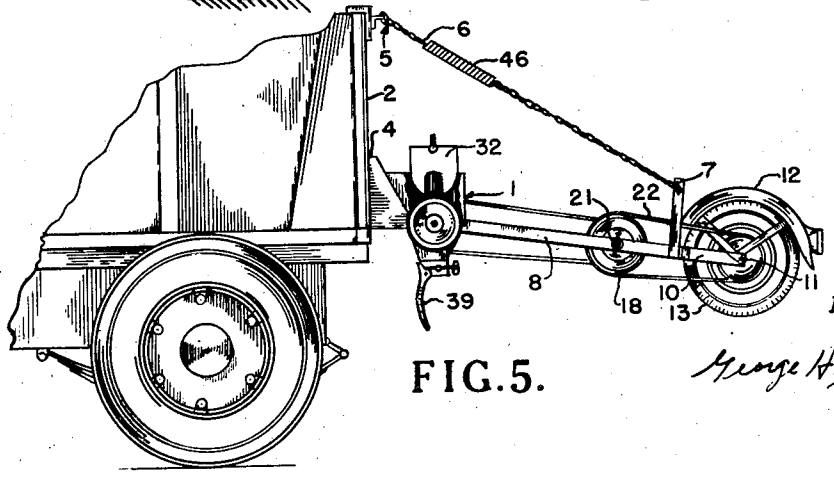


FIG.5.

INVENTOR.

George H. Sanderson

Dec. 18, 1956 G. H. SANDERSON 2,774,602

MATERIAL SPREADING APPARATUS

Filed Jan. 10, 1952 3 Sheets-Sheet 3

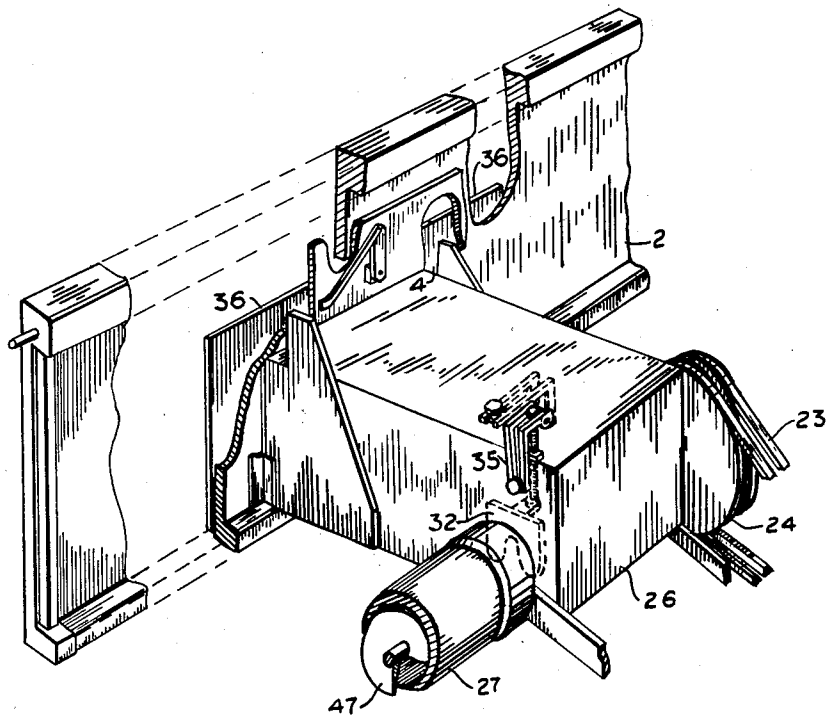


FIG. 6

INVENTOR.

George H. Sanderson

United States Patent Office 2,774,602 Patented Dec. 18, 1956

2,774,602

MATERIAL SPREADING APPARATUS

George H. Sanderson, Ada, Ohio

Application January 10, 1952, Serial No. 265,851

6 Claims. (Cl. 275—2)

This invention relates to a spreading device for granular materials and more particularly to a spreading assembly adapted for mounting on the tail gate of a dump truck bed. The device is a self-driven assembly which is well adapted for use in spreading granular materials such, for example, as rock salt, gravel or calcium chloride, over the surface of an ice or snow laden highway.

Prior spreading devices of the type adapted for use with dump trucks and adapted to be fed through the tail gate assembly thereof, have had the inherent disadvantage that the truck used to spread the material over the center of the highway must drive somewhat in the center of the road. Such an arrangement is hazardous not only to traffic following the truck, in that it inhibits the visibility of the driver thereof but also is a hazard to oncoming traffic which must pull off to the side of the road upon meeting the truck.

The blower type spreading devices of the prior art while adaptable to spread material to the center of the highway present some disadvantages in that they are generally extremely heavy and require the attendance of an operator to insure proper operation thereof. Additionally this type device requires the inclusion therein of a screen arrangement to prevent damage to the blower of the apparatus by over-sized material particles. The incorporation of such a screen arrangement necessitates provision for screen cleaning in the event they become clogged up. In this respect the usage of such apparatus presents the disadvantage that material spreading operation must be discontinued while the screens are being cleaned.

The present invention is well adapted for use with a dump truck bed of the type having an auxiliary opening in the gate thereof. The instant device is advantageously arranged for mounting on the truck tail gate without the alteration thereof. It is readily removable to permit intermittent duty cycle operation of the truck in the event that weather or other operational demands do not warrant a continuous setup thereof. It is arranged to be fed from the dump bed through the conventional gate opening without the necessity of opening the gate assembly proper. Additionally, it provides an arrangement for conveying the thus received material from the gate opening at the lower center portion of the tail gate to a position outboard of the truck bed in adjacency with and immediately above the center of the roadway.

A preferred embodiment of the invention includes apparatus for driving the conveyor during truck movement in a relationship whereby it is adapted to automatically discontinue the spreading operation as the truck decelerates to a stop. The arrangement thereof is such as to provide an even distribution of the granular material over the road bed surface during truck travel. Additionally, it insures against the disadvantageous unloading of an excessive quantity of material upon discontinuance of the spreading operation or when truck operation is interrupted or stopped. The drive arrangement incorporated therein, additionally presents the advantage that the material delivered therefrom is spread at a rate which increases in direct proportion to the rate of travel of the vehicle. It will thus be obvious that with the spreading device of the present invention, material spreading may be accomplished more uniformly and at a higher rate than with spreading devices heretofore or now in general use.

One object of the present invention resides in the efficient accomplishment of rock salt or similar granular material spreading from a motor truck in which uniform material delivery to the road surface is accomplished at all speeds of vehicular travel.

Another object resides in the provision of quantity control and distribution control in the spreading of granular material over a highway surface.

Another object of the instant invention resides in the accomplishment of material spreading over an increased area of the road bed, which area extends to the center of the highway.

An additional object of this invention lies in the provision of a truck-drawn spreading device which is adapted to spread material at the center of the highway while the truck is enabled to maintain its course of travel within the proper lane of travel.

It is also an object of this invention to provide a self-actuated spreading device of a character adapted for mounting on the end gate of a truck dump bed and which is readily adapted for removal therefrom.

Another object resides in the provision of a spreading device for use with a truck dump bed which is adapted to spread material when the dump bed is raised and which is adapted to discontinue the spreading operation when the dump bed is lowered to its normal travel position.

In correlation with the above object relating to the spreading of material only when the dump bed is raised to permit material flow from the gate opening thereto, it is a further object of this invention to provide a device in which the flow of materials to the area to be covered is in direct proportion to the rate of travel of the truck.

It is a further object of this invention to provide a rock salt spreading device adapted for mounting on the tail gate of a dump truck which provides uniform material spreading over a road bed at any rate of truck travel and which provides many advantages and overcomes all of the hereinabove stated disadvantages of the spreading devices hereinbefore or now in general use.

Additional objects of this invention will be obvious to those skilled in the art or will become apparent from the following description and the accompanying drawings wherein:

Fig. 1 is a perspective view of the spreader device as mounted on the rear tail gate panel of a dump truck;

Fig. 2 is an elevational view of the spreader device, with the wheel thereof in engagement with the road bed;

Fig. 3 is a partially fragmentary plan view of the spreader assembly, showing the appearance thereof from a position at the rear of the truck with certain parts broken away;

Fig. 4 is a fragmentary view of the spreader assembly taken from a position at the front of the feeder box;

Fig. 5 is a view similar to Fig. 2, but differing therefrom in that the device is in a non-operative condition with the wheel thereof out of engagement with the road surface; and

Fig. 6 is a fragmentary perspective view with parts broken away and in section showing details of the manner of installation of the hopper box through the opening in the central portion of the tail gate.

Referring now to Figs. 1, 2, 5 and 6 of the drawings the spreader assembly is shown generally at 1 and is adapted for mounting on the tail gate panel 2 of a dump truck 3. It is arranged for mounting through the gate opening, not shown but located in the area at 4 of the tail gate and is provided with a suspension assembly 5 which is adapted to be dropped over the upper portion of the truck tail gate. This assembly is in the

general form of a U-frame support and is arranged for suspension from a spring and chain arrangement 6 to an arm link 7 which extends from the frame rail members 8 and 9. The frame rail members 8 and 9 are arranged to provide at their lower end a yoke 10 for the reception of an axle shaft 11 of the wheel and fender assembly 12 which is mounted thereon in a conventional manner by suitable fork ends. The shaft 11 carries a rubber-tired wheel 13 having chains 14 thereon, Fig. 1, the hub 15 of which has affixed thereto a driving pulley 16, or as in the case of a preferred embodiment of the invention a pair of similarly arranged driving pulleys, Figs. 3 and 4. These pulleys 16 are connected by belts 17 to a pair of speed reduction pulleys 18 and 19, mounted on the shaft 20 for supported rotation by bearings 21 of the frame support rails 8 and 9.

The extension of the shaft 20 is provided with a dual V-belt pulley 22 arranged in driving relation through the belts 23 to drive a pulley 24 which is mounted on the extension of shaft 25. The shaft 25 extends from the pulley 24 to the housing of the hopper box 26 and through a conveyor tube element 27 to a suitable bearing at 28. The portion of this shaft enclosed within the housing of the box 26 is provided with projections 29 which provide a mixing type conveyor feed. The portion of this shaft which extends into the conveyor element 27 comprises an integral spiral screw flight 47 which provides an auger type conveyor arrangement for material movement from the box 26 to the outer end thereof. The box 26 is provided with bearings 30 supported by the frame rail members 8 and 9 and is open at 31 as shown in Fig. 4 in a manner whereby it is adapted to receive material from the opening in the truck tail gate and to admit this material to the mixer flight. The box 26 is additionally provided with a gate assembly 32 which is slideably received therein for vertical movement across the opening 33 between the hopper box 26 and the tubular conveyor element 27. This gate functions to control the quantity of material to be fed from the box, through the conveyor to the discharge opening 34. The gate element, Fig. 6, is provided with a hand knob and folding crank assembly 35 arranged to adjustably regulate the positioning of the sliding gate valve 32.

The housing assembly includes a plate flange 36, Fig. 6, at the open end thereof for attachment to the truck tail gate. The conveyor outlet assembly 37 includes a baffle housing 38 and a deflector plate 39. The baffle housing is of generally cylindrical configuration at the top thereof and is adapted for concentric mounting over the outer end of the conveyor cylinder. The lower portion is an elongated rectangular tube arrangement having a plurality of baffle elements 40 mounted therein in a manner to deflect material flow from the outlet for distribution at the outer end thereof by the deflector plate.

The deflector plate 39 is pivotally mounted on the lower body of the baffle housing by a pin arrangement 41. Suitable stop surfaces may be provided at 42 if it be desired to limit forward flow of material.

If it be desired to produce greater material coverage, a screw adjustment as for example that shown at 42 may be provided on the stop pin 44 to raise the discharge edge of the plate and raise the effective flow distance through which the material is subjected to windage effects.

The chain supports of the suspension assembly 5, comprise a pair of U-shaped screw-clamps 45 for attachment over the truck end gate. The tension type coil springs 46, which are in interconnected relationship therewith and with the chain arrangements 6, provide for absorption of shock forces encountered by the wheel and transmitted therefrom through the frame members to the conveyor.

In the operation of the illustrated embodiment of this invention the tail gate opening of the truck is opened to permit reception therein of the flange elements of the mixer box. The spring and chain-type suspension assembly is dropped over and clamped over the upper edge of the tail gate to yieldably support the assembly therefrom.

In the normal horizontal position of the dump bed with respect to the truck, the spreader assembly is in a raised position, the tire thereof being out of engagement with the road surface and the assembly being in an inoperable condition. When it is desired to spread material with the device, the dump bed is raised to allow gravity flow of material into the spreader and to permit engagement of the wheel 13 as the truck moves along the roadway. This action functions to impart rotation to the wheel and provides drive for the mixer and the spiral flight conveyors in a manner to effect discharge of material to the baffles at the spreader outlet. The rate of flow through the conveyors, of the material to be spread by the device is controlled merely by increasing or decreasing the speed of operation of the truck over the road. This is obvious since increased truck speed provides an increase in the rate of rotation of the tire of the spreader drive wheel and a resultant increase in the conveyor rotation rate. The quantity of material to be fed from the hopper box to the screw flight conveyor is controllable by movement of the gate valve at the opening between the hopper box and the conveyor tube. After adjustment of the gate to provide the desired quantity of material flow the gate may be fixed at the desired setting by locking action of the hand knob assembly.

At such time as it may be desired to discontinue the spreading operation, or in the case of intermittent spreading cycles when passing over partially clear areas having only spots of ice or snow, the action may be accomplished by the driver of the truck who merely lowers the truck bed to a more nearly horizontal position and simultaneously therewith provides disengagement of the spreader wheel from the road surface.

Having thus described a preferred embodiment of this invention, what is desired to be claimed by Letters Patent of the United States is:

1. A rock salt spreading device of a type adapted for ready mounting and removal from the tail gate of a dump truck at a gated aperture thereof wherein said device when so mounted is rendered operable upon movement of the dump bed to an elevated position thereby to spread material over the surface of a highway, said device comprising a hopper, mounting means on said hopper comprising a plurality of laterally extending flanges adapted for passage through the gated aperture of the said tail gate and engageable with the inner walls of the tail gate thereby attaching the hopper to the truck and constructed and arranged to be maintained therein by lowering of the aperture gate of the truck tail gate, agitating means in said hopper for moving material entering the hopper at said mounting means to an outlet opening at one end of said hopper, an auger type conveyor flight and tube extending laterally from said hopper at the outlet thereof and communicating therewith, a housing for the discharge end of said conveyor flight, said conveyor tube having a single elongated slotted outlet at the end remote from said hopper, a vertically slideable material control gate mounted on the hopper for movement into the hopper outlet at the inlet to said conveyor tube, means for adjustably varying the control gate setting for material flow to said conveyor tube, a depending discharge chute at the outlet end of said housing and pivotally mounted about the discharge end of said conveyor tube, a deflector element pivotally mounted at the lower end of said chute and extending downward substantially in alignment with the front wall of the chute, and driving means including a wheel mounted on said device and adapted for engagement with the road surface upon elevation of the dump bed, said

driving means including power transfer for simultaneously driving the material agitating means and the conveyor means with rotation of said wheel as the truck moves along the road, whereby said driving means functions to vary the quantity of flow in proportion to the rate of travel of the vehicle.

2. The structure of claim 1 further characterized by the inclusion of suspension means for the driving means attachable to the upper portion of the tail gate and adapted to provide disengagement of the driving means from the road surface upon lowering of the truck dump bed to a normal horizontal position.

3. A material spreading device for mounting on a dump truck tail gate of a character incorporating a centrally disposed gated aperture comprising, mounting means including a plurality of flange members disposed to engage the interior of said tail gate and extend exteriorly therethrough, said means being configured for disengageable retention by the tail gate at said aperture, a material hopper on said mounting means having an inlet therethrough and an outlet opening remote therefrom, agitating means in said hopper for conveying material received therein to said outlet, a conveyor tube assembly connected to said hopper outlet and comprising a housing and a screw flight disposed therein, said housing having a single discharge outlet remote from the end at said hopper, driving means connected to the conveyor screw flight, and means at the conveyor outlet for spreading material discharged by the conveyor, said means comprising a depending discharge chute and a pivotally mounted deflecting plate at the opening of said chute remote from the conveyor.

4. In a granular material spreading device of the character described the combination of, means for adapting the device for suspension from the tail gate of a dump truck of a character having a centrally disposed gated opening thereon, mounting means cooperatively engageable with the interior of said tail gate and through said opening whereby the gate for said opening is maintained open thereby, an enclosing material hopper inletting only through said mounting means, agitating means in said hopper, for moving material to the outlet of said hopper, distributing means at the outlet of said hopper comprising a screw-flight conveyor and driven from the agitating means for providing translated material discharge remote from said hopper, drive means for said agitator and conveyor including means engageable with the road bed for actuation initiation upon predetermined elevation of the dump bed, thereby to provide gravity feed for the hopper, and to drive in correlation with travel movement of the truck, said suspension means being connected to support said drive means for providing disengagement thereof with the road bed when the dump bed

is in the normal horizontal position thereof and discharge means at the outer end of said conveyor which comprises a pivotally mounted discharge chute disposed to depend from said conveyor.

5. A material spreading device of a type adapted for mounting on the tail gate of a dump truck and arranged to receive material therein from an opening in the tail gate assembly which comprises, a material hopper box, flange members extending laterally from said box and engageable with the inside of said tail gate to provide a mounting for said device, a conveyor tube assembly attached thereto at the outlet of the box, a material outlet in the conveyor assembly at a position remote from the hopper box, a conveyor agitator in said hopper box, a screw-flight conveyor in the conveyor tube assembly, distributing means at the discharge outlet of the conveyor, said distributing means comprising a pivotally mounted discharge chute having a plurality of mutually spaced guide vanes disposed therein and extending downward from said conveyor discharge to the outlet of said chute, and a pivotally mounted deflector extending downwardly and outwardly from said chute and substantially in alignment with the forward wall thereof, means carried by said chute for controlling the deflection angle of material discharged from said chute, and drive means for said agitator and conveyor, said driving means including a wheel carried by the spreading device and adapted for engagement with the road surface to render the spreader device operable and adapted upon disengagement of said wheel from said road surface to render the spreader assembly inoperative.

6. The structure of claim 5 further characterized by the inclusion of an adjustable gate member interposed in the hopper box outlet and at the inlet end of the conveyor tube assembly for controlling the amount of material flow from the hopper box through the conveyor tube to the tube outlet and means including a folding crank for maintaining a fixed position of the gate member.

References Cited in the file of this patent

UNITED STATES PATENTS

758,693	Reynolds	May 3, 1904
880,908	Niebel	Mar. 3, 1908
1,623,743	McGuiness	Apr. 5, 1927
1,838,631	Naber et al.	Dec. 29, 1931
2,282,205	Olsen	May 5, 1942
2,350,476	Richey	June 6, 1944
2,360,870	Grattan	Oct. 24, 1944
2,421,211	Lutz	May 27, 1947
2,430,020	Johnson	Nov. 4, 1947
2,504,786	Bailey	Apr. 18, 1950
2,529,889	Sullivan	Nov. 4, 1950