DUMPING RATE CONTROLLING TAILGATE FOR A DUMP VEHICLE

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References Cited

UNITED STATES PATENTS

Abstract

A tailgate for use on a dumping vehicle for controlling the rate at which material is dumped from the truck having a plurality of material engaging members which discharge material over the tailgate at a desired rate by controlling the rate of movement of the material engaging means.

1 Claim, 7 Drawing Figures
DUMPING RATE CONTROLLING TAILGATE FOR A DUMP VEHICLE

BACKGROUND OF THE INVENTION

The present invention relates to tailgates for use on dump-type vehicles and more particularly, to a new and improved tailgate which controls the rate of discharge of material from the vehicle.

DESCRIPTION OF THE PRIOR ART

In the forming of surfaces such as asphalt highways, driveways, parking lots, and the like, it has been a general practice to employ road finishing machines. These finishing machines are provided with a plurality of wheels so that they can move across a roadbed to form a surface thereon. A hopper is positioned on the front of the machine to hold heated particulate asphalt material which is used in forming the road surface. This material is conveyed from the hopper to the rear of the machine and is discharged onto the roadbed where a screed ramps or vibrates the material to form a hard road surface. In this regard, it is important that the asphalt material be evenly distributed over the roadbed because irregularities in the distribution of the material results in surface irregularities in the road. It is important that a highway surface be free from irregularities to provide a soft and comfortable ride thereon and, as a consequence, various government-agency regulations limit the irregularities which can be present in a new road surface.

To reduce these irregularities, finishing machines are provided with various devices which automatically maintain the finishing machine in the correct position with respect to the roadbed and regulate the amount of road surface material deposited thereon. Although such devices have served the purpose, they have not proved entirely satisfactory under all conditions of service for the reason that considerable difficulty has been experienced during the loading of the finishing machine's hopper with material. This is due to the fact that when large amounts of material are dumped into the hopper, the weight distribution and center of gravity of the finishing machine can be drastically altered, which will cock or tilt the finishing machine and cause bumps or depressions in the road surface. During dumping, the material can also be unevenly distributed in the hopper, which is undesirable because it in turn causes uneven distribution onto the road surface. Direct dumping into the hopper is especially undesirable due to the fact that when a dump vehicle is placed adjacent the hopper and is tilted, the hot asphalt material will tend to cling together and fall from the vehicle in large amounts at one time. It has also been discovered that when a vehicle is dumped directly into the hopper that the dump body will sometime contact the hopper and shift the balance of the finishing machine.

One method of reducing this problem of direct dumping is to station a workman adjacent the hopper to control the flow of asphalt material from the truck into the hopper by use of a shovel, rake or similar tool. Another method is to dump the asphalt material into a transfer container from which the material is shoveled by workmen directly into the hopper of the finishing machine. In both of the above methods, workmen are required to physically control the rate of transfer of material from the dump vehicle to the hopper and, when large finishing machines are used, two or even three workers are required.

This loading problem is even more serious when dump trucks of the semi-trailer type are used because long truck beds enable the material to break loose and slide down into the hopper at high rates of speed, thus jarring the finishing machine and causing irregularities in the road's surface. In this regard, some states have regulations which specifically prohibit the direct dumping of material from semi-trailer type vehicles into the finishing machines. This requires the use of smaller and less economical dumping vehicles which increases the cost of forming these types of road surfaces.

SUMMARY OF THE INVENTION

The general purpose of this invention is to provide a rugged, durable tailgate assembly which controls the rate at which material is dumped from a dump vehicle and enables the vehicle to be used to dump materials directly into a finishing machine without causing irregularities in the road surface.

OBJECTS OF THE INVENTION

An object of the present invention is the provision of a tailgate for a dump-type vehicle which can control the rate at which material is discharged from the vehicle.

Another object of the present invention is the provision of a tailgate for a semi-trailer type dump vehicle which can be used in cooperation with a road surfacing machine to produce an even road surface.

Still another object is to provide a tailgate for a dumping vehicle which can handle road materials at elevated temperatures.

A still further object of the present invention is the provision of a tailgate for a dump-type vehicle which is simple, easy and inexpensive to install and manufacture.

BRIEF DESCRIPTION OF THE DRAWINGS

The exact nature of this invention, as well as other objects and advantages thereof, will be readily apparent from consideration of the following specification relating to the annexed drawings in which:

FIG. 1 is a side elevation view of the standard configuration of the prior art, showing a dump vehicle dumping directly into the hopper of a finishing machine;

FIG. 2 is a side elevation of a semi-trailer type dump vehicle with a tailgate of the present invention attached thereto;

FIG. 3 shows the semi-trailer vehicle of FIG. 2 in the dumping position;

FIG. 4 is an enlarged side elevation of the tailgate of the present invention;

FIG. 5 is a plan view of the tailgate shown in FIG. 4;

FIG. 6 is a sectional view of the device taken along line 6-6 of FIG. 5, looking in the direction of the arrows showing the device in the dumping position adjacent a hopper of a finishing machine; and
FIG. 7 is an enlarged view of a portion of the chain assembly.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings, wherein like reference characters designate like or corresponding parts throughout several views, there is shown in FIG. 1, a standard road surface finishing machine 10 with a hopper 12, a power supply 14 such as a gasoline engine, a screed 16 and an operator's seat and controls 18. In operation, the finishing machine 10 will move along a roadbed in the direction of arrow 22 while supported on a plurality of wheels 20 to form a road surface on the roadbed. To accomplish this, the finishing machine 10 transfers road surface materials 24 from the hopper 12 and distributes the materials onto the roadbed surface, whereupon the screw 16 tamps these materials to form a road surface.

To dump the road surface materials 24 into the hopper 12, a dump truck 26 with a conventional tailgate 28 on the dump body 30 is used. To accomplish the transfer of road surface materials 24 from the dump truck 26 to the hopper 12, the dump truck 26 is backed up to the finishing machine until rear wheels 32 contact roller 34 on the hopper 12. This roller contacts the rear wheels 32 to prevent contact between the frame of the dump truck and the hopper 12 while allowing the rear wheels 32 of the truck 26 to rotate. The dump body 30 is then rotated by a dump means 36 until the material 24 slides from the dump body 30 and into the hopper 12.

As can be seen, the lower rear corner of the dump body 30 will move in a downward direction as the dump body is rotated and can contact and place a downward directed force on the hopper 12 at a point 38. This force can tilt the surfacing machine 10 and cause the surfacing machine 10 to produce irregularities in the road surface being formed. Also, when material such as hot asphalt is being transferred from the dump body 30, it tends to stick to the dump body and will break loose and slide into the hopper 12 in surges rather than in a controlled continuous rate. As these surges of surfacing material 24 fall into a hopper 12, irregularities in the road surface can also be produced due to the jarring of the finishing machine 10.

Turning now to FIG. 2, there is shown a semi-trailer type dump truck 40 having a tractor 42 and a dump body 44 with the tailgate assembly 46 of the present invention. Although the tailgate assembly 46 is described herein, for use on a semi-trailer type dump vehicle, it is contemplated that it could be used on other types of dump vehicles such as the type shown in FIG. 1. The dump body 44 is powered by tractor 42 and has a substantially larger volume than dump trucks similar to the one shown in FIG. 1. This dump body 44 is a generally rectangular open-ended box with the tailgate assembly 46 forming one of the ends.

In FIG. 3, it can be seen that the dump body 44 is provided with a dumping means 48 which rotates the dump body 44 to cause the material contained therein to slide to the rear of the truck against the tailgate 46. The tailgate 46 then regulates the flow of material 28 from the dump body 44 and into the hopper 12 of the finishing machine 10, as will be hereinafter described.

Turning now to FIGS. 4, 5, 6, and 7, the tailgate assembly 46 can be seen attached to the dump body 44 by means of a pair of rods 50. These rods 50 have one end pivotally attached to the tailgate assembly 46 while the other end is provided with a plurality of mounting holes 51. Each of these holes 51 can be aligned with the pivot point 52 on the dump body 44 and a suitable fastener such as a nut and bolt assembly passed through the respective openings to pivotally attach the rod to the dump body 44. By attaching the fasteners through different mounting holes 51, the angle of the tailgate assembly 46 makes with the dump body 44 can be varied.

The tailgate assembly 46 is provided with two side plates 54, which may be constructed from suitable sheet material to act as guides for the road surface materials 24 being transferred from the dump body 44. These two side plates 54 are carried by the tailgate assembly 46 and slide with respect to the sides of the dump body, allowing the angle that the tailgate assembly 46 makes with the dump body to be varied.

A back plate 60 of sheet material is carried by the tailgate assembly and is inclined at an obtuse angle with respect to the floor of the dump body 44. At the lower end of this back plate adjacent the floor of the dump body 44, a shaft 58 is suitably journeled to rotate about a horizontal axis and carries two sprocket members 62 and 64 adjacent the ends thereof. A wedge-shaped portion 56 is provided in the floor of the dump body 44 to elevate the material 24 and guide it onto the back plate 60 of the tailgate assembly 46. A shaft 66 is located at the upper end of the back plate 60 and is suitably journeled to rotate about a horizontal axis. This shaft 66 has sprockets 68 and 70 attached near the ends thereof and aligned respectively with sprockets 62 and 64 on shaft 58. Endless link-type chains 72 and 74 are engaged with the sprocket pairs 62-68 and 64-70, respectively, to mechanically connect the shafts 58 and 66.

A hydraulic motor 76 is provided with a drive sprocket 78 on its output shaft which is aligned with a corresponding drive sprocket 80 mounted on shaft 66. An endless link-type drive chain 82 is engaged with the sprockets 78 and 80 so that the shafts 56 and 58 are driven by the hydraulic motor 76.

A plurality of parallelly spaced bars 84 is attached between the endless chains 72 and 74; so that as the chains 72 and 74 are driven by the motor 76, the bars 84 will move up the upper surface of the back plate 60 in the direction of arrow 86 to contact the material contained in the dump body 44 and move it over the outer end of the tailgate assembly 46.

As can be seen in FIG. 7, the endless chain 74 is constructed from a plurality of common links 75 into which the sprockets 64 and 70 extend and connecting links 77 to which the bars 84 are attached by pins 79. These connecting links 77 are arranged with three common links 75 attached therebetween, but it is contemplated that the connecting links 77 could be assembled with any odd number of common links 75 therebetween.

The hydraulic motor 76 is connected to a control means 88 by means of conduits 90 so that the supply of hydraulic fluid to the motor can be regulated at the rear of the dump body 44. The hydraulic fluid is supplied to the control means through conduits 80, which are at-
tached to a suitable pump means (not shown) which can be located in the cab of the dump vehicle or even on the rear of the dump body itself.

OPERATION OF THE TAILGATE

The advantages and features of this tailgate will become more apparent from a consideration of the operation thereof by referring to FIG. 6, wherein the dump body 44 is shown in a dumping position with the road surface material 24 being forced to slide down the truck body up the wedge 56 and onto the surface of the back plate 60. The material would remain on the upper surface of the back plate if it were not for the movement of the bars 84 which carry the material to the end of the tailgate assembly 46 where it is dumped into the hopper 12 of the finishing machine. The rate of transfer of the material into the hopper 12 can be regulated by a control means 88, which controls the speed of the hydraulic motor 76. In this manner, the material can be placed in the hopper 12 at the desired rate without producing irregularities in the road surface.

Various modifications are contemplated and may obviously be resorted to by those skilled in the art without departing from the spirit and scope of the invention as hereinafter defined by the appended claims, as only a preferred embodiment thereof has been disclosed.

What is claimed and desired to be secured by Letters Patent in the United States is:

1. In combination, a semi-trailer dump vehicle, said dump vehicle comprising a tractor and an elongated dump body with a floor and front and side walls, means on said dump vehicle to selectively vertically elevate the front end of said dump body adjacent said tractor to discharge material from said dump body into an open topped material receiving hopper mounted on a road finishing machine, and

a. a tailgate on said vehicle for controlling the rate and height of discharge of material from said vehicle, said tailgate comprising:
   a. an inclined conveyor means forming the rear wall of said dump body, said conveyor having one end positioned above said dump body for moving material from said dump body up over said inclined conveyor and into said hopper on said road finishing machine; said conveyor comprising an inclined plate mounted on said dump body, parallel shafts mounted at the ends of said inclined plate, a plurality of sprockets on said shafts, a plurality of parallel chains mounted on said sprockets to mechanically connect said shafts, and a plurality of parallel bars attached to and carried by said chains so that when said shafts are rotated, said bars slide in contact with said inclined plate to move material across the surface on over the elevated end of said inclined plate;
   b. hydraulic motor actuation means on said conveyor powering said conveyor means;
   c. hydraulic valve control means located on said dump body adjacent said conveyor means, for controlling said actuation means;
   d. means for adjusting the relative position of said discharge end of said conveyor means with respect to said dump body to adjust the vertical height of said discharge end of said conveyor; and
   e. ramp means attached to the floor of said dump body, said ramp means being inclined to extend from the floor of said dump body to said conveyor.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,719,298 Dated March 6, 1973

Inventor(s) Thelma Burnice Brown

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Col. 1, line 12, after "driveways", change "." to --.--.--.
Col. 1, line 25, change "results" to --result--.
Col. 1, line 56, change "sometime" to --sometimes--.
Col. 4, line 11, delete "of".

Signed and sealed this 10th day of July 1973.

(SEAL)
Attest:
EDWARD M. FLETCHER, JR. Rene Tegtmeyer
Attesting Officer Acting Commissioner of Patents