June 8, 1937. J. E. SCHULTZ 2,083,307

GRADING MACHINE

Filed April 9, 1936 4 Sheets-Sheet 1

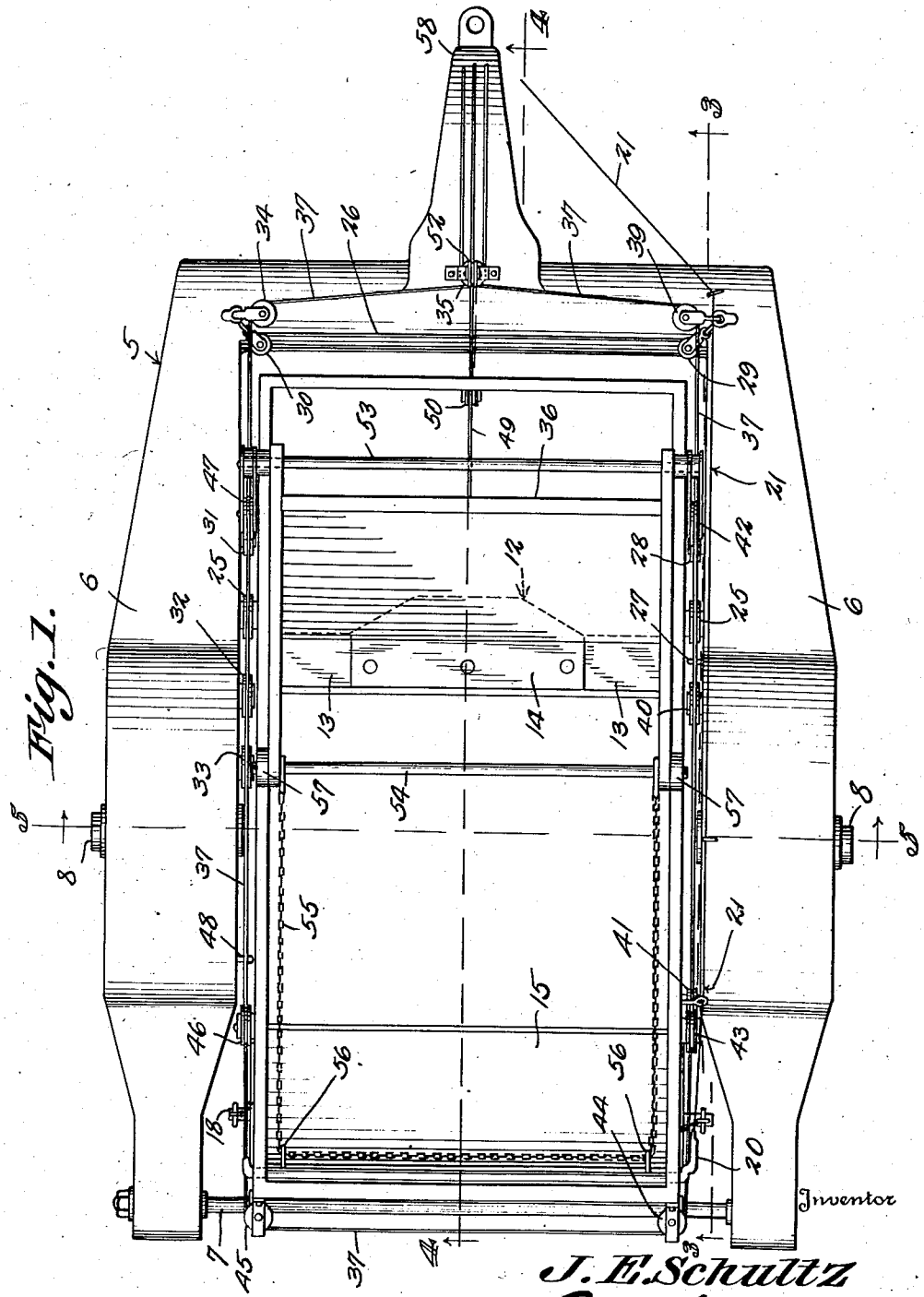


Fig. 1.

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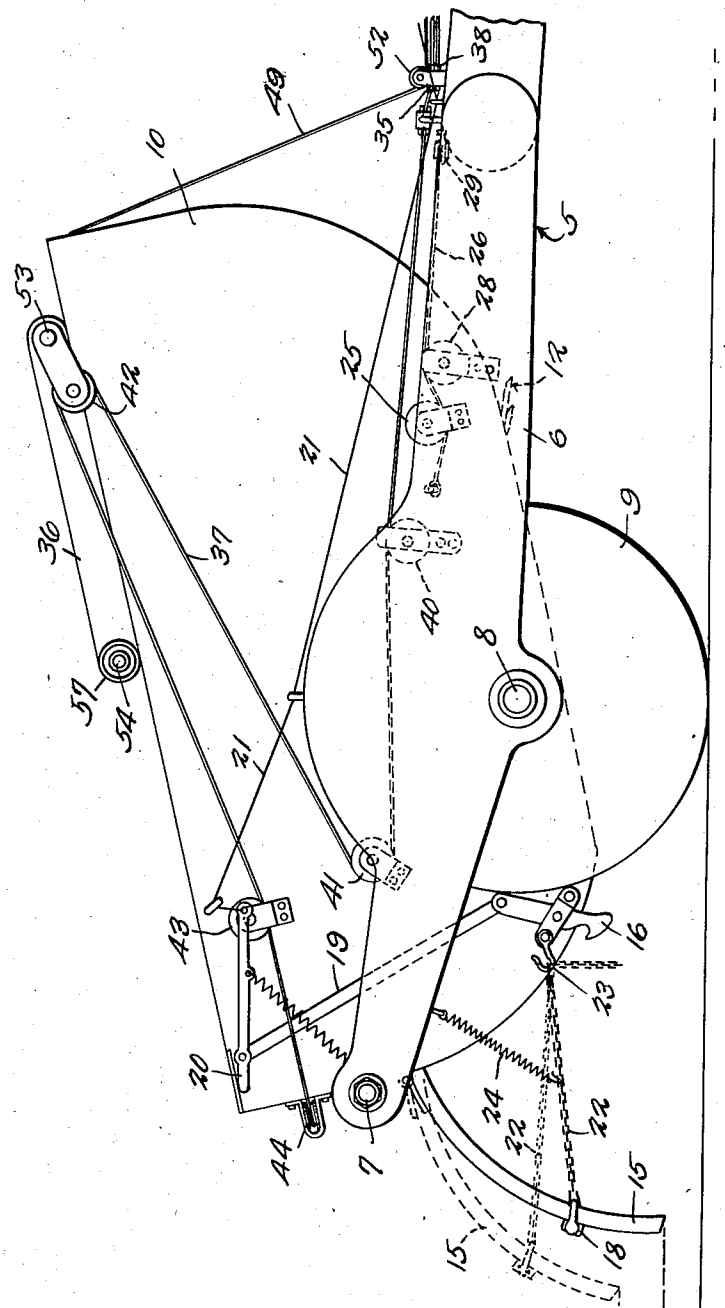


Fig. 2.

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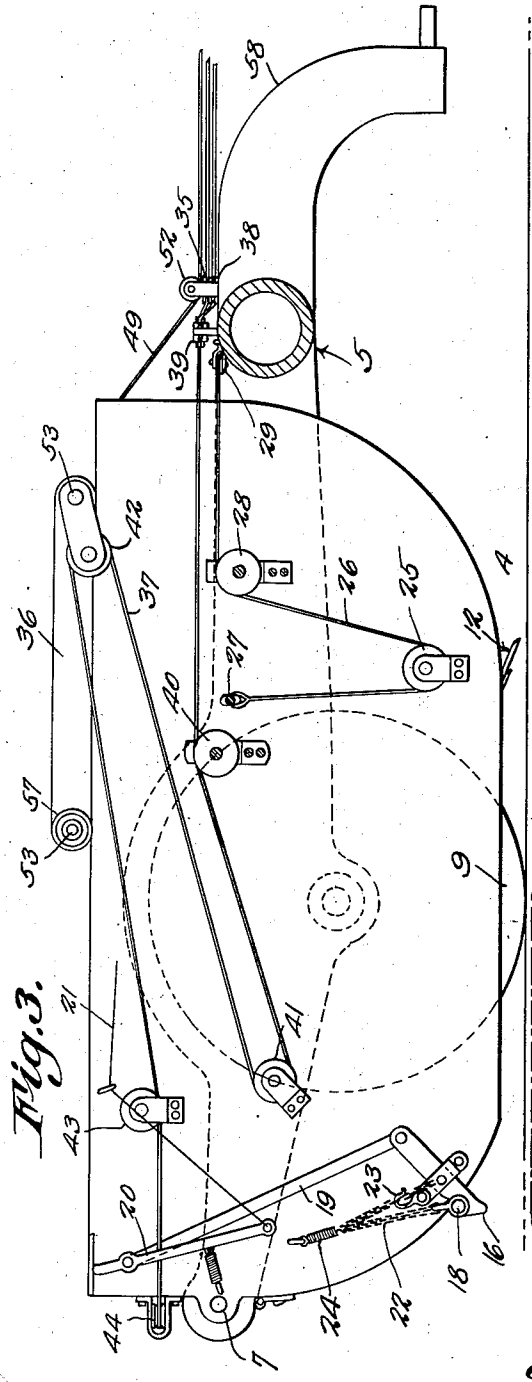


Fig. 3.

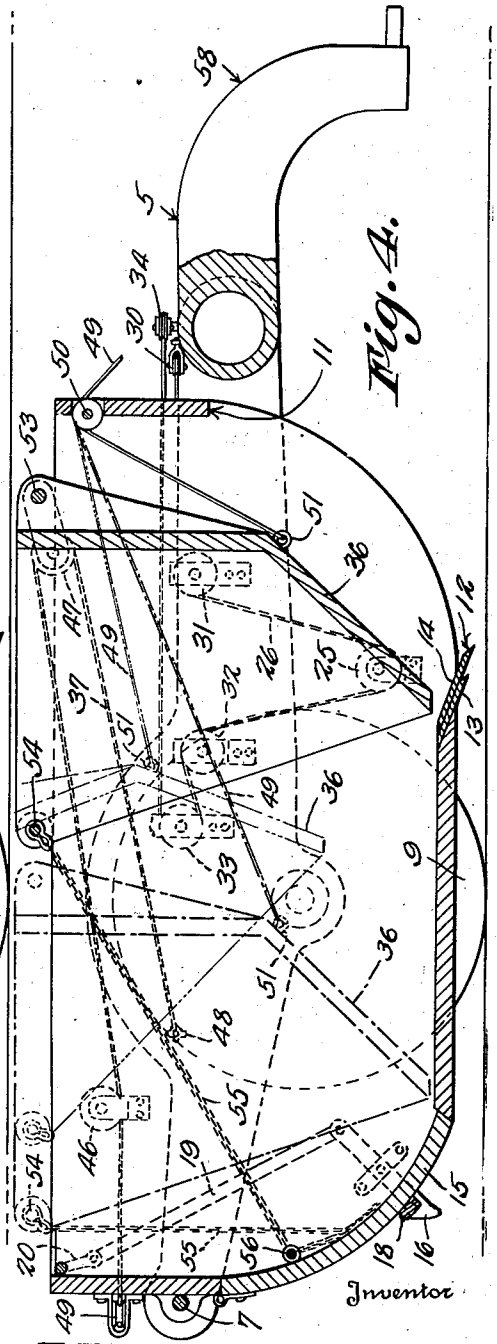


Fig. 4.

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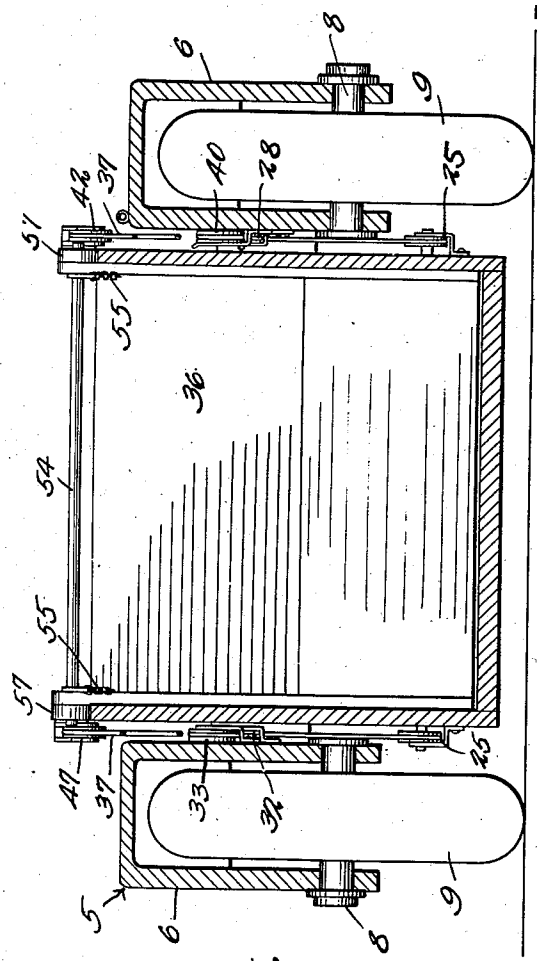


Fig. 5.

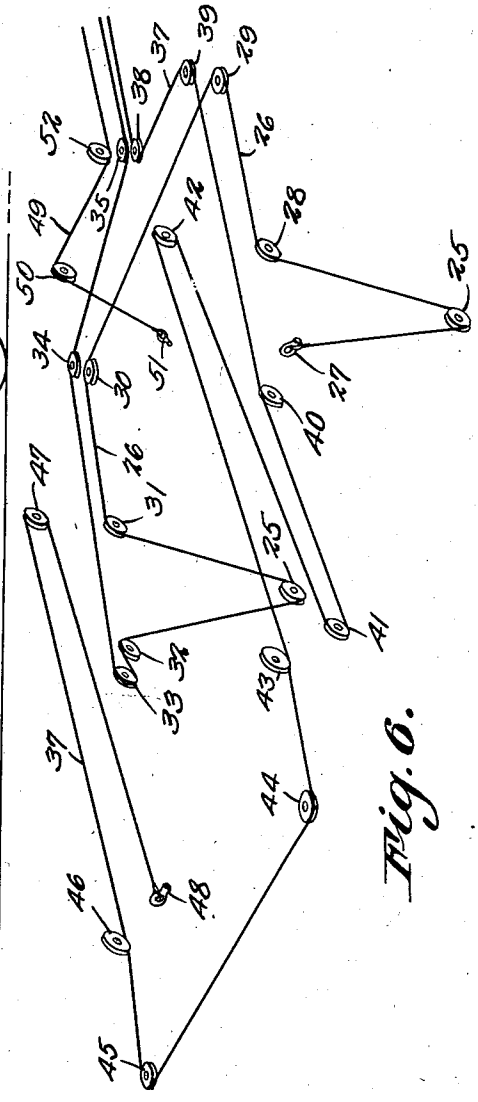


Fig. 6.

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UNITED STATES PATENT OFFICE

2,083,307

GRADING MACHINE

Jesse E. Schultz, Albany, Wis.

Application April 9, 1936, Serial No. 73,564

4 Claims. (Cl. 37—129)

This invention relates to road grading machines, and particularly to a machine designed for use in the construction and repair of road surfaces.

The primary object of the invention is to provide a machine of this character including a body portion formed with an open bottom and provided with an excavating blade mounted adjacent to the opening in the bottom, the body portion being adjustable for adjusting the depth of operation of the blade.

Another object of the invention is to so construct the body portion and blade, that the material excavated, will be delivered rearwardly into the body portion of the machine.

A further object of the invention is to provide means operating within the body portion of the machine for moving material delivered into the body portion, rearwardly, while the machine is moving over the ground surface and is in operation.

A still further object of the invention is to provide an excavating blade of a construction to operate with the minimum amount of power.

Another important object is to mount the pusher, which operates within the body portion, in such a way that the pusher will be automatically elevated to clear the material within the body portion, when the pusher is returned to its inactive position at the front end of the body portion.

With the foregoing and other objects in view, which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed, may be made within the scope of what is claimed, without departing from the spirit of the invention.

Referring to the drawings:

Figure 1 is a plan view of a road grading machine constructed in accordance with the invention.

Figure 2 is a side elevational view thereof showing the body as tilted to dump the load.

Figure 3 is a longitudinal sectional view through the machine in its normal operating position, the view being taken on line 3—3 of Figure 1.

Figure 4 is a longitudinal sectional view through the machine taken on line 4—4 of Figure 1.

Figure 5 is a transverse sectional view taken on line 5—5 of Figure 1.

Figure 6 is a diagram illustrating the cables and pulleys, by means of which the body portion and pusher, are operated.

Referring to the drawings in detail, the machine comprises a frame indicated generally by the reference character 5, which frame includes side bars 6 that have their rear ends connected by means of the rod 7. Suitable bearings are formed in the side bars 6 and accommodate the axles 8 on which the wheels 9 of the machine are mounted, the wheels providing the support for the machine.

This rod 7 also provides the support for the pivoted body portion 10 that operates between the side bars 6 of the frame, as clearly shown by the drawings.

The forward end of the body portion is cut away at 11 providing an entrance opening to the body portion, and through which material passes into the body portion.

Supported adjacent to the rear edge of the cut away portion 11, is the excavating blade indicated by the reference character 12, which extends downwardly to dig into the ground surface over which the machine is moving to dislodge material from the road surface and force it into the body portion of the machine. This blade 12 is of a novel construction, and comprises the main blade section 13 and a central blade section 14, the central blade section 14 being of a width to extend an appreciable distance beyond the forward or cutting edge of the blade 13, to the end that the central blade section will dig into the ground surface prior to the blade section 13, thereby greatly reducing the power required in operating the machine. As clearly shown by Figure 1 of the drawings, the forward corners of the blade section 14, are cut away so that considerably less resistance will be offered, when the blade is cutting into the surface under treatment.

The rear end of the body portion is provided with a discharge opening for the material forced into the body portion of the machine by the excavating blade 12. This discharge opening is normally closed by means of the pivoted end gate 15 which is curved forwardly to provide a leveling or scraping blade to scrape or level the material discharged from the machine, should it be desired to use the machine in grading or spreading the material over the road surface. The end gate 15 is normally held in its closed position, by means of the pivoted latches 16 that engage the members 18 extending from the end gate. These pivoted latches are operated by means of the links 19 that have pivotal connection with the latches 16 at their lower ends, the upper ends of

the links being operated by the lever 20, to which the cable 21 is connected so that when this cable 21 is pulled, the links will release the pivoted latches and allow the weight of the material within the body portion, to swing the end gate 15 to its open position, as shown by Figure 2 of the drawings.

At each side of the end gate, is a chain 22 adapted to be hooked into the hooks 23, that are secured to the outer surface of the body portion 10, so that movement of the end gate 15 will be regulated, to vary the spreading depth of the end gate. In order that these chains will be held taut at all times, coiled springs 24 are provided and hook into the chains 22, exerting a pull on the chains to move the chains to positions as shown by Figure 3 of the drawings, when the end gate is closed.

The body portion is supplied with pulleys 25 mounted on the outer surface of the sides thereof which pulleys accommodate the cable 26 that has one end secured to one of the side bars of the frame of the machine, at 27. This cable 26 also passes over pulleys 28, 29, 30, 31, 32, 33, 34 and 35, which are also mounted on the frame of the machine, the cable extending to a point in proximity to the operator's seat, where the operator will have ready access thereto. Thus it will be seen that due to this construction, the operator may by pulling the cable 26, which of course is accomplished in any suitable manner, cause the body portion to tilt to the position as shown by Figure 2 of the drawings, and dump the load.

Operating within the body portion 10, is a scoop-shaped pusher 36 which has its open side disposed rearwardly, its lower front edge operating in spaced relation with respect to the excavating blade 12, so that material may pass over the blade 12, through the opening between the lower front edge of the pusher and blade.

The pusher 36 is designed to move rearwardly in the body portion to push the material directed into the body portion by the blades, rearwardly of the machine so that the body portion of the machine may be completely filled before dumping.

The cable that operates the sliding pusher 36, is indicated by the reference character 37, which cable passes over pulleys 38, 39, and 40 mounted on the frame of the machine from where the cable passes over pulley 41 mounted on the body portion of the machine, and pulley 42 carried by the sliding pusher. The cable now passes over the pulleys 43, 44, 45 and 46 carried by the body portion, the pulleys 45 and 46 being disposed on the opposite side of the body portion. This cable 37 also passes over the pulley 47 which is mounted on the opposite side of the sliding pusher 36 from where the cable passes rearwardly and is secured to the frame of the machine, at 48.

The reference character 49 designates a cable that passes over the pulley 50 and is secured to the front end of the sliding pusher, at 51, the pulley 50 being elevated with respect to the securing means 51 will operate to elevate the pusher as the cable 49 is drawn to return the pusher to the front end of the machine, or to its normal inactive position. This cable 49 also operates over the pulley 52, from where it passes to a point easily accessible to the operator.

Rods 53 and 54 connect the sides of the pusher, the rod 54 providing a support for the forward ends of the chain 55 that passes through the eyes 56 secured to the end gate 15 with the result that when the sliding pusher moves forwardly, to its inactive position, the end gate 15 is automatically moved to its closed position.

The sliding pusher is supported by the rollers 57 that are mounted on the ends of the rod 53 at the rear end of the pusher. These rollers 57 move along the upper side edges of the body portion, supporting the weight of the pusher and permitting the pusher to move readily, throughout the length of the body portion.

At the forward end of the frame of the machine, is a hitch 58 which may be connected in any suitable manner, to a power device, such as a tractor or the like.

In the use of the device, the member 58 is connected with the power device, and the scoop-shaped pusher 36 is moved to its normal inactive position, or position as shown in full lines in Figure 4 of the drawings. The lower edge of the pusher is spaced from the excavating blade, so that material dislodged by the blade will be directed into the body portion of the machine.

As the material piles up in the body portion, the cable 37 is pulled by the operator operating a suitable winch or similar power means, which causes the sliding pusher to move rearwardly to a position as shown in dotted lines in Figure 4 of the drawings.

Cable 49 is now operated to return the pusher to its normal position, and as before stated, because of the arrangement of pulleys, the pusher is elevated above the material which has passed into the body portion while the pusher is in the position shown in dotted lines in Figure 4 of the drawings thereby eliminating any possibility of forcing material through the front end of the machine, while it is being returned.

When it is desired to dump the body portion, the cable 26 is pulled, causing the body portion to take a position as shown by Figure 2 in a manner as previously described. With the body portion in this position, the cable 37 may be operated to cause the pusher to force the material from the body portion.

Should it be desired to spread the material in the formation of a road surface, the chains 22 may be placed on the hooks 23 to regulate the open position of the end gate 15, which drags over the material released from the body portion, smoothing the material and forming an even road surface.

With this device, it will be obvious that material may be excavated and directed into the body portion of the machine, and the material carried to a place of deposit, thereby greatly facilitating road building.

Having thus described the invention, what is claimed is:

1. A road machine comprising a frame, a body portion of the end dump type, said body portion having an opening in the bottom thereof, a blade mounted adjacent to the opening and adapted to dig into the ground surface and direct material into the body portion, a pusher slidably mounted within the body portion and adapted to push material to the rear end of the body portion, means for moving the pusher to the forward end of the body portion and simultaneously lifting the pusher over material in the body portion, and an end gate for closing one end of the body portion.

2. A road machine comprising a frame, a body portion having a discharge end, pivotally mounted on the frame, said body portion having an opening in the bottom thereof, a blade

mounted adjacent to the opening and adapted to direct material into the body portion, a pusher slidably mounted in the body portion and pivoted with respect to the body portion, means for moving the pusher longitudinally of the body portion to force material from the body portion, and means for swinging the pusher vertically to clear material in the body portion when the pusher moves towards the front end of the body portion.

3. A road machine comprising a frame, a body portion having a discharge end, pivotally mounted on the frame, said body portion having an opening in the bottom thereof, a blade mounted adjacent to the opening and adapted to direct material into the body portion, a scoop-like pusher mounted within the body portion, and adapted to slide longitudinally of the body portion, means for moving the pusher to force material from the body portion, means for returning the pusher to its initial position at the front end of the body portion, said means including a cable and pulley adapted to lift the pusher over material in the body portion clearing material in the body portion.

4. A road machine comprising a frame, a body portion having a discharge end, pivotally mounted on the frame, said body portion having an opening in the bottom thereof, a blade mounted adjacent to the opening and adapted to direct material into the body portion, a scoop-like pusher mounted within the body portion, supporting rollers carried by the scoop and operating along the upper edges of the body portion, means for moving the scoop rearwardly, forcing material from the body portion, means for returning the scoop to the forward end of the body portion, said means including a cable and pulley attached to the scoop an appreciable distance below the rollers, whereby the scoop is elevated as it is pulled toward the forward end of the body portion, clearing material in the body portion.

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