Jan. 18, 1944. V. H. REISSER 2,339,518

ROAD WORKING MACHINE

Filed June 5, 1941 4 Sheets-Sheet 1

Fig. 1

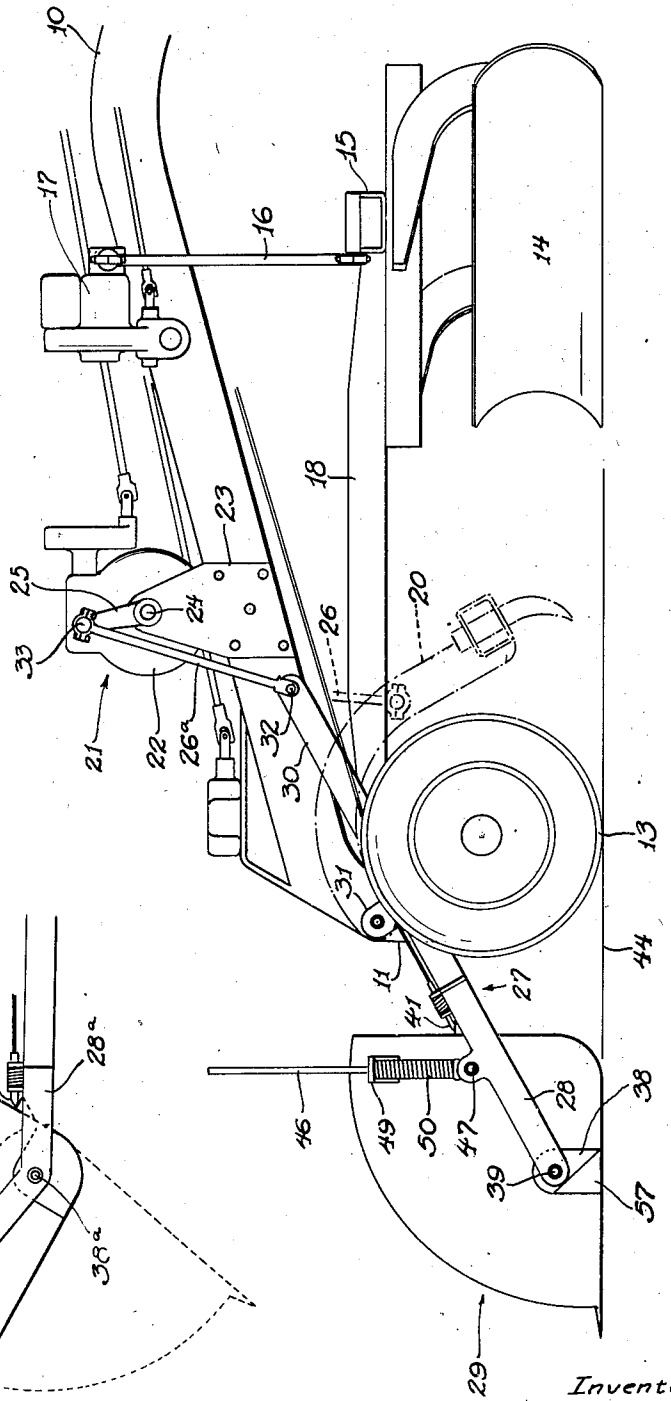


Fig. 8

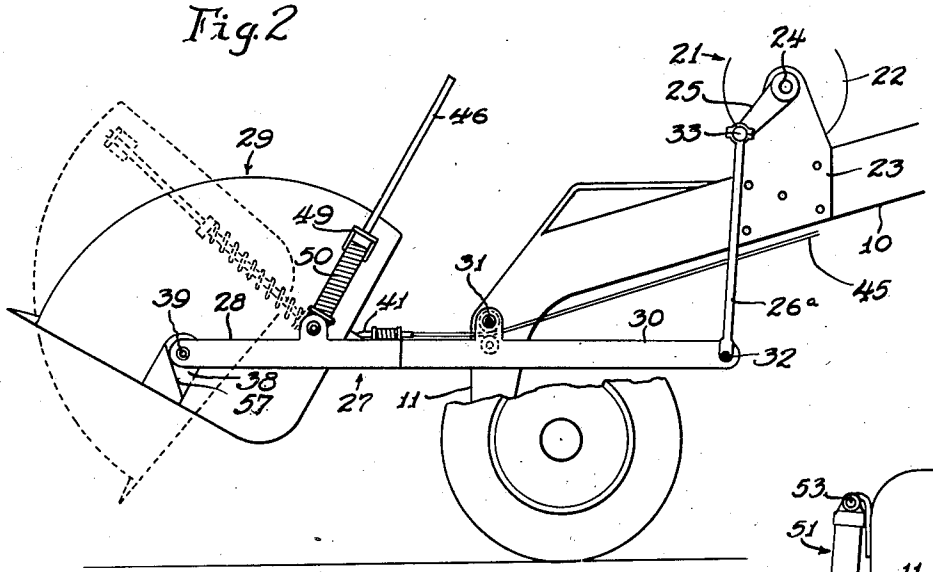
Inventor
Vernon H. Reisser
By Smith Datta Attys

Jan. 18, 1944. V. H. REISSER 2,339,518

ROAD WORKING MACHINE

Filed June 5, 1941 4 Sheets-Sheet 2

Fig. 2



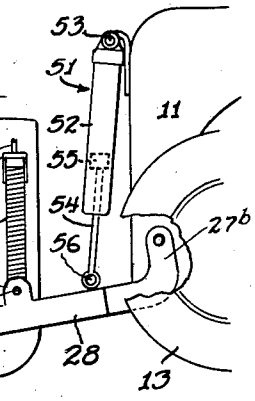


Fig. 4

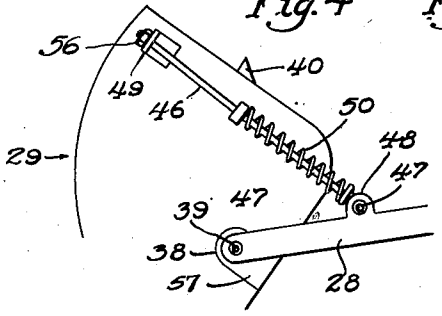
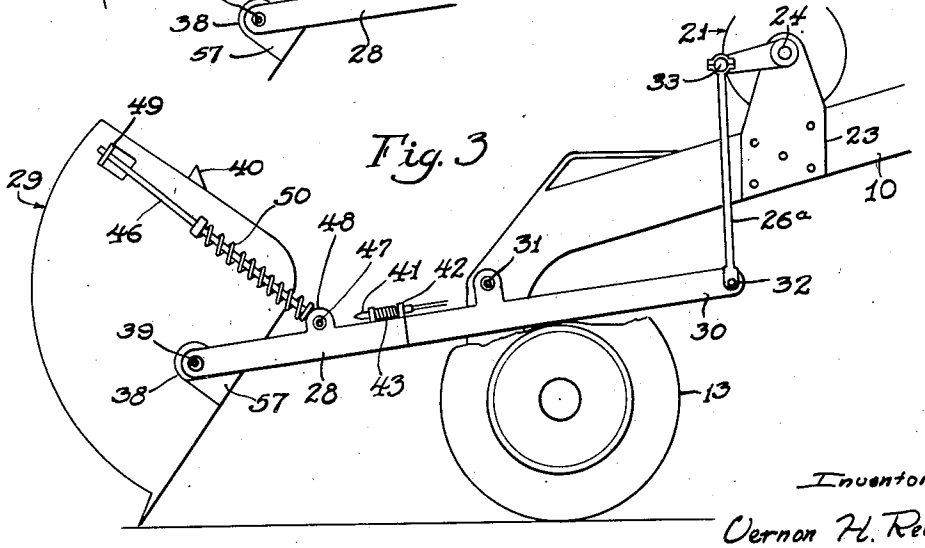


Fig. 5

Fig. 3



Inventor

Vernon H. Reisser

By Lyman Lattle Attn

Jan. 18, 1944. V. H. REISSER 2,339,518

ROAD WORKING MACHINE

Filed June 5, 1941 4 Sheets-Sheet 3

Fig. 7

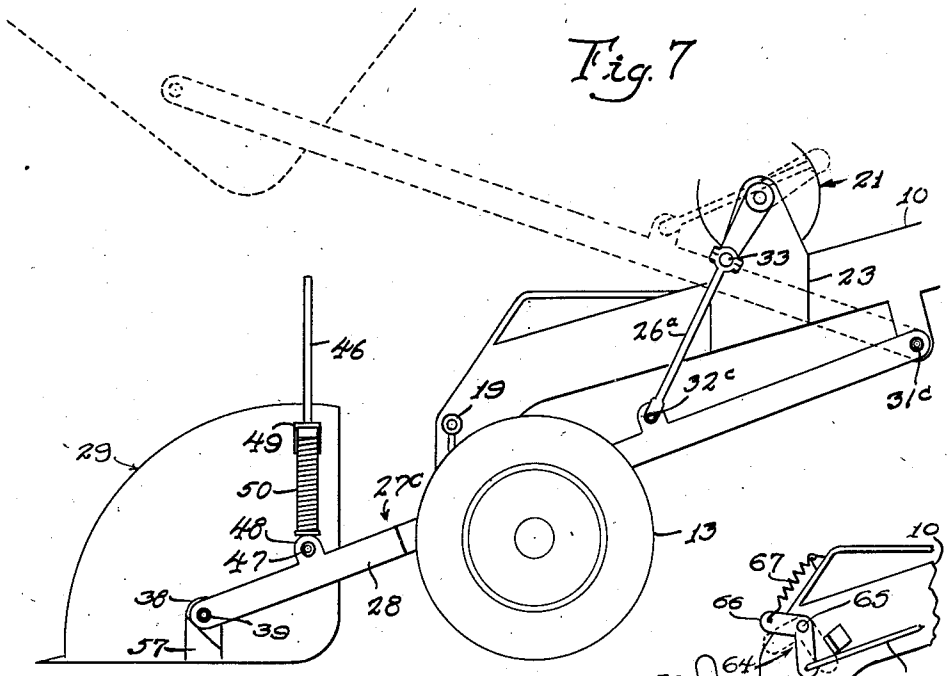
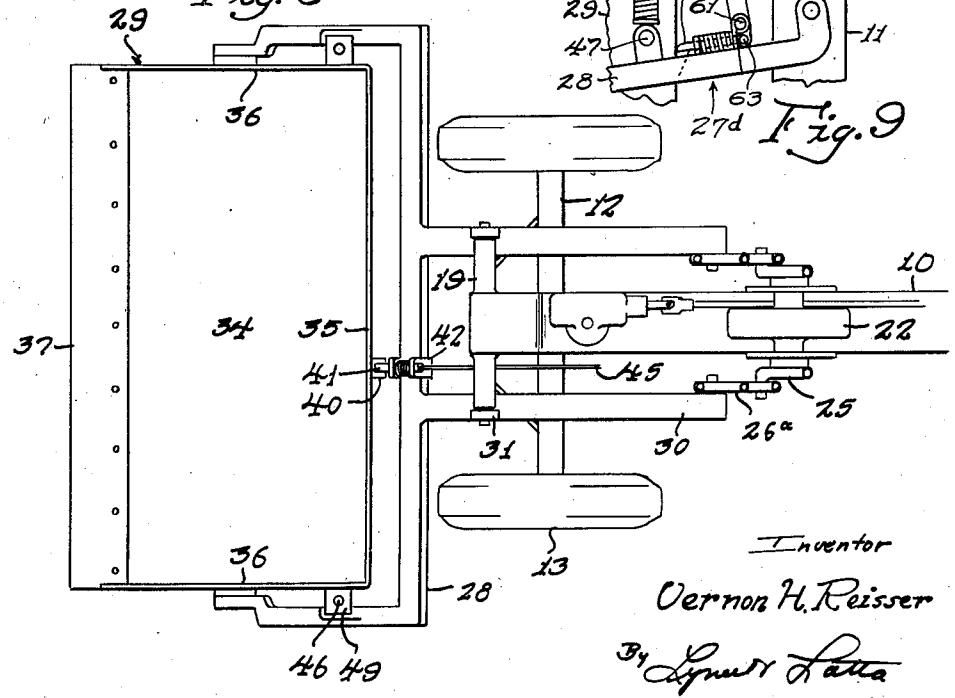


Fig. 6



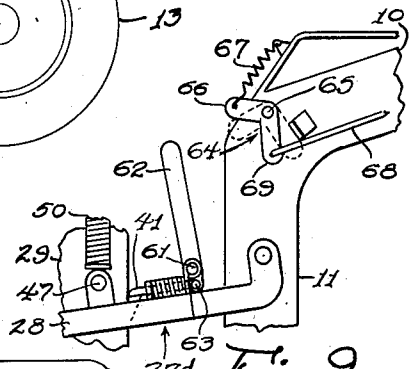


Fig. 9

Inventor

Vernon H. Reisser

By Lynn & Latta

Atty

Jan. 18, 1944. V. H. REISSER 2,339,518

ROAD WORKING MACHINE

Filed June 5, 1941 4 Sheets-Sheet 4

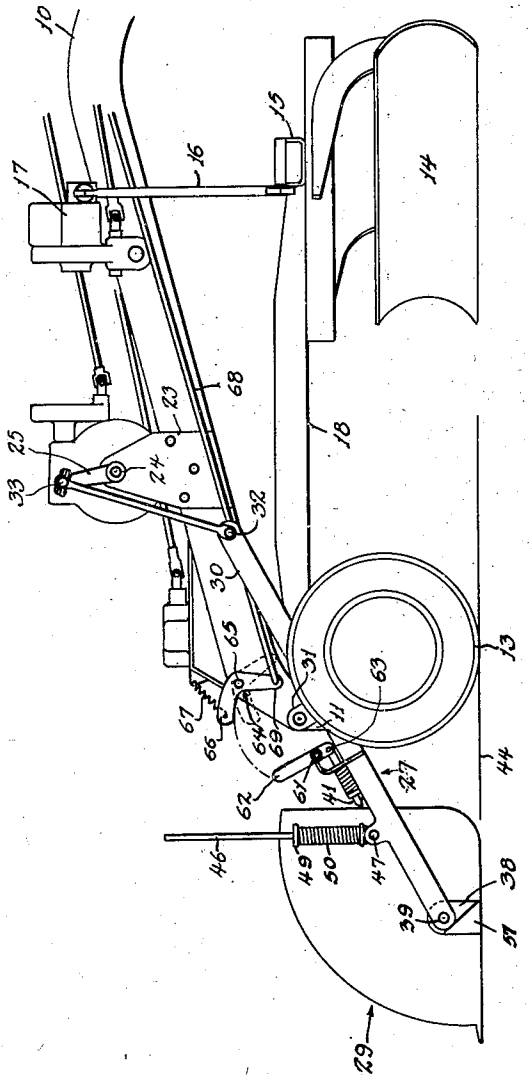


Fig. 10

Inventor
Vernon H. Reisser

By

Lynn & Latta
Attorney

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UNITED STATES PATENT OFFICE

2,339,518

ROAD WORKING MACHINE

Vernon H. Reisser, Omaha, Nebr.

Application June 5, 1941, Serial No. 396,751

14 Claims. (Cl. 37—124)

My invention relates to road working machines and has as its object to provide a machine that is adapted to function either as a road grader or as a hauling scraper. More specifically, the invention aims to provide a machine combining a hauling scraper with a road grader in a position wherein it does not interfere with the normal grading functions of the machine and wherein the operations of the scraper are clearly visible to the operator stationed at the rear of the machine.

Another object of the invention is to provide for power operation of both grader and scraper function under control exercised at the operator's station at the rear of the machine. In a specific aspect, the invention aims to provide a machine wherein the normal motive power and controls of a conventional road grading machine may be utilized for operating the scraper. To this end, the invention contemplates an arrangement wherein a scraper scoop is attached to the forward end of a road grading machine in place of the conventional scarifier, is carried by a frame that is pivoted on the scarifier pivot bearings, and is actuated by the scarifier power unit.

Another object of the invention is to provide a machine of the type indicated, wherein the power unit is adapted to function either for maintaining the scoop in scraping contact with the ground or for elevating the scoop for carrying or dumping. A further object is to provide for tilting the scoop from a carrying to a dumping position and for returning the scoop to a loading position without the use of complicated actuating and control mechanism. In this respect, the invention contemplates an arrangement wherein the scoop is biased toward its discharge position at all times and is maintained in load carrying position by releasable latch mechanism, release of the latch serving to cause the scoop to be tilted to discharge position.

In attaining the preceding object, the invention contemplates utilizing the depression of the scoop frame or carriage as the means for returning the scoop to loading position against the compression of springs that function, when the latch is released, to move the scoop from carrying to dumping position. In this operation, the edge of the scoop is fulcrumed against the ground while downward pressure is applied to the carriage to force the rear region of the scoop downwardly.

In the drawings:

Fig. 1 is a side elevation of a road working machine embodying the invention;

Fig. 2 is a view of the scoop in load carrying position, the discharge position being indicated in dotted lines;

Fig. 3 is a view of the scoop in bulldozing position;

Fig. 4 is a fragmentary view of a modified form of the invention;

Fig. 5 is a partial side elevation of another modified form of the invention;

Fig. 6 is a plan view of the form of the invention shown in Fig. 1;

Fig. 7 is a partial side elevation of another modified form of the invention;

Fig. 8 is a fragmentary side elevation of another modified form of the invention;

Fig. 9 is a fragmentary side elevation of a still further modified form of the invention; and

Fig. 10 is a side elevation of a road working machine embodying the preferred form of the invention.

As an example of one form in which the invention may be embodied, I have shown in the drawings the forward region of a road grader of a well known type embodying a longitudinal frame member 10 having at its forward end a leg 11 extending downwardly and attached to an axle 12 supported on steerable front wheels 13. A grader blade 14 is carried on a sub frame 15 which in turn is supported by links 16 connected at their upper ends to gearing units 17 by means of which the blade may be manipulated vertically. The sub frame 15 includes a drawbar 18 which has at its forward end a draft connection with the leg 11.

The grader is provided at its forward end with opposed pivot bosses 19 to which the scarifier, indicated in broken lines at 20 in Fig. 1, is normally pivoted. Carried on the frame member 10 above the scarifier, is a power unit, indicated generally at 21, by means of which the scarifier may be raised and lowered. The unit 21 comprises reduction gearing 22 carried in brackets 23 attached to the frame member 10, and having a driven shaft 24 on which are secured crank arms 25. The arms 25 are connected to the scarifier by links 26.

In the present invention the scarifier 20 is detached and the pivot bosses 19 are utilized for attaching a scoop carriage 27 to the grader. The power unit 21 is utilized for manipulating the scoop when thus attached. The carriage 27 (Fig. 6) comprises a yoke 28 in which the scoop 29 is pivoted. To the rear of the yoke 28 a pair of arms are rigidly attached as by welding. The arms 30 extend rearwardly and are formed with

ears 31 which are pivoted to the bosses 18. To the rear ends of the arms 30 are pivoted at 32 the lower ends of links 26a the upper ends of which are pivoted at 33 to the ends of the cranks 25.

The scoop 29 includes a bottom wall 34, a rear wall 35, end walls 36 and a cutting edge 37. To the end walls 36 are secured brackets 38, to which the side arms of the yoke 28 are pivoted as at 39.

To the rear wall 35 is secured a latch detent 40 (Fig. 3). A latch bolt 41, slidably mounted in brackets 42 secured to the transverse member of the yoke 28, is urged by a spring 43 toward a position in which it may coact with the detent 40 in latching the scoop 29 to the yoke 28 in the loading or load carrying position of the scoop with reference to the yoke. In the load carrying position, which is shown in full lines in Fig. 2, the scoop is elevated for transporting a load. The same position of the scoop with reference to the carriage is shown in full lines in Fig. 1, wherein the scoop is shown in loading position with reference to the ground, the latter being indicated at 44.

The latch 41 is adapted to be released by a pull cable 45 attached to its rear end and extending rearwardly to the operator's station for manipulation by the operator. When the latch is released the scoop will tilt to the discharge position shown in dotted lines in Fig. 2. In the preferred form of the invention the tilting is accomplished by a pair of tilting devices each including a rod 46 one end of which is pivoted at 47 to an ear 48 on the yoke 28 and the other end of which is slidably extended through a bracket 49 secured to an end wall 36 of the scoop. A compression spring 50 encircles the rod 46 between the ear 48 and the bracket 49 and is adapted to be compressed between the two when the scoop is latched to the carriage.

Upon release of the latch, the springs 50 will act against the brackets 49 to tilt the scoop to dumping position. When this position is reached, the scoop will be restrained from further tilting movement by contact of the side arms of the yoke 28 with stops 51 on the brackets 38.

With the scoop in dumping position, the carriage may be lowered until the edge of the scoop contacts the ground, in which position, shown in Fig. 3, it is adapted to function for bulldozing operations. When it is desired to return the scoop to load carrying position the forward region of the carriage 27 is moved further downwardly, forcing the rear region of the scoop downwardly until it is engaged and secured by the latch 41. During this movement the brackets 49 engage the springs 50 and compress them.

It may now be noted that the power unit 21 is adapted to function both for elevating the scoop and its load and for forcing the scoop downwardly against the ground so as to execute the retraction of the scoop to loading position against the resistance of the tilting devices. This characteristic is taken advantage of to eliminate the necessity for control mechanism for returning the scoop to loading position.

Although the invention contemplates the utilization of a power unit already existent in certain types of graders, it may also be utilized in a grader that is not supplied with such a power unit. In such a case, I provide, as shown in Fig. 5, a two way action fluid motor 51 comprising a cylinder 52 linked at 53 to the forward arm 11 of the grader frame, and a piston rod 54 having at one end a piston 55 slidable in the cylinder 52 and at its other end a pivotal connection 56 with the scoop. The carriage 27b is pivoted at its rear end to the frame 11.

The scoop is restrained against tilting beyond its bulldozing position by the stop lugs 57. The lugs 57 are adapted to support the scoop in bulldozing position under the opposed forces of the forward push applied through the carriage to the pivots 39, and the resistance of the material being moved by the scoop.

The function of the lugs 57 may be performed by other means such as the stop nuts 58 on the ends of the rods 46 (Fig. 4) or the brackets 59, adapted to coact with extensions 60 of the yoke side arms (Fig. 8).

Fig. 8 shows an arrangement wherein the scoop is adapted to tilt from load carrying to dumping position without the assistance of springs. In order to accomplish this, the pivots 38a are positioned rearwardly of the normal center of gravity of the scoop, irrespective of elevation.

The arrangement shown in Fig. 7 provides for additional scoop elevation. This is achieved by employing a longer carriage 27c and pivoting the rear region thereof to the frame as at 31c. The power unit is linked to the intermediate region of the carriage at 32c. The elevation that may be attained in this form of the invention is shown in dotted lines. It permits the shovel to be lifted to a position wherein its contents may be discharged into a truck.

Fig. 9 shows a latch operating arrangement that the invention contemplates for use in connection with any of the preceding forms of the invention. It provides for utilization of the power of scoop elevation to release the latch. To the carriage 27d is fulcrumed, at 61, a lever 62 the lower end of which is pivoted at 63 to the rear end of the latch bolt 41. To the leg 11 of the grader frame a trigger 64 is pivoted at 65. The upper arm 66 of the trigger 64 is normally maintained by a spring 67 in a raised position wherein the lever 62 may clear it as the carriage swings upwardly. When it is desired to release the latch, the trigger is pivoted by means of a control rod 68 connected to the depending arm 69 of the trigger, such pivoting causing the arm 66 to swing downwardly to a position wherein it is contacted by the upper end of the lever 62 as the carriage is elevated. Further elevation of the carriage will cause the latch bolt to be retracted by the lower end of the lever 62.

In the preferred form of the invention shown in Fig. 10, the construction is the same as that shown in Fig. 1, with the exception of the latch mechanism, which is the same as that shown in Fig. 9. The reference characters used to designate these parts are the same as the reference characters that designate corresponding parts in the other two figures.

I claim:

1. In a power shovel, a propelling vehicle, a scoop, a carriage pivoted to the vehicle, projecting forwardly therefrom and pivoted at its forward end to the scoop for transmitting thrust thereto from the vehicle, for permitting the scoop to tilt from a load carrying to a dumping position, and for elevating the scoop, power means for giving vertical swinging movement to the carriage, resilient means acting between the carriage and the scoop to urge the scoop from load carrying to dumping position, said resilient means

being loaded by movement of said scoop from dumping to load carrying position, and means for latching the scoop to the carriage in its load carrying position and for maintaining said resilient means loaded.

2. In a power shovel, a propelling vehicle, a carriage projecting forwardly therefrom, a scoop supported by the carriage and pivoted thereto for tilting movement from a load carrying position to a dumping position and vice versa, a tilting device comprising a rod pivoted to said carriage and a compression spring through which said rod extends, a bracket on the scoop through which said rod extends, said spring being compressed between said bracket and the carriage when the scoop is in load carrying position and being adapted to move the scoop to dumping position when the scoop is released for such movement, and means for latching the scoop in load carrying position with the said spring under compression.

3. A power shovel as defined in claim 2, wherein the scoop is pivoted to the carriage through the medium of brackets secured to the carriage, with lugs formed on said brackets and serving as stops to limit the tilting movement of the scoop relative to the carriage and to transmit thrust from the carriage to the scoop when the latter is in dumping position whereby the scoop may be utilized for bulldozing operations.

4. A power shovel as defined in claim 2, wherein the rear region of the carriage is pivoted to the frame and including power means mounted on the frame and connected to the carriage for imparting vertical movement thereto.

5. A power shovel as defined in claim 2, including power means for imparting vertical movement to the scoop, said power means comprising a hydraulic motor one end of which is pivoted to the vehicle and the other end of which is pivoted to the carriage.

6. A power shovel as defined in claim 1, including means for power release of the latching means, said releasing means comprising a lever fulcrumed on the carriage and pivoted at its lower end to the latching means, and manually adjustable trigger means carried by the vehicle, said trigger means being adjustable from a position wherein it is engaged by said lever when the carriage swings upwardly for releasing the latching means to a position wherein it is cleared by the lever so as to permit the latching means to remain latched.

7. In a combined hauling scraper and bulldozer, a propelling vehicle, a carriage projecting forwardly therefrom and pivoted thereto for vertical movement, a scoop pivoted to the forward region of the carriage on a horizontal transverse axis for swinging movement from a load carrying position to a dumping position, said dumping position becoming a bulldozing position when the scoop is lowered into contact with the earth, stop means acting between the carriage and the scoop when the latter is in said dumping or bulldozing position for preventing movement of the scoop beyond said position said stop means being adapted to take the thrust of the scoop during bulldozing operations, means for latching the scoop to the carriage in load carrying position, resilient means acting between the scoop and the carriage to urge the scoop from load carrying to dumping position when said latching means is released, said resilient means being loaded by movement of the scoop from dumping to load carrying position, and means for swinging the carriage so as to elevate the scoop, said last means being effective also for applying downward pressure to the scoop for maintaining it in loading position and for tilting it from bulldozing to loading position while the forward region of the scoop is fulcrumed against the ground, whereby to load said resilient means.

8. In a power shovel, a propelling vehicle, a scoop, a carriage pivoted to the vehicle, projecting forwardly therefrom and pivoted at its forward end to the scoop for transmitting thrust thereto from the vehicle, for permitting the scoop to tilt from a load carrying to a dumping position and vice versa, and for elevating the scoop, power means for giving vertical swinging movement to the carriage, means for latching the scoop to the carriage in load carrying position, the scoop being adapted to move from load carrying to dumping position when the latch is released, and means for power release of the latching means, said releasing means comprising a lever fulcrumed on the carriage and operatively connected to the latching means, and manually adjustable trigger means carried by the vehicle, said trigger means being adjustable from a position wherein it is engaged by said lever when the carriage swings upwardly for releasing the latching means, to a position wherein it is cleared by the lever so as to permit the latching means to remain latched.

9. A power shovel as defined in claim 8, including control means extending to the operator's station for adjusting said trigger means.

10. In a hauling scraper, a propelling vehicle, a scoop, a carriage pivoted to the vehicle, projecting forwardly and pivoted at its forward end to the scoop for transmitting thrust thereto from the vehicle, for permitting the scoop to tilt from its load carrying position to a dumping position and vice versa and for elevating the scoop, power means for giving vertical swinging movement to the carriage, means for latching the scoop to the carriage in load carrying position, the scoop being adapted to move from load carrying to dumping position when the latch is released, and trigger means carried by the vehicle and manually adjustable from a position wherein it is engaged by the latching means and thereby causes the latter to be released when the carriage swings upwardly, to a position wherein it is cleared by the latching means during such upward swing of the carriage, so as to permit the latching means to remain latched.

11. A hauling scraper as defined in claim 10, wherein said trigger means comprises a lever pivoted to the vehicle, a pull rod connected to the lever, extending to the operator's station and adapted to move the lever to a position wherein a portion thereof projects into the path of said latching means, a stop on the vehicle to prevent movement of the lever beyond said position, and resilient means yieldingly urging the lever to its inoperative position wherein it is cleared by the latching means.

12. A power shovel as defined in claim 8, wherein said lever is pivoted to the carriage intermediate its ends, has a short arm extending downwardly and pivoted to the latching means and has a long arm extending upwardly and adapted to engage said trigger means.

13. A combined hauling scraper and bulldozer as defined in claim 7, wherein said resilient means comprises a bracket secured to the scoop and having an opening, a rod pivoted at one end to the carriage at a distance from the pivotal

axis of connection of the scoop to the carriage, the intermediate region of the rod extending through said opening and the other end thereof being free, and a coil spring compressible between said bracket and the carriage, said rod extending freely through said spring.

14. A combined hauling scraper and bulldozer comprising a propelling vehicle, a carriage pivoted thereto for vertical movement, a scoop pivoted to said carriage for movement from a load carrying position to a dumping position when the carriage is elevated, said dumping position becoming a bulldozing position when the scoop is lowered into contact with the earth, means acting between the scoop and the carriage for stopping the dumping movement of the scoop and for taking the thrust reaction during the bulldozing operation, means for latching the scoop to the carriage in the carrying position, resilient means acting between the carriage and the scoop to urge the scoop from carrying to dumping position when the latching means is released, said resilient means being loaded by movement of the scoop from bulldozing to a loading position wherein the scoop is in contact with the ground along its bottom, and power means adapted to move the carriage upwardly for elevating the scoop and to move the carriage downwardly so as to tilt the scoop from bulldozing position to loading position, thereby loading the said resilient means.

VERNON H. REISSER.