United States Patent

Layton

[15] **3,704,754**

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[54] **ARTICULATED VEHICLE HAVING AN ADJUSTABLE GRADER BLADE THEREON**

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[52] **U.S. Cl.** **172/782,** 172/786, 37/117.5, 172/667, 180/792, 214/140

[51] **Int. Cl.** **E02f 3/12,** E02f 3/76

[58] **Field of Search**.....172/796, 780, 781, 791, 802, 172/782, 667, 786, 797; 37/117.5; 180/79.2 B, 42; 214/140

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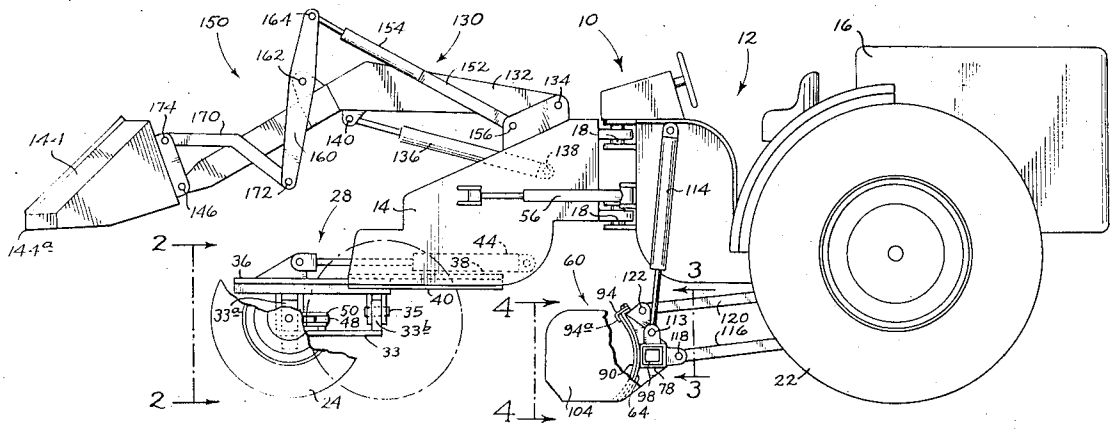
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[57] **ABSTRACT**

A vehicle having wheel-supported forward and rear frame sections which are pivotally interconnected for swinging relative to each other about an upright axis. The wheels supporting the forward frame section are steerable relative to the forward frame section, and power-operated means is provided for swinging the forward frame section relative to the rear frame section. The vehicle may be steered either by steering the front wheels, swinging the forward frame section, or by doing both. A grader blade is mounted on and follows the movement of the rear frame section. A loader boom and bucket are mounted on the forward frame section and follow the movement of the forward frame section. The grader blade extends transversely of the vehicle, and is extensible. The grader blade includes elongated blade sections connected by pivot means permitting swinging of the sections relative to each other about an axis extending longitudinally of the vehicle. This pivoted construction allows the blade to produce either a crown or a valley contour in the material it works.

13 Claims, 8 Drawing Figures



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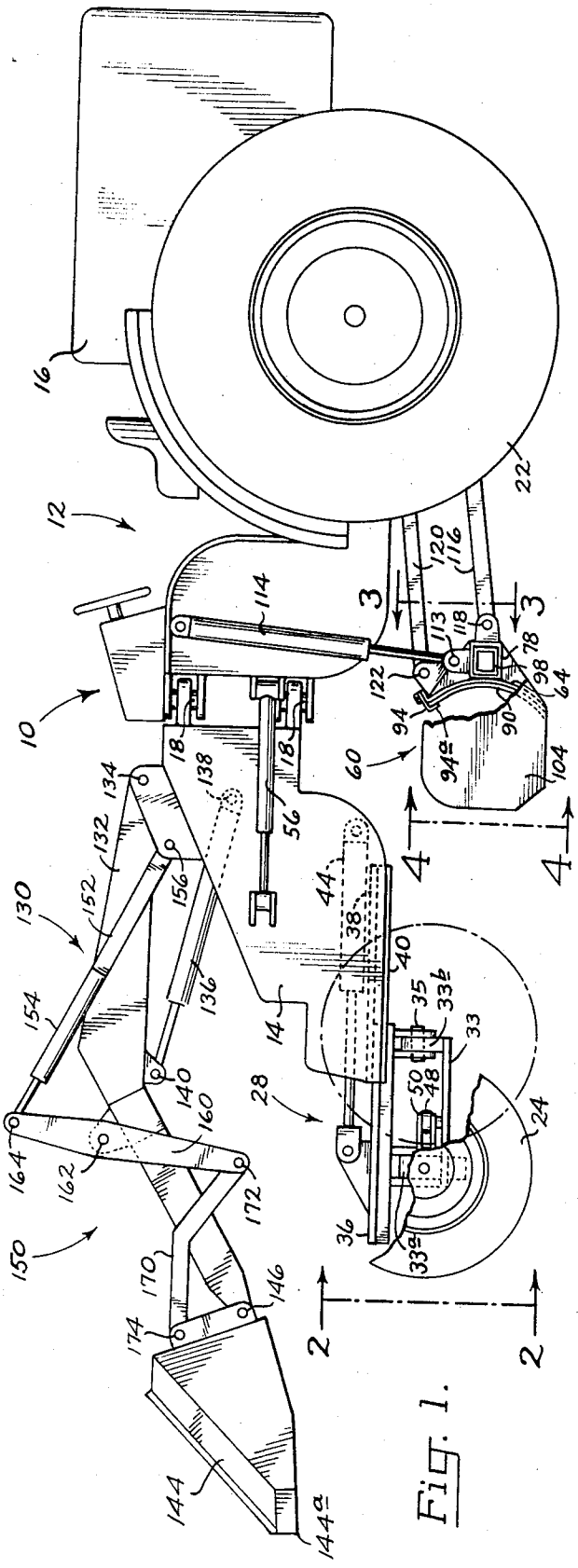


Fig. 1.

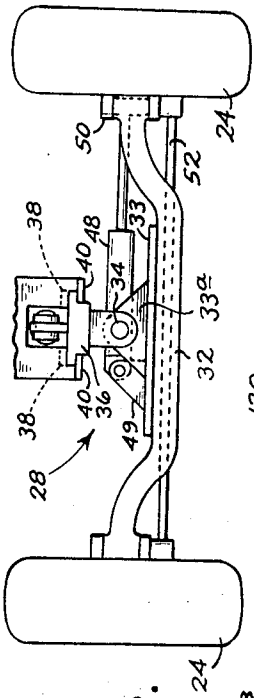


Fig. 2.

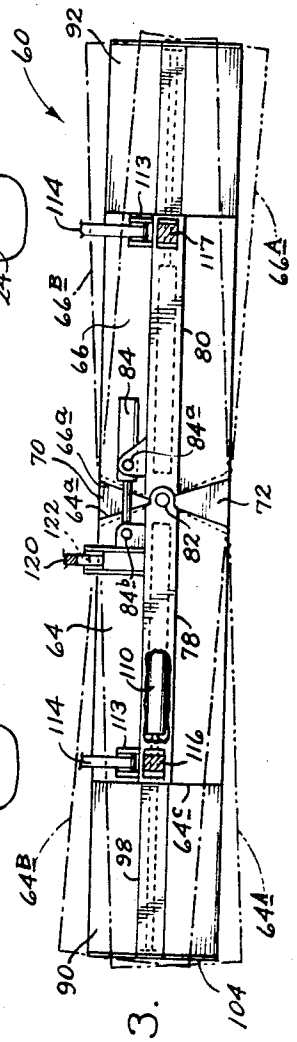


Fig. 3.

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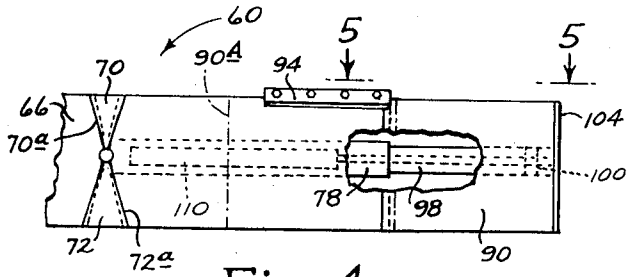


Fig. 4.

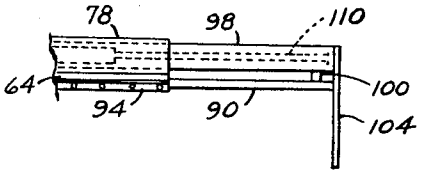


Fig. 5.

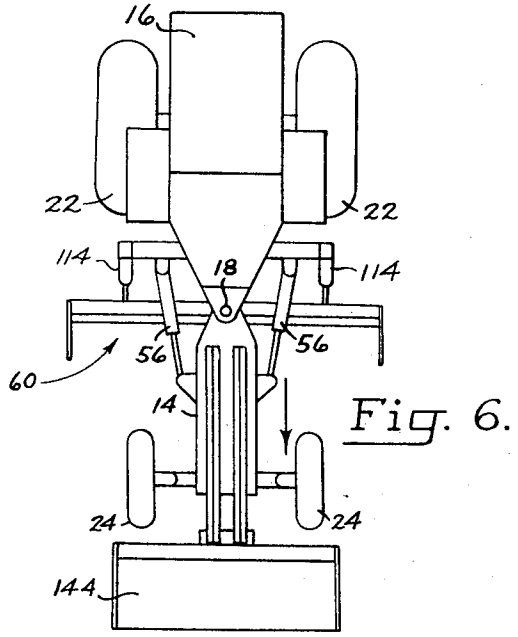


Fig. 6.

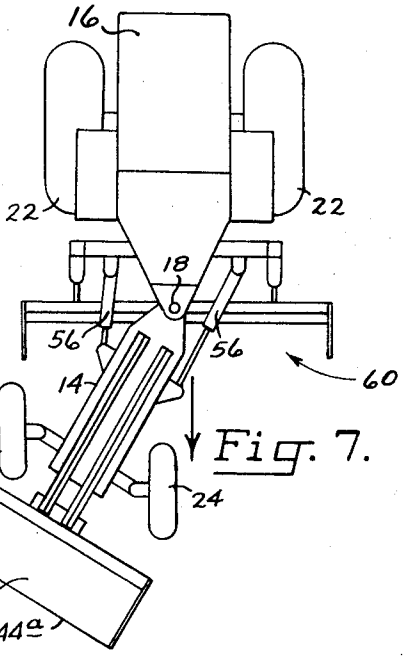


Fig. 7.

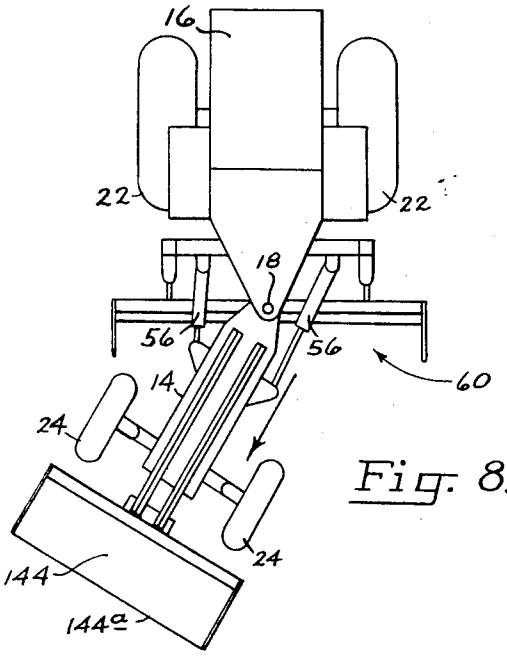


Fig. 8.

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ARTICULATED VEHICLE HAVING AN ADJUSTABLE GRADER BLADE THEREON

This invention relates to a vehicle, and more specifically to an earth-working vehicle.

A general object is to provide a novel vehicle of this description having an articulated frame and mounting a grader blade.

Another object of the invention is to provide a vehicle which has wheel-supported forward and rear frame sections pivotally interconnected for swinging relative to each other, steerable front wheels on the forward frame section, and a grader blade mounted on and extending transversely of the rear frame section which follows the movement of the rear frame section. Such a vehicle provides a highly maneuverable and efficient grader. The forward frame section of the vehicle may be swung to place its forward extremity and the front wheels to either side of the longitudinal axis of the vehicle and thus to either side of the path of the blade.

Another object is to provide an earth-working vehicle with an articulated frame that includes a raisable boom and loader bucket combination on its forward frame section, with the combination extending forwardly along and following the movement of the forward frame section. The bucket thus swings with the forward frame section and may be maneuvered directly into material to be loaded.

Yet another object is to provide an earth-working vehicle including an elongated grader blade which extends transversely of the vehicle and is extensible laterally of the vehicle, permitting varying of the width of the path graded.

Still another object is to provide an earth working vehicle which includes an elongated grader blade which is sectionalized. The sections are pivotally interconnected intermediate the ends of the blade, permitting swinging of the sections relative to each other about an axis extending longitudinally of the vehicle. This adjustability of the blade sections permits the blade to produce either a crown or a valley in the material worked by the vehicle.

A further object is to provide an earth-working vehicle having a grader blade mounted between the front and rear wheels, and a loader bucket which may be lowered to a working position directly in front of the front wheels, the front wheels being mounted for adjustable movement forwardly and rearwardly on the vehicle frame. With the wheels moved forwardly, greater working clearance is provided between them and the grader blade, for improved grader operation. With the wheels moved rearwardly, clearance is provided between them and the loader bucket.

These and other objects and advantages will become more fully apparent as the following description is read in conjunction with the drawings, wherein:

FIG. 1 is a side elevation view of a vehicle constructed in accordance with an embodiment of the invention, with portions broken away;

FIG. 2 is a view taken generally along the line 2—2 in FIG. 1 showing the front of the vehicle;

FIG. 3 is a view taken generally along the line 3—3 in FIG. 1, showing the back of a grader blade therein;

FIG. 4 is a view taken generally along the line 4—4 in FIG. 1, with a portion broken away, and showing an end of such grader blade;

FIG. 5 is a view taken along the line 5—5 in FIG. 4;

FIG. 6 is a top simplified view of the vehicle, reduced in scale; and

FIGS. 7 and 8 are similar to FIG. 6, but show the vehicle in different operating conditions.

Referring now to the drawings, and first more specifically to FIG. 1, at 10 is indicated generally a vehicle constructed according to the invention. The vehicle has an articulated vehicle frame 12, including a forward frame section 14 and a rear frame section 16. These frame sections are pivotally interconnected by a pair of vertical, axially aligned king pins 18 which accommodate relative swinging movement between the frame sections about an upright axis.

The rear frame section is supported for travel over the ground by a pair of power-driven rear wheels, also referred to herein as rear ground support means, such as the one indicated at 22. The forward frame section is supported for travel over the ground by a pair of steerable front wheels, also referred to herein as front ground support means, such as those indicated at 24 in FIGS. 1 and 2.

The front wheels are connected to the forward frame section by mounting means indicated generally at 28. The mounting means includes an axletree 32. Wheels 24 are mounted at opposite ends of the axletree on conventional spindles and pivots, whereby each may rotate freely about a horizontal axis, and each is steerable through pivoting about a substantially upright pivot axis.

The axletree is mounted at substantially its midpoint to the underside of the forward frame section 14. Describing in more detail this mounting, joined to the axletree and extending horizontally and rearwardly therefrom is a plate 33. A lug 33*a* joined to a forward part of the plate and projecting upwardly therefrom is pivotally connected at 34 (see FIG. 2) to the underside of an elongated horizontal plate member 36. A similar upright post 33*b* joined to the rear extremity of plate 33 (see FIG. 1) is joined to the underside of plate member 36 by a pivot connection 35.

Plate member 36 is telescopically received in the forward frame section. Thus, opposed longitudinal margins of the plate member are slidably supported in frame section 14 on their upper sides by a pair of parallel upper tracks 38, shown in dashed outline in FIGS. 1 and 2. On their lower sides, the longitudinal margins are slidably supported by a pair of lower tracks 40. Tracks 38, 40 extend horizontally, and substantially parallel the longitudinal axis of forward frame section 14.

A ram 44, seen in dashed outline in FIG. 1, mounted within the forward frame section is connected at its rear, or cylinder, end to the forward frame section, and at its forward, or rod, end to plate member 36. Extension and contraction of ram 44 moves plate member 36, and thus wheels 24, to various adjusted positions relative to the forward frame section. Full extension of the ram places the wheels forwardly of the forward frame section, in the position illustrated in solid outline in FIG. 1. Full contraction of the ram moves the front wheels to the position shown generally in dashed outline in FIG. 1. The purpose and advantages of this telescopic mounting for the forward wheels will be explained later.

A ram 48, extending substantially parallel to axletree 32, is connected at its cylinder end, and through an ear 49 (see FIG. 2) to plate 33. The rod end of the ram is connected to a steering arm 50, perhaps best illustrated in FIG. 1, which is joined to one of the wheels 24 in such a manner that it steers the wheel. The other wheel moves with the wheel steered by arm 50 through interconnecting the two wheels with a tie bar 52. With the construction described, extension and contraction of ram 48 serves to steer the front wheels relative to the forward frame section.

The vehicle also may be steered by swinging the forward frame section relative to the rear frame section about the pivot axis provided by king pins 18. Swinging of the forward frame section is accomplished by selective extension and contraction of rams, such as ram 56 (see FIGS. 1 and 6) interconnecting frame sections 14, 16.

As is best seen in FIG. 1, the forward frame section extends forwardly (to the left in FIG. 1) and downwardly from its connection with the rear frame section, and a clearance space between the forward and rear wheels is provided between the forward frame section and the ground adjacent where the two frame sections are joined. An elongated grader blade, indicated generally at 60, is dependently supported on the rear frame section. The grader blade extends transversely of the vehicle, and occupies this clearance space.

Referring now to FIG. 3, the grader blade includes a pair of elongated blade section 64, 66. Each blade section has a transverse curvature, as illustrated for section 64 in FIG. 1. Sections 64, 66 are substantially aligned with one another and have a set of ends 64*a*, 66*a* disposed closely adjacent each other. As is seen in FIG. 3, ends 64*a*, 66*a* in outline have a blunt taper, so that edge portions defining the ends diverge on progressing upwardly from the horizontal center line for the blade and on progressing downwardly from such horizontal center line. A triangular plate 70 is welded along one of its edges 70*a* to the face of blade section 66, and this plate overlies a portion of the face of blade section 64, as is best seen in FIG. 4. A similar triangular plate 72 is welded along one of its edges 72*a* to plate 64, and this plate overlies a portion of blade 66. Plates 70, 72 cover the space existing between the adjacent, blunt tapered ends of the blade sections.

Blade section 64 is secured, as by welding, along its back side, to an elongated hollow box beam 78. Such beam extends longitudinally of the blade section and adjacent its horizontal center line. Another elongated hollow box beam 80 is secured in a similar manner to blade section 66, (see FIGS. 1 and 3.) Adjacent ends of beams 78, 80 are pivotally connected by a pin 82 which provides a pivot axis about which blade sections 64, 66 may be swung relative to each other, such axis extending longitudinally of the vehicle. The blunt tapered ends 64*a*, 66*a* of the blade sections provide clearance to permit such swinging.

A double acting, fluid-operated ram 84 disposed above beams 78, 80 is pivotally connected at 84*a*, through its cylinder, to beam 80. The rod end of the ram is connected at 84*b* to beam 78. Extension of the ram produces swinging of blade sections 64, 66 from the position shown in solid outline, downwardly about pivot pin 82, to place the blade sections in the position shown in dot-dashed outline at 64A, 66A. Contraction of the ram swings the blade sections upwardly to place them in the positions shown at 64B, 66B. During periods of non-actuation, ram 84 functions as a means holding the blade sections in a given position of adjustment.

The grader blade also includes a pair of extensible blade portions 90, 92. The extensible portions are similar in construction and mounting, and thus only the one indicated at 90 will be described in detail.

Referring to FIG. 1, extensible portion 90 is so curbed as to fit with its backside snugly against the face of blade section 64. An elongated angle member 94 is secured to the upper edge of blade section 64, in such a manner that one of its flanges 94*a* maintains the upper margin of extensible portion 90 in sliding contact with the upper margin of blade section 64.

An elongated, hollow box beam 98 has one end slidably received within box beam 78. Its opposite end is spaced rearwardly from the backside of extensible portion 90 (see FIGS. 1, 3, 4, and 5). As is best seen in FIG. 5, extensible portion 90 and beam 98 are joined adjacent their outer extremities through a spacer block 100 which is secured, as by welding to each. Extensible portion 90 and beam 98 also are joined by a vertical end plate 104 which extends forwardly therefrom parallel to the longitudinal axis of the vehicle.

Each extensible portion thus is mounted for telescopic movement longitudinally of its associated blade section. In FIG. 3, both of the extensible portions 90, 92 are shown in their extended positions. As explained with reference to extensible portion 90, to place the extensible portion in a contracted position such is moved inwardly with sliding over the front face of its associated blade section until the end plate of the extensible portion, plate 104, comes into contact with the end edge of the associated blade section, shown in the case of blade section 64 at 64*c* in FIG. 3. Such a contracted position is illustrated for extensible portion 90 in dot-dash outline at 90A in FIG. 4.

Movement of each extensible blade portion relative to its associated blade section is produced by actuation of an elongated ram, such as that indicated generally at 110 in FIG. 3 for extensible portion 90. Considering further ram 110, such is mounted within beams 78, 98. It is connected at its cylinder end to beam 78 adjacent pivot 82, and is connected at its rod end adjacent to the outer extremity of beam 98. Extension of the ram moves extensible portion 90 outwardly on associated main blade section 64, and retraction of the ram moves the extensible portion inwardly.

A pair of upright fluid-operated rams, also referred to herein as adjustable linkage means, such as the one indicated at 114 in FIG. 1, (the other being obscured and on the opposite side of the vehicle) are pivotally connected to their upper ends to opposite sides of the rear frame section in the vehicle. At their lower set of ends, the rams are pivotally connected, one to each blade section, through connections 113 with spaced ends of beams 78, 80, as is best seen in FIG. 3. Selective actuation of rams 114 controls the vertical positioning of blade 60 relative to the vehicle frame.

A pair of thrust bars are provided, with one projecting rearwardly from each blade section in the grader

blade. Such are shown at **116** and **117** in FIG. **3**. As demonstrated by bar **116**, best seen in FIG. **1**, the forward end of a thrust bar is pivotally connected by pivot connection **118** to the beam which extends along the backside of a blade section. The opposite, or rear, end of the thrust bar is anchored through a suitable pivot connection (not shown) to the rear frame section of the vehicle, the pivot connection accommodating up and down swinging movement of the thrust bar. Also forming part of the mounting for the blade is a stabilizing bar **120** which is connected at its forward end through a pivot connection **122** to the grader blade adjacent the center of the blade. The rear end of the stabilizing bar is pivotally anchored to the rear frame section of the vehicle by a pivot connection (not shown). The function of the stabilizing bar is to maintain the face of the grader blade upright as shown in FIG. **1**.

Referring still to FIG. **1**, mounted on forward frame section **14** is loader mechanism, indicated generally at **130**. The loader mechanism includes an elongated boom **132** which is pivotally connected to the frame at **134** adjacent its right end in the figure for vertical swinging relative to the frame. A ram **136** is pivotally connected at **138** at its cylinder ends to forward frame section **14** and is pivotally connected at its rod end at **140** to boom **132**. With ram **136** contracted, the boom is in a lowered position (not shown) in which it extends forwardly and downwardly along the forward frame section. Extension of ram **136** swings the boom upwardly about its pivot connection **134** to place the boom in a raised position. The boom is illustrated in a somewhat raised position in FIG. **1**.

A loader bucket **144** is pivotally connected at **146** to the forward end of boom **132**. Pivotal connection **146** provides a substantially horizontal tip axis about which the bucket may be tipped to place it in different attitudes.

A linkage system, indicated generally at **150**, is provided for changing the attitude of the bucket. The system includes a link **152**, partly formed of a ram **154**, which is pivotally connected at **156** to forward frame section **14**. An elongated arm **160** in the linkage system is pivotally connected adjacent its midpoint at **162** to boom **132** intermediate its ends. The upper end of arm **162** in FIG. **1**, is pivotally joined to the rod end of ram **154** by a pin **164**. Another elongated arm **170** is pivotally connected at one of its ends at **172** to the lower end of arm **160**. The opposite end of arm **170** is pivotally joined to bucket **144** at **174** in a region spaced from pivot connection **146**.

The linkage system is so constructed that upon actuation of ram **154** bucket **144** is caused to swing about pivot axis **146**. Extension of ram **154** produces clockwise tipping of the bucket in FIG. **1** and contraction produces counterclockwise tipping. The boom and bucket are so mounted on the forward frame section that when the boom is in its lowered position, the bucket is held directly in front of front wheels **24**.

Explaining now the operation of the vehicle for grading, loader mechanism **130** is placed in a somewhat raised position as illustrated in FIG. **1**, mounting means **28** for the front wheels **24** is extended to place the front wheels as far forwardly of the grader blade as possible, and the grader blade is placed in a desired grading position. The vertical position of the grader blade is set by selective actuation of rams **114**. The position of the blade sections relative to each other is set by selective actuation of ram **84**. The grader blade may be positioned with sections **64, 66** axially aligned as shown in solid outline in FIG. **3**; swung upwardly about pivot connection **82** to the positions indicated at **64B, 66B**; or swung downwardly about such pivot connection to the positions illustrated at **64A, 66A**. With the blade sections in the positions shown in solid outline in FIG. **3**, the grader blade will produce a flat surface on material worked by the grader. With the outer ends of the blade sections swung upwardly, a valley contour is produced in the material worked, and with the outer ends of the blade sections swung downwardly, a crown contour is produced.

The rams associated with extensible portions **90, 92** of the grader blade also may be actuated selectively to position the extensible portions to produce a desired grading width for the grader blade.

As the vehicle is driven forwardly by rear wheels **22**, the grader blade will grade material which projects above its lower margin to the configuration formed by the lower margin of the grader blade. End plates **104** on the grader blade confine material struck from the surface worked within the bounds of the outer extremities of the grader blade so that the grader blade will carry a quantity of material forwardly to fill in low spots.

Since a quantity of material is carried by the grader blade, such will form a moving mound in front of the blade. With front wheels **24** extended as far forwardly as possible from the grader blade, they are able to run on original material surface in front of the mound rather than on the forward slope of the mound moved by the grader blade.

During the grading operation the vehicle is steered either by steering front wheels **24** relative to the forward frame section, by swinging the front frame section relative to the rear frame section, or by a combination of these two methods. During any such steering operation, blade **60** follows the movement of the rear frame section **16** and wheels **22**.

With forward frame section **14** being swingable to either side of the longitudinal axis of the vehicle by selective actuation of rams **56**, the forward frame section, wheels **24**, and bucket **144** may be swung to one side of, and out of the way of, the path of one end of grader blade **60**, as illustrated in FIG. **7**. With the forward frame section swung to the side, wheels **24** may be steered so that the vehicle will travel in a straight path along the longitudinal axis of rear frame section **16**, as indicated by the arrow in FIG. **7**. The path directly in front of one end of the grader blade is left free. This permits the grader to work in difficult, or tight, spaces which could not be worked if the forward frame section were fixed in a position extending straight forwardly from the rear frame section as illustrated in FIG. **6**.

Explaining now the operation of the vehicle as a front end loader, front wheels **24** are retracted as far as possible toward grader blade **60** and the grader blade is raised by actuation of rams **114**. With front wheels **24** retracted, loader boom **132** is lowered with ample clearance being provided between the backside of bucket **144** and the front wheels. With the bucket lowered directly in front of the front wheels, ram **154** is actuated to place the bucket in a digging attitude in

which it opens facing forwardly of the vehicle. The vehicle then is driven forwardly and the bucket digs into and scoops loose material in front of the vehicle. The bucket then is tipped in a clockwise direction in FIG. 1 by extension of ram **154** to place the bucket in a holding attitude facing upwardly, and the boom and bucket are raised. The bucket then is dumped by retracting ram **154** to swing the bucket in a counterclockwise direction to a dumping attitude wherein it opens facing downwardly.

The vehicle may be steered during loader operation in any of the three methods previously described. However, it is generally desirable to have the forward, or leading, edge **144***a* of bucket **144** moved directly into a pile of loose material. During loader operation, therefore, wheels **24** generally are maintained in a position paralleling the longitudinal axis of forward frame section **14** and the vehicle is steered by selective actuation of rams **56**, as illustrated in FIG. **8**. In this way, the bucket is moved in a direction normal to its leading edge directly into a pile of material, rather than at an angle as would be the case as illustrated in FIG. **7**, where the front wheels are positioned at an angle to the forward frame section.

While a preferred embodiment of the invention has been described herein, it should be obvious to those skilled in the art that variations and modifications are possible without departing from the spirit of the invention.

It is claimed and desired to secure by letters patent:

1. A vehicle comprising

an articulated vehicle frame, said frame comprising a rear frame section, a forward frame section, and means pivotally connecting said frame sections accommodating relative swinging movement therebetween about an upright axis;

means connected to said forward frame section for producing such relative swinging between the frame sections;

power-driven rear ground support means mounted on and supporting the rear frame section for travel over the ground;

steerable front ground support means;

means mounting said front ground support means on said forward frame section for movement relative to said forward frame section longitudinally thereof to permit positioning of said front ground support means in different adjusted positions;

means for holding said front ground support means in a given adjusted position;

an elongated grader blade; and

means supporting said blade on said rear frame section for travel with said rear frame section.

2. The vehicle of claim **1**, which further comprises a boom pivotally connected to and extending forwardly in the vehicle along said forward frame section for raising and lowering about a substantially horizontal pivot axis, and a loader bucket mounted adjacent the forward end of the boom for raising and lowering therewith, said boom in a lowered position holding the bucket directly in front of the front ground support means.

3. The vehicle of claim **1**, wherein said mounting means comprises an elongated member to which said front ground support means is joined, and receiving means telescopically receiving said member joined to said forward frame section, said member being movable in said receiving means along a path substantially paralleling the longitudinal axis of the forward frame section.

4. The vehicle of claim **1**, wherein said means for holding said front ground support means comprises a fluid-operated ram actuatable to move the support means under power.

5. A vehicle comprising

an articulated vehicle frame, said frame comprising a rear frame section, a forward frame section, and means pivotally connecting said frame sections accommodating relative swinging movement therebetween about an upright axis,

means connected to said forward frame section for producing such relative swinging between the frame sections;

power-driven rear ground support means mounted on and supporting the rear frame section for travel over the ground;

steerable front ground support means mounted on and supporting the forward frame section for travel over the ground;

an elongated grader blade, and means supporting said grader blade on said rear frame section for travel therewith, said grader blade including a pair of elongated blade sections extending laterally to opposite sides of said rear frame section and pivot means interconnecting said blade sections accommodating swinging of said blade sections relative to each other about a pivot axis extending longitudinally of the vehicle, said means supporting said grader blade comprising adjustable linkage means accommodating selective positioning of said grader blade relative to said rear frame section.

6. The vehicle of claim **5**, wherein said adjustable linkage means comprises a pair of fluid-operated rams, one for each blade section, each being mounted at one of its ends on a blade section and at the other of its ends on said rear frame section, a pair of thrust bars, one being connected to an projecting rearwardly from each blade section and having rear extremities mounted on said rear frame section, and a stabilizing bar interposed between said grader blade and rear frame section.

7. The vehicle of claim **5**, wherein said grader blade is extensible and further comprises an extensible blade portion mounted adjacent and end of one of said blade sections for telescopic movement longitudinally of said blade section and outwardly beyond said end of the blade section.

8. A vehicle comprising

a rear frame section,

power-driven rear ground support means mounted on and supporting the rear frame section for travel over the ground;

a forward frame section connected to said rear frame section and extending forwardly and downwardly from its connection with said rear frame section, a clearance space being provided between said forward frame section and the ground adjacent where the forward frame section is connected to said rear frame section,

front ground support means;

means mounting said front ground support means on said forward frame section for movement relative to said forward frame section and longitudinally thereof to permit positioning of said front ground support means in different adjusted positions,

means for holding said front ground support means in a given adjusted position;

a grader blade mounted on the vehicle and disposed under said front frame section in said clearance space;

an elongated boom pivotally connected to and extending forwardly in the vehicle along said forward frame section for raising and lowering about a substantially horizontal pivot axis, and

a loader bucket mounted adjacent the forward end of the boom for raising and lowering therewith, said boom in a lowered position extending forwardly and downwardly along the forward frame section to hold the bucket directly in front of said front ground support means.

9. The vehicle of claim **8**, which further comprises pivot means connecting said forward and rear frame sections providing an upright pivot axis about which the frame sections may be swung relative to each other, and means for producing such relative swinging therebetween.

10. The vehicle of claim **9**, wherein said front ground support means comprises a steerable ground-engaging means.

11. In a vehicle frame, an elongated grader blade and means supporting the grader blade on the vehicle frame with such extending transversely of the vehicle, said grader blade comprising a pair of elongated blade sections having one set of ends disposed closely adjacent each other and pivot means connecting said blade sections adjacent their said one set of ends accommodating relative swinging of said blade sections about an axis extending longitudinally of the vehicle, a fluid-powered ram having one end connected to one and its other end connected to the other of said blade sections for swinging them about said axis to various positions relative to each other, for holding said blade sections in any one of said positions, said grader blade further comprising an extensible blade portion mounted on an end of at least one of said blade sections for telescopic movement longitudinally of said blade section outwardly beyond said end of the blade section, and a motor means connected to the extensible blade portion and connected to said one of said blade sections, said motor means being actuable to produce such telescopic movement.

12. A vehicle comprising

an articulated vehicle frame, said frame comprising a rear frame section, a forward frame section, and means pivotally connecting said frame sections accommodating relative swinging movement therebetween about an upright axis;

means connected to said forward frame section for producing such relative swinging between the frame sections;

power-driven rear ground support means mounted on and supporting the rear frame section for travel over the ground;

steerable front ground support means mounted on and supporting the forward frame section for travel over the ground;

an elongated grader blade, and means supporting said grader blade on said rear frame section for travel therewith, said grader blade including a pair of elongated blade sections extending laterally to opposite sides of said rear frame section, pivot means interconnecting said blade sections accommodating swinging of said blade sections relative to each other about a pivot axis extending longitudinally of the vehicle, and power-operated means connected to the blade sections for swinging the blade sections about said pivot axis to various positions relative to each other.

13. In a vehicle, a vehicle frame, an elongated grader blade and means supporting the grader blade on the vehicle frame with such extending transversely of the vehicle, said grader blade comprising a pair of elongated blade sections having one set of ends disposed closely adjacent each other and pivot means connecting said blade sections adjacent their said one set of ends accommodating relative swinging of said blade sections about an axis extending longitudinally of the vehicle, said means supporting said grader blade comprising a pair of fluid-operated rams, one for each blade section, each ram being mounted at one of its ends on a blade section and having the other of its ends mounted on said vehicle frame, a pair of thrust bars, one bar being connected to and projecting rearwardly from each blade section and said bars having rear extremities pivotally mounted on said vehicle frame, and a stabilizing bar having one end pivotally connected to the grader blade and an opposite end pivotally connected to the vehicle frame.

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