

C. H. MAGRUDER.  
GRINDING MACHINE.  
APPLICATION FILED NOV. 14, 1914.

1,153,508.

Patented Sept. 14, 1915.  
2 SHEETS—SHEET 1.

Fig. 1.

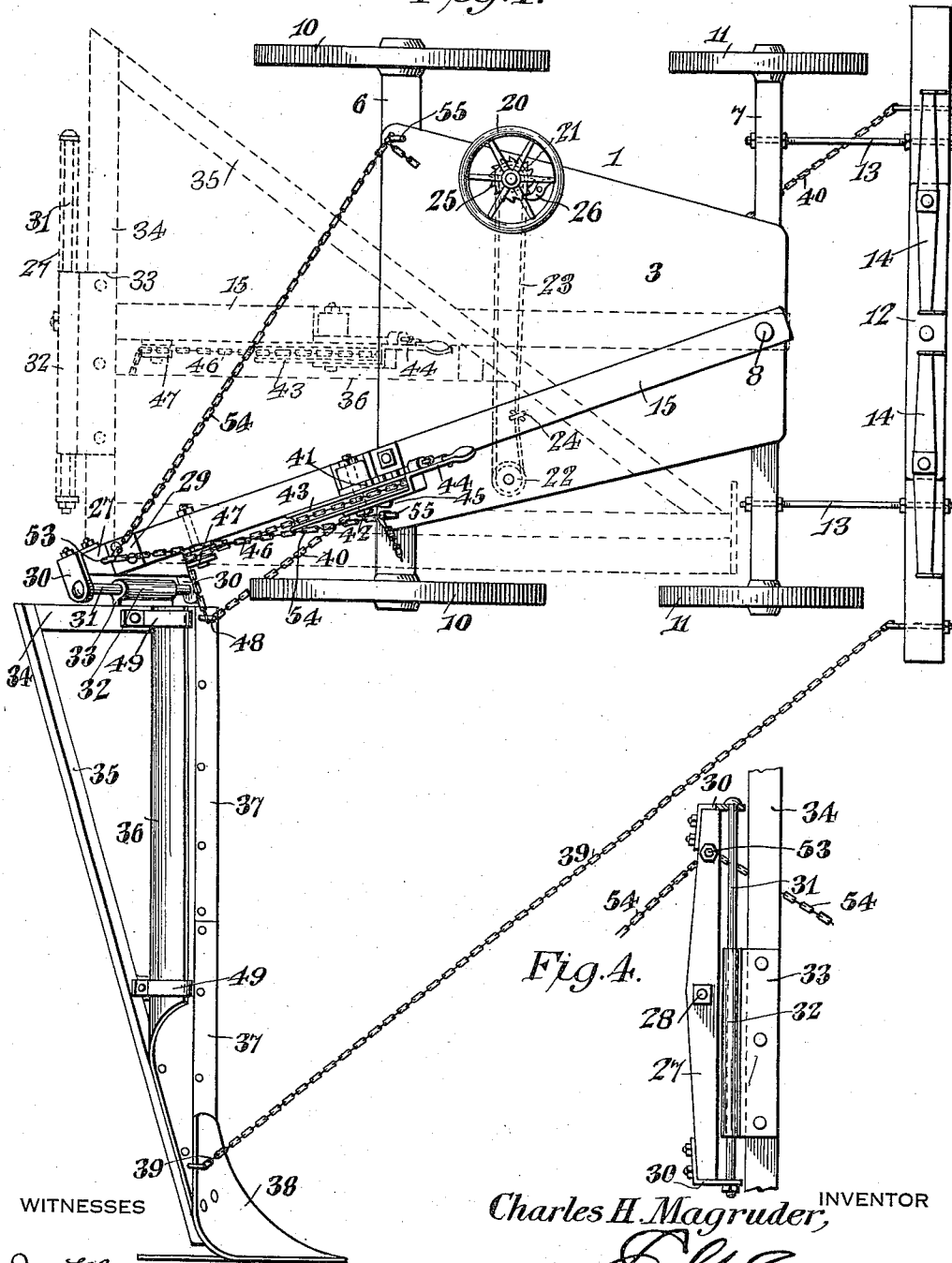
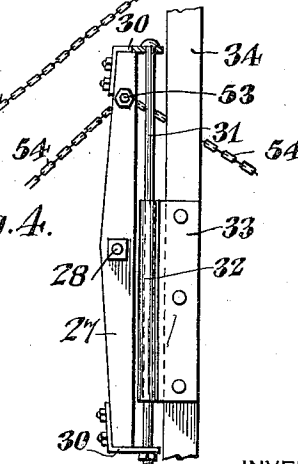


Fig. 4.



WITNESSES

Jas. McLaughlin  
F. T. Chapman.

Charles H. Magruder, INVENTOR

BY

E. J. Siggers

ATTORNEY

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2 SHEETS—SHEET 2.

Fig. 2.

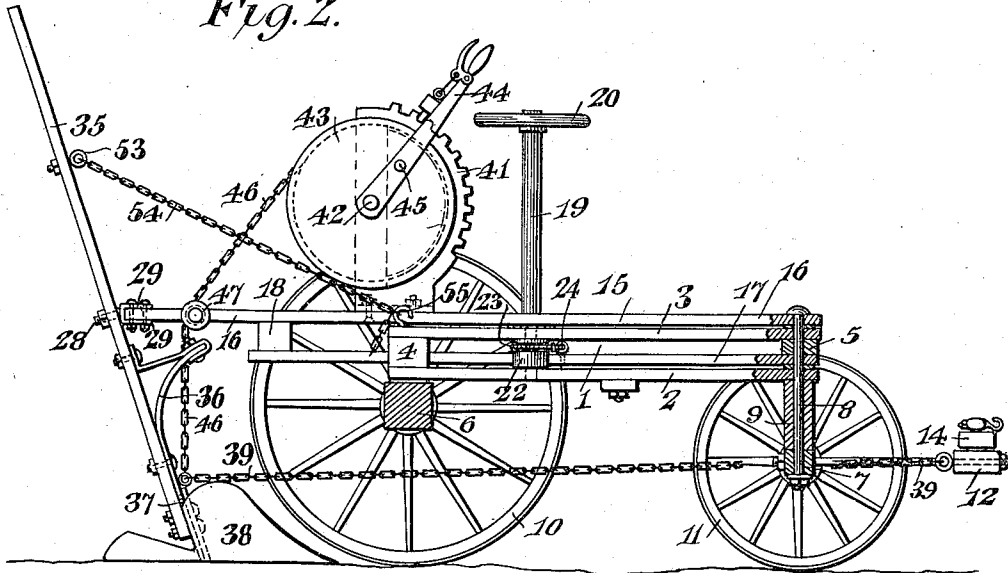


Fig. 5.

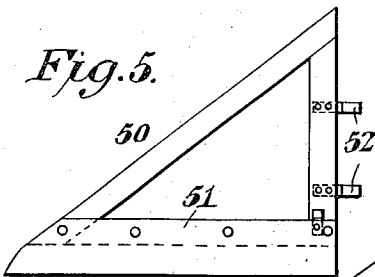
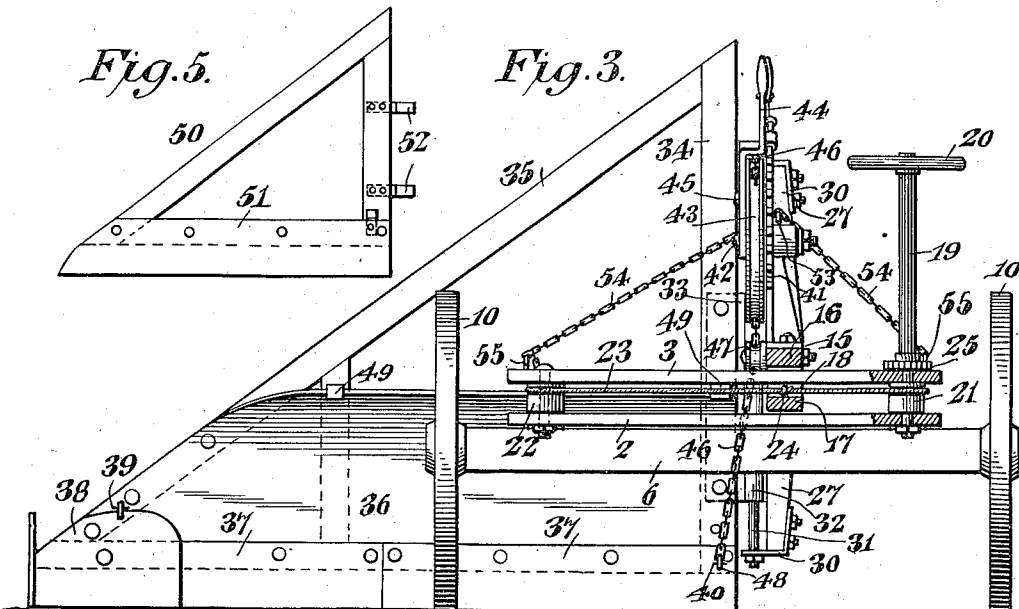


Fig. 3.



WITNESSES

*James McEachran*  
*F. J. Chapman.*

Charles H. Magruder, INVENTOR

BY

*E. G. Figgers*

ATTORNEY

# UNITED STATES PATENT OFFICE.

CHARLES H. MAGRUDER, OF SHELBYNA, MISSOURI.

## GRADING-MACHINE.

1,153,508.

Specification of Letters Patent.

Patented Sept. 14, 1915.

Application filed November 14, 1914. Serial No. 872,147.

*To all whom it may concern:*

Be it known that I, CHARLES H. MAGRUDER, a citizen of the United States, residing at Shelbyna, in the county of Shelby and State of Missouri, have invented a new and useful Grading-Machine, of which the following is a specification.

This invention relates to grading machines and is designed to perform the operations which road scrapers and the like are expected to perform, and in addition thereto provide for scraping across ditches or wash-outs where ordinary graders are ineffective or will not reach.

To this end the invention comprises a suitable vehicle with a scraping blade capable of sidewise projection beyond the vehicle to substantially the entire length of the blade and the raising and lowering of the blade and the storage of the scraping members upon the vehicle for transportation.

The invention will be best understood from a consideration of the following detailed description, taken in connection with the accompanying drawings forming a part of this specification, with the further understanding that while the drawings show a practical form of the invention, the latter is not confined to any strict conformity with the showing of the drawings, but may be changed and modified so long as such changes and modifications mark no material departure from the salient features of the invention.

In the drawings: Figure 1 is a plan view of the improved scraper or grader with the scraping blade at the full laterally projected position and also showing in dotted lines the position assumed by the scraping devices when folded upon the vehicle. Fig. 2 is a side elevation with a portion of the vehicle in section. Fig. 3 is a front elevation with some parts in section and showing the scraping blade in an intermediate position of lateral projection. Fig. 4 is a detail of the hinge connection between the blade support and the pivot connection with the vehicle. Fig. 5 is a view of another form of scraper blade, the view being upon a reduced scale to that of the other figures.

Referring to the drawings there is shown a vehicle 1 having a body portion provided with a bottom 2 and top 3 each shown as of unbroken continuity and having the sides approaching toward the front end of the ve-

hicle, but it will be understood that the construction of the vehicle body is not limited to such particular formation. The bottom 2 and top 3 of the body of the vehicle are separated by spacers 4, 5, the spacers 4 being at the rear of the body member, which in the particular construction shown is the wider end of the body member. The usual rear and front axles 6 and 7 are provided for the support of the body member, the front axle being held by a king bolt 8 carried by the front central portion of the body and extending through a spacing block 9 between the front of the body and the axle 7 to conform to different heights of the two axles from the ground. The rear axle 6 is provided with wheels 10 and the front axle with wheels 11, which latter, in the particular showing of the drawings, are smaller than the rear wheels, but these are also matters which may be varied within considerable limits. In the showing of the drawings the front axle carries a bar 12 connected to the axle by elongated bolts 13 spacing the bar sufficiently in front of the axle to avoid the wheels 11, and this bar carries swingle-trees 14 for the attachment of draft animals.

Mounted at the front end on the king bolt 8 is a swinging arm 15 comprising a top strip 16 and a lower strip 17. The arm 15 is of sufficient length to extend from the king bolt rearwardly beyond the rear edge of the body of the vehicle, and also rearwardly beyond the rear wheels 10, and in the particular showing of the drawings the strip 16 is arranged above the top 3 of the body and extends to the extreme rear of the arm, while the strip 17 is intermediate of the bottom 2 and top 3 of the body, and is of less rearward extent than the strip 16, being connected thereto and spaced therefrom by an interposed block 18 between the rear end of the strip 17 and the corresponding portion of the strip 16. Of course, it will be understood that the arm 15 may be otherwise constructed so long as it is capable of performing the functions demanded of it, which functions will hereinafter appear.

For the purposes of the present invention the arm 15 is to swing horizontally about the king bolt 8, and to facilitate this swinging movement, so that it may be controlled from the top of the vehicle, there is mounted in the vehicle an upright post or shaft 19, having at its upper end a manipulating wheel

20, and between the top and bottom members of the body of the vehicle carrying a drum or pulley 21. The post 19 with its pulley 21 is situated at one side of the body of the vehicle, while at the other side of the body of the vehicle between the top and bottom members there is journaled a pulley 22, and encircling these pulleys and extending between them is an endless chain or rope 23, one strand of which is made fast to the strip 17 of the arm 15 by a fastening device 24 which may consist of a staple, eye bolt, or other device usually employed for such purpose. The post or shaft 19 carries a ratchet wheel 25 engaged by a holding pawl 26 on the top of the vehicle body. By this means the arm 15 is moved in either direction about the king bolt, but may be held in any position of adjustment toward one side of the vehicle, for a purpose which will presently appear.

Pivotally connected at about the middle of its length to the rear end of the strip 16 of the arm 15, is a rock arm 27. This connection comprises a bolt or pin 28 extending through the arm 27 about midway of the length of the latter, and connected to the strip 16 by strap extensions 29 of the pin or bolt, which constitutes a pivot pin or bolt. At opposite ends of the arm 27 angle brackets 30 are made fast, and these brackets form supports for the opposite ends of a pintle rod 31, carrying an elongated sleeve 32 provided with a side flange 33, which sleeve and flange may correspond to one wing of a hinge. The sleeve 32 is sufficiently shorter than the pintle rod 31 to permit a considerable longitudinal movement of the sleeve 32 along the rod, while the rod and sleeve with the wing or flange 33 constitute a hinge. Fast to the wing 33 is one end member 34 of a frame 35, which in the particular showing of the drawings is a triangular frame, but, of course, may be otherwise shaped. Considering the frame 35 as a triangular frame, there is attached to its basic portion a scraper blade 36 carrying a suitable number of active or road engaging members 37. By making that part of the scraper blade which is subject to wear of several short sections, renewal of the parts is facilitated at a minimum cost. That end of the scraper blade remote from the frame member or post 34 carries a plow share 38 constituting the extreme outer end of the scraper blade, so that dirt engaged by the plow share is directed toward the body of the scraper blade to be carried forwardly by the latter. By properly pitching the blade with relation to the line of draft the dirt gathered by the scraper blade may be discharged at the heel of the blade. This pitch of the blade is determined by a chain or other like connection 39 between the outer or plow end of the scraper blade or scraper frame and the correspond-

ing end of the bar 12. The heel of the scraper frame and blade is connected by a chain or similar device 40 to the bar 12 near the other end thereof. The scraper blade is, therefore, in a manner directly connected to the draft animals, so that the vehicle is to a large extent relieved from strains which might otherwise be brought upon it.

Mounted on the arm 15 near the rear end thereof is a rack segment 41 carrying at its center, by an axis bolt or pin 42, a drum 43 and a latch arm 44 made fast to the drum by a pin or bolt 45, while the latch of the latch arm is in operative relation to the teeth of the segment 41. Made fast to the drum 43 is one end of a chain or other flexible strand 46 carried about a direction-changing pulley 47 of the strip 16 to an eye bolt 48 or other suitable connection at the lower portion of the heel end of the scraper frame, and this same eye bolt may be utilized for the attachment of the chain or strand 40 to the scraper frame.

The upper edge of the scraper blade 36 is forwardly bent to hold any gathered dirt from overflowing, and this portion of the scraper blade is braced and supported by brackets 49.

Instead of the scraper frame 35 with its blade 46, a lighter form of frame 50 may be employed, as shown in Fig. 5, and in this case a scraper blade 51, also of lighter and simpler construction than the blade 36 with its renewable edge portions 37, is provided. Instead of the sleeve 32 the frame 50 is supplied with spaced pivot eyes 52 which may encircle the pintle bolt 31. Otherwise the structure of the grader is the same as already described with reference to Figs. 1 to 4, and the scraper frame 50 is simply intended as a substitute for the scraper frame 35 with the parts carried thereby.

In the inactive position of the parts of the grader the swinging arm 15 is so adjusted as to be somewhere near the longitudinal middle line of the vehicle, and the rock arm 27 is swung on the pivot 28 until about horizontal, in which position the scraper frame 35 with the scraper blade 36, which together may be considered as constituting the scraper, is turned about the pintle 31 as a hinged pintle, until the frame 35 rests in a substantially horizontal position upon the arm 15 in overlying relation to the body of the vehicle. In this position of the parts the grader is readily transported from place to place, or may be stored in a minimum of space.

If now it be desired to use the grader, the frame 35 is lifted from its resting place on the vehicle and then turned upon the pivot 28 until the road engaging members 37 of the blade 36 are in contact with the ground or nearly so, actual contact, or even a sub-surface position, being brought about by a

suitable manipulation of the lever 44 causing the lowering of the blade to the desired extent. Any lateral adjustment of the scraper blade is brought about by a manipulation of the wheel 20, which, through the shaft 19 and strand 23 extending about the rollers 21 and 22 and fast at 24 to the arm 15, causes the latter to swing about its pivot 8 laterally of the line of travel and the scraper frame and blade participate in such lateral movement. However, because of the hinged connection 31, 32 with the arm 27 carried by the arm 15, the scraper blade maintains its lateral position with respect to the line of travel, which position may be actually or very nearly perpendicular to the line of travel, or at an angle thereto as determined by the length of the chain or strand 39. Such initially adjusted position of the scraper blade with relation to the line of travel is maintained within close limits throughout the entire swing of the arm 15 to either side of the line of draft. The range of movement of the arm 15 is such that at one limit of movement of the arm the scraper blade is behind the vehicle so as to extend from one side of the vehicle to the other, and if the length of the scraper blade be about the same as the width of the vehicle the scraper will then be located between the lines of travel of the wheels of the vehicle. If the arm 15 be at the other limit of its movement the scraper blade is projected to substantially its whole length to one side of the vehicle. This last position is advantageous where it is desired to scrape on both sides of a ditch or wash-out, for the vehicle may travel upon unbroken ground and the scraper be laterally projected until it spans the ditch or wash-out. Then by a proper adjustment of the parts the ditch or wash-out may be filled by the action of the scraper, while the vehicle itself is running upon a surface unaffected by the scraper. All this is brought about by mounting the scraper frame or blade, or as it may be termed the scraper, at one end or edge upon the free end of a pivoted arm carried by the vehicle and capable of swinging crosswise thereof. whereby the scraper blade has a range of adjustment from a position where it is practically wholly behind the vehicle to a position where it is practically wholly to one side of the vehicle. Also the structure is such that the scraper may be moved into overlying position of the vehicle being supported thereby.

In order to regulate the depth of cut of the outer end of the scraper blade represented by the plow share 38, provision is made for rocking the rock arm or rocker post 27 on the pivot 28. This may be done in several different ways, and one of the several means for the purpose is shown in the drawings. Extending from a fastening device

53, such as an eye bolt, fast to the arm 27 near the top of the latter are the like ends of two chains 54 or other suitable means. These chains extend oppositely from the arm 27 to hooks 55 at or near the opposite rear corners of the vehicle body. By a proper adjustment of the chains 54 the scraper frame may be rocked so that the plow end 38 will cut deep or shallow irrespective of the adjustment of the heel end of the scraper.

What is claimed is:—

1. A grading machine, comprising a vehicle, an elongated scraper, and a support connected to the scraper and carrying the latter by one end, said support being movable crosswise of the vehicle to project the scraper laterally with respect to the vehicle to a position substantially wholly to one side of the vehicle and perpendicular to the line of travel, whereby the scraper will operate on both sides of a ditch or the like with the vehicle traveling at one side of said ditch.

2. A grading machine comprising a vehicle, a carrier having a range of movement thereon laterally of the line of travel of the vehicle, and a scraper mounted at one end on and solely supported by the carrier for adjustment with said carrier to a position substantially wholly to one side of the vehicle.

3. A grading machine comprising a vehicle, an arm thereon pivoted at one end to the vehicle and having a range of movement on the pivot in a direction lateral to the line of travel of the vehicle, and a scraper mounted at one end on the free end of and solely carried by said arm, and movable with the arm to a position substantially wholly to one side of the arm and the vehicle.

4. A grading machine comprising a vehicle, an arm pivoted at one end to the vehicle near the front of the latter, and said arm being of a length to project to the rear of said vehicle, and a scraper hinged at one end to the rear end of the arm and movable with the latter, said arm having a range of lateral adjustment to project the scraper wholly to one side of the vehicle with said scraper wholly to the corresponding side of the arm.

5. A grading machine comprising a vehicle, an arm pivoted at one end to the vehicle near the front of the latter and extending to the rear of the vehicle, said arm being movable on its pivot in a direction lateral to the line of travel of the vehicle, and a scraper hinged at one end to the free end of the arm and participating in the lateral movements of said arm, the hinge connection being constructed to permit movements of the scraper along the hinge in the direction of the length of the hinge.

6. A grading machine comprising a vehicle, a carrier thereon having a range of movement lateral to the line of travel and from one side to the other of the vehicle,

and a scraper hingedly mounted at one end to and supported wholly by the carrier for adjustments with respect to the vehicle with and by the carrier to a position substantially wholly to one side of the vehicle while substantially maintaining a constant relation to the line of travel.

7. A grading machine comprising a vehicle, an arm pivoted at one end to the vehicle near the front of the latter and extending beyond the rear of the vehicle, said arm being movable in a direction laterally of the line of travel of the vehicle, and a scraper having a hinge connection at one end to the arm, said connection being pivoted to the arm to turn on an axis substantially perpendicular to the hinge axis.

8. A grading machine comprising a vehicle, an arm pivoted at one end to the vehicle near the front of the latter for swinging movements substantially lateral to the line of travel, and said arm extending beyond the rear of the vehicle, a scraper, and a universal connection between one end of the scraper and said arm, said scraper being wholly carried by the arm.

9. A grading machine comprising a vehicle, an arm mounted on the vehicle to move laterally thereon, an elongated scraper, a hinge between one end of the scraper and one end of the arm with said scraper movable lengthwise of the hinge in an up and down direction with respect to the vehicle, and adjusting means for moving the scraper lengthwise of said hinge.

10. A grading machine comprising a vehicle, an arm provided at one end with an upright pivotal connection with the vehicle near the front end of the latter, and said arm extending beyond the rear of the vehicle, means for moving the arm crosswise of the vehicle about its pivot to different positions with respect to the line of travel of the vehicle, and a scraper hinged at one end to the rear end of the arm and movable lengthwise of the hinge, said hinge connection to the arm being also pivotally connected to the arm for movement of the hinge on an axis perpendicular to the direction of movement of the scraper along the hinge.

11. A grading machine comprising a vehicle, an arm provided at one end with an upright pivotal connection with the vehicle near the front end of the latter, and said arm extending beyond the rear of the vehicle, means for moving the arm crosswise of the vehicle about its pivot to different positions with respect to the line of travel of the vehicle, and a scraper hinged at one end to the rear end of the arm and movable lengthwise of the hinge, said hinge connection to the arm being also pivotally connected to the arm for movement of the hinge on an axis perpendicular to the direction of movement of the scraper along the hinge, and

said arm also carrying adjusting means and connections therefrom to the scraper for regulating the depth of cut of the scraper.

12. A grading machine comprising a vehicle, an arm pivotally connected at one end to the vehicle near the front end thereof and movable on its pivot crosswise of the vehicle, said arm extending to the rear of the vehicle, a scraper hingedly connected at one end to said arm, draft means on the vehicle, and flexible connections between the scraper and the draft means.

13. A grading machine comprising a vehicle provided with draft means, a scraper, a carrier for the scraper on and movable crosswise of the vehicle and constituting the sole support for the scraper, hinge connections between one end of the scraper and the carrier, and flexible connections between the scraper and draft means.

14. A grading machine comprising a vehicle provided with draft means, a scraper, a carrier for the scraper on and movable crosswise of the vehicle and constituting the sole support for the scraper, hinge connections between one end of the scraper and the carrier, and flexible connections between the scraper and draft means, said carrier being also provided with supporting means for the hinged end of the scraper for elevating and lowering said scraper.

15. A grading machine comprising a vehicle provided with draft means, a scraper, a carrier for the scraper on and movable crosswise of the vehicle and constituting the sole support for the scraper, hinge connections between one end of the scraper and the carrier, and flexible connections between the scraper and draft means, said carrier being also provided with supporting means for the hinged end of the scraper for elevating and lowering said scraper, and said scraper being also pivotally connected to the carrier for permitting the elevating and lowering of the end of the scraper remote from the carrier.

16. A grading machine comprising a vehicle having draft means, a carrier on the vehicle movable crosswise thereof, a scraper hingedly connected at one end to and wholly supported by the carrier, and flexible connections between the scraper and draft means, whereby the scraper may be adjusted laterally to one side of the vehicle, and at the same time maintain approximately the same relation to the line of draft in different positions of lateral adjustment.

17. A grading machine provided with a scraper, a support for the scraper movable crosswise of the machine, a hinge connection between one end of the scraper and the support, said hinge connection being provided with an elongated pintle along which the scraper is movable, adjusting means for the scraper carried by the support and connected to the heel end of the scraper, said

scraper also being provided with a plow at the end remote from the hinged end, means for adjusting the support and with it the scraper crosswise of the vehicle, draft means 5 on the vehicle, and flexible connections between the ends of the scraper and the respective ends of the draft means.

18. A grading machine comprising a vehicle, a scraper thereon, a rock arm carrying 10 one end of the scraper and in turn supported by the vehicle, and connections between one end of the rock arm and the body of the vehicle for tipping that end of the scraper remote from the pivotal support to regulate 15 the depth of cut of said end.

19. A grading machine comprising a vehicle, a scraper, a carrier for the scraper, a

support pivoted to the carrier, a hinge connection between the support and one end of the scraper along which hinge connection 20 said scraper is movable lengthwise of the hinge, means on the carrier for elevating and lowering the hinge end of the scraper, and means for moving the scraper about the 25 pivot of the support for raising and lowering that end of the scraper remote from the hinge.

In testimony, that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

CHARLES H. MAGRUDER.

Witnesses:

T. A. HENNIGER,  
E. O. PAINTER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."