Nov. 16, 1926. 1,607,227

A. W. AITKEN

GRADER ATTACHMENT FOR ROAD ROLLERS

Filed May 8, 1925 3 Sheets-Sheet 1

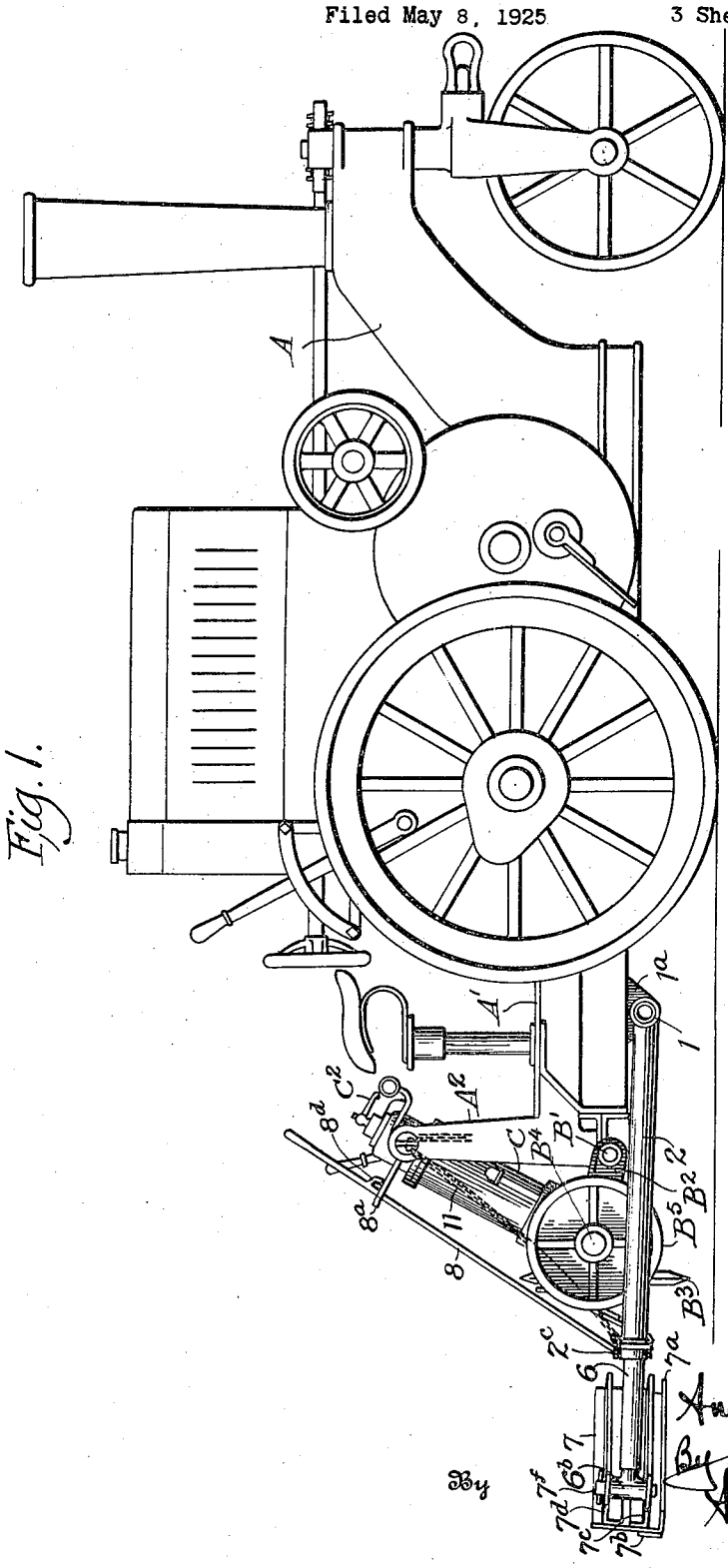


Fig. 1.

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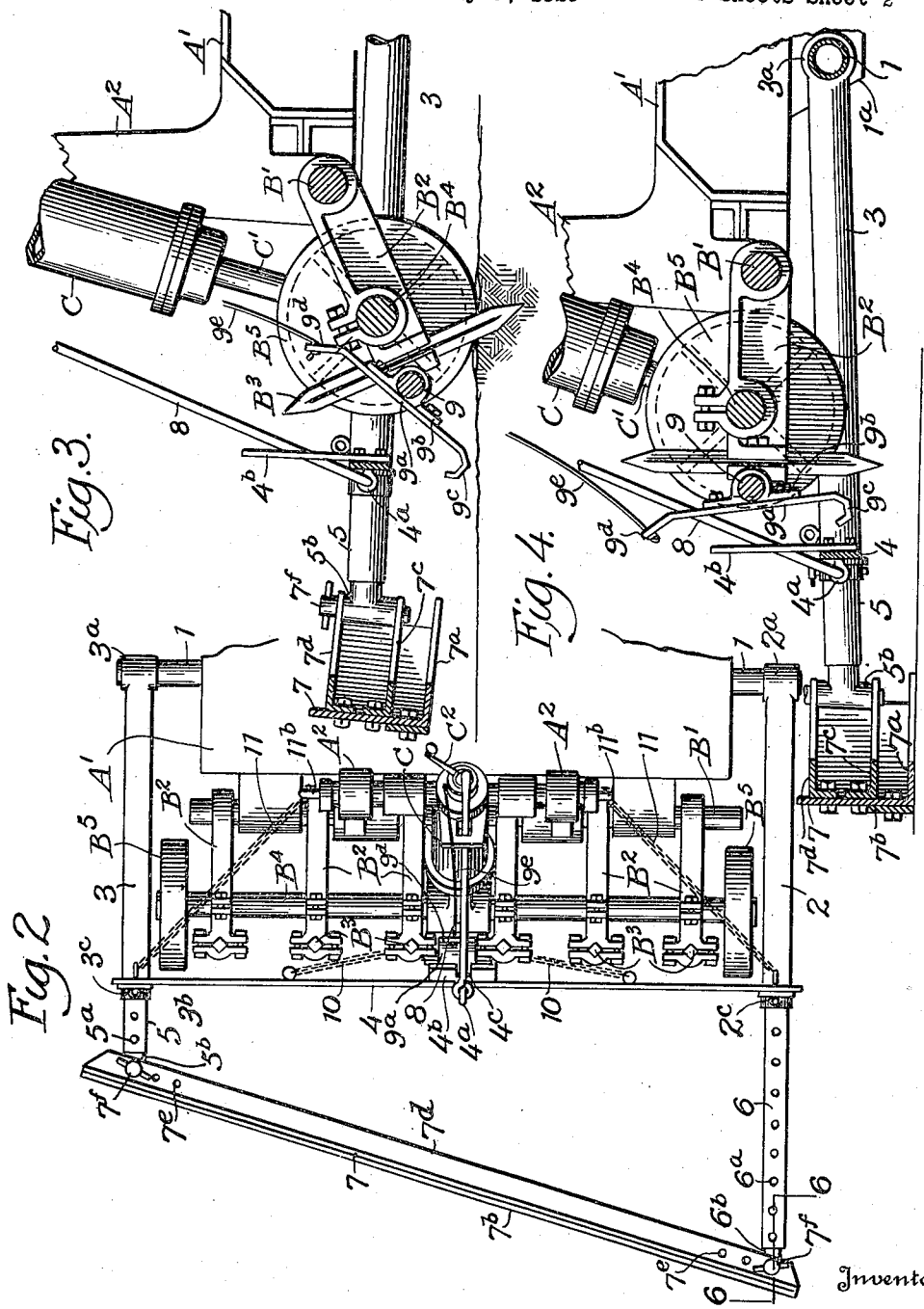


Fig. 3.

Fig. 4.

Fig. 2.

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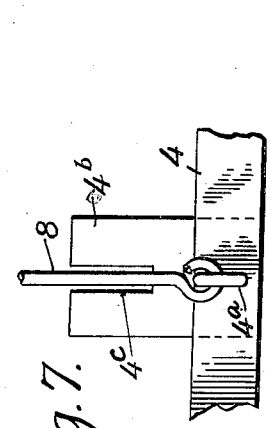


Fig. 7.

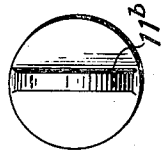


Fig. 9.

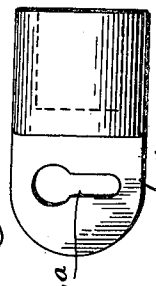


Fig. 8.

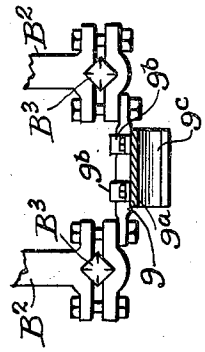


Fig. 10.

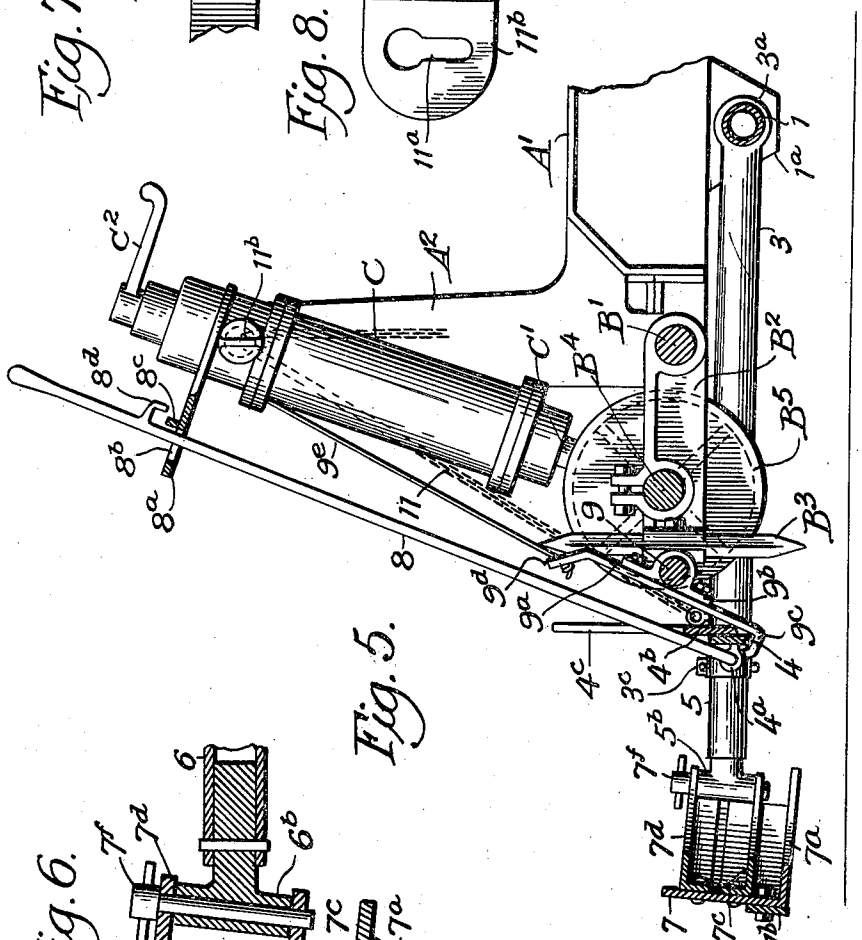


Fig. 5.

Fig. 6.

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Patented Nov. 16, 1926.

1,607,227

UNITED STATES PATENT OFFICE.

ANDREW W. AITKEN, OF SPRINGFIELD, OHIO, ASSIGNOR TO THE BUFFALO-SPRINGFIELD ROLLER CO., OF SPRINGFIELD, OHIO, A CORPORATION OF OHIO.

GRADER ATTACHMENT FOR ROAD ROLLERS.

Application filed May 8, 1925. Serial No. 28,939.

This invention is an improvement in grader attachments for road rollers, tractors, and the like, said attachment being particularly adapted for use with road rollers, preferably of the three wheel type, having an operator's platform, and a scarifier with its pressure operating cylinder mounted at the rear end thereof.

The principal object of the invention is to provide a grader vertically swingably mounted at the rear end of the vehicle and in rear of the scarifier, means being provided, operable from the operator's platform, whereby the grader may be raised or lowered by and with the scarifier; means being also provided whereby the grader may be locked in raised position permitting the scarifier to be operated independently of the grader, but when the grader is lowered into operative position the scarifier may be raised, and the road or other surface simultaneously graded and rolled.

Another object of the invention is to provide a grader blade mounted in a rectangular frame pivoted to the rear end of the road-roller, the connections between the members of the frame being sufficiently loose to permit sufficient racking or twisting of the frame whereby either outer corner of the frame may be raised to a different elevation than the outer corner thereof and the grader blade thereby set to suit the camber of the road, or the like, being graded and rolled.

I will explain the invention with reference to the accompanying drawings which illustrate one practical embodiment thereof, to enable others to adopt and use the same, and will summarize in the claims the novel features of construction, and the novel combinations of parts, for which protection is desired.

In said drawings:

Fig. 1 is a side elevation of a road roller of the three-wheeled type, having a scarifier with its pressure operating cylinder, and showing my novel grader attachment mounted at the rear end thereof, both the grader and scarifier being shown in raised inoperative position.

Fig. 2 is a top plan view of the grader attachment.

Fig. 3 is a longitudinal section showing the grader in raised position and the scarifier lowered.

Figure 4 is a section similar to Fig. 3 showing the grader lowered and the scarifier raised.

Fig. 5 is a view similar to Figs. 3 and 4 but showing both the scarifier and grader in raised position.

Fig. 6 is a section on the line 6—6, Fig. 2.

Fig. 7 is a view showing the guard plate.

Figs. 8 and 9 are detail views.

Fig. 10 is a detail showing the pivotal connection of the hook plate.

My novel grader attachment may be used on any type of vehicle, such as a road-roller, tractor, or the like, but is particularly adaptable for use in connection with a road roller A of the three wheeled type, having an operator's platform A′ at the rear end thereof; also provided with a scarifier usually comprising a horizontally disposed shaft B′ upon which are pivotally mounted a plurality of spaced arms B^2 carrying the picks B^3, said arms B^2 each being connected adjacent their outer ends to a transverse bar B^4 whereby all the arms pivot in unison upon shaft B′ as the bar B^4 is raised or lowered. Rollers B^5 are mounted on the ends of bar B^4, beyond the outer arms B^2 for limiting the cutting depth of the scarifier. The scarifier is preferably operated by the piston rod C′ of a pressure cylinder C, usually operating under compressed air, which cylinder is mounted above the scarifier between standards A^2 at the rear end of the roller, the lower end of the piston C′ being connected to the bar B^4 whereby the scarifier is raised and lowered by the pressure cylinder C. A handle C^2 at the top of the cylinder C controls the admission of compressed air into the respective ends of the cylinder. The construction and operation of the scarifier and its pressure operating cylinder are well-known and need no further description here.

The grader attachment is disposed adjacent to the scarifier B and comprises a ree-

tangular frame consisting of a horizontal bar 1 extending transversely of the road roller frame, and beyond the scarifier rollers B^3, said bar 1 being mounted in bearings 1^a preferably attached to the underside of the road-roller, in rear of the rear or traction wheels of the roller, said bar 1 being prevented from axial movement in its bearings by means of pins or collars on the bar adjacent the bearings 1^a, but however any other desired means may be used. At the respective ends of bar 1 are tubular members 2 and 3, extending at right angles to bar 1, and pivotally mounted thereon in any desired manner, such as by means of heads 2^a, 3^a. Members 2 and 3 are spaced sufficiently far apart to clear the scarifier wheels B^5 and are of same length, the same extending slightly to the rear of the scarifier wheels B^5. A bar or member 4 loosely connects the outer rear ends of members 2 and 3, whereby as bar 4 is raised and lowered the members 2 and 3 will pivot on bar 1.

The connections between the grader members 2 and 3 with the bars 1 and 4 are preferably made loose to allow the frame to be racked or twisted to permit the outer end of either member 2 or 3 to be raised slightly higher than the other member, whereby the grader blade 7, (hereinafter described) carried by the members 2 and 3, may be adjusted to suit the camber of the road, or the like, upon which the machine is operating.

Slidably mounted in the tubular members 2 and 3, and extending beyond the rear ends thereof, are extension members 5 and 6, one member, such as 5, being preferably somewhat shorter than member 6, and said members being interchangeable in the frame members 2 and 3. Each member 5 and 6 is provided with a series of perforations 5^a, 6^a, extending its entire length and adapted to register respectively with perforations in the outer rear ends of members 2 and 3. Pins 2^c, 3^c, passing through the registering perforations respectively will lock the members 5 and 6 in adjusted positions with respect to the members 2 and 3. Members 5 and 6 are provided on their outer ends with heads 5^b, 6^b, respectively carrying the grader blade 7.

The grader blade preferably comprises a plate 7 of desired width, the length thereof being preferably greater than the overall width of the road-roller. The lower end of plate 7 is flanged forwardly as at 7^a and at right angles to the plate. On the rear of blade 7, at the lower edge thereof and flush with the heel of flange 7^a, is a wearing strip 7^b preferably bolted or otherwise removably attached to the plate 7 whereby the strip 7^b, when worn out, may be readily replaced. Above and parallel with the flange 7^a is an angle bar 7^c extending the full length of the blade 7, and above and parallel with the bar 7^c is an angle bar 7^d, spaced from bar 7^d, a distance to suit the heads 5^b, 6^b, of extension members 5 and 6, said bar 7^d likewise extending the full length of the blade 7. Angle bars 7^c and 7^d are preferably riveted to plate 7 to give rigidity and stiffness thereto. Extending through the angle bars 7^c, 7^d, adjacent each end of the grader blade are series of registering or aligned perforations 7^e, and pins 7^f passing through the aligned perforations 7^e in bars 7^c, 7^d, and through bores in heads 5^b, 6^b of members 5 and 6 securely lock the grader blade in any position on the members 5 and 6. By the above construction the grader blade may be adjusted any desired distance from the frame member 4, and may be caused to make any desired angle therewith, the members 5 and 6 being interchangeable in the frame members 2 and 3.

At the center of the frame member 4 is an eye 4^a into which is hooked the lower end of a rod 8 extending upwardly and forwardly and substantially parallel with the cylinder C, the upper end of rod 8 extending through an elongated slot 8^b in a plate 8^a bolted or otherwise secured to the cylinder C adjacent its upper end. At the forward edge of slot 8^b is an upstanding lug 8^c (Fig. 5) over which a downwardly extending hook 8^d, on rod 8 adjacent its upper end, is adapted to catch when the grader frame is sufficiently elevated, as hereinafter described, to maintain the grader frame in elevated position. Slot 8^b is of sufficient length to enable the hook 8^d to pass therethrough to permit lowering of the grader frame when the upper end of rod 8 is manipulated to disengage hook 8^d from lug 8^c. A guard plate 4^b is preferably mounted upon the member 4 in way of the rod 8, said guard having a slot 4^c therein extending downwardly from its top for the rod 8, guard 4^b preventing the hook 9^c on the scarifier, (hereinafter described) which raises and lowers the grader frame, from overtopping the member 4.

Between the two middle arms B^2 of the scarifier B, is a rod 9, bolted or otherwise secured to the rear ends of said arms and disposed parallel with, and slightly above, the member 4. A hook plate 9^a is pivoted intermediate its ends upon rod 9 by means of bearings 9^b. The lower end of plate 9^a is bent rearwardly and upwardly to form a hook 9^c adapted to engage the underside of frame 4 as shown in Fig. 5 when plate 9^a is swung into proper position. The upper end of plate 9^a is bent rearwardly as at 9^d, and a flexible member 9^e is connected with the outer end of portion 9^d, whereby as the member 9^e is pulled upwardly the hook portion 9^c of the plate will be thrown rearwardly to engage the underside of the frame 4. Normally, hook 9^c will be disengaged from the frame 4. The upper end of member 9^e

is preferably fastened adjacent the upper end of cylinder C, or any other place convenient for the operator.

The grader blade 7, in operation, will usually be set at an angle to the transverse axis of the road roller, and therefore chains 10 or the like, are provided, which are fastened to the member 4 adjacent its outer ends (Fig. 2) and to the scarifier B, in order to maintain the axes of the grader frame and roller in substantial alignment, and to prevent racking of said frame by the force of the dirt exerted diagonally on the blade 7.

In order to afford the blade 7 an angular adjustment in its own vertical plane to suit the camber of the road or other surface, I provide chains 11 extending from the outer ends of members 2 and 3, and passing through chain slots 11^a in heads 11^b preferably mounted on extensions of the pivot studs of the cylinder C on standards A^2. By the above arrangement, when one chain is drawn tight and locked in its slot 11^a and the other chain is slack, the rear end of its respective frame member 2 or 3 will be raised higher than that of the other member, and the blade 7 will be thus raised and retained higher at one end than the other, the connections between frame members 1, 2, 3 and 4 as above described being made sufficiently loose to permit such racking of the frame.

In operation, assuming both the scarifier B and grader blade 7 in elevated position, the scarifier B may be lowered when desired by turning the valve handle C^2, hooked rod 8 normally maintaining the grader blade frame in elevated inoperative position.

If it is then desired to use the grader, valve handle C^2 should be turned to raise scarifier B, and at the same time member 9^e should be pulled to engage the hook plate 9^a with the underside of member 4 as the scarifier is ascending. The grader frame will be thereby slightly raised to allow hook 8^d to clear lug 8^c as shown in Fig. 5. When the grader is thus raised the rod 8 may be pushed rearwardly to free hook 8^d from lug 8^c and valve handle C^2 turned to lower the scarifier B and also the grader frame. The scarifier may then be raised out of the way for the grading operation.

When it is desired to raise the grader the scarifier B must first be lowered. Handle C^2 must then be turned to raise the scarifier and at the same time pulling member 9^e to engage the hook 9^c with frame member 4. By reason of the gravity of the inclined rod 8, when the frame approaches the limit of the upward movement the hooked end 8^d will again drop over lug 8^c and the frame will be thus retained in raised position. Hence the grader frame is always raised and lowered by the scarifier B, but either the grader or scarifier may be used independently of the other.

I do not limit my invention to the exact form shown in the drawings for obviously changes may be made therein within the scope of the claims.

I claim:

1. In combination, a tractor; a scarifier; a grader; means for raising and lowering the scarifier; and means on the scarifier adapted to engage the grader to raise and lower the grader with the scarifier, said means permitting the grader and scarifier to be operated independently.

2. In mechanism as set forth in claim 1, said means comprising a member pivoted on said scarifier, and adapted in one position to engage said grader.

3. In combination with mechanism as set forth in claim 1, means independent of the scarifier for holding the grader in raised position.

4. In combination with mechanism as set forth in claim 1, a member mounted above said grader, and a hook rod connected with said grader and adapted to engage the member to hold the grader in raised position.

5. In combination with mechanism as set forth in claim 1, a member mounted above said grader having a slot; and a hook rod connected with said grader and passing through said slot and adapted to engage the member to normally hold the grader in raised position.

6. In combination, a tractor; a scarifier; a grader; means for raising and lowering the scarifier; means on the scarifier adapted to engage the grader to raise and lower the grader with the scarifier; and means for normally holding the grader in raised position.

7. In mechanism as set forth in claim 6, said means on the scarifier comprising a member pivoted on said scarifier, and adapted when rocked to one position to engage said grader.

8. In combination with mechanism as set forth in claim 6, said means for holding the grader in raised position comprising a hook rod on the grader adapted to normally engage the tractor frame.

9. In combination with mechanism as set forth in claim 6, a member mounted above said grader, and a hook rod connected with said grader and adapted to engage the member to hold the grader in raised position.

10. In combination with mechanism as set forth in claim 6, a member mounted above said grader having a slot; and a hook rod connected with said grader and passing through said slot, and adapted to engage the member to normally hold the grader in raised position.

11. In combination with a road-roller

having a scarifier, and having means for raising and lowering the scarifier; a grader pivoted on said roller; a hook plate pivoted on said scarifier and adapted when rocked to engage said grader; and means for rocking said plate.

12. In combination with mechanism as set forth in claim 11, a member mounted above said grader, and a hook rod connected with said grader and adapted to engage the member to normally maintain the grader in raised position.

13. In combination with mechanism as set forth in claim 11, a slotted plate mounted above said grader, and a rod connected with said grader and passing through the slot in said plate; said rod having a hook adapted to normally engage the plate to maintain the grader in raised position.

14. In combination with a road-roller having a scarifier at the rear end of the roller and having a pressure cylinder for raising and lowering the scarifier; an adjustable grader pivoted on the roller and extending in rear of said scarifier; a hook plate pivoted on said scarifier and adapted when rocked to engage said grader; and means for rocking said plate.

15. In combination with mechanism as set forth in claim 14, a slotted plate mounted above said grader, and an inclined rod connected with said grader and passing upwardly through the slot in said plate, said rod having a hook adjacent its outer end adapted to normally engage the plate to hold the grader in raised position.

16. The combination, with a road-roller having a scarifier at the rear end of the roller and having a pressure cylinder for raising and lowering the scarifier; an adjustable grader pivoted on said roller and extending in rear of said scarifier; a hook plate pivoted on said scarifier; and adapted when rocked to engage said grader; means for rocking said plate; and a guard for preventing the plate from overtopping the grader.

17. In combination with mechanism as set forth in claim 16, a slotted plate mounted above said grader, and an inclined rod connected with said grader and passing upwardly through the slot in said plate, said rod having a hook adjacent its outer end adapted to normally engage the plate to hold the grader in raised position.

18. In a road grading machine, a tractor, a grader frame comprising opposite side members pivotally connected to the tractor frame, a grader adjustably connected with the rear ends of said side members, a bar connected with said side members; and flexible members connected with the outer ends of said side members and adjustably engaging the tractor frame.

19. In mechanism as set forth in claim 14, a scarifier mounted on the tractor; means for raising and lowering the scarifier; and means on the scarifier disconnectibly engaging the grader frame to raise or lower the frame with the scarifier; and means for upholding the grader frame in raised position independently of the scarifier.

20. In a road grading machine, a tractor, a grader frame comprising opposite side members pivotally connected to the tractor frame, a grader adjustably connected with the rear ends of said side members; a bar connecting with said side members, the connections between said bar and side members being loose; and flexible members connected with the outer ends of the side members and adjustably engaging the tractor frame.

21. In mechanism as set forth in claim 16, a scarifier mounted on the tractor; means for raising and lowering the scarifier, and means on the scarifier disconnectibly engaging the said bar; and means for upholding the grader frame in raised position independently of the scarifier.

22. In combination with a road-roller having a scarifier, and having means for raising and lowering the scarifier; a grader frame comprising opposite side members pivoted on the roller frame, a bar connecting said side members; extension members connected with said side members; a grader carried by said extension members; and means on said scarifier for engaging the bar to raise and lower the grader frame.

23. In mechanism as set forth in claim 22, said means comprising a hook plate pivoted on said scarifier and adapted when rocked to engage said bar; and means for rocking said plate.

24. In mechanism as set forth in claim 22, the connections between said bar and side members being loose; heads mounted on the roller frame, and flexible members adjustably connected with the outer ends of said side members and engaging said heads.

25. In mechanism as set forth in claim 22, the connections between said bar and side members being loose; heads mounted on said roller frame having key-slots therein; and chains respectively connected with the outer ends of said side members and engaging the key-slots.

26. In combination with a road-roller having a scarifier mounted at the rear end thereof, and having means for raising and lowering the scarifier; a grader frame comprising a transverse member at the rear end of the roller frame; opposite side members pivoted on said transverse member and extending to the rear of said scarifier; a bar connecting the said side members in rear of and adjacent said scarifier; extension members connected with said side members; a grader adjustably mounted on the outer ends of said extension members; and means on said scari-

fier for engaging the bar to raise and lower the grader frame.

27. In mechanism as set forth in claim 26, said means comprising a hook plate pivoted on the rear end of said scarifier, and adapted when rocked to engage the under side of said bar; means for rocking said plate; and a guard for preventing the plate from overtopping said bar.

28. In mechanism as set forth in claim 26, the connections between said transverse member, side members, and bar being loose; heads mounted on said roller frame above the bar having key-slots therein; and chains respectively connected with the outer ends of said side members and engaging the key-slots.

In testimony that I claim the foregoing as my own, I affix my signature.

ANDREW W. AITKEN.