May 13, 1930. A. W. AITKEN 1,758,491

GRADER ATTACHMENT FOR ROAD ROLLERS

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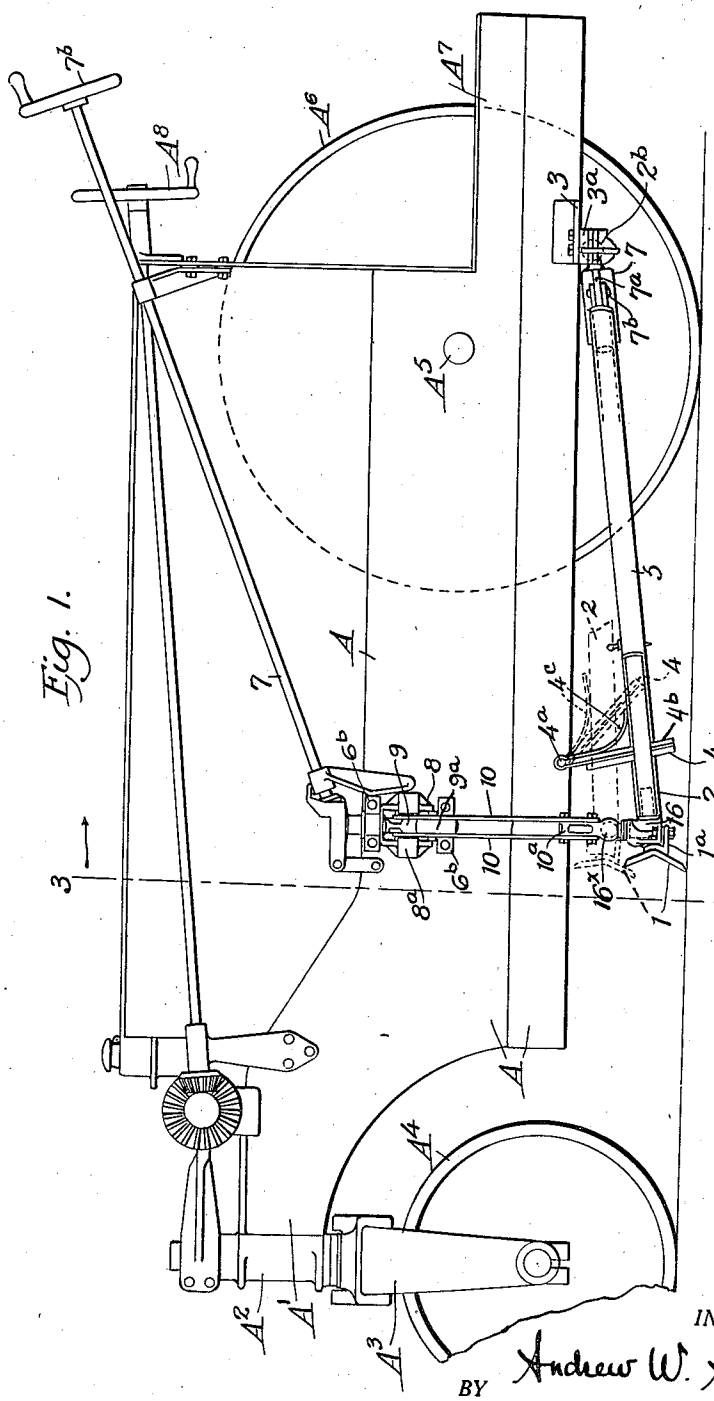


Fig. 1.

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Fig. 2.

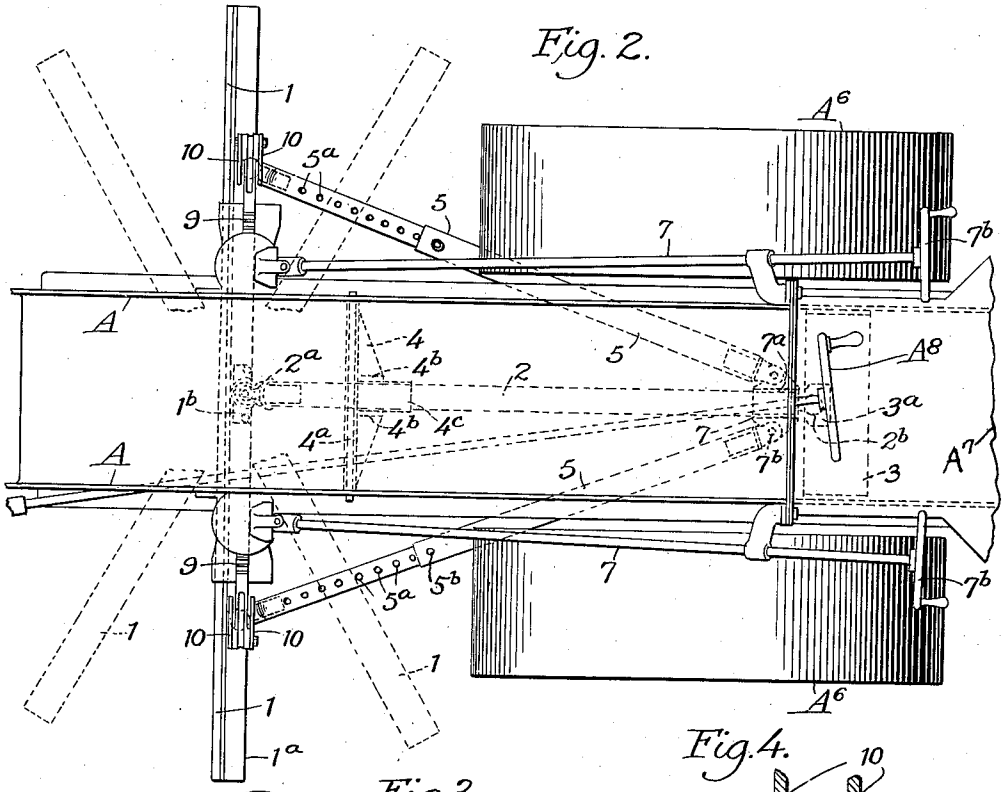


Fig. 3.

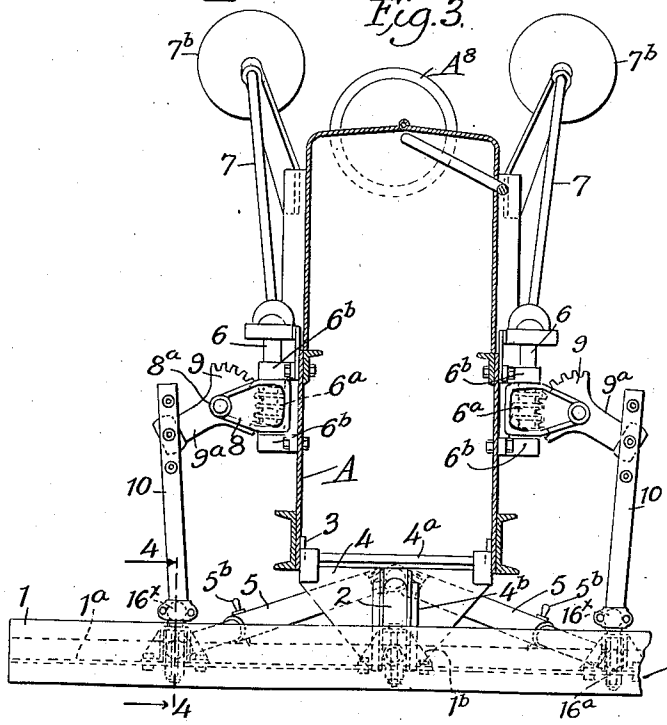
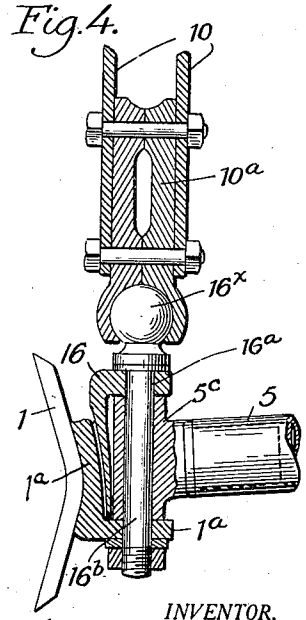


Fig. 4.



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UNITED STATES PATENT OFFICE

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GRADER ATTACHMENT FOR ROAD ROLLERS

Application filed January 5, 1928. Serial No. 244,677.

This invention is a novel grader attachment for road rollers, and the principal object of the invention is to provide a novel attachment adapted to work under the frame of conventional road roller of the 3-wheel type, the side frame of which usually clears the ground a distance of only fifteen inches. Such small ground clearance renders it impossible to mount the grader blade on the conventional grader ring as would be the case if more clearance were provided, and on which the grader blades are usually centered for adjusting to different angularities with respect to the longitudinal axis of the roller frame.

My novel grader attachment however permits the blade to be lowered or raised an amount sufficient for ground clearance in traveling; also to be adjusted in a horizontal plane for different angularities; and to be further adjusted in a vertical plane to conform with the desired camber of the road surface; the vertical adjustment being accomplished by suitable means controlled from the operator's stand.

A still further object is to provide a simple, readily adjustable, and rigid attachment for supporting the blade from the tractor, and which will permit the various adjustments above referred to.

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

In said drawings:

Figure 1 is a side elevation of a road roller of the conventional 3-wheel type, showing my grader attachment applied thereto;

Fig. 2 is a top plan view of a portion thereof;

Fig. 3 is a section on the line 3—3, Fig. 1.

Fig. 4 is a section on the line 4—4, Fig. 3.

As shown in the drawings, I have illustrated my invention in connection with a conventional road roller, of the 3-wheel type, having a pair of side frames A disposed longitudinally and supporting the usual motor, clutch and the like; said side frames extending upwardly at their front ends to form a gooseneck A' the forward ends of which carry a casting A^2 for the yoke A^3 of the front roller A^4. The rear ends of the side frames A are supported on a rear axle A^5 carrying the rear rollers A^6 at each side of the roller, the tracks of the rear rollers A^6 overlapping the track of the front roller A^4. At the rear end of the side frames A, between the rollers A^6 is located the operator's platform A^7, and the usual steering control A^8, and the engine and clutch controls (not shown).

The grader blade 1 is disposed transversely of and beneath the side frames A, intermediate the front and rear rollers, said blade being of suitable length and of desired cross-section. An angle iron 1^a preferably extends across the back of the blade 1. At the center of the blade on its rear side and to the angle iron 1^a is secured a casting 1^b having trunnions adapted to receive the T-head 2^a of an axially disposed push-bar 2 extending rearwardly from the blade 1 to a point beneath the rear platform A; the rear end of push bar 2 being provided with a ball head 2^b engaging a ball socket in a casting 3^a secured at the center of a plate 3 extending between the side frames A at the lower edges thereof.

Means are provided for maintaining the front or blade carrying end of the push bar 2 on the longitudinal axis of the roller while permitting raising and lowering movement of the bar in the vertical plane. As shown a member 4 extends between and is hinged at its upper corners on a rod 4^a extending between the side frames in rear of the blade 1 whereby the member 4 will normally drop by gravity below the frame members. Extending upwardly from the lower edge of member 4, on the axis of the roller is a slot bounded by angle irons 4^b receiving the push bar 2 thereby preventing lateral movement of the bar 2, the bar 2 remaining at all times in the slot in member 4. A curved piece 4^c on the member 4 slides upon the top of push bar 2 as shown in Fig. 1 whereby as the push bar is raised, as hereinafter described, the piece 4^c will cause the member 4 to rock up-

wardly as shown in dotted lines in Fig. 1 so as to prevent binding of the bar 2 in the upper or inner end of the slot as might be the case if the member 4 were in true vertical position when attempting to raise the push bar. Other means engaging the bar 2 adjacent the blade 1 may be provided for preventing lateral swing of the push bar 2, while permitting movement in a vertical plane.

Adjacent each end of the grader blade 1 is pivotally connected a telescope strut 5 adjustable in any desired manner to different lengths whereby the angularity of the blade in a horizontal plane may be changed, as indicated in dotted lines in Fig. 1. As shown, one member of each strut is provided with a series of perforations 5^a adapted to register with a perforation in the other member of the strut to receive a pin or bolt 5^b. The foward end of each strut is provided with a head 5^c (Fig. 4) having a transverse bore registering with the holes 16^a in a trunnion casting 16 bolted to angle iron 1^a of the blade 1 to receive a bolt 16^b. The struts 5 slope rearwardly and inwardly as shown in Fig. 1 and the rear ends of the struts 5 are provided with forked heads to embrace webs 7^a on a collar 7 mounted on the push bar 2 adjacent its rear end, the webs and bifurcations being transfixed by a bolt 7^b. Thus as the push bar 2 rotates with the blade 1, in adjusting one side of the blade higher than the other, the collar 7 will also rotate therewith and prevent binding of struts 5 in the bearing castings 16. While I prefer to mount the rear ends of struts 5 on the webs 7^a of collar 7 carried by the bar 2, obviously the struts may be connected to any desired portion of the roller frame and may be provided with their own individual ball and socket joints independently of the ball and socket connection of the push bar 2.

Because of the length of the telescopic struts 5, and the usual lost motion at points of pivoting, it might even be found unnecessary to provide ball and socket joints for the rear ends of struts 5.

Means are also provided for independently adjusting each end of the blade 1 in a vertical plane, said means comprising a worm shaft 6 having a worm 6^a and vertically mounted in bearings 6^b secured to the side frames A, above the normal position of blade 1. Each shaft 6 has a bevel gear on its upper end meshing with a bevel pinion on a shaft 7 mounted in suitable bearings and extending rearwardly to a point above the platform A^7, a handwheel 7^b being mounted on each shaft 7 whereby rotation of the shaft will rotate the worm shaft 6.

Pivotally mounted between the bearings 6^b on shaft 6 is a bracket casting 8 which preferably embraces the worm 6^a and is provided with opposed bearings 8^a for the shaft of a segmental gear 9 meshing with the worm 6^a, said gear 9 having an outwardly extending arm 9^a normally overlying a bearing casting 16 for the adjustable strut 5. A pair of straps 10 are adjustably secured to the outer end of arm 9^a and extend downwardly and are secured to a ball socket casting 10^a (Fig. 4) engaging a ball 16^x on the top of the pivot bolt 16^b.

Since the bracket casting 8 is pivoted on the worm shaft 6, as the blade 1 is adjusted in a horizontal plane the arm 9^a will also swing with the end of blade 1; and the ball and socket casting 10^a will prevent binding of the parts as the blade is swung in the vertical or horizontal planes. Since one such shaft 7 and connections are provided for each end of the blade 1, the operator has complete control of the position of the blade in a vertical plane relative to the road surface at all times.

While I have shown the straps 10 as connected by socket casting 10^a to the pivot bolt 16^b which also connects the telescopic struts 5 to the blade 1, obviously the straps 10 could have their own ball and socket connections to the blade 1 independent of the pivot bolt.

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

I claim:—

1. In combination, a wheeled frame, a grader blade beneath the frame; a push bar pivotally connected to the blade and frame; and means for preventing lateral movement of the bar while permitting vertical movement thereof comprising a member swingably suspended from the frame and having a slot extending upwardly therein from its lower edge, said slot receiving the bar; and means for pivoting the member as the blade is raised and lowered.

2. In combination, a wheeled frame, a grader blade beneath the frame; a push bar pivotally connected to the blade and frame; means for preventing lateral movement of the bar, while permitting vertical movement thereof; means for adjusting the blade comprising a pair of struts pivoted at their forward ends to the blade; the rear ends of the struts having a universal connection with the frame; and means at each end of the blade for raising and lowering same.

3. In a combination as set forth in claim 2; said push bar holding means comprising a member swingably suspended at its upper end from the frame and having a slot extending upwardly therein from its lower edge, said slot receiving the bar; and means for pivoting the member as the blade is raised and lowered.

4. In combination, a wheeled frame, a grader blade beneath the frame; a push bar pivotally connected to the blade and frame; and means for preventing lateral movement of the bar while permitting vertical movement thereof comprising a member swingably

suspended at its upper end to the frame and having a slot extending inwardly therein from its lower edge, said slot receiving the bar; and means on said member engaging the bar whereby as the latter is raised the member will be rocked.

5. In combination, a wheeled frame, a grader blade beneath the frame; a push bar pivotally connected to the blade and frame; means for preventing lateral movement of the bar, while permitting vertical movement thereof; means for adjusting the blade comprising a pair of adjustable struts pivoted at one of their ends to the blade; the other ends of the struts having a ball and socket connection with the frame; and means adjacent each end of the blade for raising and lowering same.

6. In combination, a wheeled frame, a grader blade beneath the frame; a push bar pivotally connected at one end to the blade; the other end of the bar having a universal connection to the frame; means engaging the bar adjacent the blade for preventing lateral movement of the bar while permitting vertical movement thereof; means for adjusting the blade comprising a pair of adjustable telescopic struts pivoted at one of their ends to the blade; the other ends of the struts converging and being connected to the push bar adjacent its universal connection with the frame; and means adjacent each end of the blade for raising and lowering same.

7. In combination with a road machine having side frames, a grader blade beneath the frames; a push bar pivotally connected at its forward end to the blade; the rear end of the bar having a ball and socket connection to the frame; means for preventing lateral movement of the bar while permitting vertical movement; struts for adjusting the blade in the horizontal plane; and means for adjusting the blade in the vertical plane; said push bar holding means comprising a member swingably suspended at its upper end between the side frames, and having a slot extending therein from its lower edge, said slot receiving the bar; and means for pivoting the member as the blade is raised and lowered.

8. In combination with a road machine having side frames, a grader blade beneath the frames; a push bar pivotally connected at its forward end to the blade; the rear end of the bar having a ball and socket connection to the frame; means for preventing lateral movement of the bar while permitting vertical movement; struts for adjusting the blade in the horizontal plane; and means for adjusting the blade in the vertical plane; said push bar holding means comprising a member swingably suspended at its upper end between the side frames, and having a slot extending therein from its lower edge, said slot receiving the bar; and means on said member engaging the bar whereby as the latter is raised the member will be rocked.

9. In combination with a road machine having side frames, a grader blade beneath the frames; a push bar pivotally connected at its forward end to the blade; the rear end of the bar having a ball and socket connection to the frame; means for preventing lateral movement of the bar while permitting vertical movement; struts for adjusting the blade in the horizontal plane; and means for adjusting the blade in the vertical plane; said struts being pivoted at their forward ends to the blade; the rear ends of the struts having a ball and socket connection with the frame.

10. In combination with a road machine having side frames, a grader blade beneath the frames; a push bar pivotally connected at its forward end to the blade; the rear end of the bar having a ball and socket connection to the frame; means for preventing lateral movement of the bar while permitting vertical movement; struts for adjusting the blade in the horizontal plane; and means for adjusting the blade in the vertical plane; said struts being pivoted at their forward ends to the outer ends of the blade respectively; the struts sloping inwardly and the rear ends of the struts being connected to the push bar adjacent its ball and socket connection with the frame.

11. In combination with a road machine having side frames, a grader blade beneath the frames; a push bar pivotally connected at its forward end to the blade; the rear end of the bar having a ball and socket connection to the frame; means for preventing lateral movement of the bar while permitting vertical movement; struts for adjusting the blade in the horizontal plane; and means for adjusting the blade in the vertical plane; said vertical adjusting means comprising vertically disposed worm shafts journaled on the side frames; brackets pivoted on the shafts and embracing the worms; segmental gears journaled in the brackets and meshing with the worms and having outwardly extending arms, links connected with the arms and having ball and socket connections with the blade; and means for rotating the shafts.

12. In combination with a road roller having side frames, a grader blade beneath the side frames; a push bar disposed in the plane of the longitudinal axis of the roller and pivotally connected at its forward end to the blade, the rear end of the bar having a ball and socket connection with the frame; means on the side frames engaging the bar adjacent the blade for preventing lateral movement of the bar while permitting vertical movement; adjustable telescopic struts pivoted at their forward ends to the ends of the blade; a collar on the push bar adjacent its rear end, and the rear ends of the struts sloping inwardly

and connected with the collar; means for adjusting the angularity of the blade in the horizontal plane; and means for adjusting the angularity of the blade in the vertical plane.

13. In a combination as set forth in claim 12; said push bar holding means comprising a member swingably suspended at its upper end between the side frames and having a slot extending therein from its lower edge, said slot receiving the bar.

14. In a combination as set forth in claim 12; said push bar holding means comprising a member swingably suspended at its upper end between the side frames and having a slot extending therein from its lower edge, said slot receiving the bar; and a curved piece on said member sliding on the bar whereby as the latter is raised the member will be rocked.

15. In a combination as set forth in claim 12; said means for adjusting the angularity of the blade in the vertical plane comprising vertically disposed worm shafts journaled on the side frames; brackets pivoted on said shafts and embracing the worms; segmental gears journaled in said brackets and meshing with the worms; outwardly extending arms on said segmental gears; links connecting the arms and the ends of the blade; and means for rotating the shafts.

16. In a combination as set forth in claim 12; the pivot bolts of the struts having ball heads; and said means for adjusting the angularity of the blade in the vertical plane comprising vertically disposed worm shafts journaled on the side frames; brackets pivoted on the shafts and embracing the worms; segmental gears journaled in the brackets and meshing with the worms; outwardly extending arms on the segmental gears; links connecting the arms and having ball sockets receiving the balls on the pivot bolts, and means for rotating the shafts.

17. In combination, a wheeled frame; a grader blade beneath the frame, a push bar having a universal rocking connection with the grader blade and frame respectively; means preventing lateral movement of the grader blade; means for raising and lowering the blade; and adjustable struts pivoted on the blade and frame for adjusting the angularity of the blade, said struts having T-heads engaging the blade for maintaining same faced vertically for operation.

18. In combination, a wheeled frame; a grader blade beneath the frame; a center push bar having a universal rocking connection with the grader blade and frame respectively; means preventing horizontal swinging of the push bar; means for raising and lowering the blade; adjustable struts pivoted on the blade and push bar for adjusting the angularity of the blade; said struts having heads engaging the blade for maintaining the blade faced vertically for operation.

19. In combination, a wheeled frame; a grader blade beneath the frame; a center push bar having a ball and socket connection with the grader blade and frame respectively; means movable with the push bar confining the lateral swing of the push bar; means for raising and lowering the blade; and means for adjusting the angularity of the blade while maintaining the blade faced for operation.

20. In combination, a wheeled frame; a grader blade beneath the frame; a center push bar having a universal rocking connection with the grader blade and frame respectively; means confining the lateral swing of the push bar; means adjacent each end of the blade for raising and lowering same; means for raising the confining means as the blade is raised; and means adjacent each end of the blade for adjusting the angularity thereof while maintaining the blade faced for operation.

21. In combination, a wheeled frame; a grader blade beneath the frame; a center push bar having a universal rocking connection with the grader blade and frame respectively; means confining the lateral swing of the push bar; means for adjusting the angularity of the blade, said means maintaining the blade faced for operation; means for raising and lowering the blade; and means on the confining means engaging the push bar for raising and lowering the confining means therewith.

22. In combination, a wheeled frame; a grader blade beneath the frame; a center push bar making a universal rocking connection with the grader blade and frame respectively; means confining the lateral swing of the push bar; adjustable struts extending from the ends of the grader blade and having a universal rocking connection with the frame said struts maintaining the blade faced for operation; and means for raising and lowering the blade.

23. In combination, a wheeled frame; a grader blade beneath the frame; a center push bar making a universal rocking connection with the grader blade and frame respectively; means confining the lateral movement of the push bar; adjustable struts extending from the ends of the grader blade and pivoted on the push bar, said struts maintaining the blade faced for operation; and means for raising and lowering the blade.

24. In combination, a wheeled frame; a grader blade beneath the frame; a center push bar making a ball and socket connection with the grader blade and frame respectively; means confining the lateral movement of the push bar; adjustable telescopic struts extending from the ends of the grader blade and pivoted on the push bar, said struts maintaining the blade faced for operation; and means for raising and lowering the blade.

25. In combination, a wheeled frame; a grader blade beneath the frame; a center push bar making a ball and socket connection with the grader blade and frame respectively; means confining the lateral movement of the push bar; adjustable telescopic struts extending diagonally from each end of the grader blade and pivoted on the push bar adjacent the ball and socket connection with the frame; said struts maintaining the blade faced for operation; and means at each side of the frame above the blade for raising and lowering the blade.

26. In combination with a road roller, a grader blade, a push bar pivotally connected to the approximate center of the grader blade and to the road roller frame; means for raising and lowering the blade relative to the frame; means for adjusting the horizontal angularity of the blade relative to the push bar while maintaining same faced for operation; and means carried by the push bar for preventing lateral movement of the push bar.

27. In combination with a road roller, a grader blade beneath the road roller frame; a push bar pivotally connected to the grader blade and to the road roller frame; means for limiting the lateral swing of the push bar; adjustable connections between the ends of the grader blade and the pivotal connection of the push bar to the frame for maintaining the blade faced for operation in all adjusted positions thereof; and means for adjusting the horizontal angularity of the blade relative to the push bar.

28. In combination with a road roller; a grader blade beneath the road roller frame; a push bar pivotally connected with the grader blade and to the road roller frame; means for limiting the lateral swing of the push bar; adjustable struts connecting the ends of the grader blade with the pivotal connection of the push bar to the frame for adjusting the angularity of the blade relative to the push bar while maintaining same faced for operation; and means for raising and lowering the blade.

29. In a road grader; a wheeled frame, a push bar pivotally connected to the frame; a grader blade pivotally connected adjacent its center to the push bar and adjustable at varying angles thereto; means for holding the blade in angularly adjusted position relative to the push bar, and means carried by the push bar for preventing lateral movement of the blade.

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