March 23, 1937. I. M. WELLS 2,074,601

ROAD GRADER MOLDBOARD CONTROL MEANS

Filed Nov. 23, 1934 2 Sheets-Sheet 1

FIG-2-

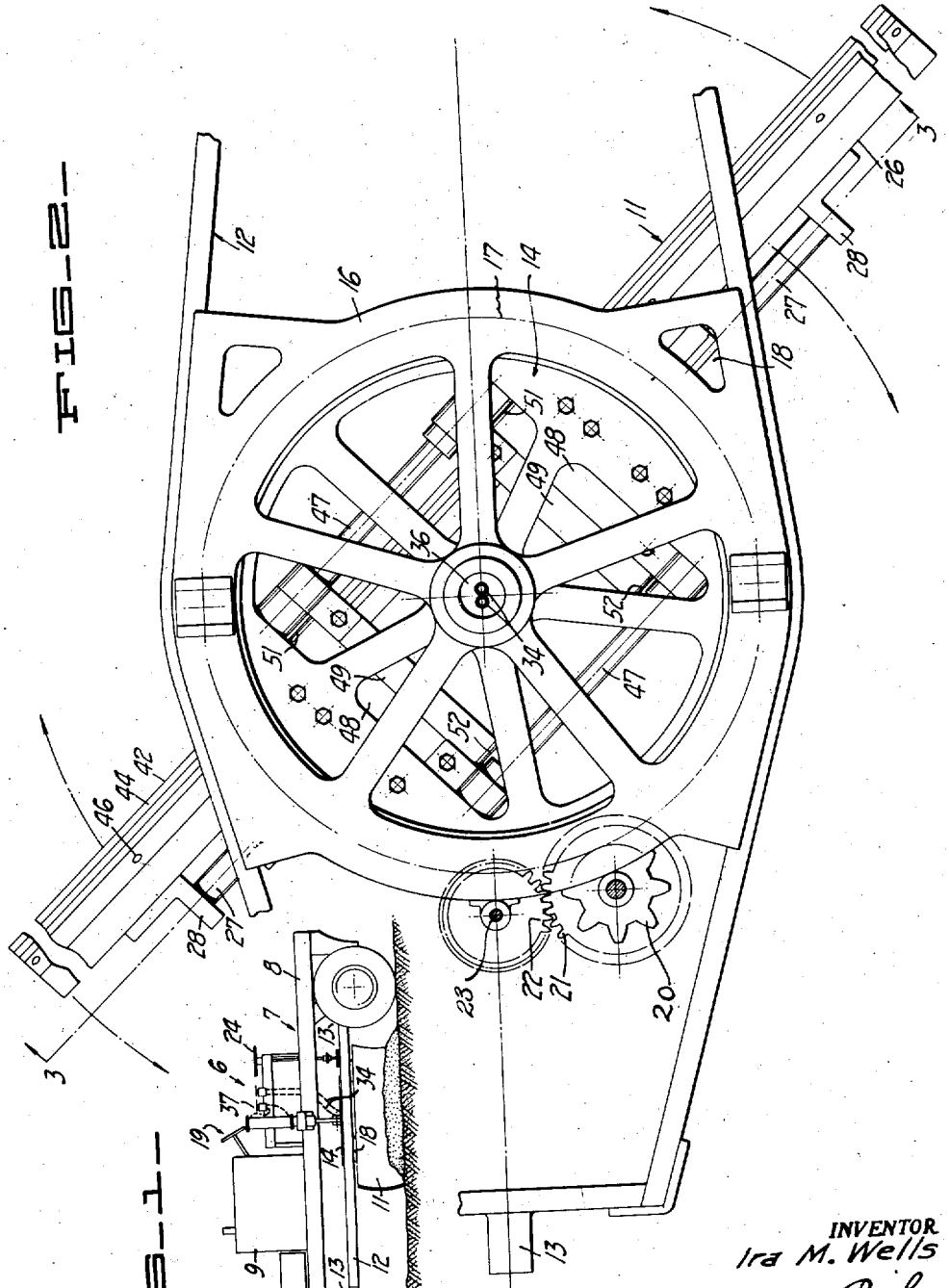


FIG-1-

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ROAD GRADER MOLDBOARD CONTROL MEANS

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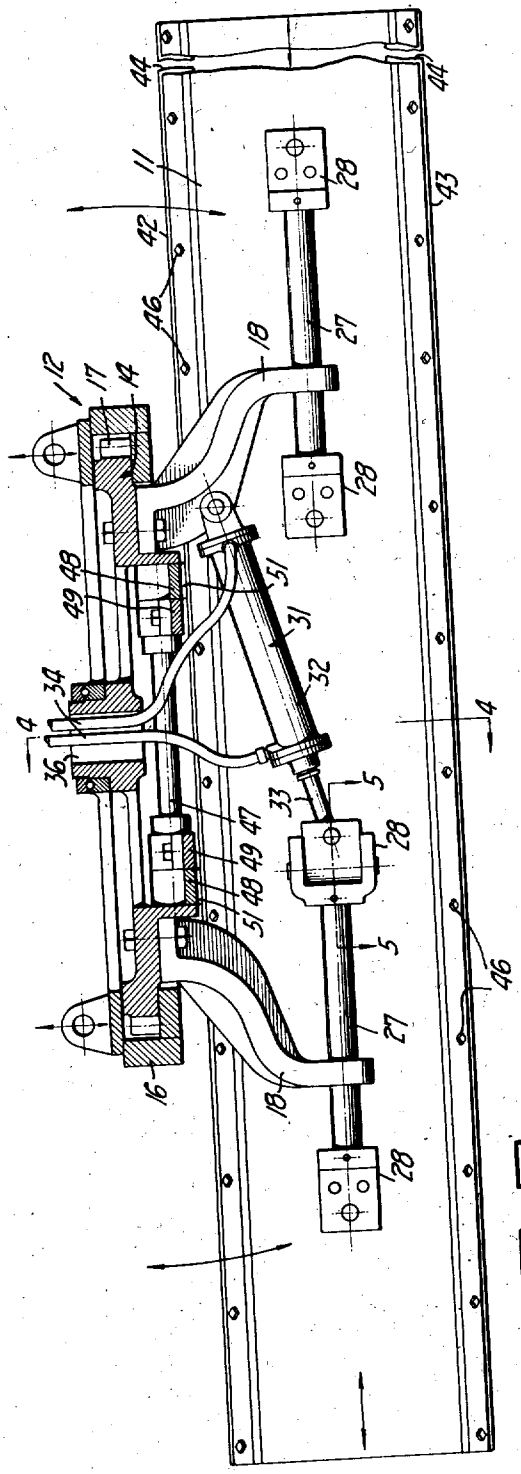


FIG-3-

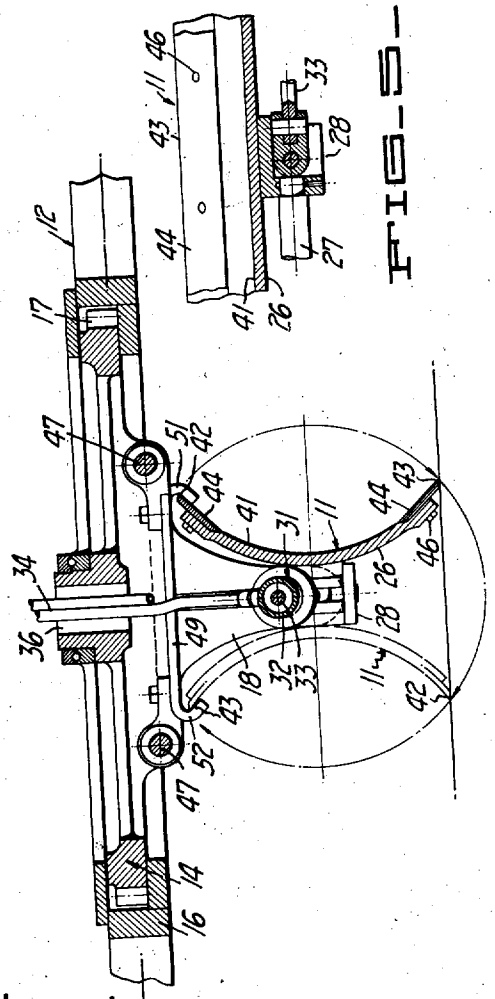


FIG-4-

FIG-5-

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ROAD-GRADER MOLDBOARD CONTROL MEANS

Ira M. Wells, Oakland, Calif.

Application November 23, 1934, Serial No. 754,502

4 Claims. (Cl. 37—156)

The invention relates to road graders and more particularly to the moldboard mounting and adjusting means therefor.

An object of the invention is to provide in combination with a moldboard a means permitting the operator to shift the board sidewise without requiring him to leave his station or to withdraw his attention from the other operating controls.

Another object of the invention is to provide a means of the character described which while manually controlled will be power operated whereby the operator may with ease and facility cause the sidewise movement of the relatively long and heavy moldboard into a wide range of useful positions.

A further object of the invention is to provide a control means of the character described which may be operated during the course of movement of the grader to afford during the sidewise movement of the moldboard for a continuous operation of the grader and to provide in this manner for a compound forward and sidewise grading action and for the uniform diagonal movement of material from one side of the grader, ahead and to the other side of the grader.

Still a further object of the invention is to provide a revolvable moldboard support permitting of the ready turning of the moldboard to face in opposite directions with respect to the line of travel of the grader whereby a continuous grading operation may be effected on the forward and return travel of the grader over a course without requiring the turning about of the grader at an end of the course.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth in the following description of the preferred form of the invention which is illustrated in the drawings accompanying and forming part of the specification. It is to be understood, however, that variations in the showing made by the said drawings and description may be adopted within the scope of the invention as set forth in the claims.

Figure 1 is a side view of a grader with the means of my invention incorporated thereon.

Figure 2 is a plan view of the moldboard and mounting assembly therefor of the grader shown in Figure 1.

Figure 3 is a sectional view of the assembly shown in Figure 2 and is taken substantially on the plane of the line 3—3 of Figure 2.

Figures 4 and 5 are vertical sectional views taken substantially on the plane of the lines 4—4 and 5—5 respectively of Figure 3.

Referring more particularly to the drawings, the control means 6 of my invention is shown in connection with a grader 7 including, a wheel supported frame or chassis 8, self powered by a motor 9, and a moldboard or blade 11. As will of course be clear, the general grader combination is well known in the art and I may, in practicing my invention adapt the same to all types of graders regardless of whether the same be self-powered or drawn by auxiliary equipment or supported for movement on wheels or otherwise.

In the type of grader illustrated, the moldboard is usually carried by a secondary frame 12 which may be pivotally secured at its ends 13 to the main frame 8 so as to permit turning of the frame and moldboard from a normally horizontal position. Also, and as here shown, it is customary to support the moldboard from the frame 12 by means of a so called circle mounting 14 which permits of turning of the moldboard to different angular positions about a vertical axis. The latter mounting in the present case comprises a circular housing 16 secured to the frame 12 and in which is mounted for rotation a ring gear 17. Secured at diametrically spaced positions on the ring gear are a pair of depending supporting arms 18, known generally in the art as rams horns, which are in turn secured at their lower ends to the moldboard to cause the latter to rotate together with the ring gear as a unit. Rotation of the gear and attached moldboard is arranged to be effected from the driver's station 19 of the grader through an actuating mechanism including a pinion 20 mounted on the frame 12 and engaging the gear 17 and which is connected by auxiliary gears 21 and 22 to a shaft 23 which in turn is rotated by a hand wheel 24 at the driver's station.

My invention is arranged for adaption to a grader having the general combination of elements above and pertains particularly to the mounting connection of the moldboard with its support. While in the present disclosure I have shown the moldboard supported by the arms 18, it will be understood that other mounting arrangements such as a direct connection of the moldboard to the frame or other parts may be used. In keeping with the present arrangement, the moldboard is provided at the rear side 26 thereof with a pair of longitudinally spaced rods 27 which are fixed in parallel relation to the longitudinal center line of the moldboard in brackets 28 and slidably mounted in openings pro-

vided through the lower ends of the arms 18. In this manner the moldboard is mounted for longitudinal movement relative to the arms 18 and the circle support and is permitted to move from a center position to either side of the grader. In accordance with the present invention this side movement of the moldboard is arranged to be effected and controlled from the operator's station of the grader and includes as part of the actuating mechanism a hydraulic expanding member 31 which is connected to one of the arms 18 and to the moldboard to provide on expansion and contraction thereof for a corresponding side movement of the moldboard. More specifically the member 31 comprises in the present arrangement a combination of a cylindrical housing 32 which is pivotally mounted at an end to one of the arms 18 and which carries a reciprocating piston having a connecting rod 33 therefor extending from an opposite end of the housing and universally connected at its outer end to one of the brackets 26. Application of operating fluid to the cylinder is provided by a pair of conduits 34 which connect at opposite ends of the cylinder and are extended therefrom upwardly through a central opening 36 in the circle support and to a valve control mechanism 37 at the operator's station, and thence to a source 38 of fluid under pressure. Thus the control of the side movement of the moldboard from the operator's station only entails the mere turning of a valve thereat to cause the communication of the pressure source with the appropriate side of the cylinder 32. As a result the movement of the relatively long and heavy moldboard may be rapidly effected by the operator with a maximum of ease and simplicity and without requiring the operator to leave his station or to withdraw his attention from the other operating controls.

Another important advantage afforded by my control is capability thereof of effecting the sidewise movement of the moldboard during the forward movement of the grader without in any way interfering with the continuity of the grading operation and providing in addition for an important and useful resultant diagonal movement of the moldboard. This latter diagonal movement of the moldboard, as will be readily understood is a result of the combination of a forward movement of the grader and a simultaneous sidewise movement of the moldboard. Thus, as will be further understood, by turning the circle support to cause the moldboard to face at substantially right angles to the aforesaid diagonal movement, it is possible to move bodily an excess or pile of material on one side of the grader ahead and to the other side of the grader without changing the course of travel of the grader, a feature which to our knowledge had been impossible of attainment with graders of the present type heretofore available.

A further feature of our moldboard mounting assembly is the provision afforded thereby for quickly and readily reversing the moldboard to face in opposite directions with respect to the line of movement of the grader. As may be best seen from Figures 2, 3, and 4 there is sufficient clearance between the rods 27 and the rear side of the moldboard to permit the latter to revolve about the lower ends of the supporting arms 18 with the rods as a center to position the rear side of the moldboard against opposite sides of the arms 18 and to thereby position the forward side 41 of the moldboard in either of oppositely disposed positions with respect to the line of movement of the grader. Since the extent of revolution of the moldboard is through but substantially 180°, it will be understood and as clearly represented in Figure 4, the longitudinal edges 42 and 43 of the moldboard are in the reversed positions of the moldboard also reversed as to top and bottom positioning. For this reason and in order that the moldboard will be equally effective in both positions thereof, I prefer to provide each of the edges 42 and 43 with sharpened ground engaging blades 44 which as in the present case, may be removably secured to the moldboard by means of bolts 46.

Means are also provided for adjustably holding the moldboard in either of its revolved positions and here comprise a pair of bars 47 fixedly secured to the ring gear 17 and positioned to overlie in parallel relation the upper edges of the moldboard in its forwardly and rearwardly turned positions. Mounted on the bars 47 are pairs of spring detent members 48 and 49 which extend from one bar to adjacent the other where they are provided with downwardly extending hook portions 51 and 52 which are arranged to engage over and hold against displacement the upper edge of the moldboard.

Thus with the moldboard mounting of my invention it is possible on travel of the grader to either end of its course to simply raise the detent members holding the moldboard, rotate the moldboard into engagement with the oppositely disposed detent members to reverse its facing, and then return the grader over the course without requiring the turning around of the grader apparatus at the ends of its course. This operation is of importance, as will be readily understood, where grading a relatively narrow course such as in the mountains or other places, is required and where turning around of the apparatus at the end of the course may be impossible or dangerous.

I claim:

1. In a grader, a frame supported for movement, a member pivotally secured thereto for rotation in a substantially horizontal plane, a moldboard slidably mounted for endwise displacement on said member and generally across the line of movement of said grader, and a fluid pressure expanding means interconnecting said member and moldboard for causing said displacement of the moldboard during the movement of the grader to effect a continuous and uniform diagonal movement of said moldboard relative to the line of movement of the grader.

2. In a grader, a frame supported for movement and provided with a driver's station, a member rotatably carried by said frame for rotation in a substantially horizontal plane, a moldboard slidably mounted for endwise displacement on said member, power operated means for causing a uniform longitudinal movement of said moldboard generally across the line of movement of the grader to produce a diagonal movement of said moldboard relative to said line of movement, and means positioned at said driver's station for controlling the energizing of said power operated means, and regulating the amount and angularly of said diagonal movement.

3. A grader comprising, a movable frame, a circle support secured thereto, a pair of members secured to and depending from said circle support, a moldboard, longitudinal guide means

on said moldboard slidably and rotatably secured to said members for rotatably moving said moldboard with said circle support and permitting longitudinal shifting of the moldboard relative to said circle support and for providing a rotation of the moldboard along a horizontal axis longitudinally of the moldboard to reverse the facing thereof, a pair of spaced bars carried by said circle support in generally spaced parallel relation over the upper edges of the moldboard in the reversed positions thereof, spring detent members each secured at an end to one of said bars and extended in the direction of the other bar for engagement with an edge of said moldboard for holding the same in either of the reversed positions thereof.

4. A road grader comprising, a frame supported for movement over a road, a circle support mounted on said frame for rotation in a substantially horizontal plane, a moldboard slidably mounted for endwise displacement on said circle support, and means providing a continuous uniform endwise displacement of said moldboard generally across the line of movement of said frame and during the course of movement thereof to produce a continuous and uniform diagonal movement of said moldboard relative to the line of movement of the grader.

IRA M. WELLS.

DISCLAIMER

2,074,601.—*Ira M. Wells*, Oakland, Calif. ROAD-GRADER MOLDBOARD CONTROL MEANS. Patent dated March 23, 1937. Disclaimer filed December 11, 1941, by the assignee, *Western-Austin Company*.

Hereby enters this disclaimer to claim 4 in said specification.

[*Official Gazette January 6, 1942.*]

on said moldboard slidably and rotatably secured to said members for rotatably moving said moldboard with said circle support and permitting longitudinal shifting of the moldboard relative to said circle support and for providing a rotation of the moldboard along a horizontal axis longitudinally of the moldboard to reverse the facing thereof, a pair of spaced bars carried by said circle support in generally spaced parallel relation over the upper edges of the moldboard in the reversed positions thereof, spring detent members each secured at an end to one of said bars and extended in the direction of the other bar for engagement with an edge of said moldboard for holding the same in either of the reversed positions thereof.

4. A road grader comprising, a frame supported for movement over a road, a circle support mounted on said frame for rotation in a substantially horizontal plane, a moldboard slidably mounted for endwise displacement on said circle support, and means providing a continuous uniform endwise displacement of said moldboard generally across the line of movement of said frame and during the course of movement thereof to produce a continuous and uniform diagonal movement of said moldboard relative to the line of movement of the grader.

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