Nov. 5, 1963 M. J. DUNN 3,109,351

SHOULDER BUILDING APPARATUS FOR ROAD CONSTRUCTION

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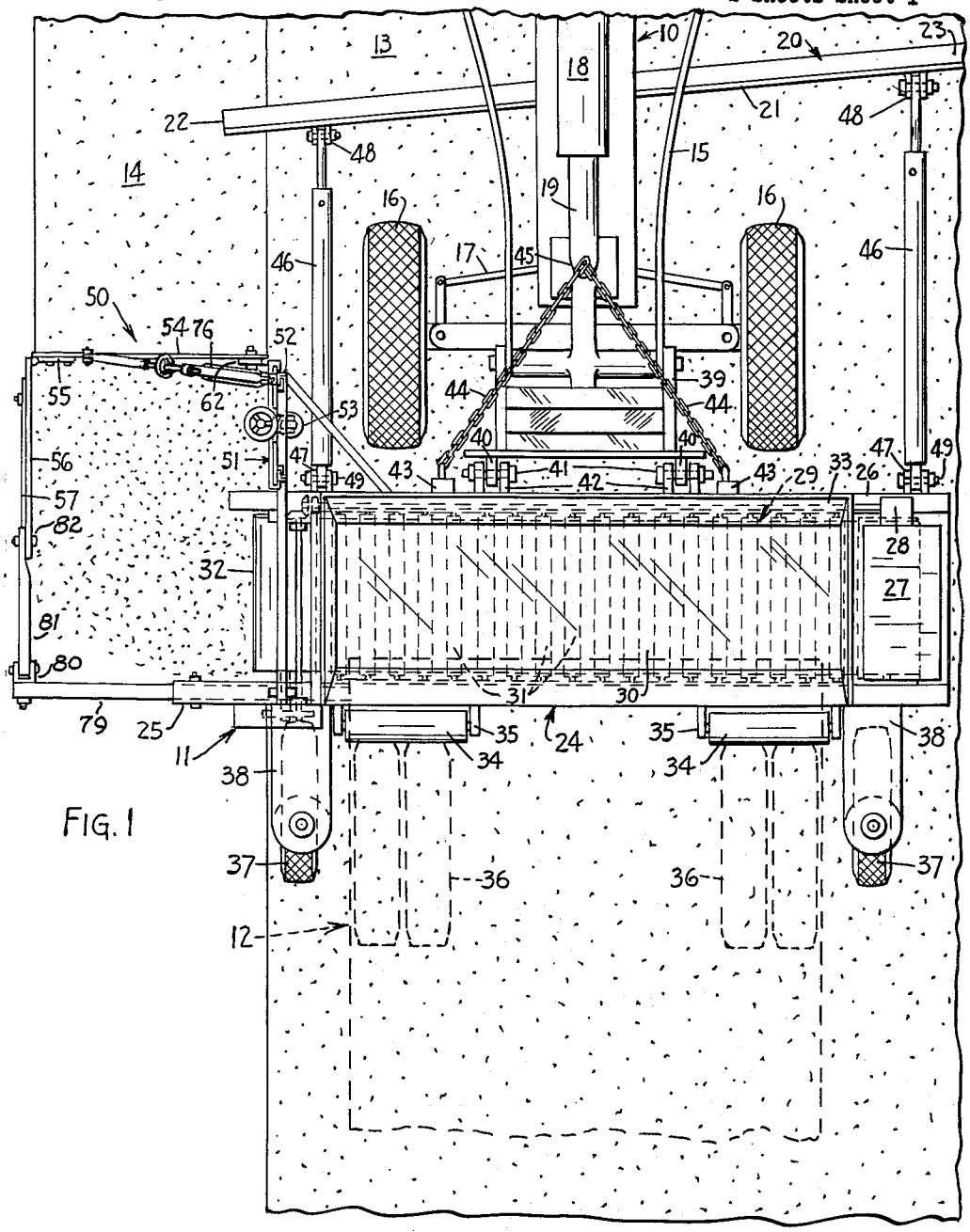


FIG. 1

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FIG. 2

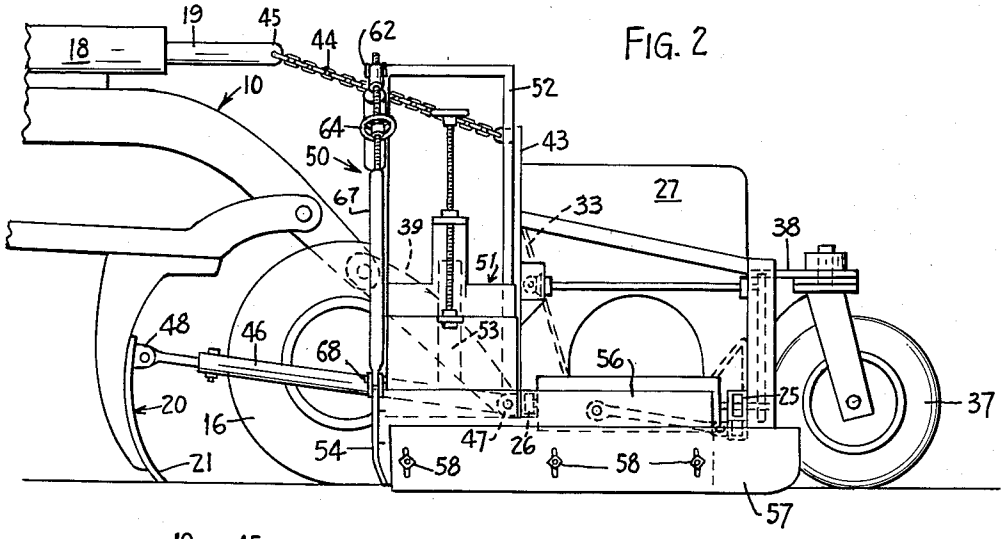


FIG. 3

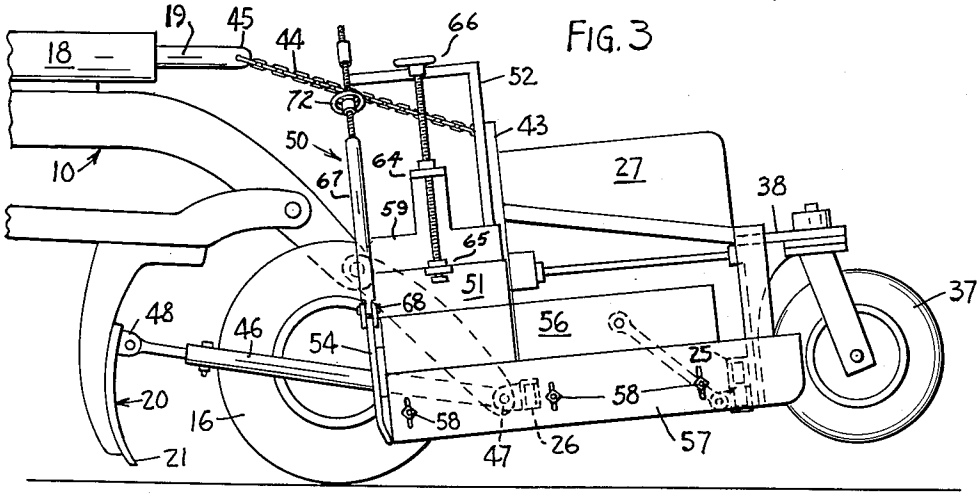
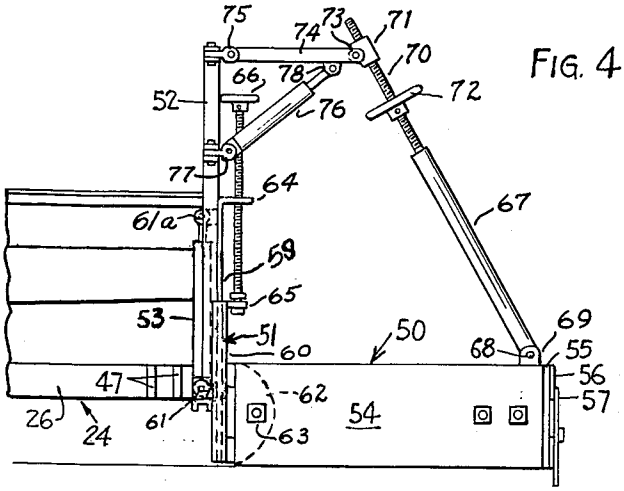


FIG. 4



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United States Patent Office 3,109,351 Patented Nov. 5, 1963

3,109,351

SHOULDER BUILDING APPARATUS FOR ROAD CONSTRUCTION

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Filed Sept. 23, 1958, Ser. No. 762,747
3 Claims. (Cl. 94—44)

This invention relates to road construction, and more particularly to apparatus for building shoulders at the sides thereof.

It is an important object of the invention to provide an apparatus which will be versatile and capable of supplying material for producing road shoulders of various widths and angulations with efficiency and economy of operation.

It is another object of the invention to provide a shoulder building attachment combined with a conventional construction vehicle such as a road grader in such a manner that the driver of the vehicle can, without assistance, control the entire apparatus and rapidly and accurately build shoulders or trench fills at the side of a road.

More specifically, it is an object of the invention to provide special mounting and bracing members that will enable the operator to raise the attachment from the road when it is desired to manuever the vehicle, such manuevering being accomplished by using conventional vehicle controls and all the while maintaining a strongly braced relation between the vehicle and the attachment.

These and other objects and advantages of my invention will more fully appear from the following description, made in connection with the accompanying drawings, wherein like reference characters refer to the same parts throughout the several views and in which:

FIGURE 1 is a top plan view of my shoulder building apparatus, unessential portions of a conventional road grader being omitted from the view, and a portion of a dump truck being shown in dotted line configuration in the position assumed during the shoulder building operation;

FIGURE 2 is a side elevation of the shoulder building apparatus in its normal operative position showing the relationship of the braces and mountings with respect to the front end of the grader;

FIGURE 3 is a side elevation similar to that of FIGURE 2, but showing the position of the attachment when raised for turning and manuevering the grader; and

FIGURE 4 is a back view of the shoulder box portion of the attachment showing the controls and mounting system therefor.

Referring now more particularly to FIGURE 1, my shoulder building apparatus is intended to be utilized with conventional vehicle equipment such as a road grader which is indicated generally at 10 and shows only the essential portions thereof which coact with my attachment, the latter being indicated generally at 11. The grader 10 and attachment 11 are intended to be used in conjunction with dump trucks consecutively positioned at the fore of the attachment, a representative truck being indicated in dotted line as 12 and shown only insofar as necessary to establish the driving relation therebetween. The road grader and attachment are propelled as a unit edgewise of a road 13 for the purpose of adding a shoulder 14 thereto.

Referring now to the conventional vehicle 10, this unit may be any one of a number of standard types, each being provided with a frame 15 having front wheels 16 mounted thereon and capable of being steered through steering mechanism 17. Frame 15 has, as standard equipment, an actuator 18 which, in the case of road grader illustrated, constitutes a hydraulic cylinder for retracting a reciprocable portion 19 to raise and lower a scarifier (not shown) positioned forwardly on the frame 15.

Also constituting a conventional part of the grader 10 is the moldboard 20 which is adapted to bear a grading blade 21 and which extends outwardly at each side of the frame 15 to terminate in the respective ends 22 and 23. The special bracing and controlling means for the shoulder builder will be described in detail after the description of the shoulder building attachment, per se.

My attachment 11 has a supporting structure 24 which constitutes generally a frame having a forward beam 25 and a rearward beam 26, as shown in FIGURE 1. A motor 27 is mounted securely to one side of the attachment 11 and is adapted to drive through mechanism 28 a conveying means 29 which may constitute an endless traveling belt 30 disposed about rollers 31. The conveyor 30 travels to the left in FIGURE 1 so as to terminate at 32 to one side of the supporting structure 24 opposed to the position of motor 27. The upper stretch of belt 30, of course, travels to the left so as to carry material outwardly of the road 13 for building the shoulder 14. A hopper 33 overlies the belt 30 and is adapted to receive shoulder building material from the dump truck 12 during operation of the apparatus. A pair of idler rollers 34 are journalled on respective bearing mounts 35 which, in turn, are secured forwardly of the beam 25 so as to bring the rollers 34 into contact with the rear truck wheels 36, as shown in FIGURE 1. When the grader 10 and attachment 11 are propelled forwardly, the truck 12 will likewise be pushed ahead so as to maintain the proper positioning for dumping material into the hopper 33. The driver of truck 12 need thus only position his truck 12 with respect to the attachment 11 and then permit the operator of the shoulder building apparatus to operate the grader as well as to push the truck 12 ahead.

Because of the heavy weight of the attachment 11 and of the high forces applied to the attachment, I employ gound contacting means such as the caster wheels 37 journaled in the brackets 38 which, in turn, are mounted forwardly of the attachment and secured to the bam 25. The caster wheels 37 normally maintain sufficient clearance with the truck wheels 36 to provide for gradual curves and normal manuevering during the shoulder building operation.

An important feature of the invention resides in the mounting and control means whereby the attachment 11 may be properly braced to withstand high forces and yet may be maneuvered and even raised completely from the road when it is desired to make sharp turns or to reverse the direction of the road grader 10. Such bracing and control features include a pivot mount 39 which is secured rigidly to the forward and medial portion of frame 15 on the grader 10. The pivot mount 39 is provided with bearings 40 extending forwardly thereof and adapted to receive pivot pins 41 which, in turn, carry the bearings 42 secured to beam 26 at the rear of the frame 24. A pair of anchored fasteners 43 are secured in spaced relation at an upper position on the frame 24 and a linking means such as the chains 44 are secured thereto and extend rearwardly where they are fastened to the outermost end 45 of the scarifier actuator extension 19. Thus, when the extension 19 is retracted, the entire attachment will be raised upwardly and rearwardly and pivoted about the pivot pins 41.

Since considerable force is exerted upon the attachment 11 during the usage thereof from the act of forming a road shoulder as well as from pushing a dump truck and retaining a heavy load of material, it is desirable to brace the attachment in a manner such as to retain the flexibility of operation without impairing the strength of the mount. To this end, I provide a pair of lengthwise adjustable brace rods 46 which are pivotally secured to a respective pair of bearing brackets 47 disposed at opposite ends of the beam 26, as shown in FIGURE 1. The rearward ends of the brace rods 46 are respectively secured to brackets 48 which are, in turn,

fastened to the respective outer ends 22 and 23 of moldboard 20. Since the rods 46 are each adjustable in lengthwise direction, the particular setting of the moldboard 20 is of little consequence. It is important, however, that each of the brace rods 46 exert an equal pushing force upon frame 24 so as to stabilize the attachment during use. In order to maintain the adjusted mounting of the brace rods 46, I position the pivot bearing brackets 47 so that pins 49 lie exactly in the same axis which passes through the bearings 42 and their respective pivot pins 41. Thus the entire attachment 11 may be raised and lowered by means of the scarifier actuator 18 without removing or concurrently adjusting the brace rods 46.

The shoulder building box is generally shown at 50 and best observed in FIGURES 1 and 4. The shoulder building box 50 is mounted pivotally with respect to mounting assembly 51, and the latter is adapted to be raised and lowered in its entirety in guided relation on the standard 52 which is rigidly secured in upstanding relation to frame 24 at the delivery end 32 of the conveyor belt 30. To this end, a vertical raising and lowering device such as hydraulic ram 53 is interposed between mounting assembly 51 and the standard 52, as shown in FIGURE 4.

The box 50 has a strike-off blade 54 at the rear thereof, and the strike-off blade is provided with an extension 55 which can be set at various widths depending on the width of the shoulder to be built. An edge-defining plate 56 is secured to the outer edge of extension 55 and is formed at right angles thereto as to extend parallel to the edge of the road 13 when the shoulder 14 is being formed. The edge-defining plate 56 has an adjustable plate 57 secured flatly thereagainst by means such as bolts 58 and can be adjusted so as to extend downwardly to assist in restraining the outward surge of shoulder building material.

The hydraulic ram 53 is intended to raise and lower mounting assembly 51 to its extreme positions without regard to fine adjustment. In order to obtain fine adjustment for level work or when a shoulder is to be built with base material at a predescribed depth below the surface of road 13, the strike-off blade 54 and its extension 55 may then be properly positioned to lie at a predetermined height when ram 53 is extended to its lowermost position. To this end, the mounting assembly 51 is divided into plate portions 59 and 60, plate 59 being slidably mounted on the standard 52 and plate 60 being vertically slidable on plate 59. Ram 53 is secured at 61 to the supporting structure 24 and at 61a to the plate 59. The plate 60, however, is independently adjustable relative to the plate 59 and bears an outwardly extending bracket 62 and pivot connection 63 to which the blade 54 is mounted. Plates 59 and 60 are provided with respective brackets 64 and 65 in aligned relation so that an adjustment screw 66 is threadably received in the bracket 64 and rotatably secured against endwise displacement in the bracket 65. The adjusting screw 66 can thus be employed to effect a variable adjusted position of the blade 54 with respect to the entire mounting assembly 51 and the hydraulic ram 53, when at its lowermost position, will always return the blade 54 to this adjusted position. In the course of building shoulders, concrete gutters and other roadside structures may be encountered which require the temporary raising of the blade 54 and immediate lowering as soon as the construction is passed. The operator need not adjustably position ram 53, but merely permits it to extend to the extreme lower position in order to re-establish the proper working depth of blade 54.

In a similar manner, the outer end of blade 54 is adjustably positioned by the brace 67 which is pivotally secured at 68 to bracket 69 on blade 54. Brace 67 has an upper portion 70 which is threadedly received in the block 71 and is rotatable within the lower portion 67 by means of hand wheel 72. Block 71 is pivotally mounted at 73 to

arm 74 which, in turn, is pivotally secured at 75 to the upper end of the standard 52. A hydraulic ram 76 is interposed between the standard 52 and arm 74 at the respective pivot brackets 77 and 78. Here again, the hand wheel 72 is utilized to obtain the working position of the outer end of blade 54 and the hydraulic ram 76 maintains such position when in its retracted condition. Hydraulic ram 76 may be utilized in conjunction with hydraulic ram 53 for temporarily raising the entire shoulder building box 50 when an obstruction is encountered during its forward travel. The brace 67 and its adjusting screw 70 may be utilized to angulate the blade 54 outwardly and downwardly, and such outward angulation will be maintained each time the hydraulic ram 76 is returned to its operating position.

Additional bracing may be supplied for the edge-defining plate 56, as shown in FIGURE 1. The beam 25 is provided with an extension piece 79 which has a universal connection 80 at its outer end. The connection 80 carries a brace 81 which may be adjustably secured at 82 to the edge-defining plate 56. The adjustment of brace 81 is made in accordance with the adjusted setting of the strike-off blade 54 and provides additional strength for the shoulder building box and its mountings.

It will be observed that the retractability of blade 54 and its extension 55 is not only independent of the adjusted angulation and depth but is independent of the pivotal raising of the entire shoulder building apparatus upon retraction of the scarifier actuator 18. Thus, a single operator can, with speed and economy, maneuver his road grader in turning and avoiding obstructions and yet can continue without assistance to feed material from a dump-truck through the shoulder builder to produce an accurately defined shoulder.

It will, of course, be understood that various changes may be made in the form, details, arrangements and proportions of the parts without departing from the scope of my invention as set forth in the appended claims.

What I claim is:

1. A road shoulder building attachment for a road grader, said attachment having a supporting structure adapted to be secured to the forward end of a road grader and extending transversely thereacross, a traveling conveyor mounted on said supporting structure and extending to one end thereof, a shoulder box mounted on said supporting structure and underlying said conveyor and extending beyond said one end of said supporting structure, a first plate secured to said end of said supporting structure and vertically shiftable with respect thereto, a second plate fixedly secured to said shoulder box and being mounted for vertically slidable adjustment upon said first plate, and remotely controllable means for instantaneously raising and lowering said box, said remotely controllable means being respectively secured at the ends thereof to said first plate and to said supporting structure.

2. A road shoulder building attachment having elements as set forth in claim 1 wherein means for the vertically slidable adjustment of said second plate with respect to said first plate is a mechanically adjustable screw threadedly interconnected between said plates, and wherein said remotely controllable means comprises a hydraulic ram.

3. A road shoulder building attachment as set forth in claim 1 wherein said shoulder box comprises a bracket secured to said second plate, a strike off blade transversely positioned with respect to the direction of travel of said attachment and pivotally secured at its inward end to said bracket, an edge-defining plate secured to the outer end of said strike off blade, an arm pivotally secured at one end to said supporting structure above said shoulder box, a block pivotally secured at the other end of said arm, and extensible means secured between said outer end of said strike-off blade and said block for mechanically adjusting the height of said edge-defining plate with respect to said supporting structure, and a remotely controllable hydrau-

lic ram connected at its respective ends to the supporting structure and to said arm at a position adjacent said block for raising and lowering said edge-defining plate and the outer end of said strike off blade by pivoting the same about the pivotal securement of said strike off blade.

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