

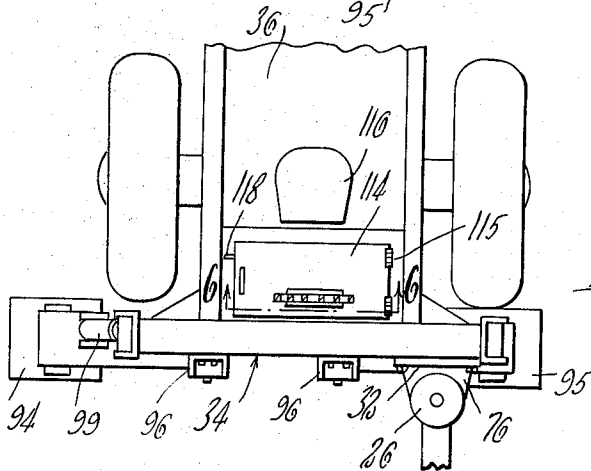
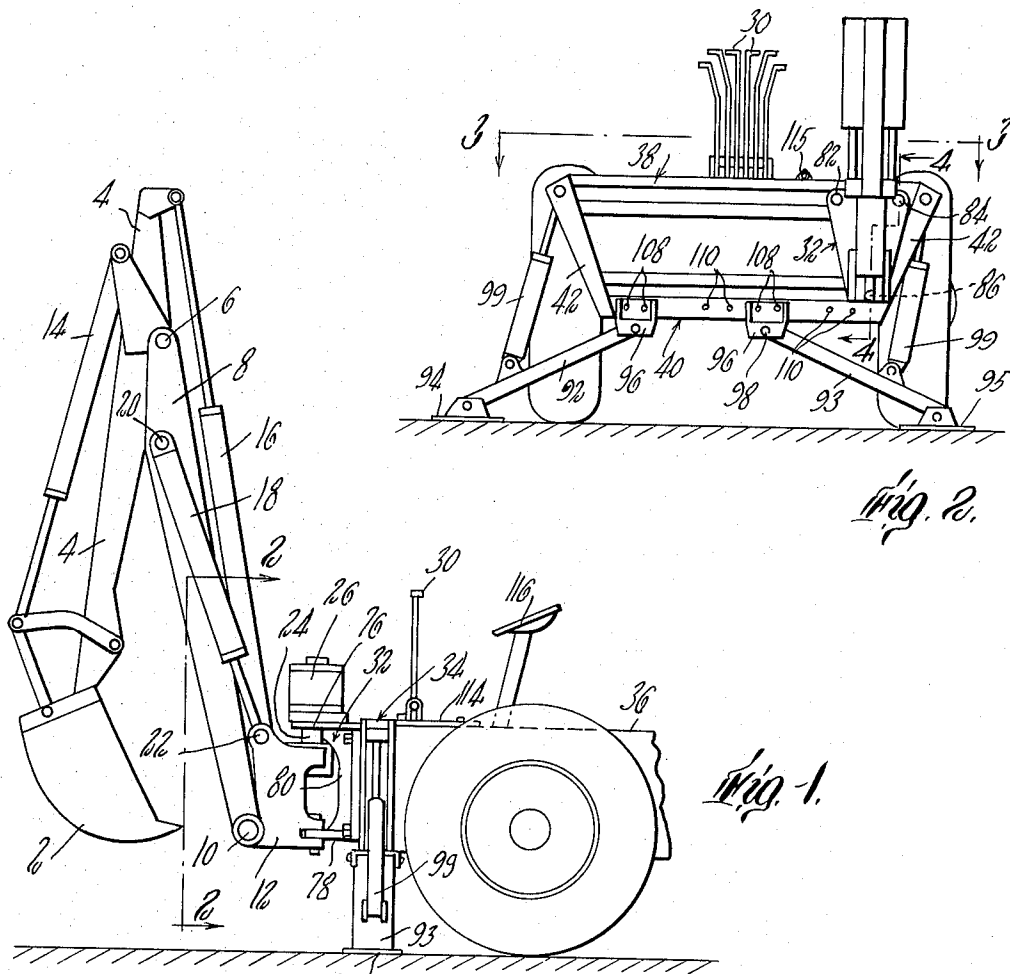
April 5, 1966

R. H. VAUGHAN
EARTH MOVING APPARATUS

3,244,301

Filed Dec. 4, 1963

2 Sheets-Sheet 1



April 5, 1966

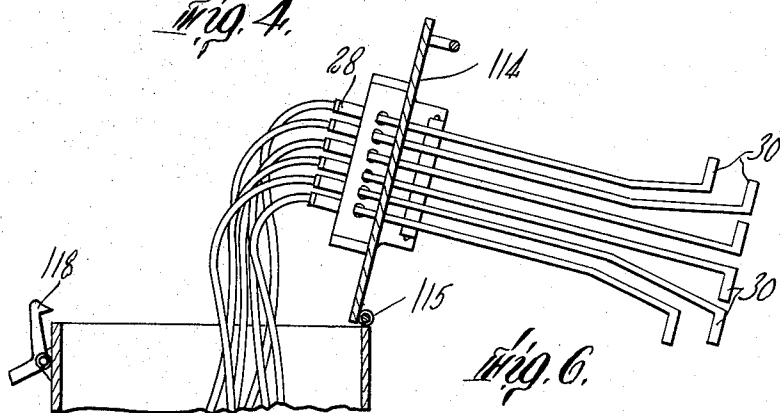
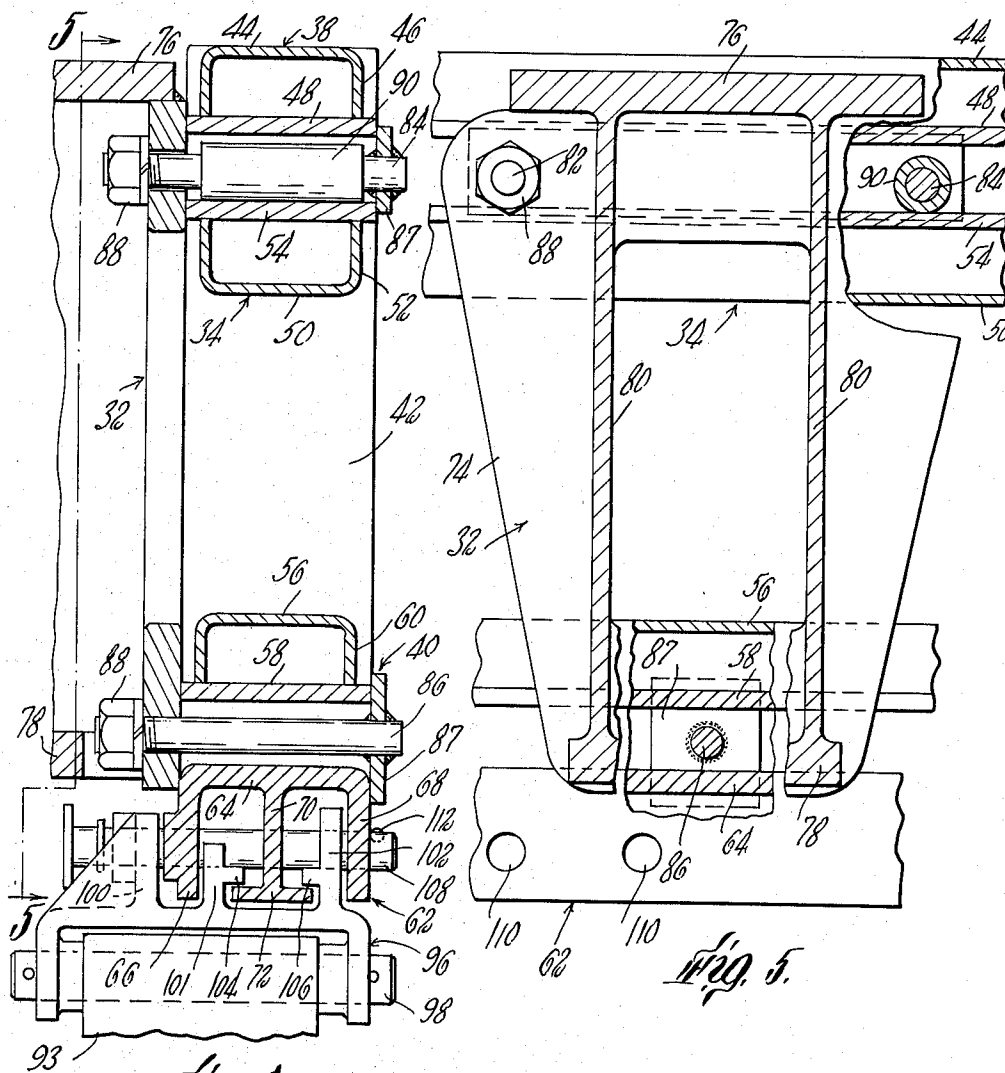
R. H. VAUGHAN

3,244,301

EARTH MOVING APPARATUS

Filed Dec. 4, 1963

2 Sheets-Sheet 2



1

3,244,301

EARTH MOVING APPARATUS

Roger H. Vaughan, Princeton, Mass., assignor to Wain-Roy Corporation, Hubbardston, Mass., a corporation of Massachusetts

Filed Dec. 4, 1963, Ser. No. 327,890

5 Claims. (Cl. 214-138)

The present invention relates to earth moving equipment and more particularly to a vehicle-mounted backhoe.

The hydraulically operated backhoe, mounted on a standard tractor or carried on its own vehicle, is rapidly coming into wide use. For certain types of operations, such as trenching along a curb or close to the side of a building, it is desirable that the backhoe be mounted closely adjacent to one side of the vehicle so that it can efficiently work close to the wall or other obstruction. For other operations, however, the same vehicle is more effective and efficient if the backhoe can be carried near the middle or center line of the vehicle or at the opposite side of the vehicle, and it is important that the backhoe be readily adjustable from one such position to another. Such backhoes are commonly provided with hydraulically operated stabilizer arms having pivoted feet on their outboard ends for engagement with the ground whereby the weight of the backhoe and one end of the vehicle may be transferred from the vehicle running gear to the stabilizer feet, to more firmly support the backhoe while it is in operation. When it is desirable or necessary to transfer the backhoe to one side of the vehicle it may in many cases be desirable also at the same time to alter the transverse position of one or both stabilizer arms accordingly. Also the backhoe control valves as commonly mounted on the vehicle or on the backhoe attachment for a tractor are either not conveniently accessible to the operator when they require attention or are not adequately concealed and protected from damage when in their normal working position. It has been known to provide means for attaching a backhoe to a vehicle in such a way that the backhoe may be adjusted transversely of the tractor, as shown for example in British Patent No. 903,511. Such known arrangement, however, do not provide for the adjustment of the backhoe from one position to another in a satisfactorily convenient manner, as the backhoe and its supporting structure are heavy and not readily moved about.

It is an object of the invention to provide a backhoe structure for attachment to a tractor, or adapted to be incorporated as an integral part of a self-contained backhoe carrying vehicle, in which the backhoe may conveniently be adjusted into different transverse positions on the vehicle and quickly and conveniently secured in such adjusted position.

A further object of the invention is to provide an effective arrangement whereby the stabilizer arms of a backhoe supporting structure may be adjusted to dispose the stabilizer feet at different positions transversely of the vehicle and conveniently secured in such positions.

A further object is to provide an arrangement for mounting the backhoe control valves so that when the backhoe is in operation the valves are adequately protected from accidental damage but whereby nevertheless the valves may quickly and conveniently be made accessible for inspection or work thereon.

A further object of the invention is to provide an improved backhoe unit for attachment to a tractor or incorporation in a land vehicle whereby the backhoe is readily convertible to efficiently perform different types of work requiring location of the backhoe and its sta-

2

bilizer arms at different transverse positions with respect to the longitudinal center line of the vehicle.

A further object is to provide such a convertible backhoe and supporting structure wherein the backhoe control valves are well protected from accidental damage but readily accessible for service.

Other and further objects, features and advantages of the invention will become apparent from the following description of an illustrative particular backhoe structure embodying the invention, in which description reference is made to the accompanying drawings, wherein,

FIG. 1 is a side view of the backhoe and a portion of its supporting vehicle;

FIG. 2 is a rear elevation;

FIG. 3 is a plan view;

FIG. 4 is a vertical sectional view taken on line 4-4 of FIG. 2;

FIG. 5 is a vertical sectional view taken on line 5-5 of FIG. 4; and

FIG. 6 is a vertical sectional view taken on line 6-6 of FIG. 3.

In accordance with the invention I provide a backhoe supporting frame, which may be incorporated in a land vehicle or arranged as an attachment to a vehicle such as a standard tractor, wherein the frame is provided with means for supporting the backhoe thereon on trackways for rolling movement of the backhoe bodily into different transverse positions of adjustment on the frame in which positions the backhoe supporting structure may be releasably rigidly clamped to the frame, and providing also means whereby stabilizer arms are carried on the frame for convenient movement into different transverse positions of adjustment in which the stabilizer arms may selectively and releasably be rigidly clamped to the frame in adjusted position. The backhoe control valves are carried on the frame on one side of a plate which is pivoted on the frame for movement from a normal working position in which it serves to conceal and protect the valves from accidental damage to another position in which it exposes the valves so that they are readily accessible for inspection, adjustment or service.

Referring now to the drawing, FIGS. 1, 2 and 3, the backhoe is of standard conventional construction comprising a bucket 2 pivoted on the lower end of a dipper stick 4 which in turn is pivoted at 6 on a boom 8 which boom in turn is pivoted at 10 on a swing frame 12. An hydraulic piston and cylinder 14 is arranged to swing the bucket 2 on the dipper stick 4, cylinder and piston 16 swing the dipper stick 4 on its pivot 6 with respect to the boom, and a cylinder piston 18 having the cylinder pivoted on the boom at 20 and the piston rod pivoted on the swing frame 12 at 22 elevates and depresses the boom 8 in swinging movements about its pivot 10. Side to side swinging movement of the boom is effected by swinging movement of the swing frame 12 on its vertical pivot at 24 by means of a rotary hydraulic motor 26. The hydraulic motor 26 and the hydraulic jacks 14, 16 and 8 are connected through appropriate pressure fluid hoses in the conventional manner to a source of pressure fluid on the vehicle through control valves 28, FIG. 6, which may be operated by the operator through control handles 30.

The swing frame 12 and with it the entire backhoe and its operating cylinders and pistons is carried on a bracket 32 which is mounted on a transverse frame 34, in turn mounted on the frame of the land vehicle, in this instance the tractor 36.

The frame 34 is of open construction, comprising an upper horizontal frame member 38 and a lower horizontal frame member 40, interconnected at their ends

by end frame members 42. The upper frame member 38 is formed from a channel 44 disposed with its flanges 46 extending downwardly and having welded to their outer edges a plate 48, and a similar channel 50 having its flange 52 turned upwardly and welded at their free ends to a plate 54. The plates 48 and 54 are spaced from each other to provide an upper horizontal trackway on the frame 34. The lower horizontal frame member 40 is formed from a channel 56 having a plate 58 welded to the free edges of its flanges 60, and a built-up member 62 comprising a horizontal member 64, edge members 66 and 68, spaced depending hangers 70 carrying at their lower edges a track 72. The plate 58 and the horizontal member 64 are spaced from each other in the same manner as the plate 48 and the plate 54 to provide a lower horizontal trackway on the frame 34. The backhoe carrying bracket 32 is adapted to move with a rolling motion on the trackways provided by the upper and lower horizontal frame members.

The bracket 32 comprises a triangularly shaped plate 74 having a plate 76 extending rearwardly and horizontally from its upper edge and a plate 78 extending rearwardly and horizontally from its lower edge. Vertical stiffening webs 80 interconnect the plates 76 and 78, as shown. The swing frame 12 is pivotally mounted on the upper and lower plates 76, 78.

The plate 74 is provided with three bolts 82, 84 and 86 having their heads 87 disposed on the forward face of the frame 34 and their free threaded ends provided with lock washers and nuts 88. On each of the upper bolts 82, 84 is a sleeve 90 freely rotatable on the bolt, forming a roller. The upper bolts 82, 84 pass between the plates 48 and 54 and the lower bolt 86 passes between the plates 58 and 64 whereby the entire bracket 32 may readily be moved transversely of the frame 34 by rolling movement of sleeves 90 on the horizontal trackway of the upper frame member 38. In this way the entire backhoe may be moved into a position at one side of the vehicle, as illustrated in FIG. 2, or may be positioned at the opposite side of the vehicle or at any desired intermediate position. When the bracket 32 is in the desired position, it may be releasably and rigidly secured in place and clamped to the transverse frame 34 by tightening down the nuts 88, thereby clamping the bracket to the frame 34.

A pair of stabilizer arms 92, 93 having ground engaging stabilizer feet 94, 95 respectively are mounted on the transverse frame 34. Referring particularly to FIG. 4, each stabilizer arm is mounted on a bracket 96 by means of a bolt 98, for upward and downward swinging movement by the conventional hydraulic jacks 99. Each bracket 96 includes three upstanding ribs 100, 101 and 102. The ribs 101 and 102 carry intumed lugs 104 and 106, respectively, overlying the track 72. The ribs 100, 101 and 102 are bored as shown to receive a pair of removable pins 108. Similarly the members 66, 68 and 70 of the built-up member 62 are bored as at 110 to receive the pins 108.

When the pins 108 are in position passing through the bores 110 and the bores in bracket 96 they connect the bracket 96 and thus the stabilizer arms securely to the frame 34. Spring pressed balls 112 serve to hold the pins 108 in position. When it is desired to adjust a stabilizer arm transversely of the vehicle, the pins 108 may be removed, whereupon the bracket 96 is supported on the track member 72 by means of the intumed lugs 104 and 106 resting thereon. In this condition, the stabilizer bracket may conveniently be moved transversely of the frame 34 into a different adjusted position with its bores coinciding with other bores 110 in the built-up member 62, whereupon the pins 108 are reinserted to secure the stabilizer arm in its new position. Thus, in the position of FIG. 2, with the backhoe mounted adjacent the right hand side of the vehicle, as seen in that figure, the right hand stabilizer 93 can be adjusted to bring its foot 95

into a position within the outline of the right hand side of the vehicle, or substantially so, so that the entire vehicle may be operated closely adjacent an obstruction, such as a wall, on its right hand side.

The backhoe control valves 28 are mounted in a cluster on the under surface of a metal plate 114 hinged on frame 34 at 115. When plate 114 is in its normal working position, as shown in FIGS. 1, 2 and 3, it forms a floor plate for the feet of the operator who is sitting in the operator's seat 116. The plate 114 may be secured in its working position by a latch 118. When in this working position, the plate 114 serves to conceal and protect the valves from accidental damage. When it is necessary to gain access to the valves 28, as to inspect or repair the valves, the latch 118 may be released and plate 114 swung upwardly about its hinged connection 115 to the position shown in FIG. 6. In this position the valves are exposed and are conveniently accessible to the operator sitting in the seat 116.

It will thus be seen from the foregoing disclosure of one particular embodiment of the invention that the invention has provided a backhoe supporting and mounting arrangement embodying various features of convenience whereby the backhoe and the backhoe stabilizer arms may be readily adjusted transversely of the vehicle and the backhoe control valves are well protected from accidental damage during the working operation but are readily accessible to the operator for inspection, adjustment or repair.

What is claimed is:

1. An earth-moving apparatus comprising a land vehicle, a frame on one end of the vehicle and extending transversely thereof, at least two transverse horizontal trackways on said frame spaced from each other, a bracket supported by both the trackways and having a roller running on one only of said trackways for rolling movement of the bracket on the frame transversely of the vehicle into different positions of adjustment, means for releasably clamping said bracket rigidly to said frame, a backhoe supported on said bracket for bodily movement therewith, a pair of ground-engaging stabilizers mounted on said frame for movement thereon transversely of the vehicle into different positions of adjustment, means for releasably clamping the stabilizers rigidly to said frame, a plate, a backhoe control valves connected to said plate on one side thereof, and a hinge member connecting said plate to said frame for pivotal movement of the plate and valves from a working position in which the plate protects the valves to another position in which the valves are exposed and accessible.

2. An earth-moving apparatus comprising a land vehicle, a frame on one end of the vehicle and extending transversely thereof, a backhoe supported on said frame, a plate, backhoe control valves mounted on said plate on one side thereof, and a hinge member connecting said plate to said frame for pivotal movement of the plate and valves from a working position in which the plate protects the valves to another position in which the valves are exposed and accessible.

3. An earth-moving apparatus comprising a land vehicle, a frame on one end of the vehicle and extending transversely thereof, a transverse horizontal trackway on said frame, a bracket having a roller running on said trackway for rolling movement of the bracket on the frame transversely of the vehicle into different positions of adjustment, means for releasably clamping said bracket rigidly to said frame, a backhoe supported on said bracket for bodily movement therewith, a plate, backhoe control valves mounted on said plate on one side thereof, and a hinge member connecting said plate to said frame for pivotal movement of the plate and valves from a working position in which the plate protects the valves to another position in which the valves are exposed and accessible.

4. An earth-moving apparatus comprising a land vehicle, a frame on one end of the vehicle and extending

5

transversely thereof, a transverse horizontal trackway on said frame, a backhoe supported on said frame, two ground-engaging stabilizers spaced transversely of each other and mounted on said frame for movement on said trackway transversely of the vehicle independently of each other into different positions of adjustment, means for releasably clamping each stabilizer rigidly to said frame, a plate, backhoe control valves mounted on said plate on one side thereof, and a hinge member connecting said plate to said frame for pivotal movement of the plate and valves from a working position in which the plate protects the valves to another position in which the valves are exposed and accessible.

5. An earth-moving apparatus comprising a land vehicle, a frame on one end of the vehicles including spaced frame members extending transversely of the vehicle, one of said transverse frame members being formed to provide a transverse horizontal trackway, a backhoe supported on said frame, two ground-engaging stabilizers

6

spaced transversely of each other and mounted on said one of said frame members for swinging movement and for movement on said trackway transversely of the vehicle independently of each other into different positions of adjustment, means for releasably securing each stabilizer in adjusted position on said trackway, and two hydraulic jacks each connected between one of said stabilizers, at a point intermediate its upper and lower ends, and said frame at a point above and spaced transversely from the upper end of said one of said stabilizers.

References Cited by the Examiner

UNITED STATES PATENTS

15	2,474,803	6/1949	Putnam	-----	214—134
	3,023,914	3/1962	McGuire et al.	-----	212—145
	3,155,250	11/1964	French et al.	-----	214—138

HUGO O. SCHULZ, *Primary Examiner.*