CONVERTIBLE RAIL-HIGHWAY HEAD BLOCK ASSEMBLY

John Knox Kershaw, Southport, Ind., assignor, by mesne assignments, to The Mannon Group, Inc., Chicago, Ill., a corporation of Delaware

Filed Apr. 3, 1968, Ser. No. 718,560
Int. Cl. 6; B06F 1/04; E01b 27/00

U.S. Cl. 105—215

6 Claims

ABSTRACT OF THE DISCLOSURE

A head block assembly for mounting rail-wheels on a road and rail machine and for mounting and independently adjusting the elevation and level of an overhanging railway implement. A head block frame fixed to the spring structure of a road-rail vehicle carries a first set of guides for a wheel carrier which can be lowered to position rail wheels in rail engaging position to provide positive rail support for such frame, and also carries second guides in which an implement mounting frame is vertically adjustable. The implement mounting frame has pivot mounting brackets at the bottom and a pair of winch drums at the top from which cables extend to support an overhanging implement pivotted to the brackets. A hydraulic cylinder pulls on a drive cable to drive the winch drums.

Cross references


Background of the invention

This invention relates to a railway roadbed machine, and more particularly to a machine adapted to travel either on rails or on roads, and particularly to a head block for such a machine for mounting retractable rail wheels and for mounting roadbed working implements.

The present invention is part of an overall development of a universal track machine which will be highly effective as a roadbed maintenance machine and also highly mobile for travel over the roads; which will carry several interrelated roadbed working and maintenance implements and provide for operating such equipment on the rails and for transporting the equipment on the roads between work sites and onto and off the railway at work sites. The basic prime-mover is a self-propelled vehicle of sturdy and powerful construction having four or more pneumatically-tired wheels for road travel, at least two of which are steerable, and at least four of which are powered from a heavy traction engine. Retractable rail wheels guide the road wheels for traction on the rails and are hydraulically adjustable to vary the loading between the two sets of wheels. All work equipment is adjusted hydraulically by controls located for operation by a single operator in a cab from which the vehicle is driven on the highway and operated on the rails. Implements used with the prime-mover may include a ballast distributing plow at the front, side wings for working ballast banks, and a rear track broom.

The present invention is particularly concerned with a head block assembly mounted at each end of the universal track machine, which provides separately adjustable mountings for the rail wheels and the roadbed implements. The rail-wheel mounting provides for vertical movement of the rail-wheels between a lowered rail-engaging position and a retracted road-travel position, and for adjustment of the wheels in lowered position to control the load distribution between the rail wheels and the road wheels. The independently adjustable implement-mounting frame provides for adjusting the elevation of the implement in its working position, to control its working depth and to raise it to a clearance position, and also provides for pivoting the implement upward to a maneuvering or traveling position.

In accordance with the invention, the head block comprises a transverse frame fixed to a structure of the road-rail vehicle which is supported by springs from the road wheels. Such frame supports a pair of inner guides which slidably receive a vertically adjustable wheel carrier having bearings at its lower end in which the rail wheel axle is journaled. The cross frame also carries outer vertical guides for an implement frame which comprises side posts received in the guides and having implement pivot brackets at their lower ends. Such side posts are interconnected at the top by a transverse cross head which carries two spaced winch drums mounted on a common shaft and driven by a hydraulic cylinder in the cross head. The cables from the winch drums attach to remote points on an overhanging implement, to position the implement about the axis of the pivot brackets. The wheel carrier and the implement frame are independently adjustable vertically in the cross frame by separate pairs of hydraulic cylinders.

The accompanying drawings illustrate the invention. In such drawings:

FIG. 1 is a somewhat diagrammatic side elevation of a universal track machine equipped with head blocks embodying the present invention, with a plow mounted on the front head block and a broom mounted on the rear head block;

FIG. 2 is a front elevation of the front head block;

FIG. 3 is a plan view of the head block shown in FIG. 2;

FIG. 4 is a vertical section taken on the line 4—4 of FIG. 2; and

FIG. 5 is a side elevation of the head block shown in FIG. 2.

Description of the preferred embodiment

The prime-mover 10 shown in FIG. 1 is for operation either on rails 4 of a standard railroad track, as shown, or for operation on a roadway, in which case its rail wheels and implements are raised. Such prime-mover 10 comprises a heavy frame 12 mounted by springs 13 on the axles of front drive wheels 14 and rear drive wheels 16, and includes a control cab 18 at its forward end and an engine compartment 20 at the rear. The cab 18 contains a seat for the operator, a steering wheel and other controls for the vehicle, and hydraulic controls for the head blocks and the various work implements carried by the prime-mover. The engine compartment 20 contains an engine 22 which drives an oil pump and is connected through a transmission and clutch assembly to drive shafts 23 and 24 for the front and rear road wheels. The lateral spacing or tread of such wheels 14 and 16 is equivalent to that of the rails so that such wheels will ride on such rails.

At each side, the machine carries an adjustable mounting frame 26 for a wing implement 28 for working the side-banks of the ballast beds.

Each end of the prime-mover carries a head block 30 in which is mounted a vertically-movable rail wheel carrier 32 having bearings for the axle of a pair of rail wheels 34 coplanar with the adjacent road wheels 14 and 16. Such rail wheels 34 when lowered engage the rails 4 and serve to guide the drive wheels 14 and 16 on the track and to transmit directly to the rails, independently of the springs 13, a selected portion of the weight of the prime-
mover and its working implements. Each head block also includes an outer pair of tubular guides which slidably receive a mounting frame 36 which has pivotal mounting brackets 38 at its lower end and a horizontal mechanism at its upper end. At the front of the machine shown in Fig. 1, a ballast plow 42 is pivotally connected to the brackets 38 at the lower end of the mounting frame, and is supported by cables 44 from the winch mechanism 40 at the upper end of the mounting frame. At the rear of the machine, a track broum 46 is pivotally supported by the brackets 38, and by the cables 44. As will be fully explained below, each implement, that is, the plow 42 and the broum 46, may be raised and lowered by raising and lowering the mounting frame in the head block, and may be swung upward by pulling in on the cables 44.

As shown in FIGS. 2-4, each head block 30 comprises a pair of vertically-spaced transverse frame members 50 fixed to a pair of mounting plates 52 which in turn are fixed to the ends of the side members 54 of the vehicle frame 12. The projecting outer ends of the frame members 50 are braced from the vehicle frame members 54 by diagonal braces 56. The mounting frame members 50 carry a single pair of guides shown as sleeves 60 which extend through apertures in the webs of the frame members 50 and are welded in place. These sleeves 60 slidably receive the vertical side posts 62 of the wheel carrier frame 32. Such side posts are interconnected at the bottom by a cross head 64, and the lower end of each side post 62 carries a mounting foot 68 which is mounted on a bearing block 70 in which is journaled the axle 72 for the rail wheels 34. The wheel carrier frame 32 is raised and lowered by a pair of hydraulic cylinders 74 connected between brackets 75 on the guide sleeves 60 and brackets 76 on the side posts 62. Convenitely, the hydraulic cylin-
ders extend and retract through apertures in the webs of the frame members 50 so that they lie coplanar with the guide sleeves 60.

The frame members 50 also carry a pair of outer guides in the form of tubular sleeves 78 extending through apertures at the ends of the frame members 50 and welded thereto. Such sleeves 78 slidably receive the tubular side members 80 of the implement mounting frame 36, the lower end of which members carry collars 82 which support the pivot brackets 84 for pivotal mounting of an implement. The upper ends of the side members 80 are interconnected by a pair of channels 86 laid against the side members 80 and welded thereto to form a cross head 88 for the implement frame. The vertical position of the implement frame with respect to the sleeves 78 is controlled by a pair of hydraulic cylinders 88 connected between a bracket 87 on the lower frame member 50 and a bracket 89 on one of the cross head members 86. For the purpose of adjustably limiting the downward movement of the implement frame, the cross head members 86 carry a pair of stop members 90 in positions opposite the upper ends of the sleeves 60 in which the wheel carrier side posts 62 are mounted, and the upper ends of each sleeve 60 carries a plate 92 in which is threaded a vertically adjustable stop 94.

A winch shaft 100 is journaled in bearings 102 carried by bridge members 104 spanning the cross head members 86. At each end, such shaft 100 carries a winch drum 106 on which is wound a winch cable 44. At the right end (FIG. 2) the winch shaft also carries an operating drum 108 for a drive cable 110 which extends from such drum 108 diagonally downward to an idler sheave 112 mounted at an angle between the side members 86 of the cross head. From such idler, the cable 110 runs to and around a sheave 114 and thence to a fixed anchor 116 on one of the cross head members 86. The sheave 114 is carried by a clevis 118 fixed to the end of the piston rod of a hydraulic cylinder 120. When such piston rod is retracted, the cable 110 is pulled from the drum 108 and drives such drum and the winch shaft 100 in a direction to wind the lift cables 44 onto the winch drums 106. When the piston rod is extended, the sheave 114 is moved to the right, which allows the cables 44 to unwind from the winch drums 106 and winds the drive cable 110 onto the operating drum 108.

The head block operates as follows: When the vehicle 10 is arranged for operation of the rails, the wheel carrier 32 is lowered to position the rail wheels 34 in engagement with the rails 4, where they serve to guide the drive wheels 14 and 16 along the rails. Adjust-ment of the pressure in the cylinders 74 controls the position of the wheel carrier and serves to vary the distribution of load between the rail wheels 34 and such drive wheels 14 and 16. When the vehicle is to be operated on the roads, the cylinders 74 are actuated to lift the wheel carrier 32 and the wheels 34 to elevated position with ample clearance from a road surface on which the vehicle is supported by the wheels 14 and 16.

Adjustment of the implement frame 36 is independent of adjustment of the wheel carrier. An implement such as the plow 42 is mounted by pivot pins in the brackets 38 at the side members 80 of the implement frame 36 and is supported in overhanging position by the cables 44 from the winch drums 106. Angular adjustment of the implement about the pivot mounting may be made by actuating the hydraulic cylinder 120 to draw in or let out the drive cable 110 and hence to draw in or let out the winch cables 44. The plow 42 may be moved to an upright travel position as shown in dotted lines in FIG. 1 by fully retracting the cables 44. The implement in its operative position is held level by the pivot con-
tections to the brackets 82 and by the cables 44. In such level position, the implement and its supporting frame 36 may be raised and lowered as a unit by actuation of the hydraulic cylinders 88. The plow 42 at the front of the vehicle in FIG. 1 is shown in a lowered operating position. The broum 46 at the rear of the vehicle 10, on the hand, is shown in raised position, in which the implement frame 36 has been raised by the cylinders 88.

The independent adjustment of the implement frame permits the implements to be properly positioned for working operation and also to be raised to a clearance position for passage over portions of the railway which are not to be worked for example, over road crossings. The pivot and cable support for the overhanging implement permits the implement to be adjusted to a upper level for operating and to be swung upward to a raised position for road travel and other maneuvering.

I claim:
1. A head block for a vehicle adapted to operate on a railway and having a frame mounted by springs on at least one pair of wheels, a transverse frame fixed to the structure of the vehicle supported by such spring, a first pair of vertical guides on said transverse frame, a rail wheel carrier mounted in said guides and having rail-wheels journaled thereto, said wheel carrier being vertically adjustable in said guides and having an angular position in which the rail wheels are positioned for supporting the vehicle frame from underlying rails, a second pair of vertical guides on said transverse frame, an implement carrier mounted in said guides, lift means for raising and lowering said implement carrier in its guides and means for mounting an implement on said implement carrier.
2. A head block as set forth in claim 1 in which said implement mounting means comprises pivotal mounting brackets at the bottom of said implement carrier, a winch drum on said carrier having a cable extending from the top of said carrier for attachment
at a remote point to an overhanging implement pivoted to said brackets, and means for operating said winch drum independently of said carrier lift means to adjust the cable and thereby control the angular position of the implement about its pivotal mounting on the brackets.

3. A head block as set forth in claim 1 in combination with a road-rail vehicle having a frame mounted by springs on road wheels, and means for raising and lowering said wheel carrier to position said wheels in lowered position for rail engagement and in elevated clearance position for road travel.

4. A head block and road-rail vehicle combination according to claim 3 in which road wheels are spaced to ride on and provide traction on rails, and said rail wheels in rail-engaging position are coplanar with said road wheels to guide them on the rails.

5. A head block for supporting an overhanging implement on a vehicle frame, comprising a frame structure fixed to the vehicle, a pair of laterally spaced vertical guides fixed to said structure, an implement mounting frame having a pair of side posts slidably received in said guides, implement mounting brackets at the bottom of said side posts,

6. A head block as set forth in claim 5 with the addition of a driving drum mounted on said frame and operatively connected to said winch drums, an operating cable on said driving drum, and a hydraulic cylinder mounted on said implement frame and connected to operate said operating cable and thereby to drive said driving drum and winch drums.

References Cited

UNITED STATES PATENTS

3,022,744 2/1962 Jackson -------------- 104—12
3,249,067 5/1966 Keller -------------- 105—215
3,269,331 8/1966 Thompson -------------- 105—215

ARTHUR L. LA POINT, Primary Examiner
H. BELTRAN, Assistant Examiner

U.S. Cl. X.R.

37—115; 104—12; 105—177; 172—272