

Feb. 22, 1938.

J. HELLER

2,109,388

LAND VEHICLE EQUIPPED WITH LOAD SHIFTING DEVICES

Filed July 16, 1935

2 Sheets-Sheet 1

FIG. 1

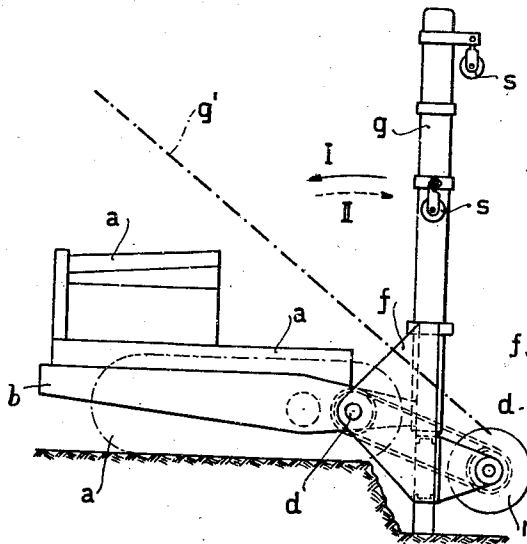


FIG. 2

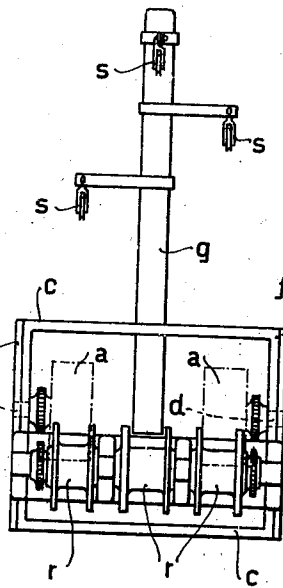
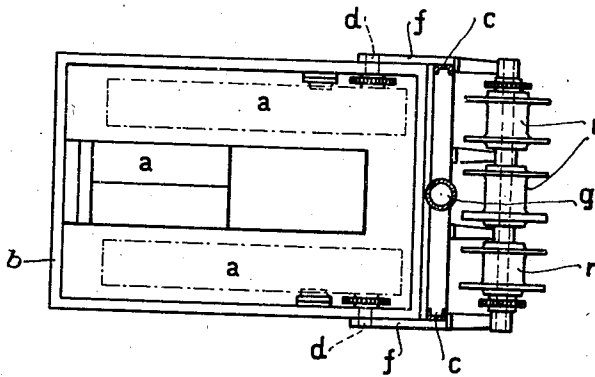


FIG. 3



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FIG. 4

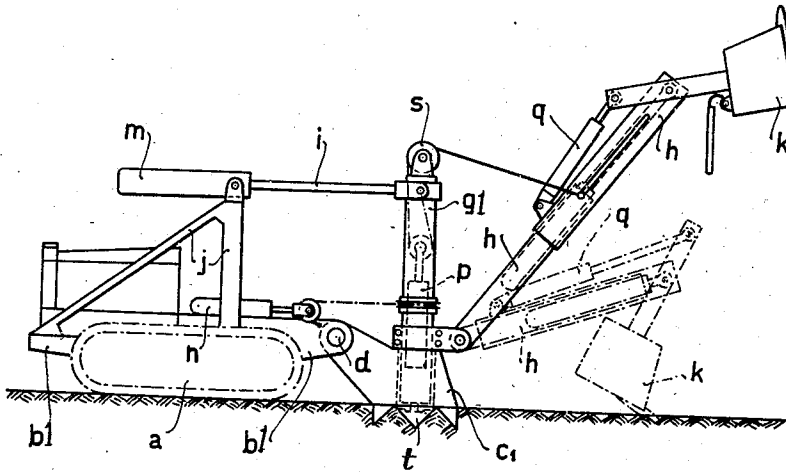
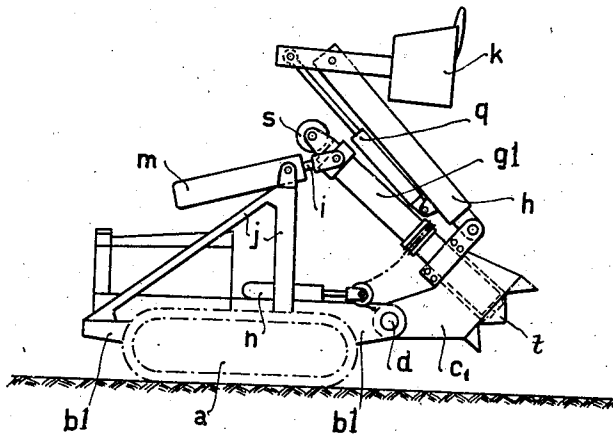


FIG. 5



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## UNITED STATES PATENT OFFICE

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## LAND VEHICLE EQUIPPED WITH LOAD-SHIFTING DEVICES

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Application July 16, 1935, Serial No. 31,664  
In Austria July 24, 1934

6 Claims. (Cl. 212-145)

This invention relates to such devices for the lifting, collecting, and lading of loads, or for dredging and the like, as are required to be frequently transferred from one place of work to another and for this purpose are made traveling, that is to say mounted on a truck, caterpillar tractor, or the like. In devices of this nature the reactions of the working forces influence in vehicle carrying the working device, inasmuch as they tend to press it into the ground, to displace it, and to tilt it. These reactions must be taken up by the inherent stability of the vehicle the weight of which must therefore be proportionate to the work performed and very considerably greater than would be demanded by the circumstances otherwise requiring to be taken into consideration. The cost of production is thereby increased, but, most important of all, working with such a device, and more particularly moving from one place of work to another over inadequately bearing ground, for example over wooded and cultivated territory, is rendered very difficult.

The subject-matter of the present invention is a traveling working device of the type described in which the above-mentioned drawbacks are to a great extent obviated. The invention consists essentially in the arrangement that the working device and/or its carrying or working system of rods, is so movably and adjustably connected to the vehicle that the device, when brought into the working position, is supported upon the ground independently of the vehicle but at the same time remains in firm horizontal connection with the vehicle, while being capable of being tilted up on to the vehicle for the purpose of traveling from one place to another. The connection between the vehicle on the one hand and the working device and/or its carrying and working system of rods on the other hand preferably consists of powerful horizontal pivot pins about which the working device can be tilted.

In the accompanying drawings constituting part of the present specification:

Figs. 1-3 illustrate diagrammatically, in side elevation, front elevation, and plan view, respectively, the technical principle on which the present invention is based.

Figs. 4 and 5 show, as an example of the embodiment of the invention, an appropriately constructed digging and lading excavator mounted on a caterpillar tractor.

In Figs. 1, 2, and 3 there is shown, as the main part of the working device, and/or of the carrying and working system of rods of the same,

mounted on the vehicle *a*, for example a crawler or caterpillar tractor having spaced apart endless ground-engaging tracks, a column or mast *g*. Upon this column *g* there is disposed the working device proper, which does not in itself form part of the present invention, and which may for example be a crane, a cable hoist for lifting and collecting loads, a digging or lading excavator, or the like. The column *g* is attached to a frame-like member *c* (Fig. 2) which is furnished with two very powerful side frames *f* (Figs. 1 and 2). These two side members *f* are articulated to the vehicle *a* or to the chassis framework *b* of the vehicle by means of stout pivot pins *d*.

The frame *c* and the pillar or column *g*, together with the working device mounted thereon, can be rocked about the pivot pin *d* as indicated by the arrows I and II (Fig. 1). In the working position, the frame or foot member *c* rests upon the ground adjacent the vehicle *a* (Fig. 1), the working device remaining in firm horizontal connection with the vehicle *a* through the intermediary of the pivot pins *d*. When the vehicle is to be moved to another place of work, the parts *c* and *g* are tilted in the direction of the arrow I (Fig. 1), so that the entire working device is swung up on to the vehicle. The column *g* then assumes the position indicated by the chain-dotted line *g'* (Fig. 1).

In place of the column *g* there can of course be employed any other type of structure, for example a lattice-work, for the carrying of the working device; this structure is then pivotally connected to the vehicle *a* by means of the pivot pins *d* in the same manner as the column *g*.

On the parts (*c*, *g*) of the working device pivotally mounted on the pins *d* there are preferably also provided the winch drums *r* and the sheaves *s* for the cables or chains serving for the operation of the working device. The drive of this device is taken from the engine of the vehicle *a*.

In the same manner, in the form of construction shown in Figs. 4 and 5, a part *c*<sub>1</sub> is pivotally connected to the framework *b*<sub>1</sub> of the vehicle *a* by means of a powerful pivot pin *d*. On this part *c*<sub>1</sub> there is again mounted a column *g*<sub>1</sub> which in this second constructional example carries a digging and lading excavator and which for this purpose is rotatable about its axis. The main constituent parts of this excavator, which does not in itself form part of the present invention, are denoted in the drawings by the reference characters *h* and *k*. Fig. 4 shows the excavator

in the operative position, while Fig. 5 shows the same laid back on the vehicle *a* for transport.

In the constructional example shown in Figs. 4 and 5 there is articulated to the upper end of the column *g*, a rod *i* which serves for the tilting of the working device, and which is connected to the vehicle *a* or to a superstructure *j* provided thereon. The operation of the connecting rod *i*, of the jib *h*, and of the excavator scoop *k*, as also the rotation of the pivoted column *g*, can be effected in any suitable manner, for example by means of racks, chains, cables, or the like. In the constructional example shown in the drawings, all these operations are effected hydraulically by means of a pump (not shown) which can be mounted on the vehicle *a* itself and driven by the engine of the latter. The cylinders of the various hydraulic operating devices are denoted by *m*, *n*, *p*, and *q* in Figs. 4 and 5.

The part *c* (Figs. 1-3) or *c*<sub>1</sub> (Figs. 4 and 5), which carries the working device proper, constitutes an enlargement of the bearing surface of the vehicle, supports the weight of the working device in the operative position, and takes up the vertical armature reactions of the working forces so that these forces do not influence the vehicle *a* itself. By virtue of the fact that the vehicle remains in firm horizontal connection with the working device through the pivot pins *d*, the horizontal forces are taken up both by the vehicle and also by the part *c* or *c*<sub>1</sub> resting upon the ground. The weight of the working device and the reactions of the working forces press the part *c* or *c*<sub>1</sub> very firmly onto the ground, thereby anchoring the vehicle and the working device in position. In order to effect still firmer anchoring, the part *c*<sub>1</sub> can be provided with projections or prongs *t* (Figs. 4 and 5) adapted to engage in the ground. In spite of this anchoring no difficulty is encountered in moving the outfit from one place of work to another, since on completion of the work at one place, the part *c* or *c*<sub>1</sub> is lifted vertically from the ground.

I claim:

1. In combination, a crawler type tractor including spaced apart endless ground engaging tracks, a chassis frame connected to said tractor, rearwardly extending side frames horizontally pivoted to opposite sides of said chassis frame at its rear end, a mast carried centrally between said rearwardly extending side frames, and suitable lifting equipment mounted on said mast and between the ends of said side frames, said mast being adapted to contact with the ground when said frames are swung downwardly about their pivots.

2. The combination of a crawler type tractor having spaced apart ground engaging tracks and a chassis frame attached thereto, horizontal pivots affixed to the rear ends of the sides of the said

chassis frame, rearwardly extending auxiliary side frames secured to said horizontal pivots, suitable lifting machinery including a pillar mounted on said auxiliary side frames, and a foot member centrally mounted of said auxiliary side frames and adapted to minimize the armature reaction being imparted to said tractor side frames and tracks when said foot member is swung into engagement with the ground by downward movement of the side frames about their pivots.

3. In combination, a crawler type tractor having a chassis frame, horizontal pivots affixed to the rear ends of the sides of the chassis frame, auxiliary side frames mounted on said pivots so as to extend rearwardly of the tractor, a lifting mast mounted on a foot member connected to the side frames, said foot member being adapted to engage the ground when the mast is swung about the horizontal pivots into a vertical position.

4. The combination comprising a crawler type tractor having a chassis frame, an auxiliary frame connected to the rear end of said chassis frame by a horizontal pivot and extending rearwardly therefrom, a lifting mast carried by said auxiliary frame and mounted so as to extend from the upper side only of said auxiliary frame, and means disposed beneath said mast and rigidly mounted on said auxiliary frame for supporting said mast vertically by the ground adjacent to the tractor when the frame is swung downwardly.

5. The combination comprising a crawler type tractor having a chassis frame, an auxiliary frame connected to the rear end of said chassis frame by a horizontal pivot and extending rearwardly therefrom, a lifting mast carried by said auxiliary frame and mounted so as to extend from the upper side only of said auxiliary frame, and means disposed beneath said mast and rigidly mounted on said auxiliary frame for supporting said mast vertically by the ground adjacent to the tractor when the frame is swung downwardly, said auxiliary frame being provided with spaced projections for gripping the ground.

6. The combination comprising a crawler type tractor having a chassis frame, an auxiliary frame connected to the rear end of said chassis frame by a horizontal pivot and extending rearwardly therefrom, a lifting mast carried by said auxiliary frame and mounted so as to extend from the upper side only of said auxiliary frame, means disposed beneath said mast and rigidly mounted on said auxiliary frame for supporting said mast vertically by the ground adjacent to the tractor when the frame is swung downwardly, and hydraulic means carried by the tractor for swinging the mast and the auxiliary frame.

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