Dec. 14, 1943. P. B. ASHWORTH 2,336,831

WHEELED VEHICLE OF THE ELEVATOR TYPE

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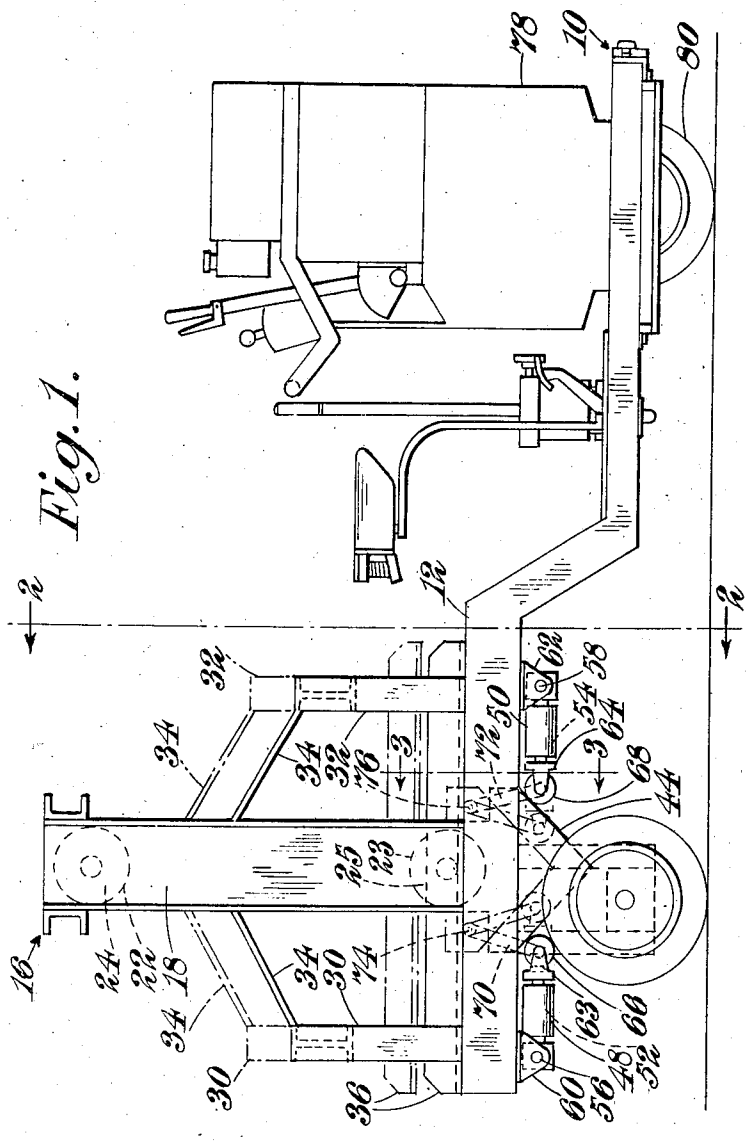


Fig. 1.

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Fig. 2.

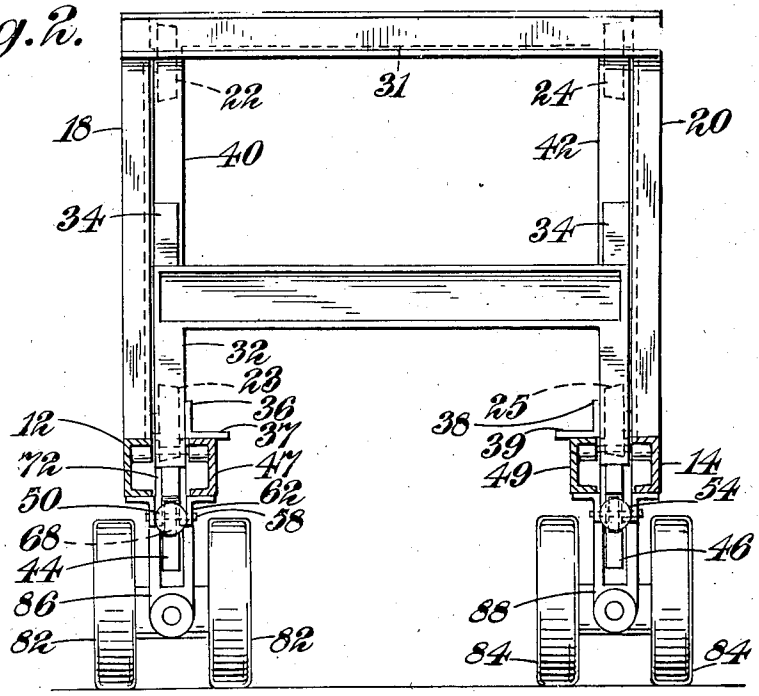
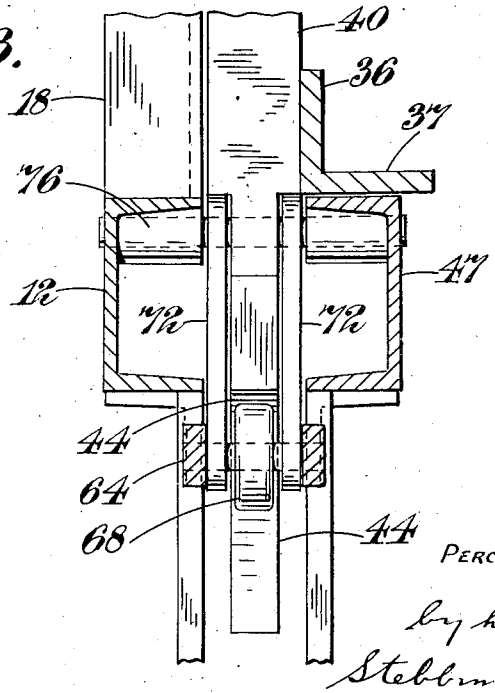


Fig. 3.



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Patented Dec. 14, 1943

2,336,831

UNITED STATES PATENT OFFICE

2,336,831

WHEELED VEHICLE OF THE ELEVATOR TYPE

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Application December 16, 1942, Serial No. 469,161
In Great Britain December 4, 1941

4 Claims. (Cl. 187—9)

This invention relates to wheeled vehicles of the elevator type (hereinafter referred to as the type described), wherein vertical guides extend upwards from the chassis, a load-supporting member is guided by the guides, and elevating mechanism comprises hydraulic or mechanical lifting devices arranged to lift and lower the load-supporting member.

It is an object of the invention to provide an improved construction of wheeled vehicle of the type described wherein the elevating mechanism is so constructed and arranged that the guides of the load-supporting member shall be substantially relieved of lateral stresses due to the lifting forces.

According to the invention there is provided a wheeled vehicle of the type described, wherein the load-supporting member, which may be in the form of an elevator frame that has vertical guide members guided by said guides to move vertically in relation to the chassis, carries one or more abutment members each having opposite, converging, downwardly-directed sides, and one or more pairs of lifting devices are arranged to exert their thrusts in opposite directions against opposite sides of an abutment member. In this arrangement, a vertical component of each thrust operates to lift the abutment member and the load-supporting member with it, while owing to the thrusts being balanced at opposite sides of the one or more abutments the guides of the load-supporting member are relieved of lateral stresses due to the lifting forces exerted on it.

Conveniently, two abutments having each two lifting devices co-operating therewith are arranged at opposite sides of the central longitudinal plane of the chassis.

Preferably each abutment member is of V-shape in cross-section and constitutes a lifting wedge.

When the lifting devices are in the form of hydraulic rams, screw-jacks or the like, they may be pivoted to the chassis at their ends remote from the abutment member and may have their opposite ends connected by links to the chassis at a situation above the abutment member. Conveniently each of these links is arranged to swing between two end positions which make substantially equal angles with the vertical.

One embodiment of the invention is diagrammatically illustrated by way of example in the accompanying drawings wherein—

Figure 1 is a side elevation showing one form of vehicle of the elevator type according to the invention,

Figure 2 is a vertical sectional elevation taken on the line 2—2 in Figure 1, and

Figure 3 is a detail vertical section that is taken on the line 3—3 in Figure 1 and is drawn to a scale larger than that of Figures 1 and 2.

Like reference characters designate like parts throughout the several views.

Referring to the drawings, a wheeled vehicle of the elevator type comprises a U-shape chassis, designated generally 10, that has two longitudinals 12, 14, and rigidly carries an arched cross-member, designated generally 16 that is arranged approximately centrally on it. Vertical side limbs 18, 20 of this arched member are of channel or U-section facing outwardly, and have each a vertical pair of rotary guide members 22, 23 and 24, 25, respectively, in the form of rollers journalled in them, one roller of each pair being near the top and the other near the bottom of the arched member 16.

An elevator frame, designated generally 28, which is lifted and lowered by two pairs of lifting devices described hereinafter, comprises three vertical members 30, 31, 32, each of inverted U-shape arranged spaced apart in the direction of length of the vehicle, the middle member 31 being slightly taller than the two end members 30, 32 which are of equal height and are tied by upwardly slanting braces 34 to the middle member 24. The lower ends of these three vertical members 30, 31, 32 are connected together by two angle irons 36, 38, whereof the lower horizontal limbs 37, 39 constitute ledges that lie approximately level with the top of the chassis in the lower position of the elevator frame, and that are directed towards one another for engaging under the load. Side limbs 40, 42 of the central member 31 of the elevator frame are each of channel section, and respectively lie adjacent to the side limbs 18, 20 of the arched member 16, and receive and are guided by the guide rollers on the latter. The side limbs of the two end members 30, 32 of the elevator frame may be of H or other convenient section. As described so far the truck and its elevator frame are known in themselves. In the improved construction of truck according to the present invention, the end portions of the side limbs 40, 42 of the middle member 31 of the elevator frame are formed as lifting wedges 44, 46 of V section, whereof the opposite sides converge and are downwardly-directed. These wedges 44, 46 constituting abutment members having opposite, converging, downwardly-directed sides, lie inside the chassis at the longitudinals 12, 14 and each between its

adjacent longitudinal and a horizontal beam 47, 49. These beams 47, 49 lie parallel with the adjacent longitudinal, but are spaced away therefrom to provide a gap for accommodating a wedge and permitting it to be elevated by the lifting devices. The beams 47, 49 may be secured to the longitudinals in any convenient manner, and may be regarded as constituting parts of the longitudinals.

Two pairs of lifting devices 48, 50 and 52, 54 preferably constituted by jacks, which will be referred to as hydraulic jacks, are arranged at opposite sides of the chassis, one pair co-operating with each lifting wedge 44 and 46. As these pairs of lifting devices are arranged similarly, a description of one pair will suffice for both. The two hydraulic jacks 48, 50 of a pair lie substantially horizontally at opposite sides of the allotted wedge 44 and in the longitudinal direction of the vehicle, and have their ends remote from the lifting wedges pivoted at 56, 58 to brackets 60, 62 fixed to the chassis. The heads 63, 64 of the rams of the jacks, preferably having each an anti-friction roller 66, 68, respectively, bear against opposite sides of the wedge 44 at a situation near the top of it when the elevator frame is in its lowest position shown in full lines in Figure 1. Two links 70, 72 pivoted at 74, 76, respectively to the chassis at an elevation above the jacks, pivotally support the heads 63, 64 of the rams and permit them to move from a retracted position, shown in full lines in Figure 1, at one side of the vertical plane passing through the pivot of the link on the chassis, to an extended position, shown in broken lines in Figure 1, a substantially equal distance at the opposite side of the vertical plane. When the rams are retracted the elevator frame is in its lowest position, whilst when the rams are extended the elevator frame is lifted into an elevated position indicated in broken lines in Figure 1, owing to the rollers running on the sides of the wedge. If the rams are of equal power and exert equal thrusts these will be balanced, so that the guides of the elevator frame will be relieved of lateral stresses due to the lifting forces. Owing to the links 70, 72 at the heads of the rams being suspended from the chassis, they take all the downward reaction of the loaded wedge which results in a more efficient and more convenient method of carrying the load.

The described vehicle may be self-propelled and may be provided with driving and steering means 78 at the front thereof above a front road wheel 80, as illustrated in Figure 1. Two pairs of rear road wheels 82 and 84 may each be journalled in any convenient manner, as in journal brackets 86 and 88, respectively, depending from the longitudinals 12, 14 and their adjacent beams 47, 49. As illustrated, the upper portions of these journal brackets are forked to provide a gap, into which the wedges 44, 46 can extend with play. The U-shaped chassis 10 has its end situated at the rear end of the vehicle to facilitate loading, so that when the elevator frame is in its lowest position the load can be wheeled or slid on to the angle irons 36, 38, or on to a plate or bearers carried by the angle irons, and then elevated by means of the jacks in the manner described above.

One important advantage of the described construction of elevator truck of the wedge type is the possibility of being able to vary the angle of the lifting wedges and thereby vary the speed of rise of the elevator frame or the effort required to lift the elevator frame.

Various modifications may be made in the details of construction described above without departing from the scope of the invention as defined in the claims. For example, in some cases screw-jacks or the like may be employed instead of hydraulic rams.

I claim:

1. A wheeled vehicle of the elevator type comprising in combination a chassis, vertical guides extending upwards therefrom, a load-supporting member arranged to be guided by said guides, two abutment members that are carried by the load-supporting member and have each opposite, downwardly-converging, co-terminous, side faces, which abutments are arranged at opposite sides of the central longitudinal plane of the chassis, and two pairs of lifting devices, one pair allotted to each abutment member, which lifting devices are carried by the chassis and are arranged to exert their thrusts in opposite directions against the opposite side faces of the abutment members for lifting the load-supporting member.

2. A wheeled vehicle of the elevator type, comprising in combination a chassis, vertical guides extending upwards therefrom, a load-supporting member guided by said guides, an abutment member that has opposite, converging, downwardly-directed side faces and is situated on the load-supporting member, a pair of lifting devices arranged to exert their thrusts in opposite directions against the side faces of the abutment member for lifting the load-supporting member, which lifting devices are pivoted to the chassis at their ends remote from the abutment member, and links that pivotally connect the other ends of the lifting devices to the chassis at a situation above the abutment member.

3. A wheeled vehicle as set forth in claim 2, wherein each link is arranged to swing between two end positions which make substantially equal angles with the vertical.

4. A wheeled vehicle of the elevator type, comprising in combination a chassis, vertical guides extending upwards from opposite sides thereof, a load-supporting member in the form of an elevator frame having vertical guide members guided by said guides, which frame carries two abutment members of V-shape in cross-section that are situated at opposite sides of the chassis and elevating mechanism comprising two pairs of hydraulic rams, which pairs are associated each with one of the abutment members, the two rams of each pair being arranged to exert their thrusts in opposite directions against the opposite sides of the associated abutment member for lifting the elevator frame, each of which rams is pivoted to the chassis at its end remote from the associated abutment member, and two pairs of links, one pair associated with each pair of rams, the two links of a pair being pivoted at one end to the heads of the associated rams, and at their other ends to the chassis at a situation above the adjacent abutment member.

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