Nov. 13, 1923. 1,473,894

H. F. WEATHERBY

LUMBER PILE VEHICLE

Filed Dec. 2, 1921 3 Sheets-Sheet 1

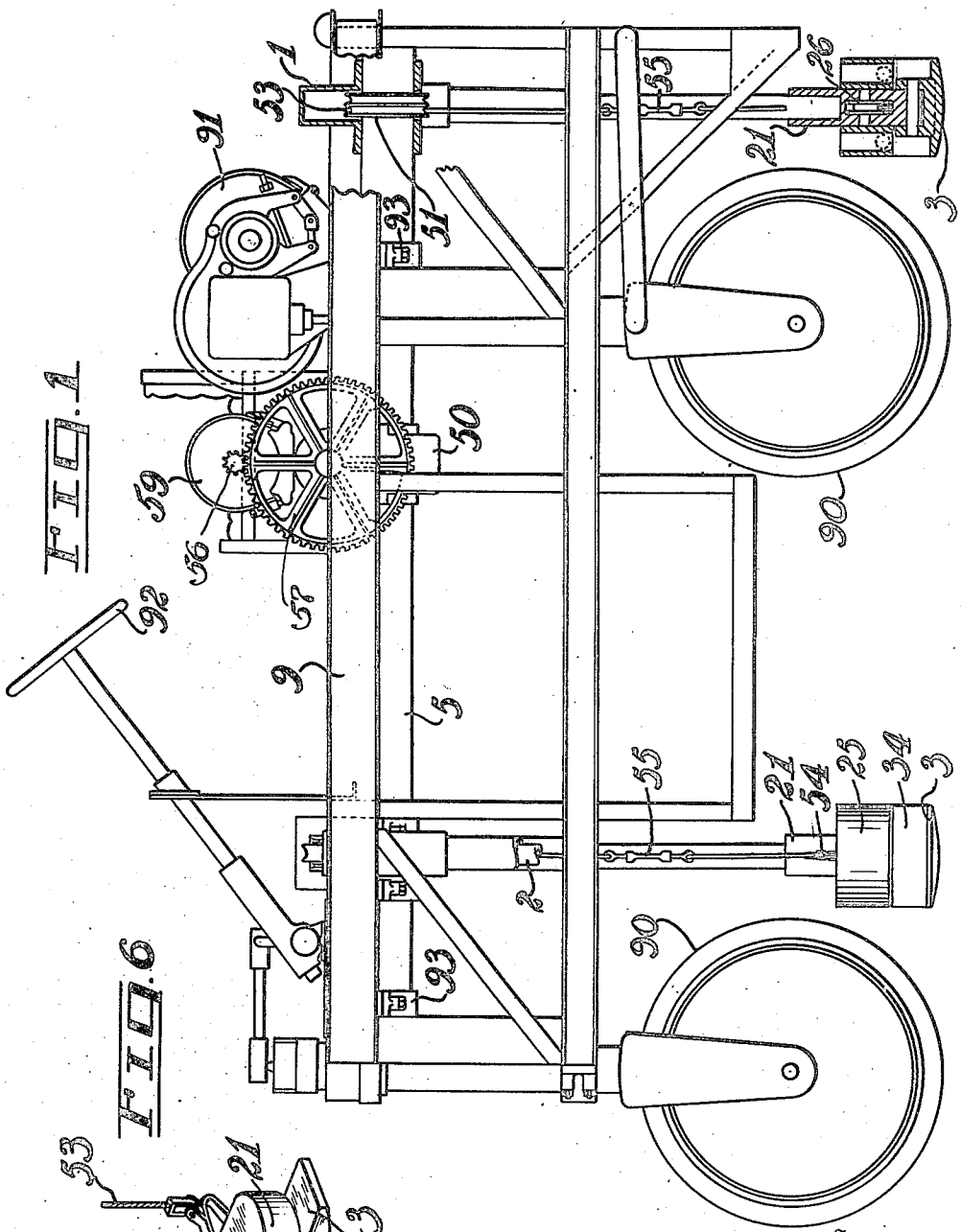

FIG. 1

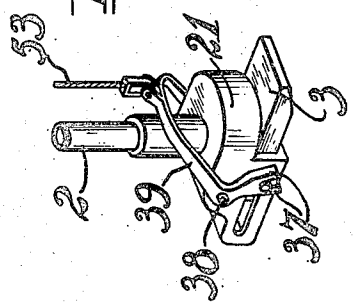

FIG. 6

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FIG. 2

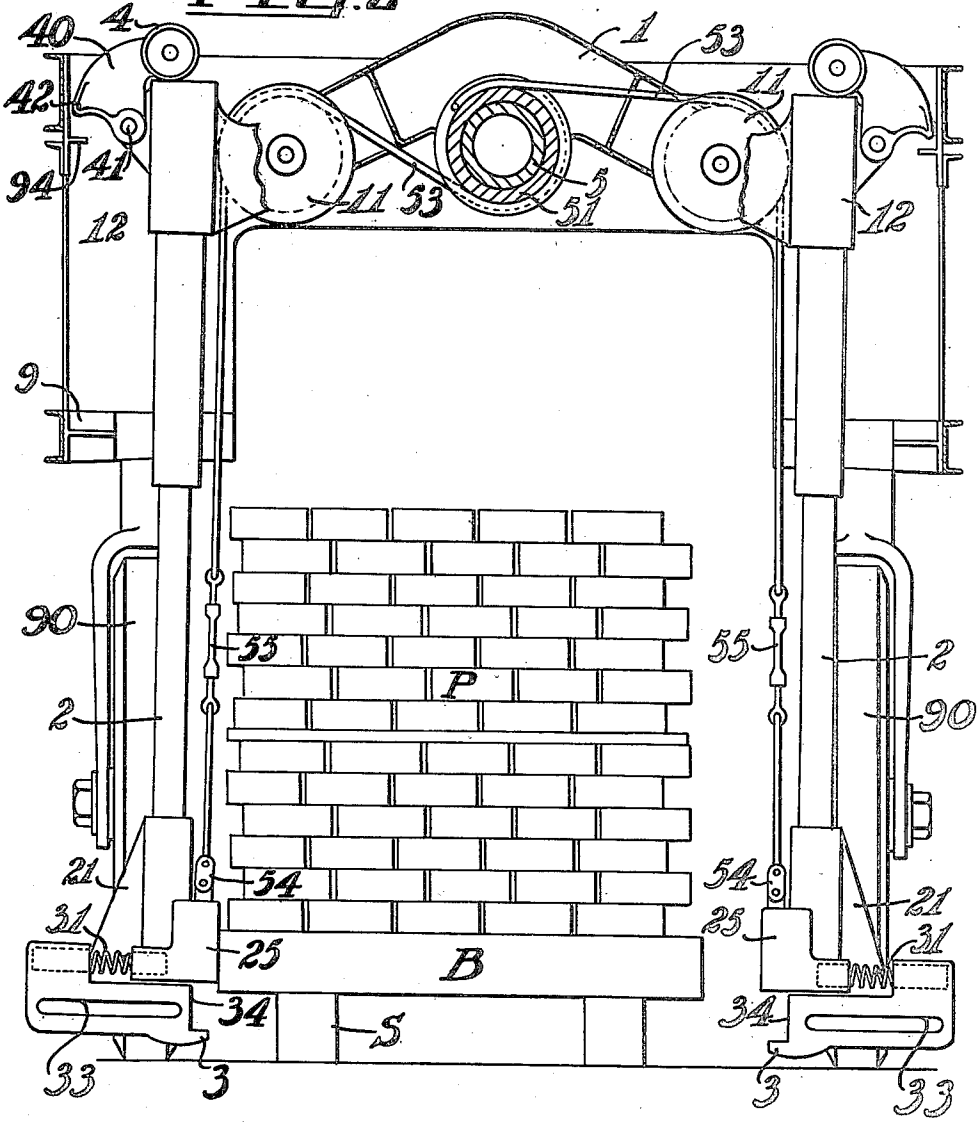

FIG. 5

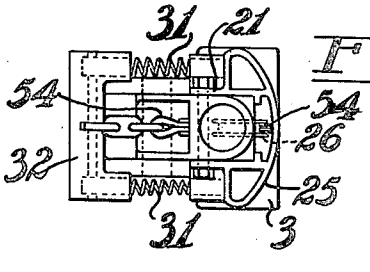

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FIG. 3

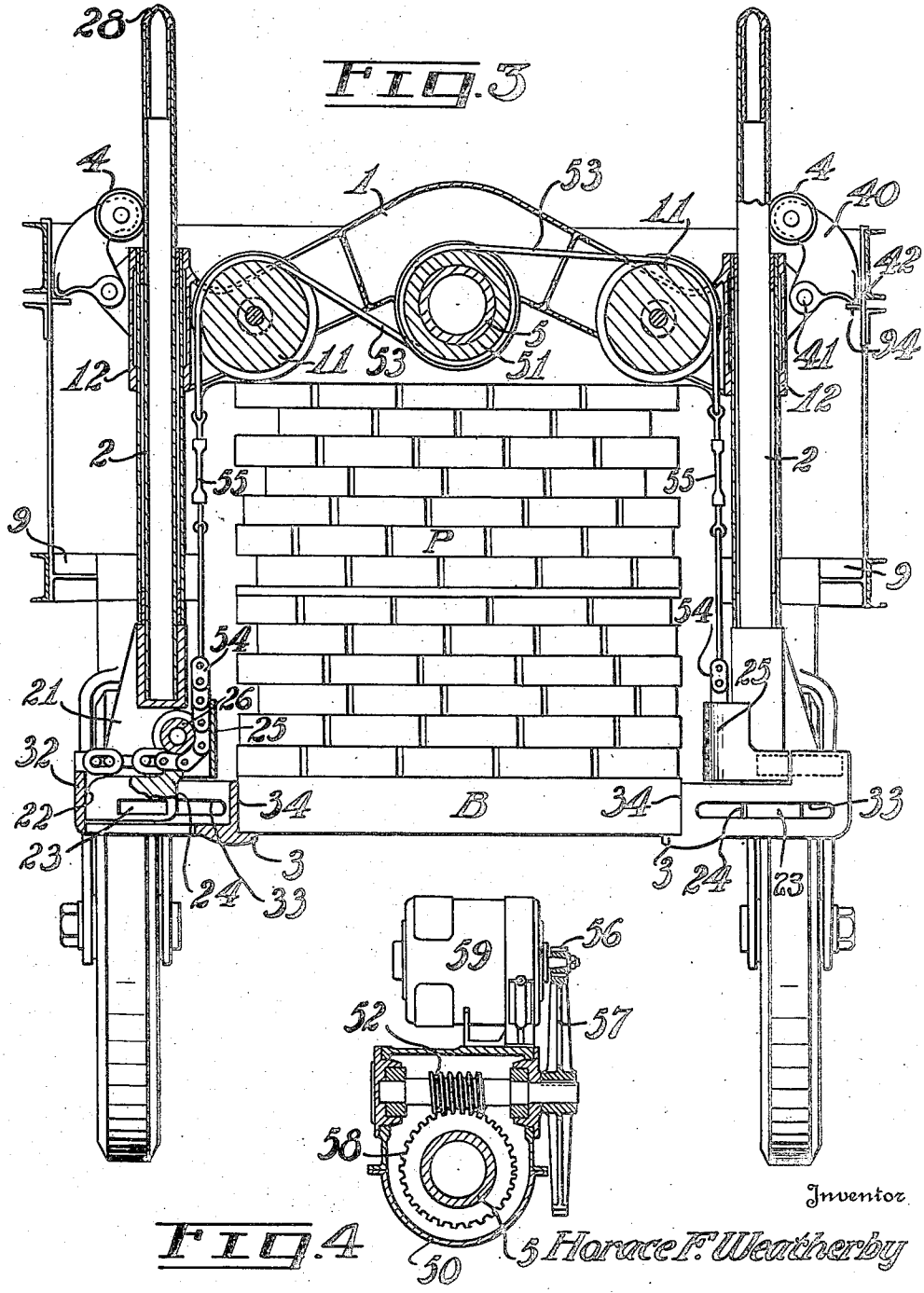

FIG. 4

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UNITED STATES PATENT OFFICE.

HORACE F. WEATHERBY, OF SEATTLE, WASHINGTON.

LUMBER-PILE VEHICLE.

Application filed December 2, 1921. Serial No. 519,506.

To all whom it may concern:

Be it known that I, HORACE F. WEATHERBY, a citizen of the United States of America, and resident of the city of Seattle, in the county of King and State of Washington, have invented certain new and useful Improvements in Lumber-Pile Vehicles, of which the following is a specification.

My invention relates to carriers of the type particularly intended for picking up and conveying a loose pile of lumber, but which, of course, may be employed for other purposes, such as conveying timbers. Such vehicles are generally of the type which straddle the load and pick it up on a pair of bolsters beneath the pile, by means of bolster-engaging feet, and while I do not desire to be limited in the details of my construction other than as defined by the appended claims, yet I shall describe it in connection with a carrier of the general type described.

An object of my invention is to provide improved means for engaging the pile of lumber or the bolster upon which it is supported preparatory to lifting the pile.

A further object is to provide such pile or bolster engaging means which will not interfere with the positioning of the vehicle relative to the pile but which will be retracted out of possible engagement with the pile during the positioning of the vehicle.

A further object is to provide a load-carrying frame in connection with such a vehicle which, when the pile is lifted, will be rigid, but which prior to lifting the pile will be yieldable to accommodate irregularities in the ground, in the pile, or in the positioning of the vehicle relative to the pile.

A further object is to provide means which will automatically center and lock the load-carrying frame as it moves into load carrying position and while it retains such position.

A further object is to provide a novel means for suspending and operating such load-carrying frame.

Further objects, and objects relating to structural details, may be ascertained by a study of the accompanying drawings and the following specification and claims.

My invention comprises those novel parts and combinations thereof which are shown in the accompanying drawings, described in the specification, and particularly defined by the claims terminating the same.

In the accompanying drawings I have shown my invention in a form which is now preferred by me.

Figure 1 is a side elevation of the carrier, parts thereof being broken away and shown in section.

Figure 2 is a transverse section through the vehicle in position over a load.

Figure 3 is a similar transverse section of the vehicle, the load being shown raised into position.

Figure 4 is a detail of the drive for the load lifting means.

Figure 5 is a detail in plan of the load-engaging foot.

Figure 6 is a perspective detail of a modified form of load-engaging foot.

In general terms my invention comprises a main frame generally represented by the numeral 9 mounted on wheels 90 and supporting a swinging load-carrying frame which will be described later. Both the main or mobile frame 9 and the load-carrying frame supported thereon are preferably made of inverted U-shape, to include a pile of lumber or other load between the depending supports and beneath the upper portions which connect the same. The main frame has secured thereon a motor 91 which furnishes the motive power of the vehicle and suitable steering means controlled by the steering wheel 92. The load-carrying frame is provided with means to engage a load to lift it, which means are preferably retractible so that they will not interfere with the positioning of a vehicle above a load, with a suitable source of power, as the motor 59 upon the main frame 9, which operates load-lifting mechanism, and may also be provided with means for locking this swinging frame when the load lifting operation has commenced.

Suitably supported upon the frame 9 are one or more units of a load-carrying frame, each unit being in the form of an inverted letter U and comprising, preferably, a yoke 1 pivoted between its end and legs 2 which are guided in the ends of the yoke 1 for substantially vertical movement therein, the legs and the yoke 1 forming together a rigid but swingable frame. As shown herein parallel guides 12 are provided in the outer ends of the yoke 1 in which the upper ends of the legs 2 move.

The legs 2 do not in any material sense support the load but merely act as guides

for load-engaging feet 3 which are carried by their lower ends. It is obvious, of course, that the legs 2 might be fixed in the yokes 1 and the feet 3 be formed to slide upon the legs 2, but in order to overcome certain practical disadvantages of such an arrangement I prefer that described above.

The feet 3 should not project into the path of the pile P or its bolster B prior to the time the vehicle is correctly positioned above the pile and is prepared to lift it. I have shown them, therefore, as retractible normally within the inwardly-facing limits of terminal members 21 which are secured upon the lower end of the legs 2. Springs 31, interposed between the member 21 and the lower end 32 of the foot, serve to keep it retracted normally. Guides or pins 23 carried by the member 21 are received in and cooperate with guide slots 33 in the foot 3 to permit lateral or horizontal movement of the foot relative to the member 21. The foot 3 may have an upwardly extending flange 34 which is adapted to engage the end of the bolster B and this flange, contacting with the face 24 of the member 21, limits the inward or retractile movement of the foot. The projecting movement thereof may be limited by the end of the bolster B or by contact of its rear flange 32 with the rear face 22 of the member 21. The inner face 25 of the member 21 may be curved if desired to form a guard which will pass smoothly over the ends of the bolster B or along the pile P, the foot 3 being retracted during this positioning operation and lying, moreover, beneath the level of the bolster B.

The yoke or yokes 1 may be suitably supported upon the main frame 9 or upon a shaft 5 which is journaled at 93 in the main frame. Preferably, in addition to forming the support for the yokes 1 and the apparatus suspended therefrom, the shaft 5 is also rotative to actuate the load-engaging and lifting means. To this end a sheave 51 is secured upon the shaft adjacent each yoke and sheaves 11 are supported upon the yoke adjacent each end. Cables 53, one secured to the under side of the sheave 11 and one to its upper side, pass thence each over its respective sheave 11 and downward to connect with a chain 54. This chain passes over a sheave 26 mounted in the member 21 and is secured to the rear flange 32 of the foot 3. Preferably the chain lies behind the guard surface 25 so that it will not interfere with the pile of lumber. Length and tension adjusting means, such as the turnbuckle 55, may be employed in each of the lines composed of the cable 53 and chain 54 if this is desired.

Rotation of the shaft 5 is accomplished from the motor 59 through a suitable train of gearing, as shown in Figure 4, wherein a pinion 56 drives a gear 57, the latter in turn driving a worm gear 58 upon the shaft 5 through a worm pinion 52. The entire gear train may be enclosed within a casing 50. As the motor 59 is energized the shaft 5 is rotated and tension is placed upon the cables 53, the parts being then in the position shown in Figure 2 with the legs 2 at their lowermost position and the feet 3 retracted. The first action following the rotation of the shaft 5 is to cause the projection of the feet 3 in opposition to the springs 31. These having been previously positioned adjacent the ends of the bolster B, upon their projection they engage beneath the bolster which is usually raised slightly upon blocks S. As rotation of the shaft 5 continues the legs 2 are raised in the guides 12, carrying with them the terminal member 21 and the feet 3. This action raises the load from the ground to any desired height within the limits of the particular vehicle, and the load can thus be transported from place to place.

It is evident that means may be employed for moving the feet other than those described above. It is, to a certain extent, not essential that the feet be movable through the operation of the lifting means, although this is my preferred arrangement. One manner in which the foot may be movable through the operation of the lifting means is shown in Figure 6, wherein a bell crank lever 39 is pivoted at 38 upon the member 21. The foot 3 which is supported in the member 21 to slide in or out, has lever-engaging pins 37 lying between forked ends of the lower arm of the bell crank lever 39. The opposite end of this lever is connected to the lower end of a cable 53. When tension is placed upon the cable 53, the first action will be to move the bell crank lever 39 upon its pivot and by the engagement between its lower end and the pins 37, the foot 3 is inwardly projected as in the former case. Any other suitable means of projecting the foot 3 may be employed.

I have not heretofore spoken of means for centering the load-carrying frames or for locking them against swinging after the load has been lifted. With the construction so far described it is evident that the unit comprising the yoke 1 and the two legs 2 is free to swing upon the supporting shaft 10 from side to side, or transversely of the main frame 9, and in this manner to adjust itself to the position of the pile P. When two or more such units are employed, as in the present case, each can adjust itself independently of the others. However, it is desirable, and in most cases essential, that the load-carrying frames shall not be permitted to swing after the load has been lifted from the ground.

The means which I have employed for locking the frame against swinging and for centering it, comprise rollers 4 which are po-

sitioned in the path of the upper end of the legs 2 and which may be swung inward within the path of this leg, but not outward. They are shown as supported upon a lever 40 pivoted at 41 upon the ends of the yoke 1.

This lever is provided with a stop 42 which is engageable with a stop 94 upon the main frame to limit the outward swinging of the lever 40 and roller 4. Preferably the upper end of the leg 2 is provided with a coned cap 28 which is engageable with the roller 4.

So long as the legs 2 remain at their lowermost limits the rollers 4 and stops 42 and 94 have no effect thereon during their usual rather limited swaying movement, and they take the position shown in Figure 2. As the leg 2 begins to rise in the guides 12, its coned upper end 28 contacts with the rollers 4, forcing them outward from the position shown in Figure 2 to that shown in Figure 3. One or both of the stops 42 will thereupon engage its flange 94. If only one stop has so engaged its flange, the whole yoke and parts supported therefrom will be forced into a central position so that the opposite stop 42 will contact with its flange 94, thus centering the entire load-carrying frame. As the raising of the legs 2 continues, the rollers 4 lie closely against their outer sides and due to the contact of the stop 42 and flange 94 at each side, rocking of the yoke 1 and its attached parts is prevented.

By the above construction I have provided a vehicle for the purposes described which will adjust itself freely to a load; which has no projecting parts to interfere with proper positioning of the load over the vehicle; which can automatically engage a load and then lift it; in which all frame members are rigid relative to each other once the lifting of the load has commenced, and in which the load-carrying frame is hung and actuated from a common shaft.

What I claim as my invention is:

1. A vehicle comprising a mobile main frame and a rigid load-carrying frame including a member extending downwardly at each side of the main frame, said load-carrying frame being pivotally supported from the main frame upon a longitudinal axis.

2. A vehicle as in claim 1 in which both frames are adapted to straddle the load.

3. A vehicle comprising a mobile main frame and a load-carrying frame supported from the main frame to swing upon a longitudinal axis, said load-carrying frame having legs provided with load-engaging and supporting members, said legs being relatively fixedly spaced transversely of the vehicle.

4. A vehicle comprising a mobile main frame and a load-carrying frame including a transversely-extending yoke supported from the main frame to swing upon a longitudinal axis, and a load-supporting leg guided for vertical movement at each end of said yoke.

5. A vehicle as in claim 3, wherein the load engaging and supporting members are movable relative to their supporting legs to engage and disengage the load.

6. A vehicle as in claim 1, wherein the load-carrying frame includes a plurality of independently pivoted inverted U-shaped members extending transversely of the vehicle.

7. A vehicle as in claim 1, wherein the load-carrying frame includes transversely extending inverted U-shaped members having load-engaging and supporting means at their lower extremities.

8. The combination with a vehicle as in claim 1, of means for locking the load-carrying frame against swinging by its engagement with a load.

9. In combination, a mobile frame, a load-carrying frame having members movable into and from load-supporting position, said frame being supported from and swingable transversely of the mobile frame, and means for locking the frame against swinging operable through the movement of said members towards load-supporting position.

10. In combination, a mobile body, a load-carrying frame supported thereon and including a yoke transversely swingable, load-supporting members guided and vertically movable in said yoke into and from load-supporting position, and means operable to lock the yoke and the load-supporting members carried thereby against swinging while in load-supporting position.

11. In combination, a mobile body, a load-carrying frame supported thereon and including a plurality of yokes independently transversely swingable, and load-supporting members guided in said yokes for vertical movement into and from load-supporting position, means for simultaneously moving said load-supporting members, and means operable to lock each yoke and the load-supporting members carried thereby against swinging while in load-supporting position.

12. In combination, a mobile body, a rigid load-carrying frame pivoted thereon to swing transversely of the body, and load supporters carried by said rigid frame and movable into and from load-supporting position.

13. In a carrier of the character described, a load-supporting unit comprising a yoke pivotally supported intermediate its ends, a leg guided in each end of said yoke for vertical movement, and a load supporter connected to move with each leg.

14. In a carrier of the character described, a load-supporting unit comprising a yoke pivotally supported intermediate its ends, a

rigid leg guided in each end of said yoke for vertical movement, and a foot carried by each leg and adapted to engage beneath a load.

15. In a carrier of the character described, the combination with a load-supporting unit comprising a yoke pivotally supported intermediate its ends, a rigid leg guided in each end of said yoke for vertical movement, and a foot carried by each leg, of means for moving said feet inwardly to engage beneath a load, and then lifting said feet.

16. In combination, a plurality of longitudinally-spaced yokes swingable each in a transverse plane, a leg carrying a load supporter and vertically movable in the ends of each of said yokes into and from load-supporting position, and means adapted to be put into operation as said legs move towards load-supporting position to prevent swinging of the load supporters while in such position.

17. In combination, a plurality of longitudinally-spaced yokes swingable each in a transverse plane, a leg carrying a load supporter and vertically movable in the ends of each of said yokes into and from load-supporting position, and means engageable by said legs as they move towards load-supporting position to prevent swinging of the yokes, legs, and load supporters while in such position.

18. In a carrier of the character described, in combination, a plurality of longitudinally-spaced yokes supported intermediate their ends and swingable each in a transverse plane, a plurality of load supporters suspended from said yokes and vertically movable, a leg movable vertically in each end of said yokes with said load supporters, and means engageable by said legs as the load supporters move upward to prevent swinging of the yokes and supporters while upraised.

19. In a carrier of the character described, in combination, a plurality of longitudinally-spaced yokes supported intermediate their ends and swingable each in a transverse plane, a plurality of load supporters suspended from said yokes and vertically movable, a leg movable vertically in each end of said yokes with said load supporters, and a roller mounted in the path of movement of each leg and engageable thereby as the load supporters move upward, said rollers being non-yieldable in a direction to permit swinging of the yokes and legs when engaged therewith.

20. In a carrier of the character described, in combination, a plurality of longitudinally-spaced yokes supported intermediate their ends and swingable each in a transverse plane, a plurality of load supporters suspended from said yokes and vertically movable, a leg movable vertically in each end of said yokes with said load supporters, and a roller mounted in the path of movement of each leg and engageable with the outer side thereof as the load supporters move upward, a lever carrying each of said rollers to permit inward movement thereof, and stops for preventing swinging of the load supporters and yokes when the rollers are engaged by said legs.

21. In combination, a mobile frame, a load-carrying frame including a plurality of independently transversely swingable, longitudinally spaced yokes supported upon the mobile frame, load-supporting members, legs connected thereto and vertically movable in the ends of said yokes into and from load-supporting position, and means interengageable between said legs and the mobile frame for automatically positioning the yoke in horizontal position and the legs in vertical position as the legs move into load-supporting position.

22. In a carrier of the character described, a leg, a load-engaging and supporting foot slidably supported in said leg and projectible therefrom in a horizontal plane to engage beneath a load, means normally retaining said foot retracted within the leg, and means for projecting said foot.

23. In a carrier of the character described, a leg, a load-engaging and supporting foot laterally slidable in a horizontal plane at the lower end of said leg, and means for projecting said foot.

24. In a carrier of the character described, a leg, a normally retracted foot guided by said leg for vertical movement and laterally slidable therein to project into load-engaging and supporting position, and means for successively projecting said foot and then raising it.

25. In a carrier of the character described, a leg, a normally retracted foot guided by said leg for vertical movement and laterally slidable therein to project into load-engaging and supporting position, and load-lifting means operable when actuated to project and then to raise said foot.

26. In a carrier of the character described, a leg, a normally retracted foot guided by said leg for vertical movement and projectible into load-engaging and supporting position, and a load lifting member secured to said foot and operable when actuated to project the foot in a horizontal plane and subsequently to raise it.

27. In combination, in a carrier of the character described, a yoke pivoted at its center to swing, a leg guided in each end thereof for vertical movement, a normally outwardly retracted foot supported at the lower end of each leg, and load-lifting means operable to project each foot inwardly and to raise it and the leg supporting it.

28. In a carrier of the character described,

a vertically-movable leg, a sheave journaled in the lower end thereof, a foot, said foot and leg having cooperating guides permitting lateral sliding of the foot in the leg, springs normally retaining the foot retracted within the inner limit of the leg, means for inwardly projecting the foot, and a flexible lifting member passing downwardly and under said sheave, and secured to the outer end of said foot.

29. In a carrier of the character described, a mobile frame, a single central longitudinally extending shaft journaled therein, a load-carrying frame supported solely from said shaft, and load-supporting and lifting mechanism supported from said load-carrying frame and operable by rotation of said shaft.

30. In a carrier of the character described, a mobile frame, a longitudinally-extending shaft journaled therein, a load-carrying frame pivotally supported from said shaft to swing transversely of the mobile frame, and load-supporting and lifting mechanism carried by the load-carrying frame and operable by rotation of said shaft.

31. In a carrier of the character described, a mobile frame, a longitudinally-extending shaft journaled therein, a plurality of independent yokes pivotally supported and axially spaced upon said shaft, whereby they may swing each in a transverse plane, and load-supporting and lifting mechanisms carried by each of said yokes, and operable by rotation of said shaft.

32. In a carrier of the character described, a mobile frame, a longitudinally-extending shaft journaled therein, a transversely-extending yoke pivotally supported on said shaft, legs depending from the ends of said yoke, load-supporting and lifting means carried by the lower end of said legs, and operative means connecting said load-supporting and lifting means and the shaft to operate said means by rotation of the shaft.

33. In a carrier of the character described, a mobile frame, a longitudinally-extending shaft journaled therein, a transversely-extending yoke pivotally supported on said shaft, legs, depending from the ends of said yoke, load-supporting and lifting means carried by the lower end of said legs, a sheave upon the shaft, sheaves at each end of the yoke, and a cable passing about the sheave on the shaft and over the other sheaves to operate the load-supporting and lifting means.

34. A vehicle comprising a mobile main frame, a load-carrying frame supported from the main frame to swing upon a longitudinal axis, means for lifting a load, and means operable by the operation of raising the load for locking the load-carrying frame against swinging.

35. A vehicle comprising a mobile main frame and a rigid, symmetrical, inverted U-shaped load-carrying frame supported from the main frame to swing upon a longitudinal axis centrally positioned above the load.

Signed at Seattle, King County, Washington, this 25th day of November, 1921.

HORACE F. WEATHERBY.