

Dec. 22, 1931.

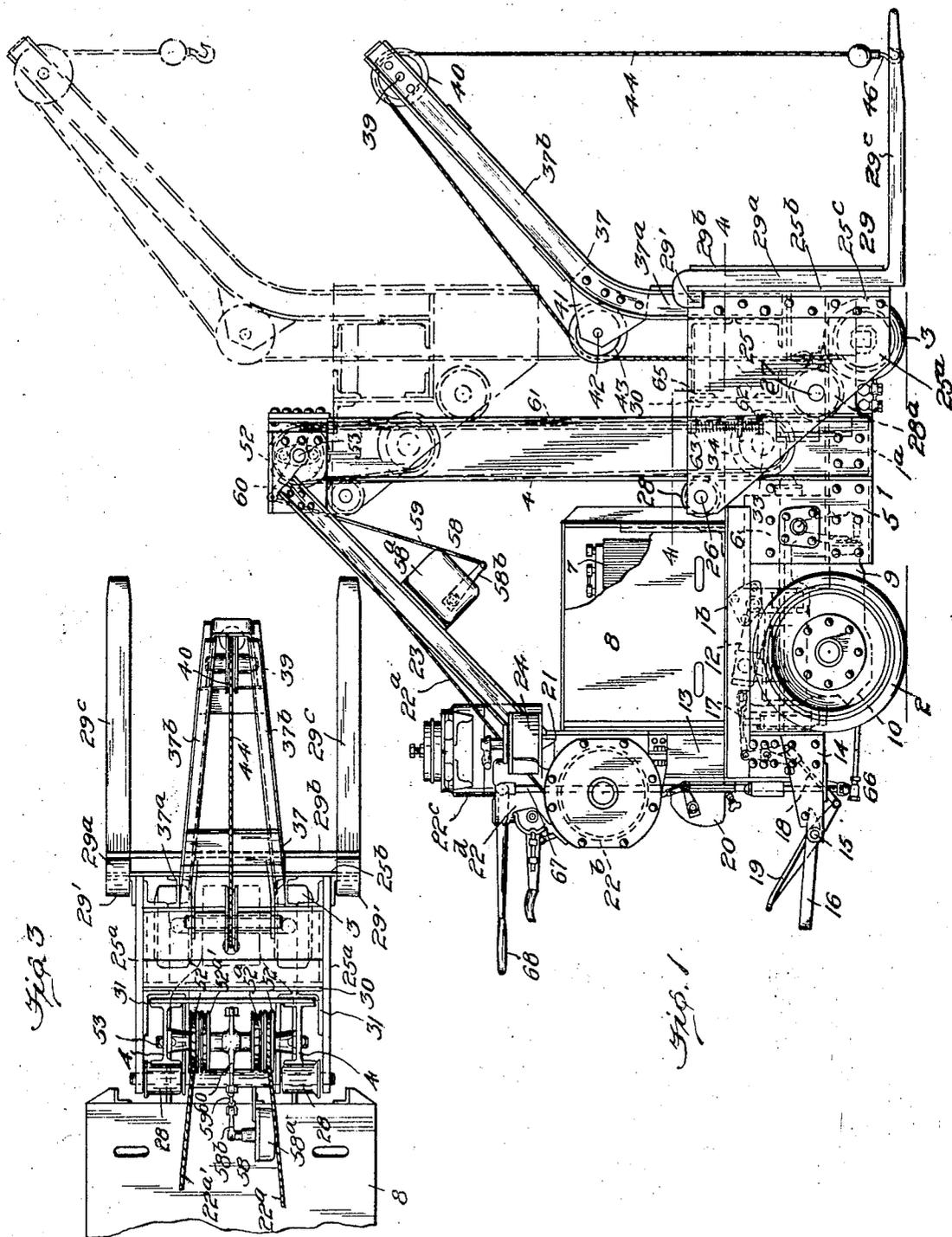
E. H. REMDE

1,837,486

INDUSTRIAL TRUCK

Filed Aug. 6, 1926

4 Sheets-Sheet 1



INVENTOR.

Edward H. Remde

BY

Geo. Witt

ATTORNEY.

Dec. 22, 1931.

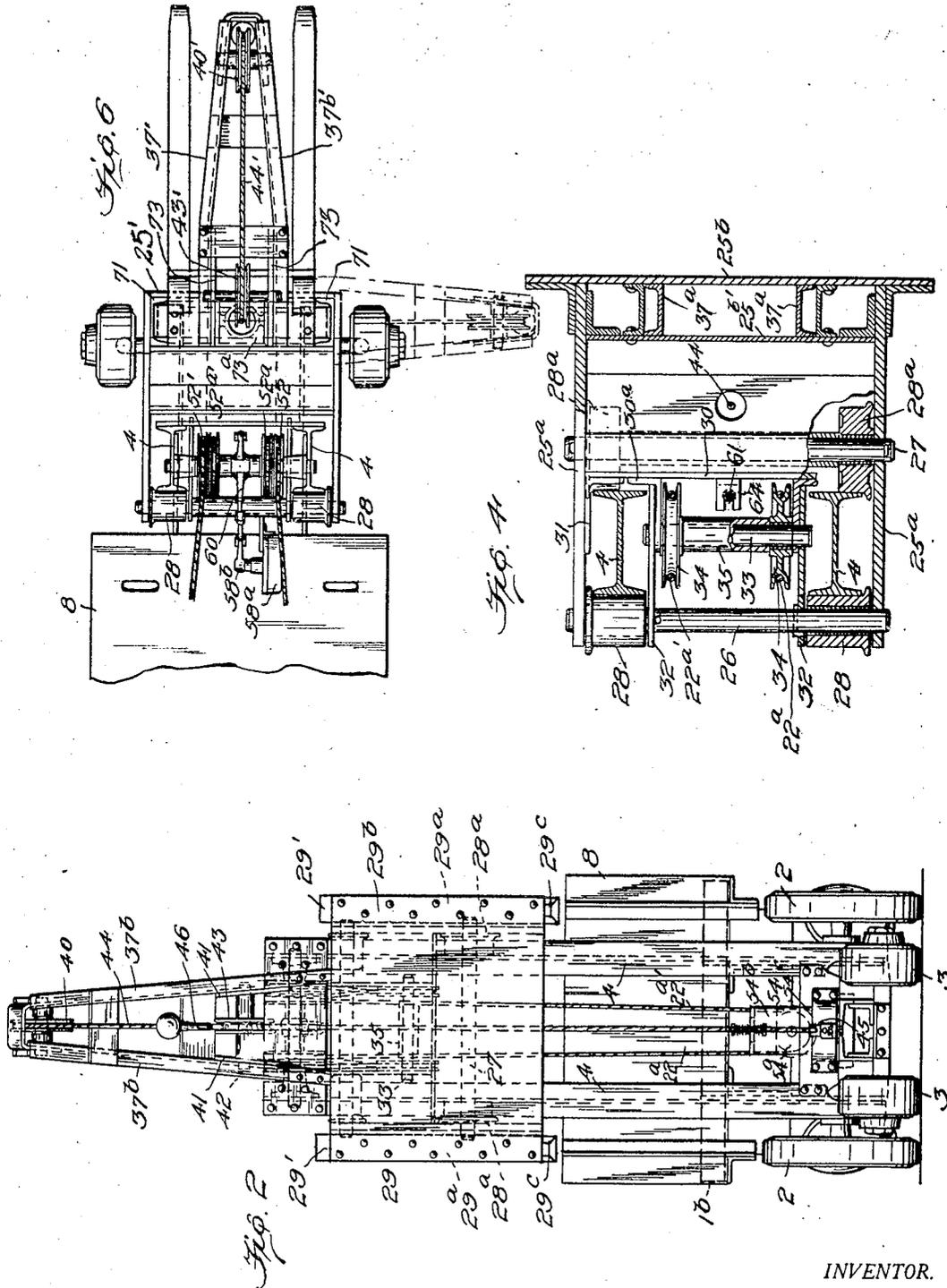
E. H. REMDE

1,837,486

INDUSTRIAL TRUCK

Filed Aug. 6, 1926

4 Sheets-Sheet 2



INVENTOR.

BY Edward H. Remde  
Geo A. Pitts  
ATTORNEY.

Dec. 22, 1931.

E. H. REMDE

1,837,486

INDUSTRIAL TRUCK

Filed Aug. 6, 1928

4 Sheets-Sheet 3

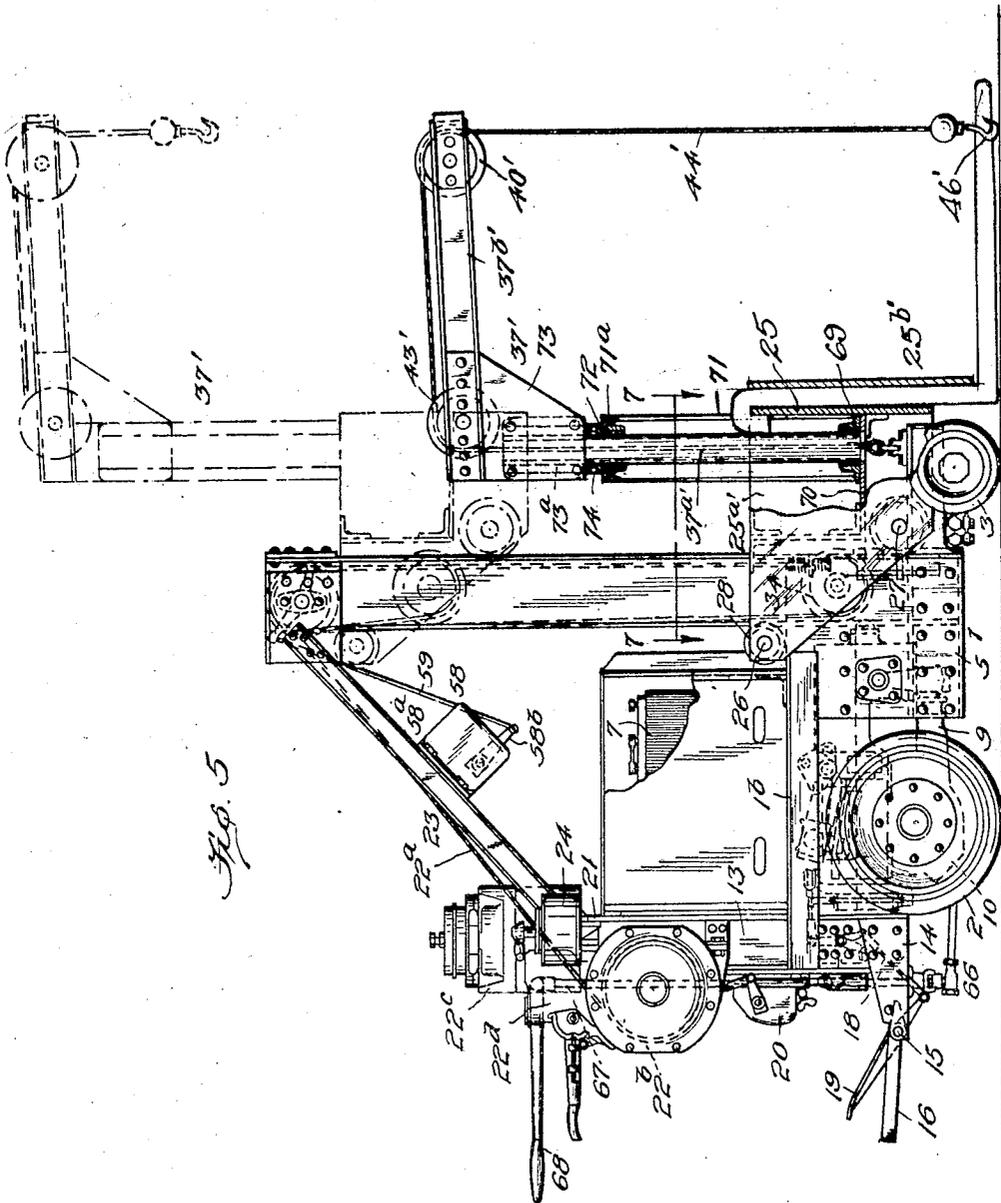


Fig. 5

INVENTOR.

Edward H. Remde

BY

Geo. Pitts

ATTORNEY.

Dec. 22, 1931.

E. H. REMDE

1,837,486

INDUSTRIAL TRUCK

Filed Aug. 6, 1926

4 Sheets-Sheet 4

Fig. 7

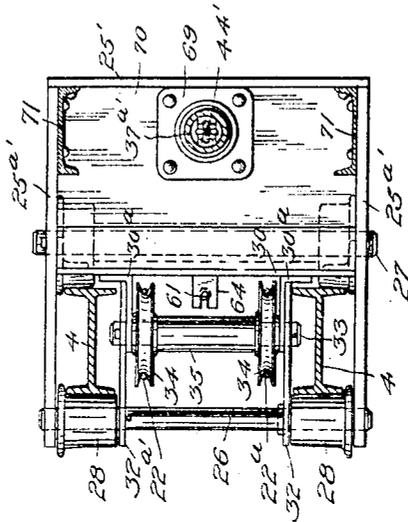
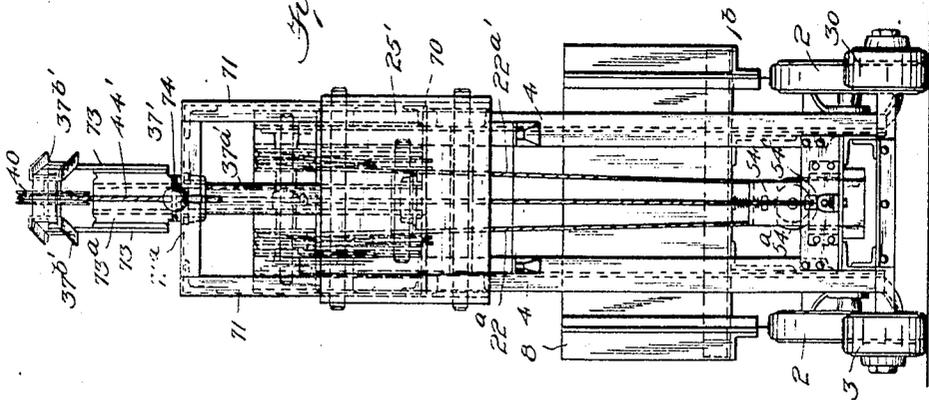


Fig. 8



INVENTOR.

Edward H. Remde

BY

Geo. Pitts

ATTORNEY.

# UNITED STATES PATENT OFFICE

EDWARD H. REMDE, OF CLEVELAND, OHIO, ASSIGNOR TO THE BAKER-RAULANG COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO

## INDUSTRIAL TRUCK

Application filed August 6, 1926. Serial No. 127,682.

The invention relates to an industrial truck for elevating and lowering and transporting bodies of various kinds, such as castings, boxes and other types of loads.

5 One object of the invention is to provide an improved elevating mechanism of simple character and one capable of adaptation to different kinds of raising and lowering operations.

10 Another object of the invention is to associate and combine with a truck having a tiering mechanism an auxiliary hoisting means, whereby the operations of handling and transporting loads under varying conditions are facilitated, the operations of raising and lowering may be carried on faster and the load may be elevated to and from levels beyond the limit of movement of the tiering mechanism.

20 Other objects of the invention will be apparent to those skilled in the art to which my invention relates from the following description taken in connection with the accompanying drawings, wherein

25 Fig. 1 is a side elevation of a truck embodying my invention.

Fig. 2 is an end view of the truck looking toward the left of Fig. 1.

30 Fig. 3 is a fragmentary plan view of the truck.

Fig. 4 is a section on the line 4—4 of Fig. 1.

35 Fig. 5 is a side elevation of a truck, embodying my invention but showing a slightly modified form of construction.

Fig. 6 is a fragmentary plan view of parts shown in Fig. 5.

Fig. 7 is a section on the line 7—7 of Fig. 5.

40 Fig. 8 is an end view of Fig. 5, looking towards the left, but showing the elevating mechanism raised.

45 In the drawings, 1 indicates a frame of suitable construction supported on pairs of wheels 2, 3, and supporting a guide frame 4. In the illustrated form of construction, the guide frame 4 is disposed between the ends of the frame 1. To provide for the extension of the guide frame 4 downwardly relatively close to the floor or supporting surface, the

frame 1 comprises a relatively low section 1a and an elevated section 1b, which sections have an overlapping relation and are rigidly connected together preferably by plates 5. The guide frame 4 preferably comprises a 55 pair of vertically disposed I beams which are riveted to the connecting plates 5 and sleeve to reinforce them to impart strength and rigidity thereto as well as to insure a rigid relation between the sections of the frame 1. 60 For this purpose the flanges of the I-beams on their inner lower portions are removed so that the webs of the beams may engage flat against the plates 5.

Where the truck frame 1 is constructed in 65 the manner shown, the wheels 2 are disposed below the elevated frame section 1b and utilized as traction wheels driven by a motor 6 preferably of the electric type), while the wheels 3 are relatively small and serve as trailing 70 wheels. 7 indicates the source of power, preferably comprising storage batteries mounted on the elevated frame section 1b and connected by suitable leads with the motor 6. The batteries 7 may be enclosed in a casing 75 or housing 8. The motor 6 is mounted in a cradle 9. The cradle 9 forms a part of the housing 10 for the axle mechanism which drives the traction wheels 2 in a well known manner, the axle mechanism being driven by 80 a propeller shaft 11 connected in a well known manner to the shaft of the motor 6. The axle housing 10 and cradle are connected to the frame 1 by a suitable suspension mechanism 12, which forms the subject-matter of 85 a separate application filed jointly by John H. Hertner and myself (see Letters Patent No. 1,628,145).

13 indicates a pair of uprights secured to 90 the frame section 1b at its outer end and extending thereabove and therebelow. At their lower ends, the uprights 13 support a pair of brackets 14 which in turn support a shaft 15 on which is pivoted a base or platform 16 for the operative of the truck to stand on; the 95 base 16 being pivoted on the shaft 15, it may be swung upwardly when not in use as shown in dotted lines in Fig. 1. 17 indicates as an entirety a braking mechanism normally braking 100 the propeller shaft, and through it and the

axle mechanism serving to brake the wheels 2. The braking mechanism 17 includes a linkage 18 connected to a foot pedal 19 by which the braking mechanism is controlled. Above the frame section 1*b*, the uprights 13 support a controller 20 for the motor 6 and a dash plate 21, which carries a suitable safety switch mechanism which is inter-connected with the braking mechanism 17 to automatically break the motor circuit when the brake is applied.

22 indicates as an entirety a load handling mechanism, which includes a hoisting or elevating means, indicated as an entirety at 23, for raising and lowering the load supporting and engaging members, whereby the load handling mechanism may operate to elevate and stack loads or bodies to and upon elevated supports and on each other, where stacking or tiering of loads for storing purposes is required, or to remove the same therefrom. The hoisting means 23 preferably comprise a pair of flexible members 22*a*, 22*a'*, such as steel cables, connected to the load supporting, elevating and engaging elements in the manner to be later set forth. The cables 22*a*, 22*a'*, wind on and off a pair of drums 22*b* (only one being shown in Fig. 1) which are driven in either direction by a suitable power means and an electric motor 22*c* supported by a housing member 22*d* mounted on the uprights 13. The mounting for the drums 22*b* and motor 22*c*, the driving or power means for the drums, and the braking elements for the drums and motor are fully shown and disclosed in my co-pending application Ser. No. 77,352, filed December 23, 1925 (see Letters Patent No. 1,661,387, dated March 6, 1928). In the illustrated form of construction, I use two cable sections 22*a*, 22*a'*, and wind both ends on and off the drums 22*b* simultaneously, for which purpose both drums are driven together in either direction. 24 indicates a controller for the motor 22*c*, being preferably mounted within easy reach of the operative when standing on the platform 16. 25 indicates a frame preferably of U-shape and comprising side walls 25*a* and an outer wall 25*b*, secured to each other by angles 25*c*. The side walls 25*a* are formed with pairs of aligned openings, supporting the opposite ends of shafts 26, 27, and these shafts loosely carry rollers 28, 28*a*, which preferably engage the opposite outer end walls of the I-beams constituting the guide frame 4, to slidably support the frame 25 on the latter, whereby it may be raised and lowered by the hoisting or elevating means 23. The frame 25 is adapted to carry a load supporting member 29 that may be projected below the load to be elevated or lowered in a well known manner. The supporting member 29 will be later referred to. 30 indicates a transverse plate extending between the side walls 25*a* and connected thereto by angles 31.

32 indicate a pair of plates disposed between and in parallel relation to the I-beams 4 and supported on the plate 30 by angles 30*a* and the shaft 26, these plates being formed with aligned openings through which the shaft 26 extends. 33 indicates an intermediate shaft supported at its opposite ends in openings formed in the plates 32. 34 indicates sheaves loosely mounted on the shaft 33 and held in spaced relation by a sleeve 35. The cable sections 22*a*, 22*a'*, are operatively connected to the frame 25 in the following manner: the section 22*a* leads over and around a sheave 52 loosely mounted on a shaft 53, which is suitably supported by and extends between the guide beams 4 near their upper ends; from the sheave 52, the cable extends down to and around one of the sheaves 34; from the latter sheave the cable extends upwardly to and around a sheave 52*a* also loosely mounted on the shaft 53; and from the latter sheave, the cable 22*a* extends down to and is operatively connected to a slack absorbing or take-up means indicated as an entirety at 54. The section 22*a'* leads over and around a sheave 52' loosely mounted on the shaft 53; from the sheave 52' the cable extends down to and around the other sheave 34; from the latter sheave the cable extends upwardly to and around a sheave 52*a'* loosely mounted on the shaft 53; and from this latter sheave the cable 22*a'* extends down to and is operatively connected to the take-up means 54. The operative connection for the cables 22*a*, 22*a'*, with the take-up means 54 may comprise a sheave in which arrangement the cables will be formed from a single section, but preferably this connection consists of a rotatable element 54*a* having grooves around its side edges and suitable means on its lower portion to secure the cable ends thereto. In the arrangement of reeving for the cables 22*a*, 22*a'*, just described, it will be seen that when the drums 22*b* are rotated to wind them thereon, the pull of the cables will be transmitted to and through the sheaves 34, and hence this pull will be effective to raise the frame 25, supporting member 29 and any load thereon.

The take-up means 54 preferably comprises a weighted member 54*b* on which the rotatable member 54*a* is mounted (see Fig. 2) and a guide 54*c* therefor. The weighted member 54*b* is provided with extended sides which abut the lower edge of the guide to limit its upward movement, due to the pull of the cables in supporting or raising and lowering the frame 25 and the supporting member 29 and any load that may be on the latter; but if slack occurs in the cables, or either thereof, for example, due to the load supporting member 29 or the frame 25 engaging an obstruction in its down movement, then the weighted member will slide downwardly in its guide 54*c* and thus take up such slack occurring in the cables. No claim is

made herein to the take-up means in itself since the same forms the subjects-matter of an application filed June 24, 1924, by Amiel G. Hutzley, Ser. No. 722,125 (see Letters Patent No. 1,690,681), and in view thereof, further description herein will not be necessary.

In the illustrated form of construction the load supporting member 29 is removably mounted on the frame 25, so that it may be disengaged therefrom, at will, dependent of the particular operations to be carried out or the type of load to be handled.

In some instances the supporting member may be substituted by another form of supporting member; or it may be removed to eliminate interference with the handling of the loads by the auxiliary elevating or hoist means to be later referred to; or it may be removed to permit the attachment of a trailer to the frame 1. By preference, the supporting member herein illustrated comprises a pair of L-shaped bars disposed in spaced relation, their upright sections 29a being rigidly connected by a plate 29b. When positioned on the frame 25, the plate 29b seats against the plate 25b; in this position the horizontal sections 29c extend outwardly, whereby they may be projected below the load to be handled. To connect the member 29 to the frame 25, I prefer to bend the upper ends of the sections 29a rearwardly and downwardly to form hooks 29', capable of removably engaging the upper end of the plate 25b, as shown in Figs. 1 and 3. The hook end of the sections may be extended downwardly on the inner face of the plate 25b so as to prevent any tendency of the member 29 to swing outwardly.

36 indicates as an entirety an auxiliary elevating or hoist means so arranged and connected with the tiering mechanism 22 that the operation of raising and lowering of the frame 25 serves to operate the load engaging member, indicated at 46. The auxiliary elevating or hoisting means not only increases the utility of the truck by adapting it to varying load handling operations, but its connection with the tiering mechanism is such that the speed of operation of its load engaging member, upwardly and downwardly and the travel of such member is increased. Of these means, 37 indicates a boom mounted on the frame 25. The boom 37 preferably comprises a pair of channel bars having vertical sections 37a and outwardly bent sections 37b, the latter preferably converging at their outer ends. The vertical sections 37a are rigidly supported between the wall 25b and a separate transverse plate 25b'. The bars constituting the boom 37 may be connected together by one or more plates 38. At their outer ends, the sections 37b support a transverse shaft 39 on which is loosely mounted a sheave 40 and adjacent their bent portions the bars carry up-standing plates 41, which

support a shaft 42. 43 indicates a sheave loosely mounted on the shaft 42, the sheave being provided with a hub or sleeves being provided on the shaft 42 between its sides and the plates 41 to support the sheave in line with the sheave 40. 44 indicates a flexible member, such as a wire cable, running over the sheaves 43, 40, being anchored at one end to a lug or bolt 45 suitably secured to the frame 1 (preferably the section 1a as shown in Fig. 2). The other end of the cable is suspended from the sheave 40 and carries the load engaging member 46. The load engaging member 46 is herein shown as a hook, but it will be understood that such member may be otherwise constructed, according to the kind of load to be lifted and transported, for example, a grab-bucket, a magnet, etc. Due to the fact that the cable 44 is anchored at one end to the frame 1 and runs over and is suspended from the sheave 40, operation of the frame 25 upwardly along the guides 4 will result in raising the load engaging member 46—see dotted lines in Fig. 1.

In the construction above described and shown in the drawings it will be noted that the auxiliary elevating or hoist means 36 is so connected or related to and associated with the main elevating or tiering mechanism that the movement of the latter is compounded to increase the rate of movement and travel of the load engaging member 46. In the form of construction shown, the load engaging member is operated at approximately twice the speed and its travel is twice the distance of that of the frame 25, in either direction of movement of the latter.

Aside from the fact that such auxiliary means may effect the handling and transporting of loads for which the load supporting member 29 is not adapted, it has the further advantage of being usable for picking up bodies or loads resting directly on the floor or other surface, which position thereof prevents the truck from being operated to project the supporting sections 29b thereunder. Since the load engaging member 46, when operated, moves relative to the frame 25 or member 29, in this last referred to operation the load engaging member 46 may be used to support the load while being transported or it can be operated to place the load on the supporting member 29. Furthermore, by using a boom that extends upwardly beyond the frame 25, the auxiliary means 36 can be used to raise loads to and remove them from positions beyond the upper limit of movement of the frame 25 on the guides 4.

58 indicates a limiting means for stopping the motor 22c to prevent movement of the frame 25 beyond predetermined positions. Of these means, 58a indicates a suitable switch mechanism interposed in the circuits for the motor 22c and having an operating arm 58b connected by a link 59 to one end of a rocker

60, trunnioned on the shaft 53, this rocker being preferably arranged between the sheaves 52, 52a, and 52', 52a', and thereby serving to space them on the shaft. The opposite end of the rocker 60 has connected to it a rod 61, which is suitably guided at its lower end and carries adjustable collars 62, 63, arranged to be engaged by a lug 64 secured to a cross member 65 which is supported by the side walls 25a. The rod 61 may be operatively connected to the weighted member 54b, so that when it slides downwardly it will move the rod 61 and through it operate the switch mechanism 58a to stop the motor relatively quickly.

Either or both pairs of the wheels 2, 3, may be mounted to effect steering of the truck. Preferably, both pairs of wheels are mounted on knuckles and connected by operating connections 16, connected to a column 67, having a handle 68.

In Figs. 5 to 8, inclusive, I have shown a modified form of construction wherein the boom, indicated at 37' is swiveled so that its load suspending arm or section 37b' may be swung to either side of the truck frame 1, one of such positions being shown in dotted lines in Fig. 6.

In these views, the boom 37' comprises a tubular member or section 37a', which serves as a shaft. 69 indicates a ring secured to the bridge plate 70 supported within the walls 25a', 25b', the ring being provided with a bushing which forms a bearing for the lower end of the shaft 37a'. 71 indicates a pair of upright channel bars resting on the bridge plate 70 and connected at their upper ends by a channel bar 71a. The bar 71a is formed with an opening through which the shaft 37a' extends and supports a ring or collar 72 having a bushing which forms a bearing for the upper portion of the shaft. As shown, the bearings for the shaft 37a' are spaced apart to form an adequate support for the boom 37'. 73 indicates a pair of gussets fixed to castings 73a, which in turn are fixed to the opposite sides of the tubular member 37a', at its upper end. The gussets 73 carry a pair of outwardly extending channel bars, which constitute the boom section 37b' already referred to; each bar being riveted or otherwise rigidly secured to one of the gussets. 74 indicates a thrust bearing interposed between the lower edges of the castings 73a and the bar 71a. 40' indicates a sheave loosely mounted on the shaft 39', the opposite ends of which are supported in openings, formed in the channel bars of the boom section 37b'. 43' indicates a guide sheave similarly mounted near the inner end of the boom section 37b'. 44' indicates the cable running over the sheaves 40', 43', the latter preferably being so arranged that the cable may extend downwardly through the tubular section 37a' for connec-

tion with the frame section 1a, as shown in Fig. 5.

It will be understood that the supporting member 29 may be engaged with the frame 25' in a similar manner to that shown in Figs. 1 and 3. As already set forth, the boom 37' may be swung laterally to either side of the frame 1' to pick up or dump loads, and when in either of said positions the frame 25' may be raised and lowered to effect operation of the load engaging member 46'; thereby enabling the truck having this type of boom to be used under conditions somewhat different from those for which the construction shown in Figs. 1 to 4, inclusive, is adapted.

To those skilled in the art to which my invention relates, many changes in construction and widely differing embodiments and applications of the invention will suggest themselves without departing from the spirit and scope thereof. My descriptions and the disclosure herein are purely illustrative and are not intended to be in any sense limiting.

What I claim is:

1. In apparatus of the class described, the combination with a frame and wheels for supporting said frame, of a member movable upwardly and downwardly on said frame and carrying a load supporting device, a boom on said member, a flexible member suspended from said boom and carrying at its suspended end a load engaging device, an anchor for connecting the opposite end of the flexible member to said frame and means on said frame for moving said movable member upwardly and downwardly.
2. An apparatus as claimed in claim 1 in which the load supporting device is removably mounted on said member.
3. An apparatus as claimed in claim 1 in which the boom is mounted to swivel.
4. In an industrial truck, the combination of a wheel mounted frame having a relatively low section, a vertical guide frame mounted on the low section, an elevating member slidably mounted on said guide frame, a load carrying device on said member arranged to be projected below a load to lift and transport the same, a boom carried by said member and provided with a guide sheave arranged adjacent its outer or free end, a flexible member anchored at its inner end to said frame and running over said sheave and depending therefrom, a load engaging member carried by the outer or depending end of said flexible member, and means for raising and lowering said elevating member and operating through said boom and flexible member to raise and lower said load engaging member.
5. A hoisting apparatus comprising a base, an upright frame thereon, a frame slid-

1,837,486

5

ably connected to the upright frame for up and down movement and provided with a lift member, a device movable vertically relative to the slidable frame, means for lifting said slidable frame on said upright frame, and means for lifting said device on and relative to said slidable frame by and during movement of said first mentioned means.

10 6. A hoisting apparatus comprising a frame including a supporting base and an upright guide frame, a frame movable up and down on the guide frame and provided with a lift member, a pulley on the upper  
15 portion of said slidable frame, a load carrying member movable relative to said slidable frame, a flexible member connected to said load carrying member and taking over the pulley to a fixed anchor, and a pulley-sup-  
20 porting flexible operating member on said guide frame and connected to said slidable frame for lifting the latter.

7. In apparatus of the class described, the combination with a wheel mounted frame  
25 having a guide, of a member slidable upwardly and downwardly on said guide and provided with a projecting load carrying element, a load engaging and lifting device mounted on said slidable member to move  
30 relative thereto, said device being disposed vertically above said carrying element, and means for operating said slidable member and said device.

8. In apparatus of the class described, the combination with a wheel mounted frame  
35 having a guide, of a member slidable upwardly and downwardly on said guide and provided with a projecting load carrying element, a load engaging and lifting means  
40 comprising a support on said member positioned above said load carrying element, a sheave on said support and a flexible member anchored to said frame and depending  
45 from said sheave to suspend a load engaging and lifting device vertically above said element, and means for operating said member.

In testimony whereof, I have hereunto subscribed my name.

50 EDWARD H. REMDE.

55

60

65