

April 14, 1942.

R. G. LE TOURNEAU

2,279,832

MOBILE ELEVATOR

Filed June 20, 1941

6 Sheets-Sheet 1

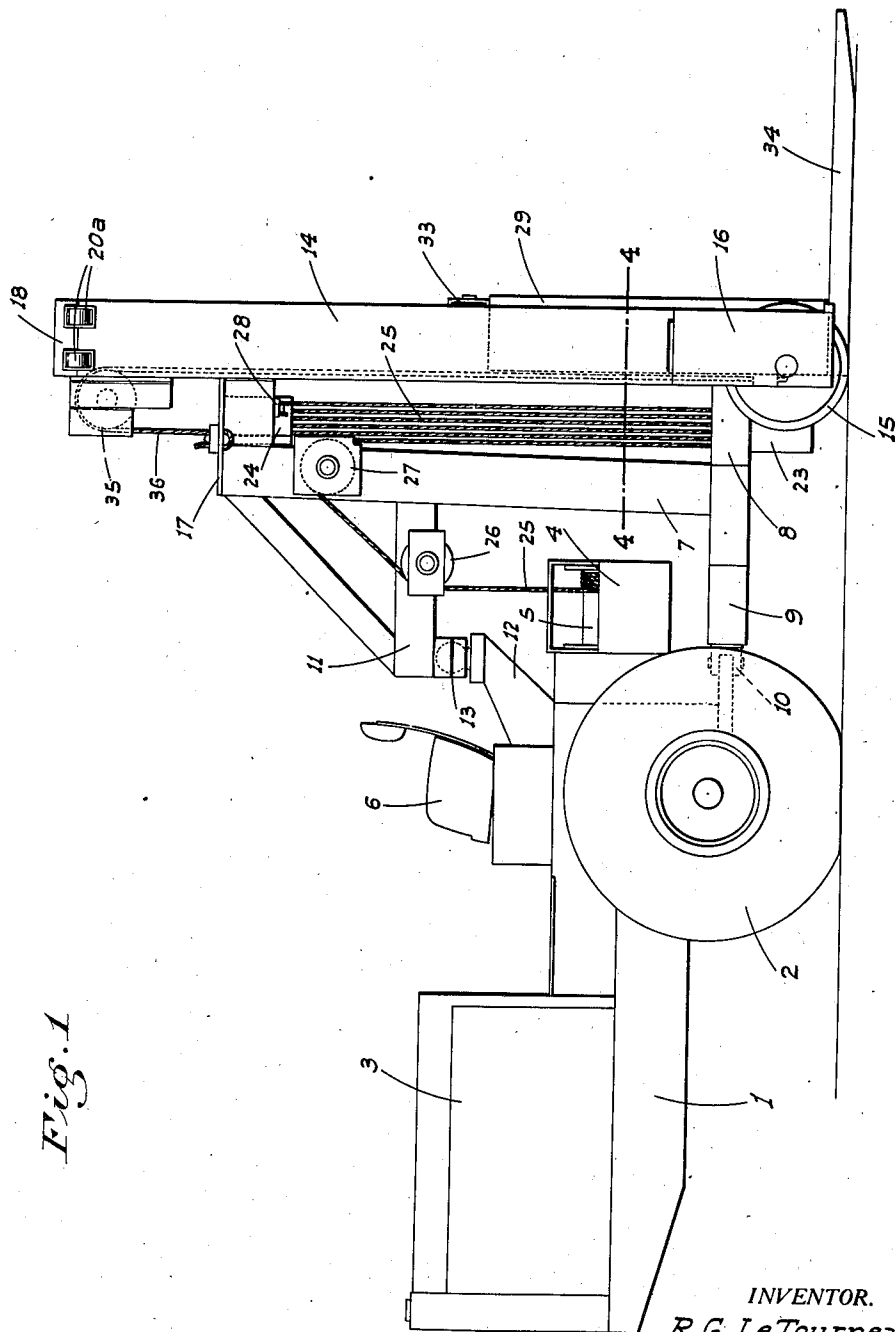


Fig. 1

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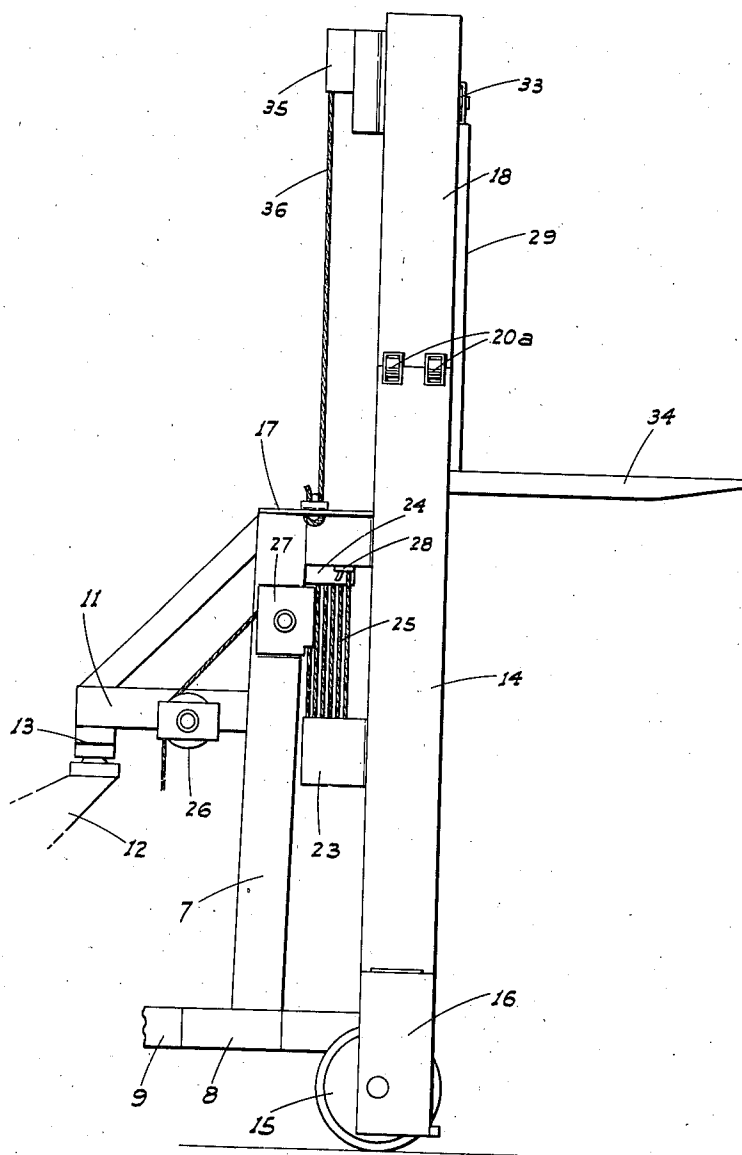
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MOBILE ELEVATOR

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Fig. 2



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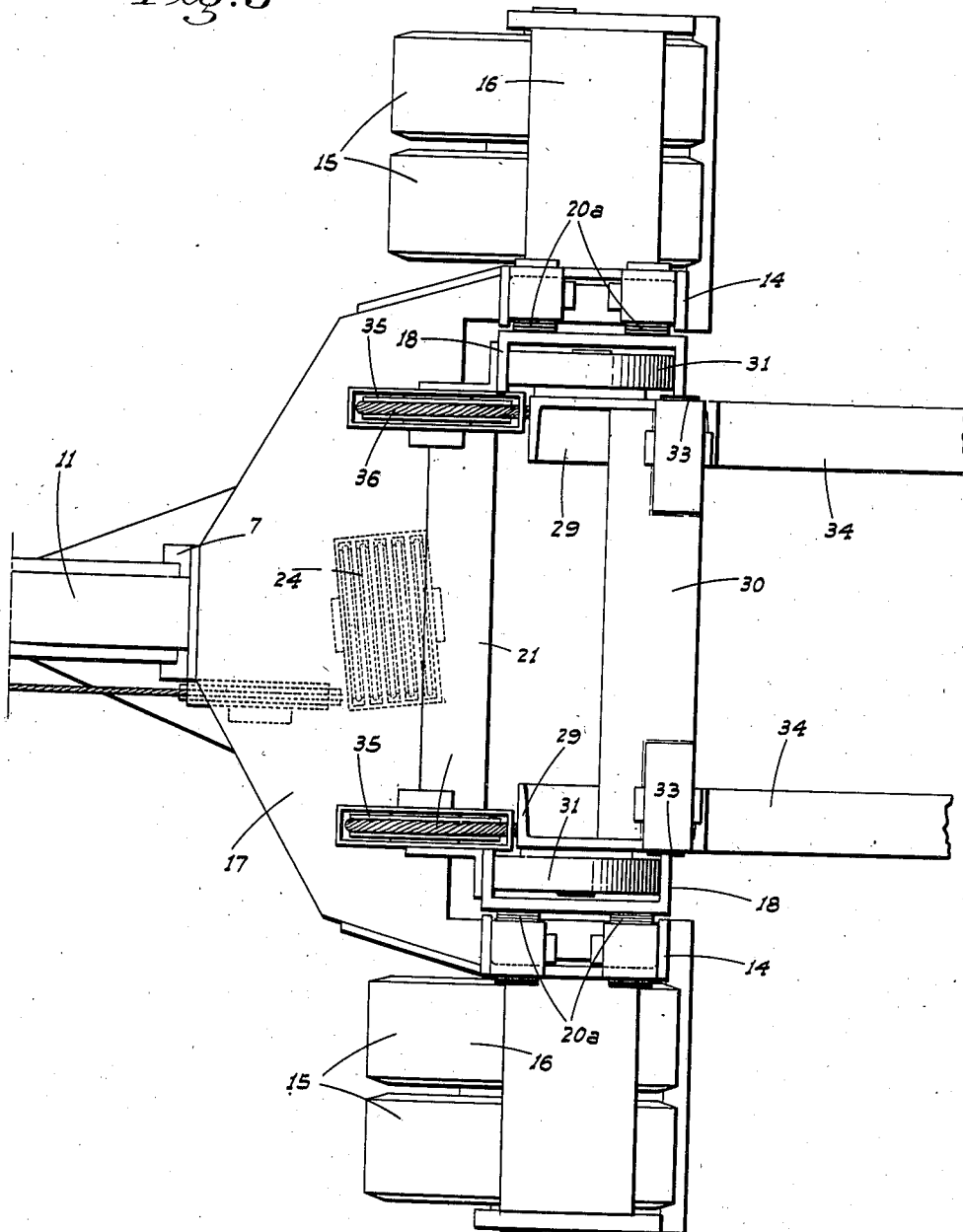
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Fig. 3



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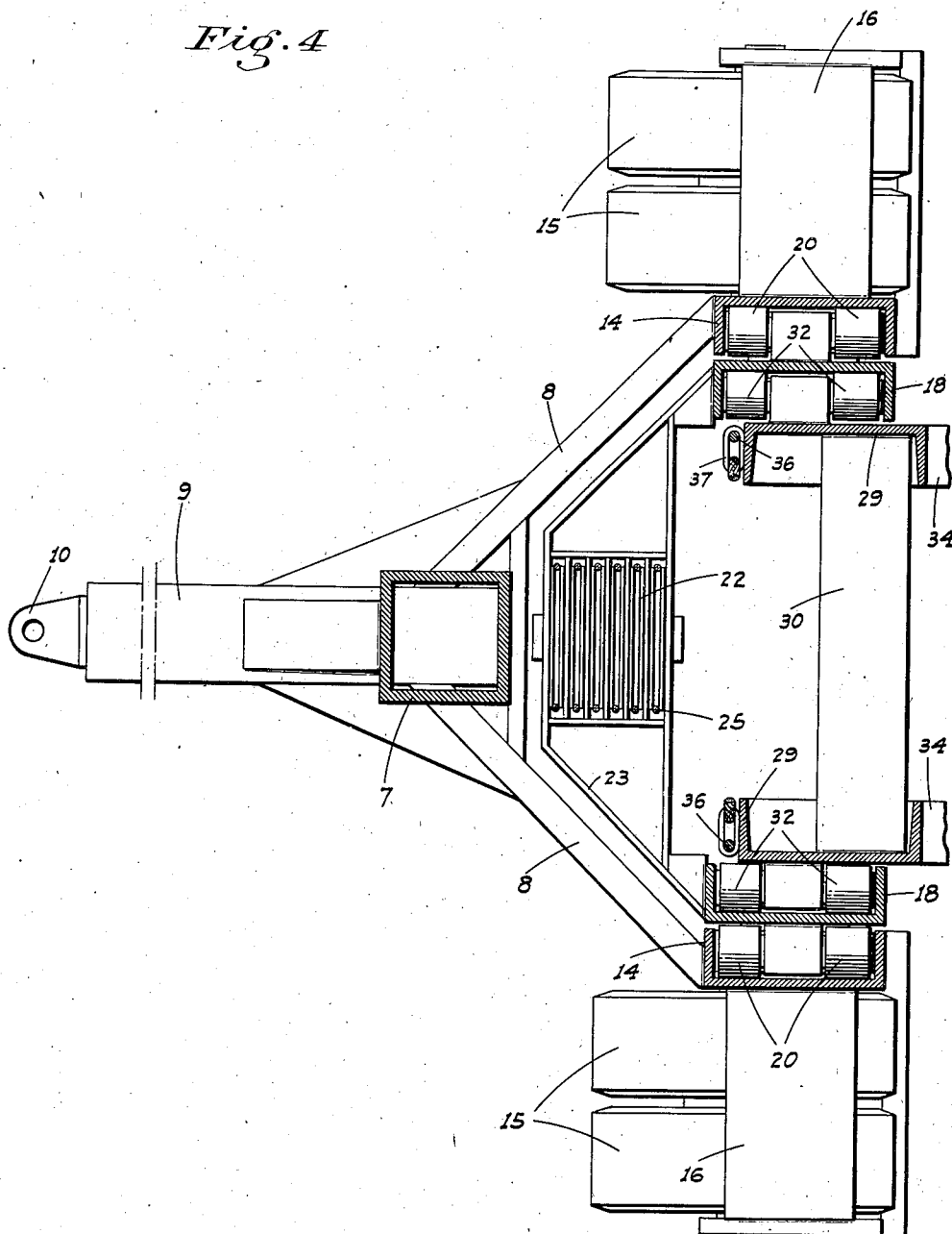
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Fig. 4



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Fig. 5

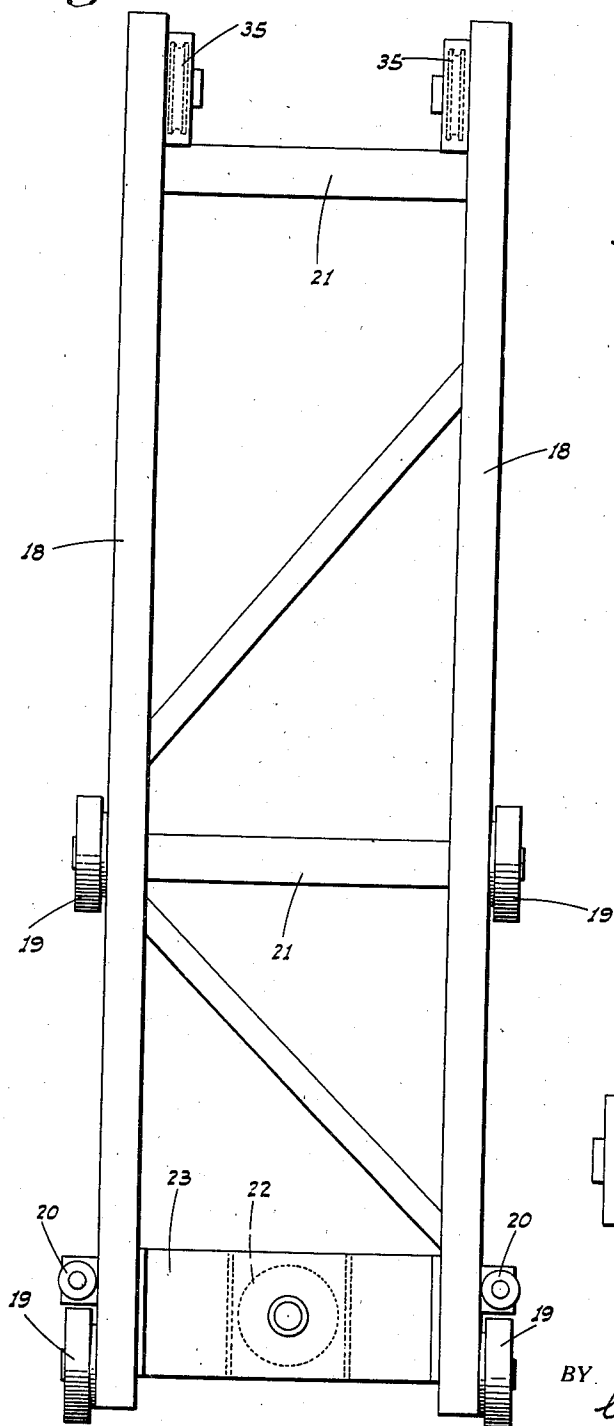
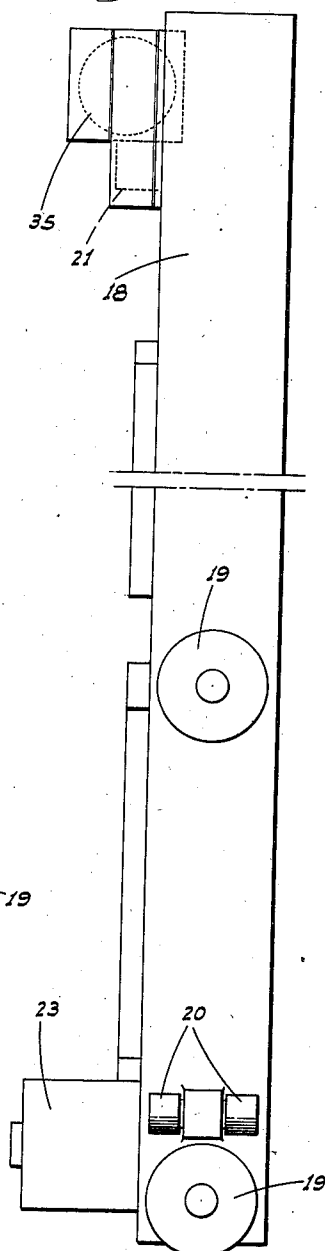


Fig. 6



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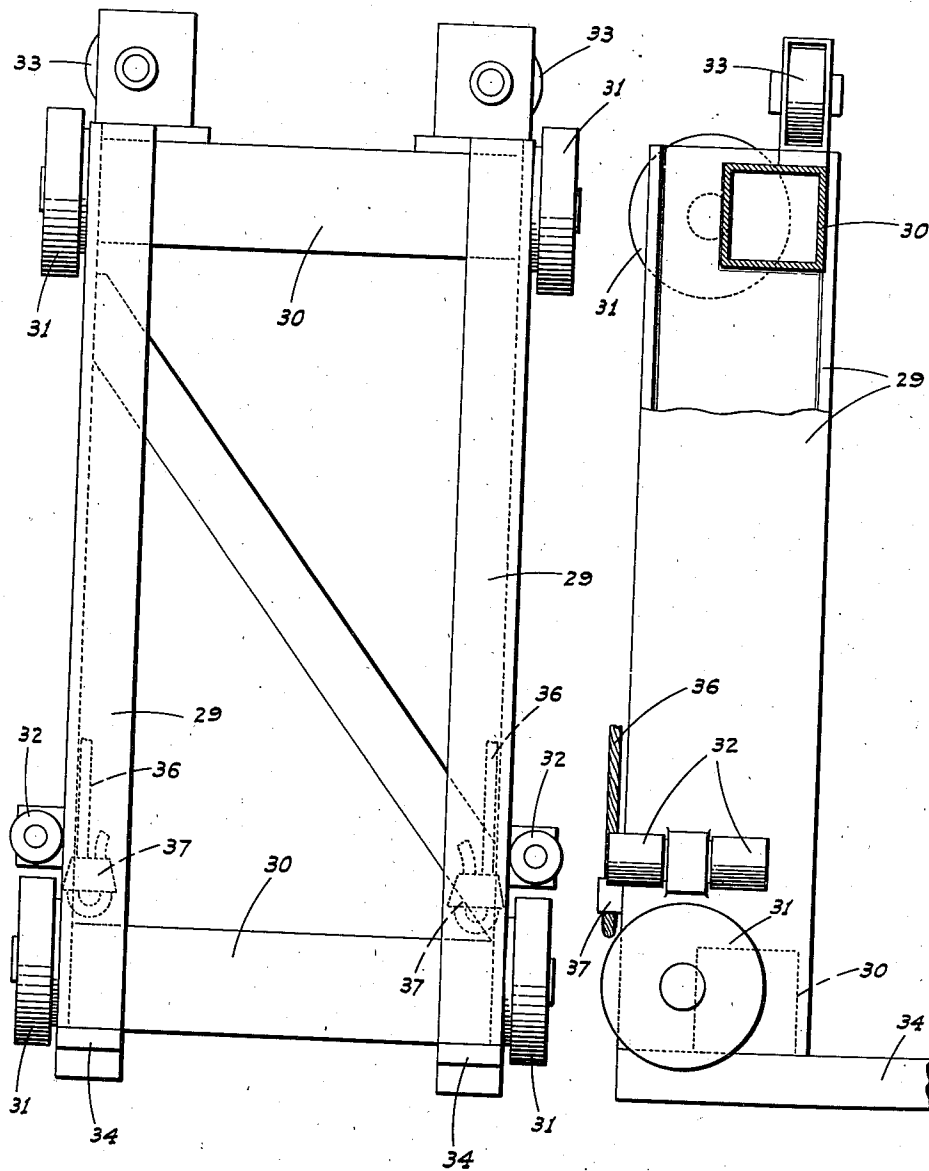
MOBILE ELEVATOR

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Fig. 7

Fig. 8



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UNITED STATES PATENT OFFICE

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MOBILE ELEVATOR

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Application June 20, 1941, Serial No. 398,967

4 Claims. (Cl. 214-113)

This invention relates in general to power actuated, fork type, transporting and stacking carriers or mobile elevators as used in warehouses, manufacturing plants, canneries, and the like; and in particular the invention is directed to, and it is an object to provide, a mobile elevator of the type described which is operative to lift heavy loads to substantial height from floor level without a tendency to overbalance the machine.

A further object of the invention is to provide a mobile elevator which is highly maneuverable; the machine being characterized by the relatively short coupling between the front and rear wheels which provides a short turning radius, and yet the machine embodies a nicety of counterbalance by unique placement of the engine relative to the elevator assembly.

Another object of the invention is to provide a mobile elevator wherein the engine or tractor assembly is connected in horizontally turnable or steerable relation to the elevator assembly; both of such assemblies being wheel supported.

A further object of the invention is to produce a simple and inexpensive device, and yet one which will be exceedingly effective for the purpose for which it is designed.

These objects I accomplish by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings similar characters of reference indicate corresponding parts in the several views:

Figure 1 is a side elevation of the machine with the elevator frame in lowered position.

Figure 2 is a fragmentary side elevation with the elevator frame in raised position.

Figure 3 is a top plan view of the elevator assembly.

Figure 4 is a sectional plan on line 4-4 of Fig. 1.

Figure 5 is a rear elevation of the floating frame, detached.

Figure 6 is a side elevation of the floating frame, detached.

Figure 7 is a rear elevation of the elevator frame, detached.

Figure 8 is a side elevation—partly in section—of the elevator frame, detached.

Referring now more particularly to the characters of reference on the drawings, my improved mobile elevator comprises generally a two-wheel tractor assembly connected in horizontally swiveling and draft relation to a wheel

supported elevator assembly; the elevator assembly being power actuated from the tractor.

The tractor assembly includes a substantially horizontal forwardly projecting frame 1 pivoted at its rear end in connection with transversely spaced supporting and drive wheels 2; this frame being unsupported ahead of the wheel axis. Adjacent its forward end the frame supports an engine 3 arranged in suitable and selective driving relation with wheels 2, and a drum type power control unit 4 mounted on and projecting from the rear of the tractor; the axis of the drum 5 of said unit extending lengthwise of the tractor in a horizontal plane. An operator's seat 6 is mounted on the tractor above the wheels, and from this station the operator controls both the drive of the power control unit 4 and the wheels 2; conventional controls (not shown) being employed.

The elevator assembly, which is connected to the tractor, comprises a heavy duty vertical post 7 whose lower end terminates in clearance relation to the ground and is fixed with the forward ends of rearwardly diverging, horizontal beams 8 which form a horizontal yoke. A rigid tongue 9 is fixed on and projects forwardly from said lower end of post 7, and at its forward end such tongue is connected with the tractor rearwardly and below the axis of wheels 2, as at 10, for horizontal swivel movement. A horizontal and rigid arm 11 extends from post 7 above and in overhanging relation to the power control unit 4, and to a rigid, upstanding bracket 12 on the tractor rearwardly of seat 6. A ball and socket connection 13 connects the forward end of arm 11 and the upper portion of bracket 12; the vertical axis of this ball and socket being vertically aligned with the corresponding axis of the tongue and tractor connection 10, whereby the tractor can swing horizontally relative to the elevator assembly, but relative tilting movement in a vertical plane is prevented.

At their rear ends beams 8 are connected in fixed relation to transversely spaced, vertical frame members 14 which are of channel shape in cross section and face each other; the lower ends of said members being disposed relatively close to but clear of the ground. Dual wheel units 15 are disposed to the outside of members 14 and support the latter through the medium of laterally projecting wheel yokes 16. Adjacent their upper ends, and at their forward edge, frame members 14 are connected by a horizontal plate 17 which extends forward and is fixed to the upper end of post 7. Frame mem-

bers 14 form the outermost of three telescopic frame assemblies.

A rectangular but elongated floating frame, shown detached in Figs. 5 and 6, is disposed in guided relation and for vertical movement between channel frame members 14; this floating frame comprising vertical channel-shaped sides 18 facing toward each other and fitted with rollers 19 which ride between the flanges of channel members 14 with an easy fit, and other rollers 20, adjacent the lower rollers 19, which ride the bottom of said members 14. The latter at the top are provided with rollers 20a engaging the outer faces of members 18. Cross beams 21 connect sides 18 of the floating frame at the front thereof. A multiple sheave block 22 is disposed adjacent and centrally ahead of the lower end of the floating frame, being connected to sides 18 by means of a skeleton cage 23. The upper or corresponding multiple sheave block 24 is mounted on the underside of plate 17 in vertically aligned relation. A cable 25 leads from the drum 5 of power control unit 4 on the tractor, over a direction-changing sheave 26, about another sheave 27 mounted on post 7, thence back and forth about the sheaves of blocks 22 and 24, and finally to a dead end attachment 28 along-side of block 24.

An elevator frame of elongated rectangular configuration, but somewhat shorter than the floating frame, is vertically disposed between the channel sides 18 of the floating frame and comprises facing channel sides 29 offset rearwardly a slight distance relative to said sides 18, and connected by top and bottom cross beams 30. The sides 29 carry rollers 31 at both ends which ride in channel sides 18 of the floating frame with an easy running fit between the flanges thereof, and other rollers 32 which ride the bottom of said channel sides 18. Rollers 33 atop the elevator frame ride the outer edges of the rear flanges of channel sides 18. Transversely spaced, rearwardly projecting load supporting arms 34 extend horizontally from fixed connection with the elevator frame at the bottom.

A pair of fixed sheaves 35 are mounted on the upper end of the floating frame and project forwardly in transversely spaced relation above plate 17. Heavy duty cables 36 extend about sheaves 35 with one end of said cables being anchored to plate 17 and the other end anchored, as at 37, to the elevator frame adjacent the lower ends of side channels 29. Cables 36 are of such length that when the floating frame and sheaves 35 are in lowermost position, the elevator frame is in a like position with load arms 34 on the ground, as shown in Fig. 1.

Operation

In use, the tractor assembly is operated or maneuvered to position arms 34 beneath the load to be lifted, whereupon power control unit 4 is actuated so as to wind cable 25 onto drum 5, which results in multiple sheave block 23 being drawn upward toward block 24, carrying the attached floating frame upward relative to the fixed frame members 14.

As the floating frame rises, sheaves 35 likewise rise which in turn pull upward on cables 36, shortening the reaches thereof connected to the elevator frame and elevating the latter from the ground twice the distance the floating frame moves, as shown in Fig. 2.

It will thus be seen that a load may be lifted from the ground a height nearly that of the

fixed outer frame members 14; the floating frame, as it rises, providing the necessary firm support for the elevator frame at all positions of the latter. At the same time, an excessive permanent height, which would interfere with movement through warehouse doors and the like, is avoided.

It will be seen that the machine is capable of lifting very heavy loads due to the multiplication of power between the power control unit 4 and elevator frame, and in addition the projecting frame 2 and supported engine 3 serve as a counter-weight which prevents rearward tipping when a load is in position on arms 34 and the elevator frame raised. For transporting a load from place to place, the machine is very maneuverable due to the close coupling of the tractor and elevator assemblies, and this advantage is of importance to facilitate lifting, transporting, and stacking of loads.

From the foregoing description it will be readily seen that I have produced such a device as substantially fulfills the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described my invention, what I claim as new and useful and desire to secure by Letters Patent is:

1. A mobile elevator comprising a fixed up-standing frame, supporting wheels therefor, a vertical post disposed ahead of said fixed frame, rigid connecting members between the post and the fixed frame at top and bottom, a pair of tongues projecting forwardly from the post in vertically spaced relation, a two-wheel tractor including a forwardly projecting engine supporting frame, vertically aligned means pivoting said tongues on the tractor at the rear for horizontal swinging movement, a power drum on the tractor between said tongues, a floating frame mounted in telescopic vertically movable relation to the fixed frame, an elevator frame mounted in telescopic vertically movable relation to the floating frame, a multiple sheave block and tackle connected between the floating frame at the bottom and the uppermost one of said connecting members and having a lead cable, a direction changing sheave on the uppermost tongue above said drum, said lead cable passing through said sheave and being attached to the drum, and means to raise the elevator frame by and upon vertical movement of the floating frame.

2. In a mobile elevator which includes the combination of a wheel supported elevator assembly having rearwardly projecting load supporting arms, a tractor ahead of said elevator assembly and a vertically rigid horizontally swiveling draft connection therebetween; said tractor including means projecting a substantial distance ahead of its supporting wheels in counterbalancing relation to said load supporting arms.

3. In a mobile elevator which includes the combination of a wheel supported elevator assembly having rearwardly projecting load supporting arms, a tractor ahead of said elevator assembly and a vertically rigid horizontally swiveling draft connection therebetween; said tractor being of the two-wheel type and includ-

ing a frame portion projecting a substantial distance ahead of the wheel axis in overhanging relation to the ground, and an engine supported on said frame portion in counterbalancing relation to said load supporting arms.

4. A mobile elevator comprising a wheel supported cable actuated elevator assembly, a pair of tongues rigid with and projecting forwardly from the elevator assembly in vertically spaced relation, a tractor ahead of said tongues, means 10 pivoting said tongues on the tractor for horizontal swinging movement, the tractor including a power drum disposed between said tongues, the elevator assembly actuating cable leading to connection with said drum, and a direction changing sheave for said cable mounted on one of said tongues, said sheave being positioned to properly lead the cable from the drum regardless of the angle of draft between the tractor and elevator assembly.

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