May 15, 1956 W. NATKANSKI 2,745,561

UNDERGROUND GARAGE

Filed Dec. 20, 1954 3 Sheets-Sheet 1

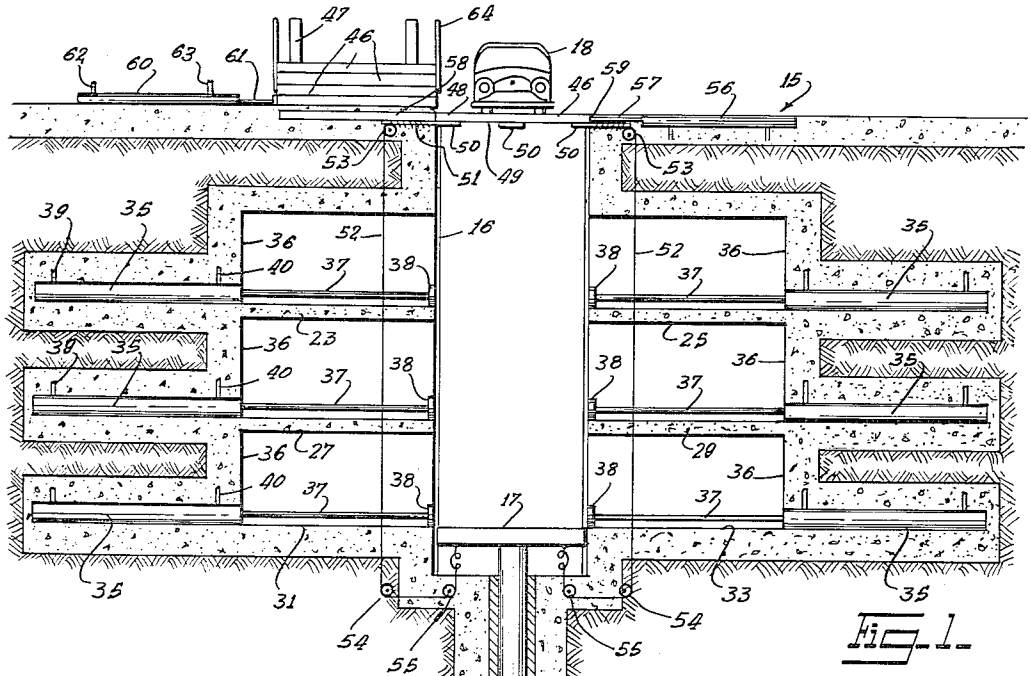


Fig. 1

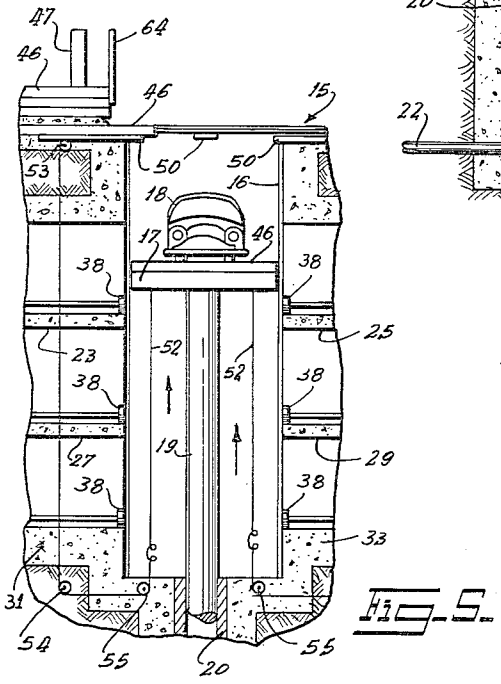


Fig. 5

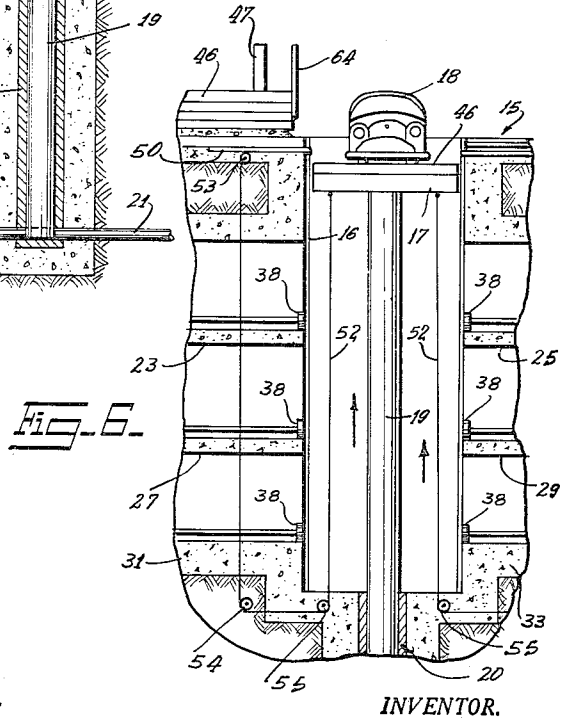


Fig. 6

INVENTOR.
WINCENTY NATKANSKI
BY
ATTORNEY

May 15, 1956 W. NATKANSKI 2,745,561

UNDERGROUND GARAGE

Filed Dec. 20, 1954 3 Sheets-Sheet 2

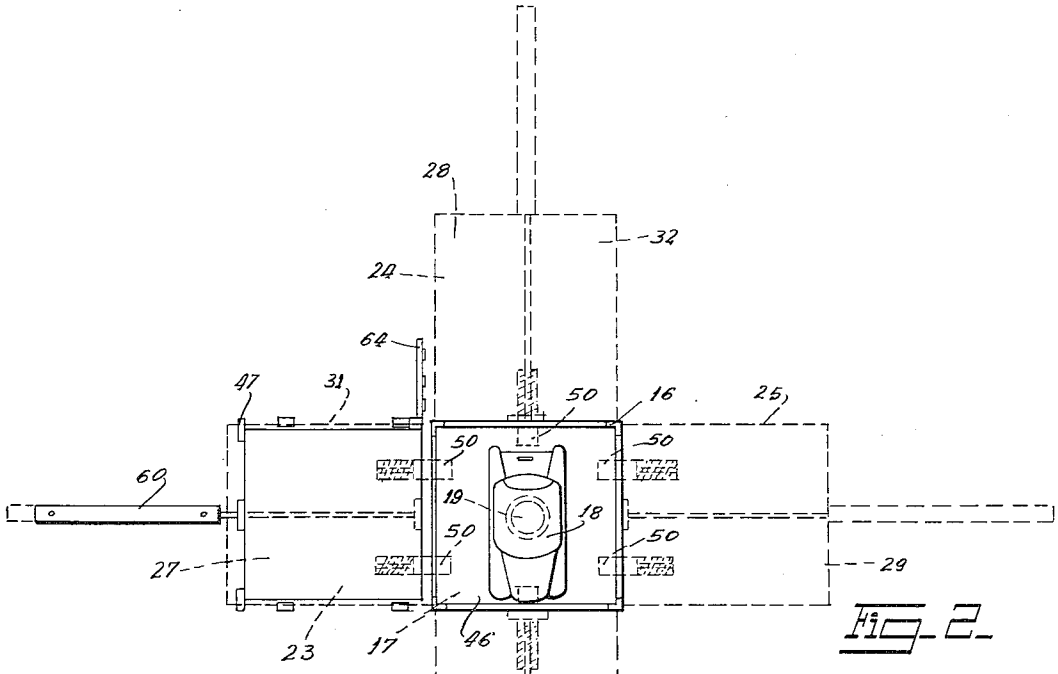


Fig. 2

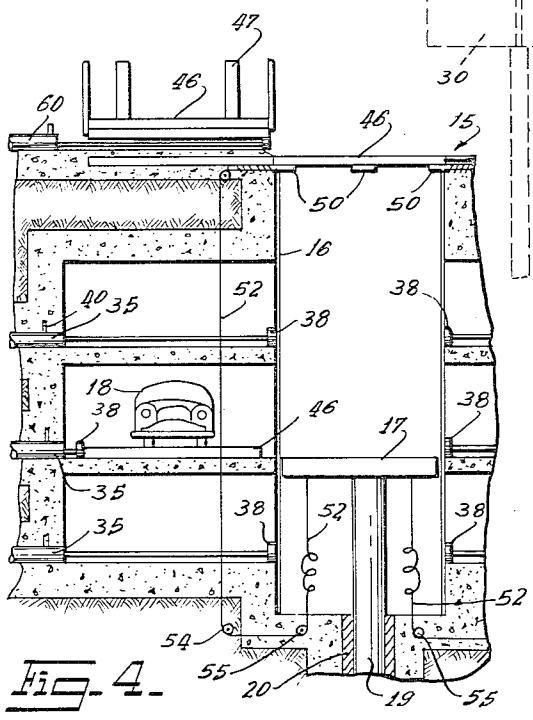


Fig. 4

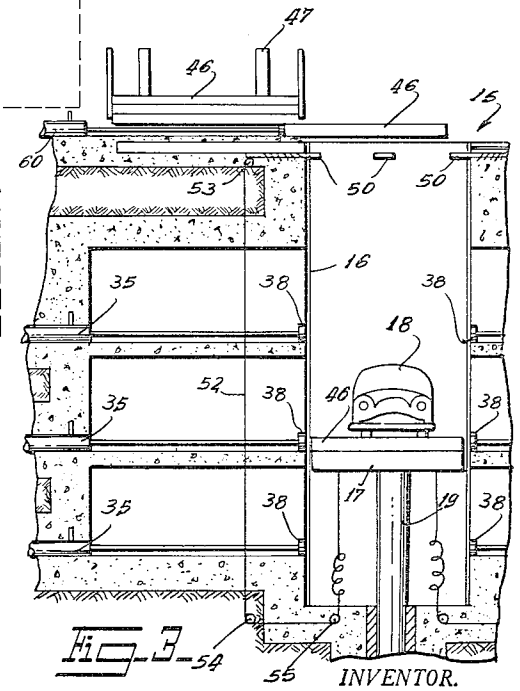


Fig. 3

INVENTOR.
WINCENTY NATKANSKI
BY
ATTORNEY

May 15, 1956 W. NATKANSKI 2,745,561

UNDERGROUND GARAGE

Filed Dec. 20, 1954 3 Sheets-Sheet 3

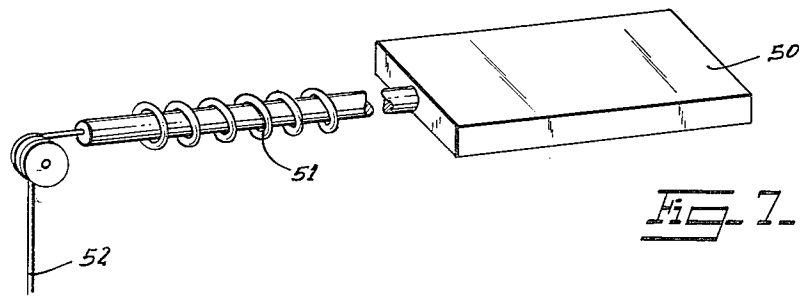


Fig. 7.

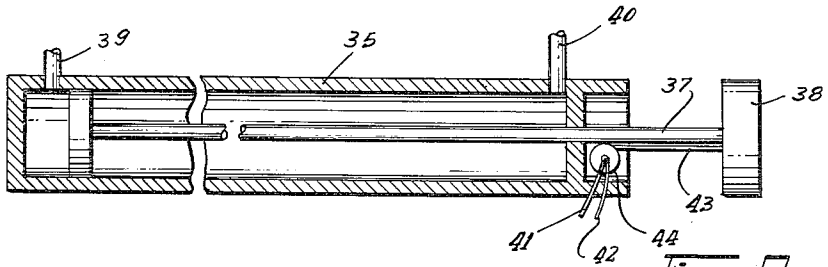


Fig. 8.

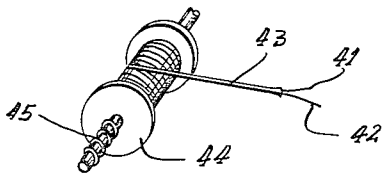


Fig. 9.

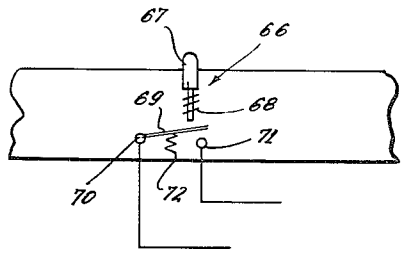


Fig. 10.

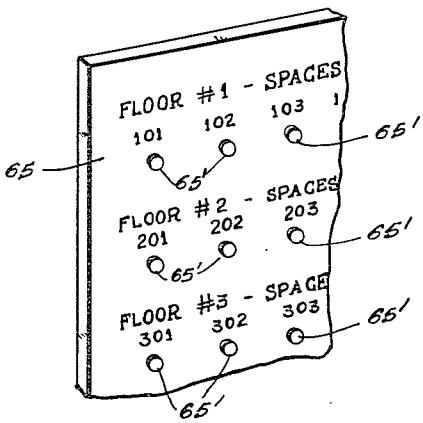


Fig. 11.

INVENTOR.
WINCENTY NATKANSKI
BY Zoltan A. Blachly
ATTORNEY

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2,745,561

UNDERGROUND GARAGE

Wincenty Natkanski, New York, N. Y.

Application December 20, 1954, Serial No. 476,364

4 Claims. (Cl. 214—16.1)

This invention relates to new and useful improvements in parking and storage garages for motor vehicles.

More particularly, the present invention proposes the construction of an improved underground parking and storage garage which can be built upon a small lot in business and other congested areas to handle as a commercial garage a large number of vehicles with a minimum of personnel.

As a further object, the present invention proposes forming the underground garage so that it can be built under factories and apartment houses for operation as a self-service unit by the vehicle drivers themselves.

Still further, the present invention proposes constructing the garage with a surface apron having an elevator shaft frame extending therefrom vertically into the ground and an elevator in the frame with floors radiating from the frame having means thereon to move vehicles off and onto the elevator.

Another object of the present invention proposes forming the garage with a plurality of vehicle holding pallets and with means to hold one of the pallets over the elevator shaft frame to cover the shaft when the elevator is down and to hold a vehicle in position to be loaded on the elevator when the elevator is up.

A further object of the invention proposes constructing the garage with means to remove the shaft frame covering pallet when the elevator rises loaded with a pallet and vehicle or vehicles.

For further comprehension of the invention, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings, and to the appended claims in which the various novel features of the invention are more particularly set forth.

In the accompanying drawings forming a material part of this disclosure:

Fig. 1 is a vertical sectional view with parts broken away and in section of an underground garage constructed and arranged in accordance with the present invention.

Fig. 2 is a top plan view of the structure shown in Fig. 1.

Fig. 3 is a fragmentary sectional view similar to Fig. 1 but showing the vehicle about to be moved into a parking stall and a cover plate in the process of covering the shaft.

Fig. 4 is a view similar to Fig. 3 showing the vehicle parked and the shaft covered.

Fig. 5 is a view similar to Fig. 3 but showing the vehicle being raised and the cover plate being removed.

Fig. 6 is a view similar to Fig. 5 but showing the parts in a later position in the vehicle raising stage.

Fig. 7 is a fragmentary perspective view of one of the pallet holding members and attendant parts.

Fig. 8 is a sectional view of one of the cylinders, piston rods and electromagnet piston heads shown in the several figures.

Fig. 9 is a perspective view of the electric cord spring reel shown in Fig. 8.

Fig. 10 is a fragmentary diagrammatic view showing a section of one of the parking floors with a switch to show when that floor is full.

Fig. 11 is a fragmentary perspective view of an indicator board with a lamp for each parking floor electrically connected with one of the parking floor switches shown in Fig. 9.

Referring more particularly to the drawings, the parking garage of the present invention has a surface apron 15 with an elevator shaft frame 16 extending from the apron vertically into the ground.

An elevator 17 adapted to hold one or more vehicles 18 is movably mounted in the frame 16. While elevator 17 may be of any well-known type, in the example shown elevator 17 has an elevator moving means in the form of a hydraulic shaft 19 which fits in hydraulic cylinder 20 supplied with suitable hydraulic fluid at its base by inlet conduit 21 and having an outlet conduit 22. The conduits 21 and 22 are connected with a hydraulic fluid pressure source (not shown) having the usual controls and safety devices (not shown).

A plurality of underground floors 23, 24, 25 and 26, on the first parking level, 27, 28, 29 and 30 on the next lower parking level and 31, 32, 33 and 34 on the lowermost parking level radiate from the elevator shaft frame 16. The parking floors may be so spaced that no two adjacent floors are more apart vertically than slightly more than the height of a vehicle 18. As many floors may be provided as desired and as the terrain permits.

Vehicle transferring means is provided on each floor to move vehicles to and from the elevator. Such transferring means in the example shown is a hydraulic cylinder 35 mounted behind the end wall 36 of each floor with a hydraulic piston rod 37 slidably mounted in the piston rod and an electromagnet head 38 on the piston rod. Each cylinder 35 may be supplied with hydraulic fluid through spaced conduits 39 and 40 to move the piston rod forward or retract it as desired.

Each electromagnet head 38 is connected by wires 41 and 42 in cable 43 to an electric power source through conventional switches and controls. Each cable 43 is wound upon a reel 44 spring biased by spring 45 and mounted in the front end of one of the cylinders 35.

A plurality of metal plates or vehicle holding pallets 46 are provided with a stack of these pallets disposed in a bin 47 at one side of the elevator shaft frame. The electromagnet heads 38, when energized, are adapted to hold onto one edge of a pallet 46 to move that pallet off and onto the elevator when a vehicle is on the pallet. Preferably one side of each pallet, the top, 48, should be rough to hold a vehicle and prevent it rolling thereon and the other side, the bottom, 49, smooth to slide easily for moving the pallet.

Pallet holding members 50 are provided adjacent the apron to hold one of the pallets 46 over the elevator shaft structure for a vehicle to be moved on and off the pallet. Members 50 are slidably and retractably mounted with springs 51 to bias them normally into their pallet holding position. A cable 52 is connected to one end of each pallet holding member 50 to retract that member. The cables 52 encircle pulleys 53, 54 and 55 and are secured to the bottom of the elevator so that when the elevator rises to the top of the shaft, the members 50 will be retracted and the pallet 46 held by them and on which a vehicle 18 is parked will be free to rest on the elevator.

A pallet withdrawing hydraulic cylinder 56 and piston rod 57 is provided adjacent the apron and a recess 58 is provided across from the electromagnet head 59 of the piston rod 57 so that a pallet 46 may slidably be withdrawn from the spaced pallet holding members when the elevator approaches the apron with a pallet and vehicle on it. Switch means (not shown) may be provided op-

eratively to connect the pallet withdrawing cylinder, piston rod and electromagnetic head with the elevator to operate the withdrawing means when the elevator approaches the apron loaded.

A hydraulic cylinder 60 is provided adjacent the pallet bin 47 with a piston rod 61 to move the bottom pallet from the bin onto the pallet holding members 50. The hydraulic fluid conduits 62 and 63 of cylinder 60 may be operatively connected with the elevator to be operated by the lowering of the elevator as shown in Fig. 3.

A control board 64 is mounted on the bin 47 so that the driver of a vehicle may park his vehicle himself. Sutiable controls are provided on the board 64 connected to the various hydraulic elements. A lamp panel or indicator board 65 is also provided with a lamp 65' corresponding to each parking floor each lamp being connected to an electric source (not shown) through a floor switch 66. Each floor switch 66 consists of a detent button 67 biased by a spring 68 away from a switch blade 69. The blade 69 is connected at one end pivotally with a terminal 70 and a second switch terminal 71 is located beneath the other end of the blade. A spring 72 normally biases the blade away from terminal 71. A pallet 46 sliding onto the floor will press in the detent button and connect the two switch terminals to light the lamp for that floor on the board 65.

To operate the underground garage, the driver of a vehicle parks it on the pallet which normally covers the elevator shaft. He then gets out of the car and presses the elevator starting button on the control panel. When the elevator rises to the top of the shaft, the finger-like members 50 retract depositing the pallet and vehicle on the elevator. The operator then chooses an empty floor, as shown by the lamps, and presses the elevator button for that floor. When the elevator reaches that floor it stops and the hydraulic cylinder for that floor is energized to move the piston rod forward to contact the pallet with its electromagnet head. This head is then energized and the cylinder fluid is reversed to retract the piston rod dragging the pallet and vehicle onto the parking floor. Meanwhile, the cylinder and piston rod adjacent the pallet bin has moved another pallet over the elevator shaft opening.

When a loaded elevator rises, the piston rod 57 of cylinder 56 moves the empty pallet covering the elevator shaft into the recess 58 from whence it can be removed by the electromagnet head of piston rod 57 when desired. All of the mechanical, hydraulic and electrical elements may be operatively interconnected for automatic or semi-automatic operation.

While I have illustrated and described the preferred embodiment of my invention, it is to be understood that I do not limit myself to the precise construction herein disclosed and that various changes and modifications may be made within the scope of the invention as defined in the appended claims.

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

1. An underground parking and storage garage comprising a ground level surface apron, an elevator shaft frame extending from said apron vertically into the ground, an elevator adapted to hold one or more vehicles movably mounted in the frame, elevator moving means to move the elevator up and down the frame, a plurality of floors radiating from the elevator shaft frame, a plurality of vehicle holding pallets, pallet moving means on each of said floors to move a pallet and vehicle thereon to and from the elevator, said pallet moving means being operative from said apron above ground, pallet holding means adjacent said apron to hold one of said pallets over the elevator shaft structure for a vehicle to be moved thereon and therefrom, means connecting said pallet holding means with the elevator to retract the pallet holding means and deposit a pallet and vehicle thereon

on the elevator, and pallet withdrawing means adjacent the apron slidably to withdraw an empty pallet from the pallet holding means, and means operatively connecting the pallet withdrawing means with the elevator to operate said pallet withdrawing means when the elevator approaches the apron with a pallet and vehicle on the elevator.

2. An underground parking and storage garage comprising a ground level surface apron, an elevator shaft frame extending from said apron vertically into the ground, an elevator adapted to hold one or more vehicles movably mounted in the frame, elevator moving means to move the elevator up and down the frame, a plurality of floors radiating from the elevator shaft frame, a plurality of vehicle holding pallets, pallet moving means on each of said floors to move a pallet and vehicle thereon to and from the elevator, said pallet moving means being operative from said apron above ground, stack means adjacent the elevator shaft frame to hold a stack of said pallets, pallet holding means adjacent said apron to hold one of said pallets over the elevator shaft structure for a vehicle to be moved thereon and therefrom, and means adjacent said stack means to move a pallet from the stack of pallets onto the pallet holding means, said means to move a pallet from the stack of pallets onto the pallet holding means being operatively connected with the elevator and operated by the lowering of the elevator.

3. An underground parking and storage garage comprising a ground level surface apron, an elevator shaft frame extending from said apron vertically into the ground, an elevator adapted to hold one or more vehicles movably mounted in the frame, elevator moving means to move the elevator up and down the frame, a plurality of floors radiating from the elevator shaft frame, a plurality of vehicle holding pallets, pallet moving means on each of said floors to move a pallet and vehicle thereon to and from the elevator, said pallet moving means being operative from said apron above ground, stack means adjacent the elevator shaft frame to hold a stack of said pallets, pallet holding means adjacent said apron to hold one of said pallets over the elevator shaft structure for a vehicle to be moved thereon and therefrom, means adjacent said stack means to move a pallet from the stack of pallets onto the pallet holding means, said means to move a pallet from the stack of pallets onto the pallet holding means being operatively connected with the elevator and operated by the lowering of the elevator, and means connecting said pallet holding means with the elevator to retract the pallet holding means and deposit a pallet and vehicle thereon on the elevator on the rising of the elevator to adjacent the apron.

4. An underground parking and storage garage comprising a ground level surface apron, an elevator shaft frame extending from said apron vertically into the ground, an elevator adapted to hold one or more vehicles movably mounted in the frame, elevator moving means to move the elevator up and down the frame, a plurality of floors radiating from the elevator shaft frame, a plurality of vehicle holding pallets, pallet moving means on each of said floors to move a pallet and vehicle thereon to and from the elevator, said pallet moving means being operative from said apron above ground, stack means adjacent the elevator shaft frame to hold a stack of said pallets, pallet holding means adjacent said apron to hold one of said pallets over the elevator shaft structure for a vehicle to be moved thereon and therefrom, means adjacent said stack means to move a pallet from the stack of pallets onto the pallet holding means, said means to move a pallet from the stack of pallets onto the pallet holding means being operatively connected with the elevator and operated by the lowering of the elevator, means connecting said pallet holding means with the elevator to retract the pallet holding means and deposit a pallet and vehicle thereon on the elevator on the rising of the

elevator to adjacent the apron, pallet withdrawing means adjacent the apron slidably to withdraw an empty pallet from the pallet holding means, and means operatively connecting the pallet withdrawing means with the elevator to operate said pallet withdrawing means when the elevator approaches the apron with a pallet and vehicle on the elevator.

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