Nov. 15, 1932. H. K. WHEELER 1,887,667

MEANS OF PARKING CARS IN GARAGES

Filed April 2, 1929 5 Sheets-Sheet 1

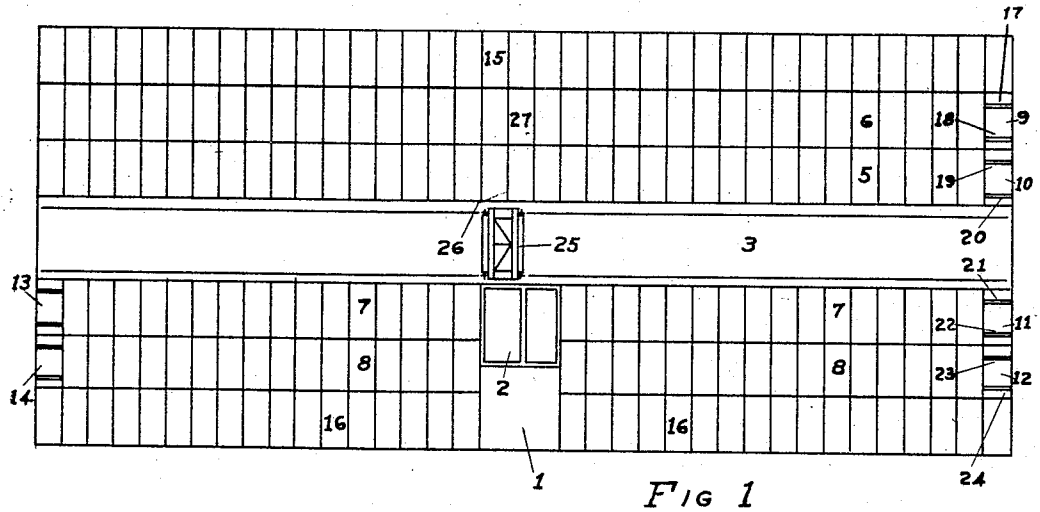

FIG 1

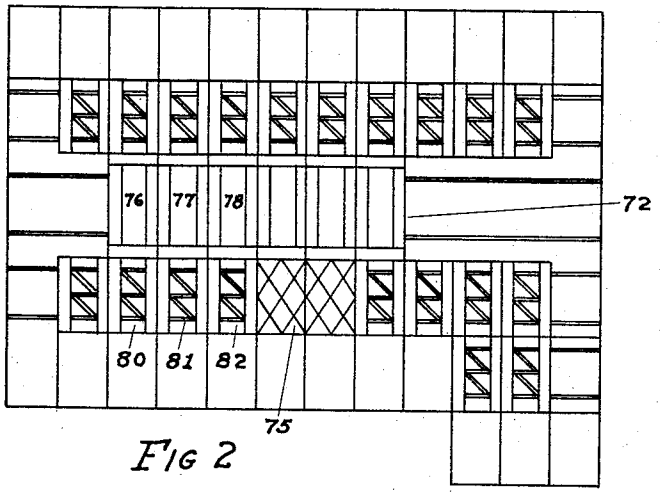

FIG 2

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MEANS OF PARKING CARS IN GARAGES

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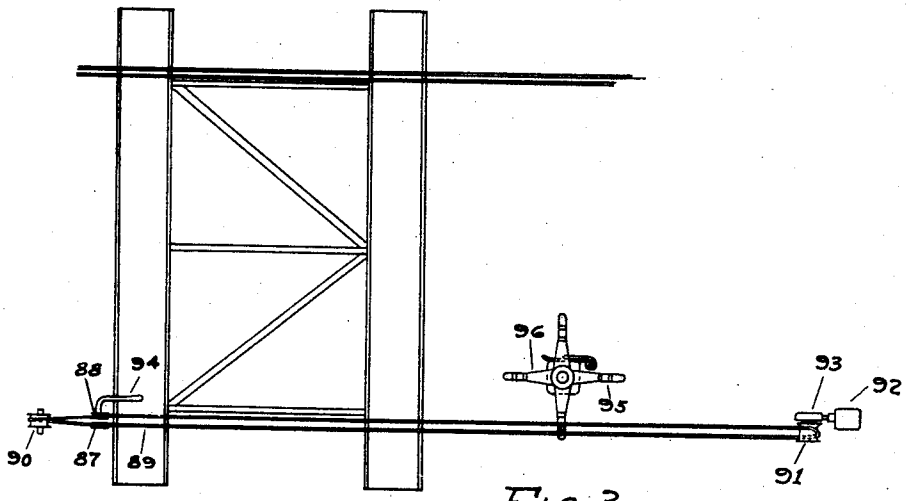


FIG 3

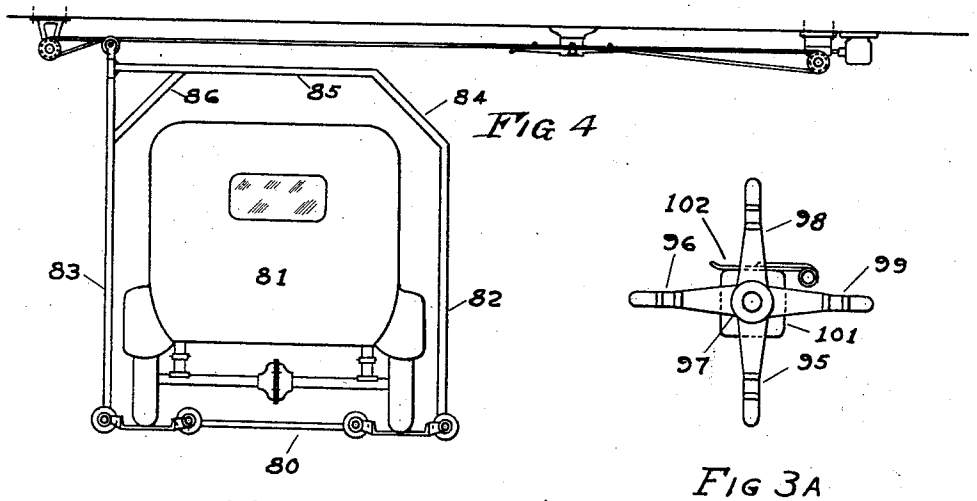
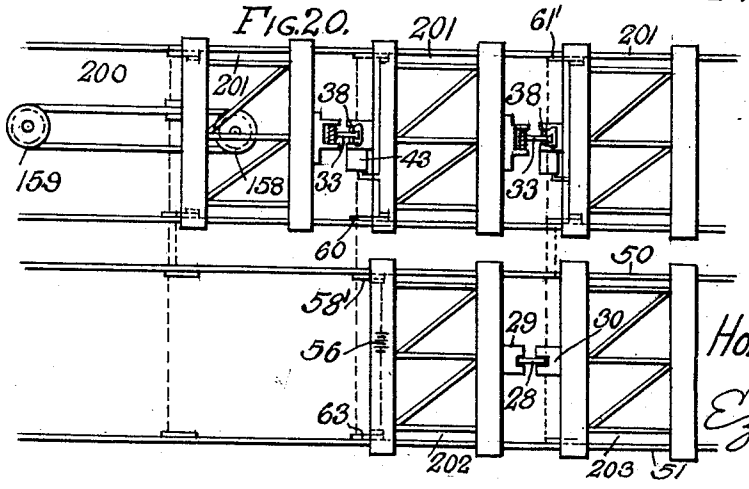


FIG 4

FIG 3A

FIG. 20.



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MEANS OF PARKING CARS IN GARAGES

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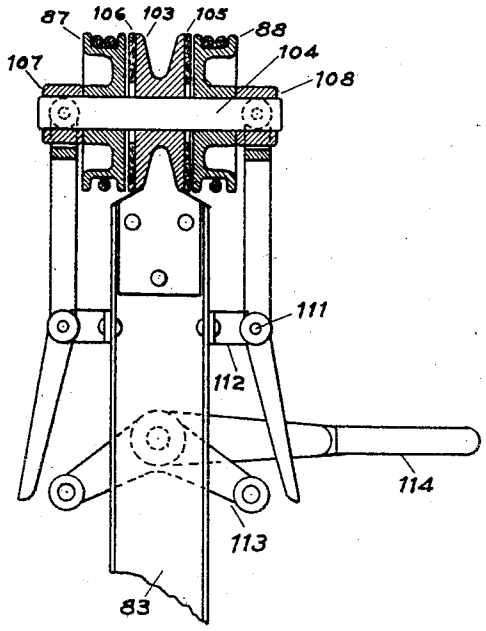

FIG 5

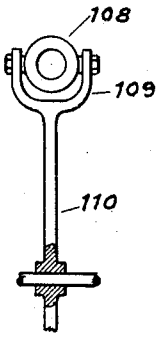

FIG 6

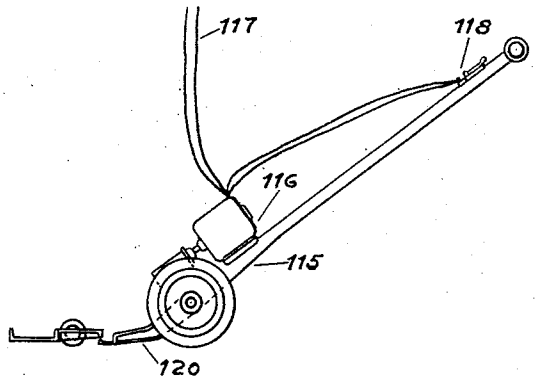

FIG 7

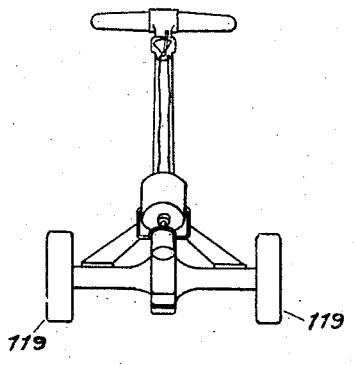

FIG 8

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MEANS OF PARKING CARS IN GARAGES

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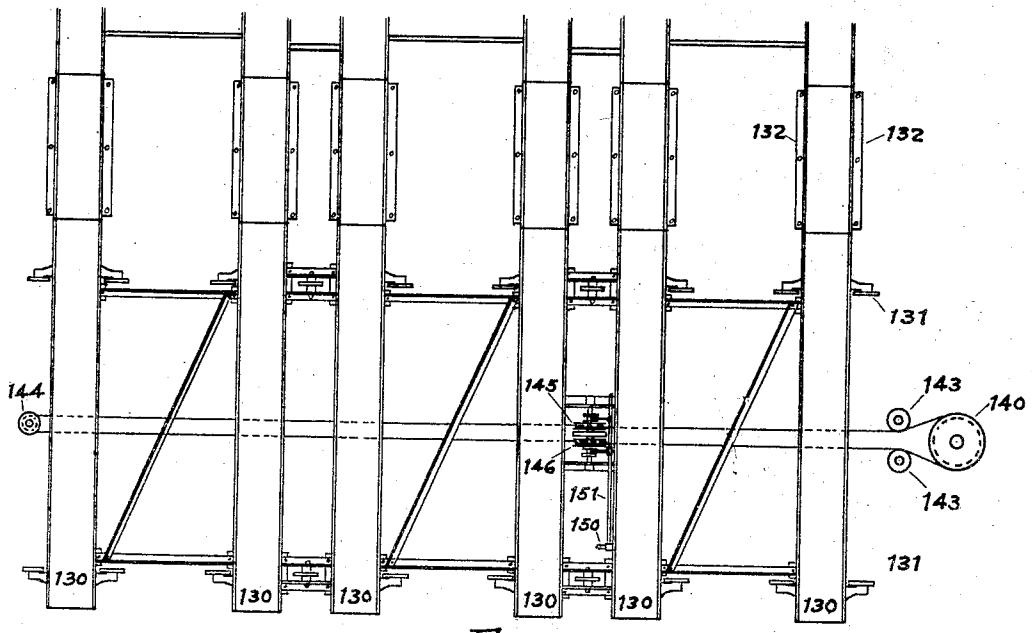

FIG 9

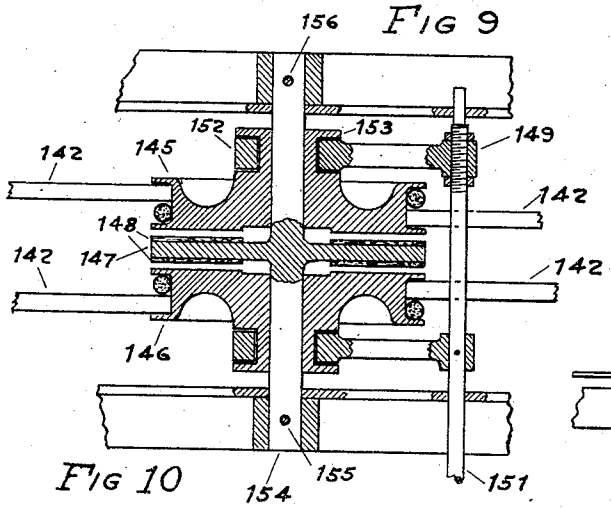

FIG 10

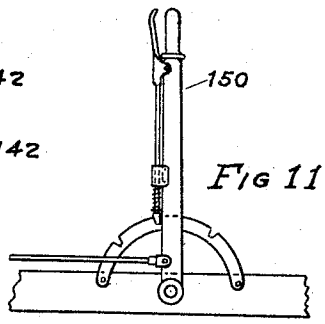

FIG 11

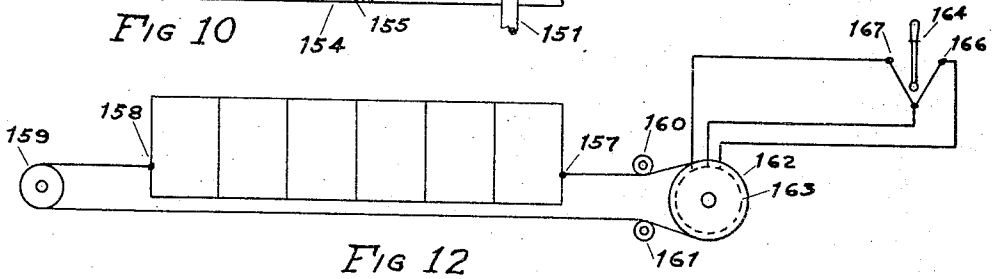

FIG 12

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MEANS OF PARKING CARS IN GARAGES

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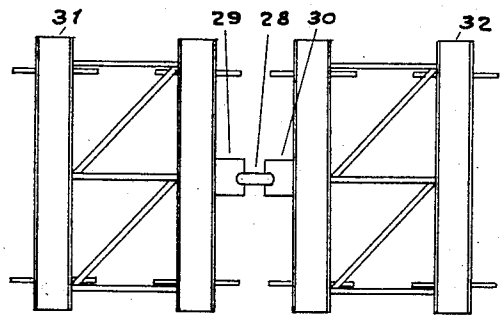

FIG 13

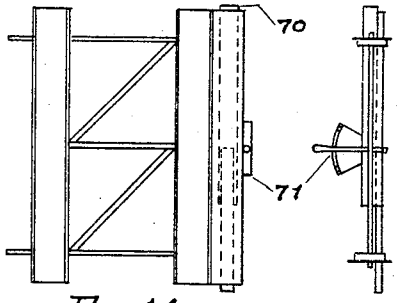

FIG 14

FIG 15

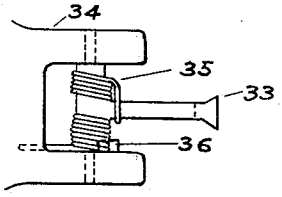

FIG 16

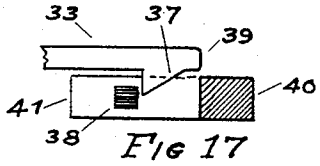

FIG 17

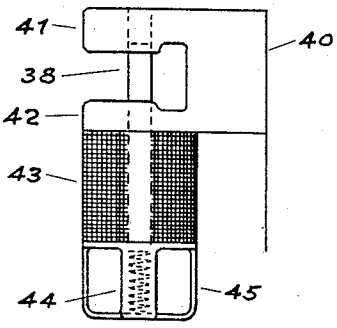

FIG 18

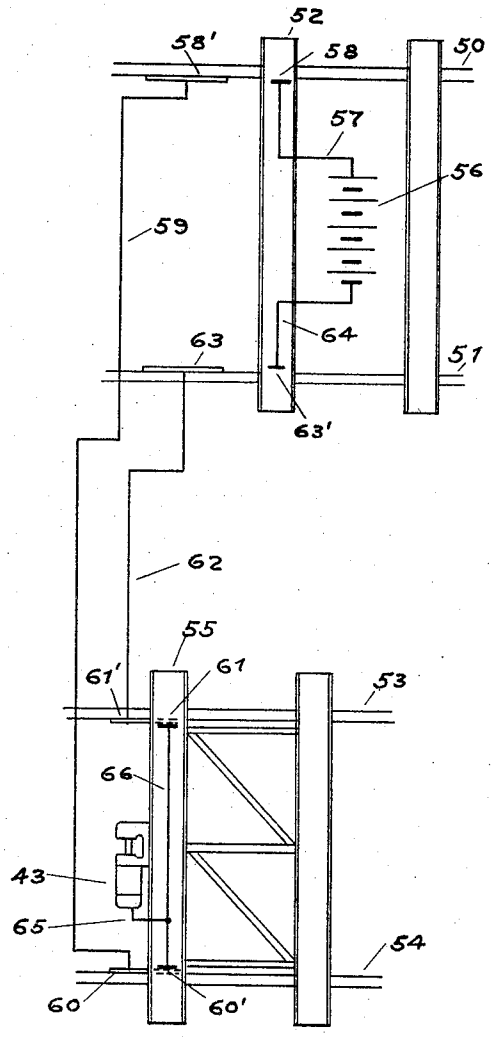

FIG 19

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Patented Nov. 15, 1932 1,887,667

UNITED STATES PATENT OFFICE

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MEANS OF PARKING CARS IN GARAGES

Application filed April 2, 1929. Serial No. 351,853.

The present invention relates to a system of parking cars and to new means and methods of carrying the system into effect.

Whereas in the ordinary method of parking cars in garages or in any parking spaces considerable free space is required to maneuver the cars about and also considerable skill is required, in my new method very little free space is required, no difficult maneuvers necessary and further there is no danger of damage or collision of cars.

In my earlier application, United States patent application, Serial No. 322,024, filed November 26th, 1928, I have disclosed certain new improvements in parking cars along the present line but the invention there relates only to a system in which an aisle is adjacent to a single row of stalls. In the present invention practically the entire space in a garage may be used for parking cars by further improvements in the method, apparatus and system about to be described.

The further advantages of the present invention will be better learned by a consideration of the following description of an embodiment of the invention in connection with the drawings in which:—

Figures 1 and 2 show layouts of the system.

Figures 3, 3*a* and 4 show details of the driving and operating mechanism.

Figures 5 and 6 show details of the operating mechanism.

Figures 7 and 8 show a modification.

Figures 9 and 10 show details of the construction and operating means of the system employing a magazine car.

Figure 11 shows a detail of the operating means.

Figure 12 shows a modification.

Figure 13 shows a detail of the coupling means.

Figures 14 and 15 show a detail of the operating means.

Figures 16, 17, 18 and 19 show details of the electrically controlled coupling system.

Figure 20 shows schematically a preferred embodiment of the invention.

In my earlier application above referred to I provided an aisle with stalls on each side and the transfer cars were moved from the stall to the aisle in taking a car out. This system demanded about one third of the space in a garage for aisles. In my present invention not even this space is demanded for I make the stalls themselves movable to the right or left to make an opening or aisle to take out motor cars directly in back.

As previously each motor car is kept on its own individual transfer car where it is free from injury by collision and can be easily moved about. The cars are movable transversely however either singly or in groups of two or more than two, depending on how many cars need be moved to allow cars in the rear to be brought out. Further in this system there is no need of having transfer cars for the last row. These may be put in stalls one beside the other as it is possible to make an aisle in front of any car to allow it to be brought out.

A further improvement in the present system is found in the arrangement and combination of the system so far briefly described with the magazine transfer car for simultaneously collecting and distributing a number of cars from either side of the permanent aisle to the elevator or elevators or the exit or entrance space. In connection with the system where cars are parked on both sides of the permanent aisle the magazine car is particularly useful to load and unload simultaneously a number of cars.

In Figure 1 is shown a storage system in which there is a center drive and exit 1, or an elevator 2, if the floor plan shown is not the first floor, and a permanent open aisle 3 as it will be called hereafter. Where the space for the garage is so shaped that the permanent open aisle 3 may be placed symmetrically and running the long dimension of the garage this will prove the most serviceable plan as then fewer rows of cars standing before the rear cars need be moved.

The rows marked 5, 6, 7, and 8 are provided with transfer cars except in the end stalls 9, 10, 11, 12, 13, and 14 which are empty so that the whole row may be moved one stall space one way or the other. The back rows 15 and 16 have no transfer cars as it is not

necessary to move the car stored there to the left or right to remove them.

Tracks 17, 18, 19, 20, 21, 22, 23, and 24, are preferably provided so that the transfer cars may be easily moved and in fact any number can easily be moved together.

Means are provided for coupling the cars together such as hooks or a car coupling device as is well known in the art and each transfer car may be coupled to the next car at all times. When it is desired to make an opening to bring a rear car out, the rows in front may be uncoupled at that point and power applied at the end of the train to move the trains to the right or left to make an opening for the rear car to come out. In this manner only the end car need be provided with power or in fact no car need be provided with power, the center car in the permanent aisle having coupling means to push or pull the side rows one way or the other. As shown in Figure 1 the center car 25 may be coupled to the row 5, after the row is uncoupled at the point 26. The car 25 may be then moved to the right and the row 5 will be opened at the point 26 for the car 27 to come out.

The coupling means may be automatic and controlled by switches at the side wall or by the position of the transfer car 25 on the rail. As the transfer car 25 moves to the right or left it may open up the coupling between transfer cars in the adjacent rows and then all that would be necessary to shift the cars is to couple the transfer car 25 to the row at the point of the break of the cars.

Some of the details for accomplishing this are shown in Figures 13, 14, 15, 16, 17, 18 and 19. In Figure 13 is shown a coupling means 28 in the shape of a bar with ends shaped to fit in the pieces 29 and 30 fastened respectively to cars 31 and 32. The coupling bolt 28 may be pivoted in one socket piece 29 or be removable.

Where the coupling and uncoupling are desired to be automatic the means may be constructed and operated as shown in Figures 16, 17, 18, and 19. In Figure 16 the coupling bar 33 is pivoted in forked piece 34 which takes the place of the piece 29. A spring 35 and catch 36 keeps the bar 33 in a substantially horizontal position under spring pressure and as the cars are moved towards one another the latch 37 slips over the cross bar 38 in the adjacent car and the two cars are joined since the end 39 of the latch is also now touching the coupling member 40 on the adjacent car.

The cross bar 38 is movable in the holes in the arms 41 and 42 of the coupling member 40 by means of the solenoid 43 which draws the cross bar 38 back against the spring 44 in the end case 45 when current is supplied to it. The cross bar 38 need only be operated when it is desired to uncouple the cars.

It may be operated as shown in Figure 19. The tracks 50 and 51 are supposed in the center permanently opened row and the transfer car the one operating in that row. Under ordinary conditions the cars are coupled together as shown in Figure 13. It is desired to move the car on the left in Figure 13 one space over, it is never necessary to move it more than one space over. The center row car 52 comes along a track parallel to the tracks 53, 54 in the adjacent row as shown in Figure 19 to a point just opposite the car 55 at which time the circuit through the battery 56 on the car 52 completed to operate the solenoid and draw back the cross bar 38. The circuit is completed through the wire 57 contacts 58 and 58′ wire 59 contact 60 and 60′, wire 65 solenoid 43, wire 66 contact 61 and 61′ wire 62 contact 63 and 63′ and wire 64 back to the battery.

When the two cars are opposite one another the coupling on one side of the car opens and remains that way by virtue of the current in the circuit until the contact has been broken. This is broken by motion of the cars and allows the latch 37 to move sufficiently from the position of the cross bar 38 before the latter again snaps in place. The center car 52 is coupled to the cars in the next row by means of a chain or by an extensible rod 70 as shown in Figures 15 and 14 operated at the side by the hand lever 71. This rod 70 may be extended through two or more transfer cars in adjacent rows if desired and in this manner more than one row may be moved at once.

In the manner above described the center transfer car can control any and all operations necessary to move out or put in any car.

In place of a single transfer car in the center row, the same methods can be applied with very much improved results in most cases to a magazine transfer car as shown in Figure 2. The system may be set up exactly as in Figure 1 with the exception that there is magazine car 72 containing preferably space for more than two cars and any number up to one half the number of cars in the adjacent row. This means allows operation from the adjacent rows to the magazine car and many cars can be deposited and withdrawn from their stalls with only one movement of the car. As employed the magazine car 72 may be moved from the extreme right to the extreme left and in the process, cars may be removed from or put on the elevator 75 and removed from or put on the individual transfer cars.

In the operation of the magazine system the cars may be put on the front row of transfer cars or on the rear row. The rear row opening in this case, is, when automatically controlled, controlled as the end of the magazine transfer car comes opposite the car to be uncoupled, the contacts on the magazine car being at one end of the car. The magazine car 72 comprises a plurality of parallel guides

or channels in which machines can stand side by side. The spacing of the stalls, 76, 77, 78, etc., must coincide exactly with the spacing of the transfer cars 80, 81, 82, etc., so that any one or all of the machines may be transferred from the magazine car to the individual transfer cars without more than one alignment.

Each individual car may be moved by hand, or if the cars are uncoupled at the desired point and coupled together to the very end car, the line may be moved by moving the end car. This is shown in Figure 20. If the system of Figure 19 is adopted as shown in Figure 20, the magazine car uncouples the car opposite to it as it approaches, and in this position an opening may be made in the aisle or rows of transfer cars.

In Figure 20 each parallel row, of which one row 200 is shown, has the individual carriers 201 connected by the latch and bar mechanism shown in Figures 14, 16 and 17. In this Figure 20 the lower open aisle carriers 202 and 203 are joined together by the removable link 28 shown in Figure 13. The system as described in connection with Figure 19 is used in Figure 20 for opening the connection between individual carriers 201 in the row 200. The plates 58′ and 63 are located on the open aisle carrier rails and are energized by the battery 56 on the open aisle carrier 202. Electrical energy is therefore applied to the plates 60 and 61′ and the magnet 43 is operated to withdraw the bar 38 holding the latch arm 33.

In Figures 3 and 4 the transfer cars are shown as driven from above although the drive may be from beneath. The transfer car 80 on which the machine 81 is shown has side brackets 82 and 83 and overhead frame supports 84, 85, and 86. At the top of the frame are supported two pulleys 87 and 88 in horizontal axes. These pulleys have a cable 89 making one turn about them. The cable 89 first passes around one pulley 87 and then over the end pulley 90 then returning over the second pulley 88 and over the pulley 91 at the other end. The pulley 91 is the driving pulley being driven by the motor 92 through the reduction gear 93.

By preventing the pulley 87 or 88 from turning as will be shown afterwards the transfer car 80 may be moved in either direction. When both pulleys 87 and 88 are free the pull in one direction balances the pull in the other direction and the car remains where it is. As the car is carried by the cable, the arm 94 pushes against the supporting arm 95, which flies up as shown in Figure 3 but really in a horizontal plane and the arm 96 comes beneath the cable to support it. This mechanism is shown more in detail in Figure 3*a*. The sprocket 97 carrying the arms 95, 96, 98 and 99 is free to rotate in either direction when the arm 94 comes in contact with it. As the arm 94 pushes the sprocket arm 95 the cam 101 pushes outward the spring 102 which thereby becomes tensioned. When the sprocket has turned just more than 45° the spring begins to push on the cam and snaps it into position with the arm 96 or 99 now underneath the cable depending upon which way the sprocket was turned. In this manner the arm will come beneath the cable to support it before the pulleys on the transfer car have moved far enough to allow the cable to sag. In this manner the pulley can travel back and forth without being interferred with by supports.

The means for locking the pulley as mentioned above is shown in Figures 5 and 6.

In Figure 5 the upright support 83 has an end piece 103 supporting the shaft 104 which does not turn in it. Idling on the shaft 104 are the pulleys 87 and 88. On the face of the piece 103 are mounted leather or other friction discs 105 and 106. At the ends of the shaft 104 are collar members 107, 108 which can be moved in and out on the shaft. These collar members are supported in forked bearing as shown by 109 Figure 6. The lever 110 carrying the forked bearing is pivoted by a pin 111 and bracket bearing 112 fixed to the upright support 83. The lower end of the lever 110 is adapted to be engaged by the cam 113 operated by the hand lever 114. The left side of Figure 5 is constructed exactly as the right. In operating the mechanism when it is desired to lock the roller 88 the arm 114 is raised. The cam 113 comes in contact with the lower part of the lever 110 forcing this outward and the collar 108 inward, bringing the pulley 88 to bear against the leather 105. The pulls are therefore unequal and the transfer car will move. If the car was to be moved in the opposite direction the hand lever 114 should have been thrown downward.

Instead of supplying power in the manner indicated in Figures 3, 4 and 5, a portable mechanism could be used as shown in Figures 7 and 8. Here a portable rolling truck 115 may be supplied with a motor 116 which can have a plug connection 117 and a switch near the handle 118. The truck has a pair of wheels 119, 119, and an arm or holding platform 120 which can be placed under the edge of the transfer car. When the handle 121 is pressed downward the wheels 119 grip the floor and when the motor is turned on, the transfer car can easily be pushed along the floor.

In Figures 9, 10, 11, and 12, is shown a system for operating the magazine car preferably, but any car can be operated in the same manner if desired.

In Figure 9, the magazine car has a plurality of guide channels 130, which are spaced apart to accommodate cars side by side, the same spacing as found in the rows of indi-

vidual transfer cars. These channels are held rigidly together in a frame by the cross rods and irons shown in the figure. The magazine car is also provided with a plurality of wheels 131, adapted to run on tracks perpendicular to the direction of the guide channels.

On the floor aligning with the guide channels are permanently fixed guide channels 132, 132, etc., adapted to guide the cars in their stalls or on the transfer cars as indicated in Figure 9.

The driving means is a pulley system driven by the driving pulley 140. The cable 142 passes between two guides 143, 143, and at the other end around a pulley 144. On the magazine car it passes one turn around each of the pulleys 145, 146 as indicated more clearly in Figure 10.

The magazine car is operated by cable from the hand brake lever 150 on the car. This lever moves the rod 151 longitudinally to bring the pulley 145 or 146 against the locking face plate 147 which is faced with the leather discs 148. For this purpose the rod 151 carries an adjustable cross rod 149 which carries the collar 152 fitting in a groove in the pulley collar 153. The movement of the rod 151 moves positively the pulleys in or out of engagement with the face plate 147. The rod 154 carrying the face plate 147 is fixed by pins 155, and 156 and does not rotate.

Instead of moving the magazine transfer in this way, the magazine car may have one end of the cable fixed at one end of the car as shown in Figure 12 at 157 and the other end of the cable fixed at 158. At one end of its travel the cable will pass around a pulley 159 and at the other end within guide pulleys 160 and 161 around the driving pulley 162. The motor 163 for driving the pulley 162 must in this case be a reversible motor and for this purpose a reversible switch 164 is provided to connect for forward drive 167 or backward drive 166.

Having now described my invention, I claim:—

1. In a system for storing vehicles, having individual transfer cars, and a center aisle car, means for operating the coupling between adjacent cars by the position of the center aisle car, comprising a latch member positioned on one car and a holding element in the adjoining car, said latch member normally engaging said holding element, and means to withdraw said holding element for the short interval in which said adjacent cars are separated, said means being operated by the movement of said center aisle car through a given position.

2. A system for storing vehicles on a floor comprising an open aisle, a plurality of movable individual carriers located therein, means for linking said carriers together, adjacent parallel rows having a plurality of individual carriers and means operated by the position of the open aisle carrier for separating the adjacent parallel rows.

3. A system for storing vehicles on a floor comprising an open aisle, a plurality of movable individual carriers located therein, means for linking said carriers together, adjacent parallel rows having a plurality of individual carriers and means operated automatically by the position of the open aisle carrier for separating the adjacent parallel rows opposite the position of the open aisle carrier.

4. A system for storing vehicles on a floor comprising an open aisle, a plurality of movable individual carriers located therein, means for linking said carriers together, adjacent parallel rows having a plurality of individual carriers, and means operated automatically by the position of the open aisle carrier for separating the adjacent parallel rows opposite the position of the open aisle carrier including a latch positioned on one carrier and a movable bar on the other carrier and means electrically operating said bar controlled by the position of the carrier.

5. A system for storing vehicles on a floor comprising an open aisle carrier, a plurality of movable individual carriers located therein, adjacent parallel rows having a plurality of individual carriers, means located at the end of the rows for moving said row of carriers from the end carrier and means operated automatically by the position of the open aisle carrier for separating the adjacent parallel rows opposite the postion of the open aisle carrier.

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