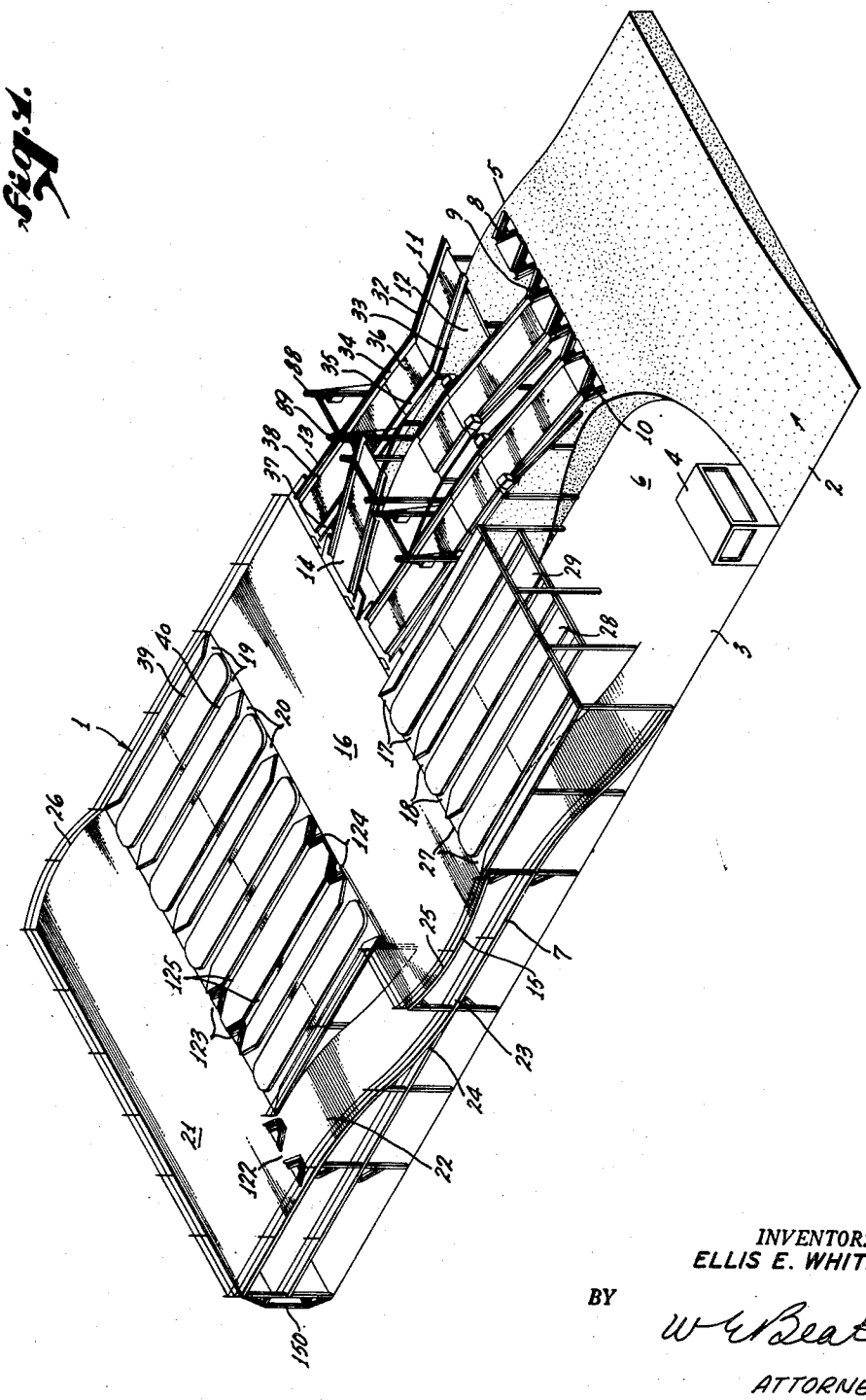
Jan. 11, 1955 E. S. WHITE 2,698,974

MULTIDECK PARKING RACK

Filed July 3, 1948 7 Sheets-Sheet 1

Fig. 1.



INVENTOR:
ELLIS E. WHITE

BY

W. H. Beatty

ATTORNEY.

Jan. 11, 1955 E. S. WHITE 2,698,974

MULTIDECK PARKING RACK

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Fig. 2.

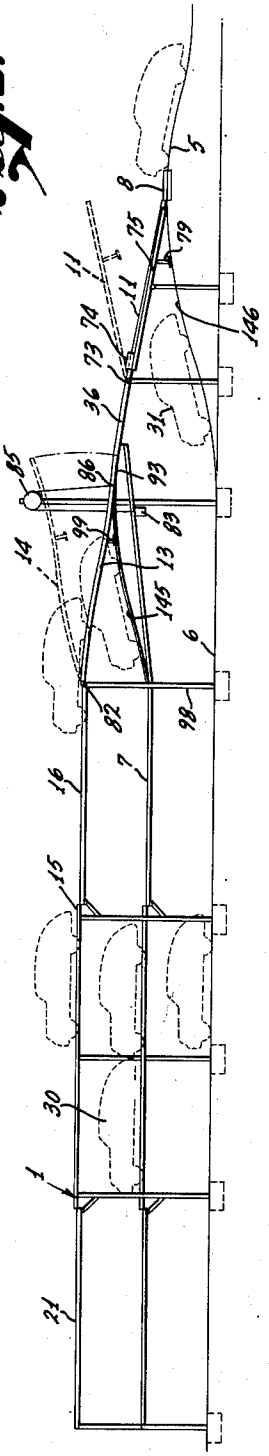


Fig. 3.

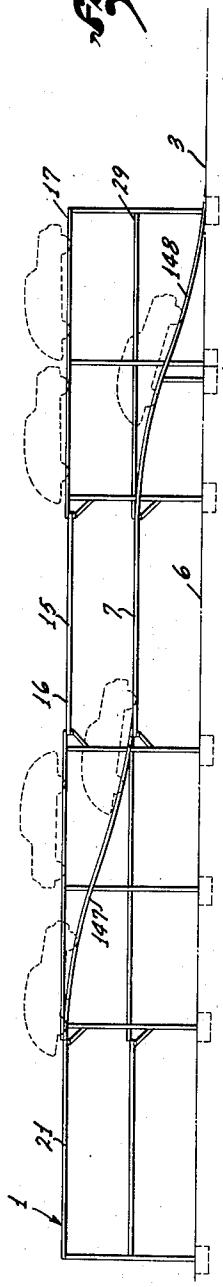


Fig. 7.

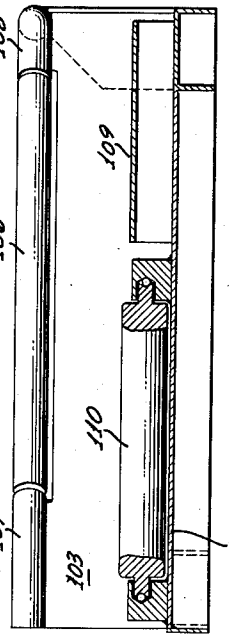
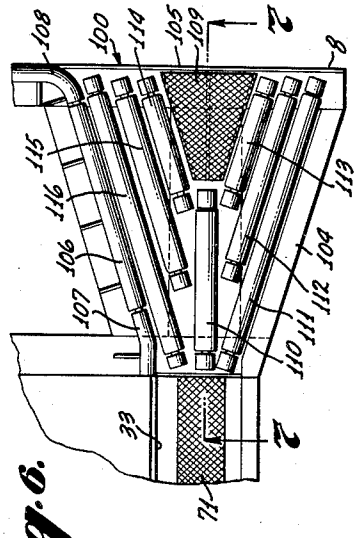


Fig. 6.



INVENTOR:
ELLIS E. WHITE

BY

W. E. Beatty

ATTORNEY.

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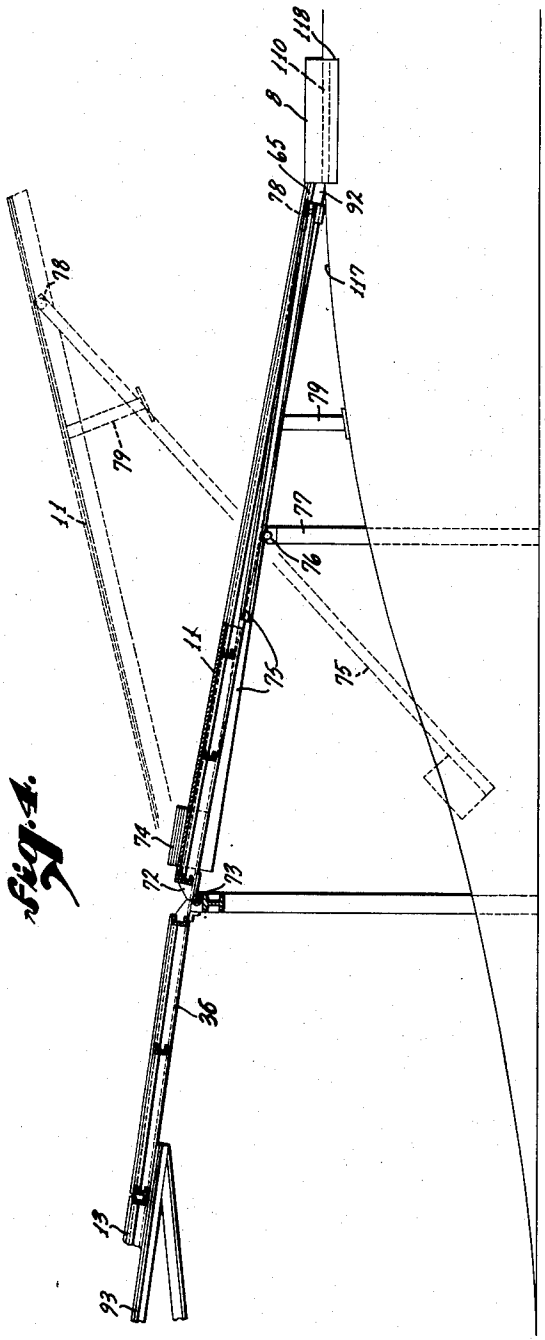


Fig. 4.

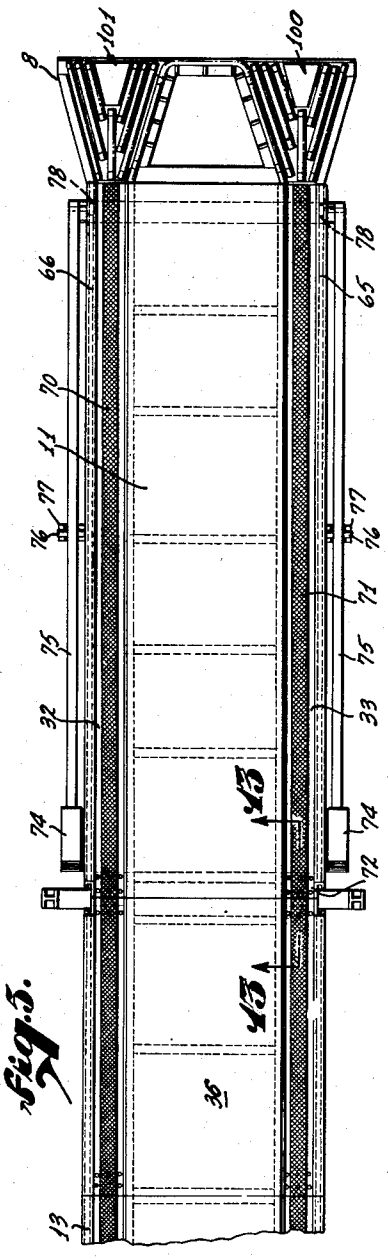


Fig. 5.

INVENTOR:
ELLIS E. WHITE

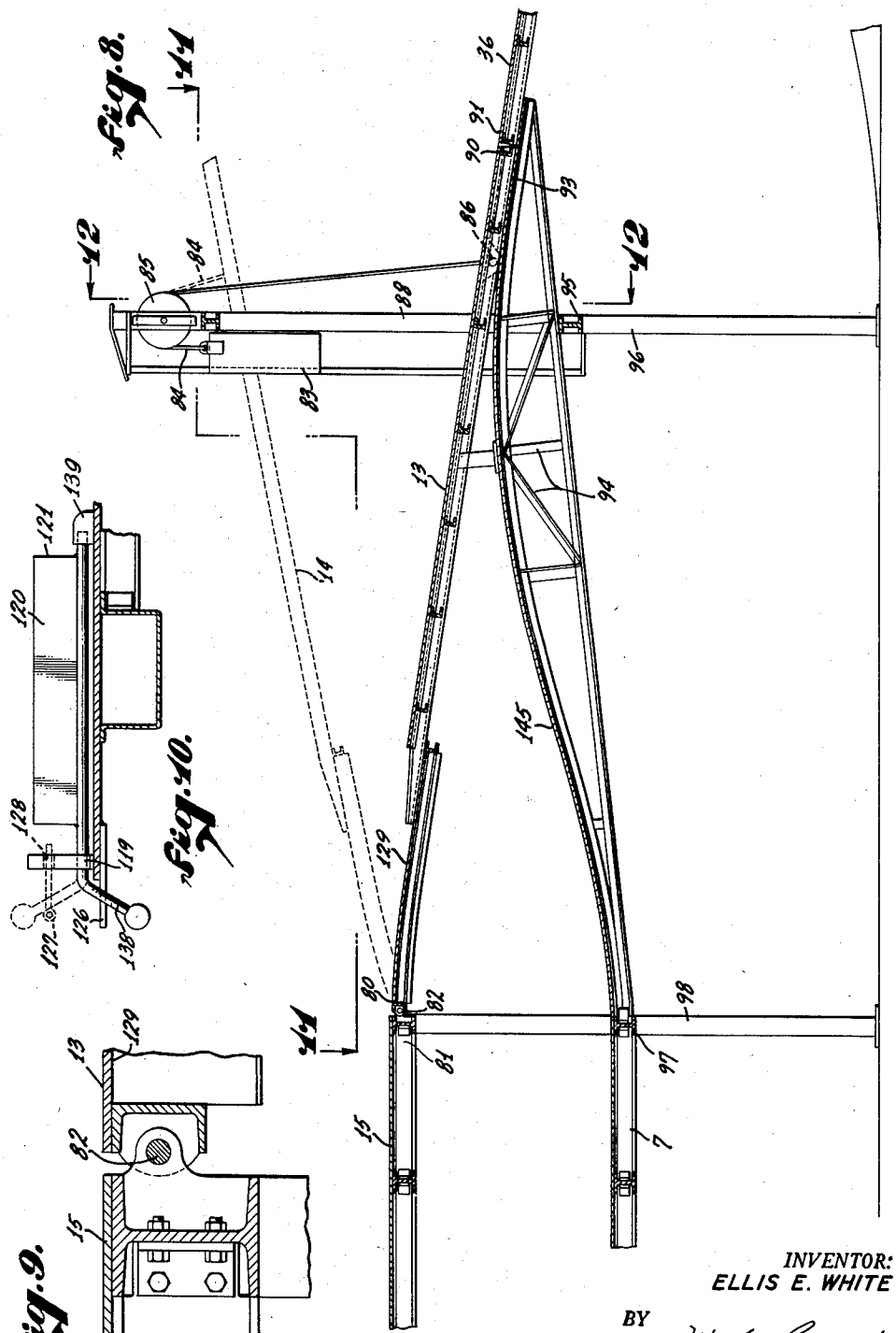
BY W. H. Beatty

ATTORNEY.

Jan. 11, 1955 E. S. WHITE 2,698,974

MULTIDECK PARKING RACK

Filed July 3, 1948 7 Sheets-Sheet 4



INVENTOR:
ELLIS E. WHITE

BY W. E. Beatty

ATTORNEY.

Jan. 11, 1955 E. S. WHITE 2,698,974

MULTIDECK PARKING RACK

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Fig. 11.

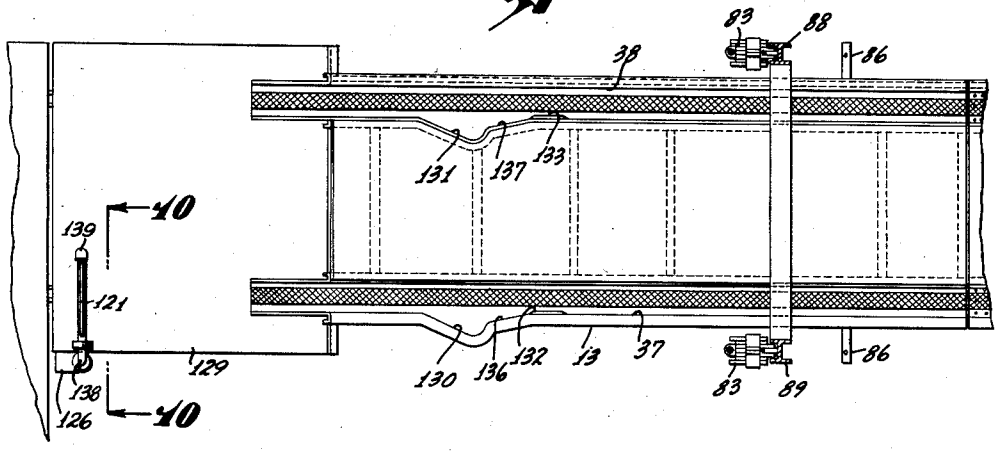


Fig. 12.

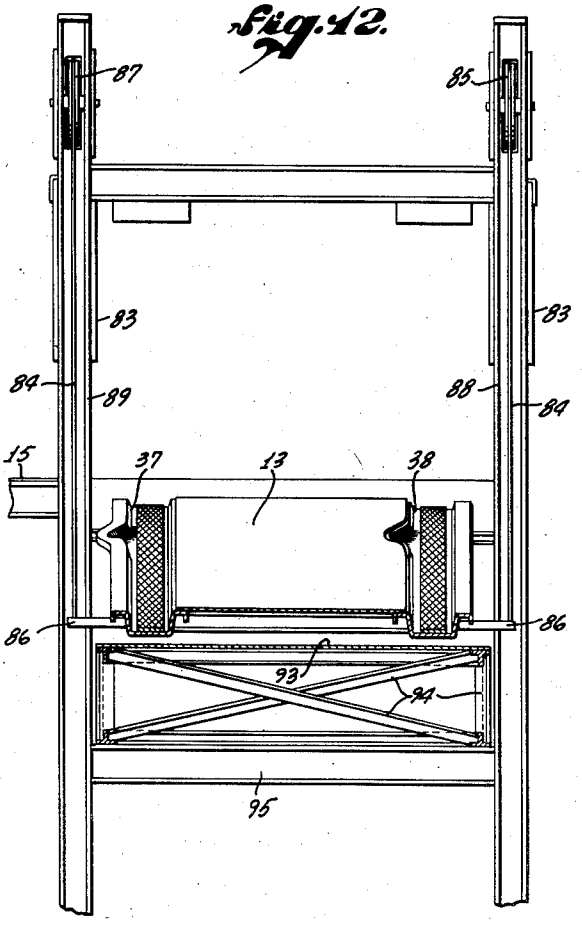
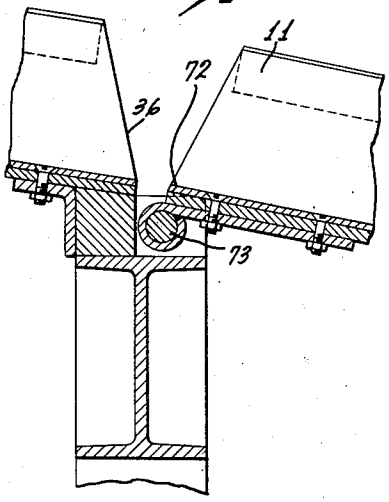


Fig. 13.



INVENTOR:
ELLIS E. WHITE

BY W. E. Beatty

ATTORNEY.

Jan. 11, 1955 E. S. WHITE 2,698,974

MULTIDECK PARKING RACK

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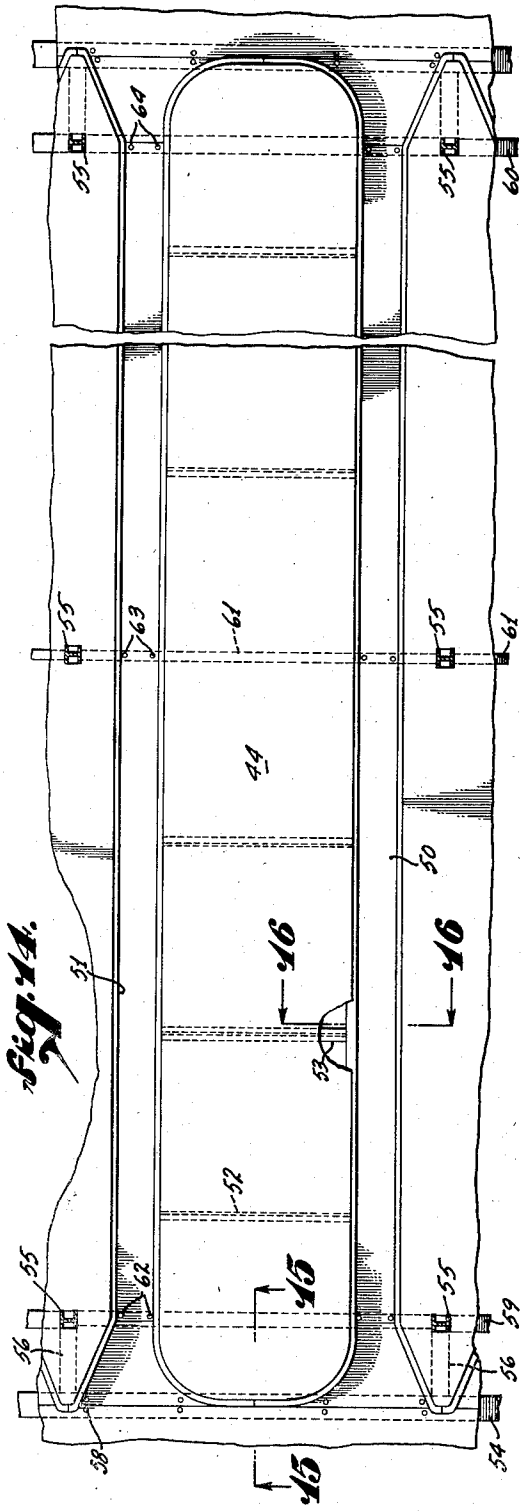


Fig. 14.

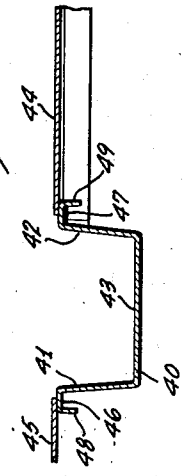


Fig. 16.

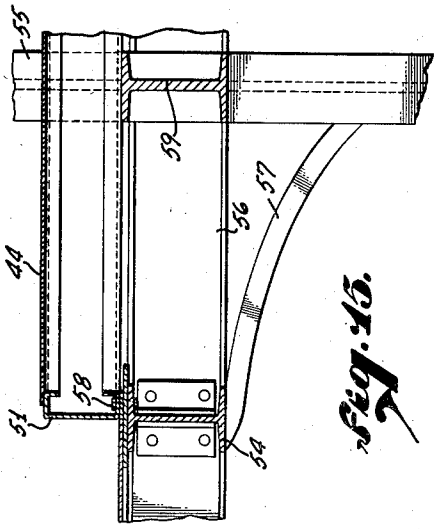


Fig. 15.

INVENTOR:
ELLIS E. WHITE

BY W. E. Beatty

ATTORNEY.

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MULTIDECK PARKING RACK

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Fig. 17.

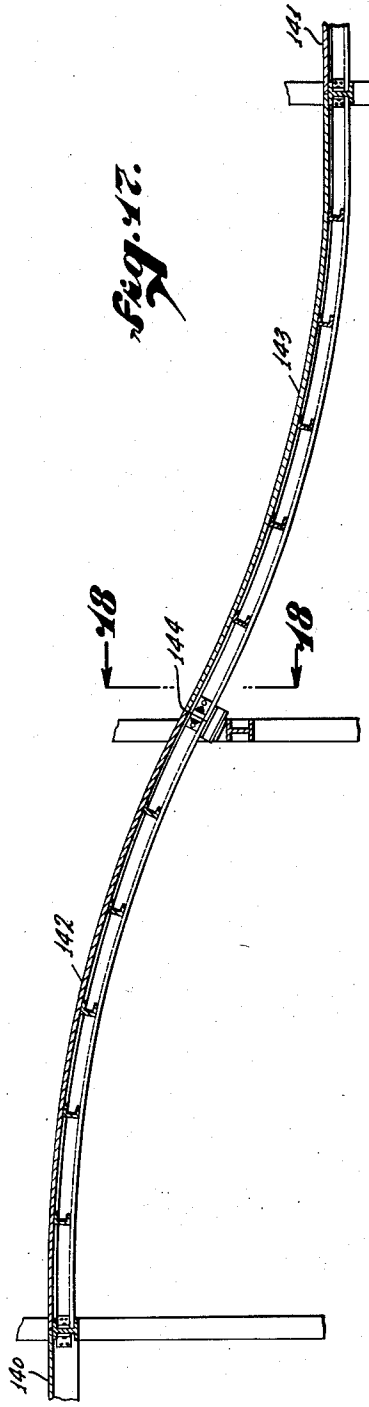


Fig. 19.

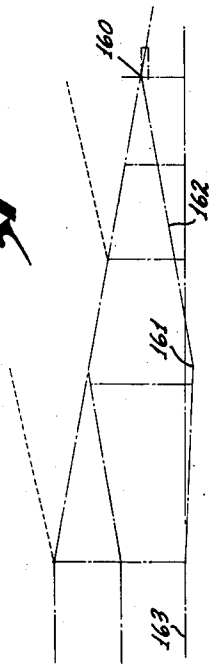
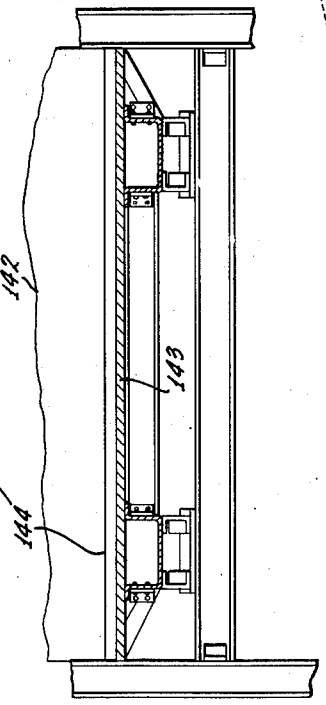


Fig. 18.



INVENTOR:
ELLIS E. WHITE

BY W E Beatty

ATTORNEY.

United States Patent Office 2,698,974 Patented Jan. 11, 1955

2,698,974

MULTIDECK PARKING RACK

Ellis E. White, Beverly Hills, Calif., assignor to Multi-Deck Parking, Inc., a corporation of California

Application July 3, 1948, Serial No. 38,689

10 Claims. (Cl. 20—1.13)

The invention relates to a multi-deck parking rack for automobiles or the like and has for an object to provide an improved economical structure.

Some things which are in common use, but not economical are the provision for an upper story or deck for parking cars wherein the cars can move at random. This random ability is wasteful of space, dangerous to fenders, and not conductive to economy for the reason that the floor throughout must be made strong enough to support the full weight of the car or cars.

Another item which is not conducive to economy, particularly economy of space, is the use of a fixed ramp leading to an upper deck. The reason for this lack of economy is that a certain amount of clearance such as seven or eight inches must be provided for the crank case or undercarriage of the car and this necessitates a gradual slope for the upper end of the incline. This great length of incline is also necessary in the conventional arrangement, in order to prevent the front bumper from striking the lower level and the rear bumper from striking the incline when descending, and to prevent the front bumper from striking the incline and the rear bumper from striking the lower level when ascending. Also the fixed ramp blocks the lower level.

A third conventional item which is not conducive to economy of spacing is the necessity for an entrance aisle large enough to permit the car to turn and approach the parking space in a direct line so that the cars can be parked substantially parallel to each other.

More particularly, it is an object of the present invention to overcome or reduce the three uneconomical features referred to above and to provide multi-rack parking structure which is less expensive to build and wherein more cars can be parked in a given space than heretofore.

Generally speaking, the invention comprises the following features, separately, and in combination. (1) U-channels are provided to form a metal way, or track, and parking space for the car, the channels having elevated sides to guide the wheels along the channel, thereby reducing the over-all structural strength which must be provided, as at this part of the structure the car cannot have random movement but is confined to the metal way. (2) An elevated or multi-story parking structure is provided wherein such U-channels serve as cross-supports for the framework. (3) A cross aisle serves a plurality of parallel metal ways for flexibility in parking and removing cars, and a ramp which may be a fixed conventional ramp or an improved shorter ramp according to the present invention is provided for an exit. (4) A bascule bridge or tilt ramp gives choice of entrance to either an upper level or a lower level, as opposed to a fixed ramp which only gives access to the upper level and blocks off the lower level. (5) A movable ramp is provided whereby the car may have access either into a lower level or an upper level, the entrance path to the ramp being elevated to a position intermediate the height of the lower level and the upper level. This feature contributes to a movable ramp which is shorter than would otherwise be possible in reaching from such intermediate elevation to the upper level. (6) The invention provides an incline having a shorter length than heretofore, the reduction may be as much as fifty percent, with a clearance of 7 or 8 inches in 12 feet to avoid bumping the crankcase or fenders. This is accomplished by arching the upper half of the incline upwardly and arching the lower half downwardly, with respect to a plane through the ends of the incline. (7) The bascule bridge preferably has a

curvature conforming to the incline curvature referred to above. (8) An improved wheel guide is provided for directing the wheels of the car into the U-channel track, by reducing lateral friction of wheel alignment with the track while maintaining forward traction. (9) A wheel guide or a parking rack is adapted to serve a plurality of different floor levels by associating with the guide one or more tilt ramps which give a choice as to the various levels. (10) A garage floor is provided for efficient and close parking of a plurality of parallel lines of cars wherein the major portion of the floor is of light weight material insufficient to support the weight of the car while only a minor portion of the floor has a high load bearing ability for guiding and supporting the cars to the parking lanes.

The invention provides a multi-deck parking framework which can be prefabricated to save erection time. Also it is portable, salvageable, and has interchangeable units.

The invention comprises a number of other improvements and modifications referred to hereafter.

For further details of the invention reference may be made to the drawings wherein

Fig. 1 is a perspective schematic diagram of the multi-deck parking rack according to the present invention.

Fig. 2 is a schematic view of the approach ramp in side elevation.

Fig. 3 is a schematic diagram of the exit ramp in elevation.

Fig. 4 is an enlarged sectional view of a lower portion of the approach ramp.

Fig. 5 is a plan view of a lower portion of the approach ramp.

Fig. 6 is a plan view of the wheel guide.

Fig. 7 is an enlarged sectional view on line **7—7** of Fig. 6.

Fig. 8 is a vertical sectional view of the upper portion of the approach ramp.

Fig. 9 is an enlarged vertical sectional view of the hinge member at the inner end of the upper ramp.

Fig. 10 is an enlarged vertical sectional view on line **10—10** of Fig. 11.

Fig. 11 is a plan view, partly in section, on line **11—11** of Fig. 8.

Fig. 12 is an enlarged vertical sectional view on line **12—12** of Fig. 8.

Fig. 13 is an enlarged vertical sectional view of the hinge detail at the inner end of the lower ramp on line **13—13** of Fig. 5, with parts broken away.

Fig. 14 is a plan view of a typical parking space, with parts broken away.

Fig. 15 is an enlarged sectional view on line **15—15** of Fig. 14.

Fig. 16 is an enlarged sectional view on line **16—16** of Fig. 14.

Fig. 17 is an enlarged vertical sectional view of the exit ramp from one deck to a lower deck, with parts broken away.

Fig. 18 is an enlarged sectional view on line **18—18** of Fig. 17.

Fig. 19 is a schematic diagram of a modified form of the approach ramp.

All views which are taken on lines are looking in the direction of the respective arrows.

Referring in detail to the drawings, the multi-deck parking rack **1** in Fig. 1 is given as a typical example, although the space relation of the entrance, exit, and parking facilities may be varied in a number of ways, depending partly upon whether the entrance **2** and the exit **3** are to be served by one office **4**, or whether the exit is to be arranged at an alley or side street, and depending further upon how many decks are to be employed and the general arrangement of the ramps and parking facilities. With particular regard to the example shown in Fig. 1, the entrance **2** for automobiles is elevated as indicated at **5**, to a height intermediate the height of the ground level indicated at **6** and a first deck **7**. This is also illustrated in Fig. 2 wherein the approach **5** is also shown as being elevated to a position intermediate the ground level **6** and the first deck **7**. At the approach **5** is a relatively fixed wheel guide **8**, a similar wheel

guide 9 and 10 being provided for the adjoining lanes, to line up the wheels so that the car is directly in alignment with the path into the parking structure. If it is desired to park a car on the ground floor 6, the inclined ramp 11 here illustrated as a bascule type bridge is moved by the operator to the elevated position shown in Fig. 1 whereupon a car not shown can take the decline 12 to the ground floor.

Ramp 11 has fixed thereto a leg or strut 79, see Fig. 4, and ramp 13 has a similar strut 99, see Fig. 2. If the ground floor is full of cars, the ramp 11 is lowered into juxtaposition with the wheel guide 8 which then serves to guide the car into alignment with the ramp 11 whereupon there are still two choices for parking, namely, an additional inclined ramp 13, a similar one being shown in elevated position at 14, makes it possible to park the car on the deck 7 when the ramp 14 is up, or park the car on the top deck 15 when the ramp like 14 is down.

Adjacent the top ends of the lanes provided by the upper ramps 13, 14 etc. is a cross aisle 16 where the cars can move at random, for example, to park in the parking lanes like 17, 18, etc. at the side of the approach ramps like 11 and 13, or such cars can proceed across the aisle 16 and park in the opposite parking lanes like 19 and 20. At the opposite ends of the parking lanes like 19 and 20 is an additional cross aisle 21 which has a fixed ramp 22 which has a portion 23 at the level of the deck 7 for the exit of any cars leaving that deck, the ramp 22 continuing to the ground level at the exit 3.

The parking lanes like 17, 18, 19, 20 and the cross aisles like 16 and 21 are also provided on the first deck 7.

The deck extensions 25, 26 are typical, so that a car can make a turn and pull straight into the end lane like 19 or 27.

The front end 28 of the bays 17, 18 and the bays 29 therebelow may be extended in line with the front end of the ramps like 11, with the lines of wheel guides like 8 to 10 extended in front thereof to serve the ground floor.

It will be noted that the upper portion of the ramp 22 where it conjoins with the deck 7 is dead end as indicated at 24 which restricts the parking and handling of cars, whereas such dead end is avoided in the approach lanes by use of the movable ramps like 11 and 13; hence, a car can move forward to the far end of its parking space as indicated at 30 in Fig. 2, and can move forward out of its parking lane, whereas a car like 31 can be parked under ramp 11 on the approach leading into the ground level 6.

On the ramps like 11 and 13 and in the parking spaces like 17 to 20, the car is confined to move in one of several parallel paths, each comprising a metal way preferably having parallel U-channels for the car. In Fig. 1, these U-channels are indicated at 32 and 33 for ramp 11; 34 and 35 for the fixed ramp 36; 37 and 38 for the tilt ramp 13; and at 39 and 40 for the parking lane 19. The U-channels like 39 and 40 for the various parallel parking lanes like 17 to 20 form cross supports for the multi-deck structure.

The U-channels like 32 and 33 and all similar channels referred to above, as shown in Fig. 16, have upright sides like 41, 42 about 5 inches high to guide the wheel and prevent the wheels from riding off the top of the flange, the wheels resting on the bottom 43 of the upwardly facing U-channel. The sides 41, 42 have outwardly extending flanges 46, 47 which are turned down as shown at 48, 49 or turned in at an angle to strengthen the channel, all U-channel tracks having this feature. Between adjacent U-channels is provided a metal sheeting, such as 44, to catch the drip from the car, this sheeting being strong enough to support the weight of the average person but not strong enough to support the weight of the car. At the outside of such channels is a metal sheeting 45 to serve as a walk for the operator.

In the parking area provided by the lanes like 17 to 20, the U-channels have high load bearing ability as required to support the weight of the cars. The area of such U-channels is minor in comparison to the whole parking space provided by the lanes, while a major portion of such area is covered by light metal sheeting such as drip sheets 44, see Fig. 16, and walks 45, the sheets like 44 and 45 being strong enough to support the weight of an average person, but not strong enough to support the weight of the car. This leads to economy in the size of the columns and beams required for the multi-deck structure.

The illustration in Fig. 14 is for a typical parking lane and the U-channels 50 and 51 between their adjacent sides are cross-braced by U-channels on edge, as indicated at 52, 53, the channels thus braced being supported by I-beams like 54 in Fig. 15, wherein the column 55 is set back so as to give more latitude in turning the car into and out of a parking lane. The columns like 55 have curved knee braces like 57 which support deck beam extensions like 56 which are bolted to stringer I-beams like 54 and channels 50, 51 rest on stringer 54 and are fastened thereto viz. by bolts 58. Also channels 50, 51 are supported near their ends by cross beams 59 and 60 and at its middle by cross beam 61, being secured thereto viz. by bolts indicated at 62, 63, 64, the curvature of the tire overlying the bolt heads at the corner of the channel. The spacing of the channels 50, 51 is adjustable as the position of the various bolts 58, 62 can be changed. The various sections are likewise interchangeable as the whole metal structure 1 is held by removable bolts and nuts.

All such U-channels which are inclined at the ramps like 11, 13 and 36, preferably have at the bottom thereof a checker plate, as indicated at 70 and 71 in Fig. 5, to insure traction.

As shown in Fig. 4, the upper end 72 of the lower ramp 11 is connected by a hinge 73 to the rear end of the fixed ramp section 36. The weight of ramp 11 is counterbalanced by a pair of weights like 74 carried by a pair of arms like 75 each having a trunnion support like 76 on a post 77. The outer end of each arm like 75 has a roller like 78 under the outside flange 65, 66 of the U-channels 32, 33. The lower end of ramp 11, when in its lower position shown in full lines in Fig. 4 is suitably locked in its down position in alignment with wheel guide 8, by a lock or catch not shown. The operator removes the catch and the ramp moves to elevated position as it is overbalanced, when it is desired for the car to enter underneath the ramp 11 to park on the lower level. When it is desired to park the car on an upper level, the operator pulls the ramp 11 down, locks it or catches it in the full line position shown in Fig. 4, whereupon the car can pass over the ramp 11 to the upper level. When ramp 11 is in its lower position, the lower end 92 of the ramp is supported on the ground on the downgrade 117, and wheel guide 8 is sunk into the ground as indicated at 118 so that its rollers 110 to 116 (see Figs. 2, 4, 6 and 8) will be only slightly above the contour of the grade 117.

The ramp 13, as shown in Fig. 8, is also in the form of a bascule bridge in having its upper end 80 connected to the outer end 81 of the deck 15 by a hinge 82 while its weight is counterbalanced by a pair of weights 83 each connected to a cord 84 which passes over a pulley 85, the other end of the cord being connected to the ramp, as indicated at 86. The pulley 85 and companion pulley 87, as shown in Fig. 12, are carried by suitable posts 88, 89. When the ramp 13 is in lower position shown in full lines in Fig. 8, its lower end 90 is in alignment with the upper end 91 of the fixed ramp 36. The upper end of ramp 36 is supported by an arch metal roadway 93 (see Figs. 2 and 8) which serves also to support the outer end 91 of ramp 13 when in its lower position. The roadway 93 comprises a flat floor plate and it is suitably cross braced as indicated at 94 and carried by an I-beam like 95 on columns like 96, the other end of the roadway section 93 being similarly supported by I-beams and columns as indicated at 97 and 98.

As shown in Fig. 13, the ends of the U-channels at the lower end of the ramp section 36 and at the upper end of the ramp 11 are cut away or tapered in order to permit movement of the ramp 11 about the hinge 73.

As shown in Fig. 5, the wheel guide 8 comprises a converging guide 100 for the U-channel 33 and a similar converging wheel guide 101 for the companion channel 32. Both of these guides are alike and the one indicated at 100 will be described in connection with Figs. 6 and 7, wherein the bed-plate 102 of the guide carries an elevated flange 103 having a height substantially the same as the height of the side of its U-channel 33. Flange 103 has a cooperating similar flange 104, these two flanges having a wide entrance 105 and converging to the same distance apart as the width of the U-channel 33 to guide the wheel into the U-channel. The top of flange 103 has an elongated roller 106 mounted between fixed rounded sections 107 and 108 to avoid damage to the

tire if it should strike these elements. On the bed **102** is arranged a triangular traction plate **109** in line with the center line of the channel **33** and, also on that center line and between the plate **109** and the channel, is a cylindrical roller **110** and on which the car wheel rides. Between the roller **110** and the flange **104** are arranged a plurality of other cylindrical rollers **111**, **112** and **113** carried by the bed-plate **102**. A cylindrical array of rollers **114**, **115**, **116** is arranged at the other side of traction plate **109**. The rollers **111** to **116** have their axes inclined in the general direction of the path leading into the channel so that a wheel riding on such rollers and approaching the center line of channel **38** at an angle is guided into alignment with the channel **33**. The rollers are so arranged as to reduce the lateral friction of the wheel away from the flanges **104** and **103** while providing traction for the wheel in the direction of roller axes leading into the channel, such traction being increased by reason of the traction plate **109** which provides traction at the entrance to the guide when the wheel is substantially in alignment with the channel. It has been found by actual test that a cylindrical roller lengthwise or substantially lengthwise of its axis has sufficient traction for the purpose.

An aligning rack like **8** may be employed as indicated at **122** at the entrance to the ramp **22**, see Fig. 1. Also similar aligning racks, as indicated at **123** and **124**, may be employed at opposite ends of one of the lanes **125** so that it can be used as a through lane connecting the aisles **16** and **21**.

The elevated guard roller **106** has been illustrated only on flange **103** at the right of the wheel guide, on the assumption that a car would approach from the left, although a similar guard may be provided for the flange **104** if the cars are to approach from a position at the right, or from either direction.

If desired, a safeguard may be employed to prevent a car from rolling unattended down one of the ramps. As shown in Figs. 10 and 11, this safeguard may take the form of a pivoted catch **120** having a gate **121** in the path of the wheels at one side of the car. The gate **121** has a hinge support **119**, **139** mounted on floor plate **129** and an arm **138** which strikes a stop **126** to prevent the gate from moving clockwise while permitting a car climbing the incline to force the gate **121** down in a counter-clockwise direction and ride over it. If it is desired to drive down the incline, the gate **121** can be locked in its down position, by means of a pin **127** and a lock aperture **128** on the hinge support **119**.

Also as a safeguard to prevent a car from rolling down an incline, when parked thereon, the sides of the U-channel may be laterally displaced to provide pockets **130** and **131** as shown in Fig. 11, to receive and hold the front wheels of the car while permitting the car to proceed in a forward direction. On the downhill side of each pocket **130**, **131** is a pad **132**, **133** to crowd the wheels away so they will not strike the corners **134**, **135** when ascending. The downhill end of each pocket is tapered as shown at **136**, **137** to guide the wheels out of the pockets when descending.

Calculation to scale has shown that the improved form of arcuate roadway, as illustrated in Fig. 17 makes it possible to reduce the length of an incline by as much as 50%, while providing the necessary clearance to avoid bumping the undercarriage or bumpers as above explained. In Fig. 17, the deck **140** represents an upper level while the deck **141** represents the next lower level and if, for reference purposes, a plane is passed through the opposed ends of these decks, it will be noted that the upper half portion **142** of the incline arches upwardly away from such plane, while the lower half portion **143** arches downwardly from such plane. The sections **142** and **143** of course join or merge together at their lower and upper ends respectively as indicated at **144** and the upper end of section **142** merges with the deck **140** while the lower end of section **143** merges with the deck **141**. The contour illustrated in Fig. 17 is also preferably employed as indicated at **145** for the approach to the first level deck **7**, for the approach **146** to the ground level **6** as shown in Fig. 2, and for the incline **147** from the upper deck **15** to the first deck **7**, and from the deck **7** to the ground as indicated at **148**, the inclines **147** and **148** being fixed ramps as above described. Also if desired, the ramps like **11** and **14** may conform to the curvature shown in Fig. 17.

If the parking lot is large enough, the ramps like **147** and **148**, as well as the tilt ramps like **11** and **14** may be straight.

The sections **142** and **143** in Fig. 17 are substantially arcs of a circle having a radius of about 37 feet.

If desired the U-channels, referring to Fig. 16, may have sloping sides instead of straight sides **41**, **42** so that one will nest in the other to save space when packing a plurality of U-channels together.

If desired, a queen truss **150** as shown in Fig. 1 may be used to brace the end of the structure. Also an outboard or overhanging bumper guard may be employed whereby the wheels of the car may be parked practically to the edge of the deck like **21**. If desired, a one or two story structure, as shown in Fig. 1 may have superimposed thereon another one or two story structure and, if desired, the upper multi-story structure may be arranged at right angles to the lower structure, the two structures being connected by a fixed ramp.

Referring to Fig. 19, the height of the approach hill indicated at **160**, can be lowered by providing a relief dip **161** at the bottom of the ground floor hill **162**, the dip **161** extending below the level **163** of the ground. The dip **161** may be deep enough so that deck **7** is level with the ground.

The rack **1** is preferably wholly of metal and, hence, does not absorb grease like concrete. Also preferably the whole rack **1** pitches toward the entrance, to drain rain or wash-water, the U-channels serving as sluice ways. All drip pans, such as indicated at **44** in Fig. 14, preferably have a convex crown for stiffening and to drain rain or wash-water into the U-channels.

If desired, a switch may be mounted under the U-channel portion for a car. Such channel sags slightly when the car is in position on the channel and this sag may operate the switch to control a signal light at the office to show the area where cars are parked, to direct traffic to empty areas.

Instead of the U-channels, use can be made of a single vertical wall. Also one of the side flanges **103** or **104** of the aligning rack may be omitted if the cars approach the remaining flange **103** or **104**.

By confining the movement of the car to a definite track, it is possible to use a closer spacing of columns such as **55** throughout the structure, whereby lighter beams like **54** can be used because of such closer spacing of the columns. A wider spacing of columns and, hence, heavier beams are required for concrete floors where the cars can move at random.

Various modifications may be made in the invention without departing from the spirit of the following claims.

I claim:

1. A multi-deck parking structure which comprises a plurality of parking levels one above another, a fixed inclined first ramp section extending upwardly from a given parking level to a locus intermediate said given and a superjacent parking level, a tiltable ramp section hinged at said superjacent level and extending to said locus and aligning with said first fixed ramp section when it is tilted down and a fixed ramp section beneath said tiltable ramp section aligning with said first mentioned fixed ramp section and extending from said locus to said given level, said inclined fixed ramp section and said tiltable ramp section when it is tilted down forming an uninterrupted way over which a motor vehicle may be driven from said given level to said superjacent level and said first mentioned fixed ramp section and said second mentioned fixed ramp section forming an uninterrupted way over which a motor vehicle may be driven under said tiltable ramp section when said tiltable section is tilted up.

2. A multi-deck parking structure which comprises a plurality of parking levels one above another, a fixed inclined first ramp section extending upwardly from a given parking level to a locus intermediate said given and a superjacent parking level, a tiltable ramp section hinged at said superjacent level and extending to said locus and aligning with said first fixed ramp section when it is tilted down and a fixed declined ramp section beneath said tiltable ramp section aligning with said first mentioned fixed ramp section and extending from said locus to said given level, said inclined fixed ramp section and said tiltable ramp section when it is tilted down forming an uninterrupted way over which a motor vehicle may be driven from said given level to said superjacent level and said inclined fixed ramp section and said declined fixed ramp

section forming an uninterrupted way over which a motor vehicle may be driven under said tiltable ramp section when said tiltable section is tilted up, said declined fixed ramp section being bowed upwardly at its upper end and bowed downwardly at its lower end.

3. In a multi-deck parking rack for parking and unparking motor vehicles having a plurality of parking decks supported one above the other, an inclined ramp extending from a given deck to the superjacent deck above said given deck on which to drive motor vehicles from said given deck to said superjacent deck, said ramp including a fixed inclined ramp section at its lower end and a hinged tiltable ramp section at its upper end, said fixed ramp section extending upwardly in an inclined direction from said given deck to a locus about half the distance from said given deck to said superjacent deck, said tiltable ramp section extending from said superjacent deck to said locus and when tilted down being in alignment with said fixed section and when tilted up providing a space through which to drive a motor vehicle under said tiltable section, and another fixed ramp section under said tiltable ramp section extending downwardly in a declined direction from the upper end of said first mentioned inclined fixed ramp section to said given deck, said inclined and declined fixed ramp sections providing an uninterrupted way over which to drive a motor vehicle from said given deck to another place on said given deck when said tiltable ramp section is tilted up.

4. In a multi-deck parking rack for parking and unparking motor vehicles having a plurality of parking decks supported one above the other, an inclined ramp extending from a given deck to the superjacent deck above said given deck on which to drive motor vehicles from said given deck to said superjacent deck, said ramp including a fixed inclined ramp section at its lower end and a hinged tiltable ramp section at its upper end, said fixed ramp section extending upwardly in an inclined direction from said given deck to a locus about half the distance from said given deck to said superjacent deck, said tiltable ramp section extending from said superjacent deck to said locus and when tilted down being in alignment with said fixed section and when tilted up providing a space through which to drive a motor vehicle under said tiltable section, and another fixed ramp section under said tiltable ramp section extending downwardly in a declined direction from the upper end of said first mentioned inclined fixed ramp section to said given deck, said inclined and declined fixed ramp sections providing an uninterrupted way over which to drive a motor vehicle from said given deck to another place on said given deck when said tiltable ramp section is tilted up; the upper portion of said declined fixed ramp section under said tiltable ramp section being bowed upwardly and the lower portion of said declined fixed ramp section being bowed downwardly.

5. In a multi-deck parking rack for parking and unparking motor vehicles having a plurality of parking decks one above the other, an inclined ramp on which to drive motor vehicles from a given deck to a superjacent deck, said ramp including an inclined fixed ramp section extending from said given deck to a locus intermediate said given deck and said superjacent deck and a tiltable ramp section hinged to said superjacent deck and extending to said locus, said hinged section being in alignment with said fixed section when the hinged section is tilted down and when tilted up providing a space through which a motor vehicle may be driven under said hinged section, and a declined fixed ramp section under said tiltable ramp section extending from said locus to said given deck, said inclined fixed ramp section and said declined fixed ramp section forming an uninterrupted way over which to drive a motor vehicle when said hinged ramp section is tilted up.

6. A multi-deck parking rack for parking and unparking motor vehicles which comprises a plurality of parking decks supported one above the other by framework, each upper deck having parallel rows of parking lanes and a cross aisle adjacent said parking lanes, each parking lane comprising a track for the wheels of a motor vehicle leading into said aisle on which to drive a motor vehicle from said aisle, an inclined ramp leading from a given deck of the upper decks to a cross aisle of the next upper deck, said ramp having a fixed section at its lower end spanning about half the inclined distance between said given deck and said next adjacent upper deck and a hinged tiltable ramp section spanning the remainder of said inclined distance, another fixed ramp section under said tiltable ramp section extending from the upper end of said first mentioned fixed ramp section down to said given deck, said tiltable ramp section and said first mentioned fixed ramp section providing an uninterrupted way on which to drive a motor vehicle from said given deck to said last mentioned cross aisle when said tiltable ramp is tilted down, and said fixed ramp sections providing an uninterrupted way over which to drive a motor vehicle under said tiltable ramp section to a cross aisle on said given deck when said tiltable ramp section is tilted up.

7. A multi-deck parking structure for parking and unparking motor vehicles driven under their own power which comprises a plurality of parking decks supported one above the other by structural steel framework, each parking deck comprising a row of parking lanes spaced in parallel relation, a transverse aisle extending along said row at one end of said parking lanes, and a transverse aisle extending along said row at the other end of said parking lanes, said transverse aisles providing areas for random movement of vehicles being parked and unparked, an inclined track connecting a transverse aisle of a given deck with a subjacent deck over which the vehicles can be driven from said subjacent deck to said last mentioned transverse aisle, said incline having a reference plane through the juncture of the upper end of said incline with said last-mentioned aisle and through the juncture of the lower end of said incline with said subjacent deck, said inclined track having an upper portion arching upwardly from said plane, and having a lower portion arching downwardly from said plane, said inclined track comprising two sections, the upper of which is hinged at its upper end for tiltable movement and the lower of which is fixed, said upper section when tilted down aligning with said fixed section and forming an uninterrupted way over which a motor vehicle may be driven from said subjacent deck to said transverse aisle on said given deck and when tilted up providing a space through which a motor vehicle can be driven under the tiltable section, and a second fixed bowed ramp section extending from the upper end of said first mentioned fixed ramp section to said subjacent deck, said fixed ramp sections, when said tiltable ramp section is tilted up, providing an arched uninterrupted way over which a motor vehicle may be driven from one place on said subjacent deck to another place on said subjacent deck.

8. A multi-deck parking rack for parting and unparking motor vehicles driven under their own power which comprises a first parking deck, a second parking deck supported on framework above said first parking deck and a third parking deck supported on framework above said second parking deck; an inclined ramp extending from the level of said first to the level of said third parking deck, that part of said ramp which extends from said third deck to said second deck comprising a fixed inclined ramp section extending from the level of said second deck to a locus intermediate the levels of said second and third decks and a tiltable ramp section aligned with said fixed ramp section extending from said third deck to said locus and that part of said ramp which extends from the level of said second deck to the level of said first deck comprising a fixed inclined ramp section extending from the level of said first deck to a locus intermediate said first and second decks and a tiltable ramp section aligned with said first mentioned tiltable and fixed ramp sections and extending from the level of said second deck to said second mentioned locus; a fixed declined ramp section under said first mentioned tiltable ramp section extending from said first mentioned locus to the level of said second deck; and a fixed declined ramp section under said second mentioned tiltable ramp section extending from said second mentioned locus to the level of said first deck, said inclined fixed ramp sections and tiltable ramp sections providing an uninterrupted way on which to drive a motor vehicle from said first to said third deck when said tiltable ramp sections are tilted down and said first mentioned declined fixed ramp section together with its adjoining inclined fixed ramp section providing an uninterrupted way over to drive a motor vehicle under said first mentioned tiltable ramp section when it is tilted up and said second mentioned declined fixed ramp section together with its adjoining inclined fixed ramp section providing an uninterrupted way over which to drive a motor vehicle under said second mentioned tiltable ramp section when it is tilted up.

9. A multi-deck parking rack for parking and unpark-

ing motor vehicles which comprises first, second and third parking decks, the second deck being supported above the first deck by steel framework and the third deck being supported above the second by steel framework, each of said second and third decks comprising a row of parallel metal ways each of which provides a parking place for an automobile and a transverse aisle at each end of said metal ways and extending along said row for random movement of automobiles whereby an automobile may be driven from one of said transfer aisles on a given deck to the other of said transfer aisles on that deck through a selected metal way of said row of metal ways, each metal way having a pair of parallel rails, each of said rails comprising an upwardly facing U-channel wider than the vehicle wheel and having elevated sides to guide the wheels of the vehicle along the channel with the bottom of the wheels resting on and supported by the bight of the channel, said U-channels serving as cross-supports for the said framework, a first fixed inclined ramp section extending from the level of said first deck to a locus intermediate the levels of said first and second decks, a first tiltable ramp section hinged at the level of said second deck and extending to said locus when tilted down, a second fixed inclined ramp section aligned with said first tiltable ramp section and extending from the level of said second deck to a locus intermediate the levels of said second and third decks, a second tiltable ramp section hinged at the level of said third deck and when tilted down extending to said locus intermediate said second and third decks, said fixed inclined sections and said tiltable sections, when said tiltable ramp sections are tilted down, forming an uninterrupted inclined way over which a motor vehicle may be driven from the level of said first deck to the level of said third deck on to a transverse aisle of said third deck, a declined ramp section under said first tiltable ramp section extending from the upper end of said first fixed inclined ramp section to the level of said first deck, a second declined ramp section under said second tiltable ramp section extending from the upper end of said second fixed inclined section to a transverse aisle on said second deck, said first fixed inclined section and said first declined section providing a way over which a motor car may be driven under said first tiltable ramp section on to said first deck when said first tiltable ramp section is tilted up and said first fixed inclined section, said first tiltable ramp section and said second declined ramp section providing an uninterrupted way over which a motor vehicle may be driven from said first deck to a transverse aisle on said second deck when said first tiltable ramp section is tilted down and said second tiltable ramp section is tilted up.

10. A multi-deck parking structure which comprises a plurality of parking levels one above another, a fixed inclined first ramp section having a pair of parallel U-shaped channels forming a track for the wheels of a motor vehicle, extending upwardly from a given parking level to a locus intermediate said given and a superjacent parking level, a tiltable ramp section hinged at said superjacent level and having a pair of parallel U-shaped channels extending to said locus and aligning with the channels of said first fixed ramp section when it is tilted down; a fixed ramp section beneath said tiltable ramp section aligning with said first mentioned fixed ramp section and extending from said locus to said given level, a wheel guide positioned at the lower end of each of said channels on said first fixed ramp section, each wheel guide comprising a traction plate having its center line aligned with the center line of its adjacent channel, a set of rollers mounted above and on one side of said traction plate converging toward the center line of its adjacent channel and a set of rollers mounted above and on the other side of said traction plate converging toward said channel center line, said converging sets of rollers providing means for guiding the wheels of a motor vehicle into said channels and said traction plates providing means for maintaining forward traction of the vehicle wheels into said channels when the wheels are driven into said guides, said inclined fixed ramp section and said tiltable ramp section when said tiltable ramp section is tilted down forming an uninterrupted way over which a motor vehicle may be driven from said given level to said superjacent level and said first-mentioned fixed ramp section and said second fixed ramp section forming an uninterrupted way over which a motor vehicle may be driven under said tiltable ramp section when said tiltable section is tilted up.

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