

March 28, 1933.

A. S. WATSON

1,903,274

GARAGE HANDLING MECHANISM

Filed Sept. 10, 1930

6 Sheets-Sheet 1

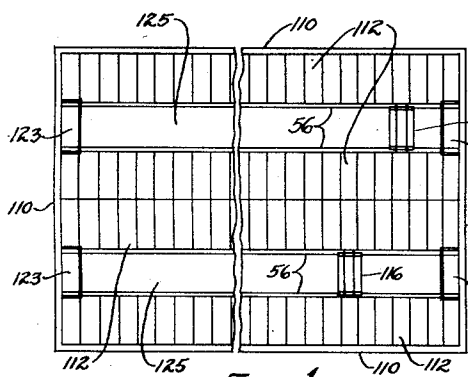


Fig. 1.

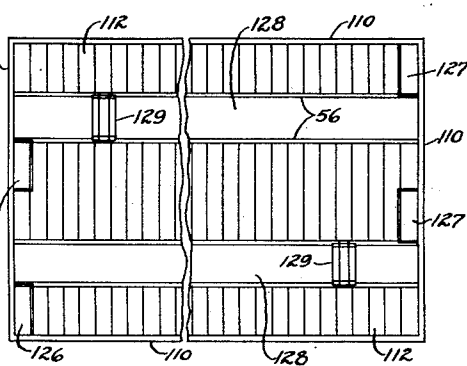


Fig. 2.

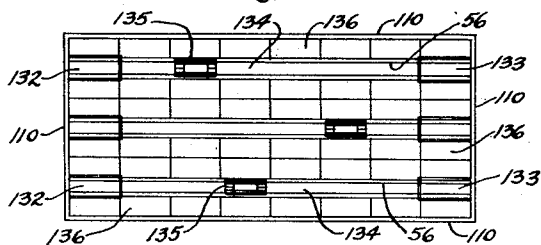


Fig. 3.

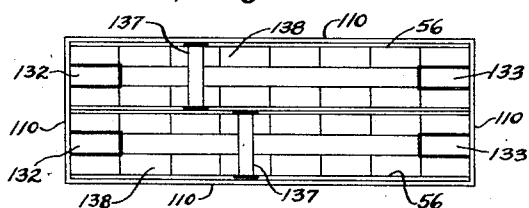


Fig. 4.

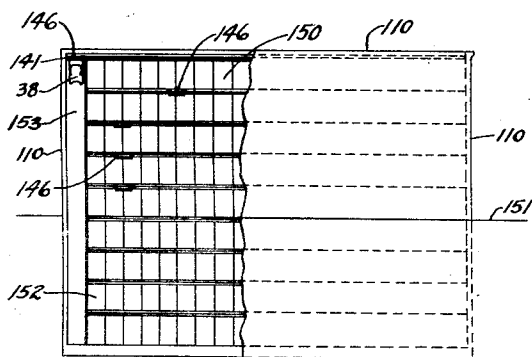


Fig. 7.

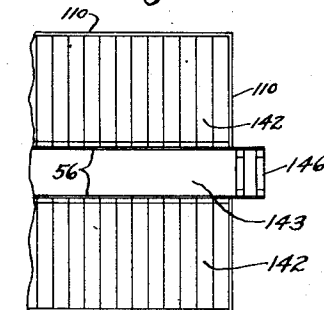


Fig. 6.

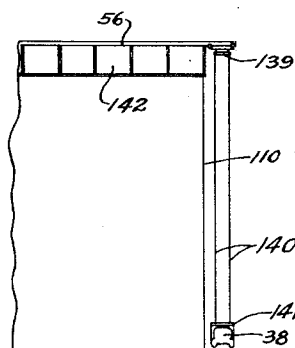


Fig. 5.

INVENTOR
Archie S. Watson
BY *George C. Ingewell*
ATTORNEY

March 28, 1933.

A. S. WATSON

1,903,274

GARAGE HANDLING MECHANISM

Filed Sept. 10, 1930

6 Sheets-Sheet 2

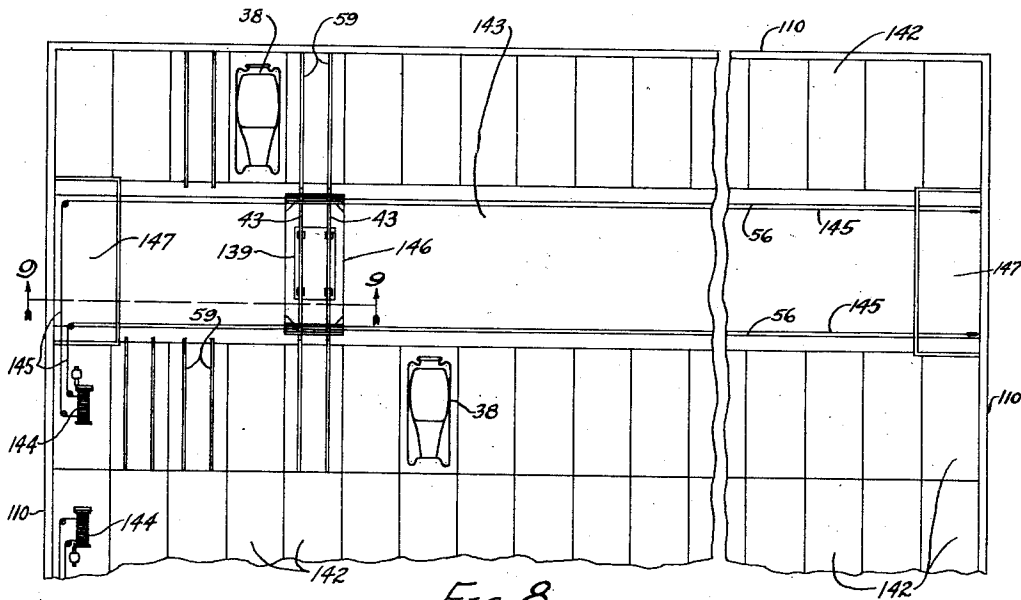


Fig. 8.

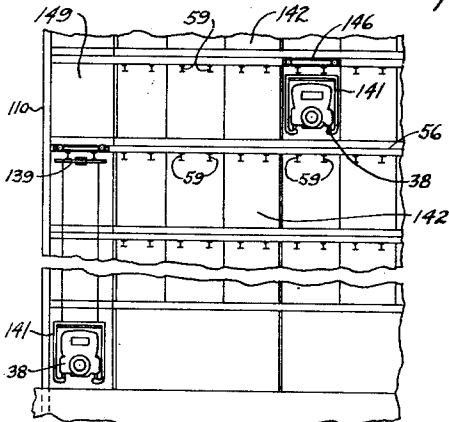


Fig. 9.

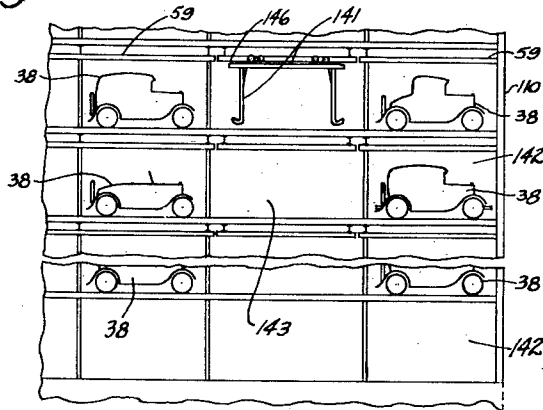


Fig. 10.

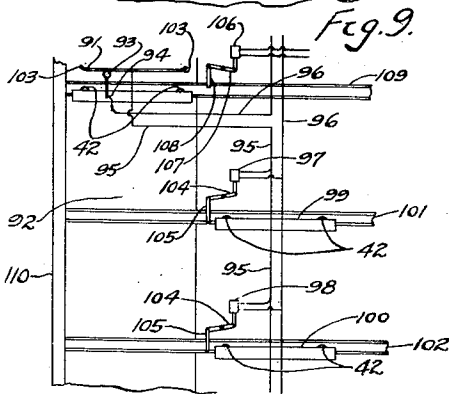


Fig. 12.

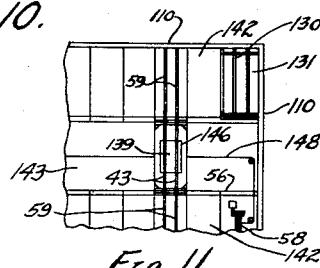


Fig. 11.

INVENTOR
Archie S. Watson
BY George B. Ingewell
ATTORNEY

1,903,274

Filed Sept. 10, 1930

Fig. 13.

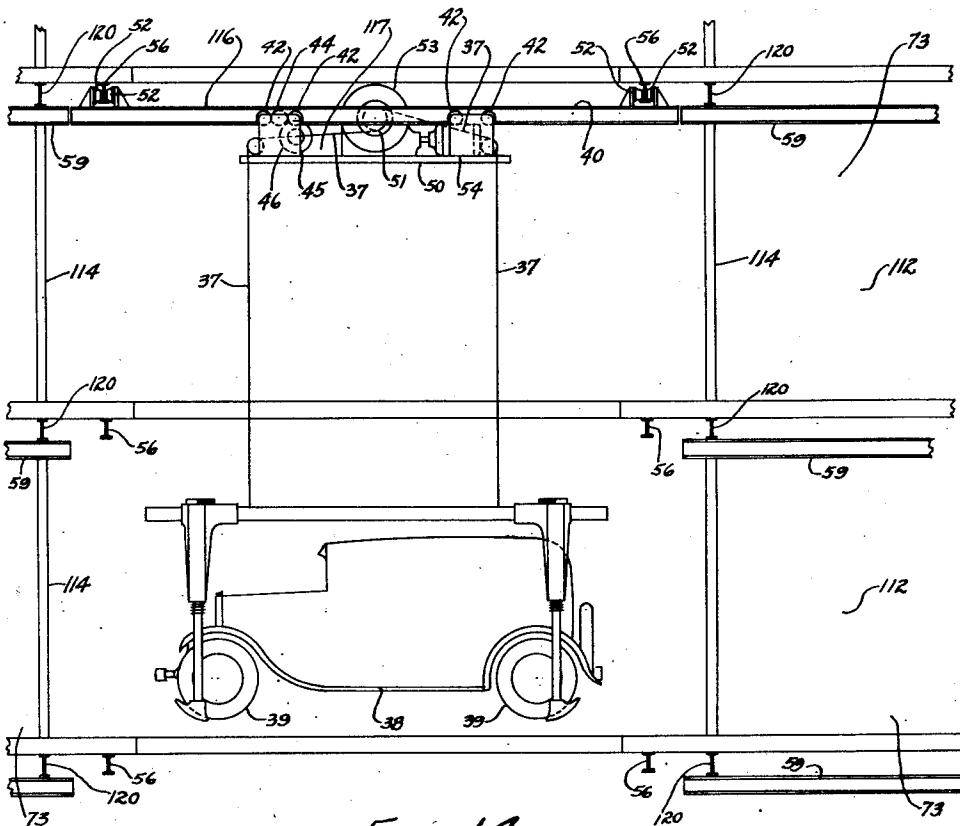


Fig. 14.

INVENTOR
Archie S. Watson,
BY George B. Ingersoll,
ATTORNEY

March 28, 1933.

A. S. WATSON

1,903,274

GARAGE HANDLING MECHANISM

Filed Sept. 10, 1930

6 Sheets-Sheet 4

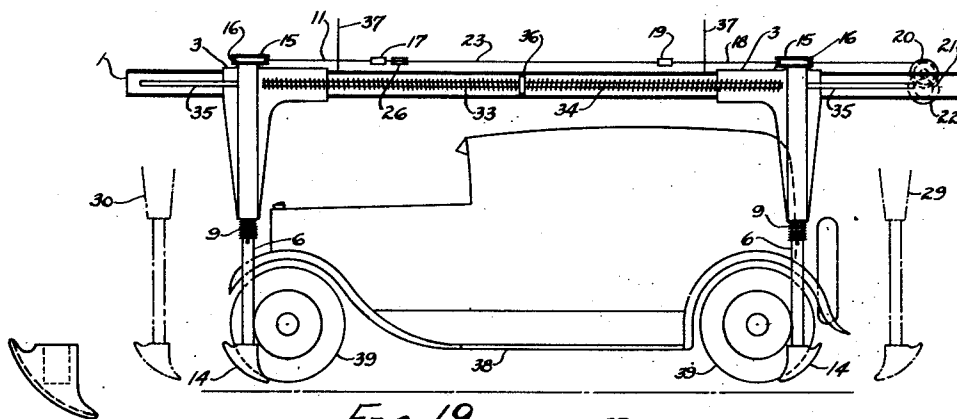
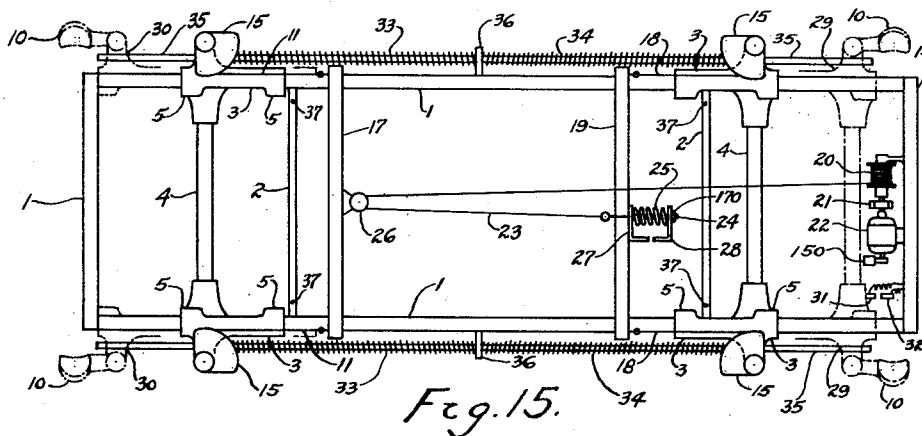


Fig. 17.

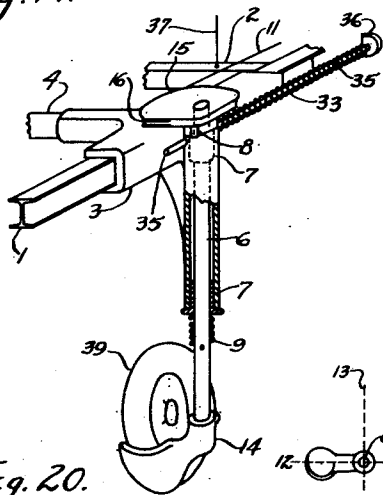
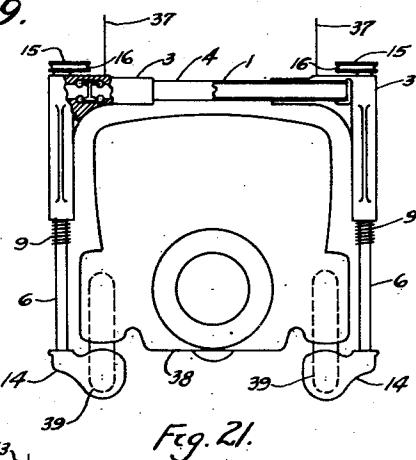


Fig. 16.

Fig. 18.



INVENTOR
Archie S. Watson,
BY George C. Ingensoll,
ATTORNEY

March 28, 1933.

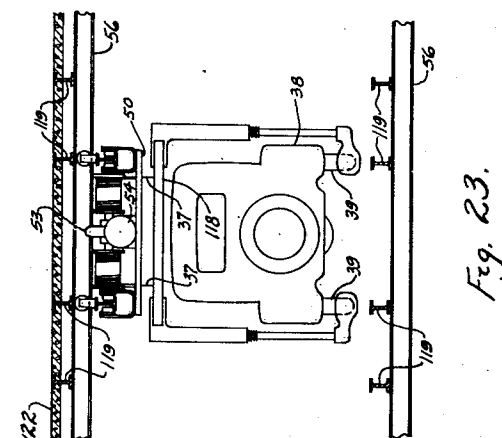
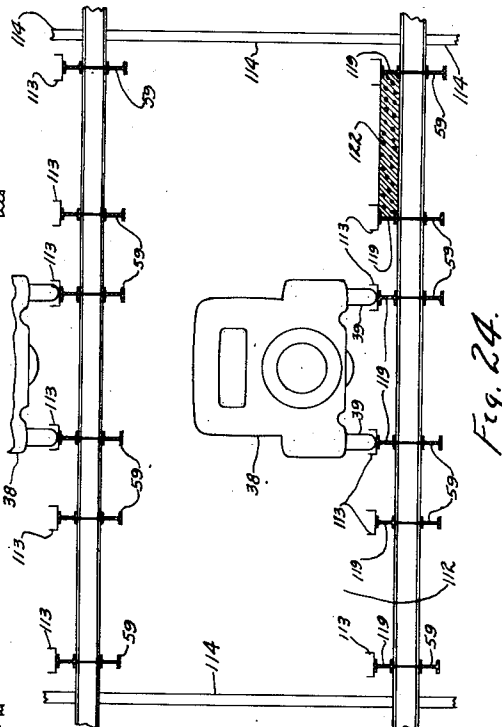
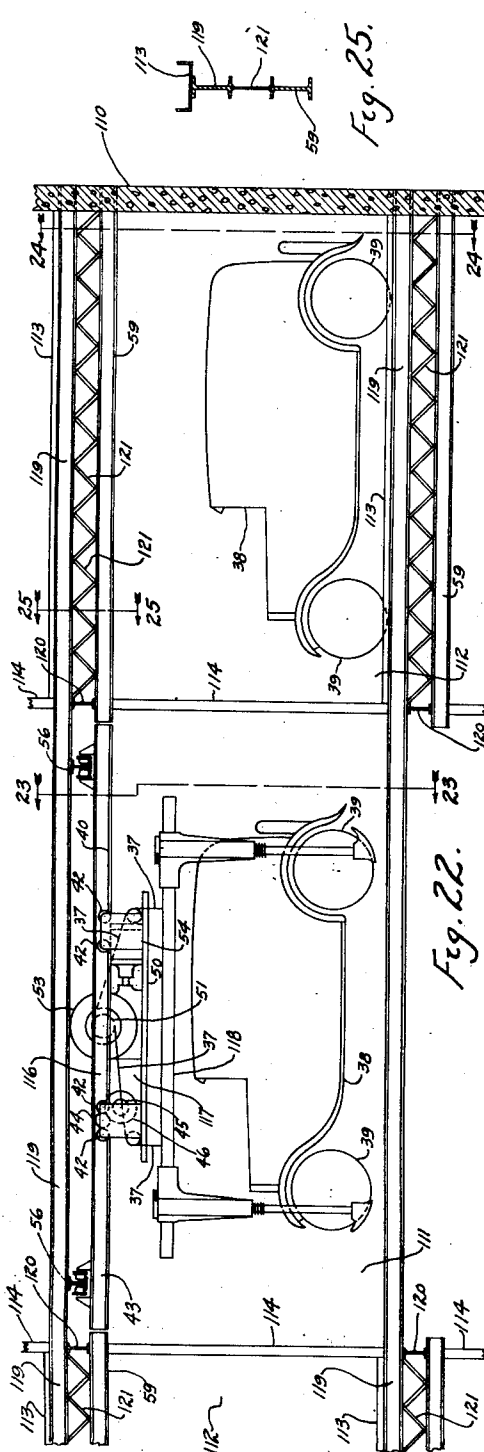
A. S. WATSON

1,903,274

GARAGE HANDLING MECHANISM

Filed Sept. 10, 1930

6 Sheets-Sheet 5



INVENTOR
Archie S. Watson,
BY George E. Jorgensen
ATTORNEY

March 28, 1933.

A. S. WATSON

1,903,274

GARAGE HANDLING MECHANISM

Filed Sept. 10, 1930

6 Sheets-Sheet 6

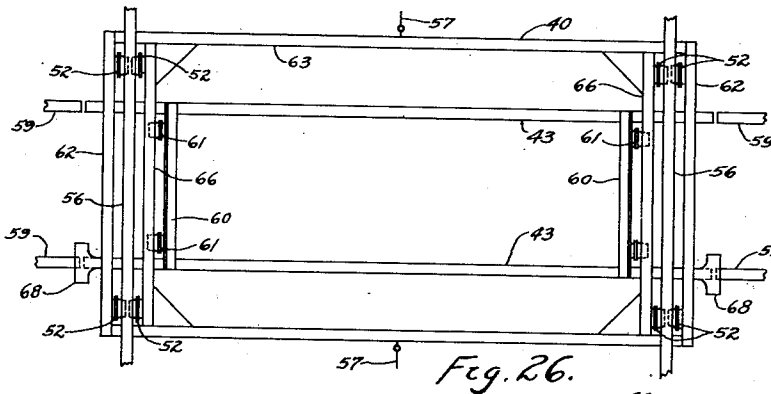


Fig. 26.

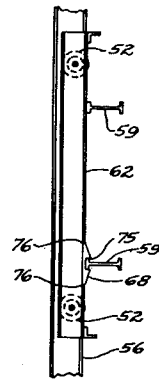


Fig. 27.

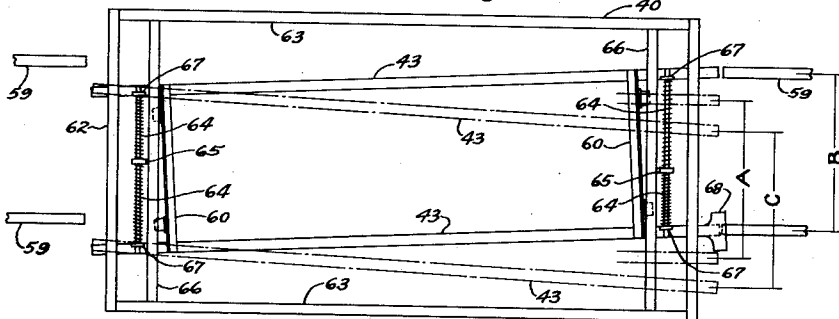


Fig. 28.

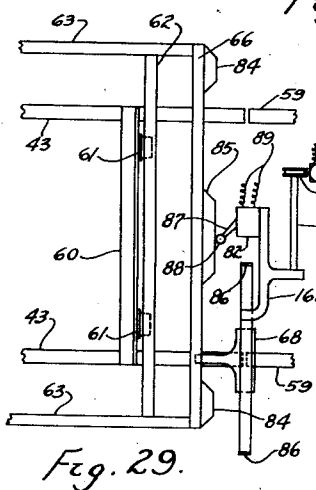


Fig. 29.

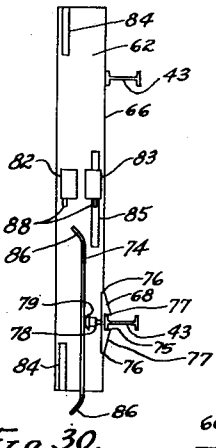


Fig. 30.

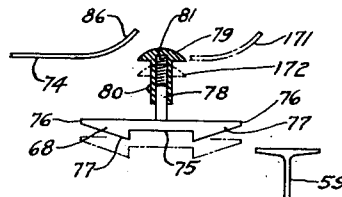


Fig. 33.

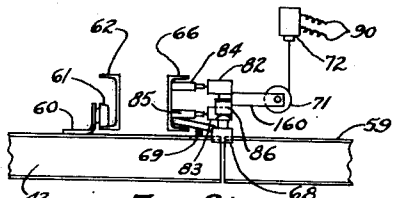


Fig. 31.

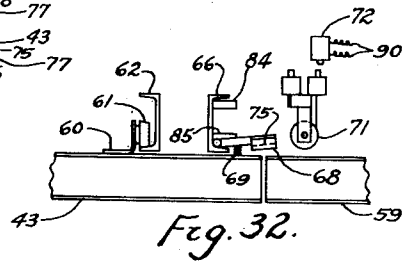


Fig. 32.

INVENTOR
Archie S. Watson,
BY George B. Ingersoll,
ATTORNEY

UNITED STATES PATENT OFFICE

ARCHIE S. WATSON, OF HIGHLAND PARK, MICHIGAN

GARAGE HANDLING MECHANISM

Application filed September 10, 1930. Serial No. 481,023.

My invention relates to improvements in garages equipped with car handling devices; and the objects of my improvement, are first, to provide a garage with safe and speedy means for attaching or detaching a motor vehicle with the hoisting and conveyor means; second, to provide a garage with a car handling device without the necessity of resorting to the usual carriages, trays, turntables, dollies, or tilting devices; third, to provide a garage with a car handling device capable of use in conjunction with a self contained trolley hoist or crane mechanism without the necessity of resorting to the use of the usual or typical elevator means; fourth, to provide a garage car handling device for picking up a motor vehicle by approaching said motor vehicle from either its ends or sides; fifth, to provide a garage handling device capable of being automatically attached to a motor vehicle regardless of its length; sixth, to provide a garage handling device capable of being hoisted, conveyed, or deposited with the vehicle without the removal of the gripping mechanism from the vehicle; seventh, to provide a garage handling device for use in conjunction with overhead monorails or trolley tracks of the conventional type; eighth, to provide a garage handling device capable of being operated manually, semi-automatically, or completely automatically; ninth, to provide a garage handling device capable of use both within and without the garage; tenth, to provide a garage handling device having supporting members used as a structural portion of the garage building; eleventh, to provide a garage handling device having movably mounted track members; and twelfth, to provide a garage handling mechanism having means for automatically aligning its movable track members with fixed track members.

I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a schematic view disclosing the plan of a garage having two entrance hoisting shaftways and two exit hoisting shaftways; Fig. 2, a schematic view disclosing the plan of a garage having two entrance

elevator shaftways and two exit elevator shaftways; Fig. 3, a schematic view disclosing the plan of a garage having dual entrance and exit shaftways and storage stalls extending longitudinally with the runways; Fig. 4, a schematic view disclosing the plan of a garage having storage stalls extending longitudinally with the runways together with a travelling crane capable of traversing the entire area of the garage; Fig. 5, a schematic side elevation disclosing a building equipped with my garage handling device on its roof; Fig. 6, a schematic view of the plan of the building disclosed in Fig. 5; Fig. 7, a schematic view of a sectional elevation of a garage; Fig. 8, a plan view of a garage of typical arrangement, disclosing hoist hatchways at each of its ends; Fig. 9, a partial vertical section taken on the line 9—9, Fig. 8; Fig. 10, a sectional view similar to that disclosed in Fig. 9, except with the storage stalls disclosed as extending transversely with the runways; Fig. 11, a partial plan view of a garage similar to that disclosed in Fig. 2 and disclosing further details as to the location of the hatchway to the crane and runway; Fig. 12, a sectional elevation, in schematic form, of a garage disclosing a hatchway and crane together with the method of safeguarding and interlocking the various handling units while one of said units is being used in the hoisting operation; Fig. 13, a partial plan view of a garage equipped with a travelling crane together with its trolley and hoist units thereon; Fig. 14, a side elevation of mechanism disclosed in Fig. 13, disclosing several of the storage floors of the garage; Fig. 15, a plan view of the gripping device used in my garage handling mechanism; Fig. 16, a plan elevation of the member which engages the tire of the motor vehicle to be stored; Fig. 17, a side elevation of the member which engages the tire of the motor vehicle to be stored; Fig. 18, a view disclosing the tire engaging member gripping the tire of a motor vehicle; Fig. 19, a side elevation of the gripping device; Fig. 20, a perspective view of the tire engaging member and its operating mechanism; Fig. 21, an end view of the gripping device engaging

a motor vehicle; Fig. 22, a sectional elevation of a garage disclosing the stall supports, tracks, and runways, together with the gripping device and motor vehicles; Fig. 23, a sectional view taken on the line 23—23, Fig. 22; Fig. 24, a sectional view taken on the line 24—24, Fig. 23; Fig. 25, a sectional view taken on the line 25—25, Fig. 22; Fig. 26, a plan view of the travelling crane used in my garage handling mechanism; Fig. 27, an end elevation of the travelling crane; Fig. 28, a plan view of the travelling crane together with its movable track members; Fig. 29, a plan view of the lock and electric stops used at each end of the travelling crane; Fig. 30, an end view of the lock and electric stop; Fig. 31, a side elevation of the lock and electric stop; Fig. 32, a side elevation of the lock and electric stop, the lock being disengaged from the rail members; and Fig. 33, an end view of the lock member in relation to the rail and shoe members.

Similar numerals refer to similar parts throughout the several views.

Figures 15, 16, 17, 18, 19, 20, and 21 disclose the gripping device for automotive vehicles as used in my garage handling mechanism and comprises the substantial frame member 1, provided with the intermediate cross members 2, for carrying the necessary mechanism. The intermediate cross members 2 may be of structural steel construction. The members 3 are movably mounted on the frame member 1, the members 3 being tied together by the cross members 4. The members 3 are readily movable on the frame member 1 and are held in contact therewith by the lugs 5.

The members 6 are supported by the bearings 7 within the members 3 and are adapted to rotate through approximately an arc of ninety degrees, the rotation of said member 6 being limited by the stops 8 contacting against suitable projections on the members 3. The torsion springs 9 are attached to each of the members 6 and 3 in a suitable manner to normally hold the shaft 6 in the position as indicated by the dotted lines 10, Fig. 15 and by the full lines in Fig. 16, and at the same time, allows the shaft 6 to be rotated, by the movement of the cables 11, through an angle of approximately ninety degrees as indicated by the positions 12 and 13 in Figs. 16 and 18. The shoe members 14 are attached to the lower extremity of the shafts 6 and are of concave construction to allow their concave surfaces to contact with and assume a gripping relation relative to the tires 39 of the vehicle 38. The concave portion of the shoe members 14 may be designed to suit the average range of tire sizes but for practical purposes of lifting accuracy the contour of the shoe member may be made with a large contact area which would subject the tire to considerably less contacting pressure than would

exist when the motor vehicle was normally resting on a floor or other nominally flat surface.

The sector pulleys 15 are suitably attached to the upper end of the shafts 6 and are provided with the grooves 16 into which are suitably connected the cables 11 which are in turn suitably fixed to the equalizing bar 17. In a similar manner the sector pulleys 15, at the opposite end of the frame member 1, are attached by the cables 18 to the equalizing bar 19.

At the end of the frame member 1 is suitably mounted a winding winch comprising the drum 20, suitably connected by the reduction gear unit 21, to the electric motor 22, said electric motor 22 being provided with a suitable solenoid brake 150, and this mechanism may be of the usual conventional design, preferably using a worm gear reduction mechanism. The cable 23 is suitably attached, at one of its ends, to the drum 20 and at the other of its ends, to the rod 24 which passes through the compression spring 25 which is suitably mounted on the equalizing bar 19. The cable 23 is also attached to the equalizing bar 17 by means of the pulley 26 through which the cable 23 passes, the pulley 26 being suitably attached to the equalizing bar 17.

The electrical contact members 27 and 28 are respectively retained between the equalizing bar 19 and the compression spring 25 and between the compression spring 25 and the nut 170 at the end of the rod 24. The contact members 27 and 28 are suitably connected to a relay switch of conventional design (not shown) which may be electrically connected to the motor 22 in such manner that the motor 22 will be electrically stopped when the compression spring 25 is compressed sufficiently, by a tension on the cable 23, to cause the contact members 27 and 28 to be moved together into a contacting position.

Also in a similar manner, when the motor 22 is reversed and the members 3 and 4 are movably operated backwards to their farthest open positions, as indicated by the dotted lines 29 and 30, Figs. 15 and 19, the contact member 31, suitably mounted on one of the movable members 3, will be moved into contact with the contact member 32, suitably mounted on the frame member 1, thus causing the motor 22 to stop, the contact members 31 and 32 being suitably connected to a relay switch of conventional design (not shown) which in turn is electrically connected to the motor 22. The springs 33 and 34 are mounted on the rods 35 which may be retained, at their central portion, in the bosses 36 attached to the frame 1, the ends of the rods 35 being slidably mounted in the members 3. The springs 33 and 34 will exert their pressure against the movable members 3 and normally cause said movable members 3 and their attached parts to always tend to move to their extreme outer

or open positions 29 and 30, Figs. 15 and 19, and at the same time will permit the members 3 and their attached parts to movably operate toward each other to sufficiently close positions to accommodate the shortest length of wheel base of any motor vehicle. The cables 37 are suitably attached to the frame member 1 and to hoisting and trolley mechanism above as hereinafter disclosed. The use of four cables 37 are preferred in order to assure freedom from swinging and a level position while lifting although a lesser number of lifting cables may be used. The entire assembly of frame member 1 and with its attached parts together with the motor vehicle 38 may be lifted into reasonably close contact with the hoisting mechanism and stoppage of the hoisting movement may be accomplished by the use of a conventional type of limit switch (not shown) automatically stopping the ascent as is accomplished in the usual and common commercial practice on cranes and hoists. In operation, the entire assembly comprising the frame member 1 with its attached parts would be lowered over the motor vehicle 38, the movable members 3 being in their farthest open positions, as indicated by the dotted lines 29 and 30, Figs. 15 and 19, the shoe members 14 being in their normally outward positions, as indicated by the dotted lines 10, Fig. 15, and the full lines in Fig. 16. The motor 22 may be controlled, by manual or automatic means of conventional type, to rotate and thereby causing the solenoid brake to open, the rotation of the motor 22 further operating the reduction gear unit 21 and the drum 20, the operation of the drum 20 winding up the cable 23 and causing the equalizing bars 17 and 19 to be moved towards each other. However, the movement of the members 3 toward each other will be momentarily arrested as the springs 33 and 34 are stronger than the springs 9, thus allowing the equalizing bars 17 and 19 to be moved together with the cables 11 and 18, thus automatically rotating the sector pulleys 15 together with their shafts 6 and shoe members 14 through an arc of approximately ninety degrees, from the position indicated at 12, Fig. 16, to the position indicated at 13, Figs. 16 and 18, in which position 13, the shoe member 14 will automatically be brought into its tire gripping position, as disclosed in Figs. 19, 20, and 21, the entire number of shoe members 14 being continued to be pulled together into gripping contact with the tires 39, this being continued until the spring 25 is compressed until the pressure causes the contact members 27 and 28 to move together into contacting positions, when the motor 22 and its operated mechanism will be stopped. The spring 25 may be made adjustable to any desired pressure thus permitting sufficient pressure to control the gripping action on motor vehicles of any weight. It is to be noted that the gripping

movement of the mechanism is automatic and can be used to grip the wheels of a motor vehicle regardless of its length of wheel base or accuracy of position of the motor vehicle in relation to the gripping mechanism. With a motor vehicle 38 thus held in my gripping mechanism, the entire load unit can be hoisted, conveyed, and lowered.

Figs. 13 and 14 disclose a general assembly of the gripping mechanism holding a car in suspension, the gripping mechanism being attached to the trolley member 50, which comprises frame members 41 in which are suitably mounted the trolley wheels 42 running on the track members 43, the trolley wheels 42 being connected, by suitable gearing, with the pinion gears 44 which are further operatively connected by the gears 45 and 46 to the shaft which in turn is connected to worm gear reduction unit 47 and to the motor 48, the motor 48 being equipped with the solenoid brake 49 which is mounted on said motor 48. It will be noted that when the motor 48 is operated, the wheels 42 of the trolley member 50 will rotate in unison, thereby affording maximum traction and quick acceleration. If desired all of the wheels 42 could be directly motorized in a similar method to that shown. Whereas the trolley member 50 is here disclosed as operating on double track members 43, thus affording a stabilized condition in hoisting and conveying and preventing any swaying or swinging of the motor vehicle 38 in the gripping mechanism together with lower headroom and reduced wear and reduced wheel load per wheel on lighter runway track members 43, it is to be understood that my design of handling mechanism can be utilized on any conventional type of single monorail construction. Also mounted on the frame member 50 of the trolley or travelling mechanism is the hoisting mechanism consisting essentially of the drums 51 having suitable grooves provided for the cables 37, the drums 51 being operatively connected to the worm gear unit 53 and the electric motor 54 which is provided with the solenoid brake 55. The rotation of the motor 54 will cause the gripping mechanism and its motor vehicle 38 to be lifted or lowered when suitable control circuits and controller (not shown) are operated. Figs. 13 and 14 disclose in schematic form, the utilization of a conventional type of crane hoisting and propelling mechanism and it is to be understood that any of the usual and conventional types of crane mechanism, designed for similar conditions of service, can be used. Figs. 26 to 32, inclusive, disclose the travelling crane member 40 together with its aligning features. The crane member 40 comprises structural side and end members suitably mounted in which are trolley wheels 52 adapted to roll on the runway members 56, the crane assembly be-

ing moved along its runway members 56 by means of the cables 57 being suitably attached to a winch member as disclosed schematically at 58 in Fig. 11, a single cable 57, as disclosed in Fig. 26 or double cables, as disclosed at 57 in Fig. 13, being used, as desired for attachment to the crane member 40. The track members 43, suitably mounted on the under side of the crane member 40, are adapted for alignment with the stationary track members 59. The track members 43 are held together by the transverse members 60 on which are suitably mounted the rollers 61 resting on the member 66 of the crane member 40, thereby permitting the two members 43 to move relative to the outer frame members 63 of the crane member 40.

The four springs 64 are suitably attached to the track members 43 and anchored to the member 65 which is suitably attached to the member 66 which forms a portion of the crane member 40, one end of said springs bearing against the bosses 67 which are suitably attached to the track members 43. It is to be noted that the springs 64 hold the track members 43 nominally in a central position as denoted at "A" in Fig. 28, said springs 64 permitting, however, said track members to be moved either way at either end to the positions as denoted at "B" and "C", Fig. 28. The operation of the lock member 68 may be accomplished in various ways and Figs. 29 to 33 inclusive disclose operating means in schematic form. In the normal travelling position, the lock member 68 will be held out of engagement with the track members 43 and 59 by the spring 69 interposed between the lock member 68 and the track member 43 as disclosed in Fig. 32. Adjacent to the desired stopping point or position of the track members 43, the movable member 160 would be suitably mounted on the stationary track members 59, the movably mounted member 160 being provided with an extension 70 carrying the wheel 71 which thus connects the movably mounted member 160 with the solenoid 72, the solenoid 72 being suitably and electrically connected to electrical control mechanism (not shown) which would provide for energization of the solenoid 72 which would in turn cause the movably mounted member 160 and attached members to move down from the position as shown in Fig. 32 to the position as shown in Fig. 31. When the solenoid 72 is thus electrically controlled from any remote point to move down to the position as shown in Fig. 31, at a particular selected point or stall 73, said stalls 73 being indicated in Fig. 14, said solenoid 72 will thus cause the movably mounted member 160 to also move downwardly and bring the shoe bar 74 into contact relation with the lock member 68, said shoe bar 74 being attached to the movably mounted member 160. It is

to be noted that the lock member 68 is provided with a notch 75 for engaging the sides of the track members 59 and 43, together with extending portions 76 which have surfaces 77 for facilitating the transverse travel of the lock members 68 over the track members 59 and 43. Also the lock members 68 are provided with an extension 78 over which slidably fits the cap member 79 which is provided with longitudinal slots engaging the pin 80. A spring 81 is interposed between the extension 78 and the inside of the cap member 79 thus providing for a lost motion movement of the cap member 79 on the extension 78, as disclosed in Fig. 33, this lost motion of the cap member 79 against the spring 81 causing the lock member 68 to be lowered when the shoe member 74 is brought into contact with the top of the cap member 79 and to then snap over the track members 59 when the lock members 68 are brought into alignment with the track members 59, thereby locking the track members 59 and 43 together. Attached to the movably mounted member 160 are disclosed two hatchway limit switches 82 and 83 which carry the pilot circuit to the electric motor 58 which propels the crane mechanism, as shown in Fig. 11. The two hatchway limit switches 82 and 83 as shown are designed to line up with the boss members 84 and 85 as disclosed in Figs. 29 and 30, and when the switches 82 and 83 are in contact with said boss members 84 and 85 respectively, the electric current would be made or broken, thus causing the motor 58 first to be reduced to slow speed and then come definitely to rest, that is, the entire crane mechanism would be automatically slowed up and stopped at the required or desired point or position as remotely controlled by buttons or circuits as above explained. This ability of the crane mechanism to be thus stopped will permit the crane mechanism with its frame member 63 to drift by the nominal locking point and thereby eliminating the necessity of an accurate controller and inching which requires expensive and complicated electrical equipment. The details of the wiring and controller circuit will be that of conventional practice and will necessarily have to be varied to suit various conditions and installations. The shoe members 74 will be provided with curved ends 86 for facilitating riding over the cap member 79 when the shoe member 74 forces the cap member 79 downwardly as respectively indicated by the positions 87 and 88, Fig. 33. The limit switches 82 and 83 are provided with the pivotally mounted arms 87 in which are suitably mounted the rollers 88 which contact with the inclined and straight faces of the boss members 84 and 85.

The solenoid 72 and the limit switches 82 and 83 are respectively provided with the electric wires 89 and 90 for connecting with

the electrical control and operating units as above described. In order to prevent interference between two or more crane members in a single hatchway, Fig. 12 discloses, in
 5 schematic arrangement, a shoe member 91 suitably mounted over the hatchway 92 and arranged so that the contactor 93 suitably mounted on the travelling crane member 94 will close the electrical circuit, through the
 10 electric wires 95 and 96 connected with the solenoids 97 and 98, when the travelling crane member 94 is in position over the hatchway 92, thus causing the solenoids 97 and 98 to break the electric circuit actuating
 15 the propulsion mechanism of the travelling cranes 99 and 100 on the rail members 101 and 102 so that the travelling cranes 99 and 100 cannot approach into the hatchway space 92. The shoe member 91 is also provided
 20 with curved ends 103 for facilitating moving contact with the contactor 93. If desired, the solenoids 97 and 98 may be used to actuate pivotally mounted members 104 to impose a mechanical member 105 as a barricade or
 25 guard to the movement of the travelling crane members 99 and 100 into the hatchway 92. The solenoid 106 is disclosed with its pivotally mounted member 108 in a non-interfering position relative to the travel of
 30 the crane member 94 on the rail member 109. The outside wall of the garage is designated at 110. The schematic arrangement of safety locks as disclosed in Fig. 12, can be extended in practice to provide an installation of safety
 35 guards covering garages of any shape or size or any desired disposition of hatchways, runways, or stalls for conveying or storing motor vehicles.

It is to be noted that my garage handling
 40 mechanism provides, in connection with the efficient handling method, an inexpensive, compact, and safe type of building construction designed specifically for use with my garage handling mechanism for the storing
 45 of motor vehicles and adaptable for other building, storing, and handling purposes. As disclosed in Figs. 22, 23, and 24, and hereinafter described more fully, this essentially comprises a floor arrangement with the run-
 50 way space 111 for moving vehicles and adjacent to which are the stalls or spaces 112, the supporting members 113, on which the motor vehicles 38 rest, while in storage, constituting a means of adding structural
 55 strength to the overhead tracks or monorails 59 used for moving the motor vehicles 38 immediately below, as well as further constituting the means of structural strength to general building framework which includes the walls 110, the columns 114, and
 60 the structural frame members 115 and 120. This design of building construction and arrangement will provide more economical building construction together with simplified floors, as for practical purposes, the

conventional floors of a garage could be entirely dispensed with where bins, stalls, or shelves are used for storing the motor vehicles. In Figs. 22 and 23, the runway space
 111 is disclosed with the travelling crane
 70 mechanism, together with a supported vehicle 38, mounted therein. The runway members 56 are mounted over the runway space 111 and on which operates the travelling trolley or crane mechanism unit 116, and on
 75 which is mounted the hoist and trolley mechanism 117, and to which, in turn, is attached the gripping mechanism 118, as hereinbefore described.

It is to be understood that the travelling
 80 trolley or crane mechanism 116, the hoist and trolley mechanism 117, and the gripping mechanism 118 are of the same general design as the units hereinbefore disclosed in detail, reference here being made to them as units
 85 to clarify the description of them in relation to their installation in garage building construction. The structural frame members 119 mounted on the structural frame members 120 and support the members 113 which
 90 are of channel section and thus adapted to receive, guide, and maintain therein the tires 39 of the motor vehicles 38, the ends of the structural frame members 119 being supported in the building walls 110. Below the
 95 structural members 119 and supported from the members 120 are the track members 59 of the storage spaces 112, the track members 59 being arranged to coincide and form alignment with the crane track members 43. It
 100 is to be noted that the structural members 119 and 59 may be laced between with lattice or plate 121 as shown on the structural members 119 and 120 in Figs. 22 and 25, this lattice or plate reinforcement 121 adding considerable strength and rigidity to said members.
 105

It is to be noted that the use of the structural guide members 113 will eliminate the necessity of flooring the space therebetween as the function of the spaces 112 is simply to
 110 store the motor vehicles 38 as on a shelf. The runway spaces 111 may be floored, if desired, as shown at 122, to permit inspection, checking, etc. by garage officials and attendants. The entire assembly of structural members
 115 113, 119, 121, and 59 may be carried longitudinally on the members 120 which in turn may be supported on the columns 114, said columns 114 being placed at desired intervals and being designed to carry the load from one
 120 so called floor to another. The monorail members will be suitably provided with conventional electric conductor bars for carrying the current to the crane and trolley hoist mechanisms.
 125

Thus it will be easily seen that the building construction for motor vehicle storage purposes can be made relatively inexpensive and with a minimum weight of structural and component parts when my garage han-
 130

dling mechanism is used. My garage handling mechanism embraces the intimate construction of a garage, when desired, and is also adaptable for installation in a great variety of garage layouts and in many building constructions where it is desired to quickly and economically transform said building constructions for motor vehicle storage purposes. In Fig. 1 is disclosed a schematic plan view of a garage having two hatchways or entrance hoisting shaftways 123, two hatchways 124 for exit purposes, and the runway spaces or passages 125 through which the travelling trolley or crane mechanism 116 operates on the track members 56 and conveys and deposits motor vehicles into the stalls or spaces 112 which are designed for the reception of said motor vehicles. The walls of this building construction are designated at 110. It is to be noted that, in Fig. 1, the hatchways 123 and 124 are slightly longer than the width of the runways or passages 125 thereby permitting the crane mechanism 116 to pass completely over the hatchways 123 and 124 with the hoist and trolley mechanism 117 to hoist a motor vehicle to the desired floor or level on which the crane mechanism 116 operates. While the hatchways 123 and 124 are shown in Fig. 1, and also in some of the other views as being at one end of the building construction, it is to be understood that the hatchways can be located in various positions in relation to the floor plan depending on the particular building size, construction, and arrangement. However, where possible, it will be found preferable, in many instances, to locate the entrance hatchways so that they will be separated from the exit hatchways and so positioned as to provide an ample storage area for the accumulation of motor vehicles for storage purposes. Fig. 2 discloses a schematic plan arrangement similar to that disclosed in Fig. 1, except that the entrance hatchways 126 and the exit hatchways 127 represent elevators which may be used for raising and lowering the trolley, hoisting, and gripping mechanism as a unit. When it is desired to use elevators in this way, the elevators may be positioned at the side of the runways 128, thereby permitting the transfer crane mechanism 129 to approach said entrance hatchways 126 and said exit hatchways 127 at their ends and in this position to effect an alignment with runway tracks 130 when mounted on the elevators 131 (as shown in Fig. 11) which will permit the trolley, hoisting, and gripping mechanism, together with a motor vehicle, to be moved on to and to be carried, as a unit, by the elevators. It is to be understood that any conventional device, such as a conveyor or tipping table could be used, in a similar way, to place the motor vehicles on the elevators, but for the purpose of the schematic arrangement, I am as-

suming that the gripping mechanism, together with the trolley and hoist mechanism remains in a fixed relation to the motor vehicle from the time said motor vehicle is run on to the elevator at the loading floor until it is deposited in one of the storage stalls or spaces and in a similar manner when returned to the loading floor. Fig. 3 discloses a similar schematic arrangement with entrance hatchways 132 and exit hatchways 133 at the ends of the building and with the stalls 136 positioned parallel to the runways 134. The transfer crane mechanism 135 in Fig. 3 would necessarily have to be narrower and longer to permit picking up the motor vehicle in a position opposite to that indicated in Figs. 1, 2, and 3. The schematic arrangement as disclosed in Fig. 3 is essentially similar to those above described and in some instances would be advantageous for long narrow buildings as the method of handling, in all cases, would be similar, and the floor area actively used for storage purposes would be approximately the same.

Fig. 4 discloses another schematic arrangement in which a typical travelling crane mechanism 137 is used to span the entire storage bay. This arrangement would function essentially similar to the above described arrangements except the transverse transferring movements into the respective stalls 138 would be entirely confined to the bridge of the crane proper. Figs. 5 and 6 disclose a schematic arrangement of mounting the handling equipment on the roof of a building structure having the walls 110, the runway members 56 preferably projecting out over the building structure to permit, when necessary, lifting the motor vehicles from an alley or courtyard. The trolley and hoist mechanism 139 is adapted to travel on the runway members 56 and is connected by cables 140 to my gripping mechanism indicated at 141 and in which is supported the motor vehicle 38. The storage stalls or spaces 142 together with the runway 143 are here shown on top of the roof of the building structure. Fig. 8 discloses a schematic partial plan view of the general arrangement as disclosed in Figs. 1, 5, 6, or 7, in which the winches 144 comprise suitable drums having grooves for winding the cables 145, together with electric motors for operating said drums. The transfer crane mechanism 146 is thus adapted to be operated on the runway members 56 over the runway 143 to positions over either of the hatchways 147. The cables 145 are disclosed as running to each side of the runway 143 thus providing clearances at the hatchways 147 so that hoisting equipment can pass through said hatchways 147 to other floors. The stationary track members 59 in the stalls 142 are adapted for alignment with the track members 43 on the crane mechanism 146. In

Fig. 11 where the elevator 131 is used in conjunction with the crane mechanism 146, it is to be noted that the winch 58 is disclosed as using one cable 148, this being possible where simplicity of installation is desired.

Fig. 9 discloses schematically a typical sectional view in which the gripping mechanism 141 is shown in its lowered position from the hoist and trolley mechanism and ready to move the motor vehicle 38 up through the hatchway 149 to one of the storage stalls or spaces 142. Also in this view, a motor car 38 together with the crane mechanism 146 and gripping mechanism 141 is disclosed as being in one of the stalls or spaces 142. Fig. 10 discloses schematically several motor vehicles 38 in their stalls or spaces 142 along the runway space 143 in which is positioned the gripping mechanism 141 supported on the crane mechanism 146. Fig. 7 schematically discloses a building structure utilized for storing motor vehicles 38 in the stalls 150 above the ground line 151 and also in the stalls 152 below the ground line 151. The hatchway 153, together with the crane mechanism 146 and the gripping mechanism 141 are of the same general construction and arrangement as above described.

It is well recognized that the parking problem in down town areas, industrial centers, and congested residential centers, and congested residential areas in all cities is fast becoming serious and that improved methods of handling same are most important. My invention will make it possible to relieve this condition as it will materially improve the method of lifting, storing, and moving motor vehicles. Also it can be adapted for the movement of motor vehicles and other commodities either in or out of garages. The operation of the gripping mechanism, as above described, permits great flexibility in its adaptation to various floor arrangements due to its ability to pick up motor vehicles by approaching either from its sides or ends, thereby permitting the parking of motor vehicles, in an active storage, in several rows and in a relatively compact manner. Also the gripping mechanism simplifies the handling of the motor vehicles by its ability to be quickly and automatically attached to a motor vehicle regardless of its length or wheelbase and by the ability of the mechanism to deposit a motor vehicle in its storage space without the removal of the gripping mechanism from said motor vehicle. Also the handling device can be used in conjunction with the usual type of standard elevators which may be used in high lifts, in which kind of an installation, the hoisting mechanism cooperating with the gripping mechanism, can be relatively simple in construction as it would involve the necessity of lifting the

motor vehicles for a height of a few inches only. My method of handling motor vehicles for storage permits the use of overhead monorails or trolley tracks of the conventional type, as above described, thus permitting flexible applications with consequent low initial cost and low upkeep, thus further permitting storage access to space not necessarily adjacent to trolley or transfer crane runways and to buildings not ordinarily available for garage storage purposes. Thus while my method of handling is well adaptable to the larger type of garages having a multiplicity of floors, it is to be noted that, with equal merit, it can be used in the relatively smaller storages or garages as for instances in positions adjacent to the usual apartment buildings where the initial cost of installation together with its operating and maintenance cost would be relatively low, as the equipment can be arranged for manual, semi-automatic, or full automatic operation. As above disclosed, my invention can be used to store motor vehicles on the roofs of buildings which is usually waste space because of the usual lack of access thereto except by difficult installations and methods of handling, my mechanism being capable of being installed and used outside the building construction walls proper without interfering with existing building construction designs. My handling and gripping mechanism can also be used in any established floor area possible of being served by the typical travelling crane mechanism, thereby permitting the moving and placement of motor vehicles to any position on the floors. Also my invention incorporates the desirable feature in that the motor vehicle, when delivered for storage, may be locked up by the owner, thereby assuring the safety of its contents, as there remains no occasion or necessity for the garage operator or keeper to move the stored motor vehicle under its own power. This further contributes to safety from fire hazards and from destructive monoxide gases and oil fumes. It is also to be especially noted that my invention incorporates distinct improvements in the overhead transfer carriage or travelling crane mechanism necessary for the movement of the motor vehicles, thus contributing to speedy handling. Speed in handling is a very important and desirable element in any garage as it is very important that all of the mechanism relating thereto shall be designed to accomplish the utmost speed and efficiency, together with simplicity, since in this method of handling the travelling carriage or transfer crane mechanism would have considerable area to cover, in fact probably a great deal more than the hoist or elevator, as well as the necessity of stopping and starting at the various stalls or spaces where the motor vehicles are to be stored, thus necessitating a mechanism designed for rapid travelling and

operation. This requisite of speed in travel and operation is made possible by means of the movable set of track members provided on the travelling crane mechanism, said movable track members being maintained in flexible relation to the main frame members and so designed that the entire mechanism will snap into alignment relationship with the stationary track members in the adjacent storage stalls and at the same time permitting a slight drift of the main travelling carriage proper, thereby eliminating the necessity of intricate stopping mechanism that otherwise would be necessary for bringing the two sets of track members into accurate alignment as required when the motor vehicles are being transferred into and out of the storage stalls. This locking feature is further facilitated by use of the winches or hoists of the elevator type having cables connected thereto from the travelling transfer crane, movement being effected in this manner in preference, in many instances, to the conventional motorized mechanism propelling the crane by traction alone on the runways. Such an arrangement will afford rapid and definite control of the movement of the travelling transfer crane together with rapid acceleration and deceleration and a minimum amount of "inching" the travelling crane and its track members into position, thereby speeding up the entire process of handling motor vehicles in garages.

I claim:

1. In a garage handling mechanism, the combination of members for supporting a motor vehicle, means for moving said members into engagement with said motor vehicle, and means for controlling the engaging pressure of said members with said motor vehicle, said means comprising members automatically operated to contact and non-contact positions relative to one another.

2. In a garage handling mechanism, the combination of a frame member, members movably mounted on said frame member, members movably mounted on said first mentioned members, and means for moving said first mentioned members to or from each other, said means further moving said last mentioned members on said first mentioned member.

3. In a garage handling mechanism, the combination of means for engaging a motor vehicle at a plurality of points, means for equalizing the engaging pressure at all of said plurality of points, and means for limiting the engaging pressure to a pre-determined amount.

4. In a garage handling mechanism, the combination of a plurality of pivotally mounted members for engaging a motor vehicle, means for pivotally moving said plurality of said members, means for moving said plurality of members to or from engagement with said motor vehicle, said means auto-

matically operating said first mentioned means, and resilient means opposing the movement of said plurality of members to engagement with said motor vehicle.

5. In a garage handling mechanism, the combination of movably mounted members, resilient means opposing the movement of said movably mounted members, means for operating said movably mounted members, a resilient member connected with said last mentioned means, and electrical contact members connected with said last mentioned means and said resilient member.

6. In a garage handling mechanism, the combination of a winch, electrical means operating said winch, means for gripping a motor vehicle, said means being operated by said winch, electrical contacts controlling the operation of said electrical means, and means for controlling the operation of said electrical contacts, said last mentioned means being controlled by said means for gripping said motor vehicle.

7. In a garage handling mechanism, the combination of shoe members for engaging the wheels of a motor vehicle, said shoe members being rotatably mounted, each of said shoe members being provided with a concave portion for engaging the wheel of the motor vehicle, and means for rotatably moving said shoe members through a partial revolution.

8. In a garage handling mechanism, the combination of movably mounted shoe members, a sector pulley suitably connected with each of said shoe members, means for moving said movably mounted shoe members together with said sector pulleys, and means for limiting the movement of said movably mounted shoe members.

9. In a garage handling mechanism, the combination of a frame member, shoe members movably supported on said frame member, a sector pulley suitably connected with each of said shoe members, cable members engaging said sector pulleys, and means for operating said cable members, said means moving said shoe members on said frame member.

10. In a garage handling mechanism, the combination of a frame, means for gripping a motor vehicle, said means being movably mounted on said frame, equalizing members, cable means connecting said equalizing members, cable means connecting said equalizer members and said means for gripping said motor vehicle, and means for operating said cable means.

11. In a garage handling mechanism, the combination of a frame, a plurality of pairs of housings movably mounted on said frame, members rotatably mounted in said housings, shoe members suitably attached to and adapted to move with said members rotatably mounted, resilient members tending to always maintain said shoe members from movement, and means for operating said each of said

pairs of housings to and fro relative to the other of said pair of housings.

12. In a garage handling mechanism, the combination of means for gripping a motor vehicle, means for electrically operating said first mentioned means, and electrical contact members connected with said second mentioned means, said electrical contact members being actuated by said second mentioned means, said electrical contact members thereby controlling the operation of said first mentioned means by said second mentioned means.

13. In a garage handling mechanism, the combination of a frame, members for gripping a motor vehicle, equalizing members connected with said members for gripping said motor vehicle, and means for moving said members for gripping said motor vehicle together with said equalizing members, said members for gripping said motor vehicle moving approximately through one quarter revolution during the initial movement only of said equalizing members.

14. In a garage handling mechanism, the combination of a frame member, a pair of members movably mounted on said frame member, means for moving said pair of members toward each other, and automatically operated means for moving said pair of members from each other.

15. In a garage handling mechanism, the combination of gripping means for engaging the tires of a motor vehicle, means for automatically moving said gripping means into engagement with the tires of the motor vehicle, and means for causing said gripping means to automatically disengage the tires of the motor vehicle.

16. In a garage handling mechanism, the combination of gripping members for engaging the tires of a motor vehicle, said gripping members being normally maintained in a non-engaging position relative to the tires of the motor vehicle, means for moving said gripping members into engagement with the tires of the motor vehicle, and automatically operated means for returning said gripping members to their normal non-engaging position relative to the tires of the motor vehicle.

17. In a garage handling mechanism, the combination of gripping means, means for moving said gripping means to its engaging position, and electrical contact members connected with said gripping means and said last mentioned means.

18. In a garage handling mechanism, the combination of a frame member, gripping members movably mounted on said frame member, means for moving said gripping members to their engaged positions, means for electrically controlling the operation of said last mentioned means, and means for electrically controlling the movement of said gripping members on said frame member to

prevent said gripping members from moving beyond predetermined positions on said frame member.

19. In a garage handling mechanism, the combination of gripping members for engaging the tires of a motor vehicle, means for moving said gripping members and means for electrically controlling the engaging pressure of said gripping members with the tires of the motor vehicle, said last mentioned means being automatically operable at intermediate points of the movement of said gripping members to accommodate varying lengths of motor vehicles.

20. In a garage handling mechanism, the combination of a frame member, gripping members movably mounted on said frame member, means for electrically moving said gripping members, and electrical contact members suitably mounted to move with said gripping members, said electrical contact members thereby controlling the engagement pressure of said gripping members.

ARCHIE S. WATSON.

90

95

100

105

110

115

120

125

130