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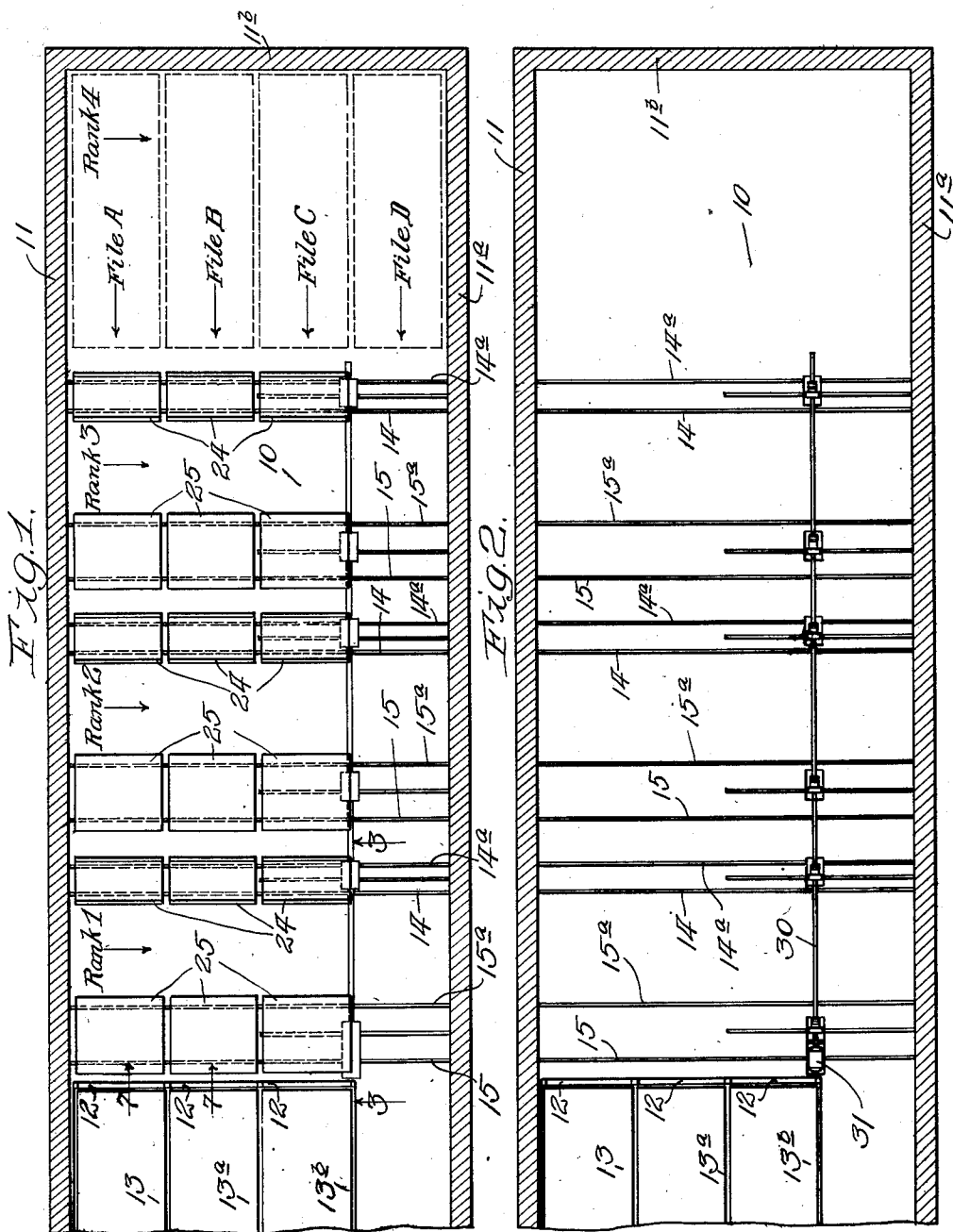
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2,031,392

PARKING APPARATUS

Filed June 20, 1934

4 Sheets-Sheet 1



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Feb. 18, 1936.

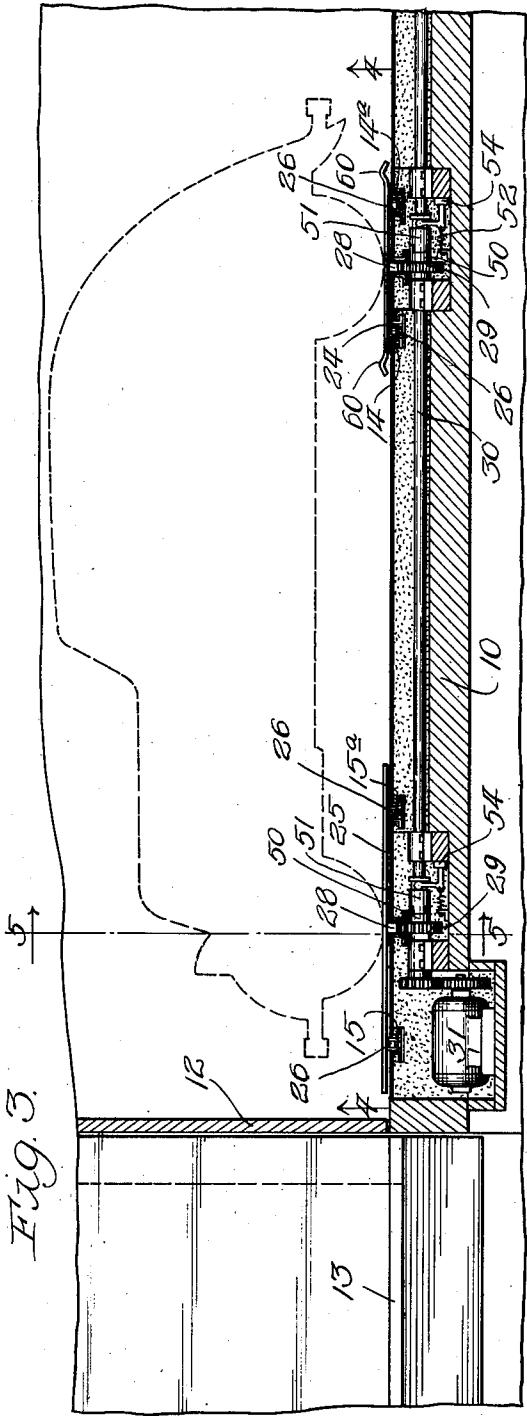
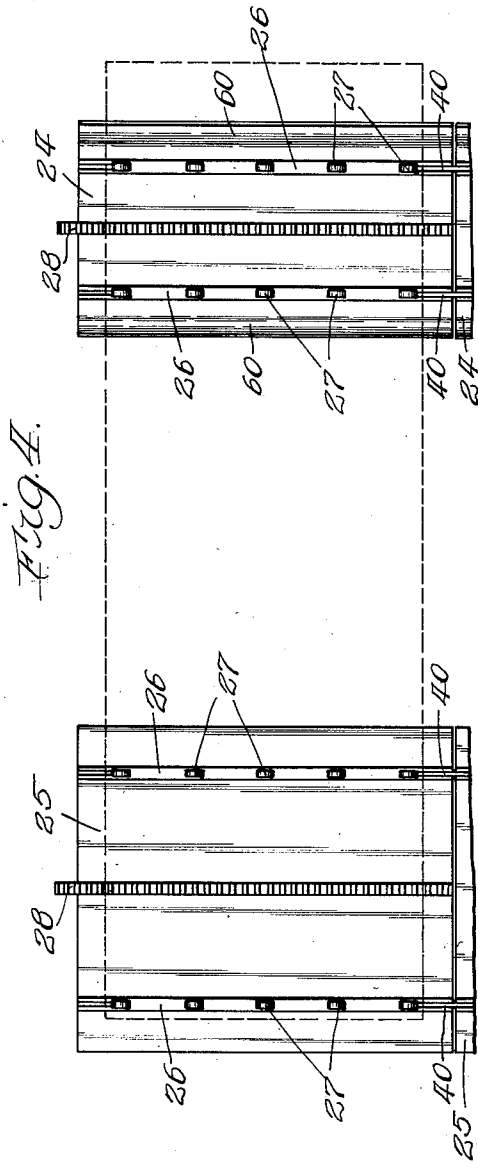
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PARKING APPARATUS

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4 Sheets-Sheet 2



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Fig. 5.

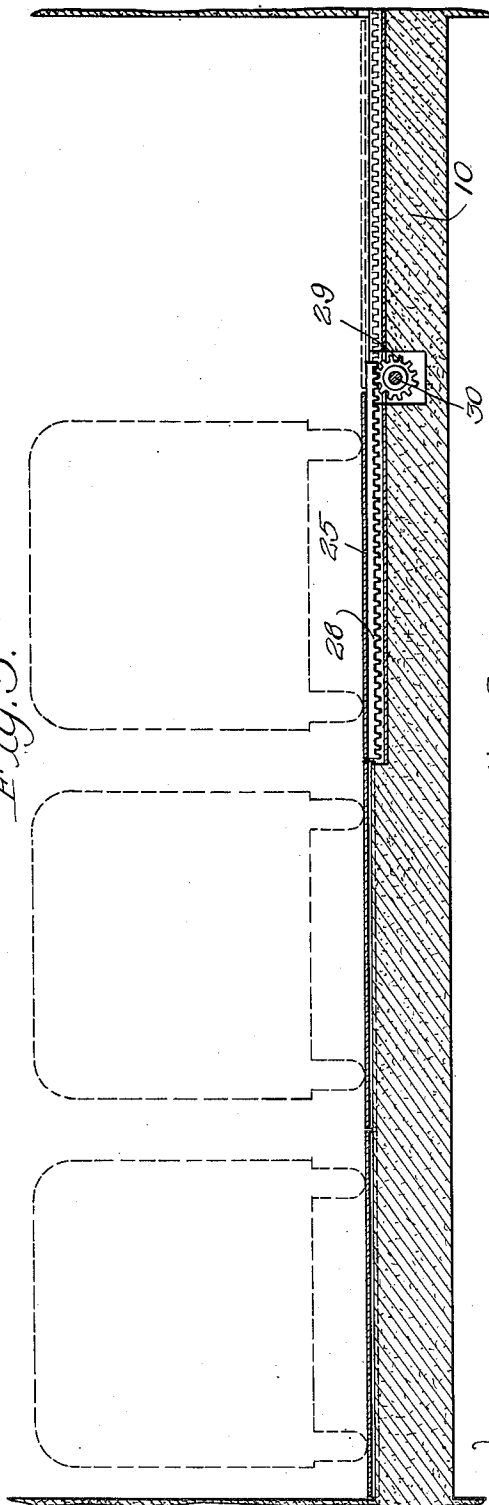
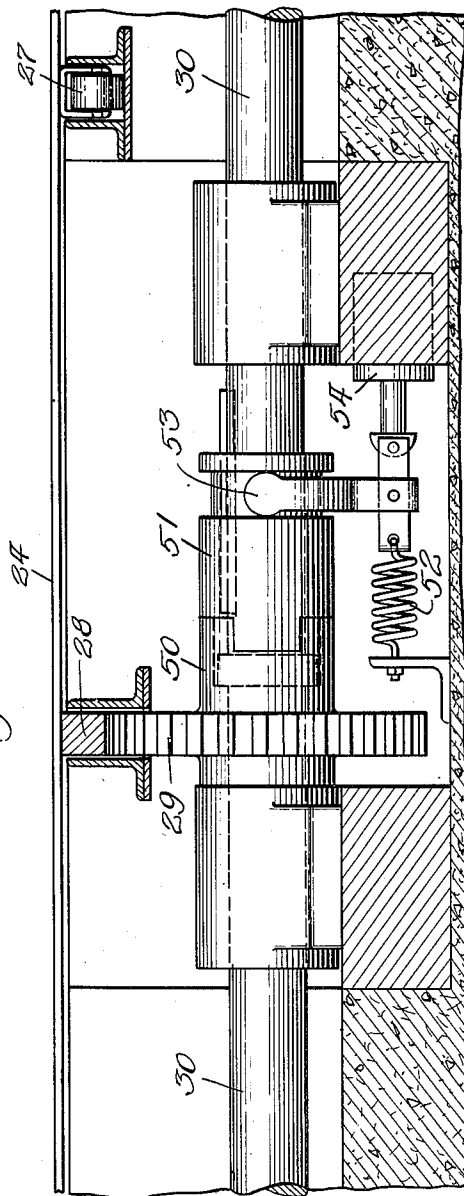


Fig. 6.



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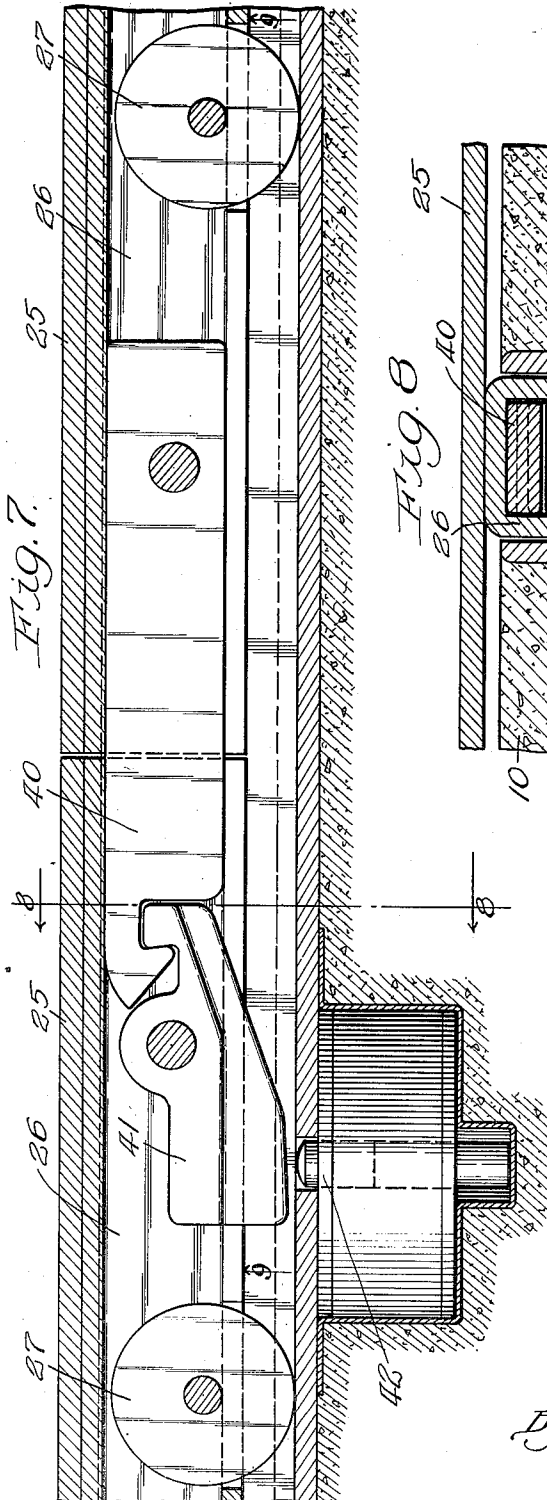
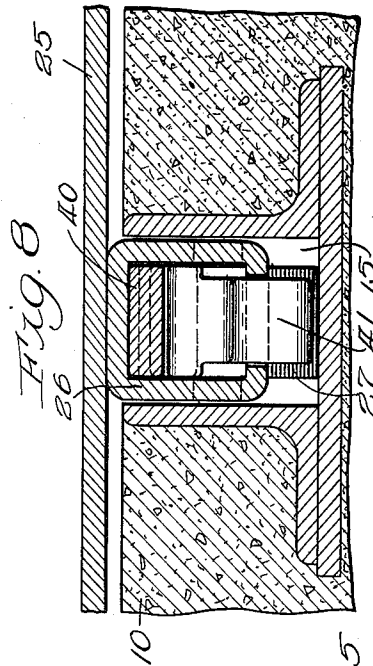
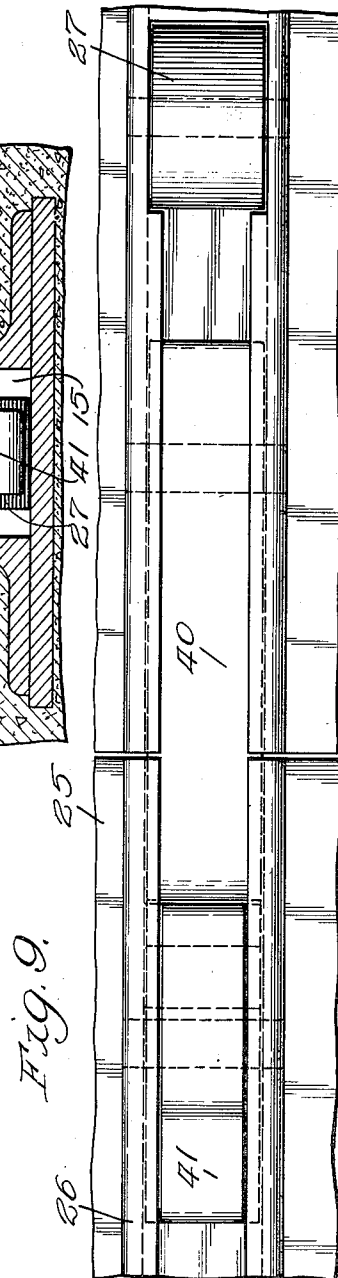
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PARKING APPARATUS

Filed June 20, 1934

4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

2,031,392

PARKING APPARATUS

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Application June 20, 1934, Serial No. 731,561

4 Claims. (Cl. 214—16.1)

This invention relates to improvements in storage apparatus and, more especially, such apparatus adapted for storing vehicles, for example, motor vehicles and the like.

Among the features of my invention is the provision of improved apparatus for storing vehicles in a confined space or area on a substantially horizontal floor or support, making very effective use of the space at hand while at the same time providing ample space for the movement to and from of vehicles.

For the purpose of illustrating my invention, I have shown the same employed in connection with a unit area having certain dimensions. It is obvious, however, that the principles of the invention may be embodied in larger or smaller areas.

By the use of my invention, a large proportion of any given space may be effectively utilized for the storage of vehicles and, at the same time, any individual vehicle can be placed in storage or removed therefrom with a relatively small amount of movement of other stored vehicles and by way of paths or driving lanes wider than otherwise would be possible.

Another new and novel feature of my invention is the development of the vehicle carriers or parkers in two separate, distinct and unconnected sections; one section to support the front wheels of a vehicle and the other section to support its rear wheels.

An important feature is the side connection of the carriers in each row or rank into a continuously connected train in a manner that will permit a train of carriers in one row or rank to be moved a predetermined distance sidewise in one direction; then permit the disconnecting of any selected pairs of carrier sections, or pair of carriers; then permit side movement in the reverse direction of the disconnected sections to any desired distance, thus opening between a parked automobile in an adjacent rank and the exit a clear driving lane of a width greater than it is possible to create by a single side movement in either direction alone without undue sacrifice of storage space.

The apparatus consists of a combination of movable carriers capable of supporting automobiles or other vehicles, these carriers being so low and flat and so disposed with relationship to the floor or supporting surface as to offer no obstruction to the movement of automobiles over either the carriers or the floor in any direction. The apparatus includes the use of ribs or cross members to provide needed strength; the in-

setting of wheels within the ribs to save height; the connecting and disconnecting of carriers and sections of carriers; such connecting means being inserted within the ribs; countersinking the ribs of the carriers in slots in the floor, using flat plates as automobile wheel supports, with separate sections if desired for the front and rear wheels of the automobile; in which case there is no direct connection between the section that supports the front wheels of the auto and the section that supports the rear wheels, except through the indirect means by which the carriers are connected into trains; and the connection together of the several ranks of carriers at the ends only, by means such as a common shaft and appropriate pinions.

Other features and advantages of my invention will appear more fully as I proceed with my specification.

In those forms of devices embodying the features of my invention shown in the accompanying drawings—

Figure 1 is a top plan view, showing the carriers in place; Fig. 2 is a similar view showing the carriers removed; Fig. 3 is a view taken as indicated by the line 3 of Fig. 1; Fig. 4 is a view taken as indicated by the line 4 of Fig. 3; Fig. 5 is a view taken as indicated by the line 5 of Fig. 3; Fig. 6 is an enlarged view similar to a portion of Fig. 3; Fig. 7 is a view taken as indicated by the line 7 of Fig. 1; Fig. 8 is a view taken as indicated by the line 8 of Fig. 7; and Fig. 9 is a view taken as indicated by the line 9 of Fig. 7.

As shown in the drawings, Fig. 1 indicates a unit of storage space or area, for example, a single floor of a building of sufficient size to accommodate substantially sixteen vehicles (when filled to its maximum capacity) in rank and file formation, four vehicles to each rank and four to each file. This unit of floor area or space I have indicated, in general, by 10, the walls of the same being indicated by 11, 11^a and 11^b.

Numerals 12, 12 may indicate doors or openings affording access to the floor 10. In the event that the floor 10 is above the ground level, 13, 13^a and 13^b may indicate elevators.

For convenience, I shall designate the four files A, B, C and D, and the ranks 1, 2, 3 and 4. Each of the doors 12 furnishes access to the floor area, and a vehicle may be moved on its own wheels anywhere over the floor area, thus having unimpeded access from any door to any rank and file storage position. My storage apparatus is so constructed as to permit vehicles to move about the storage area substantially as freely

as though the apparatus were not there. This free movement is a decided improvement on other mechanical storage apparatus that does not permit this.

5 As stated, the unit area I have shown will accommodate sixteen vehicles when filled to its maximum capacity. In normal operation, however, I prefer to keep one file (with the exception of one vehicle in the last rank) vacant. With
10 this arrangement, by mere sidewise shifting of certain vehicles, any vehicle (excepting said last one in said last rank) can be driven straight ahead through a door and onto an elevator. Although this vacant file represents a loss in storage space, it is evident that as the number of files
15 is increased, the percentage of loss caused by a single vacant file is reduced.

In order to utilize a relatively large proportion of the storage space and still permit any particular vehicle to be removed from the same
20 quickly and conveniently, it is necessary or desirable to provide means for effecting lateral movement or shifting of stored vehicles from one file to another in any rank. One of the features
25 of my invention is the provision of such means so constructed as not substantially to interfere with the free movement of stored vehicles on their own wheels from rank to rank in any file.

This means, permitting such lateral shifting, includes transverse slots in the floor, sufficiently
30 narrow to afford no obstacle to the movement of automobiles over them, these slots being adapted to contain the ribs or cross members of vehicle carriers, the ribs being in a position that will not
35 interfere with automobile movement, and the carriers being adapted to support vehicles. Since the construction and operation of these means are substantially the same in each rank, it is necessary to describe in detail but one. In the
40 first rank, the four transverse slots in the floor are indicated, in general, by 14, 14^a and 15, 15^a, the first two adapted to accommodate the carrier which supports the back wheels of a vehicle, and the latter, the carrier which supports the front
45 wheels.

All the carriers, including those for both the front and back wheels, are similar in construction and operation, except that those for the front wheels are somewhat longer (from front to back).
50 Consequently, I shall describe but one in detail. The carriers for the front wheels are indicated by 25 and those for the back wheels, by 24. Obviously, if desired, the vehicles may be reversed on the carriers. Each carrier is provided on its under
55 surface with two ribs or cross members 26 in the form of channels, open at the bottom. It is obvious that the two carriers for one vehicle may be made integral, and that the two carriers, as shown, for the front and rear wheels, respectively,
60 of one vehicle may be considered as two sections of a single carrier. Hereafter, therefore, I may use the term vehicle carrier to cover means to carry one vehicle.

It is to be particularly noted that the ribs or
65 cross members 26 of the vehicle carriers are countersunk in the slots a distance sufficient to allow said ribs to be substantially flush with the floor, extending above it only far enough to permit the bodies of the carriers—the plates affixed
70 to the ribs—to clear the floor. These plates also are sufficiently thin so that they do not substantially interfere with the movement of vehicles on their own wheels over the carriers or the floor or supporting surface. That is, a vehicle may
75 be easily driven or otherwise moved in any and

every direction on its own wheels anywhere on the floor, regardless of the presence or absence of the carriers.

In the operation of the apparatus, vehicles may be driven into any file and located in any rank
5 desired. It is contemplated that four vehicles be placed in the fourth rank, but that only three be placed in ranks 1, 2 and 3. In other words, one file is left entirely vacant, with the exception
10 of the fourth rank. The space will thus accommodate thirteen cars when filled to its maximum capacity. When thus occupied by automobiles, any car desired may be removed by laterally
15 shifting the cars which intervene between the desired car and the exit, to clear the file that it occupies.

In order to provide a driving lane of adequate width in any file, the narrow spaces between the files on either side may be closed up, and the
20 vacant file at the side may be temporarily utilized. By this means, ready access is afforded to any carrier in any rank. For example, to locate or remove the car in rank 3, file B, the cars in ranks 1 and 2, file A, are shifted toward
25 the wall 11 to close the small space between file A and wall 11. The cars in ranks 1 and 2, files B and C, are shifted toward the wall 11^a, such cars formerly in file B being shifted into file C and those formerly in file C being shifted into
30 vacant file D. This permits the car in rank 3, file B, to be rolled on its own wheels straight onto the elevator 13^a.

The vehicle carriers roll laterally sidewise in the slots. Rollers 27 may either be inserted in the carrier ribs as shown in the drawings, or
35 otherwise attached thereto, or they may be countersunk in the slots, in which event the vehicle carriers would consist of pans only, moving to and fro on the rollers carried in the slots. The lateral shifting may be accomplished in any suitable
40 manner. If desired, the cars can be shifted manually. I prefer, however, to provide mechanical means for shifting the carriers and will describe the same in the following paragraph.

Vehicles are shifted by shifting the carriers
45 upon which such vehicles are stored. I have here shown mechanical means for laterally shifting the carriers, said means comprising racks 28 attached to the end carriers in each rank, and pinions
50 29 in constant mesh with such racks, said pinions being mounted on a driving shaft 30 (Figs. 5 and 6) countersunk in the floor.

Customary means, such as an electric motor 31,
55 is provided for the operation of this driving shaft. The usual means are provided for reversing the motor, so that when operating in one direction, the turning of the pinions in engagement with the driving shaft causes the end carriers and all other carriers connected thereto to move in one
60 direction; and when the motor is operating in the reverse direction, the end carriers and the other carriers connected thereto are caused to move in the opposite direction, each motion being for a definite distance sufficient to move stored vehicles out of the way and provide a driving
65 lane of ample width between the desired vehicle and the exit.

It is to be particularly noted that all the carriers and stored vehicles in any one rank may be shifted laterally in both directions by merely
70 shifting the end carrier. The supporting ribs or cross members 26 of each carrier to be connected to another has a projecting ratchet member 40 at one end which fits into the hollow of an adjacent rib. This projection 40 forms the ratchet
75

portion of a latch, and in the corresponding adjacent rib, the remainder of the latch—the pawl 41—is provided, together with customary means, such as a solenoid-operated plunger 42, for releasing the latch at the time and in the location desired. There may be as many plungers 42 as desired and they may be located wherever necessary or desirable.

The projecting ratchets 40, in conjunction with the pawls in the adjacent ribs, act as latches when the carriers in a single rank are pulled in one direction, and they also (by entering the adjacent rib) serve as a means of preventing the carriers from buckling when such carriers are pushed in the opposite direction. Carriers are pulled in one direction, the latches serving to hook a multiplicity of carriers into a train, and are pushed in the reverse direction. The latches automatically engage when the carriers are brought together.

Means have also been provided for the simultaneous movement of any desired number of carriers in any desired number of ranks. For this purpose, means are provided for connecting or disconnecting any number of the gears 29 from the shaft 30. When the gears are disconnected, they are not rotated by the shaft. In Fig. 6, I have shown how one of the gears 29 may be disconnected from or connected to the shaft 30 for rotation therewith. The mechanism includes a hub 50 on the gear 29 provided with jaws adapted to cooperate with a clutch member 50 slidably and non-rotatably mounted on the shaft 30. A fork 53 operated by a solenoid 54 is used to disconnect the clutch member 51 from the hub 50. The members 50 and 51 are yieldingly held in engagement by the spring 52.

60, 60 indicate ridges on the carriers to prevent vehicles from accidentally rolling off.

While I have shown and described certain embodiments of my invention, it is to be understood that it is capable of many modifications. Changes, therefore, in the construction and arrangement may be made without departing from the spirit and scope of the invention as disclosed in the appended claims, in which it is my intention to claim all novelty inherent in my invention as broadly as permissible, in view of the prior art.

What I regard as new, and desire to secure by Letters Patent, is:

1. Apparatus for storing vehicles, including; a floor of unit area; a plurality of vehicle carriers in rank and file formation substantially filling said area with the exception of one file, said carriers comprising independent front and back wheel sections sufficiently close to the floor to permit free passage of vehicles thereover on their own wheels; and means for moving said carriers sidewise, said means including means for moving one carrier in each rank and means for rigidly connecting to any one of said carriers any number of additional carriers in the same rank.

2. Apparatus as claimed in claim 1, with means for automatically connecting the carriers of one rank into a train when said carriers are brought adjacent each other, and means for disconnecting said carriers from train formation.

3. Storage apparatus including; a supporting surface adapted to accommodate vehicles stored in rank and file formation; transverse slots in said supporting surface, said slots extending from one file to another in each rank; transversely movable carriers arranged to support vehicles and move laterally in such slots; means for laterally moving, by selection, a single carrier in a single rank; means for simultaneously moving a multiplicity of carriers in a single rank; means for simultaneously moving, by selection, a multiplicity of carriers in a multiplicity of ranks; means for connecting all the carriers in a single rank into a continuous train, said carriers being connected together at their sides; means for disconnecting the carriers by selection; means for moving the carriers sideways a greater distance than merely from one file to another; means for disconnecting the carriers at predetermined positions; and means for preventing buckling between adjacent carriers, all apparatus normally positioned to permit free movement of vehicles in any direction over said apparatus and supporting surface.

4. In apparatus of the character described; a floor with grooves therein; a vehicle carrier close to said floor; transverse channels on the carrier lying in said grooves; rollers carried by said channels; and means for connecting together adjacent carriers; said means including projecting members carried by the channels and adapted to extend into the channels on adjacent carriers when connected together.

EUGENE S. TAYLOR.