March 24, 1931. E. CHAUDOIR 1,797,325

GARAGE

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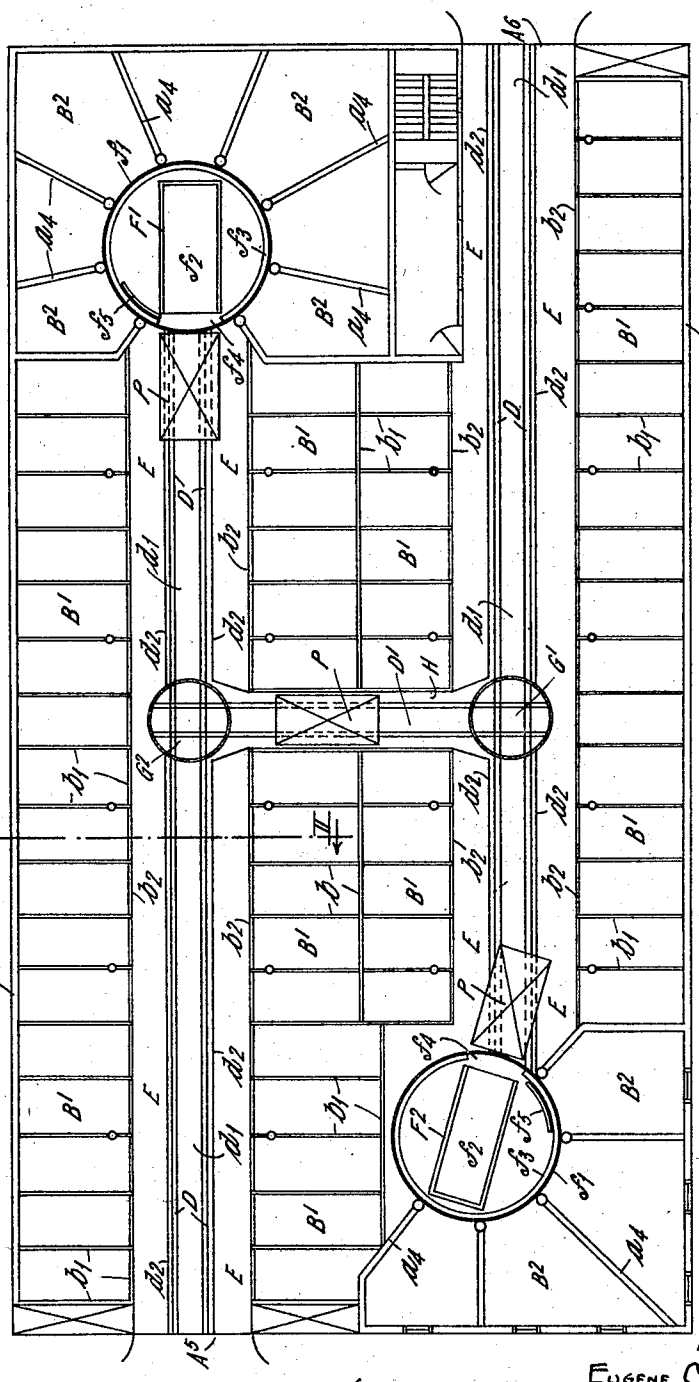


FIG. 1.

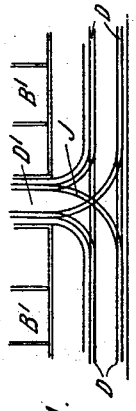


FIG. 1A.

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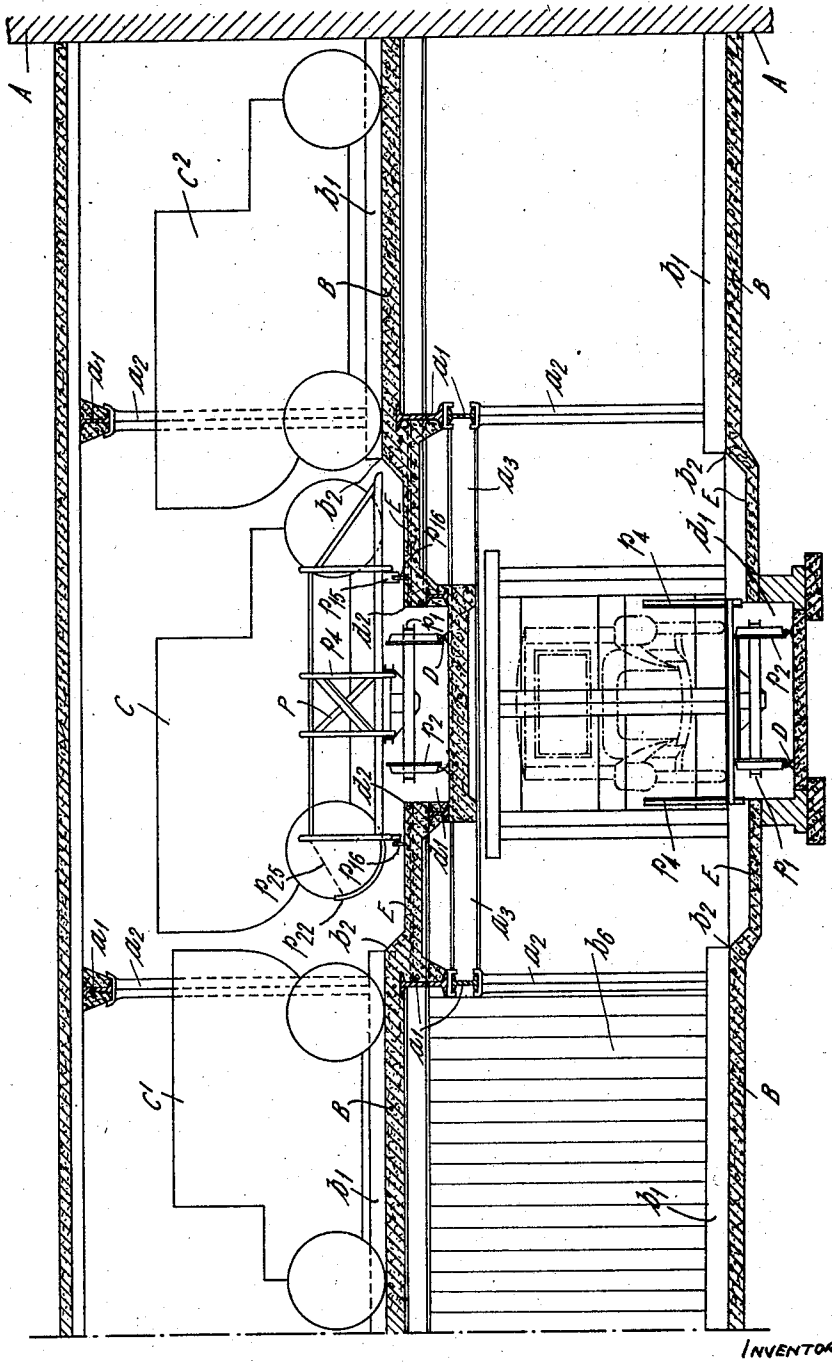


FIG. 2.

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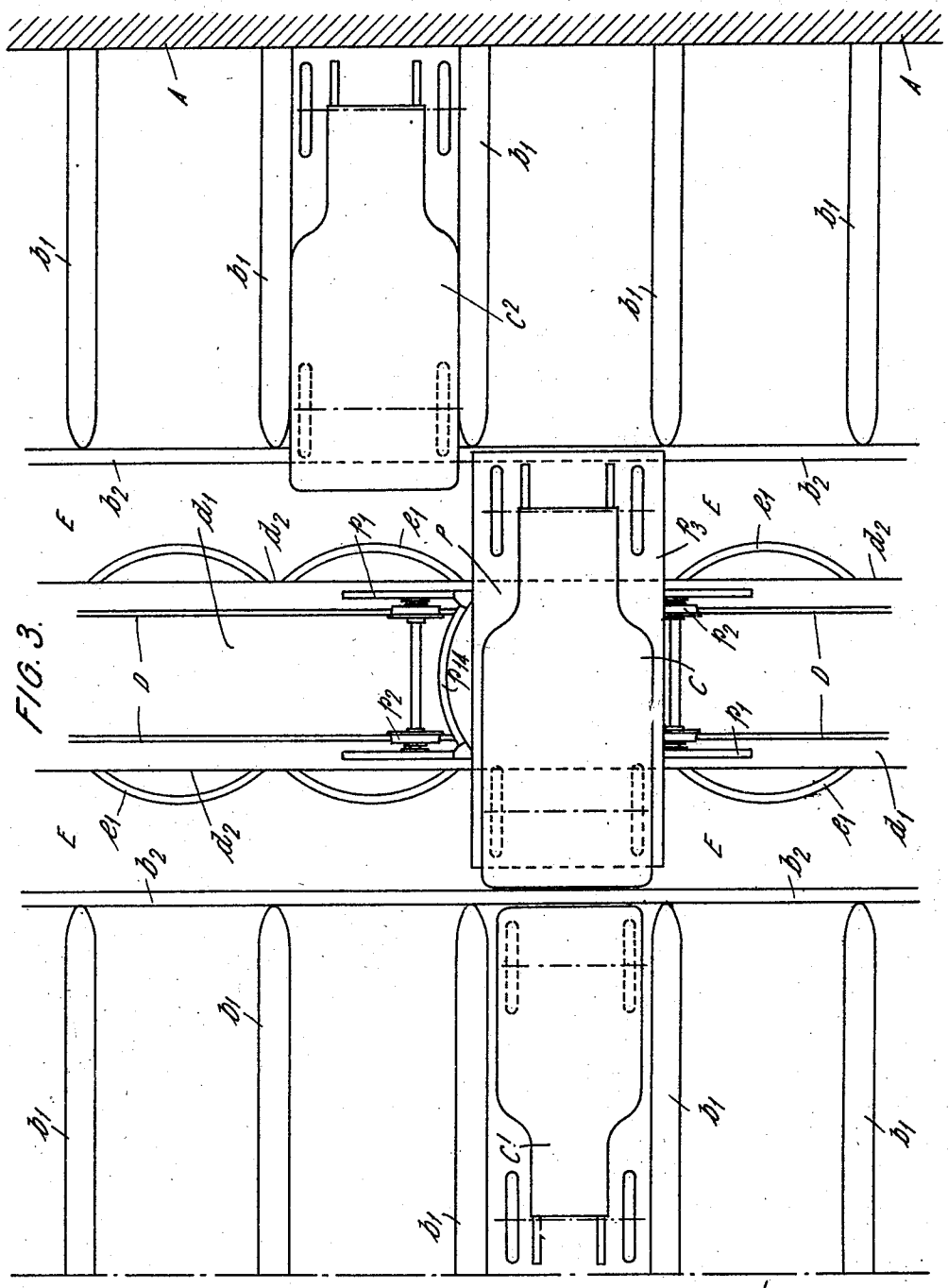


FIG. 3.

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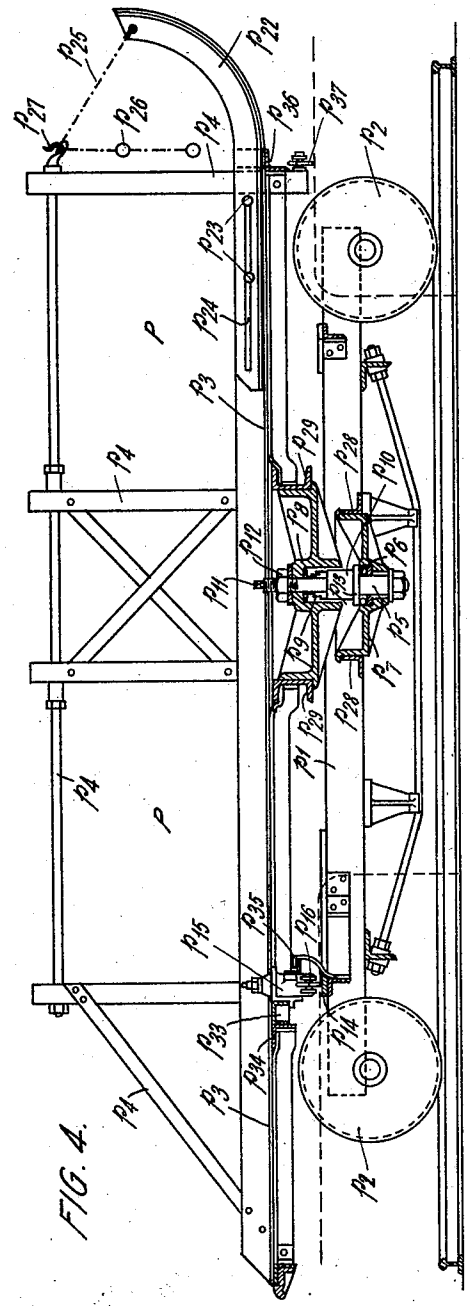


FIG. 4.

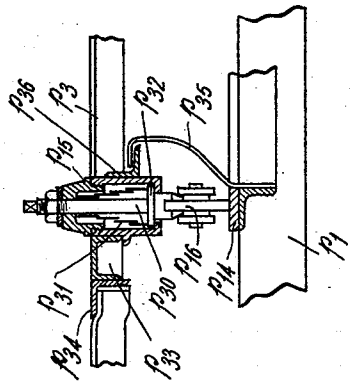


FIG. 7.

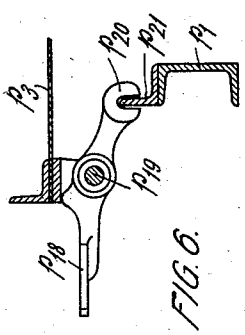


FIG. 6.

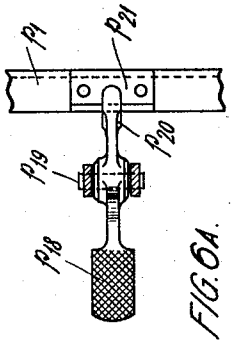


FIG. 6A.

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GARAGE

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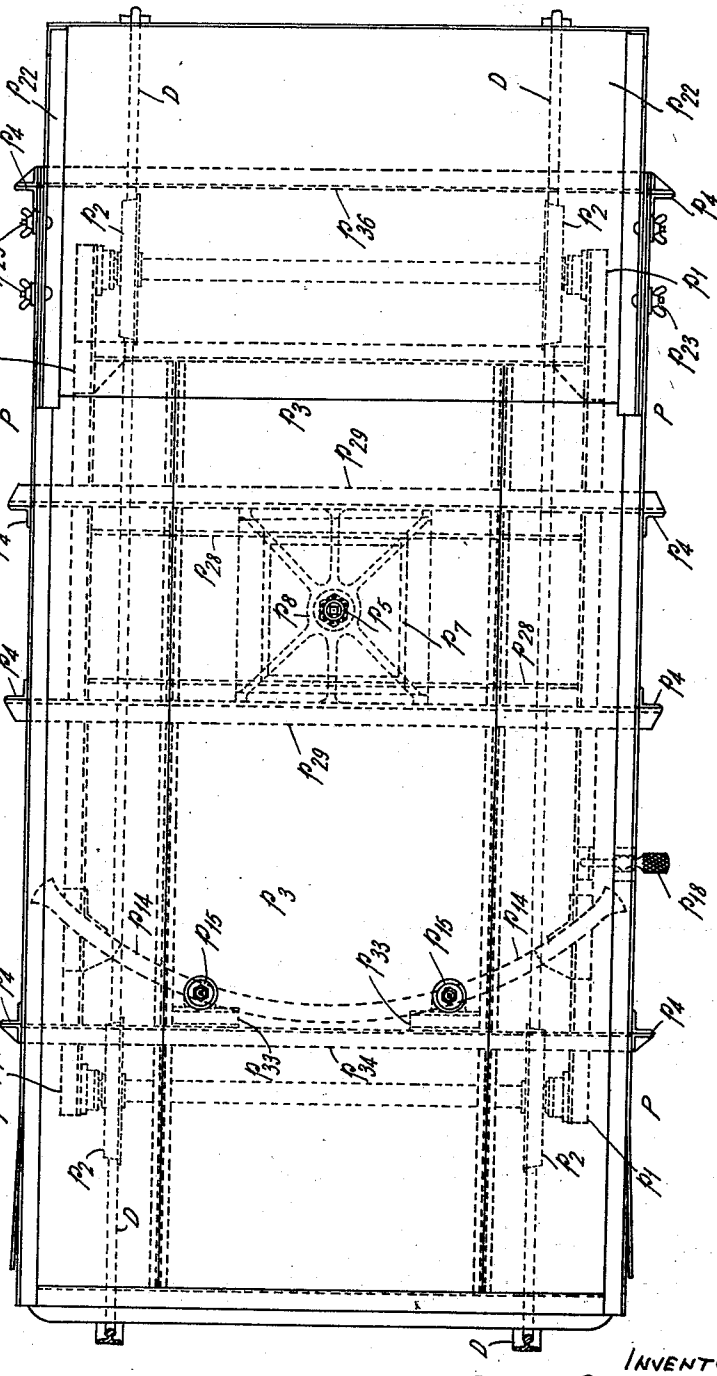


FIG. 5.

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FIG. 8.

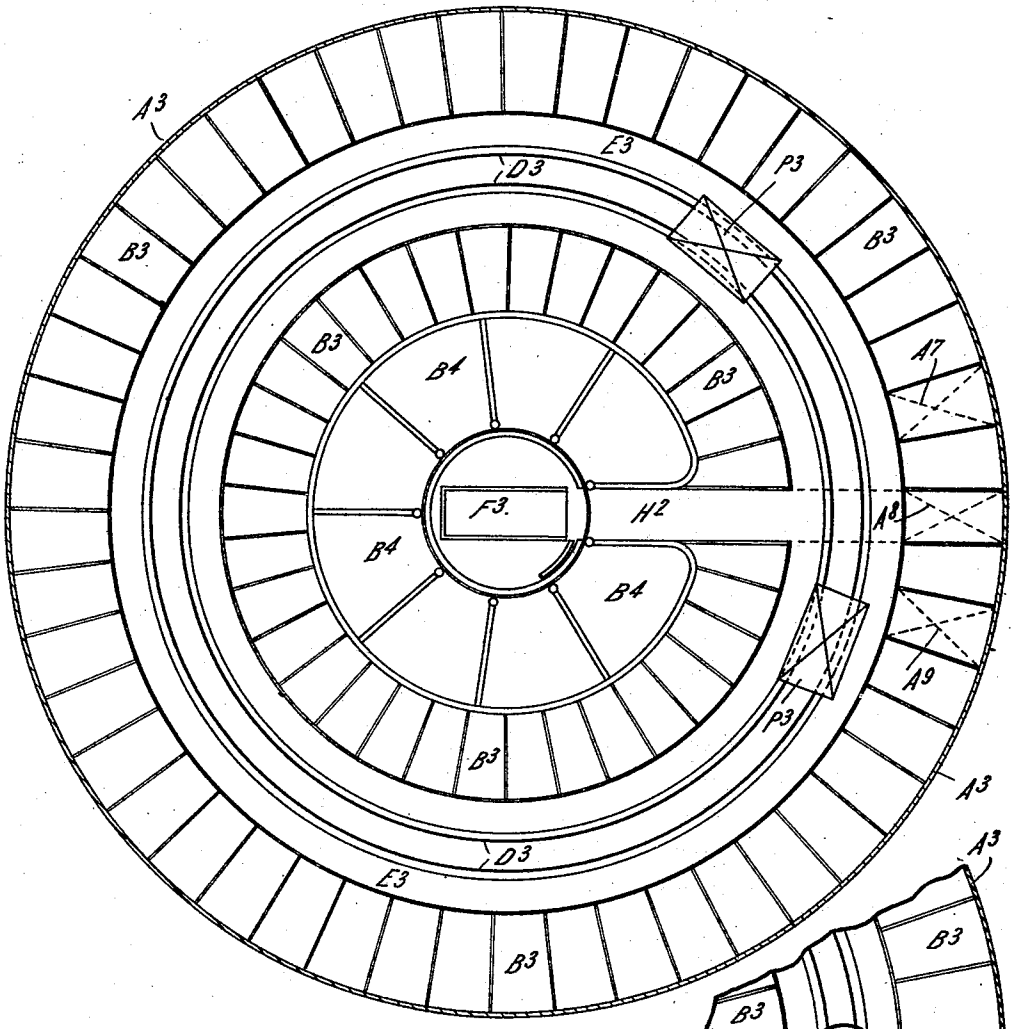


FIG. 9.

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FIG. 11.

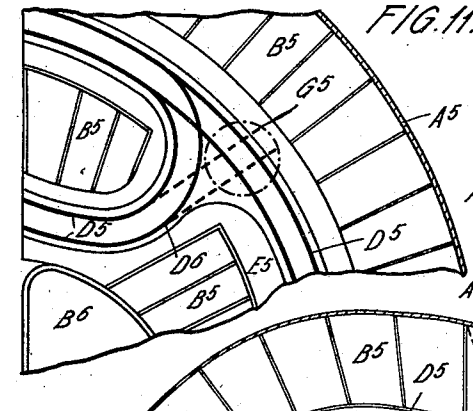


FIG. 10.

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Patented Mar. 24, 1931 1,797,325

UNITED STATES PATENT OFFICE

EUGÈNE CHAUDOIR, OF LIVERPOOL, ENGLAND

GARAGE

Application filed February 24, 1927, Serial No. 170,649, and in Great Britain October 16, 1926.

This invention relates to garages and to the method of and apparatus for transferring motor vehicles from one position to another therein, and the object is to so arrange the garage as to utilize to the greatest possible extent the floor space available in a single floor or multiple floor garage, and to provide transport means whereby in a full, or almost full garage, a motor vehicle may, without liability to damage by contact with other vehicles already parked, and usually without having to move any of the latter, be transported from the garage entrance to its allotted space in the garage, or vice-versa with a minimum expenditure of time and labor.

The invention is illustrated in the accompanying drawings, in which:—

Fig. 1 is a plan view of the general arrangement of the preferred form.

Fig. 1A is a fragmentary plan view and illustrates a modification of Fig. 1.

Fig. 2 is a part sectional elevation, to an enlarged scale, on the line II, II of Fig. 1.

Fig. 3 is a plan view corresponding with Fig. 2.

Fig. 4 is an elevation showing a turn truck.

Fig. 5 is a corresponding plan.

Figs. 6, 6A and 7 show details of the turn truck.

Fig. 8 is a diagrammatic plan of the circular garage.

Fig. 9 is a view of a modification of Fig. 8.

Fig. 10 is a plan view of a spirally arranged garage; and

Fig. 11 is a modification of Fig. 10.

Referring first to Figs. 1 to 7:—

A is the garage building which is assumed to be a multi-floor building of rectangular shape in plan; B are berthing floors arranged to accommodate motor vehicles such as C1 and C2 of the usual size as shown in Figs. 2 and 3.

Garaging spaces B1 on the berthing floors may be demarcated by lines on the floor or by curbs $b1$, or by partitions $b6$ (see Fig. 2) extending from floor to ceiling.

D are rail tracks arranged at a lower level than the berthing floors B and extending longitudinally and parallel with the edges $b2$ of the berthing floors. The rails may conveniently be carried in a trench $d1$, an intermediate floor E being formed between the edge $d2$ of the trench and the edge $b2$ of the berthing floor.

In the arrangement shown in Fig. 1 there are two lines of rail tracks, and the berthing floors are arranged on opposite sides of each rail track so as to take four rows of motor vehicles arranged side by side.

The floors are carried by longitudinal beams $a1$ supported by columns $a2$, and in the case of the upper floors the rails are carried on cross girders $a3$.

In the arrangement shown elevators F1 and F2 are arranged at opposite ends of the garage; and at each floor and in the vicinity of the elevator separate closed garaging spaces B2 are divided-off by means of radial walls $a4$ opening to the elevator well $f1$. The elevator consists preferably of a turn elevator constructed in accordance with the specification of my application for a United States patent filed on January 12th, 1927, Ser. No. 160,685, that is to say having a cage $f2$ running in guides carried by a vertical casing $f3$ rotatably carried within the well $f1$ and having openings $f4$ at each floor level closed by doors $f5$, which openings may by rotation of the casing $f3$ and cage $f2$ therewith be brought into line with the openings into any one of the garaging spaces B2 or be brought into line with the track D.

D1 is a cross track, the rails of which are arranged at the same level as and at right angles to the main tracks D, and G1 and G2 are turn-tables of the usual construction whereby a truck running on one of the main tracks may be transferred through a passageway H to the other main track. Instead of turn-tables G1 and G2 the rails of the cross track D1 may at each end have junctions J of the usual construction which serve the same purpose as a turn-table.

There is provided for each of the main tracks a turn truck P (see Fig. 4) having a platform $p3$ on which the motor vehicle C to be transported is run either from an entrance such as A5 or A6 (Fig. 1) or from an elevator cage as $f2$. The truck, and vehicle in position thereon, is transported

along the main track until the appropriate vacant garaging space on the berthing floor is reached, whereupon the platform, which is rotatable relatively to the under frame or chassis of the truck, is turned at right angles to the track, and the motor vehicle run on to the said space; the truck and motor vehicle thereon being, if necessary, transported from the one track to the other on the same level by means of the cross tracks, or from a track on one floor level to a track on another floor level by means of an elevator.

The construction of the turn truck is as follows, reference more particularly being made to Figs. 4, 5, 6, 6A and 7.

*p*1 is the under frame or chassis carrying two pairs of wheels *p*2 which run on the main tracks D or on the cross tracks D1; *p*3 is the rotatable platform having side guards *p*4; this platform is pivotally carried from the frame *p*1 by a central pivot pin *p*5 rotatably carried in a ball bearing *p*6 housed in the frame *p*7 attached to the cross-bearers *p*28 of the under carriage, a flange *p*13 of the pivot pin forming one of the races of the ball bearing. The pivot pin passes freely through the hollow boss of a central bracket *p*8 attached to the cross-bearers *p*29 of the platform, and a spiral spring *p*9 is interposed between the boss *p*10 of the pivot pin and the upper end of the recess in the boss of the bracket *p*8, the tail *p*11 of the pivot pin passing through a hole in the bracket *p*8 and being fitted with an adjustable nut *p*12.

When the vehicle is run on to the platform the weight of the vehicle transmitted through the bracket *p*8 to the spiral spring *p*9 compresses the latter and allows limited vertical spring controlled movement of the platform; the under carriage is provided with a quadrantal race *p*14 and the platform is provided with cylinders *p*15 having spring-controlled plungers *p*30 to which are attached bearing rollers *p*16 adapted, in the position illustrated in Figs. 4 and 5 to run on the race *p*14.

The function of the volute spring *p*31 is to permit the vertical movement of the bearing rollers *p*16, in case the level of the race *p*14 on the under carriage should not coincide with that of the surface of the intermediate floor E; the collar *p*32 on the plunger *p*30 determining the limits of adjustment of the latter. The brackets *p*15 are carried from the channels *p*33 secured to the cross-bearer *p*34, and the upward movement of the end of the platform, relatively to the under carriage, is limited by engagement of the inturned ends of the brackets *p*35 carried from the under carriage, with angle pieces *p*36 carried from the cylinders *p*15. Cylinders *p*15 and bearer rollers *p*16, may in the manner described be fitted to the cross-bearer *p*36 at the other end of the platform; usually however, bearing rollers such as *p*37, Fig. 4, having fixed axes, suffice at this end of the platform. Races such as *e*1, Fig. 3, to take the bearing rollers may be fitted to the intermediate floor, these however are not necessary.

When the platform is turned at right angles to the rail track, the bearing rollers *p*16 run off the quadrantal tracks *p*14 on to the intermediate floors E, the weight of a car under these circumstances presses the platform vertically downwardly relatively to the under carriage so as to bring the level of the exit end of the platform in line with the berthing floor B.

The movable platform is retained in line with the chassis, whilst travelling on the track, by a pedal-operated catch *p*18, (see Figs. 5, 6 and 6A) mounted on a pivot *p*19 and carried from the chassis and having a jaw end *p*20 adapted to engage with the angle *p*21 carried from the chassis frame *p*1. The curved end-bracket *p*22, with which a pair of the vehicle wheels engage may, in order to accommodate vehicles of exceptional length, be moved outwardly by slackening the bolts *p*23 and sliding the bracket in the slots *p*24; further support to the bracket being afforded by chains *p*25, the links *p*26 of which the adapted to engage with hooks *p*27.

In Fig. 2 the truck on the lower floor level is shown in the act of transporting the car (shown in chain dotted lines) along the main track; the truck on the upper floor level being shown with its platform turned at right angles to the track in position to permit the vehicle to be run into its appropriate garaging space.

Where the garage site is suitable, the track, the garaging spaces, the intermediate floor and the bounding walls may be arranged circularly and concentrically, as shown in Figs. 8 and 9, in which D3 are the tracks, E3 the intermediate floor, A3 the bounding wall and B3 the garaging spaces arranged in radial groupings on each side of the track. B4 are the enclosed garages having openings leading into the elevator well fitted with a turn elevator F3. The turn truck P3 is similar in construction to that described, and in transporting a vehicle from the turn elevator F3 it may be run down the radial passageway H2 and onto the turn-truck at the outer end of this passageway; or the passageway H2 may have a cross-track D4, a turntable G3 being fitted at the intersection of the cross-track and the main track D3.

Fig. 8 is a section of one of the upper floors of the garage; on the ground floor, leading from the road way, doors A7, A8 and A9 would be provided; cars to be transported to the upper floors passing through the door A8 on to the turn elevator F3; cars requiring to be garaged on the ground floor passing through the doors A7 or A9, and on to the turn-truck, the garaging spaces indicated by

the dotted cross lines being thus used as passageways.

In some cases where the site is suitable, the arrangement of the garage may be spiral in configuration, as shown in Figs. 10 and 11, which are sections of the upper floors of the garage. In this case the main track D5, the intermediate floor E5, and the wall A5 may be arranged as concentric spirals, the garaging spaces B5 being radially disposed on each side of the track. B6 are the enclosed garaging spaces opening into the well in which is fitted a turn elevator F5. The turn trucks P5 are constructed as described, and the vehicles enter the garage by the opening A10 on the ground floor, passing on to the turn truck; or through an opening A11 on the ground floor passing through the garaging space indicated by the dotted cross lines to the turn elevator F5, by which they are transported to the upper floors of the garage; or vehicles entering by the opening A11 may be directly transferred to the truck P5 when they have to be stored on the ground floor level. At D6 the tracks are laid from switching points into alignment with the turn-table G5; and at D7 junctions are arranged between the inner and outer convolutions of the spiral track; or instead of such junctions a turn-table G5 may be fitted.

Having now particularly described my invention, I declare that what I claim and desire to secure by Letters Patent, is:—

1. In a garage, and vehicle transferring apparatus therefor, in combination:—a rail track extending the length of the garage, garaging space on each side of the track, a wheeled truck running on said track, the width of which truck is substantially less than the length of the vehicles to be transferred; a platform substantially equal in width to the truck and of length sufficient to accommodate one of the vehicles to be transferred; pivotal means connecting the platform to the truck; bearing means carried by the said platform; the radial distance of which from the pivot is greater than half the overall width of the truck; floor surfaces on each side of and above the rail track, adapted to engage with the said bearing means and support the platform as the latter is turned at right angles to the truck; and races on the truck substantially at the same level as the said floor surfaces and adapted to support the said bearing means when the platform is turned in line with the truck; substantially as described.

2. In a garage, and vehicle transferring apparatus therefor, in combination:—a rail track extending the length of the garage, garaging space on each side of the track, a truck running on said track, the width of which truck is substantially less than the length of the vehicles to be transferred; a platform substantially equal in width to the truck and of length sufficient to accommodate one of the vehicles to be transferred; pivotal means connecting the platform to the truck; floor surfaces on each side of the rail track at a height intermediate the rails and the level of the floor on which the vehicles are to be garaged, and adapted to engage with the said bearing means and support the platform as the latter is turned at right angles to the truck; and races on the truck substantially at the same level as the said floor surfaces adapted to support the said bearing means when the platform is turned in line with the truck; substantially as described.

3. In apparatus as claimed in claim 1, the platform extending to full length of the truck, the pivotal connecting means between the platform and the truck being located substantially nearer one end of the platform than the other whereby when the platform is in the transverse position relatively to the truck its overhanging end extends to a garaging space the distance of which from the centre of the truck is greater than half the length of the platform; substantially as described.

4. In a garage and vehicle transferring apparatus therefor, in combination:—a rail track extending the length of the garage, garaging space on each side of the track, a truck running on said track, the width of which is substantially less than the length of the vehicles to be transferred; a platform substantially equal in width to the truck and of length sufficient to accommodate one of the vehicles to be transferred; pivotal means connecting the platform to the truck, comprising a vertical pivot pin fixed to the truck; a member fixed to the platform and engaging the said pivot pin but capable of axial movement relatively thereto; and a spiral spring interposed between the said member fixed to the platform and a part connected to the truck; bearing means elastically connected to the said platform and capable of upward movement relatively to the platform, the radial distance of said bearing means from the pivot being greater than half the over-all width of the truck; garaging floor surfaces on each side of and higher than the rail track, adapted to engage with the said bearing means and support the platform as the latter is turned at right angles to the truck; and races on the truck, substantially at the same level as the said surfaces, and adapted to support the said bearing means when the platform is turned in line with the truck; substantially as described.

5. Apparatus as claimed in claim 4 in which the said bearing surfaces are carried by studs slidably connected to the platform so as to be capable of vertical movement relatively thereto; providing flanges on said studs, and springs interposed between said flanges and said platform; substantially as described.

6. In a garage and vehicle transferring apparatus, in combination:—a plurality of rail tracks extending the length of the garage, garaging spaces on each side of each track extending the length of the garage; a cross track intersecting the fore-and-aft tracks and a turn table at each intersection between a cross track and a fore-and-aft track, trucks adapted to run on said tracks the width of each truck being substantially less than the length of the vehicle to be transferred; a platform on each truck substantially equal in width to the truck and of length sufficient to accommodate one of the vehicles to be transferred; pivotal means connecting the platform to the truck; bearing means carried by the said platform the radial distance of which from the pivot is greater than half the over-all width of the truck; garaging surfaces on each side of the rail track adapted to engage with the said bearing means and support the platform as the latter is turned at right angles to the truck; races on the truck substantially at the same level as the said surfaces, and adapted to support the said bearing means when the platform is turned in line with the truck; a truck with a car in position on the platform thereof being adapted to be run from one set of rails on to said turn table and by rotation of the turn table to be turned into alignment with the other set of rails; substantially as described.

7. In a vehicle transferring device for a garage, in combination; a truck of width substantially less than the length of the vehicle to be transferred; a platform substantially equal in width to the truck and of length sufficient to accommodate one of the vehicles to be transferred; pivotal means connecting the platform to the truck; bearing means carried by the platform at a radial distance from the pivot greater than one half the over-all width of the truck; bearing surfaces on the truck; and a guard for limiting the movement of the vehicle along the platform in the one direction; substantially as described.

8. Apparatus as claimed in claim 7 in which the guard is detachably secured to the platform so that its distance from the pivotal connection between the platform and the truck may be longitudinally adjusted within limits; substantially as described.

9. Apparatus as claimed in claim 7 in which the guard is detachably secured to the platform so that its distance from the pivotal connection between the platform and the track may within limits be longitudinally adjusted; said guard, in its innermost position, being located at a distance less than one half the length of the platform, from the pivotal means connecting the latter to the truck; substantially as described.

10. Apparatus as claimed in claim 7, in which the guard is of curvilinear configuration and is provided with horizontal members making pin-and-slot longitudinal adjustable connections with the platform; substantially as described.

In witness whereof I have hereunto set my hand.

E. CHAUDOIR.