

VEHICLE PARKING STRUCTURE

This invention relates to a parking structure for vehicles such as cars.

When constructing various types of structure, the foundation work is carried out prior to the commencement of construction work on the structure in order to ensure the stability of the structure.

A three dimensional car park structure constructed to enable the parking of vehicles on multiple tiers above the ground may have, for example three or four tiers above ground. When constructing such a structure, concrete, unscreened gravel, soil cement and such are poured into an appropriate depth below ground level at each location at which the vertical framework is to be erected in order to replace the soft and weak ground soil with a suitable foundation.

As shown in Fig. 3, foundations 21 are prepared in the ground, as described above, beneath the four corners of the space for a vehicle. Near the centre of each of these foundations 21 there is erected a vertical framework comprising uprights 20. Appropriate facing panels 22 are attached to the uprights 20 so as to connect adjacent uprights 20 together.

A problem with such conventional car parks as described above is that they do not provide the maximum parking area from the land area allotted for the construction of the car park structure. The land area allotted to the construction of the car park structure is that within outer framework B, indicated by a solid line in the drawing as shown in Fig. 3. However, the area that can actually be used for the parking of the cars is merely the area surrounded by the facing panels 22 and the vertical framework 20, as indicated by the broken line in the drawing. This is because the

uprights of the vertical framework 20 must inevitably be erected near the middle of the foundations 21. It is essential that these take up a certain area of land in order to provide stability for the parking apparatus.

In order to solve the aforementioned problem, the present invention provides a parking structure comprising a parking unit having uprights erected on foundations and facing panels extending substantially between the uprights, wherein corner members are secured to the uprights and the facing panels are secured to the corner members, the facing panels being outwardly spaced from the uprights by the corner members.

Consequently, when the facing panels enclosing the inner area of the structure are attached to the corner members, the utilizable inner area of the structure is expanded by virtue of the outward spacing of the facing panels. Thus the land area available for construction of the structure is efficiently utilised.

An embodiment of the present invention will be described, by way of example only, with reference to the drawings, wherein:-

Fig. 1 is a perspective view showing a schematic perspective view of the embodiment;

Fig. 2 is a plan view showing a part of the embodiment;

Fig. 3 is a plan view corresponding to Fig. 2, showing the structural arrangement of a conventional structure.

First, a brief explanation will be made of the outline of the parking structure shown in Fig. 1. In this figure, A indicates one parking unit of a structure consisting of a number of multi-tiered vehicle housing compartments 1, and 2 indicates an elevator.

Each vehicle housing compartment 1 has sufficient area to house a vehicle inside it and a number of tiers of these compartments are provided on top of each other. The drawing shows a three tiered structure. In each

vehicle housing compartment 1 is positioned a pallet 3 which can carry a vehicle on its upper surface.

The elevator 2 is positioned between the parking units A and moves up and down along the open side of the parking units A while maintaining a horizontal position.

In each vehicle housing compartment 1 and on the elevator 2, two pairs of rails 4 and 5 are laid, one pair near the front and the other near the back. These rails are positioned so that when the vehicle housing compartment 1 and the elevator 2 are alongside of each other, both pairs of rails will be aligned, both horizontally and in a straight line. Also, on the underside of each of the pallets 3 are installed a pair of wheels (not shown in the drawing), one at the front and other at the back, to roll along said rails 4 and 5.

The aforementioned parking structure can be operated as follows.

The elevator 2 is raised and stopped alongside one of the vehicle parking compartments in which the vehicle C is to be parked. At that time, the elevator 2 is stopped at a height where the vertical position of the rails 5 on the elevator 2 is accurately aligned with the rails 4 of the vehicle housing compartment 1 and these rails are also horizontally aligned. Once the rails are in alignment, the pallet 3 moves from the vehicle housing compartment 1 to the elevator 2 by means of the wheels running over the rails 4 and 5. Subsequently, the elevator 2, with the pallet 3 on it, is lowered to the ground, into the position shown in Fig. 1, and the vehicle C is placed on the pallet 3. Then, the elevator 2 is moved upwards until the pallet 3, which is carrying the vehicle C, is exactly alongside the vehicle housing compartment 1. The pallet 3 on the elevator 2 is then moved horizontally in the direction of the vehicle housing compartment 1, and parking of the vehicle C is thus completed.

In Fig. 1, a ramp or slanted boarding deck 6 is shown. This is to enable the vehicle C to be driven onto the pallet 3 easily. In addition, an apparatus for moving the pallet 3 laterally is provided on the elevator 2.

Each parking unit A is built as follows (see Fig. 2). First, foundations 11 of an appropriate size are formed abutting the boundaries of the construction lot where the uprights of the vertical framework are to be erected. The foundations reinforce soft, weak ground and are indispensable in providing stability for the parking unit A.

Once the foundations have been completed, the parking units A which are made of steel may be erected.

A vertical framework is formed of uprights 10 each positioned near the center of a foundation part 11. Crossbeams 12 made of steel are then fixed between the uprights 10 to form the framework. In this manner each vehicle housing compartment 1 is formed. If desired, rather than assembling the uprights 10 and the crossbeams 12 to form the parking unit A at the construction site, the uprights 10 and the crossbeams 12 can have been assembled at a remote site to form frame units. These prefabricated frame units can then be shipped to the construction site and connected into a box shape on site to build the parking unit A.

Then, as shown in Fig. 2, to each upright 10 is attached a corner member 13 which protrudes in plan view towards the outer edge of the foundation 11 on which the vertical portion is erected towards the outside of the parking unit A. These corner members 13 are formed in a solid piece by extrusion of aluminum alloy.

To each of the corner members 13 attached to each of the uprights 10 is fixed a facing material such as the facing panel 14. This is located within boundary formed by the outer edges of the foundations 11.

In Fig. 2 there are shown pillar shaped corner members 13 attached along each of said uprights 10. To

each of these corner members 13 a vertically grooved panel retaining part 15 is formed to retain the facing panel 14 by sandwiching a side edge part 14a of the facing panel 14 between the sides of the groove. This enables the easy installation of the facing panels 14.

The corner members 13, unlike the vertical frameworks 10, do not form the frame of the parking construction A, so lighter weight materials may be used. Therefore, even if these parts are placed in a position offset from the center of the corresponding part of the foundations 11, they will not affect the stability of the parking unit A. Also, each of the corner parts 13 only supports the facing panels 14 so the lightweight materials employed are sufficiently strong for this purpose. Consequently, such lighter weight materials as mentioned above can be used to form a solid piece and enable the improvement of the appearance of the outside of the structure. Moreover, they form a suitable inside space and may further lighten the load factor.

The corner member 13 is not limited to the structure shown in the drawing and various alternatives can be adopted.

As mentioned above, the construction of the illustrated embodiment differs from conventional constructions in that it does not have facing panels 14 attached directly to the uprights 10. Therefore, the internal area of the parking construction A is expanded in the four directions of front, back, left and right to the extent of the protruding part of the corner member 13. In conventional constructions, only the area indicated by the broken line in Fig. 3 could be utilized the internal area of the parking construction A. However, according to the structure of the illustrated embodiment, the area surrounded by the facing panels 14, which is broader than that defined by the broken line in Fig. 3, can be utilized as an internal part of parking unit A. For example, in the illustrated embodiment an

extra area having a width L_1 plus L_2 is obtained. This extra space may be utilized as a walkway and would also be convenient for internal maintenance work and other work in the parking unit A.

According to the present invention, it is possible to provide an internal area that is virtually the same size as the land area allotted for the construction of the three dimensional parking structure. Therefore, the result is that a three dimensional parking structure is provided wherein the internal space can be more efficiently used than is the case with conventional structures.

Moreover, conventional vertical frameworks and such can be used as they are, and using such a conventional framework a three dimensional parking structure with an expanded internal area can be easily and surely constructed.



Claim

1. A parking structure comprising a parking unit having uprights erected on foundations and facing panels extending substantially between the uprights, wherein corner members are secured to the uprights and the facing panels are secured to the corner members, the facing panels being outwardly spaced from the uprights by the corner members.
2. A parking structure as claimed in claim 1, wherein the corner members are made of lightweight material.
3. A parking structure as claimed in claim 2, wherein the lightweight material is aluminium alloy.
4. A parking structure as claimed in claim 1, 2 or 3, wherein the corner members have grooves for receiving the edges of respective facing panels.
5. A parking structure substantially as hereinbefore described with reference to Figures 1 and 2 of the accompanying drawings.