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(54) **CAR PARKING STRUCTURE**

AUTOPARKHAUS

STRUCTURE DE PARKING POUR VOITURES

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(73) Proprietor: **Gynne, Nils Alfred Samuel**
S-18262 Djursholm (SE)

(72) Inventor: **Gynne, Nils Alfred Samuel**
S-18262 Djursholm (SE)

(74) Representative: **Zetterström, Alf**
Alf Zetterström AB
Sagvägen 12
S-184 85 Akersberga (SE)

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Description

The present invention relates to a car parking structure.

More particularly, the invention relates to a car parking structure of the kind comprising a multistory building which is provided with at least one vertical elevator shaft and an elevator, arranged for movement in a vertical direction in said shaft and having at least one car parking space, and which has a plurality of parking floors, each containing a plurality of car parking spaces, arranged in a continous sequence around the elevator shaft, and a plurality of movable load platforms, which are adapted each to carry a car parked thereon, each one of said car parking spaces being provided with supporting and conveying means for the load platforms by which the load platforms may be supported in and moved in horizontal directions between different parking spaces.

Car parking structures of said kind are previously known, e.g. through US-A-4 768 914. A disadvantage of these known structures is that the supply of unoccupied load platforms to and the removal of such load platforms from an entrance and/or exit floor must be carried out by means of said elevator or, alternatively, the structure has to be provided with one or more storage shafts for unoccupied load platforms and with additional elevators in these shafts, on which a plurality of load platforms may be carried stacked upon each other. However, in practice, both alternatives are unfavourable.

In the first case, the time during which the elevator may be utilized for the transportation of cars to or from said entrance and/or exit floor will be substantially reduced and hence, the tendency to the formation of a queue during rush hours will increase in an annyoing manner.

In the second case, the special storage shafts for unoccupied load platforms will preclude a uniform disposition of the various floors in the building and make it impossible to provide a continuous sequence of car parking spaces around the elevator shaft on said entrance and/or exit floor as is most desirable in order to make it possible, when so required, to utilize this floor as a buffert store for cars which are to be collected within short or which recently have been left and are waiting for transportation to other floors by means of the elevator.

The invention has for its purpose to provide a new and improved car parking structure of the kind initially specified which eliminates or at least substantially reduces the disadvantages of the prior structure described above.

In accordance with the invention, for this purpose, there is proposed a structure of said kind, primarily characterized in that it also comprises at least one storage floor for temporarily unutilized load platforms which is located under a parking floor provided with an entrance and/or exit and which has a strongly reduced height as compared to the parking floors and contains a plurality of storage spaces for unutilized load platforms, arranged in a continuous sequence around the elevator shaft and provided with supporting and conveying means for the load platforms similar to the supporting and conveying means provided at the car parking spaces, said supporting and conveying means of at least one car parking space on the parking floor provided with an entrance and/or exit and one storage space on the storage floor located under said car parking space being formed by supporting and conveying means mounted on a lifting table which is movable in a vertical direction between said two floors in order to permit a movement of an unutilized platform in a vertical direction between said two spaces by means of the lifting table.

By providing the structure with at least one storage floor of strongly reduced height and at least one lifting table for moving unoccupied load platforms between said floor and an entrance and/or exit floor, as above proposed, one may facilitate an extremely rapid and simple movement of unoccupied load platforms to and from the latter floor without utilization of the elevator and without having to infringe upon the possibility of utilizing the entire area around the elevator shaft on this floor as car parking spaces, when so desired. Since the storage floor may have a height of only about 3 - 4 decimeters, the provision of one or more such floors neither causes any substantial increase of the total volume of the building.

Even if the movement of unoccupied load platforms between said storage floors and said entrance and/or exit floor preferably is effected by means of the lifting table, the structure may suitably be arranged to permit a movement of unutilized load platforms to and from the storage floor also by means of the elevator. Such a construction makes it possible, when so required, to fill the storage floor with unoccupied load platforms or to clear it of such load platforms.

In this case, the elevator may preferably be provided with at least one space of low height for an unutilized load platform under a car parking space therein.

According to a preferred embodiment of the invention, the lifting table may also be arranged to be utilized for moving a load platform, having a car parked thereon, between said parking floor provided with an entrance and/or an exit and another adjacent parking floor. Hereby, it is possible during rush hours, to increase the buffert store of cars close to the entrance or exit, respectively, i.e. the number of cars which are located close to the entrance or exit and which are to be collected within short or which recently have been left and are waiting for further transportation in the structure by means of the elevator.

Below the invention will be described in further detail with reference to the accompanying diagrammatic drawings, in which:-

Figure 1 shows a plan view, in section, of a car parking structure according to an embodiment of the invention, selected by way of example.

Figure 2 shows a side elevation of said structure, in

section taken along line II-II in Figure 1, and Figure 3 shows a perspective view of a load platform, seen in an inclined direction from below.

The parking structure shown in the drawings is constructed as a multistory building 10 containing a plurality of floors 11 having a larger height and two floors 12 having a substantially lower height. All floors 11 and 12 are divided into nine compartments 13 and 14, respectively, having a rectangular cross-section as seen in plan view. On each floor, these compartments are arranged in three side-by-side raws, each containing three compartments. The central compartments on the various floors together form a central vertical elevator shaft 15 containing an elevator 16 which may be controllably moved in an upward and downward direction by means of a hoist mechanism located within an upper extension 17 of the building.

Figure 1 shows a section through that one floor 11 which is located on the ground level and which is provided with an entrance opening 18 and an exit opening 19. This floor and all other floors 11 have sufficiently large height to make it possible to utilize each of the various compartments 13 located thereon around elevator shaft 15 as a car parking space in which a car 20 may be stored parked on a movable generaally rectangular load platform 21.

The elevator 16 may preferably contain two compartments 16a, which are located one above the other and serves as car parking spaces and which have a height corresponding to the height of floors 11, and, beneath said compartments, a compartment 16b of substantially lower height which may receive unutilized load platforms 21.

At its bottom, each one of the abovementioned compartments 13 and 16a on floors 11 and in elevator 16, which may be used as car parking spaces, is provided with supporting and conveying means 22, 23 for the load platforms 21 by which said platforms may be supported in stationary positions in said compartments and, when so desired, moved in horizontal directions between adjacent compartments 13 or between a compartment 13, located at a long side or a short side of elevator shaft 15 on any floor 11, and a compartment 16a in elevator 16, located on level with said floor.

These supporting and conveying means 22, 23 for load platforms 21 may be constructed in many different ways. However, they should be such as to permit a controllable movement of the load platforms in the longitudinal direction as well as in the transversal direction of said platform. In the illustrated embodiment, the supporting means are assumed to consist of rotatably mounted spherical balls 22 which are located in mutually perpendicular raws and columns in the various compartments serving as car parking spaces and which may project partially into crossing guide grooves 25, formed in the lower sides of the load platforms. The conveying means 23 may consist of one endless conveyor chain extending in the longitudinal direction of compartment 13 and another endless conveying chain extending in the transversal direction of said compartment, each one of said chains being supported by two chain wheels and provided with a number of drivers which may engage with a longitudinal or transversal raw of engagement means 26 provided on the lower side of a load platform. Hereby, the conveying means 23 may be utilized for controllably moving load platforms 21 in their longitudinal directions as well as in their transversal directions. Additionally, they may also be utilized for temporarily holding the load platforms in a desired position in a car parking space on a floor 11 or in elevator 16.

The two floors 12 of low height located under floor 11 on the ground level have for their purpose to serve as a storage for unoccupied load platforms 21. Therefore, the various compartments 14, located around elevator shaft 15 on floors 12, are formed as storage spaces for temporarily unutilized load platforms and provided with supporting and conveying means 22, 23, corresponding to the supporting and conveying means provided on floors 11 and in elevator 16. Such supporting and conveying means 22, 23 are also provided in the lower compartment 16b in elevator 16 which has a low height corresponding to the height of compartments 14.

In the compartment 13, located immediately behind entrance opening 18 and serving as a car parking space, the supporting and conveying means 22, 23 are mounted on a lifting table 24. By means of diagramatically indicated lifting means 27, this lifting table 24 may be moved in a vertical direction from the position in flush with the ground level, shown in full lines in Figure 2, to anyone of the three alternative positions shown in dash-dotted lines, where it will be located on level with the bottom surface of one or the other one of the two low floors 12 or the next lower floor 11. Hereby, lifting table 24 may be utilized for moving unoccupied load platforms 21 between the floor 11, located on the ground level and the two floors 12, serving as a store for such platforms. Moreover, it may also be utilized to move a load platform 21, having a car parked thereon, between the floor 11 located on the ground level and the next lower floor 11.

Claims

1. Car parking structure of the kind comprising a multistory building (10) which is provided with at least one vertical elevator shaft (15) and an elevator (16), arranged for movement in a vertical direction in said shaft and having at least one car parking space (16a), and which has a plurality of parking floors (11), each containing a plurality of car parking spaces (13) arranged in a continuous sequence around the elevator shaft, and a plurality of movable load platforms (21) which are adapted each to carry a car (20) parked thereon, each one of said car parking spaces (13, 16a) being provided with supporting and conveying means (22, 23) for the load platforms (21) by

which the load platforms may be supported in and moved in horizontal directions between different parking spaces (13, 16a), characterized in that the structure also comprises at least one storage floor (12) for temporarily unutilized load platforms (21) which is located under a parking floor (11) provided with an entrance (18) and/or exit (19) and which has a strongly reduced height as compared to the parking floors (11) and which contains a plurality of storage spaces (14) for unutilized load platforms (21), arranged in a continuous sequence around the elevator shaft (15) and provided with supporting and conveying means (22, 23) for the load platforms (21) similar to the supporting and conveying means (22, 23) provided in the car parking spaces (13, 16a), said supporting and conveying means (22, 23) of at least one car parking space (13) on the parking floor (11) provided with an entrance (18) and/or exit (19) and one storage space (14) on the storage floor (12) located under said car parking space being formed by supporting and conveying means (22, 23) mounted on a lifting table (24) which is movable in a vertical direction between said two floors (11, 12) in order to permit a movement of an unutilized platform (21) in a vertical direction between said two spaces (13, 14) by means of the lifting table (24).

2. Car parking structure according to claim 1, characterized in that it is arranged to permit a movement of unutilized load platforms (21) to and from said storage floor (12) also by means of the elevator (16).

3. Car parking structure according to claim 2, characterized in that the elevator (16) is provided with at least one space (16b) of low height for an unutilized load platform (21), located under a car parking space (16a) in the elevator.

4. Car parking structure according to any of the preceding claims, characterized in that the lifting table (24) is arranged to be utilized also for moving a load platform (21), having a car (20) parked thereon, between said parking floor (11) provided with an entrance (18) and/or exit (19) and another adjacent parking floor (11).

Patentansprüche

1. Autoparkhaus der Art, umfassend ein mehrstöckiges Gebäude (10), das mit mindestens einem vertikalen Aufzugschacht (15) und einem Aufzug (16) versehen ist, der zu einer vertikalen Bewegung in dem Schacht ausgebildet ist und mindestens einen Autoparkraum (16a) aufweist, und das mehrere Parkdecks (11) hat, die jeweils mehrere Autoparkräume (13) enthalten, die in einer fortlaufenden Reihe um den Aufzugschacht herum angeordnet sind, und mehrere bewegliche Ladeplattformen (21) enthalten, die jeweils ein darauf geparktes Auto (20) tragen können, wobei jeder dieser Autoparkräume (13, 16a) mit Stütz- und Fördermitteln (22, 23) für die Ladeplattformen (21) versehen ist, mit denen die Ladeplattformen abgestützt und in horizontalen Richtungen zwischen verschiedenen Parkräumen (13, 16a) bewegt werden können, dadurch **gekennzeichnet**, daß das Parkhaus ferner mindestens ein Speicherdeck (12) für vorübergehend unbenutzte Ladeplattformen (21) umfaßt, das unter einem mit einem Eingang (18) und/oder einem Ausgang (19) versehenen Parkdeck (11) angeordnet ist und das im Vergleich zu den Parkdecks (11) eine erheblich verringerte Höhe hat und mehrere Speicherräume (14) für unbenutzte Ladeplattformen (21) enthält, die in einer fortlaufenden Reihe um den Aufzugschacht (15) herum angeordnet und mit Stütz- und Fördermitteln (22, 23) für die Ladeplattformen (21) versehen sind, die den in den Autoparkräumen (13, 16a) angeordneten Stütz- und Fördermitteln (22, 23) ähnlich sind, wobei die Stütz- und Fördermittel (22, 23) mindestens eines Autoparkraums (13) auf dem mit dem Eingang (18) und/oder dem Ausgang (19) versehenen Parkdeck (11) und eines Speicherraums (14) auf dem unter diesem Autoparkraum angeordneten Speicherdeck (12) von Stütz- und Fördermitteln (22, 23) gebildet sind, die auf einem Hubtisch (24) angeordnet sind, der in einer vertikalen Richtung zwischen diesen zwei Decks (11, 12) bewegbar ist, um eine Bewegung einer unbenutzten Plattform (21) in einer vertikalen Richtung zwischen diesen beiden Räumen (13, 14) mit Hilfe des Hubtisches (24) zu ermöglichen.

2. Autoparkhaus nach Anspruch 1, dadurch **gekennzeichnet**, daß es eine Bewegung von unbenutzten Ladeplattformen (21) zu dem Speicherdeck (12) hin und von diesem weg auch mit Hilfe des Aufzugs (16) ermöglicht.

3. Autoparkhaus nach Anspruch 2, dadurch **gekennzeichnet**, daß der Aufzug (16) mit mindestens einem Raum (16b) von geringer Höhe für eine unbenutzte Ladeplattform (21) versehen ist, der unter einem Autoparkraum (16a) des Aufzugs angeordnet ist.

4. Autoparkhaus nach einem der vorhergehenden Ansprüche, dadurch **gekennzeichnet**, daß der Hubtisch (24) auch zum Bewegen einer Ladeplattform (21), auf der ein Auto (20) geparkt ist, zwischen dem mit einem Eingang (18) und/oder einem Ausgang (19) versehenen Parkdeck (11) und einem anderen benachbarten Parkdeck (11) benutzt werden kann.

Revendications

1. Structure de parking pour voiture du type comprenant un immeuble à étages (10) qui est muni d'au moins une cage d'ascenseur verticale (15) et d'un ascenseur (16), agencé pour être déplacé dans une direction verticale dans la cage et comportant au moins un espace de parking pour voiture (16a), et qui comporte une pluralité d'étages de parking (11), chacun d'eux comportant plusieurs espaces de parking pour voiture (13) agencés suivant une séquence continue autour de la cage d'ascenseur, et une pluralité de plates-formes de chargement déplaçables (21) qui sont adaptées chacune pour porter une voiture (20) qui est stationnée sur celle-ci, chacun de ces espaces de parking pour voiture (13,16a) étant muni de moyens de support et de convoyage (22,23) pour les plates-formes de chargement (21) à l'aide desquels les plates-formes de chargement peuvent être supportées et déplacées dans une direction horizontale entre des espaces de parking (13,16a) différents, caractérisée en ce que la structure comprend également au moins un étage (12) de rangement pour les plates-formes de chargement (21) temporairement inutilisées qui est placé sous un étage de parking (11) muni d'une entrée (18) et/ou d'une sortie (19) et qui comporte une hauteur réduite de façon importante en comparaison aux étages de parking (11) et qui contient une pluralité d'espaces de rangement (14) pour des plates-formes de chargement (21) inutilisées, agencés suivant une séquence continue autour de la cage d'ascenseur (15) et munis de moyens de support et de convoyage (22,23) pour les plates-formes de chargement (21) similaires aux moyens de support et de convoyage (22,23) prévus dans les espaces de parking (13,16a) pour voiture, ces moyens de support et de convoyage (22,23) d'au moins un espace de parking (13) pour voiture de l'étage de parking (11) muni d'une entrée (18) et/ou d'une sortie (19) et un espace de rangement (14) de l'étage de rangement (12) placé sous cet espace de parking pour voiture étant formés par des moyens de support et de convoyage (22,23) montés sur une table de levage (24) qui est déplaçable suivant une direction verticale entre les deux étages (11,12) de manière à permettre un déplacement d'une plate-forme (21) inutilisée suivant une direction verticale entre les deux espaces (13,14) au moyen de la table de levage (24).

2. Structure de parking pour voiture selon la revendication 1, caractérisée en ce qu'elle est agencée pour permettre un déplacement des plates-formes de chargement (21) inutilisées vers l'étage de rangement (12) et à partir de cet étage au moyen, également, de l'ascenseur (16).

3. Structure de parking pour voiture selon la revendication 2, caractérisée en ce que l'ascenseur (16) est muni d'au moins un espace (16b) de faible hauteur pour une plate-forme de chargement (21) inutilisée, placé sous un espace de parking de voiture (16a) dans l'ascenseur.

4. Structure de parking pour voiture selon l'une quelconque des revendications précédentes, caractérisée en ce que la table de levage (24) est agencée pour être utilisée également pour déplacer une plate-forme de chargement (21), comportant une voiture (20) stationnée sur celle-ci, entre l'étage de parking (11) muni d'une entrée (18) et/ou d'une sortie (19) et un autre étage de parking (11) adjacent.

Fig. 1

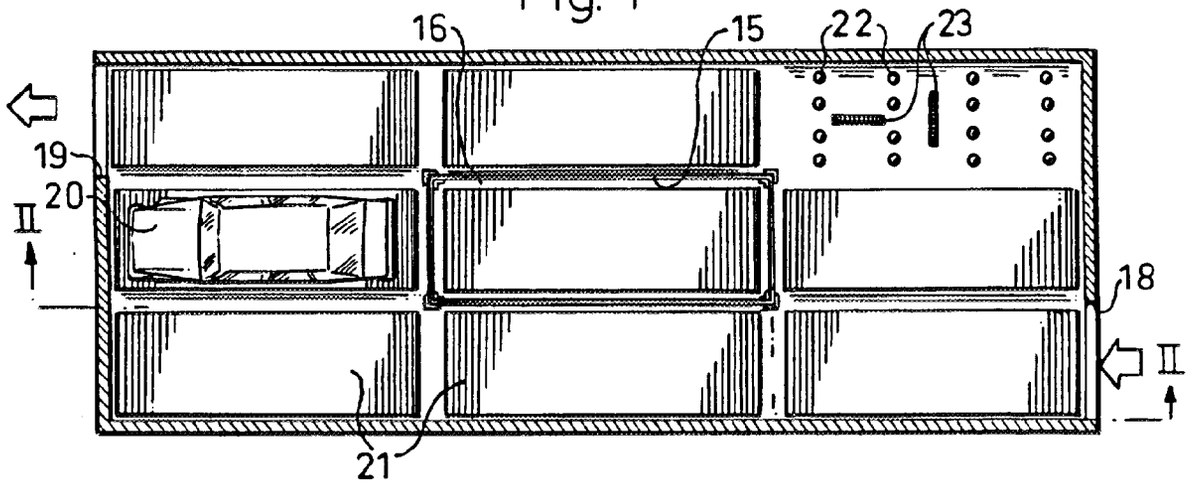

16
15
22
23
19
20
II
18
II
21

Fig. 2

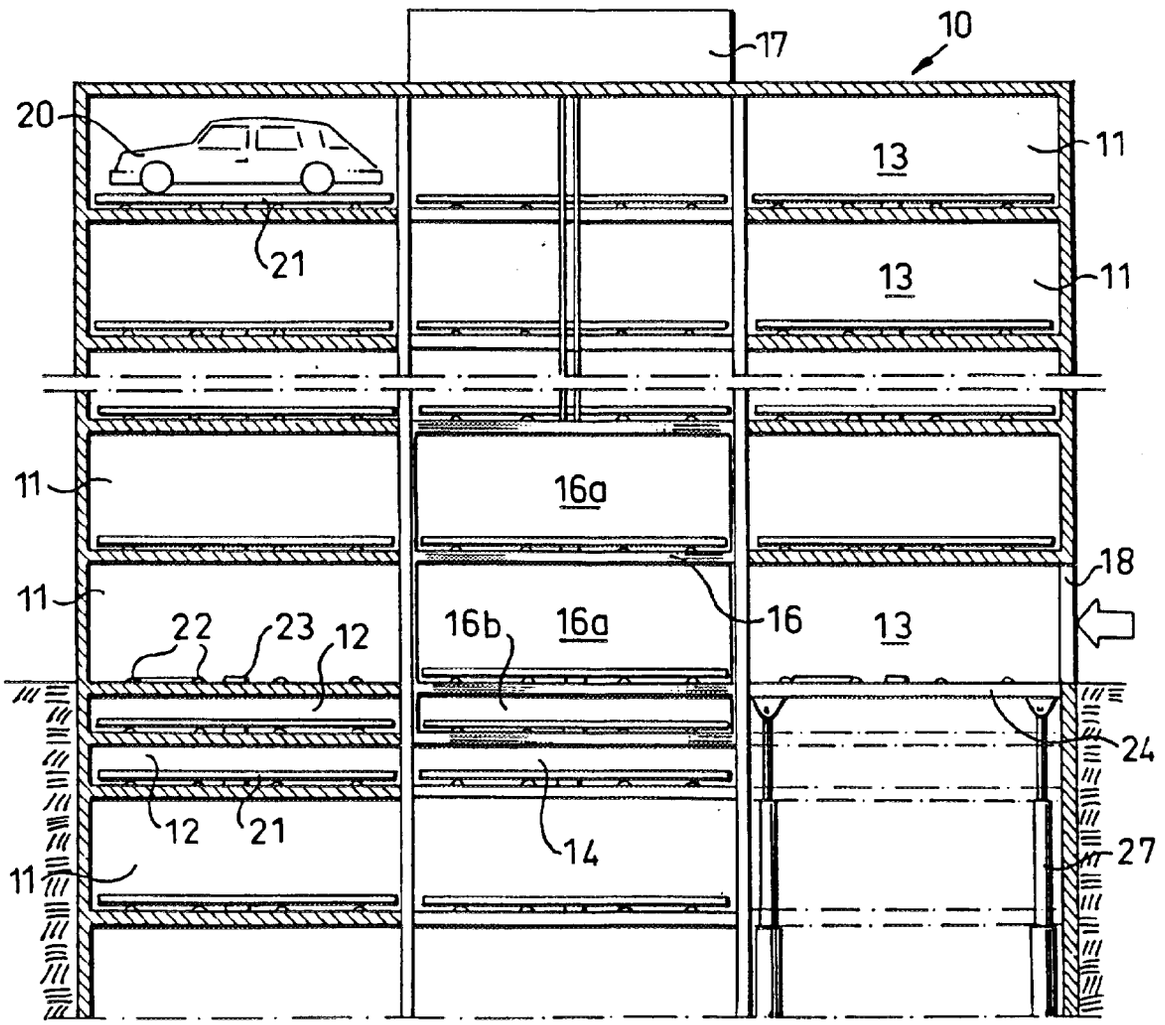

17
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16a
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11
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23
12
16b
16a
16
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24
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14
27
11

Fig. 3

