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(54) Automatic system for the orderly parking of motor vehicles.

(57) The instant invention concerns an automatic system for the parking of motor vehicles, comprising a circular structure on several levels, each level having an annular track, on which several concentric rings are mounted which are able to rotate and on which the vehicles are actuallly parked; there being in the centre of the structure, a vertical pillar along which lift trucks can slide from the bottom towards the top and vice-versa, these being able to lift and then lower the vehicles in order to position them on the various levels.

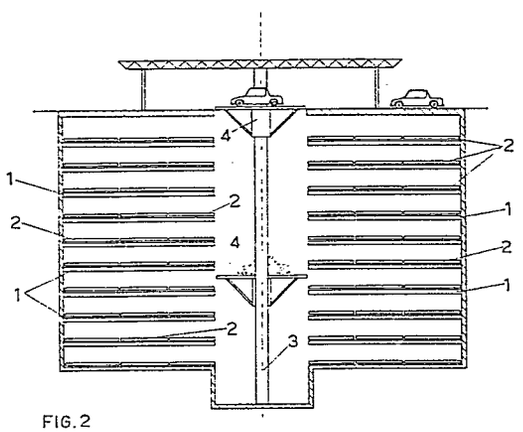

FIG.2

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Description

Automatic system for the orderly parking of motor vehicles.

This patent application for an industrial invention concerns an automatic system for the orderly parking of motor vehicles.

The invention was designed with the intention of providing a considerable contribution towards solving the problem of creating car-parks in town centres, where, given the ever increasing number of motor vehicles in circulation, it is becoming more and more difficult, if not actually impossible, to find an available space to temporarily park a vehicle.

In fact, it can be observed that the structures currently in existence are not at all satisfactory; parking spaces at street level prove to be absolutely inadequate, while underground or multi-storey car parks, when they actually exist, oblige the driver of the vehicle to perform rather lengthy operations in order to park his vehicle, which involve taking the necessary ticket, and then returning subsequently in order to pay for parking and actually collecting his vehicle.

Moreover, these car parks in most cases, are rather chaotically organised, in that while on one hand, it is necessary to employ a considerable number of garage attendants, who are able to park the cars and if necessary move them to make room for others or to enable other cars to be collected; on the other hand, the safety of the parked vehicles is at risk, in that quite often, in the course of the many parking manoeuvers, the bodywork is damaged when the vehicles accidentally come into contact with each other.

The basic idea of the system according to the invention is to offer the possibility of parking a large number of vehicles, even in areas where there is the greatest demand, by using a particularly rapid parking technique which requires no manual intervention and entails no risk to the safety of the motor vehicles.

This system comprises a circular structure on several levels, each of these levels having an annular track on which concentric rings are mounted, which are able to rotate in an autonomous manner, by means of a suitable drive mechanism.

On each of these rotating rings, there are spaces above each of which it is possible to park a vehicle, in such a way that when the system is full of cars, on each of its levels there are as many concentric rows of parked cars as there are rotating rings.

To lift or lower each individual vehicle from the various levels, there are one or more lift trucks, able to ascend or descend along vertical pillars.

It is clear that by combining the vertical action of these lift trucks and the rotating action of the concentric rings on the various levels, it is possible to position each individual vehicle fully automatically and in a particularly precise manner.

It should also be noted that the concentric rings can be different widths, so as to make the best possible use of the space available or so as to be able to adapt the spaces to suit the various types of vehicle according to their dimensions.

Moreover, it should be emphasised that in order to provide the vehicles with easy access to all the various concentric rings on each floor, the rings nearest to the lift truck pillar, have a track not to be used for parking, along which the vehicle can travel in order to reach the selected parking space.

At this point, in order to describe in practice, the automatic parking operation by means of the system at reference, it can be said that the driver merely has to position his vehicle in the vicinity of the lift truck, after which the electronic brain of the system, having singled out a suitable parking space for the vehicle, then sets the lift truck in motion, on which in the meantime, the vehicle has been positioned, and simultaneously sets the concentric rings in rotation on the level on which the car will actually be parked, in such a way that when the lift truck reaches the established level, the car will be lifted from it and guided in a single rectilinear movement, drawn by an automatic mechanism, to the empty space which has been selected for it and which in the meantime, has already been prepared exactly in front of the lift truck itself.

This parking system is extremely practical in that when the lift truck ascends vertically, the concentric rings rotate simultaneously, so that the vehicle can be immediately positioned in the space assigned to it, as soon as it reaches the level selected, without the waste of time encountered for example, in automatic storage systems, in which the articles to be arranged, must first of all be lifted vertically and are then moved horizontally until they reach their assigned space, after these two different actions have been effected one after the other.

In fact, it can also be said that in traditional storage systems, the article to be arranged finds its own space under suitable guidance, while on the other hand, in the system at reference, once the vehicle reaches the level selected, the space assigned to it on each separate occasion, actually appears directly in front of the vehicle.

In other words, the system at reference makes the orderly parking of motor vehicles extremely simple but above all, greatly reduces the time necessary for this operation. Consequently, due to the structural layout of the system, it is possible to park a considerably larger number of vehicles than in other modern more or less automated car parks in the same space of time

It is clear that the collection of the vehicle by the owner is also carried out in the same short space of time and with the same security by exactly reversing the procedure just described.

When compared to current car parks, the system according to the invention is also preferable because of the particular shape of its construction; in fact, its circular structure on the one hand, guarantees optimum use of the spaces available and on the other, lends itself most efficiently to controlling earth thrust in underground construction, in consideration of the fact that it is of no conseqence if the system at

reference is actually adopted on steel or reinforced concrete structures, in totally underground, multi-storey or mixed constructions.

In a preferred embodiment, the task of lifting the cars has been assigned to two lift-trucks, which autonomously slide vertically on opposite sides along a pillar, positioned precisely in the centre of the structure, namely the space circumscribed by the various rings one above the other; it should be noted however, that within the scope of the same inventive idea, there is nothing to prevent said pillar on its own or with other similar pillars, from being positioned in the area surrounding the outermost ring on each level; in this case, the car loading operation on the various levels would not take place from the outside towards the inside, but vice-versa.

Moreover, it is possible for the central pillar to support four different lift trucks, which slide vertically along four sets of rails applied to the pillar itself at regular 90° intervals of space; in this case, the pillar itself could be provided with the possibility of rotating around its longitudinal vertical axis, thus being able to maintain the same position for the entry and exit of the vehicles. In the same way, this possibility of rotating could also be applied on the pillar which supports only two lift trucks; if this were the case, this solution would allow the direction in which the cars enter and exit to be orientated in the best possible manner.

The constructive solution of the system with several lift trucks on the same pillar or several pillars on its structure, would be particularly efficient at peak times, when it would be necessary to satisfy in the shortest possible time, the requirements of a large number of consumers at the same time, whether they be looking for a parking space or wishing to collect their vehicles from a parking space. In conclusion, it should be said that although the system is always automatically controlled by an electronic processing centre which attends to all the necessary operations and therefore makes it unnecessary to employ labour, apart from when simple periodical checks and normal maintenance must be effected, it is also possible, if required , for the system to be operated manually.

For further clarity of explanation, the description of the invention continues with reference to the attached drawing, reproduced for illustrative and not limitative purposes, in which :

- Fig.1 is the plan view of the system at reference in the version with central pillar for lift trucks;
- Fig.2 is the section with the II-II plane from Fig.1;

With reference to these attached drawings, the system is composed of a series of annular tracks one above the other (1), above which, several flat concentric rings (2) can rotate and on which the vehicles are actually parked.

In the space at the centre of this structure, there is a vertical pillar (3), along which lift trucks (4), provided to lift the cars to be parked to the various levels of the system, can slide from the bottom towards the top and vice-versa.

With reference to Fig.1, the number (5) indicates the spaces which the innermost concentric rings on each floor must keep free, to allow the vehicles drawn by the lift truck to reach their destination on the outermost rings.

It is clear that if the vehicle has to reach the outermost ring, the sections through which it must pass on all the other innermore rings must be aligned (illustrated in Fig.1) to form a single passageway which leads directly to the space to be occupied by the parked vehicle.

The electrical, electronic and mechanical devices connected with the structure according to the invention have been expressly omitted from this description, in that they should be considered of normal design and therfore well within the capacity of any experienced engineer.

Claims

1) Automatic system for the orderly parking of motor vehicles, characterised by the fact that it comprises a circular bearing structure, with several levels each of which is composed of an annular track (1) above which several flat concentric rings (2) can rotate autonomously and on which the vehicles are actually parked; it being provided that in the space in the centre of this structure and namely the space delimited by the various rings one above the other, a vertical pillar (3) is positioned, along which lift trucks (4) can slide from the bottom towards the top and vice-versa, these being able to lift and lower a vehicle; moreover the aforementioned concentric rings (2) on each level are provided with the capacity of being able to rotate during the alternate vertical travel of the lift trucks (4);

2) Automatic system for the orderly parking of motor vehicles, according to claim 1), characterised by the fact that the vertical pillar along which the lift trucks (4) travel vertically, instead of being at the centre of the structure, can also be positioned alone or with other identical pillars in the area surrounding the structure itself, in the vicinity of the outermost ring on the annular tracks(1) arranged one above the other.

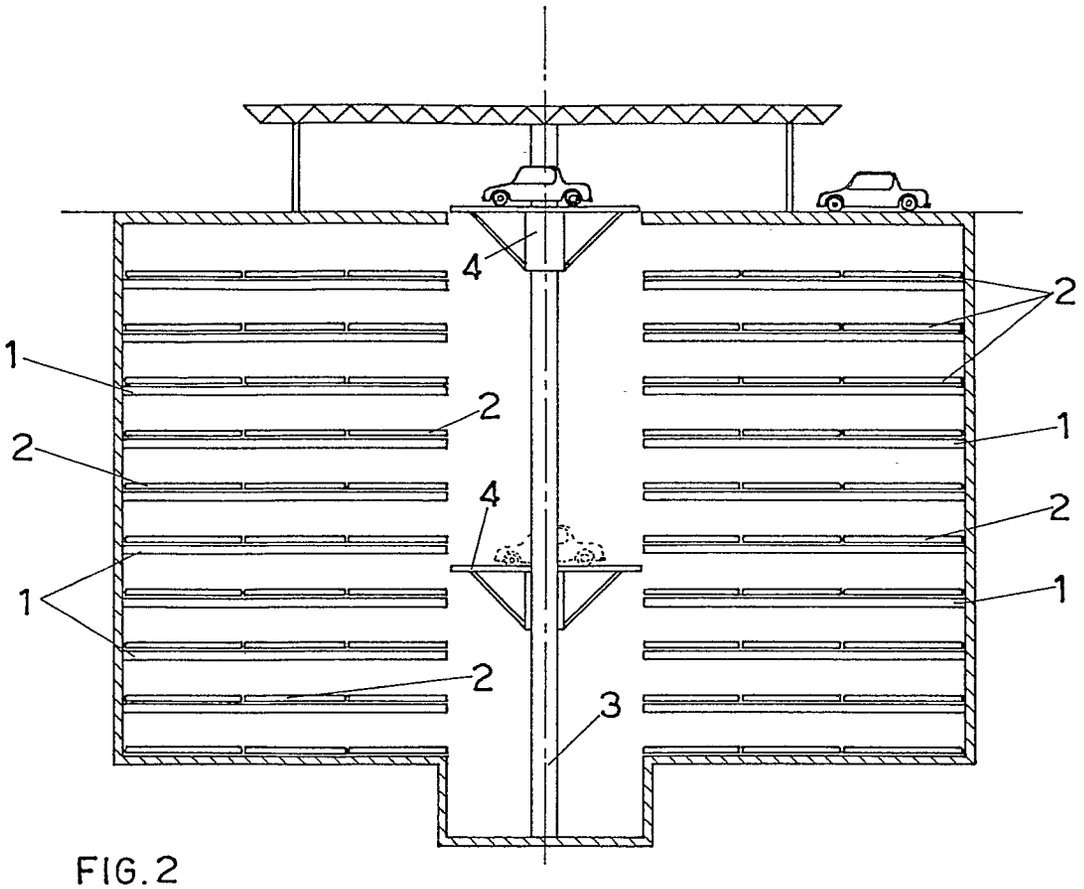

FIG. 2

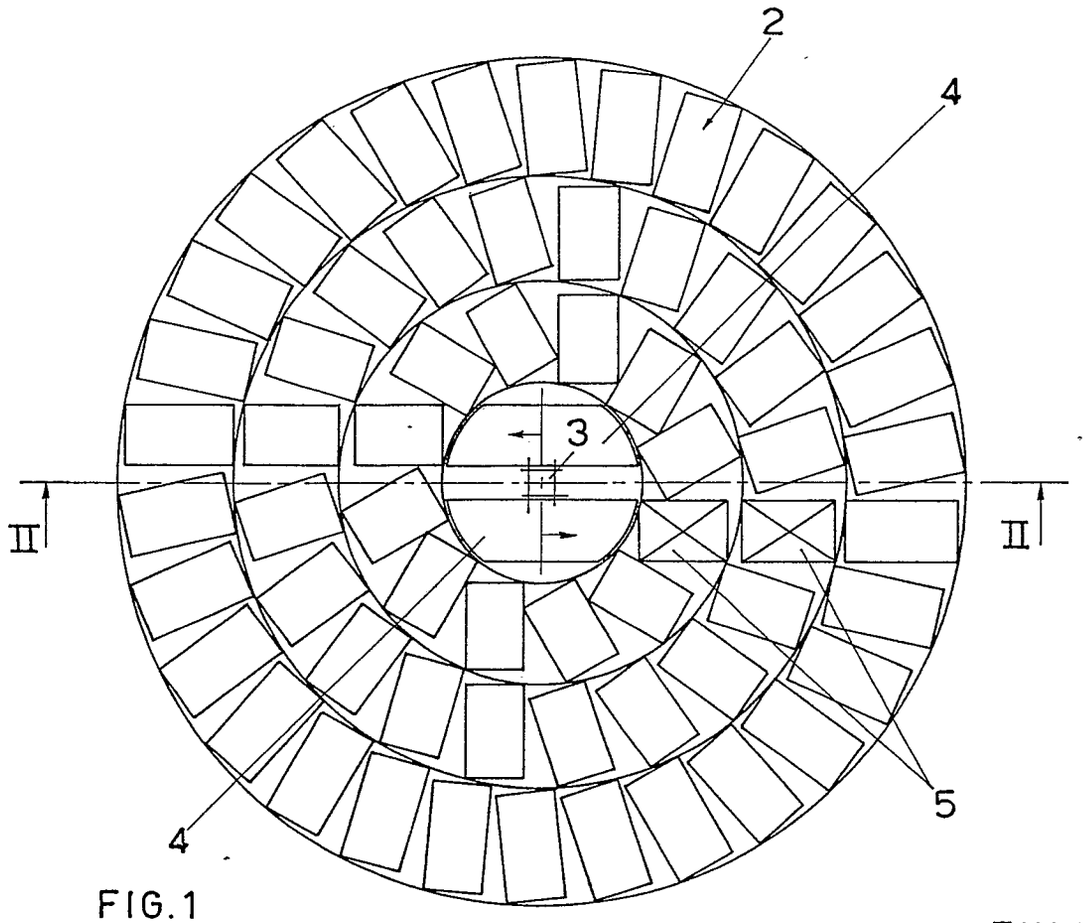

FIG. 1

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