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INNER-CITY PASSENGER CAR SALES AND SERVICE CENTRE WITH MINIMAL
AREA REQUIREMENTS



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The invention is based on a multifloor building with a basement for an automobile company agency which sells new passenger vehicles and carries out maintenance services, as claimed in the precharacterizing clause of claim 1, as is largely known from the conventional practice for automobile workshops.

Automobile companies such as these which offer full service facilities require a considerable amount of useful area. Owing to the increase in land prices in the inner area of large cities, the automobile companies are therefore being forced to the outskirts of the city, which means that services for the customers who work during the day in the central area of the cities can be provided there only with difficulty.

The object of the invention is to improve a building of this generic type for automobile servicing companies such that the services can be offered with an acceptable investment cost outlay, even close to the center of large cities, without any restriction to the useful area or to the scope of the service.

According to the invention, this object is achieved on the basis of the building of this generic type by the characterizing features of claim 1.

The arrangement of all the required facilities, including the parking areas, on a large number of floors one above the other in a standard, tower-like building with a small ground area requirement solves the problem of high land prices. The problems

associated with this of logistic communication between the individual functional areas and floor levels is solved on the one hand by the distribution according to the invention of the individual functional areas within
5 the tower-like building and by the vertical elevator, which is arranged centrally in it and which can be fed in a circular fashion.

Expedient refinements of the invention can be found in
10 the dependent claims; apart from this, the invention will also be explained in the following text with reference to an exemplary embodiment, which is illustrated in the drawing, in which:

15 Figures 1 and 2 show two perspective outside views of the tower-like sales and maintenance center for passenger vehicles,

Figure 3 shows a schematic outline through the
20 building shown in Figure 1 or 2, illustrating in particular certain details of the elevator system,

Figure 4 shows an enlarged detail illustration of the
25 detail IV from Figure 3, namely of the lifting cage with the elevator cabin for the load elevator, which is arranged so that it can rotate in it,

30 Figure 5 shows a floor plan illustration of the first basement floor in the vehicle reception area,

Figure 6 shows a floor plan illustration of the first
35 floor, that is to say of the display and sales area for new vehicles,

Figure 7 shows a floor plan illustration of one floor in the workshop area,

Figure 8 shows a floor plan illustration of the floor, which is associated with the workshop area, for storage of spare parts,

- 5 Figure 9 shows a floor plan illustration of a floor in the parking area,

Figure 10 shows a floor plan illustration of the engineering floor, and

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Figure 11 shows a floor plan illustration of a floor in the office area of the sales and maintenance center.

- 15 All the functions for selling new passenger vehicles and for maintenance services for them are combined in the multifloor building 1 with a basement as illustrated in the figures. This is an inner-city sales and maintenance center for passenger vehicles with a
20 full range of services, although relatively major repair tasks, in particular severe accident damage involving paintwork, cannot be carried out. In order to make it possible to offer a scope of services such as this, facilities for the following types of use must be
25 provided in the building:

- The customer who is already using a vehicle and wishes to leave this for maintenance or repair takes his vehicle to the so-called vehicle reception 6 and hands
30 it over to the care of the maintenance center, where the customer order is received, and the vehicle is first of all parked. To facilitate this, a relatively small extent of both office area and parking area must be provided at vehicle reception. A lifting platform
35 with a workshop space must also be provided in the vehicle reception area, for short inspections. In order to receive a relatively large number of customer vehicles which can be parked by the customers until the

5 maintenance or repair work is carried out and/or until they are picked up by the customers, a relatively large number of parking spaces 47 must also be provided for customer vehicle parking, although this does not need to be provided in the immediate vicinity of the vehicle reception 6.

10 A very important area of a maintenance center of the type under discussion here is, of course, an extensive workshop 8 with a number of maintenance boxes corresponding to the space required for repair work on a passenger vehicle, with workstations for carrying out workshop tasks separately from the vehicle, with office areas for managers/supervisors and workshop-related 15 administration tasks, with rest areas for work breaks, changing, washing and WCs, with storage areas for tools, for spare parts, for oils and consumable liquids, as well as storage areas for old parts and old liquids.

20 In order to sell new vehicles, it must be possible to place them on display in a representative display area. Appropriate office and meeting areas must also be provided in the vicinity of the display area, in order 25 to deal with customers who are interested in making a purchase.

30 Furthermore, relatively extensive administration and commercial activities are also carried out, although these may be physically separated from the direct sales and workshop area. Further office areas for management staff and for general commercial and administrative tasks including areas for infrastructure peripherals such as meeting, storage, copying and rest areas, 35 kitchenettes, WCs and the like must be provided for this purpose.

Finally, a maintenance center such as this furthermore

requires general engineering areas for accommodation of the infrastructure engineering equipment such as the building heating, air conditioning, compressed-air system for the workshop or for a tube-post system, or
5 the like, and these can be arranged physically separately from the offices or workshops.

In order to make it possible to offer the services with an acceptable investment cost outlay even close to the
10 center of large cities in a sales and maintenance center such as this without any restriction in terms of the useful area and the service scope, the said facilities, namely the vehicle reception 6, the sales area 7, the workshop area 8, the parking area 9, the
15 engineering area 10 and the office area 11, are, according to the invention, arranged in a standard, tower-like building 1 one above the other on a large number of floors, with the building having as small a ground area requirement as possible. In order to allow
20 the rectangular building cross section to be designed to be as compact as possible and to allow the floor levels to be reached by short distances from a central elevator system, the ground area for the floors which are arranged above ground level is chosen to be
25 approximately square with the horizontal dimensions $A \times B$, with one of the two dimensions A or B of this ground area, preferably the shorter of the two dimensions, corresponding to approximately three to five times, preferably approximately to three and a
30 half to four times, the length l of the longest passenger vehicle to be maintained.

In the exemplary embodiment illustrated in the figures, the display area 32 for new vehicles 34 and the
35 associated office areas 33 are arranged on the first floor and on the second floor. These floors are easily accessible via the entrance 2 from the access side 2' of the building. Since the aim of this shopping area 7

is to appeal to new customers in a particular manner, it is expedient for these areas to be designed to be as inviting as possible and to open to the road. The display and sales areas are designed to be representative of the image of the automobile company. If, in a specific situation, the shopping area is not used for selling new vehicles, or is used only to a very restricted extent for this purpose, then, depending on the local area around the building, the shopping area can be used in a different way for retail businesses, bank branches or similar businesses with a high degree of public traffic and/or high turnover expectations.

The vehicle reception areas 6 which are arranged in the basement - see in particular Figure 5 - are likewise accessible from the front 2' of the building, to be precise directly with the vehicle, for which purpose a drive-in ramp 3 is provided which initially runs in a straight line along the side of the building and is curved at its end in a helical shape. The basement floor is accordingly broader and longer by the width of the drive-in ramp 3 than the first floor and the second floor. In the illustrated exemplary embodiment, the facilities for vehicle reception 8, that is to say the parking spaces 29 for quick reception of customer vehicles, a lifting platform 31 for short inspections, and office areas 30 etc., are distributed over two underground floor levels, on both of which passenger vehicles can be driven. If the space requirement for vehicle reception should be larger, for example because a large number of customers can be expected or a large number of customers have to be dealt with during the so-called rush hour, then correspondingly more underground floor levels would have to be planned. The driving link between the first and second basement floors and between any further basement floors comprises a ramp which can be driven on in both

directions and runs in a helical shape, and which is arranged in a corner of the floor plan rectangle. For space reasons, the gradient of the helical drive-in ramp is sufficiently steep that the floor height is overcome after just at least 270° of one complete turn. In order to allow the ramps to be driven on in both directions safely despite their narrow width, which is designed for only a single lane, they must be provided with an automatically controlled traffic light system at each of the two ends, giving right of way to the vehicles which are driven in first of all, and blocking the opposite direction.

The entrance and exit for people to and from the vehicle reception 6 can be provided on the one hand by a passenger elevator 4 which, in the illustrated exemplary embodiment, is arranged diametrically opposite the helical drive-in ramp, within the building. The vehicle reception can also be reached on foot via a staircase, which is in the form of at least one emergency staircase, with the stairwell 5 being arranged centrally within the helically running ramp.

Owing to the area that it requires, the workshop area 8 is distributed over a number of floor levels 35, a floor plan of one of which is shown in Figure 7, with the storage level being shown in Figure 8. The maintenance boxes 36 for the workshop, which may also be in the form of test stands for passenger vehicles or lifting platforms, are distributed aligned radially in a star shape around the elevator shaft 12 for the load elevator, which is arranged centrally in the building. A maximum of eight maintenance boxes 36 are provided on each floor level 35, but preferably only six or seven, with adjacent maintenance boxes 36 being arranged at an angle of 45°. The other facilities for the workshop, such as the manager's office 38, the spare parts store 39 for relatively small spare parts and/or spare parts

that are required relatively frequently, washing and changing areas 41 as well as a WC for the workshop personnel, an oil store 42, a tool store 43, an electronics area 44 and vehicle-independent workstations 40 for the workshop 8, are arranged in the free spaces which remain between the maintenance boxes 36, and which diverge outwards. If - as is illustrated in Figure 7 - only seven maintenance boxes are provided, there is a larger area associated with them between two adjacent maintenance boxes and this can be used, for example, for a spare-parts store close to the workstations. A separate floor level 46 is provided for the storage of large-volume spare parts and/or spare parts which are required less frequently. This is expediently planned as the lowermost floor of the workshop area in the building structure, which has the advantage that this reduces the extent to which the workshop noise can penetrate into the shopping area. This is because the separate floor level 46 for the spare parts is a quiet zone.

The floor levels for the parking area 9 with parking spaces 47 for the parking of customer vehicles or any new vehicles are arranged above the floor levels of the workshop area 8, and the floor plan of one of these floors is shown in Figure 9. The parking spaces are distributed over a number of floors, with the individual parking spaces 47 being arranged aligned radially in a star shape around the elevator shaft 12 for the load elevator. In the exemplary embodiment illustrated in Figure 9, there are twelve parking spaces on one floor, with adjacent parking spaces being arranged at an angle of 30° . Fifteen parking spaces 47 for narrower vehicles can also be provided on each floor level, and these are then arranged at an angle of 24° from one another. The broader vehicles are parked in the floors with twelve parking spaces, and the narrower vehicles in those with fifteen parking spaces.

A separate engineering floor 10, which is arranged above the parking area 9, is provided in order to accommodate the infrastructure engineering equipment, and a floor plan of this is shown in Figure 10. It is expedient for this floor to be arranged above the parking area (and not, for example, between the workshop area and the parking area or between the workshop area and the shopping area), since this results in the shortest linking routes between the functional areas of vehicle reception, the parking area and the workshop area.

The office area 11 is located above the engineering floor 10, and its useful area is distributed over a number of floor levels 51. Since the office areas are located in the highest building zone and are furthest away from the inner-city traffic noise, this is where it appears to be best to carry out quiet work.

Stairwells and separate passenger elevators are used for the people who work in the building and for the customers to access the various functional areas. As already mentioned in conjunction with the underground floors, a passenger elevator 4 and a stairwell 5 for an emergency staircase are arranged in the corner area of the ground area $A \times B$ of the building tower 1. In fact, only one passenger elevator and one emergency stairwell is provided in the basement floors while, in contrast, two passenger elevators and two emergency stairwells are planned for the upper floors which are frequented to a greater extent by people. The two passenger elevators 4 and the emergency stairwells 5 in the illustrated exemplary embodiment are arranged outside the tower-like structure body in the corner area of the ground area, with the two passenger elevators being arranged on the access side 2' and the two emergency stairwells being arranged on the opposite rear side 5' of the building 1.

Apart from this building subdivision, one very major aspect of the invention is the logistic communication between the engineering functional areas comprising vehicle reception 6, the parking area 9 and the workshop area 8. For this purpose, a load elevator is arranged centrally in the building 1, and its elevator cabin is matched to the weight and size of the largest passenger vehicle to be maintained.

The elevator shaft 12, 12' for the load elevator which connects the floor levels to one another is - as stated - arranged centrally and in the middle within the floors above ground level. At least in the area of the workshop floors 46, 36 and above them, the shaft 12 has a round cross section with an unobstructed internal diameter which corresponds at least to the length of the ground area diagonal of the elevator cabin 14. Since it is accessible from all sides, the round elevator shaft 12 is essentially formed only by corresponding round ceiling apertures and by supporting pillars which are as narrow as possible and which connect the floor ceilings to one another in the circumferential area of the shaft. A number of shaft doors 28, which correspond to the width of the elevator cabin 14 and are all in the form of fire-resistant fire protection doors, are arranged around the load elevator shaft 12 on each floor level with a round load elevator shaft 12. For space reasons, the shaft doors are preferably in the form of tilting doors or roller doors which can be raised. In the area of the underground floors, the load elevator shaft 12' does not have a round cross section, for space reasons, but is rectangular to match the outline shape of the elevator cabin 14.

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Personal accident protection reasons on their own would not intrinsically require the individual parking spaces within the parking area 9 to be blocked off by closed

fire protection doors in a costly manner. However, adequate fire protection within the building that is used by people needs to prevent a fire on one floor from flashing over to higher floors. For this reason,
5 all the floor levels, including those within the parking area 9, must be effectively protected against flames entering or emerging from the parking spaces.

The elevator cabin 14 for the load elevator is mounted
10 in two vertically separated rotary bearings 15, 15' in a lifting cage 13, which is guided in the elevator shaft, and is provided with a controllable rotary drive (which is not illustrated), such that it can rotate about a vertical center axis 15''. The elevator cabin
15 14, which can be swiveled through more than 360° about its rotation axis, can thus be deliberately swiveled with its cabin opening horizontally to a circumferential position matching any desired one of the shaft doors 28, which are arranged around the
20 elevator shaft, on one floor level. This means that the load elevator can optimally serve the entire floor area which is arranged around the elevator shaft and is essentially in the form of a circular ring.

25 In addition to the capability of the elevator cabin 14 to rotate within the lifting cage 13 and the corresponding rotary drive, it should be mentioned that the lifting cage in the illustrated exemplary embodiment is guided in four vertical guide rails 25,
30 along which long guide shoes 26 on the lifting cage slide. The lifting cage 13 and its guidance, that is to say the guide rails 25 and the guide shoes 26, are designed to be torsionally stiff such that, even if the elevator cabin 14 is loaded extremely eccentrically and
35 the lifting cage is accelerating or decelerating vertically at the maximum rate, no tilting ever occurs and it always slides exactly horizontally in the guide rails 25. The fixed-position guide rails are likewise

arranged outside the unobstructed profile of the elevator shaft, in the same way as the guide shoes and the corner posts of the lifting cage. In the illustrated exemplary embodiment, the corner posts of the lifting cage are at the same time also in the form of cabin-height guide shoes. The recessed arrangement on the shaft side of the cage guide outside the unobstructed profile of the elevator shaft means that the end edge (which is in the form of a circular arc) of the cabin floor may be adjacent to the floor level in the area of the shaft edge, with a small transitional gap which can be driven over without any problems. On the shaft side, the guide rails are arranged in the pillar, which is in the form of a hollow profile, between two adjacent shaft doors. The cabin-height guide shoes 26 which are integrated with the side corner posts of the lifting cage clasp the guide rails 25 and slide along them, with little play. Apart from this, the guide rails on the shaft side are arranged in a circumferential position on the round elevator shaft 12 so as to match the positions of the corners of the elevator shaft 12', which has a rectangular cross section, in the basement area.

In order to fix the elevator cabin in any desired circumferential position matching a shaft door, the elevator cabin can be mechanically locked to the boundary of the elevator shaft by means of strong locking bolts, which can be extended parallel to the cabin floor. This ensures that the elevator cabin is held in a fixed position both in the vertical direction and in the horizontal direction during unloading or loading and, furthermore, that the shaft-side cage guide 25, 26 reduces the load on the rotary drive and on the rotary bearing 15, 15' resulting from corresponding tilting, rotary shocks or similar vibration. In this context, it is also necessary in particular to take account of the fact that the

elevator cabin may be aligned transversely with respect to the lifting cage during unloading or loading and that particularly high eccentric tilting forces may occur in a transverse position such as this, at least
5 during loading or unloading.

The horizontal swiveling drive and the drive for automatically opening the driven shaft door are, of course, functionally interlocked such that, when the
10 elevator arrives at the destination, the relevant shaft door cannot be opened until the horizontal circumferential position of the cabin opening matches the shaft door correctly, and the elevator cabin has been locked to the floor ceiling. Conversely, the
15 lifting drive for the load elevator and/or the horizontal swiveling drive for the elevator cabin are functionally mutually interlocked with the drive for closing the open shaft door, for safety reasons, such that the elevator cabin cannot be swiveled, and/or the
20 elevator cannot start to move, until the previously opened shaft door has been closed and locked correctly, and the elevator cabin has also been unlocked once again.

25 Vertical vehicle transportation within the building of the sales and maintenance center is expediently supervised by an operator who has been instructed on the vertical vehicle transportation within the building and has become well practiced in this procedure over
30 the course of time. The personally supervised vehicle transportation within the building involves only one operator for each vehicle to be transported, and only then for the time during which the vehicle is being transported. Automation of the elevator system in such
35 a way that, in response to a start signal, a vehicle which has been moved to a defined position in front of the load elevator could be moved into the elevator cabin without any accompanying personnel, that is to

say without human involvement, in such a way that it is moved to an empty parking space in the parking area and the vehicle could be parked there automatically and without any faults occurring, would in no way increase the transportation capacity of the elevator system. On the contrary, the risk or probability associated with such automation, which would in any case be very expensive, of the elevator system would be considerably greater than in the case of a non-automated system, so that the fault-dependent availability of an automated system would be less than that of a personally supervised elevator system.

In some circumstances, busy periods may relatively frequently occur in the mornings in a maintenance center that is arranged centrally in a highly populated area, specifically when a particularly large number of vehicles are delivered for maintenance purposes in a short time. In order to avoid a jam, the vehicles must be transported away to the parking area as quickly as possible in a situation such as this. Because of this, the elevator system should have as high a transportation capacity as possible. For this purpose, it is particularly important to be able to provide vertical accelerations and decelerations which are as great as possible (preferably at least approximately ± 50 to 80% of the acceleration due to gravity), with the capability to move at high vertical speeds. This necessitates a powerful lifting drive and a braking system which is just as powerful. It is also important for all the peripheral movements, for example horizontal swiveling of the elevator cabin to the nominal position, locking of the elevator cabin in this position, movements of the shaft doors etc., to be able to be carried out very quickly, and this is dependent not only on appropriately powerful control drives but also on the relevant components being designed to be robust, and on a quick-response control system.

A further measure for increasing the transportation capacity of the elevator system is to provide a double-floor lifting cage in which two elevator cabins are arranged above one another and are mounted such that
5 they can be rotated and can be driven to rotate independently of one another. The vertical distance between the two elevator cabins should match the floor height, at least in the parking area.

10 For vertical vehicle transportation within the building, a vehicle which is to be transported is driven using its own engine power - if this is not possible by human power - into the elevator cabin, or is rolled into it. The switches or buttons for
15 operation of the load elevator are arranged on both sides of the elevator cabin so that they can be reached through the open window from one of the two front seats in the vehicle. It should be remembered that, in some circumstances, it will be necessary to handle a right-
20 hand drive type of vehicle in a country where the traffic drives on the right or - more probably - to handle a left-hand drive type of vehicle in a country where the traffic drives on the left. The operator who is supervising the vehicle transportation remains
25 seated in the vehicle's driver's seat from where he controls the load elevator functions; he thus travels with the vehicle. When he arrives at the desired floor level and the elevator cabin has been swiveled to the circumferential position for the desired parking space,
30 the appropriate shaft door is opened automatically, and the vehicle can be driven out of the elevator cabin. The driver leaves the parked vehicle, returns to the elevator cabin, and travels back to the starting point in the load elevator. The opposite procedure is used,
35 for example, for moving a vehicle from the parking area to the workshop.

The load elevator and the passenger elevators 4, which

are arranged eccentrically in the building 1, lead only up to the engineering floor 10. Another elevator shaft 50 with a smaller cross section is arranged centrally within the building 1, above the shaft 12 for the load elevator, and extends in the vertical direction within the office area 11, continuing up to the uppermost floor level. A passenger elevator is arranged in this elevator shaft to provide vertical passenger transportation within the office area. It is therefore necessary to use two different passenger elevators, so to speak with a "change", in order to reach one of the floors in the office area from the entrance 2 to the building. Although this is somewhat disadvantageous, this is, however, countered by the advantage that the vertical communication within the office area is considerably better by virtue of the use of a centrally arranged passenger elevator than by means of one passenger elevator or two passenger elevators 4 arranged on the extreme periphery.

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Taking into account the fact that the load elevator does not continue up to the highest floor levels in the office area 11, but that a passenger elevator is provided above the load elevator there, the lifting drive for the load elevator cannot be provided - in the normal way - from above, since there is no space there to accommodate a drive. In this case, the load elevator is raised or lowered from underneath via a lifting chain 19 or a multiple arrangement of lifting chains located alongside one another, by means of a drive 22 which is arranged in the lowermost basement floor. Just two guide rollers 20 for the lifting chains are provided at the upper end of the elevator shaft, and these can be accommodated in any case, even when little space is available. In the same way, a number of guide rollers 20 for the lifting chains are also provided at the lower end of the elevator shaft, and occupy only a small amount of space. The lifting drive 22 for the

load elevator can thus be arranged at the same level as the lowermost floor level. The lifting chain 19 is guided over the various guide rollers 20 in an intrinsically closed loop, including the lifting cage 5 13. The operating section of the lifting chain runs vertically in the shaft center and is attached in a strain-resistant manner to the top and bottom of the lifting cage, while, on the other hand, a return section of the lifting chain is routed eccentrically in 10 a guide tube 21 close to the shaft wall. The guide tube must be arranged in the pillar area between two adjacent shaft doors, in order not to interfere with them.

15 Since the elevator shaft must be accessible over its entire circumference, there is no space within the elevator shaft to accommodate the counterweight that is required. The counterweight 18 for the load elevator is therefore arranged outside the building 1 in the 20 present case. It is guided in a pair of guide rails 18', which are arranged at the rear between the emergency stairwells 5. In order to allow the counterweight on the one hand to move through the complete vertical travel of the elevator cabin of the 25 load elevator, but on the other hand to avoid having to construct a separate shaft, extending below ground level, for the counterweight, the cables 17 for the counterweight are guided in guide tubes 17' through the office area 11 into the uppermost office floor before 30 their direction is changed by means of guide rollers 16, parallel to the guide rails 18' for the counterweight. The movement range for the counterweight is thus arranged offset in height in respect to the movement range of the elevator cabin. It should be 35 remembered that the guide 18' for the counterweight 18 and the compensating cables 17 are subject to weather, that is to say storms, rain, hail, snow and frost, and this must be taken into account appropriately in the

design of the weight and cable guides and in the choice of the materials. In some circumstances, the weight guide and the cable guide must be provided with electrical heating, in order to prevent them from being
5 frozen in or being frozen solid.

On the other hand, the disadvantageous external arrangement of the counterweight guide in fact has a positive aspect as well. To be precise, the
10 counterweight 18 is in the form of a panel of approximately the same height as a floor and at least just as wide, composed, for example, of a strong steel plate, as a result of which not only does the counterweight scarcely project at all orthogonally from
15 the façade but, in particular, it can be used as an advertising medium for large-area advertising messages which can be seen from a long distance. Especially since the advertising medium moves vertically, this makes it particularly conspicuous. To do this, the
20 counterweight 18, which is in the form of a panel, must be provided with a moving, electrical power supply and, in some circumstances, with data lines, which activates the advertising medium which, for example, is in the form of a large screen or some other illuminated
25 advertisement. In the case of an advertising medium in the form of a large screen, the data for the content of the advertising message could in some circumstances also be transmitted without the use of wires, and could be converted back to a visible advertisement again by
30 means of a converter arranged on the advertising medium.

The building data listed in the following text correspond to a sales and maintenance center of a
35 conventional size, which can be used as the basis for a building designed according to the invention:

- two basement floors for vehicle reception 6,
- 750 m² display and office area for the shopping

- area 7 on two floors,
- 350 m² storage area on a stores floor 46,
- 18 maintenance boxes 36 in the workshop area 8 as well as associated secondary zones 38-44, distributed over four floors,
- 5 - 104 parking spaces 47 for passenger vehicles within the parking area, which is distributed over seven floors,
- 300 m² engineering areas on an engineering floor 10, and
- 10 - 1 100 m² office area in the office region 11 (on five floors).

Together with the parking areas, this corresponds to a total useful area of about 6 000 m². In the case of a building designed according to the invention, the ground area that is built on in a calculation example calculated using the above data is, however, only 465 m², so that a total ground area requirement of between 750 and 1 200 m² must be assumed, depending on the national or state-specific building regulations relating to the distance required between buildings. Furthermore, only small gaps between buildings are generally available for building construction in the city centers of metropolises. Despite the greater construction costs for high-rise building construction and the increased technical complexity for the vertical, logistic communication between the functional areas, this results in a considerable overall cost advantage in comparison to an equivalent object which is functionally identical and has the same performance, but is based on a conventional multifloor flat construction.

Owing to the minimal amount of ground area that is built on, the concept according to the invention may be financially worthwhile despite high land prices, to be precise particularly when the maintenance orders in the

workshop are carried out based on shift operation, preferably on three-shift operation. This offers the customer services around the clock during office hours, times during which people are out or shopping times.

5 Furthermore, the automobile company operating the maintenance center is permanently provided with a highly effective advertising medium, which can be seen from long distances by third parties as well, in the immediate vicinity of the center of a highly populated

10 area by virtue of the conveniently offered maintenance services, the display and sales areas and the moving advertising hoardings.

The structure body of the tower-like building 1 should

15 not just be designed to be functional internally. For a relatively large building with technical functions to be accepted within a center of a highly populated area that is heavily frequented by the public, it is also very important for the building to have a pleasant

20 appearance. The advertising effect which is achieved by a physical symbol in an attractive city location - and thus in the immediate vicinity of the customers - is extremely important for an automobile company. For the physical breakdown of the building, which intrinsically

25 tapers upward, the building cross section has an approximately square shape only in the lower floors, that is to say in the shopping area 7 and underneath the workshop area 8. In contrast, the floor levels 35 in the workshop area 8 are in the form of a regular

30 octagon which is derived from the square shape of the shopping area 7 by capping the corners. The floor levels which are located above the workshop area 8, that is to say in the parking area 9 and engineering area 10, are approximately cylindrical, that is to say

35 they are polygonal with a circumferential circle which can be written into the octagon of the workshop area 8. The floor levels 51 for the office area 11 which are arranged at the highest point in the building once

again have a square cross section with a square which can be written into the circle formed by the cylindrical parking area 9 and engineering area 10; they may also have a round cross section.

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Because the building cross section decreases in the upward direction, the passenger elevators 4 and emergency stairwells 5 which are arranged in the corner area outside the structure body are in the form of
10 separate minaret-like towers which project a short distance from the structure body and are connected by means of short bridges 4', 5'' to the floor levels that are used by people.

15 Since the building cross section does not just decrease in size in the upward direction, but its cross-sectional shape also varies over the building height, the building has a highly contrasting and pleasant appearance. The building is provided with a feeling of
20 lightness and transparency by virtue of having a complete glass façade on all sides.

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DaimlerChrysler AG
Stuttgart

Patent Claims

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1. A multifloor building with a basement for an automobile company agency which sells new passenger vehicles and carries out maintenance services, in which building the floor levels are connected by passenger
10 elevators and load elevators as well as by staircases, with the elevator cabin of the load elevator being matched to the weight and size of the largest passenger vehicle to be maintained, in which building facilities are furthermore provided for the following types of
15 use:

- a vehicle reception area which, in a small area, contains both an office area and a workshop and parking area for receiving the customer orders and the customer vehicles for maintenance,
 - 20 ➤ a relatively large number of parking spaces for parking the customer vehicles which are to be maintained or are ready to be picked up,
 - a workshop with a sufficient number of workstations and infrastructure facilities for
25 peripheral functions,
 - a display area for new vehicles with associated office rooms,
 - an office area with office rooms including rooms for infrastructure peripherals,
 - 30 ➤ furthermore, engineering areas for accommodating infrastructure engineering equipment such as the building heating, air conditioning or the like,
- characterized by the said facilities (6-11) being arranged one above the other on a number of floors in a
35 standard, tower-like building (1) with a rectangular, approximately square ground area requirement ($A \times B$) at least for those floors which are arranged above the first floor, with one dimension (A or B) of this ground

area corresponding approximately to three to five times, and preferably about three and a half to four times, the length (1) of the longest passenger vehicle to be maintained, with the tower-like building (1) having the following further features:

- the display area (32) for new vehicles (34) and the associated office rooms (33) are arranged on one of the lower floors above ground level, preferably on the first floor (shopping area 7),
- 10 ➤ the areas for vehicle reception (6) are arranged in the basement, which can be accessed via a drive-in ramp (3),
- the elevator shaft (12, 12') for the load elevator which connects the floor levels to one another is
15 arranged centrally and in the middle within the floors above ground level, with the shaft (12) having a round cross section at least in the area of the workshop floors (46, 36) and above them, with an unobstructed internal diameter which
20 corresponds at least to the length of the ground area diagonal of the elevator cabin (14), and with two or more shaft doors (28) which correspond to the width of the elevator cabin (14) being arranged on each floor level with a round load
25 elevator shaft (12) around the latter,
- the elevator cabin (14) of the load elevator is mounted on a lifting cage (13) which is guided in the elevator shaft such that it can rotate about a vertical center axis (15'') (rotary bearings 15, 15') and is provided with a controllable rotary
30 drive (23) such that the elevator cabin (14) can be swiveled horizontally such that its cabin opening deliberately faces a circumferentially identical position with any given ones of the
35 shaft doors (18), which are arranged around the elevator shaft, on a floor level,
- the maintenance boxes (36), which are distributed on two or more floor levels, in the workshop area

(8) are arranged radially aligned in a star shape around the elevator shaft (12) of the load elevator, with the other facilities (38, 39, 41, 42, 43, 44) and workstations (40) for the workshop (8) being arranged in the free spaces which remain between the maintenance boxes (36) and which diverge outward, and with a separate floor level (46) being provided for storage of large-volume spare parts, all of which are together referred to for short in the following text as the "workshop area" (8),

➤ the parking spaces (47) for parking the customer vehicles or for any new vehicles - referred to for short in the following text as the "parking area" (9) - are distributed over two or more floor levels which are arranged above the floor levels of the workshop area (8), with the individual parking spaces (47) being arranged aligned radially in a star shape around the elevator shaft (12) of the load elevator,

➤ a separate engineering floor (10), which is arranged above the parking area (9), is arranged to accommodate the infrastructure engineering equipment,

➤ the office area (11) is distributed over two or more floor levels (51) which are located above the engineering floor (10),

➤ at least one passenger elevator (4) and at least one stairwell (5) for an emergency staircase are arranged in the corner area of the ground area (A × B) of the building tower (1), with at most one passenger elevator (4) or one emergency stairwell (5) being arranged in each corner.

2. The building as claimed in claim 1, characterized in that the drive-in ramp (3) which leads to the vehicle reception area (6) initially runs in a straight line

and, at its end, is curved in a helical shape.

3. The building as claimed in claim 1,
characterized in that

5 the basement floors around the width of the drive-in
ramp (3) are broader and longer than the first floor
and the first floors above the first floor.

4. The building as claimed in claim 1,
10 characterized in that
the ramp which can be driven on and runs in a helical
shape is arranged in one corner of the ground area
rectangle.

15 5. The building as claimed in claim 1,
characterized in that
the at least one stairwell (5) is arranged centrally
within the ramp which runs in a helical shape.

20 6. The building as claimed in claim 1,
characterized in that
the load elevator shaft (12') has a rectangular cross
section corresponding to the outline shape of the
elevator cabin (14) at least in the area of the
25 underground floors.

7. The building as claimed in claim 1,
characterized in that
the elevator cabin (14) of the load elevator can be
30 mechanically locked and fixed to the boundary of the
elevator shaft (12) in any desired circumferentially
identical position with a shaft door (28) by means of
locking bolts (24) which can be extended parallel to
the cabin floor.

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8. The building as claimed in claim 1,
characterized in that
the shaft doors (28) of the load elevator are all in

the form of fire-resistant fire protection doors.

9. The building as claimed in claim 1,
characterized in that

5 the shaft doors (28) of the load elevator are in the
form of tilting doors or roller doors which can be
raised during opening.

10. The building as claimed in claim 1,
10 characterized in that
the load elevator is driven (22) from underneath via
chains (19).

11. The building as claimed in claim 1,
15 characterized in that
the counterweights (18) for the load elevator are
arranged outside the building (1).

12. The building as claimed in claim 11,
20 characterized in that
the counterweights (18), which are arranged outside the
building (1), for the load elevator are panels which
are approximately at the same height as and are at
least just as wide as the floors.

25 13. The building as claimed in claim 12,
characterized in that
the counterweights (18) for the load elevator, which
are in the form of panels, are provided with a moving
30 electrical power supply, such that the counterweights
(18), which are in the form of panels, can be used as
information media for large-area information.

14. The building as claimed in claim 1,
35 characterized in that
the load elevator (12-24) and the passenger elevator or
elevators (4) which is or are arranged away from the
center in the building (1) lead/leads only as far as

the engineering floor (10), in that, however, an elevator shaft (50) with a smaller diameter, which is arranged within the building (1), preferably centrally in the building (1), continues above the load elevator (12-24) within the office area (11) up to the uppermost floor level, and a passenger elevator is arranged in this elevator shaft (50).

15. The building as claimed in claim 1, characterized in that two passenger elevators (4) and two emergency stairwells (5) are provided on the building (1), and are arranged outside the tower-like structure body in the corner area of the ground area (A x B).

16. The building as claimed in claim 15, characterized in that the two passenger elevators (4) are arranged on the access side (2') of the building (1), and the two emergency stairwells (5) are arranged on the opposite rear side (5') of the building (1).

17. The building as claimed in claim 1, characterized in that the areas for vehicle reception (6) are distributed over at least two levels below ground level, and are connected to one another by means of a ramp which can be driven on and runs in a helical shape.

18. The building as claimed in claim 17, characterized in that the gradient of the drive-in ramp, which has a helical shape, is sufficiently steep that the floor height is overcome after just at least 270° of one complete turn.

19. The building as claimed in claim 1, characterized in that a maximum of eight maintenance boxes (36) are provided

on each floor level (35) within the workshop area (8), with adjacent maintenance boxes (36) being arranged at an angle of 45°.

5 20. The building as claimed in claim 1, characterized in that
twelve to fifteen parking spaces (47) are provided on each floor level within the parking area (9), with adjacent parking spaces (47) being arranged at an angle
10 of 30° - 24°.

21. The building as claimed in claim 1, characterized in that
the first floor and/or the lowermost floors above the
15 first floor are equipped and set up for use as sales or commercial areas with a high degree of public traffic - referred to for short in the following text as the "shopping area" (7).

20 22. The building as claimed in claim 1, characterized in that
the building cross section of the floors which are above ground level but are below the workshop area (8), that is to say in the shopping area (7), is square.

25 23. The building as claimed in claim 1, characterized in that
the building cross section in the floor levels (35) which are in the workshop area (8) is in the form of a
30 regular octagon which is derived from the square shape of the shopping area (7) by capping the corners.

24. The building as claimed in claim 1, characterized in that
35 the building cross section in the floor levels above the workshop area (8), that is to say in the parking and engineering areas (9 and 10), is approximately cylindrical, that is to say polygonal with a

circumferential circle which can be written into the octagon of the workshop area (8).

25. The building as claimed in claim 1,
5 characterized in that
the building cross section in the floor levels (51) in the office area (11) is square, with a square which can be written into the circle of the cylindrical parking and engineering area (9, 10).

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26. The building as claimed in claim 1,
characterized in that
the passenger elevators (4) and the emergency
stairwells (5) are constructed outside the structure
15 body as separate minaret-like towers which project at a short distance from the structure body and are linked by short bridges (4', 5'') to the floor levels used by people.

20 27. The building as claimed in claim 1,
characterized by
a complete glass façade on all sides.

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