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(54) Automatic car parking.

(57) The object of the present invention consists in a novel system and the novel means which are necessary for obtaining the same, this being suitable for moving and ensiling cars into automatized modular parkings, underground or in a raised position or the mixed type. Said means realize the necessary functions through various lifting means (11,12), through pallets (1), supports (8) and horizontal slide columns (18), through hydraulic or mechanical driving devices (4,5) and also through members that make it possible to use particular closing means and means (21,22) which are capable of protecting first of all the safety of users of said parkings and then the safety of cars that are ensiled in said parkings, and the means which are capable of allowing the entrance movements in narrow spaces to be performed where entrance ramps or multiple entrances cannot be realized.

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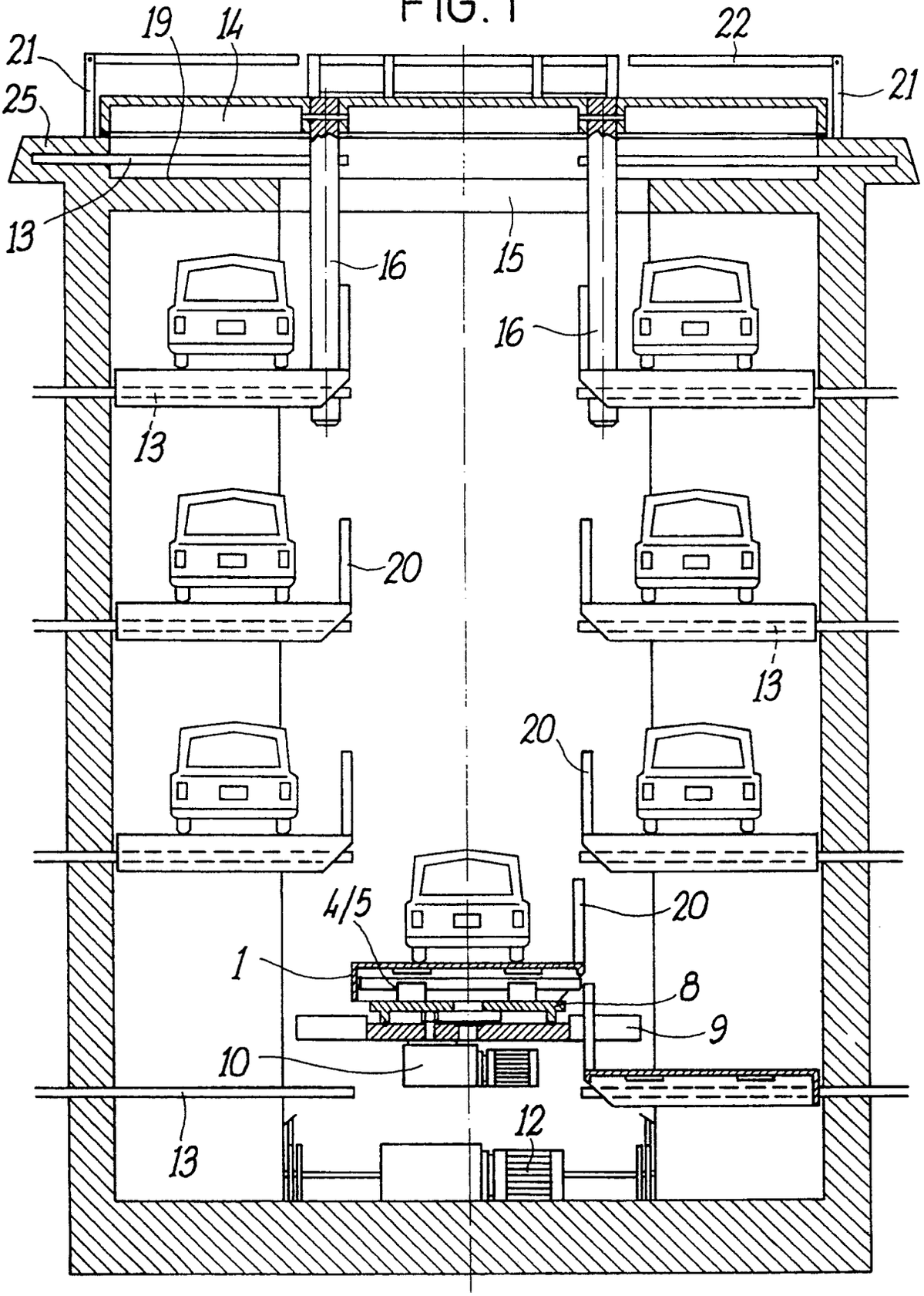
FIG. 1



SYSTEMS AND MEANS TO MOVE AND TO ENSILE CARS INTO MODULAR, AUTOMATIC PARKINGS, UNDERGROUND OR NOT, AND RELEVANT IMPROVEMENTS TO CLOSE THE ENTRANCES AND TO PROTECT THE SECURITY OF PERSONS AND MEANS USING THE SAME

The present finding relates to the solution and the improvement on systems or means to be adopted in underground or outside modular parkings, automatized or not, said means being intended not only for the operation and the rationalized structure of said parkings, but also for the safety that they are to give both to users and to their cars which are moved, transported and ensiled in such parkings.

Accordingly, the present finding innovates the members that move, guide, lift, and put on their way the cars from the moment when the driver introduces and drives them to the environments of such members as well as of the automatic transportation members, up to the moment when said cars are committed to all those means and automatic devices that lead said cars far from the user when he/she commits his/her car to such means and when said cars come back to the users when they call them back for putting the same again on the entrances; moreover said finding specifies, discloses and claims also all those systems and means that complete it so making it safer and more efficient.

It is the object of the present finding the realization, in the way mentioned above, of all said means so designed as:

- to introduce the car into the adjacent places and onto the boards or automatic guiding planes;
- to prearrange the car so that the same can be automatically transported into the parking, without accompanying the car but leaving it where tine same is to be put before the same is moved without any driver;
- to make it more functional and safer to use such kind of parkings;
- to move, drive or remove automatically cars in parkings which can be of the underground type or not;
- to ensure the occurrence of all such movements precisely, in a fast way and excluding any mistake or damages to persons and to cars;
- to arrange cars on the same pallet that has drawn and driven the same where they will be kept ensiled;
- to have pallets supported by brackets or by supporting members arranged horizontally and projecting from the vertical walls;
- to ensure the entrance closures of the parking;
- to exploit the limited entrance spaces which could not be employed in a different way,
- to make it easier to perform all motions and manoeuvres which are required before committing cars to such means or before drawing the cars of interest from the same,
- to ensure maximum safety to those who use such means, both as regards persons themselves and as regards the cars that are to be committed to such means;
- to hide also the entrances when they occupy protected or reserved areas or when they are such that the environments in which said parkings are present become visually disfigured.

Such object has been obtained by realizing all those members that make up a new system which is different from the systems already existing and which is rational and gives the following advantages:

I. such system is safe as regards the compliance with accident prevention rules;

II. it is adapted to the preservation of the environement when it might disfigure the spaces in which it is present or where the necessary service places, which are possibly arranged outside, are present;

III. it is rational as regards all motions that the person who drives the car to be ennsiled or drawn has to do;

IV. further, said system is rational as regards all motions that the automatic devices induce it or order it to perform.

In order to better illustrate the finding in question, a more detailed description will be found in the following, said description being referred to a preferred embodiment that has been taken as an unconstraining and not limitative example, said description referring to the enclosed drawings wherein:

Figure 1 represents a closed underground parking which is shown by means of a transverse or vertical cross-sectional view pointed out by the line CC in Figure 4, the boxes that form said parking being viewed from the back side and being occupied or not by cars, and the vertical lifting means is also shown as engaged in supporting a pallet with a car;

Figure 2 shows the same open underground parking represented by means of a longitudinal and vertical cross-sectional view pointed out by the line BB drawn in Figure 3, the boxes being viewed from the side part and occupied or not by cars, the vertical lifting means being also shown as engaged in keeping a car on the pallet and in the high position, before the pallet itself is put in motion to take the same to a lower position, and to keep the car in the parking, or differently to drive the car to the point where the person interested in drawing the car can actually draw the same;

Figure 3 shows the parking previously described,

which parking is viewed in this case from the top and with a single fixed loading plane arranged above the space of the same and under the closure shed or penthouse, and where a car is arriving, on the vertical transportation movable plane;
Figure 4 shows the same parkings a top view, but this time with two opposite loading planes, both of them being at the runway plane level and on the side of the entrance opening of the parking where, on one of said planes, and more precisely on the plane on the right side, the car is present, said car being covered by the shed or penthouse (which this time is larger than the first one) and being ready to go aout of the parking or on the point of going into the parking itself;
Figure 5 shows in a detailed way the parking portion where two pairs of horizontal columns are observed, said columns being opposite to two more columns, the pallet that comes from the left side being at rest between said columns, such pallet being free from the car and loaded on the vertical transportation plane;
Figure 6 shows the same detail of the parking as viewed in the preceding figure and wherein said pallet, in this case, supports a car drawn from the box on its side and loaded on the vertical transportation means;
Figure 7 shows the same detail of the parking as viewed in the preceding figure and wherein the pallet in this case supports a car which is drawn from the box and is loaded on the vertical transportation means, which means can move between said horizontal columns both upwards and downwards;
Figure 8 shows the same detail of the parking shown in the preceding figure and wherein the pallet in this case supports a car that it is on the point of drawing or of putting on the two horizontal columns;
Figure 9 shows an enlarged detail of Figure 1, wherein the high portion of the parking is put into evidence when the same is open, when the pallet on the vertical transportation plane has reached the level of the runway plane, when the covering shed or penthouse is in the raised position and when the car is on the point of being taken onto one of the side planes that are arranged on the sides of the entrance of the underground parking or on the point of coming from said plane;
Figure 10 shows the same detail as that viewed in the preceding figure, wherein the high portion of the parking is put into evidence, when the parking itself is open, when the vertical transportation means has reached the level of the runway plane, when the covering shed is raised and when the car has been transported, turned and pushed onto the right side plane that is placed by the side of the entrance of the underground, or when said car is on the point of being removed from said plane;
Figure 11 shows the same detail as that viewed in the preceding figure, wherein the high part of the parking is put into evidence, when the same has a single loading plane, when it is open, when the shed covering is reduced and open, when the vertical transportation plane has reached the level of the runway plane, when the car has been taken, possibly turned and pushed onto the single plane placed by the side of the entrance to the underground parking, or when said car is on the point of being removed from such plane, and where the means that shift laterally and cause the platform that bears the pallet with or without a car to rotate are clearly illustrated.

In the enclosed drawings, the members making up the system can be observed, said members being:

- the pallet 1 which is made up of a compound metal plate which is welded to other suitable materials, whose plane is endowed with grooves 2 wherein the wheels of the car that occupies the pallet itself are introduced so that the car keeps fixed, said plane being otherwise endowed with other suitable locking devices;
- the pairs of hydraulic cylinders 4 and 5 which, together with the platform 8, carry into effect as a pair the right or left shifts of said pallet 1: said cylinders are provided at the ends of their rods with an electromagnet 7 or with other devices that perform the functions of an electromagnet, in order to keep connected to the pallet 1 when the latter is to be retired as partially shown in Figure 8.

As an alternative, it is also possible to perform said motion by means of the following systems:

a) lateral telescopic forks controlled by an electric or a hydraulic motor or by means of any other system;
b) a cam system or any other suitable sustems;
- the movable or transportation plane 9 that moves but always keeps inside the garage and that bears the rotatable platform 6 (which bears in turn the pallet), guides such platform in its motion by means of the ratiomotor 10 and other gears. Said plane is guided by the vertical sliding blocks 18 whose length is equal to the length of the vertical walls of the garage, and said plane is driven by the chains 23 or, as mentioned above, by hydraulic or mechanical actuators.

Said hydraulic actuators can be realized in the following ways:

1) with one or more pistons which are central and direct (normal or telescopic)
2) with a direct lateral piston (one or two or more normal or telescopic pistons)
3) with a tackle piston (one or two or mote pistons)

4) with an endless screw system (one or two or more endless screws).

When said plane rises and it reaches a certain height, it pushes the columns 16 that support the shed or covering 14, whereas when the plane goes down, it drives said covering to close the opening 15.

Said plane is made up of a strong, shaped metal structure, whose shape is designed to avoid the rigid members that form the garage, which the plane can meet along its path. This is in order to make the plane lighter and in order to better manoeuvre the columns 16 which are placed so as to not prevent the motions of the cars to be transported (see Figures 3 and 4) wherein the plane itself shows suitable to serve the exit of the garage, said exit being made up of one or two horizontal opposite loading planes 19.

- The platform 8 that is caused to rotate by the ratiomotor 10 within the circular guides obtained in the horizontal surface of the movable plane 9. This platform serves the purpose of turning the car, when it requires to be oriented at the exit toward a given direction rather than toward another one or toward an intermediate direction. This is necessary when the exit or the exits of the garage lacks/lack a double ride direction, or consists/consist of a single roadway or is/are difficult to go in reverse. Said turning motion can occur in the following way: a vertical lift platform is assembled on the vertical movable plane, which platform, performing a run previously set forth lift the pallet that already supports the car, so that while said car is turned it does not strike any obstacle of the parking, said rotation occurring possibly at any height of the parking levels.

- The chain mechanisms 23 required for the vertical motion of the movable plane 9. The vertical slide guides 18 are strongly connected to two opposite vertical walls of the garage.

- The ratiomotor 12 for the motions of the chains 23 or of the operating mechanisms can be substituted with a pump with a reservoir for oil, said reservoir being arranged on the bottom plane 17.

- The sliding and support members 13 of the pallet 1, which in the case herein illustrated are of cylindrical and tubular shape, and are also fastened to the walls on the sides 8 or 9 of the garage, which can be of the underground type or constructed externally in a raised position on a welded structure. Such members can also be made up of steel section bats having different shapes.

- The horizontal sliding bushes 3 which are strongly connected to the pallet 1, cf. Figure 6, which include anti-friction material sliding blocks and are possibly endowed with a ball bush, said balls being necessary to cause the pallet 1 to run in a guided manner along the supporting horizontal columns 13.

- The horizontal columns 13 (see all the figures again coupled in pairs), said columns being parallel and opposite to one another, fastened in the vertical walls S and D by masonry or anyway strongly connected to such walls of the underground or external parking. They serve the purpose of supporting the pallet when this is left by the rotatable platform B. They are spaced apart so that pallets can be accomodated bearing cars of equal heights or having different heights. For such cars, especially for those reaching heights above the planes or plane 19, the movable plane 9, when it is driven up to the level of the runway plane, is raised beyond said runway plane so that the pallet 1 does not find such cars as an obstacle when it is to be rotated, said movable plane 9 being withdrawn after such rotation has occurred, and being put on said columns where it receives and leaves the cars.

- The movable covering 14, which is capable of closing the only entrance opening 15 and from which all cars that can be ensiled into the parking are to pass. Such covering is shifted according to the allowable motions from the bottom up and vice-versa, said covering keeping always in the outside part and having possibly a different width according to the performance which it has to give, as will be shown in the following. It is always kept in the horizontal position and hence parallel to the runway plane, and when it has the function of closing the opening 15, it acts as a shed or penthouse that protects said opening and the users as well from the inclemencies of weather. Just in cases of urgency, said covering can be lifted by an operator independently of the driving of the platform.

Elastic gaskets and discharge channels determine the finishes of the covering itself, as shown in all figures except Figures 5, 6, 7 and 8. The columns 16 that support and guide the covering 14 in its motions are guided by the bushes 17 which are dipped within the ceiling concrete of the garage; they are put in motion by the movable plane 9 that always keeps inside the garage and has an equal number of notches having a shape that makes the engagement easier, into which they are introduced when they are to be shifted and from which they are released when the plane 9 is lowered so as to leave them. The shed 14, when the columns 16 lose the guiding action of the plane 9, keeps anchored, guided and fastened on the horizontal plane 18 which, as already mentioned above, closes the opening 15 (see Figure 1).

- The plane, or the horizontal planes 19, which are opposite to one another and are on the side of the opening 15, are below the horizontal columns 13 that support the pallet 1 (with the car or without any car) and separate such pallet from the deep cavity of the parking.

Such planes are obtained where the car stops for allowing the driver to get out of the car itself or to get inthe same, which driver, because of evident safety reasons against accidents, should never enter the parking space and should never go close to the open-

ing 15 of the same. The reason why said plane can be simple or double is the object of giving the possibility of moving the cars coming into the parking, especially when said parking is built in a position where entrances are such reduced, and this is to avoid difficult manoeuvres in reverse, both on entering the parking and on leaving the same. Such condition is valid above all for entrances in reduced areas.

- The railing 20, which is strongly fastened on the right or on the left of the pallet 1, is always turned towards the impassable entrance opening 15, and hence for protecting the same (cf. all figures).

- The railing 21 that encompasses the whole entrance area and that is always beyond the covering when this is in the lower position, serves the purpose of making it impossible the passage or the waiting of anybody when the shed or penthouse is so arranged as to cover the entrance. As pointed out in Figures 3, 11, 4 and 9, said shed 14 can be more or less extended according to the requirements and depending on the widths of the entrance and of the planes 19.

- The stop bar or bars 22, assembled on hinges and making part of the railing 21, make it possible the entrance of the car or prevent the car from entering the garage, or they realize the entrance for the driver who has to take the car out. This also serves the purpose of complying with the safety rules against accidents.

For concluding this description, we think it necessary and suitable to list all movements that are required for allowing the parking, whose systems have been described, to be employed and for allowing the employment of the ancillary equipment required for the operation of the same:

A. considering that a driver wants to take his/her own car out the parking, said driver, employing a key, a card or a code controlling unit, puts in motion, acting at a point outside the parking itself and at a short distance from said shed 14 and from the protection railing 21, the movable plane 9 with the platform 8, which both slide along the side slide guides 18, because they are driven by the motor 12.

B. The plane 9 stops in front of the required pallet 1, said pallet being at rest on the right or on the left of the parking itself.

C. Members provided with electromagnets or with any other system for hooking one of the two pairs of hydraulic cylinders 4 or 5 (cf. Figure 7) come out of the plane 9 which is at rest in front of the free pallet 1, said members being directed towards the pallet of interest.

D. When the electromagnet 7 touches the metallic wall of the pallet 1, this automatically becomes connected to said wall and starts the driving of the pallet that slides on the columns 13 toward the platform 8, where it stops, and keeps on the same. The electromagnet 7 can be substituted with any other kind of coupling which is driven by a mechanical or hydraulic device, capable of performing the functions mentioned above. The pair of cylinders 4 or 6, as illustrated (cf. Figure 8) realizes said return motion of the pallet.

E. The pair of cylinders 4 or 5, once their return stroke is finished, stops and a retainer is put into action which sets forth the position of the pallet 1 with respect to the platform B (this retaining member is not shown in the figure).

F. The movable plane 9 starts again, driven by the chains 11 and by the ratiomotor 12 (or by the hydraulic cylinders placed on the inner floor of the parking, and it comes to the required position, i.e. where the pallet 1 is flush with the runway plane.

G. During the rising stroke, the movable plane 9 is intercepted along its path by the guiding columns 16 of the covering 14 that closes the opening 1S of the parking.

H. The lower end portions of the columns 16 go into the seats prearranged in the plane 9, and the covering 14 starts rising so as to open the entrance 1S of the parking itself. After a few seconds, the pallet 1 appears. In that position the stopping members intervene, which members stop safely the movable plane 9 so that said plane cannot move at all.

K. At the same time the shed or penthouse 14, which acted as a covering that closed the entrance 1S, is raised and is put in its position, and the plane 9 stops at the end of stroke.

I. If necessary, the ratiomotor 10 causes the platform 8 and the pallet 1 to rotate, said pallet receiving the car duly oriented for taking the same out of the garage.

J. When the platform 8 and the pallet 1 come to the position specified above, one of the pairs of cylinders 4 or of bilateral telescopic forks controlled by an electric on a hydraulic motor or any other systems starts, said pair pushing the pallet 1 on the two horizontal columns 13 arranged beyond the space of interest and at the outside of the parking; in that case the pallet 1 takes the position which is suitable to load a car (cf. Figure 11, where the pallet has already been loaded with the car).

L. The stopping bar 22 rises and allows the passage of the car to be parked. The car enters the loading space which is on the rigid plane 19 in order to avoid heavy drawbacks to the driver who finds a deep empty space below his/her car when he/she gets out of the same.

M. The car is driven onto the pallet 1 while two wheels of the same go into the grooves 2 of the horizontal plane of the pallet. Here the car stops, the driver brakes it and gets out of the same.

N. The driver goes out by passing the bar 22 and controls the closure of the same as will as of the

parking.

O. The automatic ensiling movement of the car is started, as the electromagnet 7, which is connected to the hydraulic cylinders 4 or 5 or to the forms as mentioned above, hooks the pallet 1, returns the same and drives it onto the platform 8.

P. The retainer or stop device sets the movable plane 9 free so that the latter goes down into the inner part of the parking together with the car.

Q. The pallet 1 and the car come to the correct position and both are pushed onto the columns 13 by the cylinders 4 or 5.

5. The cylinders 4 or 5 are withdrawn and the car keeps in its housing till it will be called back for taking it out of the parking itself, whereas the movable plane 9 with the platform 8 keeps at rest along the vertical passage space wherein they had been shifted.

6. The movable plane 9, once it has taken the pallet 1 to its place according to the organization of the parking, is prearranged according to the designed way and keeps waiting for a further impulse for shifting and going to a place where it is required or where it is addressed, or it takes a previously determined stall position at any point of the vertical space mentioned above.

T. When the car is about to reach the exit point, if the parking is provided with a second front opening with respect to the entrance opening, the car can go out of the parking through said opening without the need for being moved in reverse for causing it to leave the pallet plane and taking it out of the garage.

U. When one of the parked cars on one of the parking planes is called back by the user so that it can reach the runway plane S, the driver, by means of the control devices arranged outside the garage, on the outer part of the protection railing 21 and beyond the bar 22, commands the opening of the parking as well as the movements that will take the car again to the point where the car itself is to be drawn.

V. The pallet 1 bearing the car, as already described above, is pushed onto the horizontal guides 13 and it is stopped on the rotatable platform through the action of the electromagnets 7 and of the pistons 4 or 5.

W. The plane 9 takes the car upwards.

X. The plane meets again the columns 16 and the covering becomes a shed or penthouse so opening the passage 15.

Y. The car is taken onto the plane 19 and stopped there.

Z. The bar 22 opens and the driver goes beyond the open barrier so arriving at his/her car.

AA. The driver gets into the car, starts the same and goes out of the parking.

AB. The parking is automatically or manually ordered to close and at that point the bar 22 closes, the pallet 1 is called back onto the rotatable platform 8, the movable plane 9 starts again its run downwards, the covering 14 closes and the movable plane 9 stops as already set forth above, so as to take the stall position.

AC. When the driver leaves his/her car or takes it again, he/she has to employ the door on the side that makes it possible the employment of that door, i.e., the door where the railing 21 is present (cf. Figures 10 and 11). If other passengers are present in the car, they also are to get out through that side if they had not got out of the car before entering the enclosure mentioned above, and again where the railing 21 is present.

This is necessary because on the opposite part there is the railing 20 connected to the pallet 1, that does not allow the door to be opened, so that it prevents passengers from passing. This expedient is purposely introduced so that passengers are constrained to follow this prescription in order to avoid risks. Thus, all pallets 1 are provided with the railing 20 if such railing shows suitable or necessary.

AD. A person that comes close to the car or that goes far from the same is forced to keep close to the railing 21 which is the only space that should be preferably kept narrow because of the reasons mentioned above.

AE. When the parking is provided with a second opening or entrance ramp, it is also guarded by a second bar 22 or even by four bars (see Figures 1, 4, 9 and 10, the car can go out freely without any movement, as the entrance to the parking is so designed as to make use of the rotatable platform B which prearranges the same so that it takes the required direction before being put on one of the two rigid planes 19.

Claims

1. Systems and means for moving and ensiling cars into automatized modular parkings, underground or not, and the relative improvements for closing the entrances to such parkings and for protecting the safety of persons as well as of cars employed by the same; said systems and means being made up of the pallets 1, the movable plane 9, the rotatable platform 8, the pair of hydraulic cylinders 4 and 5, the chains 23 or hydraulic pushing members, the horizontal supporting members 13, the covering or shed 14 which is guided and supported by the columns 16, of one or two horizontal planes 19, of the railings 20 and 21 and of the bars 22, and being characterized by the double horizontal cantilever columns 13 that project from the vertical opposite walls S and D of the parking, for

supporting and guiding the pallets 1 that take the cars to the parking and that define the stall box.

2. Systems and means for modular parkings as claimed in claim 1, characterized in that they comprise the pallets 1 that are prearranged so as to receive and to bear on their shaped planes the cars to be ensiled, said pallets being guided and supported by the horizontal columns 13.

3. Systems and means for modular parkings as claimed in claims 1 and 2, characterized in that they comprise a movable plane 9 that supports, guides and drives the rotatable platform 8 with the ratiomotor 10, which plane is capable of receiving both the pallets 1 arranged on the right planes D and those arranged on the left planes S.

4. Systems and means for modular parkings as claimed in claims 1, 2 and 3, characterized in that said rotatable platform 8 bears two pairs of cylinders 4 and 5 which are strongly connected to said platform, said pairs being necessary for realizing the horizontal motions in the two opposite directions of the pallets 1 to be taken onto the right and left columns 13 of the parking.

5. Systems and means for modular parkings as claimed in claims 1, 2, 3 and 4, characterized in that all cylinders 4 and 5 bear the electromagnets 7 or other automatic hooting devices connected at the ends of said cylinders, which devices are capable of pulling the pallets 1 when they are to be removed from the horizontal columns 13 and are to be taken onto the rotatable platform 6.

6. Systems and means for modular parkings as claimed in claims 1, 2, 3, 4 and 5, characterized in that said pallets, if necessary, are all equal and interchangeable with one another, and anyway they are always provided with a metallic or non-metallic wall to which the electromagnet 7 or any other hooking and pulling device can be hooked or coupled.

7. Systems and means for modular parkings as claimed in claims 1, 2, 3, 4, 5 and 6, characterized in that said pallets 1 are provided with bushes 3 which can be of cylindrical shape and are endowed with antifriction or self-lubricating members and are anyway suitable for guiding such members when they are in motion on the horizontal supporting bracket nembers 13

8. Systems and means for modular parkings as claimed in the preceding claims, characterized in that the plane 8 is endowed with hooking or coupling devices for keeping the pallet 1 that it transports at rest and when the latter is put in motion.

9. Systems and means for modular parkings as claimed in the preceding claims, characterized in that said movable plane 9 is driven upwards and downwards by means of hydraulic systems as for instance pistons or by mechanical systems as for instance ropes or claims 23.

10. Systems and means for modular parkings as claimed in the preceding claims, characterized in that such systems and means are made up of welded or compound metallic structures, or they are built underground and made up of reinforced concrete or of prefabricated members, and they are provided with one or more entrances and are obtained by digging in gardens, courtyards or in the environments of old buildings or various kinds of buildings where other spaces cannot be employed or the realization of traditional parkings is impossible or more difficult.

11. Systems and means for modular parkings as claimed in the preceding claims, characterized in that they comprise a movable plane 14 that acts as a covering for closing the underground parking and that acts as a shed for protection from the inclemencies of weather when the parking is open and when the opening of the same is provided with one or two service planes 19 arranged by the side of the entrance 15.

12. Systems and means for modular parkings as claimed in the preceding claims, characterized in that they comprise a movable plane 14 which is supported and driven by means of two, three, four columns 16 arranged vertically which are guided in turn by bushes that are fastened in the floor, said movable plane 14 being driven by the movable plane 9 that acts always in such a manner as to close and open the parking.

13. Systems and means for modular parkings as claimed in the preceding claims, characterized in that they comprise the movable plane 14 which is suitable to camouflage the underlying parking by adaptation to the features of the environment in which the parking is present, in order not to disfigure the architectural characteristics of the environment itself.

14. systems and means for modular parkings as claimed in the preceding claims, characterized in that the horizontal external plane or planes 19 which are made of masonry or of a compound and welded metal or any other suitable material covers/cover the underlying ensiling space, and are so constructed and positioned as to act as safety

members with respect to the users of the parking in question.

15. Systems and means for modular parkings as claimed in the preceding claims, characterized in that the horizontal plane or planes 19 is/are preferably built beyond the largest and opposite sides of the opening 15 of the parking itself which are always covered by the movable shed 14.

16. Systems and means for modular parkings as claimed in the preceding claims, characterized in that a pair of horizotal guiding columns 13 is arranged above each plane 19 at a short distance from the same and is parallel to it, this being also for both planes when there are two planes, said columns being always capable of receiving, guiding and supporting the pallet when the same is arranged where the car to be ensiled or to be put again onto the runway plane is loaded and unloaded.

17. Systems and means for modular parkings as claimed in the preceding claims, characterized in that the horizontal plane bearing two recesses 2 is provided with one or two strong protective railings 20 which are fastened to the edges of the same in order to provide for safety of users who pass on the same for taking the car into the parking or for taking the car out.

18. Systems and means for modular parkings as claimed in the preceding claims, characterized in that the outside part of the garage is provided with strong and safe railings or breastworks 21 arranged where it is necessary to provide for safety of users.

19. Systems and means for modular parkings as claimed in the preceding claims, characterized in that said railings 21 are provided with one or more strong movable stop bars 22 which allow the car to enter the parking or that prevent the car from going out of the parking itself.

20. Systems and means for modular parkings as claimed in the preceding claims, characterized in that said bars 22 are raised or lowered at manual command or according to the automatic cycle set forth before.

21. Systems and means for modular parkings as claimed in the preceding claims, characterized in that the shed 14, the bars 22 and the pallet 1 are moved and controlled by suitable devices to obtain single and manual movements or continuous and automatic cyclic movements.

22. Systems and means for modular parkings as claimed in the preceding claims, characterized in that said shed 14 is moved in the two directions by different means and devices and hence independently of the motion of the movable plane 9.

23. Systems and means for modular parkings as claimed in the preceding claims, characterized in that the whole plant is provided with service stairs which can include a number of flights with suitable passages for emergency interventions.

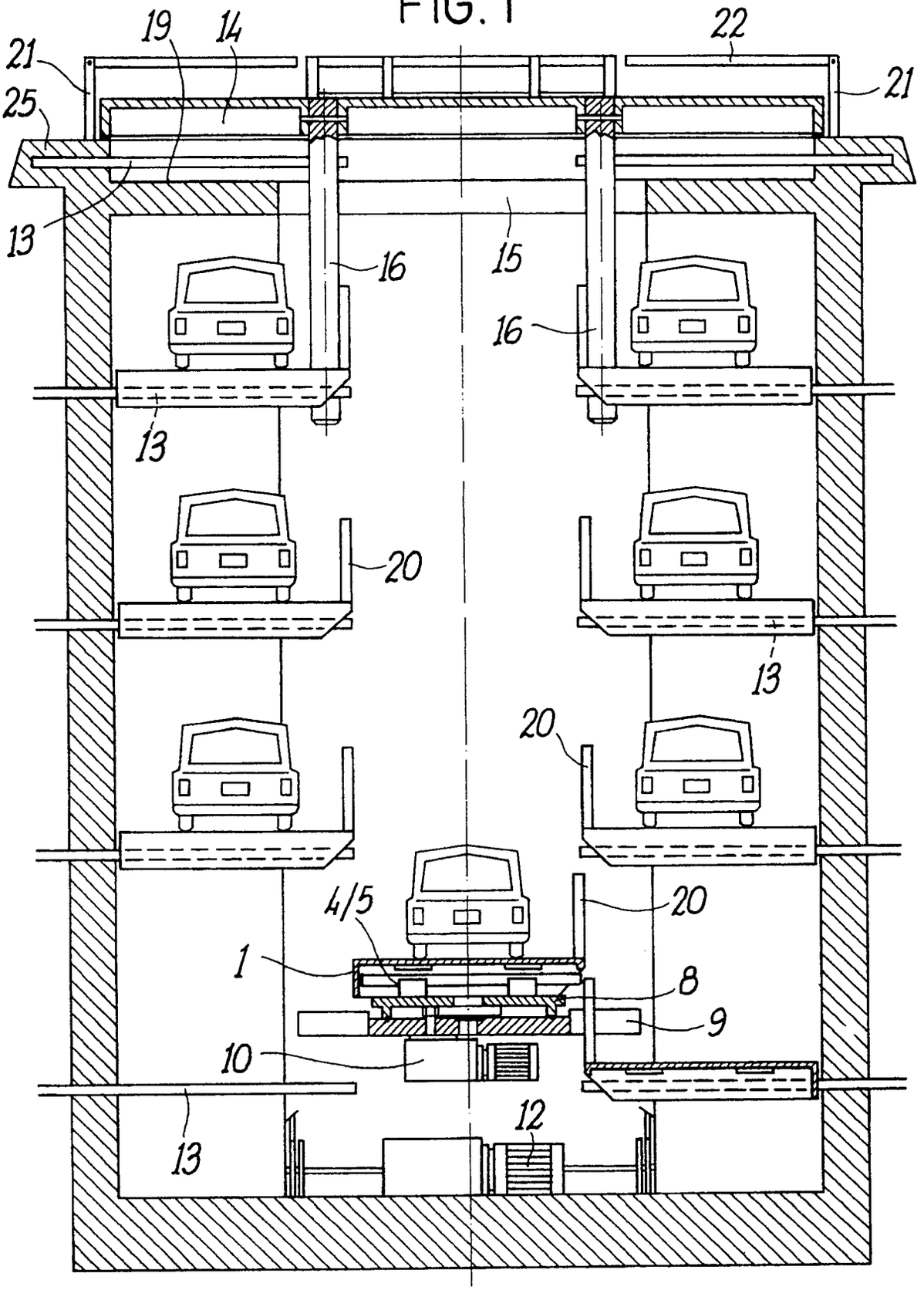
24. Systems and means for modular parkings as claimed in the preceding claims, characterized in that the whole plant including suitable sliding means can be employed in vertical adjacent silos in a continuous or temporary way.

25. Systems and means for modular parkings as claimed in the preceding claims, characterized in that the shifts of the pallet are realized by means of bilateral telescopic forks that are controlled by an electric or a hydraulic motor or by means of a cam device or any other similar system.

26. Systems and means for modular parkings as claimed in the preceding claims, characterized in that the lifting and lowering of the pallet is obtained by means of one or more direct central pistons, of the normal and of the telescopic kind, or by means of one or more direct lateral, normal or telescopic pistons, or by means of one or more tackle pistons or by means of one or more endless screw systems.

27. Systems and means for modular parkings as claimed in the preceding claims, characterized in that the rotation motion of the vertical-lift platform on which the pallet is placed occurs at any height of the parking levels.

FIG. 1



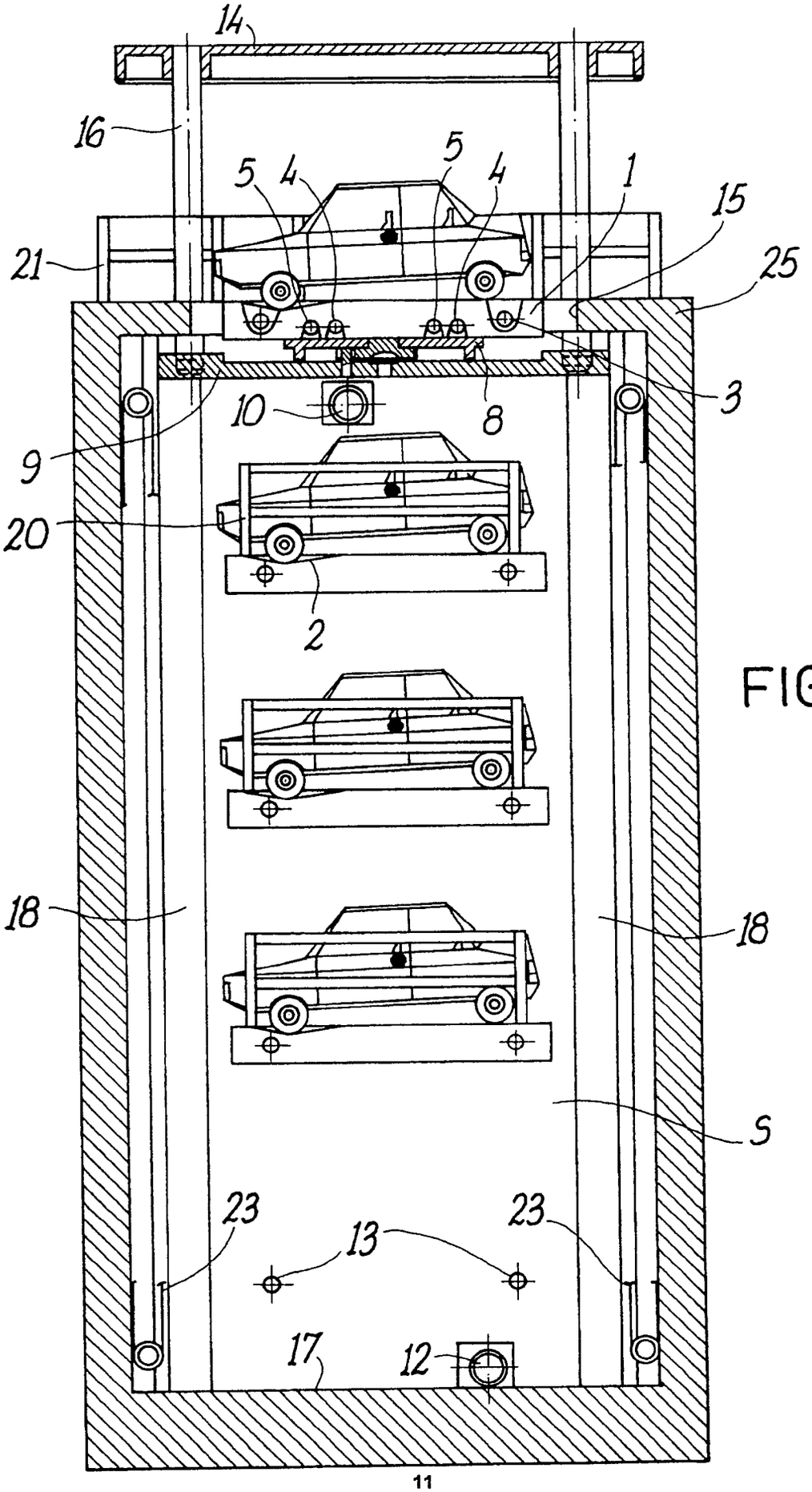


FIG. 2

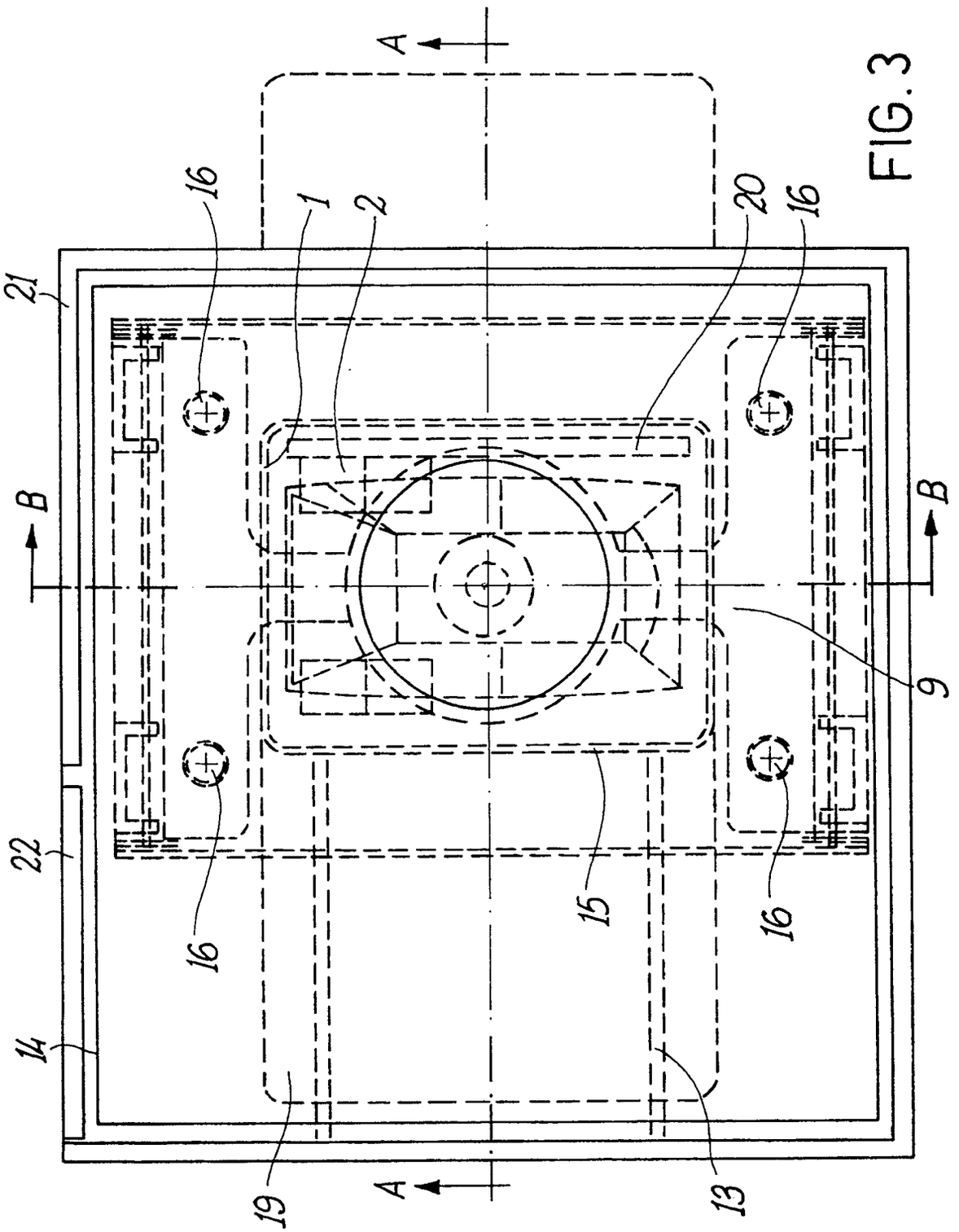


FIG. 3

FIG. 4

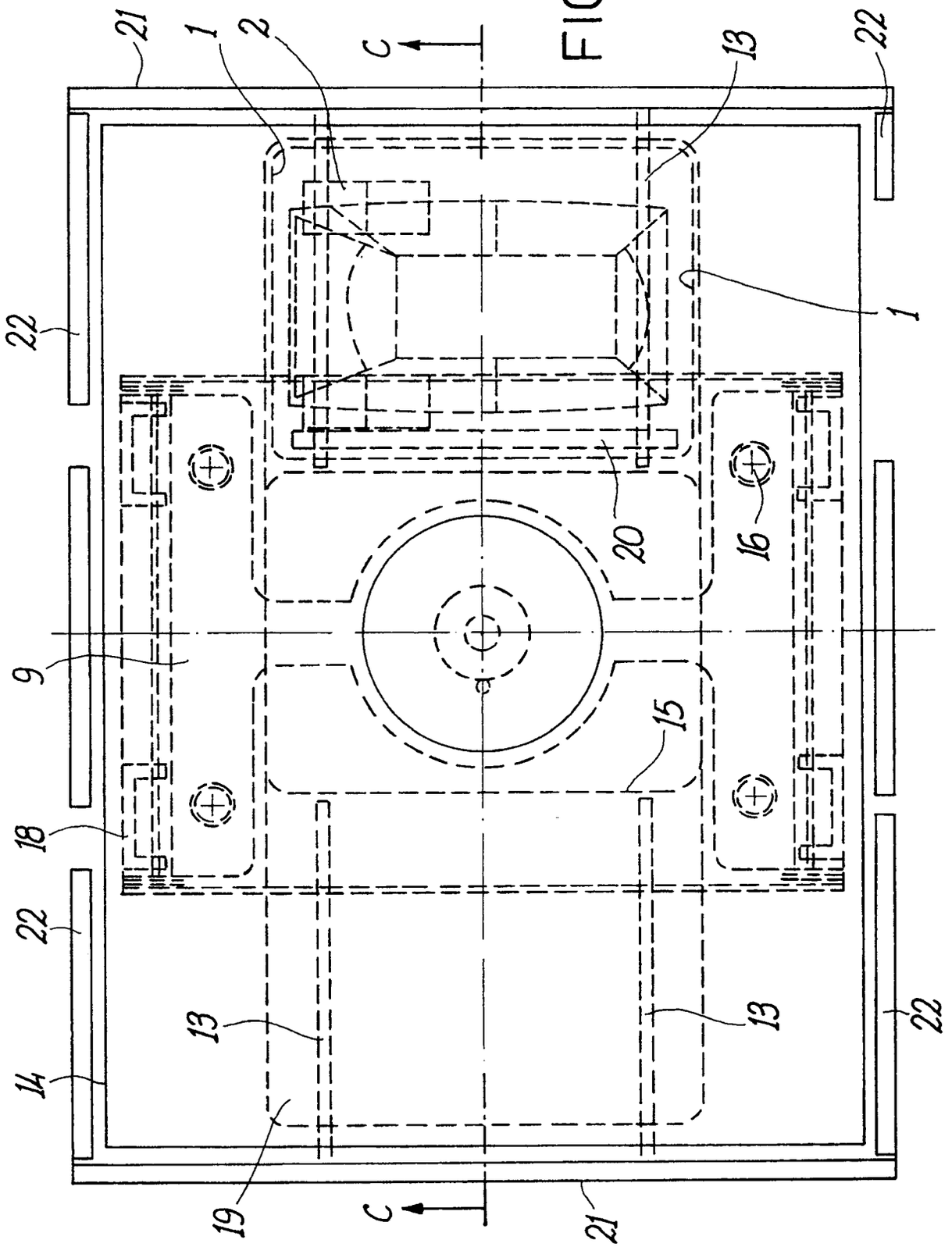


FIG. 5

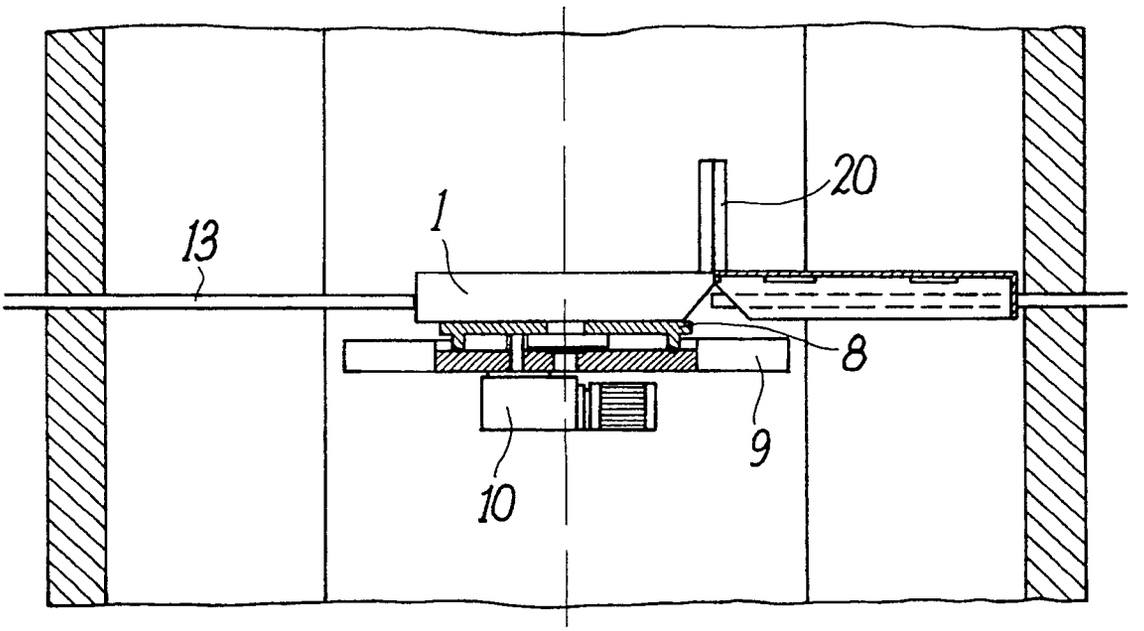


FIG. 6

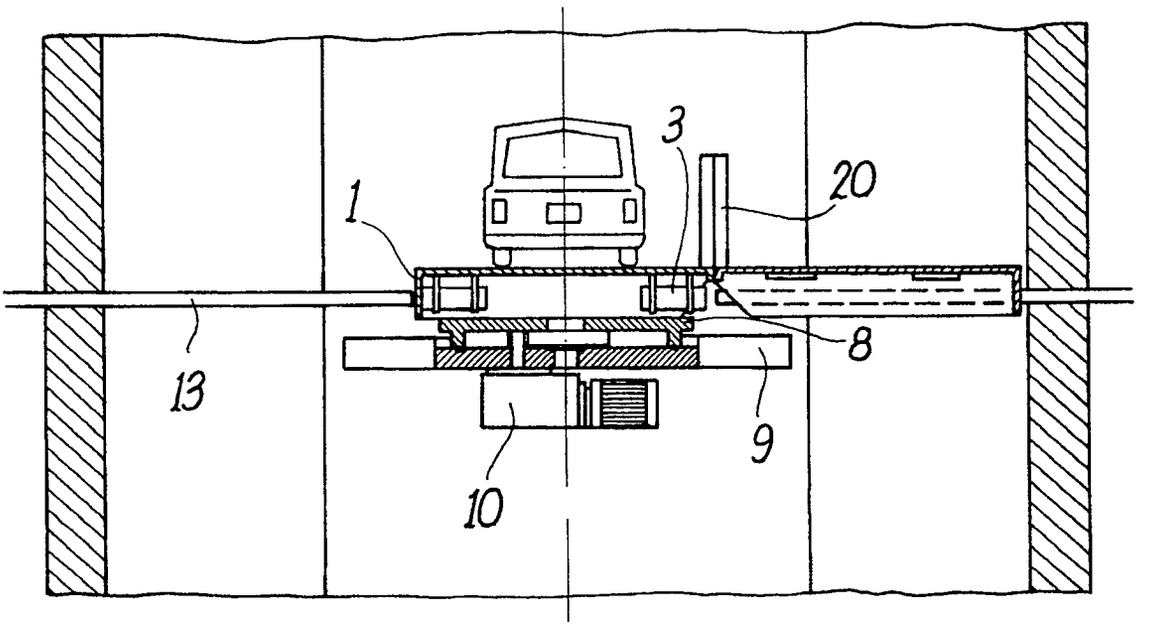


FIG. 7

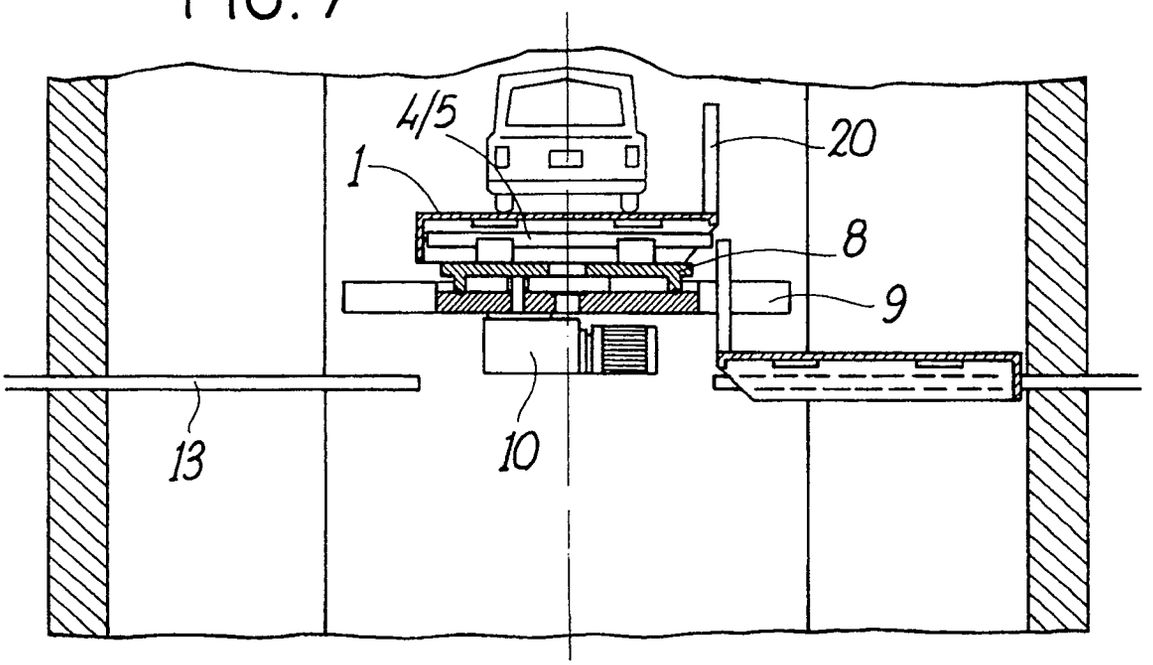


FIG. 8

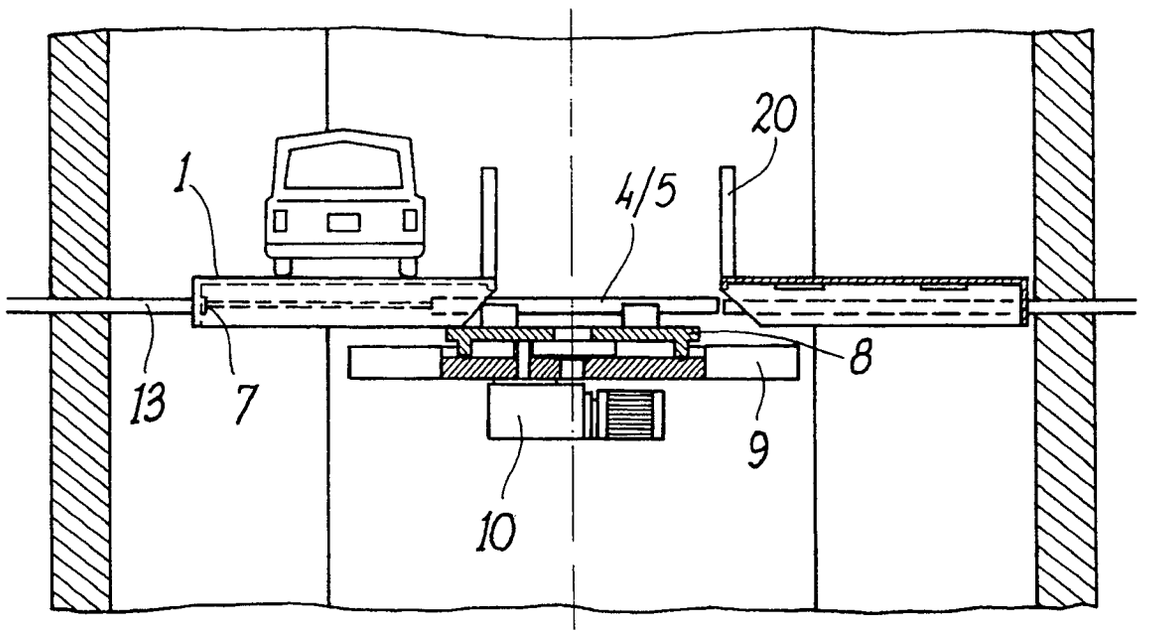


FIG. 9

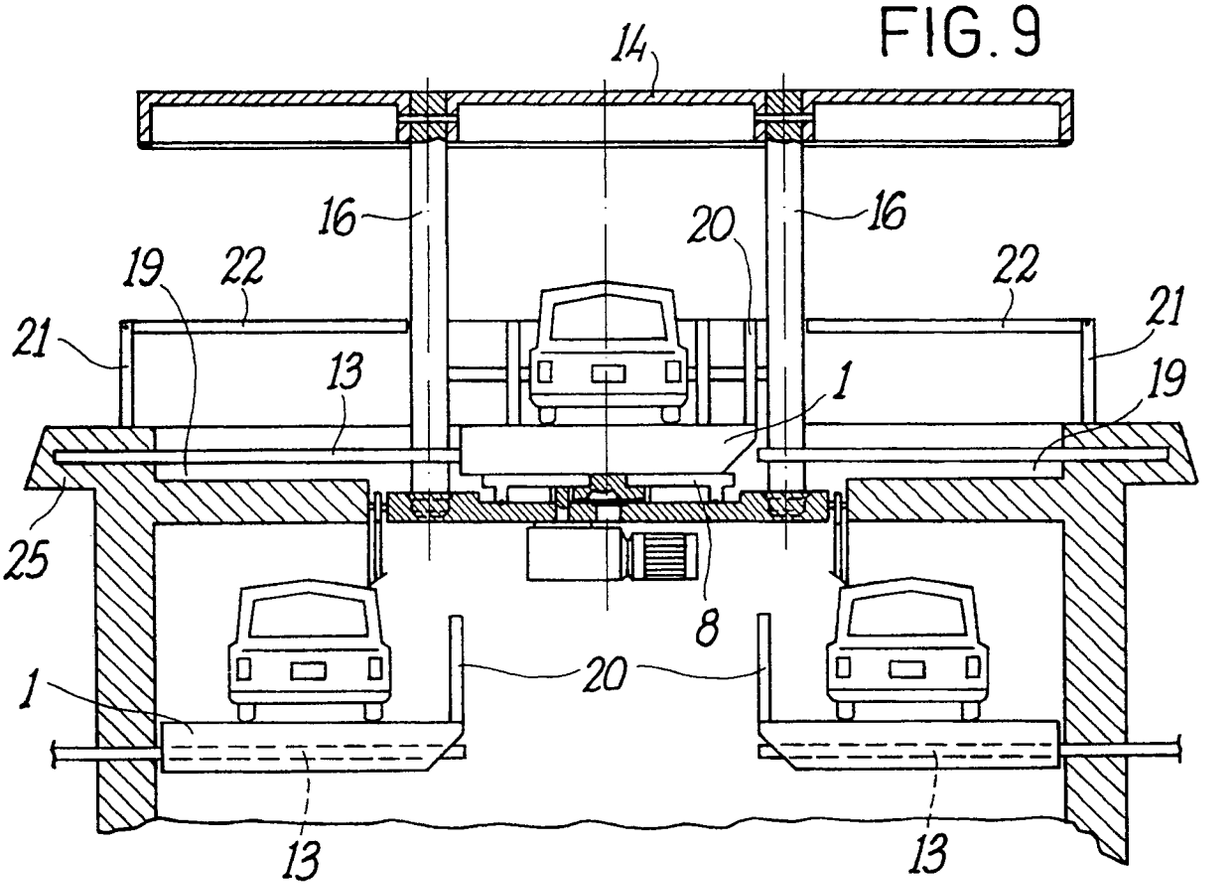

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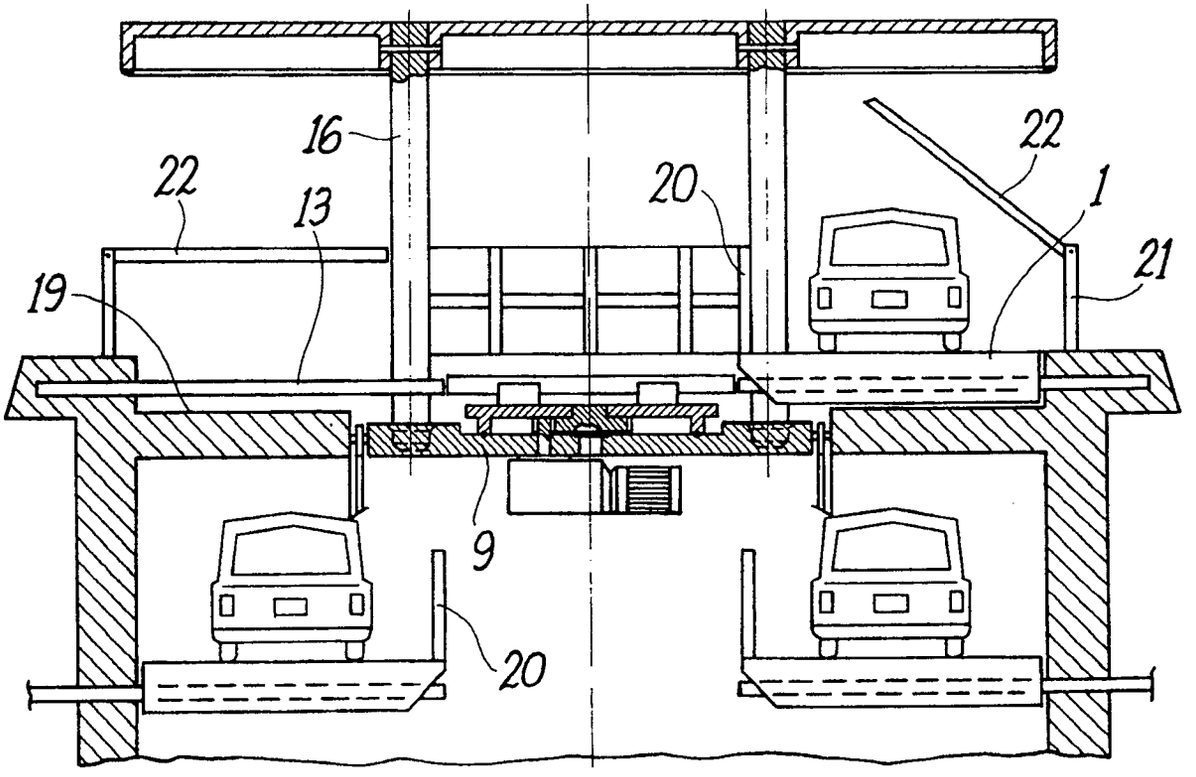
FIG. 10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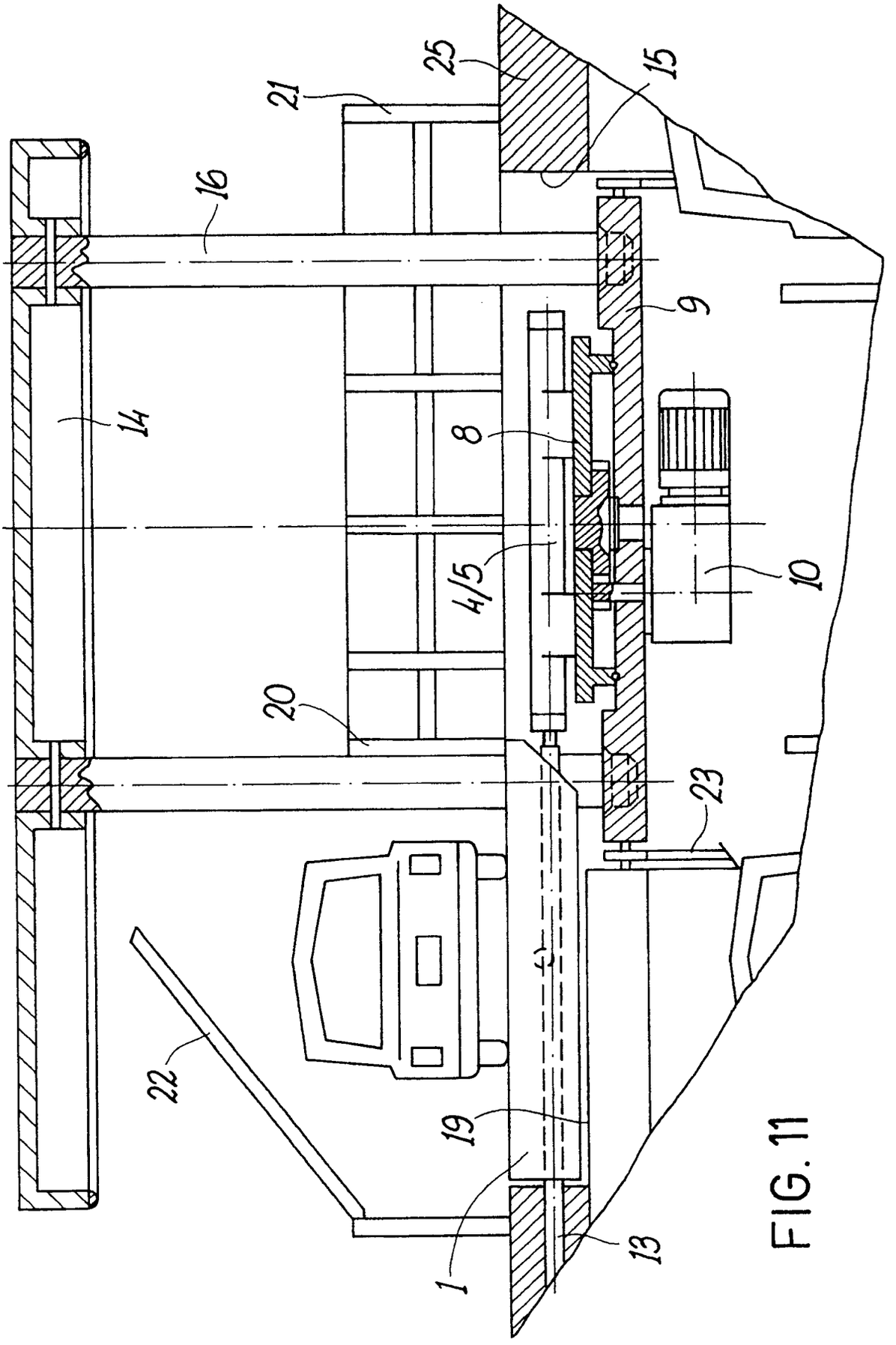

FIG. 11