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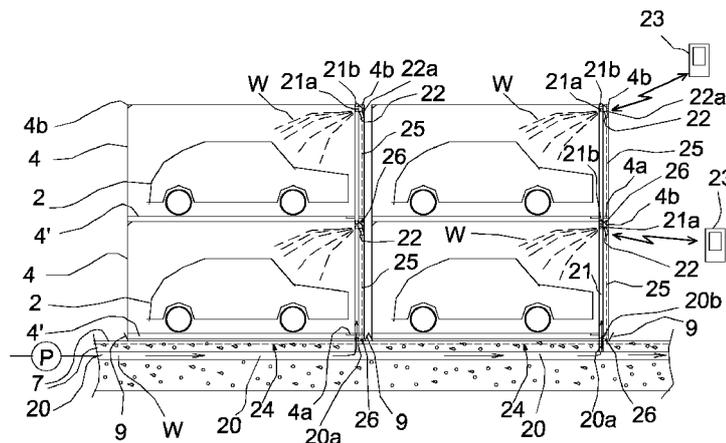


Fig. 1b

(57) Abstract: The parking facility (1) has a storage space (3) for placing vehicles on top of the base (7) of the storage space (3) in layers of storage units (4) and transfer means (5) for transferring a vehicle into or out from the storage space (3). The transfer means (5) include storage units (4) to be placed on top of each other in the storage space (3); first gripping means (50), which are arranged to transfer the storage units (4) into a storage space (3); second gripping means (50'), which are arranged to transfer the storage units (4) into a storage space (3). The parking facility is equipped with a fire extinguishing system having a flow path (20) arranged in the base (7). The storage units (4) are equipped with a feed piping (21), which forms a uniform fire extinguishing medium (W) feed channel.

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Parking facility with a safety equipment for automobiles and similar vehicles

The present invention relates to a parking facility with a safety equipment for automobiles and similar vehicles, said parking facility having an underground and/or
5 above-ground storage space for placing automobiles and similar vehicles on top of the base of the storage space in layers of storage units, transfer means for transferring an automobile or similar vehicle into or out from the storage space, said transfer means including storage units to be placed on top of each other in the storage
10 space and equipped with a bottom.

Prior known are parking facilities, which are traditional halls dug inside the earth and/or halls built above the ground, having several parking levels (tiers). Typically, each tier has a standard-size parking grid painted on the floor, into which grid the
15 automobiles are parked. Between the parking grid is a driving aisle, which must be adequately wide to enable the turning of automobiles into and away from the parking grid. In addition to this, the heights of the tiers must be made relatively high. Thus, a single automobile place takes a relatively great amount of space. Further, i.e. building in tiers is also relatively expensive, wherein building expenses per automobile space are also expensive; typically, the building expenses of a parking hall
20 for a single automobile space are on average 20,000 euros. The building expenses of underground automobile places are even higher than this. Further, the required lighting and often also heating and ventilation increase expenses.

In order to save space and facilitate parking, automated parking facilities are also
25 known. Common to these is that the automobile (or other vehicle) is generally stopped at a pick-up point outside the storage space itself, from which the automobile is automatically transferred on top of a dolly into a fixedly installed frame-like storage space. Such automated parking facilities are manufactured, for example, by
30 the Finnish company Oy Pokostore-Systems Ltd. and the German company Klaus Multiparking GmbH. The first one comprises an outer fixed frame and an inner rotary drum-like frame, into which spaces formed for an automobile to go (arranged on top of each other and in the shape of the arc of a circle) the automobile is transferred from the dolly. The automobile is brought into place in the outer frame by
35 rotating the entire inside frame, i.e. all the storage spaces of the inside frame. The

second one comprises a frame-like facility, into which are formed spaces on top of one another as well as adjacent to each other, into which spaces an automobile is to be transferred by means of a dolly. All the storage spaces are fixedly in connection with each other, so the end result is, however, a relatively large frame-like structure. Flexibility of the capacity and size of such a structure can be implemented only by changing the number of tiers. The disadvantage in both of these parking facilities is also that, due to their complicated transfer automation, they are expensive and prone to damage. Further, the service and maintenance expenses of the facilities are also high. Further, the number of tiers in the solution of Oy Pokostore-
5 Systems Ltd. is limited due to its circular shape. Also in general, these kinds of systems require many special parts, which are expensive. Current solutions are thus relatively expensive and take up a great deal of space, or automated parking solutions taking up less space are quite expensive and prone to damage.

15 Particularly, a drawback with the systems and parking facilities described above is that safety equipment, especially for fires, are difficult to place in a functional manner in connection with a parking facility. Traditional halls typically have a sprinkler system placed in the ceiling and wall structures, being of per se known art. In systems having separate storage units, technology differing from the safety equipment
20 of traditional halls is not known. Traditional fire extinguishing systems function with known efficiency in traditional halls, but in systems, in which various storage units are used, sprinkler systems placed in the ceiling and wall structures are not adequately precise to cover the fire safety of the lowermost storage units. In other words, the function of sprinklers does not extend to the lowermost storage units.

25 Another drawback relating to safety in systems having separate storage units is that their individual monitoring is difficult due to the high parking density. High parking density and the diversity of the storage units from each other makes it challenging, for example, to supply power, for example, for various sensors and lighting. There
30 are no known solutions for this problem.

The object of the present invention is to provide a facility, with which the drawbacks described above can be avoided or at least substantially decreased. The object is to provide a flexible safety equipment extending to every single storage unit.

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To achieve the object described above, the present invention is characterized in that the transfer means additionally include: a loading area, in which an automobile or similar vehicle is to be taken into the inside space of an individual storage unit; first gripping means, which are arranged to transfer the storage units into a storage space or to the loading area; an unloading area, which is spaced apart from the loading area and in which an automobile or similar vehicle is to be removed from the inside space of an individual storage unit; second gripping means, which are arranged to transfer the storage units into a storage space or to the unloading area, and that the parking facility is equipped with a fire extinguishing system having a flow path arranged to the base, and each storage unit is equipped with a feed piping, which forms a uniform fire extinguishing medium feed channel for the feed pipings between the storage units placed one on top of another and the flow path.

A facility according to the invention provides an automated and, at the same time, safe parking facility, which is very simple and inexpensive to build, because each storage unit can be equipped with exactly the same safety equipment. At the same time, high parking density per parking area used is accomplished. The safety equipment is also fully adaptable in the storage space. A parking arrangement according to the invention enables, in regard to the number of units, a very flexible, but, at the same time, safe solution in comparison to the solutions of known art. Further, the number of moving parts is few, wherein functional reliability is better than in the past.

Preferred embodiments of the present invention are described in the dependent claims.

In the following, the invention is described in more detail by referring to the accompanying drawings, in which:

Fig. 1a shows a diagrammatical sectional view of a parking facility according to a preferred embodiment of the invention,

Fig. 1b shows diagrammatically an enlargement of the storage units shown in Fig. 1, and

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Fig. 2 shows a parking facility according to another embodiment of the invention as seen from the end.

Fig. 1a shows thus diagrammatically a parking facility for automobiles and similar vehicles, which is labelled with reference numeral 1. This facility 1 includes a storage space 3 preferably formed on top of a base 7. Bordering the storage space 3, preferably, from the sides and ends are vertical walls 6 made from wall elements suitable for the purpose. The basic material of the base 7, i.e. the floor of the space 3, is, for example, concrete. The storage space 3 is thus an empty space, which per se is to be prepared very easily and at low expense. Let it be noted that Fig. 1a shows the longitudinal direction of the storage space 3.

Fig. 1a shows that the parking facility 1 includes a loading area 10 arranged in the longitudinal direction of the space 3 in connection with the first end of the space 3. The loading area 10 includes several side-by-side loading points 10a, into which automobiles 2 or similar can be driven, for example, via a loading point-specific entrance route 10b. The automobile or similar vehicle is driven into the storage unit 4 placed at the loading point 10a and switched off. The storage unit 4 is ready to be transferred by the transfer means 5 into the storage space 3. As has already been described above, to even out congestion peaks, there may be several entrance routes 10b and loading points 10a side-by-side, typically 2-12 units. Although it is not shown in the figure, the loading points 10a can also be in succession.

A parking facility 1 according to the invention thus also includes a plurality of storage units 4 apart from the storage spaces 3. The storage units are, preferably, frames 4 equipped with a bottom 4' (see Fig. 1b), into which an automobile 2 or similar vehicle can be taken at the loading point 10a before transferring the frame 4 and, hence, the automobile 2 into the storage space 3. Preferably, the frame 4 is an ISO container, a Eurocontainer or in its external dimensions similar, from which the walls and ceiling have been left off. As required, the opposite side wall in relation to the side of the driver can be left. In other words, the storage unit is formed by a support structure of the above said containers or similar (an edge beam structure, which can, as needed, be equipped with reinforcements, such as angle irons or similar), into which has been left or formed, however, a durable bottom or floor

structure, on top of which the vehicle 2 can be driven. Hereinafter a storage unit 4 may also be referred to as a container 4.

For transferring the storage unit 4 and the automobile 2 or similar vehicle into or
5 out from the storage space 3, the parking facility 1 includes, in turn, above said transfer means 5. The transfer means 5 include first gripping means 50, which can be used to grip onto the storage unit 4, into which the automobile 2 is parked (parking is explained in more detail below) or onto an empty storage unit 4, as well as transfer elements 5a; 5b, 5c; 5b', 5c', with which the first gripping means 50 and
10 second gripping means 50' can be moved.

The transfer means include here, arranged to a site above the storage space 3 into opposite walls 6, two long guide rails 5a, rails or similar (in Fig. 1a, the longitudinal direction of the guide rails 5a is perpendicular in relation to the plane of the paper).
15 The guide rails form a track 5a, supported by which is arranged to move, for the first gripping means 50, a beam bridge or double-beam bridge 5b. Similarly, for the second gripping means 50', supported by the track 5a is arranged a second beam bridge or second double-beam bridge 5b'. To the beam bridge 5b (5b') is, in its longitudinal direction (in the longitudinal direction of the space 3), arranged to move,
20 in a per se known manner, a bridge trolley 5c (5c') or similar. The track 5a can also be placed on the plane of the base (the floor) or to the base 7, wherein there are own legs (not shown) for each of the gripping means 50 and 50' between the beam bridge 5b (5b') and the track 5a. Moreover, in connection with the bridge trolley 5c (5c') are arranged gripping means 50 (50'). It can be said that, in this preferred
25 embodiment of the invention, the transfer means form a per se known bridge- or double bridge crane, which is equipped with gripping means 50 and 50'. The gripping means 50 and 50' are preferably a gripper or a modulation thereof known from an ASC (Automatic Stacking Crane) type container lift. The gripper can be lowered and raised by the lifting device (not shown) arranged to the bridge trolley 5c (5c')
30 and which is thus adapted for the handling (transfer) of the ISO containers or Euro-containers described above.

The first gripping means 50 are guided above the storage unit 4 (and automobile 2) to be transferred from the loading area 10 in order to be gripped by the gripping
35 means 50. Once the frame has been gripped by the first gripping means 50, the

storage unit 4 can be transferred by the transfer means 5 described above from the loading area 10 into the storage space 3. Similarly, the storage unit 4 (container) can be transferred by both of the gripping means 50 and 50' in the storage space 3, as well as by the second gripping means 50' from the storage space 3 to the un-

5 loading area 11.

The empty space 3 is in width preferably such that into it fits side-by-side, for example, 5-15 container rows, i.e. storage unit rows, preferably ten container rows. Each container row takes up, in its horizontal direction, approximately 3 metres of

10 space or slightly less than 3 metres. Thus, the span (length) of the beam bridge 5b moving supported by the guide rails (the track) 5a of two opposite walls 6, which corresponds to the width of the storage space 3, remains structurally as adequately small, the span being preferably approximately 20-40 metres depending also on the distance between the container rows. Fig. 1a shows that six units of frames have

15 been stacked on top of each other. In this case, for example, a six-level and ten-row arrangement can be formed, at the maximum, as a 600-place parking space, provided that each container row has ten containers 4 in succession. The number of places, the size and/or the shape of the bottom surface of the space 3 can easily be changed by removing or adding a level, row and/or the number of successive con-

20 tainers. This addition in the number of containers, one on top of the other, is shown in Fig. 1a by the containers presented by dashed lines.

In a preferred embodiment of the invention, the storage space 3 can be divided, in its horizontal direction, into sections the width of one, two or three rows of automo-

25 biles. The purpose of the sections is to divide the storage space 3 into sections, each of which having, in principle, a different storage time. For example, into one section are brought such vehicles that are stored for a short time, for example, not more than 2 hours. Moreover, into another section are brought such vehicles, which are stored, for example, 2-8 hours. Thus continuing, a different number of sections

30 can be formed, wherein into the last section are brought such vehicles, which are stored, for example, one week or longer. The division can also be made, for example, in the longitudinal direction of the storage space 3 and on other bases than the basis of time.

When dividing the space 3 into sections, for example, in its longitudinal direction, the first gripping means 50 bring the container 4 with its automobile to the first part of the space and feed the container into a free site on the base or into levels on the top of the previous frame. In this case, the first gripping means 50 with its transfer elements 5b, 5c function as the master crane. Thus, the second gripping means with its transfer elements 5b', 5c' function as the slave crane. The task of the slave crane is to fetch a container 4 with its automobile 2 that has been brought to the space 3 and transfer it in the longitudinal direction of the space 3 on the basis of parameters set by the control system 51 and/or fed into the control system 51 into appropriate places located in the space 3 as well as eventually to the loading area 10 to the unloading point 10a. Naturally, also the master crane functions similarly on the basis of parameters set by the control system 51 and/or fed into the control system 51. A desired number of sections can be formed and the described five sections is only an example of the section division. The master and slave functions of the gripping means 50 and 50' can be exchanged. In this case, the first gripping means 50 function as the slave crane and second gripping means 50' function as the master crane.

The control system 51 can receive above said parameters, for example, from a loading point-specific terminal unit 10c or from some other reader. Via the terminal unit 10c, the user of the parking facility can feed the desired parameters into the control system, for example, the storage time of the vehicle, for example, with 1-hour or 1-day precision. Also, the unloading point 11a can be equipped with a similar type of terminal unit 11c, into which can be fed required information into the control system 51, for example, when retrieving a given vehicle. The required information can be fed to the terminal units 10c and/or 11c manually or, for example, optically by scanning. The scanning alternative may be an option, for example, in parking facilities arranged in connection with airports or train stations. In this case, the terminal unit 10c can read, for example, the return time information of a travel ticket and feed the return time information into the control system 51 to relate to a given storage unit 4 and vehicle. The location of the terminal unit(s) can be elsewhere than at the loading point 10a or unloading point 11a.

Let it be noted that the base (floor) 7 can be equipped with positioning elements 9, which can be used to define the exact place of the lowermost container 4 of con-

tainers 4 taken one on top of another. Thus, the container rows and strings always remain at the same sites. These kinds of positioning elements can be, for example, mechanical controllers or electronic sensors.

5 Moreover, the parking facility preferably includes, in the longitudinal direction of the space 3 in relation to the first end 1a of the space 3, at least one exit route 11b arranged in connection with the opposing other end 1b. There can also be a plurality of unloading points and exit routes. Thus, a container 4 with its automobile 2 is brought from the storage space 3 by the transfer means 5, for example, to the unloading point 11a, wherein the automobile 2 can be entered and the automobile 2 can be driven out from the container 4 and, further, via the exit route 11b to a driveway or similar separate exit aisle. Let it be noted that the entrance route 10b as well as the loading point 10a can also function inversely as the exit route and the unloading point. The entrance routes, loading points, unloading points and exit routes can be located elsewhere than at the ends of the storage space 3, such as, for example, on the long side of the storage space 3 shown diagrammatically in Fig. 2. In Fig. 2 is shown, at the same time, also one embodiment, in which the space 3 is an underground space and the entrance routes 10b and exit routes 11b are formed as ramps leading down from the earth's surface 8 level.

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Fig. 2 shows that between the rows of the containers is preferably a so-called reserve space 3a the width of an empty or as empty as possible container row or two container rows. Into the reserve space 3a can, as needed, be transferred containers 4, for example, to remove a container 4 containing an automobile 2 out of the path of containers 4 to be transferred into the reserve space 3a. The reserve space 3a can naturally be adapted also into the embodiment shown in Fig. 1a.

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All handling and movement of empty and vehicle-containing containers, i.e. storage units, 4 is preferably controlled by the above said control system 51, which is used or is to be modified also in the handling of containers to be handled in a harbour. A control system of this type is, for example, Terminal Operating System or TOS, which is used, for example, in controlling ASC cranes. TOS is, for example, a controller 51 equipped with a logic program, the control commands from which control the location and function of the gripping means 50 and 50', for example, via a wireless or wired electric connection 51a and 51b. For this purpose, it is preferred that

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each container (frame) has a unique identifier, on the basis of which the TOS also knows the location of each container 4 and automobile (vehicle) in the storage space 3 as well as in the loading points 11a and the unloading points 10a. The operating principle of TOS is thus per se known art and, as such or at least for its essential parts, to be adapted in a parking facility 1 according to the invention, thus it is not necessary to describe it here in further detail. Using an ASC type container crane, it is possible, as needed, to transfer by the gripping means 50 also two side-by-side containers 4 (frames) and, moreover, two successive containers, i.e. as needed, four containers at a time. This is also the case with the gripping means 50, 50' according to the invention.

According to the present invention, the parking facility 1 is equipped with a fire extinguishing system. The fire extinguishing system includes a flow path 20, for example, a feed pipe 20, shown in Figs. 1a and 1b, arranged to the base 7, below the level of the surface of the base 7. In the feed pipe 20 are arranged branch parts 20a, the mouth openings of which open to the level of the base 7, here to the level of the floor of the storage space 3. The sites, at which the mouth openings open, are located at each storage unit tower. A more precise location will be described later. In connection with the mouth opening is arranged a shut-off valve 20b or similar, which prevents the compressed fire extinguishing medium W flowing in the feed pipe 20, such as water or some other fluid substance from discharging from the flow path 20 when there are no storage units 4 at all at the mouth opening. The compression of the fire extinguishing medium W is formed, for example, by a pump P adapted in connection with the flow path 20, which is placed in front of the first branch part in the direction of flow.

Fig. 1b shows that each storage unit 4 is equipped with feed piping 21 extending in the vertical direction. The first end of the feed piping 21 is located in connection with the bottom 4' of the storage unit 4 such that, while the lowermost storage unit (of the tower) is brought into place on top of the base 7, the first end of the feed piping 21 contacts the mouth opening of the branch part 20a and, hence, the shut-off valve 20b. In this case, the shut-off valve 20b opens and the fire extinguishing medium W is able to discharge into the feed piping 21 of this lower storage unit 4. The second end of the feed piping 21 extends to a similar site to the upper edge of the storage unit 4, wherein the second end is equipped with a similar or the same

kind of shut-off valve 21b as the shut-off valve 20b of the branch part 20a. Thus, while the storage units 4 are being stacked one on top of another, the shut-off valve 21b of the lower storage unit 4 always opens and the fire extinguishing medium W is able to discharge into the feed piping 21 of the highest storage unit 4 in the stack.

In a preferred embodiment of the invention, the feed piping 21 of each storage unit 4 is equipped with an actuator 21a for feeding the fire extinguishing medium W into the inside space of an individual storage unit 4. The actuator 21a is or includes an electrically or mechanically operated sprinkler, nozzle or similar, which, as it opens, allows the fire extinguishing medium W to discharge into the inside space of the respective storage unit 4, specifically on top of the vehicle 2 in the space.

It is also preferred that the parking facility 1 according to the present invention is equipped with power supply means 24, which flexibly enable the power supply of the actuator 21a (also other actuators described below) of each individual storage unit. The actuator 21a is here an electrically operated sprinkler, nozzle or similar. The sprinkler can also be mechanically operated (wherein the power supply is not needed). The current supply means preferably include a main power supply line 24 arranged in the base 7 or in connection with it. In the main power supply line 24 are arranged branch lines, which extend substantially to contactors 26 located in the level of the base 7, here the level of the floor of the storage space 3, which are located at each storage unit tower. Fig. 1 b shows that each storage unit 4 is equipped with a power supply cord 25 extending in its vertical direction. The first end of the power supply cord 25 is located in connection with the bottom 4' of the storage unit 4 such that when the lowermost storage unit (of the tower) is brought into place on top of the base 7, the first end of the power supply cord 25 comes into contact with the contactor 26 of the branch line and, hence, at the shut-off valve 20b. In this case, the power supply connects to the power supply cord 25 of the lowermost storage unit 4 and, hence, to its actuators. The second end of the power supply cord 25 extends to a corresponding site to the upper edge of the storage unit 4, wherein the second end is equipped with a similar or the same kind of contactor 26 as the contactor of the branch line. Thus, while the storage units 4 are being stacked one on top of another, the contactor 26 of the lowermost storage unit 4 always connects to the electric power line 25 of the upper storage unit 4, wherein

the power supply connects to the power supply cord of the uppermost storage unit 4 of the stack and the actuators in connection with it, such as above said sprinklers 21a.

5 Thus, each storage unit 4 can be equipped with the necessary actuators, which, in the following, are described, however, without limiting only to them. Fig. 1 b shows a second actuator presented by reference numeral 22, which is intended for gathering storage unit-specific information electronically as well as for transmitting it along a wireless data transmission bus to the control system 51 and/or to an actuator 23
10 outside the parking facility 1, which is, for example, the mobile device of the owner of the vehicle in the respective storage unit or the display terminal of the monitoring unit. The actuator 22 itself can be one of the following: a camera, motion sensor and/or temperature sensor. Further, the power supply cord 25 can be connected to other actuators of the storage unit 4, such as to a lamp (not shown). It can be said
15 that, together with the fire extinguishing system, these described preferred embodiments form a new kind of safety equipment that is to be modified according to the prevailing use of capacity.

It is preferable that the storage space 3 as well as the transfer means 5 are covered
20 by a roof 8' or similar protection. In the case of Fig. 2, the underground space 3 can be covered, for example, using concrete tiles, wherein the upper surface of the protection 8' that remains above the storage space 3 can be utilized in many ways.

The building expenses of the parking facility described above are significantly smaller
25 per parking space than, for example, the expenses of a parking hall comprising several tiers. The building expenses of a facility according to the invention are calculated to be approximately 9,000-10,000 euros per automobile place. Influencing in a manner that reduces expenses are the reduced need for land per automobile place as well as the simple structure of the facility. As an advantage can moreover
30 be mentioned that, due to the modular structure, the facility has a very flexible structure in regard to the number of automobile places, said structure being also to be modified in its bottom shape as suitable for its environment. As an example of surface area requirement can be presented a parking area dimensioned for 2,400 vehicles. This includes four units of the parking facility described above, of which
35 each is dimensioned for 600 vehicles. They can be placed with all four side-by-side

or with two facilities in two rows. The surface area requirement of such a parking area including its entrance routes is approximately 1.8 hectares, i.e. approximately 18,000 m².

- 5 There can arise a situation, in which the system does not start or some other situation, in which all cranes are out of commission. In this kind of situation, the unloading of vehicles from the parking hall occurs preferably as follows. In a preferred embodiment of the invention, the storage units 4 have, at the site 2 of the drive track of the tyres, a connection plate 4a or similar, which is shown in Fig. 1b. These
- 10 are preferably stored in the structures of the bottom 4' of the container 4. The connection plate 4a can be, for example, a "telescope plate" the entire width 1 of the end of the storage unit. In an emergency, a serviceman pulls the plates 4a out from the bottom 4' of the storage unit such that the second end of the connection plate 4a locks into the corresponding site of the next storage unit 4. Thus is created a
- 15 bridge structure filling the gaps between the storage units 4, and the automobiles 2 can be driven from one storage unit 4 to another. In the unloading area 11 is a scissor lift crane or other suitable lifting device, with which the vehicles 2 can be brought down from the higher levels.
- 20 When the containers (storage units) are handled, noise is created when one container is lowered onto another. In harbours, this is a significant problem and an attempt has been made to obviate it using rubber plates to be installed to the corners of the container. However, containers circle the earth globally and they have various owners and structure variations, so this matter has been impossible to fix in a satisfactory manner. In the present invention, the containers 4 are, however, specific to
- 25 the parking facility, for example, specific to one hall and noise nuisance can be removed by small insulation or elastic elements 4b, such as the rubber plate pieces in the corners of the containers as is shown in Fig. 1b, which absorb the collisions possibly occurring between containers 4 in connection with positioning. The rubber
- 30 plates 4b (insulation elements) can thus be designed to correspond exactly to hall-specific storage units and their attenuation requirements and no compatibility problems are created.

The present invention is not limited only to the embodiments described rather it can be adapted in various manners within the scope of protection defined by the claims.

Claims

1. A parking facility (1) with a safety equipment for automobiles (2) and similar vehicles, said parking facility (1) having an underground and/or above-ground storage space (3) for placing automobiles (2) and similar vehicles on top of the base (7) of the storage space (3) in layers of storage units (4), transfer means (5) for transferring an automobile (2) or similar vehicle into or out from the storage space (3), said transfer means (5) including storage units (4) to be placed on top of each other in the storage space (3) and equipped with a bottom (4'), **characterized** in that the transfer means (5) additionally include:
- a loading area (10), in which an automobile (2) or similar vehicle is to be taken into the inside space of an individual storage unit (4),
 - first gripping means (50), which are arranged to transfer the storage units (4) into a storage space (3) or to the loading area (10),
 - an unloading area (11), which is spaced apart from the loading area and in which an automobile (2) or similar vehicle is to be removed from the inside space of an individual storage unit (4),
 - second gripping means (500), which are arranged to transfer the storage units (4) into a storage space (3) or to the unloading area (11),
- and that the parking facility is equipped with a fire extinguishing system having a flow path (20) arranged to the base (7), and in which each storage unit (4) is equipped with a feed piping (21), which forms a uniform fire extinguishing medium (W) feed channel between the feed pipings (21) of the storage units (4) placed one on top of another and the flow path (20).
2. A parking facility according to claim 1, **characterized** in that the feed channel is equipped with a pump (P) for pressurizing the fire extinguishing medium (W) in the feed channel.
3. A parking facility (1) according to claim 1 or 2, **characterized** in that each feed piping (21) is equipped with an actuator (21a) for feeding fire extinguishing medium (W) into the inside space of an individual storage unit (4).

4. A parking facility (1) according to claim 3, **characterized** in that the actuator (21a) includes a sprinkler, nozzle or similar, which is controlled electronically or mechanically.
- 5 5. A parking facility (1) according to any one of the preceding claims 1-4, **characterized** in that each storage unit (4) is equipped with a second actuator (22) for gathering storage unit-specific information electronically as well as for transmitting it along a wireless data transmission bus to the control system (51) and/or to an actuator (23) outside the parking facility.
- 10 6. A parking facility (1) according to claim 5, **characterized** in that the second actuator (22) is a camera and/or the outside actuator (23) is a mobile device.
- 15 7. A parking facility (1) according to any one of the preceding claims 4-6, **characterized** in that the parking facility (1) includes power supply means (24), with which the power (current) required by the different actuators (21a, 22, 27, 28) of the storage unit (4) is to be supplied to the lowermost storage unit (4), and that each storage unit (4) is equipped with contactors, with which the power (current) is to be supplied, further, to the storage units (4) stacked one on top of another.
- 20 8. A parking facility (1) according to claim 7, **characterized** in that said actuator is a lamp and/or temperature sensor.
- 25 9. A parking facility (1) according to any one of the preceding claims 1-8, **characterized** in that in storage units (4) taken one on top of another, the bottom (40) of the upper storage unit forms the roof of the lower storage unit (4).
- 30 10. A parking facility (1) according to any one of the preceding claims 1-9, **characterized** in that in connection with the loading area (10) are arranged at least two loading points (10a) and in connection with the unloading area (11) at least two unloading points (11a).
- 35 11. A parking facility according to any one of the preceding claims 1-10, **characterized** in that the transfer means (5) form a bridge crane (5) having at least two beam bridges (5b, 5b0) arranged movably supported by a track (5a), of which the

first beam bridge (5b) is equipped with first gripping means (50) and the second beam bridge (5b') is equipped with second gripping means (50')-

12. A parking facility according to claim 10, **characterized** in that the bridge crane
5 (5) is an ASC (Automatic Stacking Crane) type double bridge crane.

13. A parking facility according to claim 11 or 12, **characterized** in that the track
(5a) is placed on the plane of the base (7) of the storage space or to the base (7),
wherein there are own legs between the beam bridge (5b, 5b') and the track (5a).
10

14. A parking facility according to any one of the preceding claims 1-13, **charac-
terized** in that each storage unit (4) is equipped with a unique identifier of the
storage unit (4), on the basis of which the transfer means (5) identify the location
of each storage unit (4) in the storage space (3).
15

15. A parking facility according to any one of the preceding claims 1-14, **charac-
terized** in that the floor (7) of the storage space (3) is equipped with positioning
elements (9), with which is to be defined the exact location of the lowermost stor-
age unit of storage units (4) taken one on top of another.
20

16. A parking facility according to claim 15, **characterized** in that the positioning
elements (9) are mechanical and/or electronic controllers (9).

17. A parking facility according to any one of the preceding claims 1-16, **charac-
terized** in that the parking facility (1) is equipped with a control system (51), the
control commands from which to the transfer means (5) are to control the location
and function of the gripping means (50 and 50')-
25

18. A parking facility according to any one of the preceding claims 1-17, **charac-
terized** in that the frame (4) is an ISO container, a Eurocontainer or similar, having
no walls and no ceiling.
30

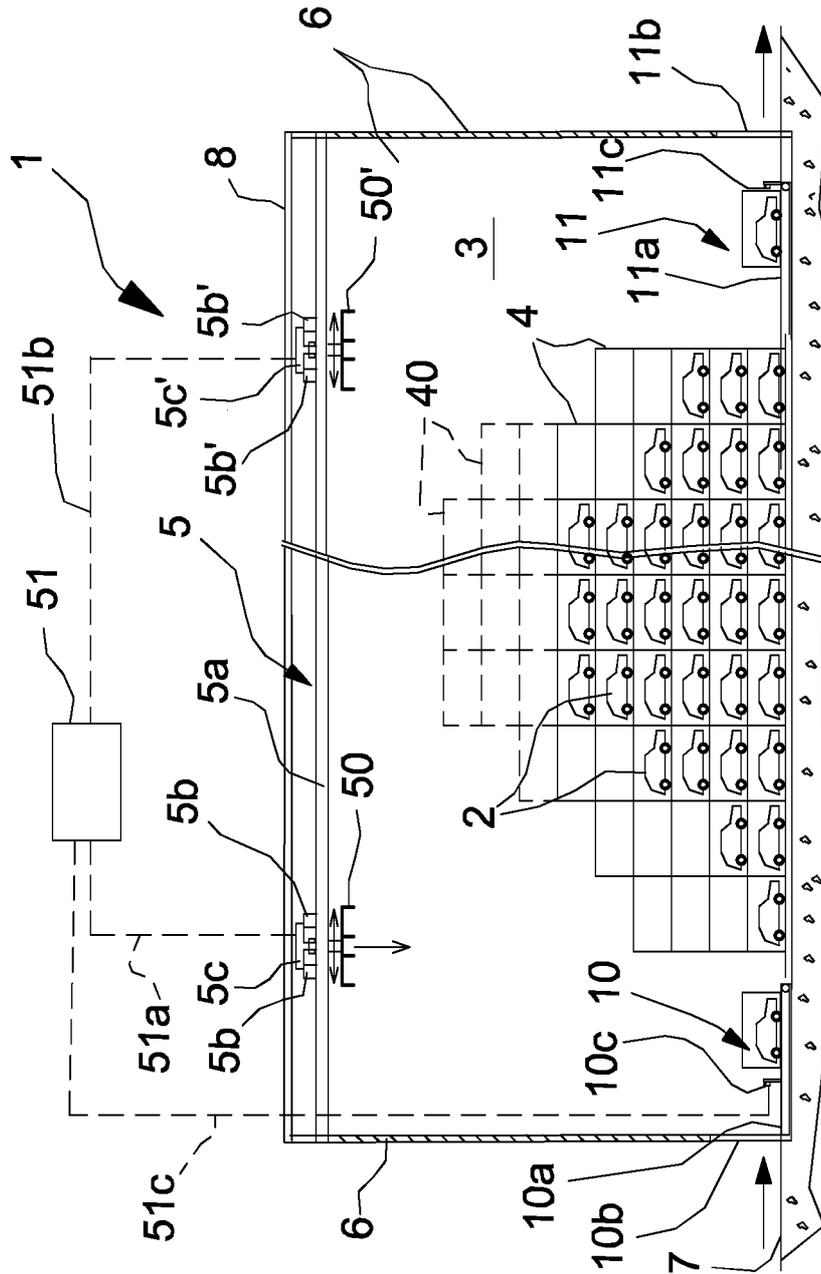


Fig. 1a

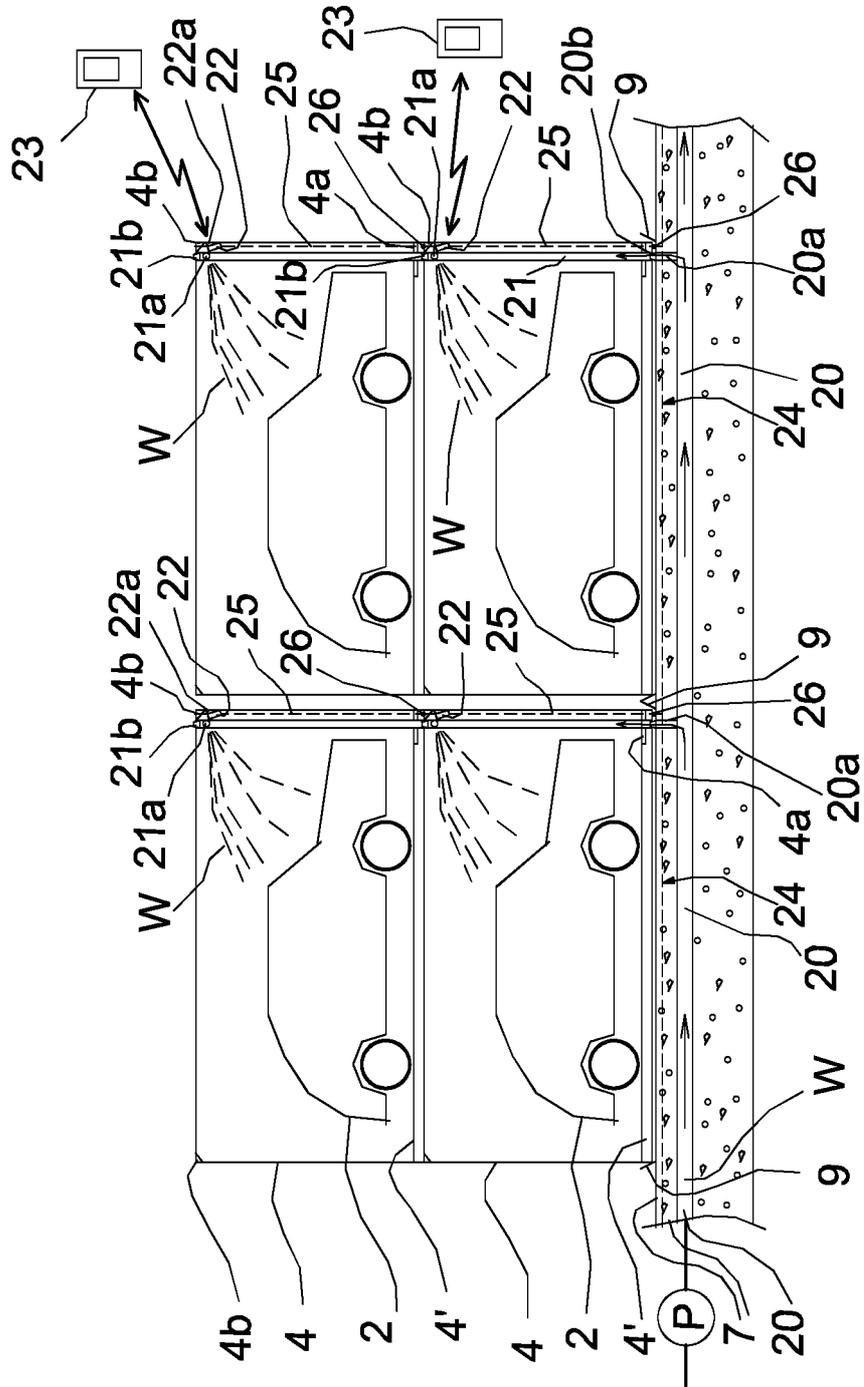


Fig. 1b

INTERNATIONAL SEARCH REPORT

International application No
PCT/FI2016/050789

A. CLASSIFICATION OF SUBJECT MATTER
INV. E04H6/18
ADD.
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
Minimum documentation searched (classification system followed by classification symbols)
E04H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal

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A	DE 43 05 993 AI (REUSS RITA [DE]) 1 September 1994 (1994-09-01) column 3, lines 63-68; figure 10 -----	1-18
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A	US 1 972 258 A (BOYLE JAMES M) 4 September 1934 (1934-09-04) page 8, lines 37-48; figure 3 ----- -/- .	1-18

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search 6 February 2017	Date of mailing of the international search report 17/02/2017
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Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Rosborough, John
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INTERNATIONAL SEARCH REPORT

International application No
PCT/FI2016/050789

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