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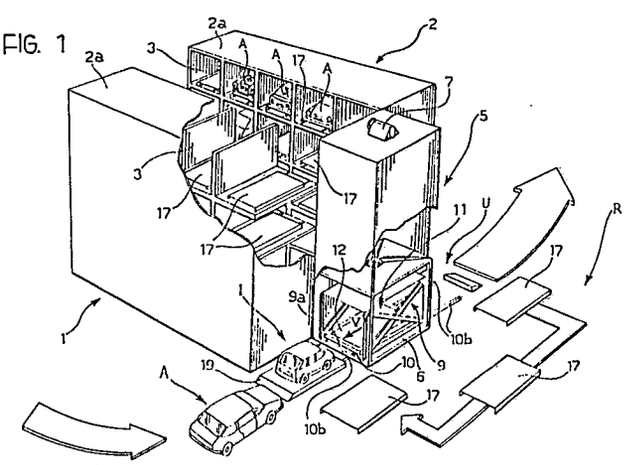
(54) An automated garage.

(57) An automated garage (1) comprises a structure (2) having several floors with a plurality of garage spaces (3) into which the motor vehicles (A) are transported by means of a lift (5) associated with the structure (2), and a shuttle (9) which is adapted to be transported vertically by the lift (5) and to move horizontally on runways of the structure (2). The shuttle (9) supports a motor-driven trolley (11) for transporting the motor vehicles (A), with the interposition of a supporting pallet (17), from the shuttle (9) to the garage spaces (3), as well as from the stations for loading (I) the motor vehicles (A) onto the shuttle and unloading (U) them therefrom.

FIG. 1



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Description

An automated garage

The present invention relates to an automated garage of the type provided with a structure having several floors with a plurality of garage spaces.

This type of automated garage currently involves the use of a transfer-lifting device comprising a platform on which a trolley for picking up and transporting motor vehicles can slide. This involves the production of fairly heavy structures for the transfer-lifting devices, as well as the production of trolleys whose operation is complex and not very reliable, for the picking-up and entrainment of the motor vehicles.

The object of the present invention is to provide an automated garage of the type specified above which has a simple and functional structure and can handle the motor vehicles completely reliably.

According to the invention, this object is achieved by virtue of the fact that the garage comprises a lift associated with the structure, a shuttle which is adapted to be transported vertically by the lift and to move horizontally on runways supported by the structure, and a transfer device which is carried by the shuttle and is adapted to transfer a pallet for supporting a motor vehicle both between the shuttle and a garage space and between the shuttle and respective stations for the entry and exit of the motor vehicles to and from the garage.

By virtue of these characteristics, the masses suspended and in movement are smaller than in the known solution which uses the transfer-lifting device.

Moreover, with the garage according to the invention, the energy used for the handling of the motor vehicles is also reduced and, because supporting pallets are used, it is not necessary to use complicated lifting and transporting trolleys which must be adapted to the different widths and lengths of the motor vehicles.

The transfer device preferably comprises a motor-driven trolley movable on respective guides provided respective on the shuttle, in the garage spaces, and at the stations for the entry and exit of the motor vehicles.

Further characteristics and advantages of the automated garage according to the present invention will become clear from the detailed description which follows with reference to the appended drawings, provided by way of non-limiting example, in which:

Figure 1 is a partially-sectioned perspective view of a garage according to the invention,

Figure 2 is a schematic side view showing the operation of the garage as a whole,

Figure 3 is a perspective view which shows the garage of Figure 1 at a stage in its operation,

Figure 4 is a view taken on the arrow IV of Figure 3, and

Figure 5 is a view taken on the arrow V of Figure 1 in a subsequent configuration of the loading of a motor vehicle.

With reference to the drawings, an automated garage is generally indicated 1 and comprises a building 2 having several floors and constituted by two structures 2a each provided with a plurality of garage spaces 3 which face each other in correspondence with a central corridor.

A lift 5 is arranged at one end of the structure 2 and comprises a loading platform 6 and motor-driven means 7 for raising or lowering the loading platform 6 into correspondence with the floors of the structure 2, in known manner.

The loading platform 6 is provided with a pair of rails 8 (Figure 2) on which there is mounted for transverse running a parallelepipedal shuttle 9 having a loading platform 9a which is also provided with a pair of rails 10 perpendicular to the rails 8 of the loading platform 6 of the lift.

A motor-driven trolley 11 is mounted for running on the rails 10 of the shuttle 9 and is provided with wheels 11a and an upper bearing surface 12 which can be raised or lowered under the action of hydraulic, pneumatic or electro-mechanical actuators (not illustrated).

At each floor of the building 2, each structure 2a supports a runway 13 on which the shuttle 9 is intended to move by virtue of its four supporting wheels 9b, at least two of which are motor-driven. The electrical connection for powering and controlling the shuttle 9 is ensured by bus ducts 14 which are arranged parallel to the runways 13 and with which a sliding contact device 15 connected to the shuttle 9 cooperates in known manner.

The electricity supply for powering and controlling the motor-driven trolley 11 is achieved by means of electric cables which are connected to the shuttle 9 and protected, in known manner, by an articulated sheath 16.

A plurality of pallets 17 are arranged in correspondence with the garage spaces 3 and are adapted to be moved by the motor-driven trolley 11 in the manner which will be described below. Beneath its pallet 17, each garage space 3 also has a pair of rails 18 with a gauge corresponding to that of the rails 10 of the loading platform 9a of the shuttle 9, for enabling the motor-driven trolley 11 to be moved from the shuttle to the garage space and vice versa.

During the operation of the automated garage 1, the incoming motor vehicles A are made to mount, for example, by means of a small ramp 19, a pallet 17 positioned at an entry station I of the garage. The user can equally well leave the motor vehicle open or closed, with the handbrake engaged or released, in gear or in neutral, since the pallet is provided with suitable locking devices and is designed to prevent the accidental movement of the vehicle. The motor-driven trolley 11, which can run on the guides 10 of the loading platform 9a of the shuttle 9 and on the corresponding guides 10b provided at the entry station I, is then positioned beneath the pallet 17 supporting the vehicle A and lifts the pallet 17 and the motor vehicle A by means of the movable platform 12. The motor-driven trolley 11, with the

pallet and the motor vehicle, is then made to go in onto the loading platform 9a of the shuttle 9 which can therefore be raised by the lift 5, by means of its loading platform 6, to a desired floor with a garage space 3a (Figure 2) from which the empty pallet has previously been removed.

When the desired floor has been reached, the lift 5 stops automatically under the guidance of the management system which is an integral part of the invention, enabling the shuttle 9 to run transversely, first on the guides 8 of the loading platform 6 of the lift 5 and then on the runways 13 associated with the central corridor. The configuration of the shuttle 9 during its transfer from the lift 5 to the runways is shown in Figure 2. During its movement along the runways 13, the shuttle 9 is supplied by means of the bus ducts 14 associated with the floor.

As soon as it reaches the garage space 3a of the pallet, the shuttle stops moving and enables the trolley 11 then to be transferred from the guides 10 of the shuttle to the guides 18 connected to the garage space. The platform 12 is then lowered so as to deposit the pallet 17 supporting the vehicle A on the floor of the respective garage space.

In order to pick up another motor car, the shuttle 9 is positioned in correspondence with an empty space (without a stored motor car) so as to pick up an empty pallet and then transport it to the entry station I.

The steps for the removal of motor cars from the garage are exactly the same, except that the pallet 17 supporting the motor vehicle to be unloaded is positioned by the motor-driven trolley 11 in correspondence with an exit station U situated on the same floor or on a different floor from the entry station I.

If the simultaneous arrival of a large number of motor cars is envisaged, a system, generally indicated R, for the recycling/storage of the pallets may be provided so as to enable a quicker loading operation without the need for an empty pallet 17 to be taken from the garage space 3.

According to another embodiment of the invention (Figure 3), the shuttle 9 is provided with an upper loading platform 9c equipped with a telescopic fork 20. The telescopic fork can be used to advantage for picking up an empty pallet at the same time as a motor car. In fact, the height of the upper platform 9c from the lower platform 9a corresponds exactly to the difference in height between two consecutive floors of the structure 2a. According to this embodiment, the movement of the shuttle can therefore serve both to transport a departing vehicle and to transport an empty pallet for the entry station I, provided that the latter and the exit station are spaced from each other by a height which corresponds to one floor.

It is obvious that all the various components of the automated garage, particularly the lift 5, the motor-driven trolley 11 and the shuttle 9, must be controlled by means of a central processing unit adapted to organise the operation of the garage completely automatically.

The lift 5 may be associated with a single structure 2a or with several structures different from that shown in the drawings. Moreover, it is possible to use two or more lifts 5 associated with the building with several floors and/or several shuttles associated with one or more lifts, according to the number of motor car movements envisaged.

Claims

1. An automated garage of the type provided with a structure having several floors with a plurality of garage spaces, characterised in that it comprises:
- at least one lift (5) associated with the structure (2),
- a shuttle (9) which is adapted to be transported vertically by the lift (5) and to move horizontally on runways (13) supported by the structure (2a), and
- a transfer device (11} which is carried by the shuttle (9) and is adapted to transfer a pallet (17) for supporting a motor vehicle (A) both between the shuttle (9) and a garage space (3, 3a) and between the shuttle (9) and respective stations for the entry and exit (I, U) of the motor vehicle (A) to and from the garage (1).

2. A garage according to Claim 1, characterised in that the transfer device comprises a motor-driven trolley (11) which is movable on respective rails (10, 18, 10b) provided on the shuttle (9), in the garage spaces (3) and at the stations (I, U) for the entry and exit of the motor vehicles (A).

3. A garage according to Claim 2, characterised in that the motor-driven trolley (11) has an upper bearing surface (12) which can be raised and lowered to enable the movement of the pallets (17) for supporting the motor vehicles (A).

4. A garage according to Claim 2 or Claim 3, characterised in that the shuttle (9) comprises a parallelepipedal supporting frame with a lower loading platform (9a) and an upper loading platform (9c), the distance between the platforms being equal to the difference in level between two superposed floors of the structure (2) of the garage (1), and in that a telescopic fork (20) is associated with the upper loading platform (9a) for moving empty pallets (17).

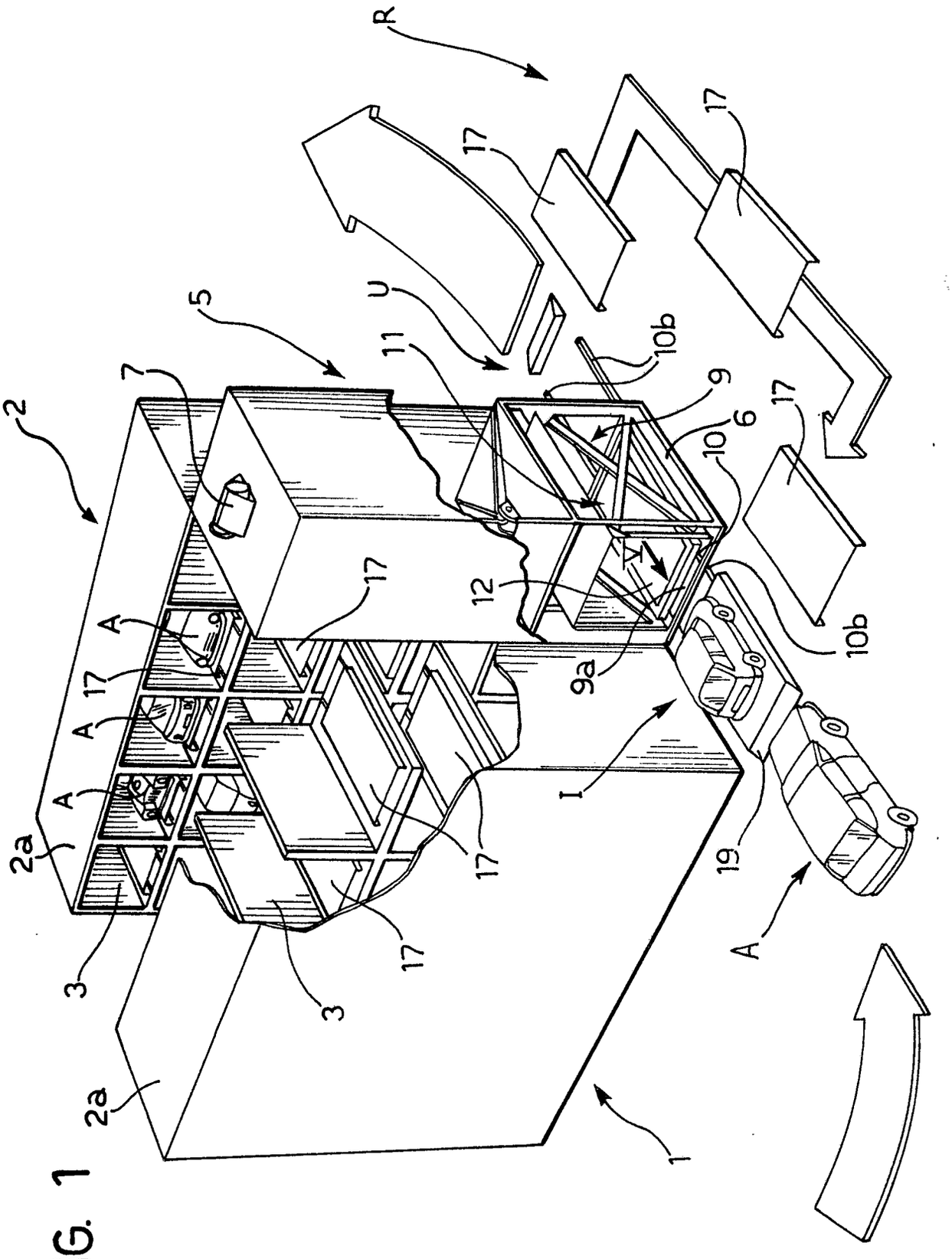
R
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FIG. 1

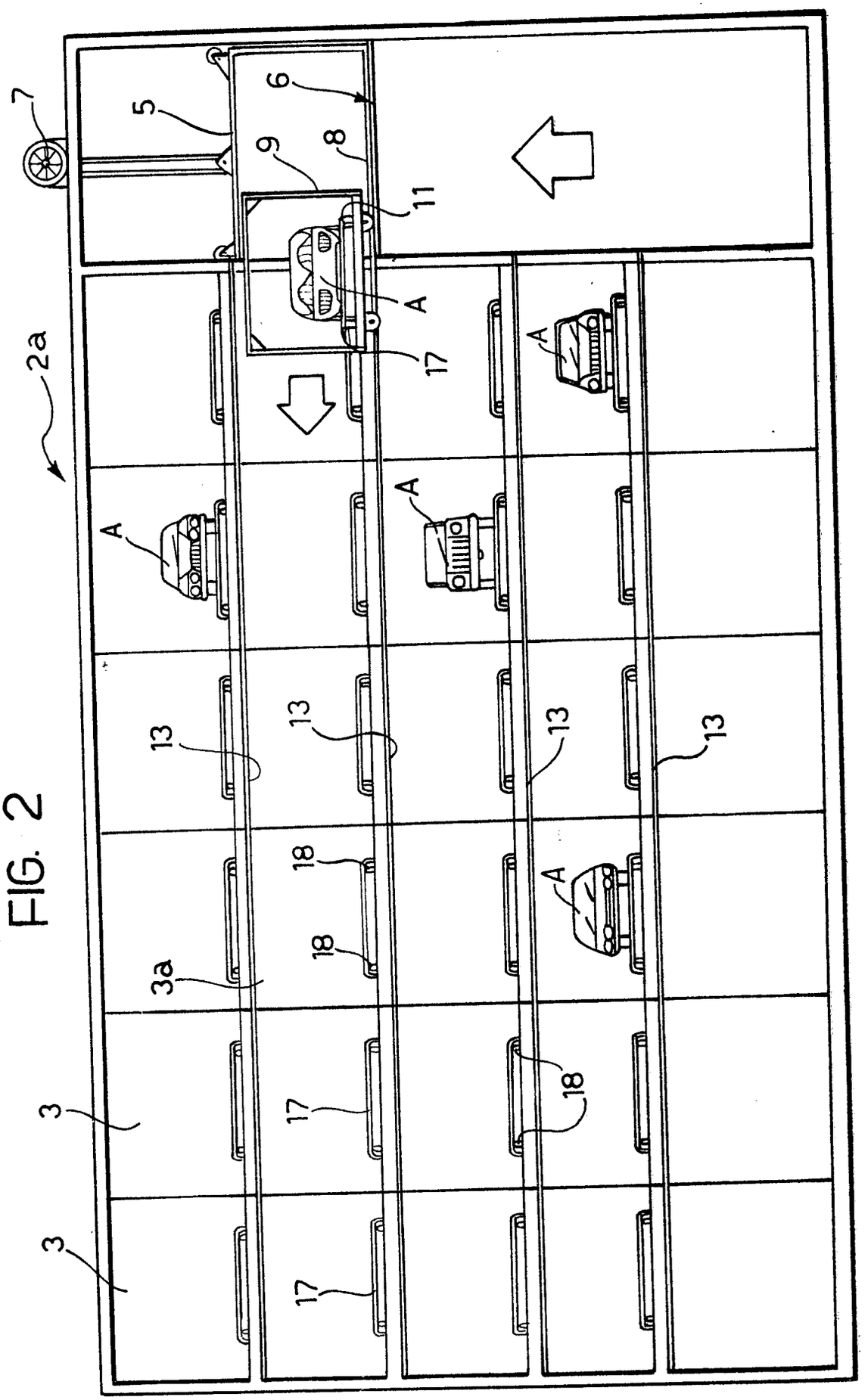


FIG. 2

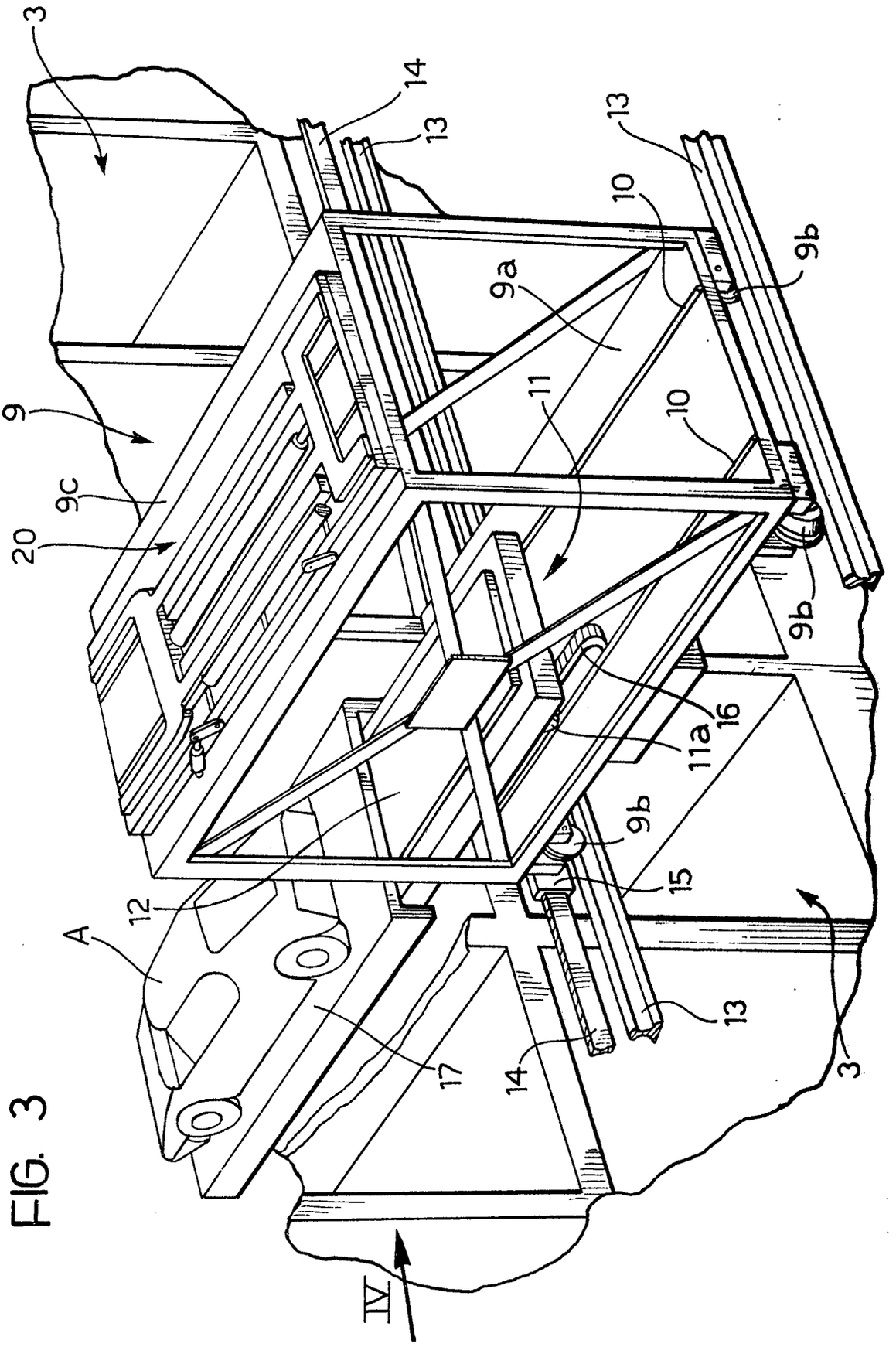


FIG. 3

FIG. 4

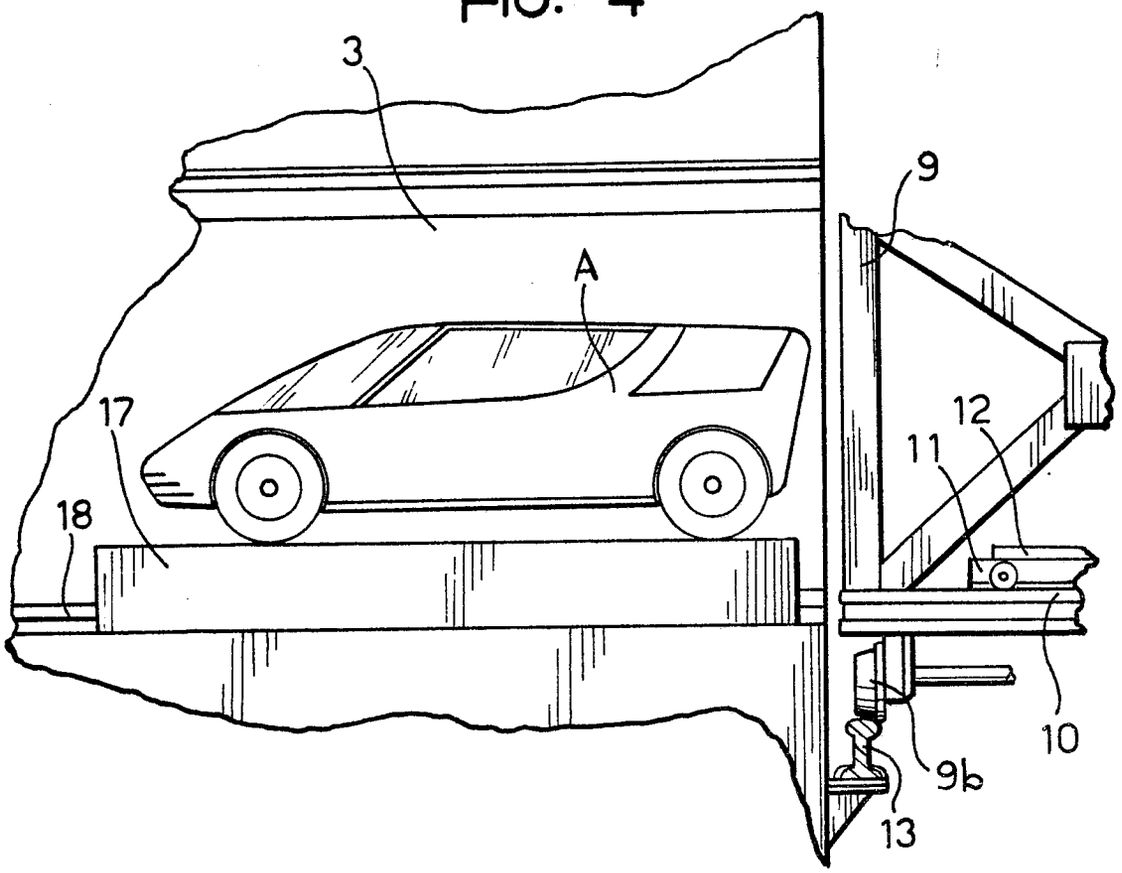
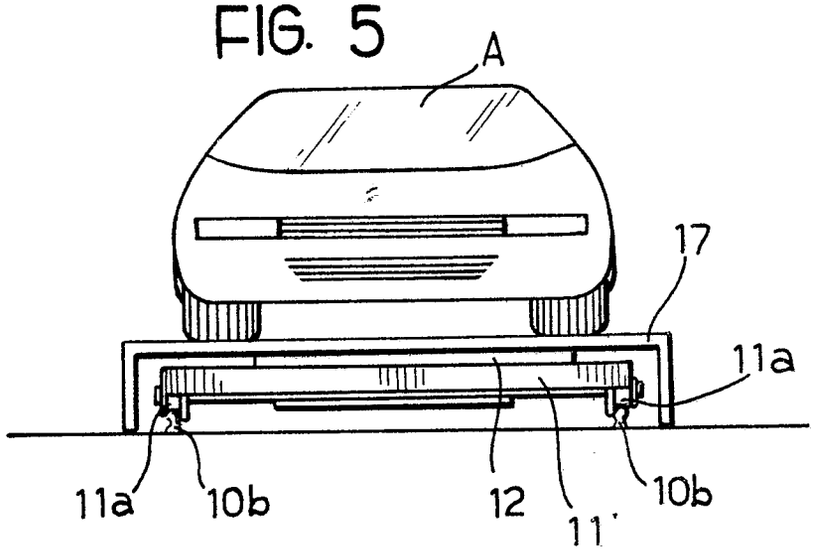


FIG. 5



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EUROPEAN SEARCH REPORT

Application Number

EP 89 83 0277

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
X	CH-A- 453 658 (TOEDTLI) * Column 3, lines 6-51; column 5, lines 13-46; figures 1-3,6,8 *	1,2	E 04 H 6/24
A	---	3	
X	FR-A-2 094 581 (CENTRE STEPHANOIS) * Page 6, line 26 - page 7, line 22; page 8, line 39 - page 9, line 12; figures 8-10,15 *	1,2	
A	---		
A	FR-A-2 049 554 (JULLIEN, A.) * Page 3, line 1 - page 5, line 9; figures 1-5 *	1-3	

TECHNICAL FIELDS SEARCHED (Int. Cl.4)

E 04 H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	12-10-1989	BARBAS A.

CATEGORY OF CITED DOCUMENTS

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