

Elevator Installation with Individually Movable Elevator Cars and Method for Operating such an Elevator Installation

The invention relates to elevator installations with a
5 plurality of individually movable elevator cars and a method of operating such elevator cars.

Every elevator installation occupies a certain proportion of the space in a building which depends on the amount of
10 traffic. The greater the amount of traffic, and the higher the building, the more space the elevator installation needs in relation to the usable surface area (net usable surface area) of the building. The performance of an
15 elevator installation can be expressed as its so-called handling capacity. The handling capacity indicates how many persons can be transported per minute in an office building when the amount of traffic is high, for example at the start of a working day.

20 It is of great interest to minimize the space required by an elevator installation.

There are various methods of readying and operating more than only one elevator car in one elevator hoistway, of
25 arranging several parallel elevator hoistways of an elevator installation, and of elevator cars transferring from one elevator hoistway into another elevator hoistway.

It is a disadvantage of the known elevators with several
30 elevator hoistways that changing hoistways mechanically is very complex and in many cases proceeds only slowly. Consequently, when the amount of traffic is high, the handling capacity is limited.

From the European patent application which was published under the number EP 1360718-A2 an elevator installation has become known having several elevator cars which have an autonomous linear drive on the car that makes it possible
5 for the elevator cars to move independently in a vertical direction in the elevator hoistways. The elevator cars are so made that a horizontal movement can also be reliably executed.

10 Conventional elevator installations are known which, for the purpose of increasing the handling capacity, are equipped with a so-called double-deck car. A double-deck car is an elevator car with two passenger compartments arranged one above the other. Such a double-deck car can,
15 when it stops at a boarding zone of the elevator installation, be loaded/unloaded simultaneously from two floors. By this means, the handling capacity is sharply improved. However, it has become apparent that a method with double-deck cars also brings disadvantages. Such
20 disadvantages are that such an elevator installation cannot be deployed flexibly because the entire double-deck car must always be moved even if only a small transportation capacity is necessary, and that both car decks must interrupt their travel if a halt needs to be made at a
25 floor for passengers of one car deck. Furthermore, the distance between the decks of the double-deck car must take account of the distance between the floors. In many cases, the distance between the individual floors is not equal, which requires complex measures on the double-deck car.
30 It is a disadvantage of the known elevator installations with several elevator cars traveling in one hoistway that the transportation capacity is limited by a relatively small number of elevator cars departing from a main stop per unit of time. The maximum achievable number of cars
35 departing per unit of time is limited inter alia by the

time needed for opening and closing the doors and for allowing the passengers to exit and board the elevator car.

In view of the known arrangements it is a purpose of the present invention to make available an elevator
5 installation and a corresponding method which reduce or completely avoid the disadvantages of the state of the art.

A particular purpose of the invention is to make available
10 an elevator installation and corresponding method in which the handling capacity in relation to a unit of area or volume of a building is higher than with known methods.

The purpose is fulfilled by the characteristics of Claim 1
15 and by the characteristics of Claim 8.

Advantageous further embodiments of the method according to the invention are defined by the dependent claims 2 to 7, and advantageous further embodiments of the elevator
20 installation according to the invention by the dependent claims 9 to 14.

The invention is based on the fact that the process of loading and unloading elevator cars, which in itself is
25 relatively time-consuming, can take place in such manner that at least two elevator cars can be loaded/unloaded more or less simultaneously. At the same time, great flexibility of readying and moving the elevator cars is made possible in that a plurality of elevator cars is employed which are,
30 or can be, individually driven, and can therefore move in the elevator installation independent of each other.

An additional increase in the handling capacity can be achieved by there being two or more elevator hoistways
35 which allow spatially separated upward and downward

movement of the elevator cars instead of there being only one elevator hoistway which is operated as a two-way hoistway.

5 Following below, the invention is described in detail in relation to exemplary embodiments and by reference to the drawings. Shown are in

Fig. 1 a diagrammatical cross-sectional side view of a
10 first elevator installation according to the invention;

Fig. 2 a diagrammatical cross-sectional side view of a
15 second elevator installation according to the invention;

Fig. 3 a diagrammatical cross-sectional side view of a
20 third elevator installation according to the invention;

Fig. 4 a diagrammatical cross-sectional side view of a
fourth elevator installation according to the invention;

25 Fig. 5 a diagrammatical cross-sectional side view of a fifth elevator installation according to the invention.

A first embodiment of the invention is described by
30 reference to Fig. 1. An elevator installation 20 is shown in diagrammatical cross section from one side. The elevator installation 20 comprises at least one vertical elevator hoistway 11.1. In the embodiment of the invention shown, there are $n=3$ vertical elevator hoistways 11.1, 11.2, and
35 11.3 arranged adjacent to each other. The vertical elevator

hoistways 11.1, 11.2, and 11.3 can, but need not, be spatially separated from each other. A total of five floors 13.1 - 13.5 are served. In the elevator hoistways 11.1, 11.2, and 11.3 are several individually movable elevator cars 16.1 - 16.8. In the example shown, there is at least one transfer zone 12.1 in the area beneath a boarding zone 17.1 which allows movement of the elevator cars 16.1 - 16.8 between the elevator hoistways 11.1, 11.2, and 11.3. The boarding zone 17.1 in the present exemplary embodiment is regarded as comprising the entrance areas of the two lowest floors 13.1, 13.2. The boarding zone 17.1 can, for example, also be positioned in a main stop, a main entrance, or a main lobby. In the example shown, there are present on every floor doors which are referenced with 14. Just at the instant shown, there are two elevator cars 16.5 and 16.6 in the boarding zone 17.1, and the corresponding doors 14.1, 14.2 are open. For simplicity, the open doors are shown black.

According to the invention, the two elevator cars 16.5 and 16.6 form a temporary multi-deck arrangement for the purpose of accelerating the process of loading/unloading. Concretely, the present example is a temporary double-deck arrangement.

25

The elevator installation 20 can now be operated as follows: In case of need, for example at times with a higher requirement for transportation, two elevator cars 16.5, 16.6 can be made available simultaneously in the boarding zone 17.1 of the elevator hoistway 11.1 for immediate loading/unloading.

It is preferable for further elevator cars 16.7, 16.8 to be held ready in the transfer zone 12.1. Every time elevator cars have departed from the boarding zone 17.1, elevator

cars move up to replace them. In the exemplary embodiment shown, an elevator car 16.4 has started the upward journey in an elevator hoistway 11.3, and the elevator car 16.7 is moving up from the transfer zone 12.1 to replace it. The
5 elevator car 16.8 moves up into an area of the transfer zone 12.1 which is situated beneath the elevator hoistway 11.1. A further elevator car 16.3 is in the elevator hoistway 11.1 traveling upwards, and an elevator car 16.2 is in the elevator hoistway 11.2 traveling downwards. The
10 elevator car 16.1 is just executing a change of hoistway in a transfer zone 15.1.

The transfer zones 12.1, 15.1 are so designed that the elevator cars can be moved horizontally individually or
15 together. To allow horizontal movement together, there is preferably at least one transfer zone whose height is so designed that two elevator cars in a temporary double-deck arrangement can be moved, which leads to a further acceleration of the change of hoistway, especially since
20 the elevator cars moved in temporary double-deck arrangement can be inserted into an elevator hoistway 11.1 together and there made ready.

Should two or more elevator cars form a temporary multi-deck arrangement, it is important that when both elevator cars are being moved, the first of the two elevator cars
25 16.5 travels to a first destination floor that lies above a second destination floor which is traveled to by the second of the two elevator cars 16.6. In other words, the first
30 elevator car 16.5 travels a distance 16.5 which is at least as great as the distance that must be traveled by the second elevator car 16.6. It is also important to ensure that the first elevator car 16.5 moves just as fast as the second elevator car 16.6 to avoid collisions.

An elevator installation with several individually driven elevator cars working in double-deck mode could also be operated in two-way mode. In this mode of operation, the elevator cars always move in the same elevator hoistway, both upwards and downwards. For such operation, no transfer zone is necessary.

Through the use of a temporary multi-deck arrangement, the handling capacity is substantially improved without the flexibility of the elevator installation being impaired.

Advantageously, a temporary multi-deck arrangement is made ready when an increased requirement for transportation is expected or when an increased requirement for transportation is detected.

It is an advantage of the invention that the readying of two or more elevator cars in temporary multi-deck arrangement can also be ended again at any time and a normal mode can be operated with individual loading/unloading and individually moving elevator cars.

Below, several of the terms used are defined more precisely before further embodiments of the invention are discussed.

An elevator hoistway is defined as an area of a building which is designed for vertical upward and/or downward movements of elevator cars. However, when interpreting the term 'elevator hoistway', it must be taken into account that a spatial separation between the individual elevator hoistways of an elevator installation is not obligatory. The invention can be applied to elevator installations with spatially separated or unseparated elevator hoistways.

According to the invention, the elevator cars are individually movable. The individual movability can be realized by various means, and several ways of executing such elevator installations are known from the state of the art which can be used in association with the invention.

Should the elevator installation have more than one elevator hoistway, it is advantageous if the elevator cars can be moved from one elevator hoistway into another elevator hoistway. For this purpose, the elevator hoistways and the elevator cars must be so executed that the elevator cars in addition to being movable in vertical direction can also be moved horizontally between the elevator hoistways or can execute a horizontal movement of their own accord. Also for this purpose, there are several examples from the state of the art which will not be discussed in detail here, since the horizontal movement is not essential to the invention.

Two or more entrance areas arranged above each other are defined as a boarding zone. In the present description, the ground floor and an additional floor above or below the ground floor are regarded as a boarding zone because here, depending on the arrangement of the entire building, a particularly high incidence of traffic prevails. The boarding zone can, however, also be located in the area of one single floor, for example a main stop, a main entrance, or a main lobby, possibly with stairs or moving walks leading from one main entrance level to another, or several other, entrance level(s).

In an elevator installation according to Fig. 1 it is, for example, conceivable that from a ground floor - not shown in Fig. 1 - situated between floors 13.1 and 13.2 a first stairway leads into a first floor 13.2 and there to an

elevator car 16.5 positioned in the elevator hoistway 11.1, and a second stairway leads into a first basement floor 13.1 to an elevator car 16.6 positioned in the same elevator hoistway 11.1. The respective floors together are
5 defined within the meaning of the invention as a boarding zone. A boarding zone can also be arranged in another area of an elevator installation, for example in the upper hoistway area. There can also be several boarding zones in one elevator installation.

10

The entrance areas need not correspond to the floors of the building. It is also conceivable that loading/unloading the elevator cars of a temporary multi-deck arrangement takes place via intermediate floors, ramps, or suchlike.

15

The terms 'boarding zone' and 'boarding level' shall also apply synonymously to exit zones and exit levels respectively. Self-evidently, the term 'load' shall also include unloading. The term 'entrance area' shall also
20 include exit areas.

According to the invention, the direction of travel in the individual elevator hoistways need not be determined.

Through a traffic-dependent elevator control system, an
25 elevator installation with $n=5$ elevator hoistways can be so controlled that in the mornings more elevator hoistways are provided for upward travel of the elevator cars than for downward travel. Towards evening, more downward hoistways than upward hoistways are provided. However, the invention
30 can also be applied to elevator installations which have a fixed allocation of upward and downward hoistways.

The invention is essentially independent of the position and arrangement of the boarding openings or doors. The
35 doors can lie in the plane of the drawing of figures 2 to 6

or in an another plane perpendicular to the plane of the drawing.

The invention can be employed particularly advantageously
5 when $n \geq 2$ elevator hoistways are provided. Also
advantageous is an elevator installation which has at least
one transfer zone for horizontal movement of the elevator
cars.

10 The arrangement and mode of operation of an elevator 20
according to the invention are represented in Fig. 2, only
the fundamental elements being shown. The elevator
installation 20 shown has $n=3$ elevator hoistways 11.1,
11.2, and 11.3. Here, too, five floors 13.1 - 13.5 are
15 served. Within the elevator hoistways 11.1 - 11.3 there are
several individually movable elevator cars 16.1 - 16.6
which are currently deployed. An elevator car 16.7 is
currently not moving and therefore blocks the elevator
hoistway 11.3 (marked with the 'No vehicles' symbol 18). A
20 transfer zone 12.1 is provided in the area of the lower
boarding zone 17.1 and a transfer zone 15.1 is provided in
the vicinity of the upper end of the hoistway which allows
movement of the elevator cars 16.1 - 16.7 between the
elevator hoistways 11.1 - 11.3.

25

The advantages of the invention are described by reference
to an (exceptional) situation which is indicated in Fig. 2.
In the example shown, the elevator car 16.7 blocks the
elevator hoistway 11.3. The traffic must therefore, under
30 the influence of a suitable elevator control system, be
handled in the two remaining elevator hoistways 11.1, 11.2.
The elevator hoistway 11.1 serves as upward and the
elevator hoistway 11.2 as downward hoistway. So as to be
able still to provide sufficient handling capacity, a

temporary multi-deck arrangement is composed of the elevator cars 16.5 and 16.6 in the boarding zone 17.1. Temporarily, the floors 13.1 and 13.3, which are situated directly above each other, serve as boarding zone 17.1.

- 5 This can be indicated by corresponding signalization in the area of the entrance openings 14.1, 14.2.

As soon as the elevator cars 16.5 and 16.6 have left the boarding zone 17.1, the elevator car 16.4 moves up into the position which was previously occupied by the elevator car 16.5. A short time after, the elevator car 16.2 will move up into the position which was formerly occupied by the elevator car 16.6.

- 15 A further, similar embodiment is explained by reference to Fig. 3, but this figure will only be discussed here to the extent that it differs from the previous figures. The elevator installation 20 has three elevator hoistways 11.1 - 11.3. Arranged under floor 13.1 are two transfer zones 12.1 and 12.2. A further transfer zone is situated at the upper end of the hoistway. The elevator hoistway 11.3 is again blocked (marked with the 'No vehicles' symbol 18). Two elevator cars 16.5 and 16.6 are ready for loading/unloading. Two further elevator cars 16.4 and 16.8 are moving horizontally under the elevator hoistway 11.1 so as to be able to move up as quickly as possible after the elevator cars 16.5, 16.6 have departed upward either individually or in double-deck arrangement. With this embodiment, the two elevator cars 16.4 and 16.8 can already be brought into a moving-up position so as to accelerate moving up. The transfer zones 12.1, 12.2 are preferably so designed that bringing into the vertical elevator hoistway 11.1 takes place quickly. For this purpose, a special mechanical device can be provided which raises the two

elevator cars 16.4 and 16.8 from the moving-up position and transfers them into the elevator hoistway 11.1.

5 It is preferable for the embodiment shown in Fig. 3 to be so designed that two elevator cars can be moved together horizontally into the multi-deck arrangement, which leads to a further increase in the handling capacity.

10 A further, similar embodiment is explained by reference to Fig. 4, but this figure will only be discussed here to the extent that it differs from the previous figures. The elevator installation 20 again has three elevator hoistways 11.1 - 11.3. The floors 13.1, 13.2 serve both as transfer zones and as boarding zones 17.1. The elevator cars 16.7, 15 16.8 are already in a moving-up position. This embodiment is particularly advantageous when there is insufficient space for one or more transfer zones under the elevator hoistways. The changing mechanism is advantageously so designed that a faster change of the elevator cars from the 20 moving-up position into the elevator hoistway 11.1 is possible. Especially preferred is a variant in which the two elevator cars in the multi-deck arrangement can be moved horizontally together.

25 In Fig. 5 an elevator installation 20 is shown which is executed in similar manner to that in Fig. 3. Fig. 5 serves to explain the mode of operation of an elevator installation according to the invention in an emergency situation (evacuation of the building). The two outer 30 elevator hoistways 11.1 and 11.3 are used as downward hoistways, and the middle elevator hoistway 11.2 serves as upward hoistway. The elevator installation 20 according to Fig. 5 has an elevator control system which coordinates the individual operations that are necessary in such an 35 emergency situation. To increase the handling capacity for

evacuation of a building, at least one of the two elevator hoistways 11.1, 11.3 serving as downward hoistway can be operated with temporary double-deck cars. When doing so, at least two elevator cars - preferably according to a stored
5 rule - are distributed in the upper area of the building in the area of adjacent floors, or on various floors, in at least one of the downward hoistways 11.1, 11.3. After loading at least two elevator cars, these - grouped into a multi-deck arrangement - are transported to an evacuation
10 exiting zone which comprises at least two entrance areas 13.1, 13.2 and in the present case corresponds to the boarding zone 17.1. Here, the evacuated persons can leave the elevator installation on at least two levels (entrance areas) simultaneously. The empty cars are subsequently
15 transported to the upward hoistway, and into the upper area of the building, where they are available for further evacuation trips.

Important in the case of an evacuation is that the elevator
20 control system is designed intelligently so that, depending on the situation, as large a transportation capacity as possible can be made available very quickly. In an emergency situation, use is preferably made of a corresponding optical signalization so that
25 loading/unloading of the elevator cars can be executed safely and quickly. Acoustic signals can be used in addition.

To move the elevator cars vertically it is preferable for
30 autonomous linear drives to be used. An exemplary technical realization for horizontal movement of the elevator cars is to be found in the publication EP 1367018-A2.

Instead of an autonomous linear drive on the car, the elevator cars can also be provided with a friction-wheel drive, gearwheel drive, rack drive, or suchlike.

5 According to a further embodiment of the invention, the elevator system 20 has an elevator control system which is so designed that a so-called requirements profile is used to enable needs-dependent provision of temporary multi-deck cars from at least two elevator cars. Such a requirements
10 profile can, for example depending on the time of day, be permanently specified or it can adapt itself dynamically to recognized events and utilization situations. The requirements profile is preferably stored in a memory. Especially suitable is a requirements profile in which
15 certain basic patterns of demand are specified, but which through observation of the daily elevator operation automatically develop further. Preferably programmed in the elevator control system are routine procedures which specify the readying and movement of the elevator cars
20 according to certain rules.

According to a preferred embodiment, the control system of the elevator installation is so designed that at least one of the elevator cars of a temporary multi-deck arrangement
25 can execute a long-distance travel in which this elevator car passes by several floors without stopping. Expediently, that elevator car is used for long-distance trips which in the upward hoistway is the top, and in the downward hoistway the bottom, elevator car of the temporary multi-
30 deck arrangement.

It is an advantage of the method according to the invention that it can be extended without limit and used in highly diverse elevator installations. Thus, according to the
35 invention, several floors can be included in the area of

the boarding zone 17.1, in which case more than two elevator cars form a temporary multi-deck arrangement.

5 It is an advantage of the arrangement that the handling capacity in relation to the occupied surface area of the building can be increased by comparison with conventional elevator installations.

10 According to the invention, the handling capacity per elevator hoistway is maximized, and the hoistway volume required is minimized in relation to the handling capacity.

15 It is a further advantage of the invention that in an elevator installation with several elevator hoistways, when one elevator hoistway cannot be used, a residual availability can be guaranteed which is greater than the availability of a conventional elevator installation.

20 To counteract the disadvantage that the passengers must board and exit on two different floors or entrance areas, special supporting measures can be taken. For example, an optimally informative signalization can be provided, and/or escalators or moving walks can be employed, to take passengers to the respective entrance areas.

25 It is preferable for the elevator control system to be equipped with a destination control system which allows each passenger according to his individual destination to be assigned to, and by means of signalization guided to, that elevator car of the multi-deck arrangement which is scheduled to stop at the desired floor. The possibility thereby provided of destination-dependent assignment of the passengers to an elevator car of the multi-deck arrangement which travels to the desired destination ensures that the
35 elevator cars of the multi-deck arrangement traveling

towards their respective individual destinations mutually hinder each other as little as possible during their travel.

5 According to the invention, an elevator installation and a method are proposed which allow good handling capacities with a reasonable building-constructional outlay. The invention offers great flexibility, since in case of need several elevator cars can be readied together.

10

The more transfer zones are provided, the more flexibly the traffic concept of the elevator installation can be designed, while on the other hand the space required obviously increases.

15

By means of the invention, the waiting times in front of the elevator hoistways and the time spent in the elevator cars are made shorter. By comparison with conventional elevators, the building construction costs can be reduced.

20

Further characteristics of the invention are:

- simultaneous loading/unloading of several elevator cars in the same hoistway;
- simultaneous or near-simultaneous departure of the
- 25 elevator cars of a temporary multi-deck arrangement in the same elevator hoistway;
- maintenance of a high handling capacity in case of emergency or in maintenance situations;
- fast and efficient increase of the handling capacity in
- 30 case of need;
- in case of need, the possibility of redefining further floors as belonging to the boarding zone;
- the possibility of several elevator cars in combination departing from the area of the boarding zone (up-peak or

down-peak mode) or arriving there in combination (for example in the case of an evacuation);

- the possibility that through suitable assignment of passengers to certain elevator cars of a multi-deck arrangement according to their destination, fewer stops at floors per elevator car are required than with conventional elevator installations;

- through coordinated travel of the elevator cars which form a temporary multi-deck arrangement, the possibility when loading/unloading of being able to reduce the mutual hindrance of the individually movable elevator cars in the elevator hoistway.

Patent Claims

1. Method of operating an elevator installation (20) with
a first vertical elevator hoistway (11.1) and with a
5 plurality of individually movable elevator cars (16.1 -
16.9), characterized in that it comprises the following
steps:
 - readying at least two of the elevator cars (16.5,
16.6) in the first elevator hoistway (11.1) in two
10 entrance areas (13.1, 13.2) which are situated one
immediately above the other;
 - simultaneous loading/unloading of the readied
elevator cars (16.5, 16.6) via the entrance areas
(13.1, 13.2);
 - 15 - transportation of the at-least two elevator cars
(16.5, 16.6) to individually assigned target floors.
2. Method according to Claim 1,
characterized in that the at-least two elevator cars
20 (16.5, 16.6) are so controlled by an elevator control
system that in a first transportation step the travel
distance to the destination floor for the respective
elevator car (16.5) traveling in front is at least as
great as the travel distance for the respectively
25 following elevator car (16.6).
3. Method according to Claim 1 or 2,
characterized in that
at least a second elevator hoistway (11.2, 11.3) is
30 present, the upward transportation and the downward
transportation of the elevator cars (16.5, 16.6) taking
place separate from each other in one or other of the
elevator hoistways (11.1 - 11.3) respectively.
4. Method according to Claim 3,
35 characterized in that it includes the following step:

- horizontal movement of empty elevator cars (16.1 - 16.8) between at least two parallel elevator hoistways (11.1, 11.2, 11.3), the movement being executed autonomously by the respective elevator car itself or by a stationary transfer mechanism.

5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
80
85
90
95
100
105
110
115
120
125
130
135
140
145
150
155
160
165
170
175
180
185
190
195
200
205
210
215
220
225
230
235
240
245
250
255
260
265
270
275
280
285
290
295
300
305
310
315
320
325
330
335
340
345
350
355
360
365
370
375
380
385
390
395
400
405
410
415
420
425
430
435
440
445
450
455
460
465
470
475
480
485
490
495
500
505
510
515
520
525
530
535
540
545
550
555
560
565
570
575
580
585
590
595
600
605
610
615
620
625
630
635
640
645
650
655
660
665
670
675
680
685
690
695
700
705
710
715
720
725
730
735
740
745
750
755
760
765
770
775
780
785
790
795
800
805
810
815
820
825
830
835
840
845
850
855
860
865
870
875
880
885
890
895
900
905
910
915
920
925
930
935
940
945
950
955
960
965
970
975
980
985
990
995

5. Method according to one of claims 1 to 4, characterized in that it includes the following step:

- allocation and guidance of each passenger to that elevator car which is scheduled to stop at the floor corresponding to the passenger's individual destination.

6. Method according to one of claims 1 to 4, characterized in that it includes an emergency procedure for the evacuation of persons with the following steps

- readying of at least two elevator cars (16.5, 16.6) in an upper area of the elevator installation (20),

- loading of at least two elevator cars with persons to be evacuated,

- transportation of at least two elevator cars (16.5, 16.6) to an evacuation exiting zone (17.1) with at least two entrance areas (13.1, 13.2) where the transported persons can leave the at-least two elevator cars simultaneously.

7. Method according to one of claims 1 to 6, characterized in that it includes the following step:

- execution of a long-distance trip by the leading elevator car (16.5), several floors (13.3 - 13.6) being passed without stopping.

8. Elevator installation (20) comprising

- a first vertical elevator hoistway (11.1),
- a plurality of elevator cars (16.1 - 16.8) which are individually vertically movable in the
- 5 first vertical elevator hoistway (11.1),
- an elevator control system which is so designed
- that at least two of the elevator cars (16.5, 16.6) in the first elevator hoistway (11.1) in the area of at least two entrance areas (13.1, 13.2)
- 10 situated immediately above one another can be readied to enable essentially simultaneous loading/unloading of the elevator cars (16.5, 16.6) via the entrance areas (13.1, 13.2),
- that after the simultaneous loading/unloading, the at
- 15 least two elevator cars (16.5) travel to individually assigned destination floors.

9. Elevator installation (20) according to Claim 8, characterized in that

- 20 the elevator control system is so designed that it always assigns to the leading of the at-least two elevator cars the destination floors which are furthest away and to the last-following elevator car the destination floors which are nearest.

25

10. Elevator installation (20) according to Claim 8 or 9, characterized in that

- a second elevator hoistway (11.2, 11.3) and means for horizontal movement of the elevator cars (16.1 - 16.8)
- 30 between the first elevator hoistway (11.1) and the second elevator hoistway (11.2, 11.3) are provided, the second elevator hoistway (11.2, 11.3) being arranged parallel to the first elevator hoistway (11.1) and the movement being capable of execution autonomously by the
- 35 respective elevator car (16.1 - 16.8) itself or by a

stationary transfer mechanism of the elevator car (20).

11. Elevator installation (20) according to Claim 10,
characterized in that

5 at least one transfer zone (12.1, 12.2; 15.1) is
provided which enables horizontal movement of an
elevator car (16.1 - 16.8) between the elevator
hoistways (11.1 - 11.3).

10 12. Elevator installation (20) according to one of claims 8
to 11,

characterized in that

an elevator control system is present and so designed
that it can determine and signal an assignment and
15 guidance of each passenger to one of the at-least two
entrance areas (13.1, 13.2) situated immediately one
above the other and thereby to the elevator car (16.5,
16.6) scheduled for a stop at the floor corresponding
to the passenger's destination.

20

13. Elevator installation (20) according to one of claims 8
to 12,

characterized in that

at least one escalator or moving walk for transporting
25 the passengers to one of the at-least two entrance
areas (13.1, 13.2) can be provided.

14. Elevator installation (20) according to one of claims 8
to 13,

30 characterized in that

at least one transfer zone is provided which enables
the combined horizontal movement of two elevator cars
between the elevator hoistways (11.1 - 11.3).