Office de la Propriété Intellectuelle du Canada
Un organisme d'Industrie Canada

Canadian Intellectual Property Office
An agency of Industry Canada

CA 2042971 C 2003/07/22

(11)(21) 2 042 971

(12) BREVET CANADIEN
CANADIAN PATENT

(13) C

(22) Date de dépôt/Filing Date: 1991/05/21

(41) Mise à la disp. pub./Open to Public Insp.: 1991/12/02

(45) Date de délivrance/Issue Date: 2003/07/22

(30) Priorité/Priority: 1990/06/01 (01 863/90-2) CH

(51) Cl.Int.^{5}/Int.Cl.^{5} B66B 1/46

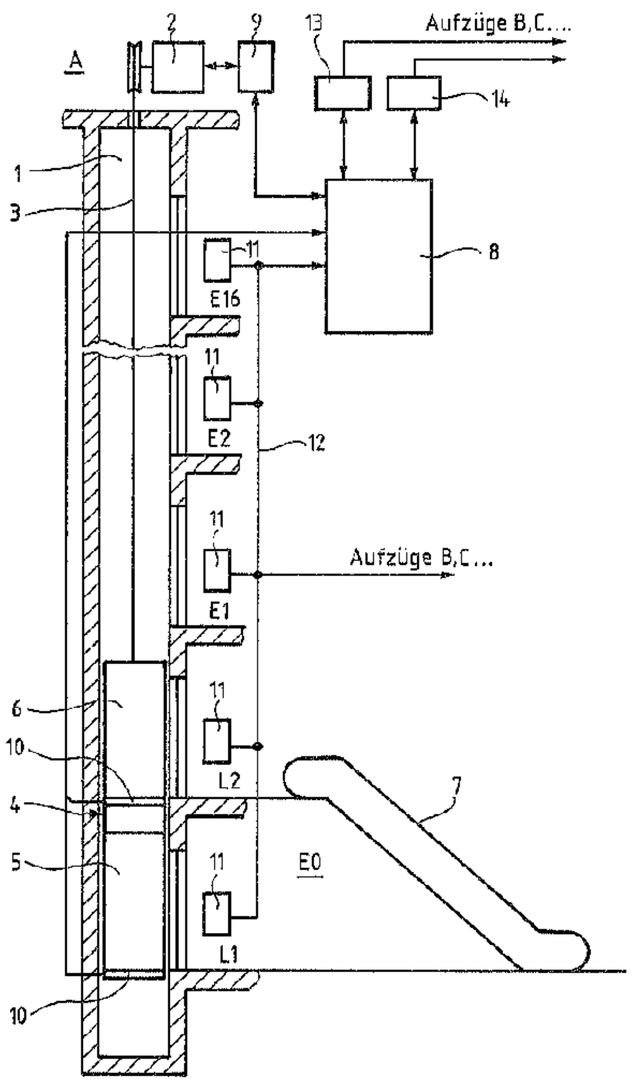
(72) Inventeur/Inventor:
SCHRODER, JORIS THEODOR, CH

(73) Propriétaire/Owner:
INVENTIO AG, CH

(74) Agent: RICHES, MCKENZIE & HERBERT LLP

(54) Titre : GROUPE DE COMMANDE POUR DISPOSITIF DE LEVAGE A DOUBLE CAGE A ALLOCATION IMMEDIATE DES ETAGES DEMANDEES

(54) Title: GROUP CONTROL FOR LIFTS WITH DOUBLE CAGES WITH IMMEDIATE ALLOCATION OF TARGET CALLS



(57) Abrégé/Abstract:
In this group control, upper as well as also lower cages of the double cages can be used at a main stopping place for journeys to even-numbered and odd-numbered storeys. For this purpose, a respective call store (20, 21), in which the calls entered at the main stopping place and identifying the target storeys are stored, is associated with the lower and the upper cage. A switching circuit (32) at its input side stands in connection with the call stores (20, 21) in such a manner that the double cage concerned is scheduled in dependence on a allocated call as stopping at storey pairs numbered even-odd or odd-even. At the output side, the switching circuit (32) is connected with a switching equipment (31), which has the effect that either the double cages stopping at storey pairs numbered even-odd or the double cages stopping at storey pairs numbered odd-even are excluded from the allocation process in the case of a further call still to be allocated in order to maximise the possibilities for co-incident stops without losing flexibility.

Summary:

In this group control, upper as well as also lower cages of the double cages can be used at a main stopping place for journeys to even-numbered and odd-numbered storeys. For this purpose, a respective call store (20, 21),in which the calls entered at the main stopping place and identifying the target storeys are stored, is associated with the lower and the upper cage. A switching circuit (32) at its input side stands in connection with the call stores (20, 21) in such a manner that the double cage concerned is scheduled in dependence on a allocated call as stopping at storey pairs numbered even-odd or odd-even. At the output side, the switching circuit (32) is connected with a switching equipment (31), which has the effect that either the double cages stopping at storey pairs numbered even-odd or the double cages stopping at storey pairs numbered odd-even are excluded from the allocation process in the case of a further call still to be allocated in order to maximise the possibilities for co-incident stops without losing flexibility.

(Fig. 2)

2042971

Description:

Group control for lifts with double cages with immediate allocation of target calls

The invention concerns a group control with double cages with immediate allocation of target calls, wherein the double cages are formed of two cages, which are arranged in a common cage frame and can be boarded selectably at a main stopping place, with call registering equipments, which are arranged on the storeys and display a keyboard for the entry of calls of desired target storeys, with call stores, which are associated with the lifts and connected with the call registering equipments, wherein a call identifying the input storey and a call identifying the target storey are stored on the entry of a call, with load-measuring equipments, which are provided in the upper cage and the lower cage of the double cage and stand in operative connection with load stores, with selectors each designating the storey of a possible stop and with an equipment, by means of which the entered calls are allocated to the lifts, according to the classifying clause of the patent claim 1.

A control for a lift group with double cages has become known by the CH-PS 529054, in which the double cages are constructed in such a manner that two adjacent storeys can be served at the same time. In this case, the filling of a building shall be achieved in the shortest possible time with approximately uniform occupation of the double cages thereby, that the passengers to even-numbered upper floors board the upper cage and those to the odd-numbered board the lower cage on the ground floor, wherein the cage call transmitters are blocked each time for the floors

not associated with the cage. As soon as the cage after departure from the ground floor must stop in response to a storey call, the blocking is cancelled so that the boarding passenger can travel to any desired storey.

Lifts of that kind can convey twice as many passengers during each travel as lifts with single cages. Since less stopping has to be done, the same number of storeys can be served in a shorter time so that the conveying performance is increased appreciably. It can however occur in this control that passengers, who do not observe the division of the even-numbered and the odd-numbered storeys over the upper and lower cage respectively, do not reach the desired storey and must alight at a different one. It must also be regarded as disadvantageous that the constraint to use the right cage, which is exerted on the boarding passengers at the main stopping place, exists not only during the relatively short time of the peak traffic, but also during the remaining time.

In a control equipment, which is known from the EP-A 0 301 178, for lifts with single or double cages, call registering equipments with keys for the entry of calls for desired target storeys are arranged on the storeys, whereagainst no call buttons are provided in the lift cages. At the main stopping place, call registering equipments with keys for even-numbered target storeys are in this case arranged at the access for the upper cages of the double cages, whilst the access for the lower cages of the double cages displays call registering equipments with keys for odd-numbered target storeys. It is proposed by a further example of embodiment to use call registering equipments with decade keyboards, wherein the keys for the odd-numbered target storeys at the upper access and the keys for the even-numbered target storeys at the lower access are

made ineffective. Even in the case of this control equipment, a passenger must consider exactly which access he has to use in order to reach the desired travel target. On use of a wrong access, the error can however still be noticed before boarding the cage so that the correct travel target can be reached through change of the access.

A group control described for single cages has become known by the EP-A 0 356 731, which applies the shortest waiting time of all passengers as criterion for the allocation of the cages to the entered calls. In this control, the travel targets can likewise be entered already on the storeys by call registering and indicating equipments proposed by the EP-A 0 320 583. Immediately after the registration and transfer of a call into a call store divided according to input and target storeys, a computer in the form of a microprocessor computes a sum called operating costs for each cage from data specific to the lift, which sum corresponds to the waiting time which would arise for the passengers in the serving of the call. The operating costs are transferred immediately after the computation into a costs register and subsequently compared immediately with the operating costs of the other lifts by means of a comparison equipment. In this case, an allocation instruction is stored in an allocation store of that lift which displays the lowest operating costs. Immediately after the allocation of cage to call has taken place in this manner, the lift concerned and its position is indicated in an indicating field of the actuated call registering and indicating equipment so that the passenger can move in good time to the associated shaft door.

The invention is based on the task of improving the control equipments initially named in the state of the art in such a manner that, in the case of lifts with double cages, the upper as well as also the lower cages of

the double cages can be used at the main stopping place for travels to even-numbered and odd-numbered storeys.

This problem is solved by the invention characterised in the patent claim 1. In this case, a respective call store,in which the calls entered at the main stopping place and identifying the target storeys are stored, is associated with the upper and with the lower cage of a double cage. A switching circuit at its input side stands in connection with the call stores in such a manner that the double cage concerned is scheduled as stopping at storey pairs numbered even-odd or odd-even in dependence on an allocated call. At the output side, the switching circuit is connected by way of a switching equipment with the comparison equipment so that, in dependence on a further still to be allocated call, either the double cages stopping at storey pairs numbered even-odd or the double cages stopping at storey pairs numbered odd-even can not participate in the comparison and allocation process. A call is allocated immediately after the entry, wherein the lift concerned and its position is indicated on an indicating field of the actuated call registering equipment.

The advantages achieved by the invention are to be seen in that the passengers at a main stopping place no longer need to consider whether they have to board the upper or the lower cage of a double cage in order to reach the desired storey, since the control is in a position of putting a suitable cage at disposal at the upper as well as also at the lower access. In this case, the initially mentioned advantage, that double cage lifts have to stop less often for journeys from the main stopping place than single cage lifts, remains fully maintained. The preferment of co-incident stops is also furthermore possible, wherein the possibility

of stopping odd-even or even-odd during the same circuit improves the availability of the cages and shortens the waiting times.

Accordingly, one aspect of the present invention resides in a group control for elevators with the immediate allocation of target calls to double cars having two cars which are arranged in a common car frame and can be boarded selectively at a main stopping floor, call registering devices which are located at the floors and have a keyboard for the entry of calls for desired target floors, call memories which are associated with the elevators and connected with the call registering devices wherein a call identifying the input floor and a call identifying the target floor are stored on the entry of a call, load measuring devices which are provided in the lower car and in the upper car of the double car and are connected with load memories, selectors for designating the floor of a possible stop, and a call allocation device for allocating the entered calls to the elevators, wherein the call allocation device for each elevator has a computer which computes operating costs corresponding to the waiting times of passengers from data specific to the elevator, an operating costs register connected to the computer wherein the operating costs registers of all of the elevators are connected to a comparison device which compares the operating costs of the elevators one with the other such that the entered call is allocated to that elevator which displays the lowest operating costs, comprising a call memory for each car of a double car in an elevator group serving a plurality of floors, each said call memory having first memory locations for storing a call representing a call input floor and second memory locations for storing a call representing a call target floor in response to an entered call; a switching circuit having an input connected to said second memory locations such that the double car to which said entered call is allocated is scheduled in dependence on said allocated call for stopping at floor pairs numbered odd-even or even-odd; a switching device connected for actuation to an output of said switching circuit and connected between an operating costs register and a comparison device so that either the double

cars stopping at floor pairs numbered even-odd or the double cars stopping at floor pairs numbered odd-even can not participate in a comparison and allocation process for the allocation of a subsequently entered call; and call registering and indicating devices located at floors served by the double cars of the elevator group for entering a target call upon actuation and for indicating the car to which said target call is allocated and the position of the car on an indicating field of the actuated one of said call registering and indicating devices.

In another aspect, the present invention resides in a group control for elevators with the immediate allocation of target calls to double cars comprising at least two double car elevators each having two cars which are arranged in a common car frame and can be boarded selectively at a main stopping floor for travel to a plurality of floors; call registering devices located at the floors served by said elevators and having a keyboard for the entry of target calls for desired target floors; a call memory for each said car of said elevator, each said call memory having first memory locations for storing a call representing a call input floor and second memory locations for storing a call representing a call target floor in response to an entered target call; a call allocation device for allocating said entered target call to said elevators including a computer for each said elevator for computing operating costs corresponding to the waiting times of passengers from data specific to said elevator, an operating costs register connected to said computer and a common comparison device wherein said operating costs registers of all of said elevators are connected to said comparison device which compares the operating costs of said elevators one with the other such that said entered target call is allocated to the one of said elevators which displays the lowest operating costs; a switching circuit for each said elevator having an input connected to said second memory locations such that said elevator to which said entered target call is allocated is scheduled in dependence on said allocated call for stopping at floor pairs numbered odd-even or even-odd; a switching device for each

said connected for activation to an output of said switching circuit and connected between said operating costs register and said comparison device so that either said elevators stopping at floor pairs numbered even-odd or said elevators stopping at floor pairs numbered odd-even can not participate in a comparison and allocation process for the allocation of a subsequently entered target call; and call registering and indicating devices located at floors served by said elevators for entering a target call upon actuation and for indicating the car to which said target call is allocated and the position of the car on an indicating field of the actuated one of said call registering and indicating devices.

In a further aspect, the present invention resides in a group control for elevators with the immediate allocation of target calls to double cars having two cars which are arranged in a common car frame and can be boarded selectively at a main stopping floor, call registering devices which are located at the floors and have a keyboard for the entry of calls for desired target floors, call memories which are associated with the elevators and connected with the call registering devices wherein a call identifying the input floor and a call identifying the target floor are stored on the entry of a call, load measuring devices which are provided in the lower car and in the upper car of the double car and are connected with load memories, selectors for designating the floor of a possible stop, and a call allocation device for allocating the entered calls to the elevators, wherein the call allocation device for each elevator has a computer which computes operating costs corresponding to the waiting times of passengers from data specific to the elevator, an operating costs register connected to the computer wherein the operating costs registers of all of the elevators are connected to a comparison device which compares the operating costs of the elevators one with the other such that the entered call is allocated to that elevator which displays the lowest operating costs, comprising a call memory for each of a lower car and an upper car of a double car in an elevator group serving a plurality of floors, each said call memory having

first memory locations for storing a call representing a call input floor and second memory locations for storing a call representing a call target floor in response to an entered call; a switching circuit having an input connected to said second memory locations such that the double car to which said entered call is allocated is scheduled in dependence on said allocated call for stopping at floor pairs numbered odd-even or even-odd only for three directly adjacent floor pairs wherein said allocated call is associated with the middle one of the three floor pairs; a switching device connected for actuation to an output of said switching circuit and connected between an operating costs register and a comparison device so that either the double cars stopping at floor pairs numbered even-odd or the double cars stopping at floor pairs numbered odd-even can not participate in a comparison and allocation process for the allocation of a subsequently entered call; and call registering and indicating devices located at floors served by the double cars of the elevator group for entering a target call upon actuation and for indicating the car to which said target call is allocated and the position of the car on an indicating field of the actuated one of said call registering and indicating devices.

The invention is explained more closely in the following with the aid of an example of embodiment illustrated on the drawing. There show:

Fig. 1 a schematic illustration of the group control, according to the invention, for a lift of a lift group with double cages,

Fig. 2 a schematic illustration of a part, which is associated with a lift, of the group control according to Fig. 1,

Fig. 3 a schematic illustration of a switching circuit, which is associated with a lift, of the group control according to Fig. 1 and

Fig. 4 a schematic illustration of the call stores of three lifts of a lift group with double cages.

Denoted by 1 in the Fig. 1 is a lift shaft of a lift A of a lift group consisting of several lifts. A hoist engine 2 drives a double cage 4, which is guided in the lift shaft 1 and .formed of two cages 5 and 6 arranged in a common cage frame, by way of a hoist cable 3, wherein sixteen storeys E1 to E6 are served in the lift plant chosen as example. The spacing of both the cages each from the other is so chosen that it agrees with the spacing between two adjacent storeys. A main stopping place E0, provided for example on the ground floor, displays a lower access L1 to the lower cage 5 and an upper access L2 to the upper cage 6 of the double cage 4, wherein the upper access L2 is connected by an escalator 7 with the lower access L1. The hoist engine 2 is controlled by a drive control known from the EP-B 0 026 406, wherein the target value generation, the regulating function and the stop initiation are realised by means of a

microcomputer system 8, which stands in connection with measuring and control members 9 of the drive control. The microcomputer system 8 beyond that computes, as is for example known from the EP-A 0 356 731, a sum, also called operating costs, which corresponds to the waiting time of all passengers and forms the basis of the call allocation procedure, from data specific to the lift. The cages 5 and 6 display load-measuring equipments 10, which are likewise connected with the microcomputer system 8. Call registering and indicating equipments 11, which are for example known from the EP-A 0 320 583, are provided on the storeys and display decade keyboards, by means of which calls can be entered for journeys to desired target storeys. In the method of the serial data input assumed by way of example, the call registering and indicating equipments 11 are connected by not illustrated serial interface blocks and a serial data conductor 12 with the microcomputer systems 8. The microcomputer systems 8 of the individual lifts of the group stand in connection one with the other by way of a comparison equipment 13 known from the EP-B 0 050 304 and a party-line transmission system 14 known from the EP-B 0 050 305.

The part, which is illustrated schematically in Fig. 2, of the microcomputer system 8 associated by way of example with the lift A displays a respective call store 20 and 21, which is associated with a respective allocation store 22 and 23, for the lower as well as also for the upper cage 5 and 6 of a double cage 4. The call stores 20 and 21 and allocation stores 22 and 23 have storage places corresponding to the number of the storeys for each direction of travel, wherein merely the stores associated with the upward direction of travel are illustrated. The call stores 20 and 21 each consist of a respective first store 20.1

and 21.1 and a respective second store 20.2 and 21.2, wherein the calls identifying the call input storeys are stored in the first stores 20.1 and 21.1 and the calls identifying the target storeys are stored in the second stores 20.2 and 21.2. An operating costs register intended for the storage of the operating costs is denoted by 24. A first selector 25 associated with the lower cage 5 and a second selector 26 associated with the upper cage 6 each in the form of further registers form addresses, which correspond to the storey numbers and by means of which the storage places of the stores 20 and 21 can be addressed. The selectors 25 and 26 each time indicate that storey, at which the double cage 4 could still stop either by the lower cage 5 or the upper cage 6, for which purpose the second selector 26 leads the first by one storey during the upward travel and the first selector 25 leads the second by one storey during the downward travel. The call stores 20 and 21 and the allocation stores 22 and 23 are read-write stores which, as also registers 24, 25 and 26, are connected with the bus 27 of the microcomputer system 8. The calls, which are stored in the call stores 20 and 21 according to the example of Fig. 2, and the allocation instructions stored in the allocation store 22 and 23 are characterised symbolically by "1", wherein the allocation instructions state that the call pair L1/E5 of the lower cage 5 and the call pair L2/E8 are allocated to the upper cage 6 of the double cage 4 of the lift A. A load store is denoted by 28, a door time store by 29 and a travelling time store is denoted by 30, which stores are likewise connected with the bus 27 of the microcomputer system 8. The stores 28, 29 and 30, which are known from the EP-A 0 356 731 cited above, are read-write stores, in which data are stored for the operating costs computation. Load values in the form of a number of persons, who are

situated in the respective lower or upper cage 5 and 6 on a future stop or the travel past a storey and which can be calculated by reason of the entered calls, are stored for each storey in the load store 28. In this case, load values formed from faulty call entries can be corrected by comparison with values ascertained through the load measuring equipments 10. The door opening and closing times of the lift concerned are stored for each storey in the door time store 29, whilst the travelling times of the double cage 4 concerned between a certain storey and every other storey are stored in the travelling time store 30. The operating costs register 24 is connected by way of a switching equipment 31 in the form of tristate buffers with the comparison equipment 13, wherein the activating connections of the tristate buffers are connected to the output of a switching circuit 32 described more closely in the following.

The switching circuit 32 consists of an OR-gate 33, which displays six inputs which are each respectively associated with six successive storeys. In a first embodiment according to Fig. 2, three of the inputs are each respectively connected with outputs of those storage cells of the second store 21.2 of the upper cage 6, which are associated with the odd-numbered storeys, and the other three inputs are each connected to the outputs of those storage cells of the second store 20.2 of the lower cage 5, which are associated with the even-numbered storeys. In a second embodiment, thereagainst, as illustrated in the Fig. 3, three of the inputs of the OR-gate 33 are each connected with respective outputs of those storage cells of the second store 21.2 of the upper cage 6, which are associated with the even-numbered storeys, and the other three inputs are each connected to the respective outputs of those storage cells of the second store 20.2 of the lower cage 5, which are associated with the

odd-numbered storeys. The output of the OR-gate 33 stands in connection with the activating connections of the tristate buffers. The switching circuit 32, which is for example formed by the microcomputer system 8 on the basis of a program, is activated each time on the storage of a call to be allocated. In this case, in dependence on the target storey concerned and on the store, into which the call was transferred, either the connections according to the first or the second embodiment are produced in such a manner that the target storey is associated with the middle one of three storey pairs fixed through the switching circuit 32.

Only the second stores 20.2 and 21.2 of the lower and upper cage 5 and 6, respectively, of the double cage 4 concerned are illustrated for three lifts A, B and C of a lift group in the Fig. 4. The distribution of the target calls, which are entered at either the lower or the upper access L1 and L2 (Fig. 1) and characterised by "1", over the second stores 20.2 and 21.2 is explained more closely in the following functional description with the aid of an example. In this case, in the range of three respectively adjacent storey pairs, the double cage 4 of the lift A is scheduled to stop at storey pairs numbered even-odd and the double cage 4 of the lift B is scheduled to stop at storey pairs numbered odd-even, whilst the double cage 4 of the lift C is not yet scheduled.

The afore-described group control operates as following:

On the entry of a call, the address of the call input storey and that of the target storey is transferred by way of the serial data conductor 12 into the microcomputer systems 8 of all lifts, wherein only one call registering and indicating equipment 11 at a time can have access to the serial data conductor 12. If the call is entered on the lower or upper access L1 and L2 of the main stopping place E0, the microprocessors of

the microcomputer systems 8 operate the address of the call entry store in such a manner that the call pair concerned is entered into the call stores of either only the upper or only the lower cages (example Fig. 2, L2/E8). It is now assumed for example that calls for the storeys E8 and E7 were entered at the upper access L2 and calls for the storeys E5 and E6 were entered at the lower access L1. It is now furthermore assumed that the switching equipment 31 is conductive for logic "0" at the output of the switching circuit 32. After the entry of the call for storey E8 at the upper access L2, the call is transferred into the call stores 21 associated with the upper cages 6 of all lifts, for which the switching circuit 32 according to the first embodiment of Fig. 2 is activated. Since the output of the storage cell associated with the storey E8 is not connected with an input of the OR-gate 33 and no call may yet be stored for the storeys E5 to E8 in the call stores 20 and 21 of all lifts, the switching equipment 31 remains in the conductive state so that all lifts can participate in the comparison. Now, the operating costs for the new call pair are computed for all lifts according to the already mentioned EP-A 0 356 731. Immediately after the computation, the operating costs are transferred into the operating costs registers 24 and compared one with the other by means of the comparison equipment 13 according to EP-B 0 050 304 proposed by way of example. Let it be assumed that lift A displays the lowest operating costs so that an allocation instruction is entered into its allocation store 23 at the storeys L2 and E8 (Fig. 2). Thereafter, the new call pair is cancelled for the lifts without allocation instruction. By the allocation of the call for storey E8, the double cage 4 of the lift A is scheduled in the region of three adjacent storey pairs numbered even-odd to stop each time

by the upper cage 6 at even-numbered storeys.

On the entry of the call for storey E7 at the upper access L2 and after transfer of the call into the call stores 21 associated with the upper cages 6 of all lifts, the output of the OR-gate 33 for lift A (Fig. 2) becomes logic "1" so that the switching equipment 31 blocks and the lift A can not participate in the allocation process. For the remaining lifts, the switching circuit 32 is activated according to the second embodiment of Fig.3, for which the switching equipment 31 is not blocked. In the now following allocation process, the call for storey E7 may be allocated to the lift B (Fig. 3) so that the double cage 4 of this lift is scheduled in the region of three adjacent storey pairs numbered odd-even to stop each time by the upper cage 6 at odd-numbered storeys. If the call for storey E5 is now entered at the lower access L1, then lift B can no longer participate in the allocation procedure, while the call is for example allocated to the lift A (Fig. 2). The call for storey E6 likewise entered at the lower access L1 has the effect that the lift A is excluded from the allocation. This call may for example be allocated to the lift B (Fig. 3). Immediately after a call allocation, the allocated call and its position is indicated to the passenger in an indicating field of the actuated call registering and indicating equipment. If a target call for a storey pair is stored either only for the lower or only for the upper cage of a double cage, the first selector 25 becomes effective in the first case for the stop initiation and the second selector 26 becomes effective in the second case for the stop initiation (Fig. 4, lift A, E5/E6, E7/E8).

In order to achieve that the lower cage 5 and the upper cage 6 are filled evenly during the peak traffic on boarding at the main stopping place E0, optical indicating equipments can be provided, which in dependence on the already allocated target calls signal the more advantageous cages to the newly arriving passengers. Thus, signs, on which it is indicated whether certain target storeys can be reached more quickly by the use of the lower cages 5 or the upper cages 6, can for example be arranged at the accesses L1 and L2.

What is claimed is:

1. A group control for elevators with the immediate allocation of target calls to double cars having two cars which are arranged in a common car frame and can be boarded selectively at a main stopping floor, call registering devices which are located at the floors and have a keyboard for the entry of calls for desired target floors, call memories which are associated with the elevators and connected with the call registering devices wherein a call identifying the input floor and a call identifying the target floor are stored on the entry of a call, load measuring devices which are provided in the lower car and in the upper car of the double car and are connected with load memories, selectors for designating the floor of a possible stop, and a call allocation device for allocating the entered calls to the elevators, wherein the call allocation device for each elevator has a computer which computes operating costs corresponding to the waiting times of passengers from data specific to the elevator, an operating costs register connected to the computer wherein the operating costs registers of all of the elevators are connected to a comparison device which compares the operating costs of the elevators one with the other such that the entered call is allocated to that elevator which displays the lowest operating costs, comprising:

a call memory for each car of a double car in an elevator group serving a plurality of floors, each said call memory having first memory locations for storing a call representing a call input floor and second memory locations for storing a call representing a call target floor in response to an entered call;

a switching circuit having an input connected to said second memory locations such that the double car to which said entered call is allocated is scheduled in dependence on said allocated call for stopping at floor pairs numbered odd-even or even-odd;

a switching device connected for actuation to an output of said switching circuit and connected between an operating costs register and a

comparison device so that either the double cars stopping at floor pairs numbered even-odd or the double cars stopping at floor pairs numbered odd-even can not participate in a comparison and allocation process for the allocation of a subsequently entered call; and

call registering and indicating devices located at floors served by the double cars of the elevator group for entering a target call upon actuation and for indicating the car to which said target call is allocated and the position of the car on an indicating field of the actuated one of said call registering and indicating devices.

2. The group control according to claim 1 wherein said switching circuit schedules the double car only for three directly adjacent floor pairs wherein said allocated call is associated with the middle one of the three floor pairs.

3. The group control according to claim 2 wherein the double cars have an upper car and a lower car and said switching circuit includes an OR-gate having six inputs each associated with a respective one of six successive floors, three of said inputs being connected with outputs of said storage locations of said second memory of the upper car which are associated with the odd-numbered floors and the other three of said inputs being connected with outputs of said storage locations of said second memory of the lower car which are associated with the even-numbered floors, and having an output connected to an activating input of said switching device, said switching device including tristate buffers.

4. The group control according to claim 2 wherein the double cars have an upper car and a lower car and said switching circuit includes an OR-gate having six inputs each associated with a respective one of six successive floors, three of said inputs being connected to outputs of said storage locations of said second memory of the upper car which are associated with the even-numbered floors and the other three of said inputs being

connected to outputs of said storage locations of said second memory of the lower car which are associated with the odd-numbered floors, and having an output connected to an activating input of said switching device, said switching device including tristate buffers.

5. The group control according to claim 1 including a first selector associated with the lower car and a second selector associated with the upper car, wherein said first selector scans said call memory of the lower car and said second selector scans said call memory of the upper car and said second selector leads said first selector by one floor during the upward travel direction of the cars and said first selector leads said second selector by one floor during the downward travel direction of the cars.

6. The group control according to claim 1 including optical indicating devices located at a main stopping floor for indicating to passengers that the lower cars or the upper cars are or are not recommended for use to certain target floors in response to one or more of said allocated target calls.

7. A group control for elevators with the immediate allocation of target calls to double cars comprising:

at least two double car elevators each having two cars which are arranged in a common car frame and can be boarded selectively at a main stopping floor for travel to a plurality of floors;

call registering devices located at the floors served by said elevators and having a keyboard for the entry of target calls for desired target floors;

a call memory for each said car of said elevator, each said call memory having first memory locations for storing a call representing a call input floor and second memory locations for storing a call representing a call target floor in response to an entered target call;

a call allocation device for allocating said entered target call to said elevators including a computer for each said elevator for computing operating costs corresponding to the waiting times of passengers from data specific to said elevator, an operating costs register connected to said computer and a common comparison device wherein said operating costs registers of all of said elevators are connected to said comparison device which compares the operating costs of said elevators one with the other such that said entered target call is allocated to the one of said elevators which displays the lowest operating costs;

a switching circuit for each said elevator having an input connected to said second memory locations such that said elevator to which said entered target call is allocated is scheduled in dependence on said allocated call for stopping at floor pairs numbered odd-even or even-odd;

a switching device for each said connected for activation to an output of said switching circuit and connected between said operating costs register and said comparison device so that either said elevators stopping at floor pairs numbered even-odd or said elevators stopping at floor pairs numbered odd-even can not participate in a comparison and allocation process for the allocation of a subsequently entered target call; and

call registering and indicating devices located at floors served by said elevators for entering a target call upon actuation and for indicating the car to which said target call is allocated and the position of the car on an indicating field of the actuated one of said call registering and indicating devices.

8. The group control according to claim 7 wherein said switching circuit schedules said elevator only for three directly adjacent floor pairs wherein said allocated call is associated with the middle one of the three floor pairs.

9. A group control for elevators with the immediate allocation of target

calls to double cars having two cars which are arranged in a common car frame and can be boarded selectively at a main stopping floor, call registering devices which are located at the floors and have a keyboard for the entry of calls for desired target floors, call memories which are associated with the elevators and connected with the call registering devices wherein a call identifying the input floor and a call identifying the target floor are stored on the entry of a call, load measuring devices which are provided in the lower car and in the upper car of the double car and are connected with load memories, selectors for designating the floor of a possible stop, and a call allocation device for allocating the entered calls to the elevators, wherein the call allocation device for each elevator has a computer which computes operating costs corresponding to the waiting times of passengers from data specific to the elevator, an operating costs register connected to the computer wherein the operating costs registers of all of the elevators are connected to a comparison device which compares the operating costs of the elevators one with the other such that the entered call is allocated to that elevator which displays the lowest operating costs, comprising:

a call memory for each of a lower car and an upper car of a double car in an elevator group serving a plurality of floors, each said call memory having first memory locations for storing a call representing a call input floor and second memory locations for storing a call representing a call target floor in response to an entered call;

a switching circuit having an input connected to said second memory locations such that the double car to which said entered call is allocated is scheduled in dependence on said allocated call for stopping at floor pairs numbered odd-even or even-odd only for three directly adjacent floor pairs wherein said allocated call is associated with the middle one of the three floor pairs;

a switching device connected for actuation to an output of said switching circuit and connected between an operating costs register and a

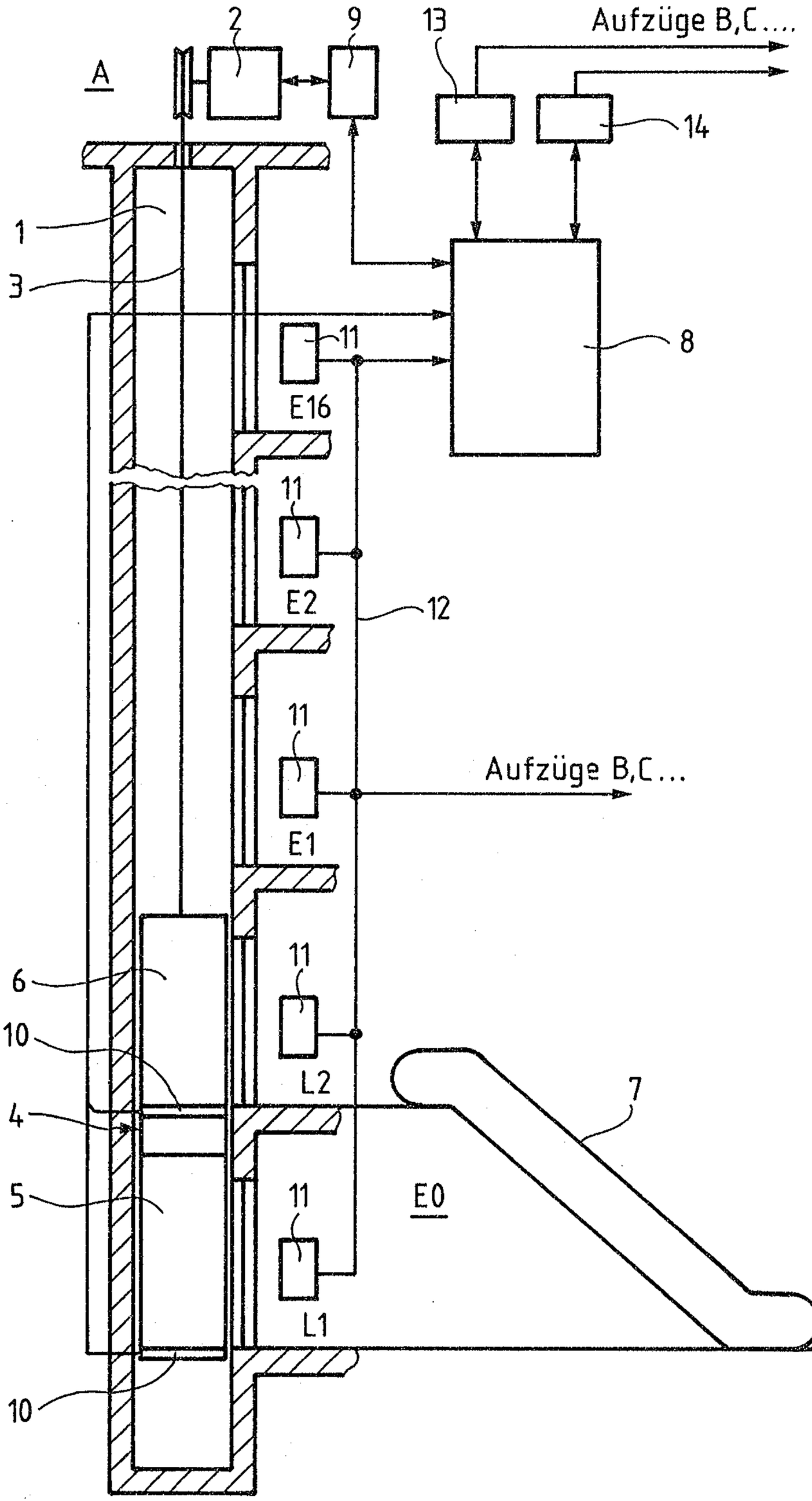
comparison device so that either the double cars stopping at floor pairs numbered even-odd or the double cars stopping at floor pairs numbered odd-even can not participate in a comparison and allocation process for the allocation of a subsequently entered call; and

call registering and indicating devices located at floors served by the double cars of the elevator group for entering a target call upon actuation and for indicating the car to which said target call is allocated and the position of the car on an indicating field of the actuated one of said call registering and indicating devices.

10. The group control according to claim 9 wherein said switching circuit includes an OR-gate having six inputs each associated with a respective one of six successive floors, three of said inputs being connected with outputs of said storage locations of said second memory of the upper car which are associated with one of the odd-numbered floors and the even-numbered floors and the other three of said inputs being connected with outputs of said storage locations of said second memory of the lower car which are associated with the other one of the odd-numbered floors and the even-numbered floors, and having an output connected to an activating input of said switching device.

Fig.1

2042971



Richter Mc Kenzie & Herbert

Fig.2

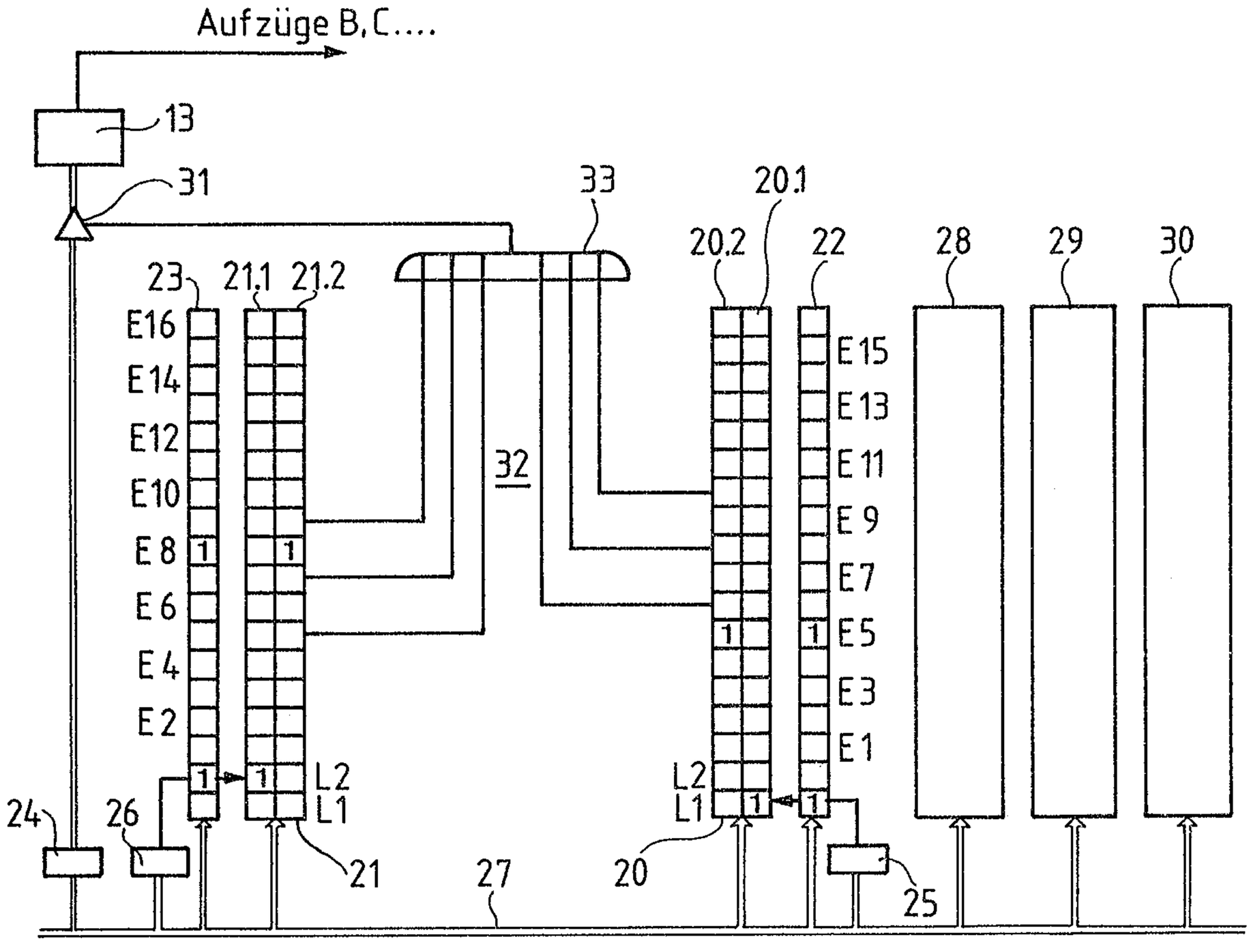


Fig.3

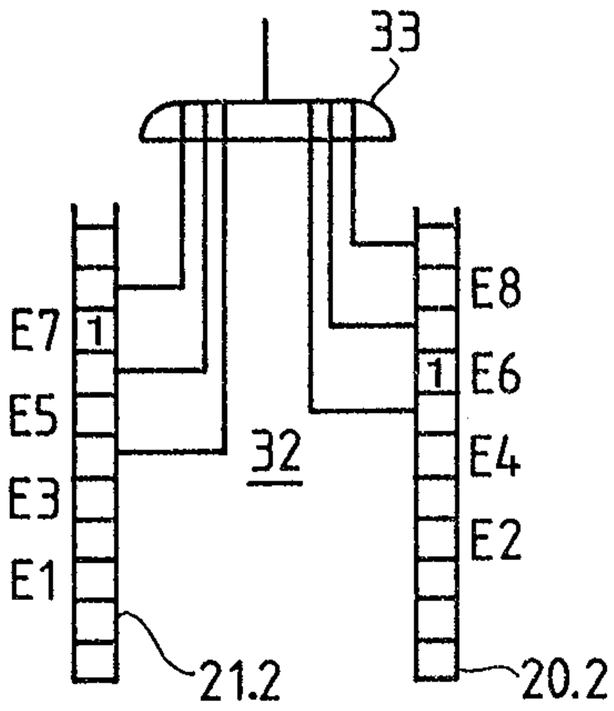
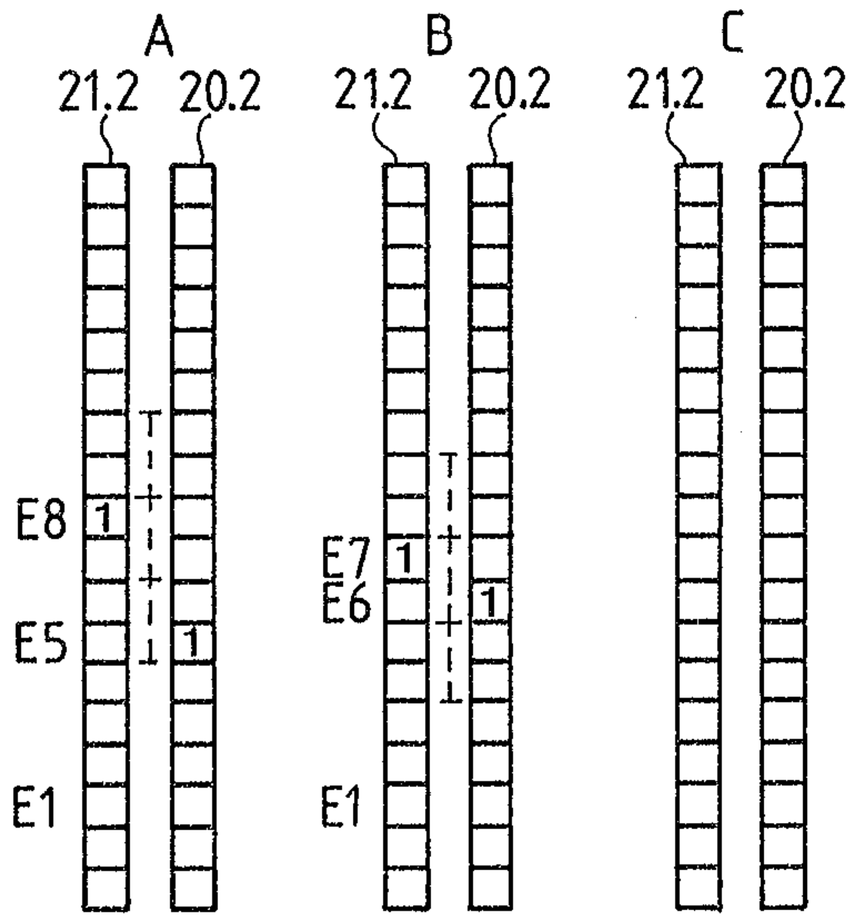
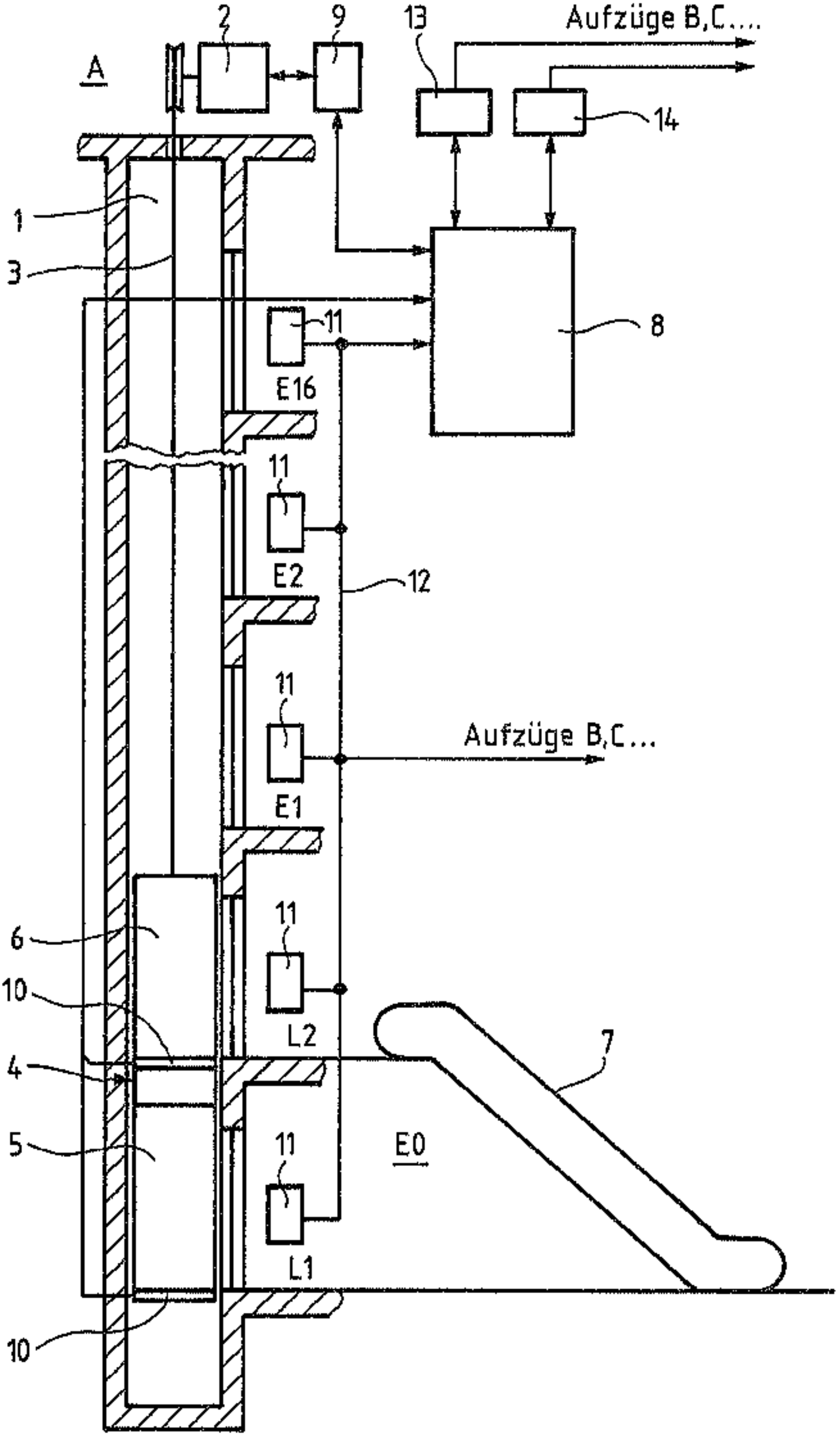


Fig.4



Kirkes McKenzie & Herbert


2
9
13
Aufzüge B,C....
A
14
1
3
11
8
E16
11
12
E2
11
Aufzüge B,C...
E1
11
6
10
L2
7
4
5
11
E0
L1
10