

Description:**Control for several Lift Groups with Destination Call Control**

- 5 The invention relates to a control for several lift groups with destination call control and immediate allocation, in which all destination call controls are combined into a common multigroup control.

10 The previous solutions of transport of persons in large buildings are based on division of the building into individual zones which mostly are each served by a respective lift group.

15 With conventional two-button controls as well as with previous destination call controls, such as, for example, for the group control equipment that has become known through EP 356 731, the passenger must first find the group which serves his desired storey. Only then will the appropriate UP or DOWN storey call or, in the case of the destination call control, the destination call be entered in the case of the conventional control. Although the traffic flow of persons is simplified in the case of the destination call group control, the search for the appropriate lift group, 20 however, still remains.

25 A destination call control with a dynamic sector allocation for a lift group has become known by US 5 382 761. A new destination call is in that case allocated either to a cage, the sector to be served by which includes the destination storey, or the new destination call is allocated to a cage which is not yet associated with an existing sector or the sector of which lies near to the destination storey and is enlarged to this. The control in that case takes into consideration the size of the already fixed sectors and allocates the new destination call to the smallest sector. A respective display, which indicates the served sector, is arranged above each lift.

30 In the case of the afore-described destination call control with dynamic sector allocation, the passenger can enter his desired destination storey and must then, by reference to the displays, find the lift which serves his storey. If several lifts are present, the search for the correct lift proves to be arduous, especially when many 35 persons are at a main stop at a peak traffic time. In addition, the search for the

correct lift becomes more difficult when the individual lift groups are not arranged in ascending or descending sequence adjacent to one another.

5 The invention is based on the object of proposing a control for lifts with destination call control of the initially mentioned kind, wherein the destination call entry can be undertaken at any desired call-registering equipment which is not allocated to a specific lift group, and an allocated lift is unambiguous and simple to recognise for the passenger.

10 This task is solved by the invention characterised in patent claim 1.

The advantages achieved by the invention are to be seen essentially in that the passenger does not need to know the building division into individual zones (storey regions) which are served only by individual lift groups. Equally, he does not need
15 to know those storey regions which are served by lifts of several groups. When the zones served by several lift groups overlap, the selection from all lifts coming into question is made automatically.

Advantageous developments of and improvements in the multigroup control
20 indicated in claim 1 for lifts with destination call control are possible by the measures recited in the subclaims. The passengers know, before the cage has reached a storey at which another lift has to be transferred to, which lift of another lift group is associated with their destination call and in which direction the lift is to be found after leaving the cage. Since the destination calls on the transfer storey
25 need not be entered once again, time is gained and crowding of the passengers and the mutual obstruction connected therewith is avoided.

Embodiments of the invention are illustrated in the drawing and explained more closely in the following. There:

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Fig. 1 shows a schematic illustration of a main stop of a lift installation which serves different sectors,

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Fig. 2 shows a schematic illustration of a main stop of a lift installation with three lift groups,

Fig. 3 shows a schematic illustration of a lift installation with three lift groups with two-sided passenger feed by way of escalators,

Fig. 4 shows a destination call input device for a multigroup control,

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Fig. 5 shows a schematic illustration of several lift groups in a tall building,

Fig. 6 shows, in perspective illustration, the interior of a lift cage with a display field of the display device, and

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Fig. 7 shows, in perspective illustration, the interior of a lift cage with two display fields of the display device.

Fig. 1 shows a schematic illustration of a lift installation with four lift groups which serve different sectors. A lift group consists of one or more lifts. In a building, the sectors can, for example, be allocated to the lift groups as follows: One lift group G1 serves the storeys 1 to 6, lift group G2 serves the storeys 1 and 7 to 9, lift group G3 serves the storeys 1 and 10 to 13 and lift group G4 serves the storeys 1 and 14 to 20. An arriving passenger does now not need to know the sectors allocated to the groups G1, G2, G3 and G4 and also does not need to enter his desired travel destination directly at the group G1, G2, G3 and G4 serving his destination storey. He can tap in every travel destination by any desired destination call input device TE which is arranged in the proximity of the groups G1, G2, G3 and G4. Subsequently, the selected lift A, B, C to Z is immediately made known to the passenger visually by way of a display device DS or acoustically. The identification of the lifts A, B, C to Z advantageously takes place by Latin letters or numbers which are arranged in ascending or descending sequence. In that case, all lifts A, B, C to Z can be denoted by the alphabetically arranged letters or numbers independently of the storey regions served. The identification of the lifts is to be so arranged that the allocated lift can be recognised unambiguously from each destination call input device TE.

This solution is very simple to operate and makes it easier for the passenger to find his lift A, B, C to Z. The passenger flow is disentangled in good time and is accelerated. Thereby, the space at the main stop, especially during peak traffic times, can be better utilised.

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Fig. 2 shows a schematic illustration of a main stop of lift installation with three lift groups which serve respectively different sectors. For example, the lifts of the first group G1 serve the storeys 1 to 10, the lifts of the second group G2 serve the storeys 1 and 21 to 30 and the lifts of the third group G3 serve the storeys 1 and 11 to 20.

Frequently, the storey regions served by individual lift groups G1, G2 and G3 in large buildings are for constructional reasons not even arranged beside one another in ascending or descending sequence. Particularly in such buildings the search for his lift is made easier for the passenger. In this case, too, it is sufficient to enter the destination storey at any desired destination call input device TE. The multigroup control always selects the most favourable lift from all available lifts and, when the storey regions served by several lift groups G1, G2 and G3 overlap, the selection is made from all lifts coming into question. As in the description concerning Fig. 1, the most favourable cage is immediately allocated to the destination call of the passenger and made known to the passenger visually on the display device DS or acoustically. In this group arrangement, too, each lift cage is provided with an easily visible Latin letter or number in ascending or descending sequence.

Fig. 3 shows an arrangement of lift groups, wherein the lift lobbies are accessible from two sides and the passengers arrive at the main stop, for example, by way of escalators FT arranged in mirror image. According to experience, most of the passengers, who normally use the other escalator, first choose the wrong direction to their lift group. This problem is similarly solved by the multigroup control; the passenger can enter his travel destination early at any desired destination call input device. The display device DS in addition contains an arrow which points in the direction of the allocated lift.

Fig. 4 shows a destination call input device TE for a multigroup control. Each destination call input device TE is provided with a keyboard, for example a decade keyboard, and a display device DS.

All destination call controls of the groups G1, G2 and G3 are connected into one central multigroup control. The individual connections can be realised by way of communications cables (bus) or wirelessly by means of a transmitter and receiver.

The possibility also exists that the individual destination call controls are connected directly by way of communications cables (bus) or wirelessly by means of a transmitter and receiver and one of the group destination call controls takes over the function of the multigroup.

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The multigroup control now ascertains the most favourable lift from all lifts A, B, C to Z coming into question, even when several sectors overlap.

10 The principle of the destination call control firstly makes it possible to so control several lift groups that the passenger can enter the destination storey at any desired decade destination call input device. All lifts in a building (or building region) are thus virtually available to him. The multigroup control makes the selection of the best lift which serves the desired storey. The passenger sees the lift destination ("A", "B" and so forth) of the lift allocated to him on the display
15 device DS immediately after the acknowledgement of the entered storey number. This information can, for example, be augmented additionally in the form of an arrow, which points in the direction to the lift door, on the display device DS.

20 The multigroup control operates by an optimising process for the selection of the most favourable lift such as is described in, for example, EP 301 173 (service costs optimisation). Moreover, the approach paths are individually included in the computation for each distance "destination call input device to lift door" in the multigroup control so that this is not perceived as waiting time by the passenger.

25 The selection of the lifts from several groups is possible only at the main stop and on storeys which are served by different groups.

As further variant, the destination call entry can also take place implicitly. In that case, an information transmitter, which consists principally of an aerial and an
30 electronic transmitter part, sends data to a recognition device after a corresponding enquiry. These data can contain direct information about the desired destination storey or serve for the identification of the lift user and thus make possible an access to the items of information, which are filed in a storage device, about the destination storey. The communication between the recognition device and the
35 information transmitter takes place by means of, for example, radio frequencies. By reference to the received data, the destination storey is evaluated in a

processing unit and fed to the multigroup control. The process of the destination call entry in this case takes place automatically and contactlessly. The passenger need now only move to the lift serving his call, independently of the group.

- 5 In Fig. 5, lift shafts of lift groups G1, G2, G3, G4 and G5 arranged in a tall building 6 are denoted 1, 2, 3, 4 and 5, wherein only one lift shaft of the lift group concerned is illustrated each time. In the lift shafts, cages K1, K2, K3, K4 and K5 are guided, which can serve specific storey regions allocated to the lift groups. The cages K1 of the lift group G1 serve a first storey region, which extends between a
10 main stop HH, for example formed by the ground floor, and a first transfer storey US1, as well as the storeys lying below the main stop HH. The cages K2 of the lift group G2 serve the main stop HH and a second storey region extending between the first transfer storey US1 and second transfer storey US2, whereagainst the first storey region is not served (identified by hatching in Fig. 5). The third storey region,
15 which is served by the cages K3 of the lift group G3, extends between the second transfer storey US2 and a third transfer storey US3. A fourth storey region extends between the third transfer storey US3 and an uppermost storey OS and is served by the cages K4 of the lift group G4. The cages K5 of the lift group G5 serve merely the main stop HH as well as storeys lying thereunder and the third transfer
20 storey US3, whereagainst the storeys lying therebetween are not served (identified by hatching in Fig. 5).

- The lift groups G1 to G5 are controlled by means of the multigroup controls. Equally, call-registering and display devices are arranged on the storeys, by means
25 of which devices calls can be entered for desired destination storeys. Immediately after entry of the call, the identification (for example, in the form of a letter) of the most favourable lift selected for the destination storey and an arrow indicating the position of the selected lift relative to the call entry location are indicated in a display field of the call-registering and display device. The destination call controls
30 of the lift groups G1 to G5 are connected together and combined into the multigroup control so that, on the entry of a call for a desired destination storey, the lift most favourable for this call is selected from the lifts of all lift groups G1 to G5, which serve the same storey, and displayed.

- 35 In Figs. 6 and 7, cages of a lift group are shown with the cage door 7 open at a stop on a transfer storey. Shaft doors 9 and 10, which are identified by indicator

plates 8 with the lift letters, of another lift group are to be seen through the opened cage door 7. According to Fig. 6, a display field 11 of a display device (such as has become known in similar form, for example by EP-B 0 320 583) is arranged in the cages of the lift groups, whereagainst two display fields 12 and 13, which are arranged to the right and to the left beside the cage door 7, of the display device are provided according to Fig. 7. The display fields 11, 12 and 13 of a lift group are each connected with the destination call controls of other lift groups with common transfer storeys. The number of the transfer storey, all destination calls in the form of the numbers of the destination storeys, which cannot be served by the lift concerned, and the lifts, which are associated with these destination calls and identified by letters provided with direction arrows, of other lift groups are indicated in the display fields 11, 12 and 13. In this case, all associations of destination call and lift are indicated in the display field 11 in the embodiment according to Fig. 6, whilst the destination calls allocated to the lifts lying to the right of the cage door 7 are indicated in the righthand display field 12 and the destination calls allocated to the lifts lying to the left of the cage door 7 are indicated in the lefthand display field 13 in the embodiment according to Fig. 7.

Let it be assumed, for example, that cage K5 of the fifth lift group G5 was allocated to the destination calls for the storeys 37, 38, 53 and 56 (Fig. 6) entered at the main stop HH. Before reaching the transfer storey US3 (40, Fig. 6), for example at the instant of the onset of braking or already after the closing of the cage door 7, the display field 11 is activated, wherein the destination calls, which cannot be served by the relevant cage K5 of the lift group G5 and have previously been passed over to the destination controls of the lift groups G3 and G4 serving the same transfer storey US3, and the allocated selected lifts and their position are indicated. Passengers situated in the cage K5 concerned thus know even before the transfer storey US3 that the lift A of the lift group G4 must be used for the storeys 53 and 56 and the lifts K or the lift group G3 must be used for the storeys 37 and 38. The association of the selected lifts with the lift groups G4 and G3 respectively is immaterial for the passengers, since the identification of the lifts is independent of the group association.

Patent Claims:

1. Control for several lift groups (G1 to G5) with destination call control and immediate allocation, wherein the call input takes place by means of a destination
5 call input device (TE) or contactlessly and automatically by means of information transmitter and recognition device and the allocated lift is made known on a display device (DS) or acoustically, characterised in that all destination call controls are combined into a common multigroup control, wherein the multigroup control selects the most favourable lift from all lifts, which come into question, of all groups (G1 to
10 G5).
2. Control according to claim 1, characterised in that the controls of the individual lifts of a group (G1 to G5) are connected into a group control and these group controls are then connected with a central multigroup control.
- 15 3. Control according to claim 1, characterised in that the controls of the individual lifts of a group (G1 to G5) are connected into a group control, wherein one of the group controls additionally takes over the function of the multigroup control.
- 20 4. Control according to one of claims 1 to 3, characterised in that the connections of the controls are effected by means of communications cable (bus).
5. Control according to one of claims 1 to 3, characterised in that the connections of the controls are realised wirelessly by means of transmitter and receiver.
- 25 6. Control according to one of claims 1 to 5, characterised in that the lifts connected with the multigroup control are provided with uniform designations to be recognised unambiguously by the passengers, especially with Latin letters from A to Z in ascending or descending sequence.
- 30 7. Control according to one of claims 1 to 6, characterised in that a display field (11) is arranged in cages (K1 to K5) of the lift groups (G1 to G5), on which display field all destination calls, which are not servable by the cage concerned and passed over to at least one other lift group, and the associated selected lifts of the
35 other lift group and their position are displayed.



8. Control according to claim 7, characterised in that two display fields (12, 13) are provided in the cages (K1 to K5) and are arranged to the right and to the left beside a cage door (7), wherein the destination calls associated with the lifts lying to the right of the cage door (7) are displayed in the righthand display field (12) and
- 5 the destination calls associated with the lifts lying to the left of the cage door (7) are displayed in the lefthand display field (13).

