



(22) Date de dépôt/Filing Date: 2005/01/04

(41) Mise à la disp. pub./Open to Public Insp.: 2005/07/06

(30) Priorité/Priority: 2004/01/06 (04405007.8) EP

(51) Cl.Int.⁷/Int.Cl.⁷ B66B 1/18, B66B 1/46, B66B 1/20

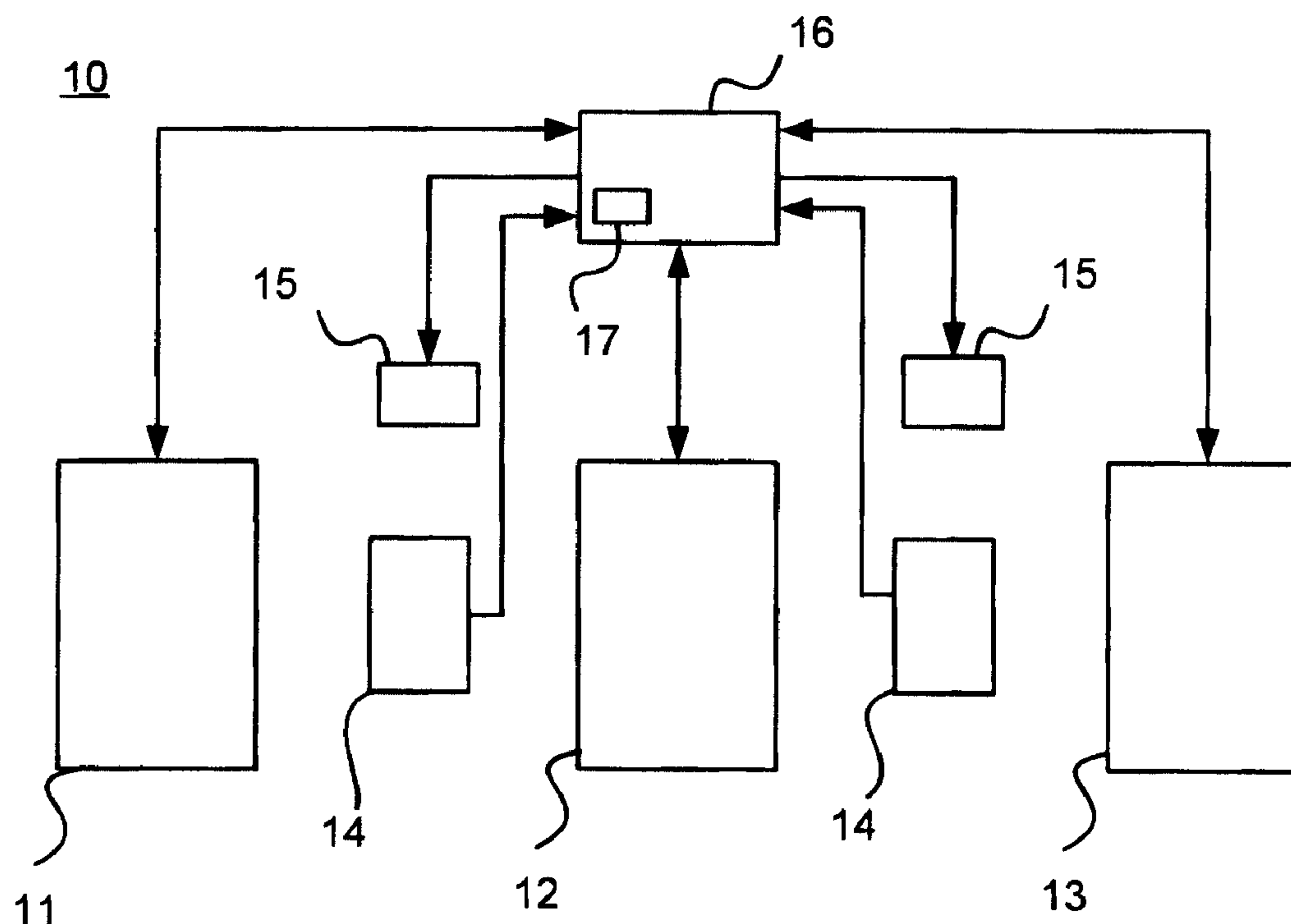
(71) Demandeur/Applicant:
INVENTIO AG, CH

(72) Inventeur/Inventor:
KOSTKA, MIROSLAV, CH

(74) Agent: RICHES, MCKENZIE & HERBERT LLP

(54) Titre : METHODE DE COMMANDE D'ASCENSEUR A ECONOMIE D'ENERGIE, ET INSTALLATION D'ASCENSEUR

(54) Title: METHOD FOR ENERGY-SAVING LIFT CONTROL, AND LIFT INSTALLATION



(57) Abrégé/Abstract:

A method of controlling a lift installation (10) with several lifts (11, 12, 13), in which destination call inputs of passengers are input by way of destination call input apparatus (14) and in which at least one traffic criterion (32, 33, 34), which characterises a traffic intensity, of the lift installation (10) is measured by a lift control (16), wherein the lift control (16) allocates costs-optimising lifts (11, 12, 13) to the destination call inputs. In order to obtain an energy saving in lift installations (10) with a destination call control without prejudicing the transport capacity of the lift installation (10) it is proposed that the lift control (16) additionally allocates energy-optimising lifts (11, 12, 13) to the destination call inputs in dependence on the traffic criterion (32, 33, 34).

Abstract

A method of controlling a lift installation (10) with several lifts (11, 12, 13), in which destination call inputs of passengers are input by way of destination call input apparatus (14) and in which at least one traffic criterion (32, 33, 34), which characterises a traffic intensity, of the lift installation (10) is measured by a lift control (16), wherein the lift control (16) allocates costs-optimising lifts (11, 12, 13) to the destination call inputs. In order to obtain an energy saving in lift installations (10) with a destination call control without prejudicing the transport capacity of the lift installation (10) it is proposed that the lift control (16) additionally allocates energy-optimising lifts (11, 12, 13) to the destination call inputs in dependence on the traffic criterion (32, 33, 34).

(Fig. 1)

Method for energy-saving lift control, and lift installation

The present invention relates to a method of controlling a lift installation with several lifts. The passengers input their travel wishes in the form of destination call inputs by way of destination call input apparatus. A lift control measures at least one traffic criterion, which characterises a traffic intensity, of the lift installation, wherein the lift control allocates the lifts in energy-optimising manner to the destination call inputs of passengers. The invention further relates to a lift installation for carrying out the above-mentioned method.

Modern lift installations operate in a manner controlled by destination call. A passenger inputs his or her travel destination by way of destination call input apparatus so that a lift control can select a lift from several lifts for corresponding destination call inputs in costs-optimising manner and allocate it to this passenger. The costs optimisation is in that case influenced by the optimisation criteria of waiting time, travel time to the destination location or maximum transport performance.

In modern lift installations low energy consumption is frequently extolled, wherein, however, savings are achieved in the region of drive technology or mechanics of the lift installations and not through the form of lift control or form of allocation of the passengers. This is partly due to the fact that the demands on lift installations on the one hand to make available a maximum transport performance and on the other hand to operate in energy-saving manner are in part mutually contradictory. In that case there is to be understood by transport performance primarily that the operator of the lift installation expects a required filling of a building in specific times and maintenance of the average waiting times predetermined for the lift installation.

A group control for lifts is described in EP 0 246 395 A1. According to this patent specification, lifts of the lift installation are allocated in costs-optimising manner to the destination calls input by passengers so that minimum waiting times result and transport performance is increased. In that case a complicated control circuit which undertakes this above-described costs optimisation is used.

Against this background the object results of indicating a method for control of a lift installation in which the possibilities for energy savings are utilised by suitable measures

without other requirements with respect to the requisite transport performance and the waiting times to be maintained being prejudiced.

This object is met in the case of a method according to category for control of a lift installation in that lifts are allocated to the destination call inputs by the lift control in energy-optimising manner in dependence on the traffic criterion.

For that purpose the lift control constantly measures the traffic intensity in the form of at least one traffic criterion, wherein the lift control switches over from the costs-optimising destination call allocation to the energy-saving allocation depending on the traffic intensity. The energy-saving allocation is also termed energy-saving mode in the following.

The invention is based on the idea that lift installations for most of the time are not operated at their transport capacity limit. Due to the algorithms, which are required for the predetermined transport capacity, for costs optimisation most lift installations are, however, operated constantly and continuously in costs-optimising manner, wherein the costs optimisation is largely used in the allocation of newly input destination calls.

The proposed solution maintains the requisite transport capacity and the average waiting times for the destination call allocations, but utilises the free periods present outside traffic peak times. Within these free periods the constant efforts of the lift control to achieve minimum waiting times and a maximum transport capacity are deactivated. In that case, through the energy-saving allocation of the destination call inputs in accordance with the invention only a moderate prolonging of waiting times has to be taken into account, which in general is not perceptible by the passengers.

The energy-saving measures in the allocation of destination calls are particularly effective in the case of lifts which have to overcome large distances without disembarkation storeys. In large buildings it is increasingly observable that almost empty lift cages travel over so-called blind zones of possibly 100 metres length. In that case the waiting time at the storey for the possibly only single passenger amounts in the extreme case to only a few seconds and that in a large building where the acceptance of correspondingly longer waiting times is inevitably present. The invention is used in this situation.

Advantageous refinements of the invention can be inferred from the subclaims.

In one advantageous refinement of the invention the energy-optimising allocation is activated in the case of falling below of at least one traffic criterion. In that case, the falling below of a traffic criterion is monitored for a predeterminable time period. On exceeding a fixable number of traffic criteria the energy-optimising allocation is deactivated. Here, too, an exceeding should advantageously be evaluated, only after a predetermined time period, as exceeding of a traffic criterion. The time period in which the traffic criteria are monitored can in that case be formed to be specific to lift. Depending on the respective case of use the energy-optimising allocation can also be deactivated in the case of exceeding a traffic criterion and activated in the case of falling below the criterion.

Belonging to the traffic intensity as a first traffic criterion in one example of embodiment of the present invention is determination of a mean waiting time of the passengers until transport, wherein this mean waiting time of the passengers until transport is compared with a predetermined waiting time for the energy-saving allocation. The lift installation is then switched by the lift control, when the predetermined waiting time for the energy-saving allocation is fallen below, to the energy-saving mode characterised by the energy-saving allocation.

A second traffic criterion for activation of the energy-saving mode is formed by a comparison of a number of the passengers, who are waiting at all storeys and up to now have not yet been transported, with a number of waiting passengers for the energy-saving mode. Here, too, the lift installation is then switched by the lift control, when the predetermined number of waiting passengers is fallen below, to the energy-saving mode.

In a further advantageous refinement of the invention a third traffic criterion for activation of the energy-saving mode is formed by means of a comparison of a mean number of passengers per journey with a number of passengers per journey for the energy-saving mode. The lift installation is switched by the lift control, when the predetermined number of passengers per journey is fallen below, to the energy-saving mode. In that case, for example, 30 seconds of standstill of a lift can be detected as empty travel in the detection of traffic intensity.

In the case of a preferred example of embodiment of the invention a deactivation of the energy-saving allocation is carried out in dependence on a predeterminable time. A rapid switching back and forth between the different forms of allocation is thereby avoided, which would ultimately increase the waiting time for passengers and thus be counter-

productive. The predetermined time can then be a minimum running time for the energy-saving allocation. Moreover, it is possible to activate and deactivate the energy-saving mode on a daily basis at clock times remaining the same, wherein this fixed activation and deactivation can also be varied appropriately to need.

In a further advantageous refinement of the invention the above-mentioned traffic criteria are measured within a settable time interval or a settable short history. It is thereby possible to influence the sensitivity in the case of switching over from the costs-optimising mode to the energy-saving mode. An example of a settable time interval in which the traffic criteria or overall the traffic intensity are measured lies at 5 minutes. This settable time interval can be different depending on the building.

If at least one or also several of the traffic criteria mentioned above by way of example are fulfilled there is switching over in the lift installation, particularly the lift control, to the energy-saving allocation so that newly input destination calls are allocated to the lifts in energy-saving manner.

In an advantageous refinement of the invention a deactivation of the energy-saving mode is undertaken only when two of the mentioned traffic criteria are no longer fulfilled and a settable minimum running time for the energy-saving measures has elapsed.

If the energy-saving mode is switched on and new destination calls are allocated in energy-saving manner, energy can thereby be saved in particular in that the lift cages are moved in balanced manner. Thus, in principle in the energy-saving allocation it is sought to so allocate the destination calls to the lifts that the lifts are moved in balanced manner. A so-called start/destination coincidence of a newly input destination call with an already registered destination call forms an exception in this balancing of the lifts. By a start/destination coincidence in the sense of the present invention there is understood travel together of at least two passengers. For this purpose in a further advantageous refinement of the invention in the case of a new input of a destination call a start/destination coincidence of the new destination call input with other already registered destination call inputs is checked, wherein in the case of presence of a start/destination coincidence the new destination call input is allocated in costs-optimising manner even though the energy-saving allocation is activate by reason of the measured traffic criteria. If during the validity of the energy-saving mode a new destination call is input and a start/destination coincidence present, one to two journeys of the lift is or are saved relative

to an energy-saving allocation to a lift which would possibly be better balanced by the allocated passenger, but would have no coincidence of the destination calls. However, compensation for the energy consumption of the two additional journeys cannot be provided by the better balancing, so that in this case the allocation is undertaken in costs-optimising manner notwithstanding the activated energy-saving mode.

In an advantageous refinement of the invention there is undertaken before each start of travel of a lift a load measurement by means of which, and possibly on the basis of further reservations for passengers allocated to this lift, a course of a lift load over a determined travel path of the lift is determined. This course of the lift load serves the purpose of selecting, in the case of energy-saving allocation of lifts, the lift with which an allocation of a new destination call ensures better balancing.

In a further advantageous refinement of the invention in the case of activated energy-saving mode and a new input of a destination call the lift load of a lift is checked for the travel path corresponding with the destination call and the destination call is allocated to the lift for which boarding of the passenger of this destination call does not cause exceeding of a predetermined lift load for this travel path. It is thereby achieved that the lifts are allocated preferentially in which the lift load lies below a predetermined limit for the travel path relevant to this destination call.

In an advantageous refinement of the invention the predetermined lift load corresponds with half the permissible lift load less a predetermined passenger weight. In that case the passenger weights can be different according to the respective place of use and in dependence on the region.

In an advantageous refinement of the invention a theoretical waiting time of each passenger is ascertained when the energy-saving mode is activated. In addition, a settable, tolerable waiting time per lift is established and serves for the lift control as a regulating magnitude. The theoretical waiting time of each individual passenger already allocated then results from the instantaneous time less the input time. Additionally added to this theoretical waiting time is the theoretical time for reaching the starting or boarding storey with consideration of possibly planned intermediate stops.

In the case of the energy-saving allocation of a lift this tolerable waiting time is compared with a theoretical waiting time of all destination calls allocated to this lift, wherein a

destination call could then be allocated to a lift when the above-mentioned theoretical waiting time of all destination calls allocated to this lift is less than the tolerable waiting time. It is thereby guaranteed that the waiting time does not lie above an established tolerable waiting time notwithstanding the energy-saving allocation. This tolerable waiting time should in that case in principle not lie above the guaranteed waiting time required by the operator. In that case, however, it is prevented that in the case of costs-optimising allocation the waiting times are progressively shortened without attention to the consumed energy.

In a further advantageous refinement of the invention there is used as a further criterion in the energy-saving allocation of destination calls the comparison of a settable, tolerable travel time to the destination with the theoretical travel time to the destination of each passenger. The travel time to the destination results from the waiting time and the travel time inclusive of the planned intermediate stops of the lift.

The allocation of a new destination call could be undertaken when the travel time to the destination of all passengers allocated to this lift is less than the tolerable travel time to the destination. The tolerable travel time to the destination is in that case again a settable magnitude which is established per lift and which is used by the lift control as a regulating magnitude.

It is advantageous if during the activated energy-saving mode in the case of allocation of new destination calls the otherwise usual limitation of the number of intermediate stops, which is usual with the costs-optimising allocation, is cancelled. This number of intermediate stops is indirectly influenced by the monitoring of the tolerable waiting time and the tolerable travel time to the destination. Limitation of the number of intermediate stops normally serves for shortening the round trip times in the costs-optimising allocation of destination calls.

In an advantageous refinement of the invention when the energy-saving mode is activated and with new input of a destination call this destination call is allocated to the lift which has the longest common travel path with suitable lift load. The suitable lift load was described above. In order to be able to make a statement with respect thereto the common travel paths by the destination call to be allocated and the instantaneously checked lift have to be compared. This advantageous allocation of the lift which has the longest common travel path with suitable travel load reduces, inter alia, the number of intermediate stops.

In an advantageous refinement of the invention during the energy-saving mode and the allocation of the new destination calls, when there is suitability of several lifts for this destination call with the same common travel path the lift most favourable in costs is allocated.

It is advantageous with the refinement according to the invention that notwithstanding activated energy-saving mode in the allocation of newly input destination calls a lift could be allocated only when the criteria for energy-saving allocation of lifts is not fulfilled, wherein a lift is allocated to a destination call of that kind in accordance with a cost-optimising allocation without consideration of the energy-saving allocation.

The above-mentioned object is also fulfilled by a lift installation with several lifts which are arranged in a building for transport of persons, in which destination calls of passengers can be input by way of destination call input apparatus and in which at least one traffic criterion can be measured by a lift control within a predeterminable time period, wherein a lift can be allocated in costs-optimising manner to a passenger by the lift control and can be indicated by way of an information unit and the lifts can additionally be allocated in energy-optimising manner to the passengers in dependence on the at least one traffic criterion.

In an advantageous refinement of the invention the lift control undertakes measuring of the traffic intensity within a settable time period, wherein the lift installation can be switched by the lift control to the energy-saving mode in dependence on the measured traffic intensity.

Overall, through the refinement according to the invention not only of the method, but also of the lift installation, a collection of passengers with a lift is favoured in direction of attainment of a balanced load, wherein the better balanced lift uses less energy than an unbalanced lift. The probability increases for the refinement according to the invention that in the better balanced lift certain travel paths for two or more passengers together can be covered.

Through the allocation of several journeys to a lift, journeys of other lifts are automatically avoided, whereby several empty journeys (collection journeys) are avoided and further energy savings can be achieved.

The invention is explained in more detail in the following on the basis of examples of embodiment, schematically illustrated in the drawings.

Fig. 1 shows a lift installation according to the present invention;

Fig. 2 shows a flow chart for allocation of a new destination call in accordance with the present invention;

Fig. 3 shows a flow chart for activation of an energy-saving mode; and

Fig. 4 shows an energy-saving allocation of destination calls in accordance with the present invention.

A lift installation 10 according to the invention is shown in Figure 1. The lift installation 10 according to the invention comprises three lifts 11, 12 and 13. The three lifts 11, 12 and 13 are controlled by a lift control 16. For simplification of the illustration, depiction of drive units and lift shafts has been dispensed with. A respective destination call is input by the passengers by way of destination call input apparatus 14 and transmitted to the lift control 16. The lift control 16 ascertains the lift 11, 12, 13 most favourable for this destination call and communicates to the passenger the ascertained lift 11, 12 or 13 by way of the information unit 15. Moreover, a load measuring unit 17 by means of which a load measurement of the individual lifts can be undertaken is arranged in the lift control 16, wherein the load-receiving parts of the load-measuring unit 17 are arranged at the lifts 11, 12, 13 (not illustrated). In that case, the form of allocation of the lifts is determined in the lift control 16.

Figure 2 shows a sequence control for allocation of a new destination call. The new destination call is input and processed by the lift control 16. In step 21 a new destination call is input by the passenger by way of a destination call input apparatus 14. The lift control 16 constantly undertakes measurement of the traffic intensity, wherein the traffic intensity comprises one or more fixable traffic criteria 32, 33, 34. In the case of falling below one or more of the predetermined traffic criteria the lift installation 10 is switched by the lift control 16 to the energy-saving mode ESRZ. In the energy-saving mode new destination calls are allocated in energy-saving manner ESRZ by the lift control 16. A time element TM, which is used in the case of deactivation of the energy-saving mode ESRZ, is arranged in the lift installation 16. After the energy-saving mode ESRZ has been

activated, one or more traffic criteria can no longer fulfil the predetermined values, so that the conditions for activation of the energy-saving mode ESZR are no longer given. However, the time element TM is used in order to avoid frequent switching back and forth. The time element TM is started when the energy-saving mode ESZR is activated. The element contains a predeterminable time period, for example 5 minutes, the expiry of which is checked. The energy-saving mode ESZR is deactivated only when one or more traffic criteria 32, 33, 34 are no longer fulfilled and the predetermined time period of the time element TM has expired. After this time period has expired, new destination calls are allocated again in costs-optimising manner (KRZOEM) without energy-saving measures. The lift control 16 thus activates the allocation mode (ESZR or KRZOEM) for new destination calls in dependence on the measured traffic intensity MVI. The lift which is to be selected and which is ascertained by the lift control 16 for the input destination call is indicated to the passenger by way of the information unit 15 in step 22 independently of the form of allocation.

In Figure 3 it is illustrated in detail how the measured traffic intensity with the traffic criteria 32, 33, 34, by way of example, is used for activation of the energy-saving or costs-optimising mode of allocation. In step 31 statistical values from the transmitted destination calls, the load measurements and other relevant parameters of the lift control, for example instantaneous clock time, time period of monitoring, lift load and passenger weight, are calculated or ascertained. These statistical values also comprise the mean waiting time WZM, the number of passengers ANBP not served and the number of passengers APFM per journey.

In step 32 the mean waiting time WZM is compared with a predetermined waiting time WZMEME for the energy-saving mode. If the mean waiting time WZM is less than the mean waiting time WZMEME for the energy-saving mode, there is continuation with step 33 in which the number of passengers ANBP not served is compared with a fixed number of passengers ANBPEME, which are not served, for the energy-saving mode. If this comparison is positive, there follows as next step 34 in which the number of passengers APFM per journey is compared with a number of passengers APFEME per journey for the energy-saving mode. If also this comparison is positive the lift installation 10 is shifted by the lift control 16 in step 38 to the energy-saving mode ESME, in which new destination calls are allocated in energy-saving manner and the time element TM in the lift control 16 is activated.

If in step 32 on comparison of the mean waiting time WZM with the mean waiting time WZMEME for the energy-saving mode a negative result is calculated, the further procedure is with the steps 35 and 36. In step 35 the number of passengers APFM per journey is compared with the number of passengers APFMEME per journey for the energy-saving mode. In step 36 the number of passengers ANBP not served is compared with the number of passengers ANBPOME, which are not served, for the energy-saving mode. If also these traffic criteria of the steps 35 and 36 are not fulfilled, run-down of the previously started time element TM in step 37 is checked. If the time period of the time element TM has expired, the energy-saving mode ESMA is deactivated in step 39 so that the allocation of new destination calls in costs-optimising manner KRZOEM without the energy-saving measures takes place. If also a comparison in step 33 is negative, further procedure is with step 35 in which the number APFM of persons per journey is compared with the number of persons APFMEME per journey for the energy-saving mode. If also this comparison in step 35 is negative, the time element TM is similarly checked or, in a given case, the energy-saving mode ESMA of the lift installation deactivated and new destination calls allocated in costs-optimising manner KRZOEME.

In Figure 4 there is illustrated a flow chart in which it is illustrated how a newly input destination call is allocated in energy-saving manner in the case of activated energy-saving mode.

In step 41 a new destination call is input. Firstly, in step 42 a start/destination coincidence between the newly input destination call and already registered destination calls are checked. If this investigation is positive, the newly input destination call is allocated not in energy-saving manner, but in costs-optimising manner in step 50. As explained above, through utilisation of a coincidence one to two journeys of lifts are saved, so that a very large amount of energy can thereby be saved. This saved energy cannot be achieved by a better balancing of the lifts, so that, in the case of a coincidence the allocation of the coincident destination call is carried out in costs-optimising manner notwithstanding the activated energy-saving mode.

If a coincidence is not present, a common travel path GFSGL with suitable load is checked in step 43. For that purpose, the load is measured by the lift control 16 by means of the load measuring unit 17 before each travel start of a lift. Thus, in the case of allocation of a new destination call to a lift the common travel path GFSGL with suitable load can be taken into consideration, in which the lift load is taken into account. The preferred lift load

for provision of a balanced lift installation lies at half the maximum permissible lift load $Q/2$. If in the case of the checking in step 43 for a common travel path of the newly input destination call there is present for this travel path a load of a checked lift which is smaller than half the permissible lift load ($Q/2$) less a predetermined passenger weight of, for example, 80 kilograms, the further procedure is with step 44. If a common travel path GFSGSL with suitable load has not been found in the case of this check in step 43, a next lift is checked in step 49 with respect to a common travel path GFSGSL with suitable load. If in this check in step 49 no other lift was found, a lift is allocated in costs-optimising manner to this destination call in step 50. If, however, a common travel path GFSGSL with suitable load is present in the case of the comparison in step 43, next in step 44 the waiting time of all destination calls WZAZR allocated to this lift is compared with the tolerable waiting TWZ. In the case of a positive comparison further procedure is with step 45. In the case of a negative comparison result, another lift is correspondingly checked in step 49, and in a given case a lift is allocated in costs-optimising manner to this destination call in step 50.

In the case of a positive comparative result in step 44 further procedure is with step 45, in which the travel time ZZAZR to the destination of all allocated calls is compared with a tolerable travel time TZZ to the destination. Here, in the case of a negative comparison a next lift is similarly checked in step 49 and, in a given case, when there is no discovery of a suitable lift a lift is allocated in costs-optimising manner to this destination call in step 50. If, however, this comparison should be positive, further procedure is with step 46. In step 46 the comparison of the common travel path VGFS is undertaken. In step 47, which follows thereupon, the lift is selected which has the longest common travel path LGFSGL with suitable load. If this comparison should be negative, a further lift is selected in step 49 and, in a given case, a lift is allocated in costs-optimising manner in step 50. If the comparison in step 47 is positive, the new destination call is allocated to the lift which has the longest common travel path LGFSGL with suitable load. This now-selected lift is allocated in energy-saving manner and is communicated to the passenger, who has input the destination call, by way of the information unit 15.

Thus, in the case of activated energy-saving allocation initially there is checking for coincidence and thereafter for an appropriate better balancing of the lift. From the lifts which fulfil the above-mentioned criterion those are selected for which the allocation of the new boarding passengers would not cause, for any of the previously already allocated destination calls, a longer waiting time WZ than the tolerable waiting time TWZ and a

longer journey time FZ to the destination than the tolerable journey time TZZ to the destination. From the lifts which fulfil both conditions that lift is selected which has the longest travel path LGFSGL - which was already planned in advance - in common with the new destination call. If several lifts should have the same common paths with the new destination call, the lift which is most favourable in terms of costs is selected and the new destination call is allocated thereto. If after the above-mentioned checks no lift should be found which fulfils all conditions, the new destination call is allocated according to the costs-optimising criteria without energy-saving measures.

There is thus indicated a method of controlling a lift installation in which in time periods in which the loading of the lift installation is not particularly high, energy-saving measures are initiated without the transport capacity of the lift installation being prejudiced, since the method in the case of a rise in the traffic intensity registers this rise and can activate a costs-optimising allocation of lifts which serves for maximising transport capacity and maintenance of guaranteed waiting times.

Patent Claims

1. Method of controlling a lift installation (10) with several lifts (11, 12, 13), in which destination call inputs of passengers are input by way of destination call input apparatus (14) and in which at least one traffic criterion (32, 33, 34), which characterises a traffic intensity, of the lift installation (10) is measured by a lift control (16), wherein the lift control (16) allocates costs-optimising lifts (11, 12, 13) to the destination call inputs, characterised in that the lift control (16) allocates additional energy-optimising lifts (11, 12, 13) to the destination call inputs in dependence on the traffic criterion (32, 33, 34).
2. Method according to claim 1, characterised in that in the case of falling below of at least one traffic criterion (32, 33, 34) the energy-optimising allocation is activated and in the case of exceeding a fixable number of traffic criteria (32, 33, 34) the energy-optimising allocation is deactivated.
3. Method according to claim 1 or 2, characterised in that the energy-optimising allocation is activated when
 - a mean waiting time (WZM) of the passengers at the storey until serving lies below a predetermined waiting time (WZEME) for the energy-optimising allocation and/or
 - a number of the passengers (ANBP) waiting at storeys, but not yet served, lies below a predetermined number of waiting passengers (ANBPOME) for the energy-optimising allocation and/or
 - a mean number of passengers (APFM) per journey lies below a number of passengers (APFOME) per journey for the energy-optimising allocation.
4. Method according to one of claims 1 to 3, characterised in that the energy-optimising allocation is deactivated in dependence on a predeterminable time (TM).
5. Method according to one of claims 1 to 4, characterised in that in the case of a new input of a destination call (41) a start/destination coincidence (42) of the new destination call input is checked with other already registered destination call inputs and in the case of presence of a start/destination coincidence the new destination call input is allocated in cost-optimising manner.
6. Method according to one of claims 1 to 5, characterised in that before each start of travel of a lift (11, 12, 13) there is undertaken a load measurement by means of which a

course of a lift load of the passengers allocated to this lift (11, 12, 13) is ascertained over a determined travel path of the lift (11, 12, 13) and that in the case of energy-optimising allocation of a destination call input the lift load of the lift (11, 12, 13) is checked for the travel path corresponding with the destination call input and the destination call input is allocated to the lift (11, 12, 13) in which the boarding of the passenger of this destination call does not cause exceeding of a predetermined lift load for this travel path (GFSGL), wherein the predetermined lift load ($Q/2 - G_P$) corresponds with half the permissible lift load ($Q/2$) less a predetermined passenger weight (G_P).

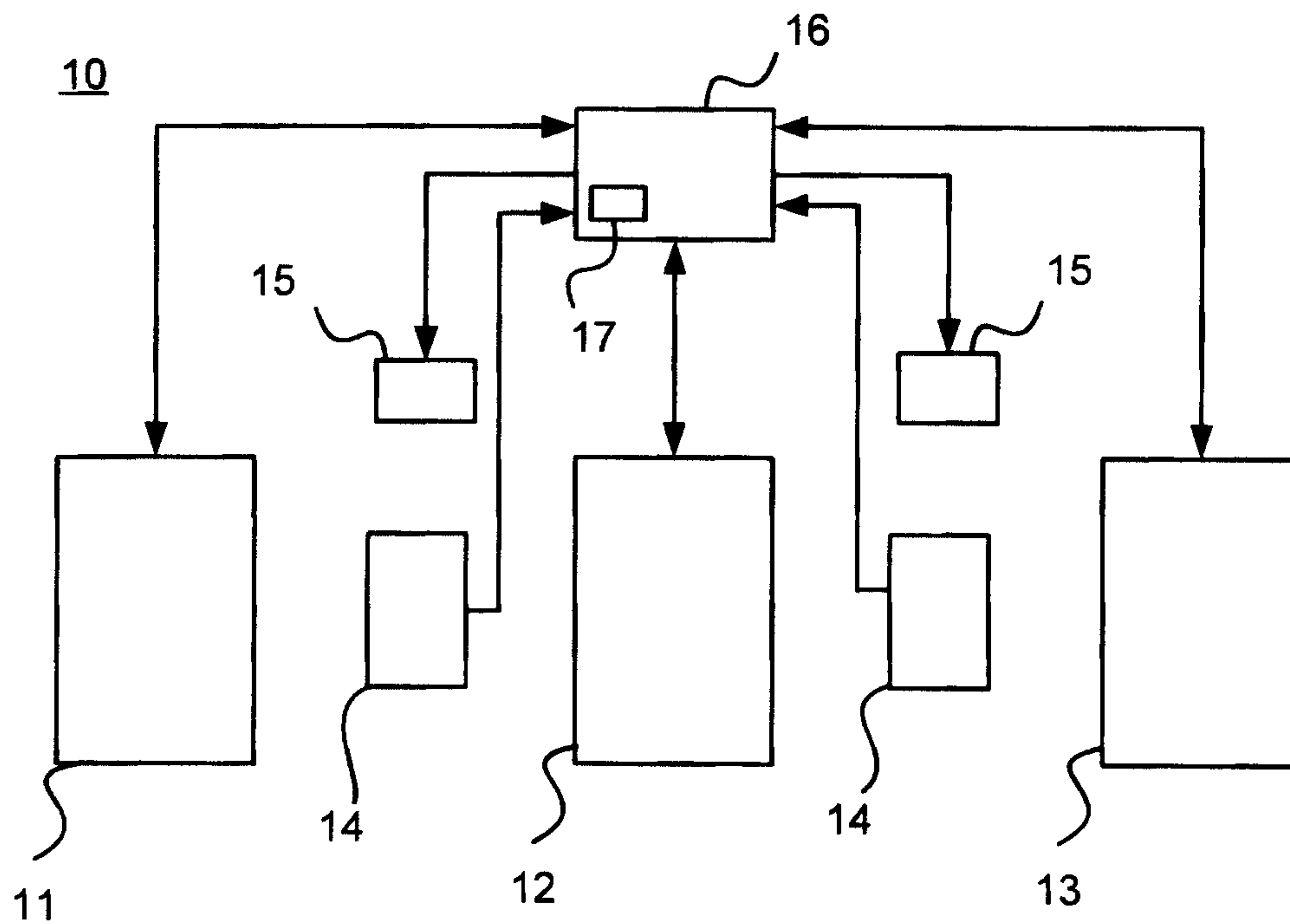
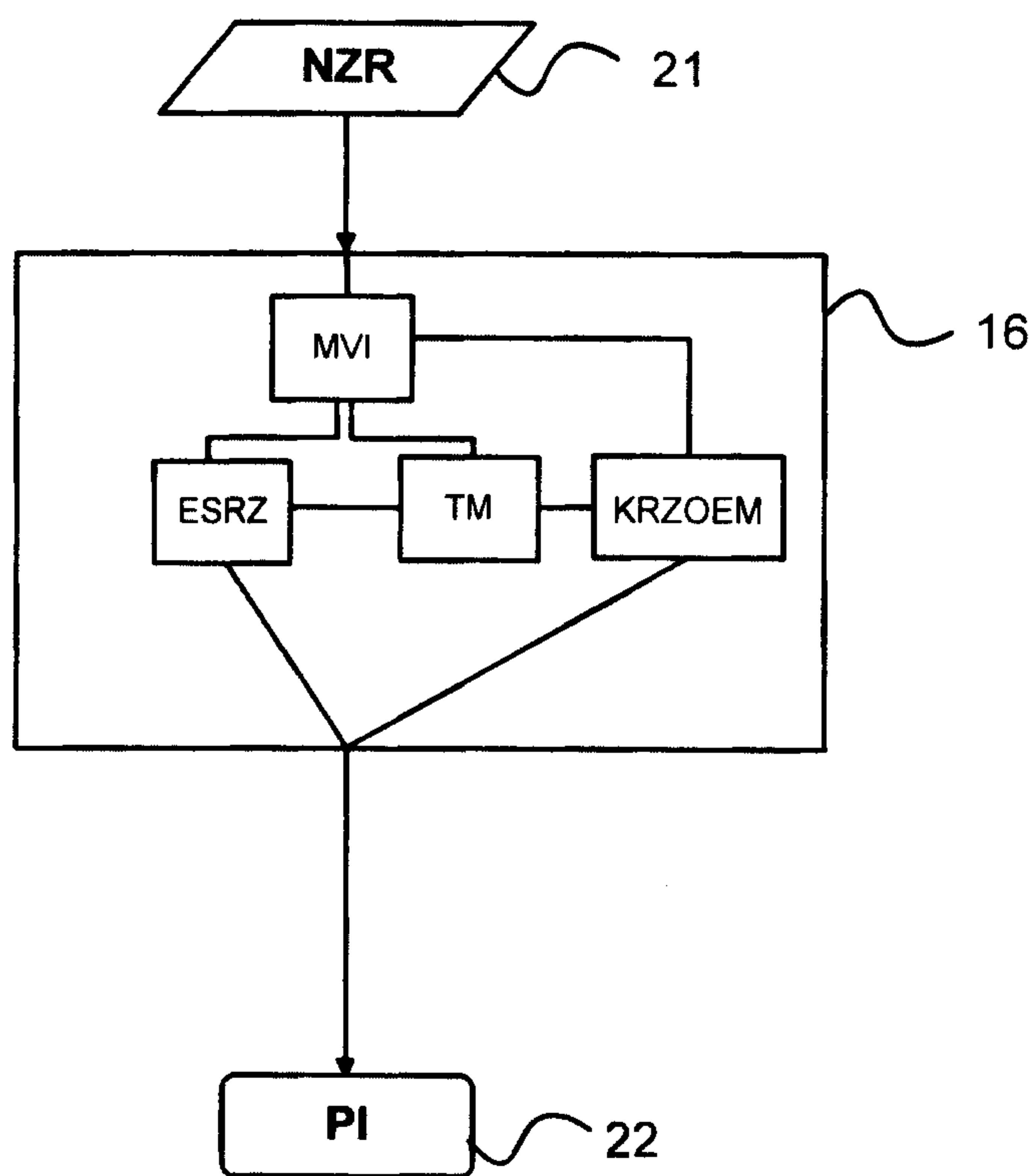
7. Method according to one of claims 1 to 6, characterised in that in the case of energy-optimising allocation the theoretical waiting time (WZ) of each passenger to whom the relevant cage is already allocated is recalculated from the theoretical travel time of the lift (11, 12, 13) until reaching the boarding storey with consideration of the new passenger to be allocated and the delay possibly caused by his or her allocation and is compared with a settable, tolerable waiting time (TWZ) and all lifts with all mentioned theoretical waiting times (WZ) are selected to be smaller than the tolerable waiting time (TWZ).

8. Method according to one of claims 1 to 7, characterised in that in the case of energy-optimising allocation the theoretical time of each passenger to the destination (ZZ), which time results from the waiting time (WZ) and the travel time (FZ) inclusive of the planned intermediate stops of the lift (11, 12, 13), is compared with a settable, tolerable time (TZZ) to the destination and in the case of new input of a destination call (41) those lifts (11, 12, 13) are selected for which a travel time (ZZAZR) to the destination of all passengers allocated to this lift (11, 12, 13) is smaller than the tolerable travel time (TZZ).

9. Method according to claim 7 or 8, characterised in that in the case of energy-optimising allocation of a destination call (41) this destination call input is allocated to the lift (11, 12, 13) having the longest common travel path (LGFSGL) with suitable lift load,, wherein in the case of suitability of several lifts (11, 12, 13) with the same common travel paths (LGFSGL) the lift (11, 12, 13) most favourable in costs is allocated.

10. Method according to one of claims 1 to 9, characterised in that in the case of energy-optimising allocation of new destination call inputs a limitation, which is present, of the number of intermediate stops is cancelled.

11. Lift installation comprising several lifts (11, 12, 13), which are arranged in a building, for the transport of persons, in which destination calls of passengers can be input by way of destination call input apparatus (14) and in which at least one traffic criterion (32, 33, 34) is measurable within a predeterminable time period by a lift control (16), wherein a lift (11, 12, 13) is allocatable in costs-optimising manner by the lift control (16) to a passenger and can be indicated by way of an information unit (15), characterised in that the lifts (11, 12, 13) are additionally allocatable in energy-optimising manner to the passengers in dependence on the at least one traffic criterion (32, 33, 34).

1 / 3**FIG. 1****FIG. 2**

2 / 3

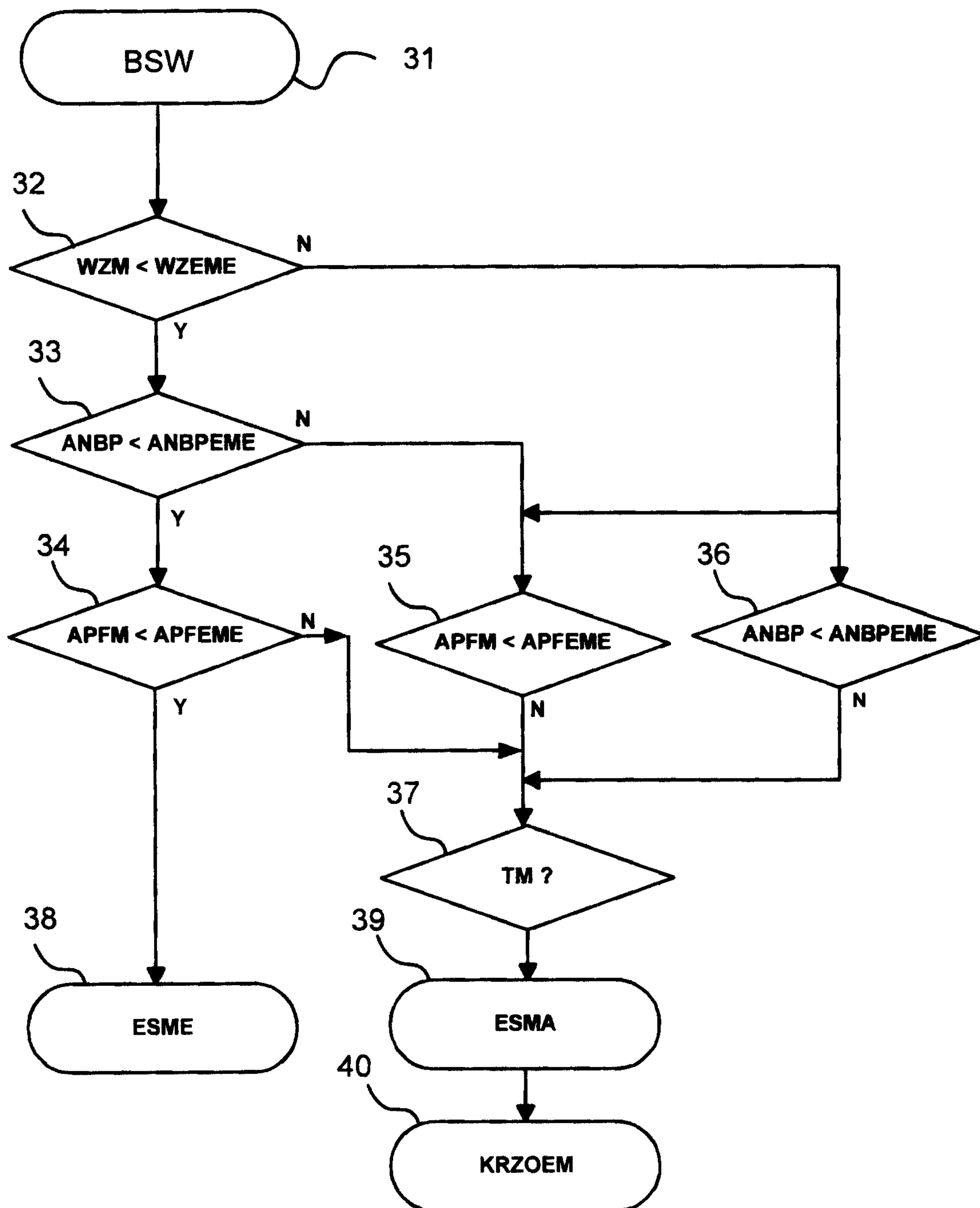


FIG. 3

3 / 3

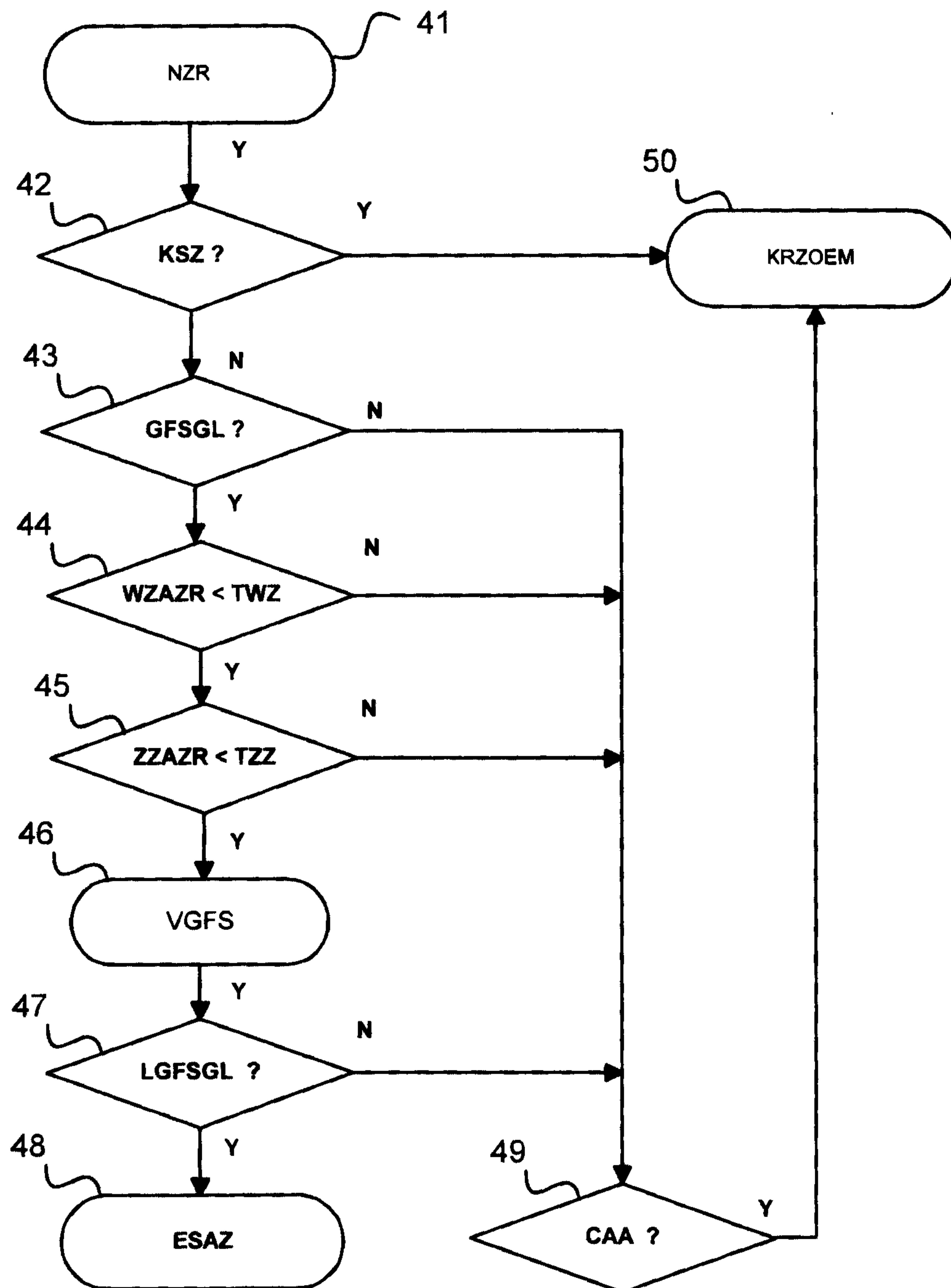


FIG. 4

