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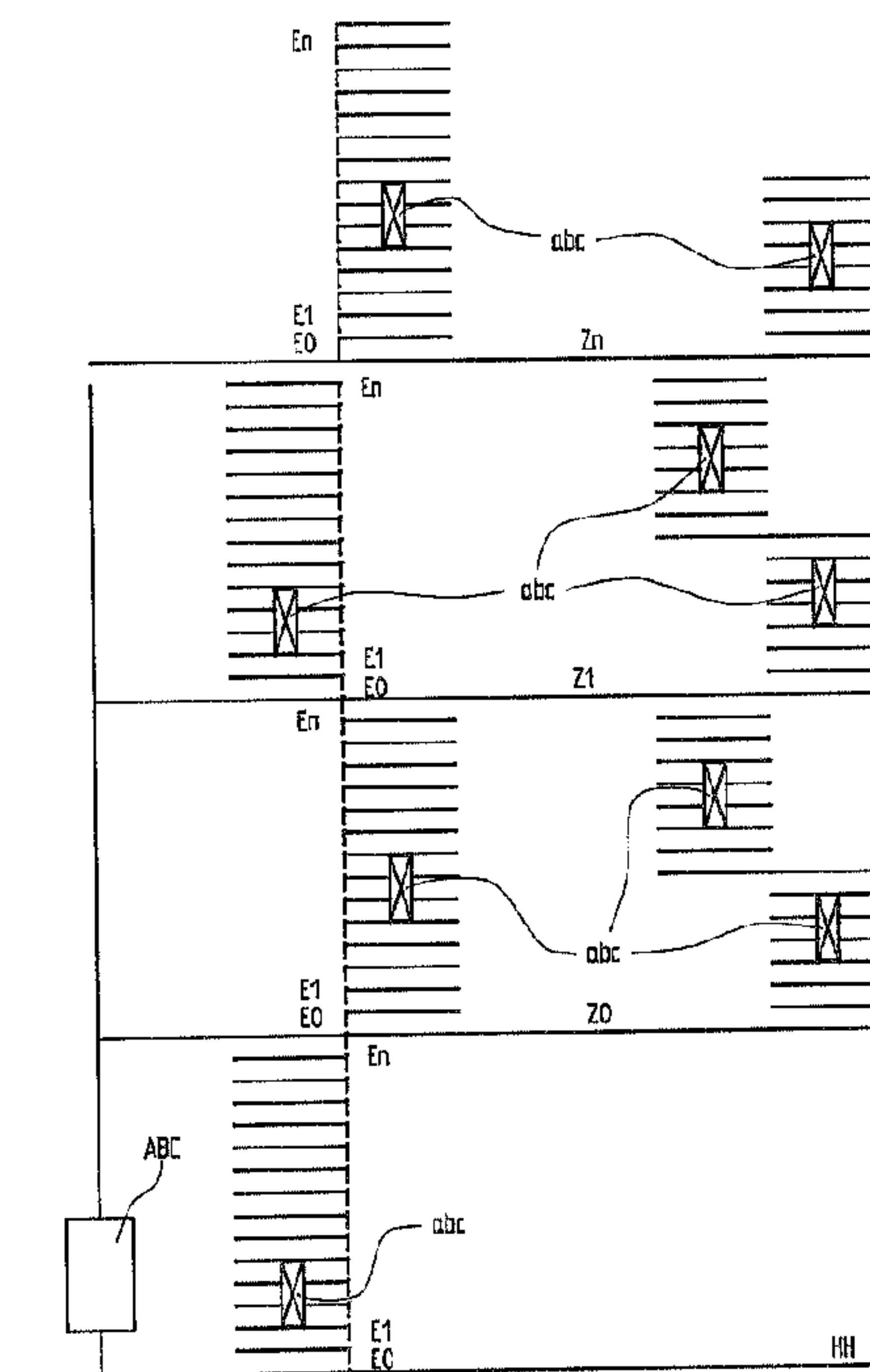
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(54) Titre : ASCENSEUR POUR FONCTIONNEMENT ZONAL

(54) Title: LIFT INSTALLATION FOR ZONAL OPERATION



(57) **Abrégé/Abstract:**

In this lift installation for zonal operation with immediate allocation of zone calls, the passenger traffic between at least one main stopping place (HH) and zones in a high building is managed by a lift installation (ABC) consisting for example of three lifts (A; B; C). The passenger traffic filling the building and arriving at the main stopping place (HH) is symbolised by arrows (P0; P1 to Pn) pointing to the lift group (ABC). The passenger traffic leaving the building and arriving at the main stopping place (HH) is symbolised by arrows (Pa) pointing away from the lift group (ABC). Each lift user filling the building passes one gateway (G0; G1 to Gn), which is associated with a zone and in which a sensor (S0; S1 to Sn) registers the lift user. Through the choice of the appropriate gateway (G0; G1 to Gn), the lift user informs the lift control of his desired zone without manual actuation of a call-registering equipment. The signals of the sensors (S0; S1 to Sn) are passed on to the control equipments of the lifts (A; B; C), which in turn inform the lift user before leaving the gateway (G0; G1 to Gn) of the respectively allocated lift by means of an indicating equipment (D0; D1 to Dn).

SUMMARY

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In this lift installation for zonal operation with immediate allocation of zone calls, the passenger traffic between at least one main stopping place (HH) and zones in a high building is managed by a lift installation (ABC) consisting for example of three lifts (A; B; C). The passenger traffic filling the building and arriving at the main stopping place (HH) is symbolised by arrows (P0; P1 to Pn) pointing to the lift group (ABC). The passenger traffic leaving the building and arriving at the main stopping place (HH) is symbolised by arrows (Pa) pointing away from the lift group (ABC). Each lift user filling the building passes one gateway (G0; G1 to Gn), which is associated with a zone and in which a sensor (S0; S1 to Sn) registers the lift user. Through the choice of the appropriate gateway (G0; G1 to Gn), the lift user informs the lift control of his desired zone without manual actuation of a call-registering equipment. The signals of the sensors (S0; S1 to Sn) are passed on to the control equipments of the lifts (A; B; C), which in turn inform the lift user before leaving the gateway (G0; G1 to Gn) of the respectively allocated lift by means of an indicating equipment (D0; D1 to Dn).

(Figure 1)

TRANSLATION OF LEGEND IN THE DRAWINGS

Aufzüge B,C = Lifts B and C

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DESCRIPTION

LIFT INSTALLATION FOR ZONAL OPERATION

The invention concerns a lift installation for zonal operation in a high building with at least one zone, with at least one main stopping place and with a lift group, which consists of at least two lifts and in which the lift cages of the lifts consist of at least one compartment and manage the passenger traffic between the main stopping place and the zones, wherein an equipment, which is actuatable hands off, is provided for registering the journeys desired by the lift users into the zones and the zone calls are immediately allocated for execution to the lift with the best possible travelling conditions by a control equipment and an indicating equipment, which makes the lift to be used known to the lift user after the selection of the desired zone, is provided for indicating the allocated lift.

A group control with immediate allocation of destination calls, in which merely storeys of a certain zone can be selected manually at the main stopping place, is known from the patent specification EP-B1 0 301 178. On the remaining storeys, the destination storeys are freely selectable, which are allocated for execution to the lift with the best possible travelling conditions by the group control.

On the one hand, fixed zones are allocated to each lift by suppression of the selection of certain storeys at the main stopping place and, on the other hand, the destination calls of the remaining storeys are

freely allocated to the lift with the best possible travelling conditions. The mixed operation of fixed zone allocation and free destination call allocation impairs the performance capability of the lift group in disadvantageous manner.

The invention is to provide a remedy here. The invention, as characterized in the claims, solves the problems of avoiding the disadvantages of the known equipment and creating a lift installation with immediate allocation of zone calls, in which a zone operation independent of the intermediate storey operation is made possible.

The advantages achieved by the invention are to be seen substantially in that, in particular in the case of high traffic volume at the main stopping place, the performance capability of the lift installation can be utilised better and that clearly structured traffic paths are available to the lift user, in particular in the case of high bowlings. Further advantages are to be seen in that no waiting times can arise due to the travel destination being made known and that both hands remain free while the travel destination is being made known, which in particular is to the benefit of handicapped persons.

In one aspect, the present invention provides a lift installation for zonal operation in a high building with at least one zone (Z0; Z1 to Zn), with at least one main stopping place (HH) and with a lift group (ABC), which consists of at least two lifts (A; B; C) and in which the lift cages of the lifts (A; B; C) consist of at least one compartment and manage the passenger traffic between the main stopping place (HH) and the zones (Z0; Z1 to Zn), wherein a call registering equipment is provided for registering the journeys desired by the lift users into the zones (Z0; Z1 to Zn) and wherein the relevant zone calls are immediately allocated for execution to the lift (A; B; C) with the best possible travelling conditions by a control equipment and wherein the lift (A; B; C) executing the desired journey is immediately made known to the lift user visually by an indicating equipment after the selection of the desired zone, characterised in that a gateway (G0; G1 to Gn), which is activated hands free, is provided for each zone (Z0; Z1 to Zn), wherein a

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sensor (S0; S1 to Sn) for detection of the lift users of the desired zone (Z0; Z1 to Zn) and an indicating device (D0; D1 to Dn) are arranged at each gateway (G0; G1 to Gn).

The invention is explained more clearly in the following by reference to drawings illustrating merely one way of execution. There show:

Figure 1 a schematic illustration of a main stopping place of a lift installation with a lift group consisting of three lifts and with means for the detection of zone calls,

Figure 2 a schematic illustration of the zoning in a high building and the serving of the zones and storeys by lift groups,

- Figure 3 a schematic illustration of a control equipment for a lift of the lift group consisting of three lifts,
- Figure 4 a circuit diagram of a call-registering equipment of the control equipment according to Figure 2,
- Figure 5 a schematic illustration of the structure of a zone call storage device, which is allocated to a lift, of the control equipment according to Figure 2 and a co-incidence circuit for the call allocation and
- Figure 6 a schematic illustration of a control equipment for an indication of the allocated zone calls at the main stopping place of the lift group consisting of three lifts.

A lift group, which consists of three lifts A, B and C and by which the passenger traffic between at least one main stopping place HH and zones Z0 and Z1 to Zn in a high building is managed, is denoted by ABC in the Figures 1 to 6. The passenger traffic arriving at the main stopping place HH and filling the building is symbolised by arrows P0 and P1 to Pn pointing to the lift group ABC. The passenger traffic arriving at the main stopping place HH and leaving the building is symbolised by arrows Pa pointing away from the lift group ABC. Each lift user filling the building passes one gateway G0 and G1 to Gn, which is associated with a zone Z0 and Z1 to Zn and in which a sensor S0 and S1 to Sn registers the lift user. By the choice of the corresponding gateway G0 and G1 to Gn, the lift user

informs the lift control of his desired zone Z0 and Z1 to Zn without manual actuation of a call-registering equipment. Photo-electric beams, turnstiles, load pick-ups, infra-red detectors, inductively or capacitively operating detectors, cameras, detectors operating on the radar principle or other equipments detecting the lift user are provided as variants of embodiment of the sensor S0 and S1 to Sn. The gateways G0 and G1 to Gn are each constructed according to the variant of embodiment of the sensor S0 and S1 to Sn. In the case of turnstiles, the gateways G0 and G1 to Gn consist for example of doorlike entrances and, in the case of load pick-ups, the gateways G0 and G1 to Gn for example consist of floor markings and load-detecting floor plates. The signals of the sensors S0 and S1 to Sn are passed onto the control equipments of the lift A, B and C, which in turn inform the lift user before leaving the gateway G0 and G1 to Gn about the respectively allocated lift by means of an indicating equipment D0 and D1 to Dn on the main stopping place HH.

In the present example of embodiment, a main stopping place HH is illustrated, from which zones Z0 and Z1 to Zn lying above the main stopping place HH are served. According to the structure of the building, at least one main stopping place HH is provided, from which zones Z0 and Z1 to Zn lying above the main stopping place HH and zones -Z0 and -Z1 to -Zn lying below the main stopping place HH are served.

The lift group ABC in the present example of embodiment consists of three lifts A, B and C, which display single-deck or multideck lift cages. According to the height of the building and the traffic volume, lift groups with two or more than three lifts are provided.

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At least one lift group ABC, which manages the traffic on the storeys E0 and E1 to En, is provided for each zone Z0 and Z1 to Zn. By contrast to the main stopping place HH, the lift user informs the lift control of his destination storey by means of call-registering equipments with keyboards or storey buttons. The destination call is allocated by the lift control immediately to a lift of the group and the lift to be used is communicated to the lift user by means of an indicating equipment.

In a further variant of embodiment, the aforescribed equipment, which is actuable hands off, according to the invention is provided for registration of the storey calls in place of the manually actuable call-registering equipment.

A lift shaft of the lift A of the lift group ABC, which consists for example of three lifts A, B and C, is denoted by 1 in the Figure 3. A lift motor 2 drives a cage 4 guided in the lift shaft by way of a hoist cable 3, wherein n zones Z0 to Zn are served, of which merely Z0, Z1 and Zn are illustrated. The lift motor 2 is controlled by a drive control known from the EP-B 0 026 406, wherein the target value generation, the regulating functions and the stop initiation are realised by means of a microcomputer system 5 and wherein 6 symbolises the measuring and setting members of the drive control, which stand in connection by way of a first interface IF1 with the microcomputer system. The cage 4 displays a load-measuring equipment 7 and an equipment signalling the respective operational state of the cage, which equipments are likewise connected by way of the first interface IF1 with the microcomputer system 5. Calls for journeys to desired zones Z0 and Z1 to Zn are detected by a call-registering equipment 9 explained more closely in the following by reference to the Figure 4.

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The call-registering equipment 9 is connected by way of an address bus AB and a data input conductor CRUIN of a serial input-output bus CRU with the microcomputer system 5 and an input equipment, which consists of a comparison equipment 10 and a DMA block and has become known by the EP-B 0 062 141. The call-registering equipment 9 furthermore stands in connection by way of a line 11 with the microcomputer systems and input equipments of the lifts B and C.

The microcomputer system 5 consists of a main stopping place storage device RAM1, a zone call storage device RAM2 described more closely in the following by reference to the Figure 5, a storage device RAM3 storing the instantaneous cage load and the operational state of the cage, a respective costs storage device RAM4 for the upward and the downward direction of travel, a respective allocation storage device RAM5 for the upward and the downward direction of travel, a program storage device EPROM and a microprocessor CPU, which is connected by way of the address bus AB, a data bus DB and a control bus STB with the storage devices RAM1 to RAM5 and EPROM. A first and a second scanner of a scanning equipment is respectively denoted by R1 and R2, wherein the scanners R1 and R2 are registers, by means of which addresses corresponding to the zone numbers and the running direction are formed. Denoted by R3 is a selector in the form of a further register, which, when the cage is travelling, indicates the address of that zone, in which the cage could still stop. As is known from the aforementioned drive control, destination paths, which are compared with a destination path generated in a target value transmitter, are associated with the selector addresses. In the case of equality of the paths and the presence of a stop command, the retardation phase is

initiated. If no stop command is present, the selector R3 is switched to the next zone.

The microcomputer systems of the individual lifts A, B and C are connected one with the other by way of a costs comparison equipment 12 known from the EP-B 0 050 304 and a second interface IF2 as well as by way of a party line transmission system 13 known from the EP-B 0 050 305 and a third interface IF3.

A circuit diagram of the call-registering equipment 9 of the control equipment according to Figure 2 is explained more closely in Figure 4. Contacts of the sensors S0 and S1 to Sn registering the lift users at the main stopping place HH are denoted by K0 and K1 to Kn. The registered lift users are interpreted by the control equipment as zone calls, wherein for example a lift user registered in the gateway G1 is regarded as zone call for the zone Z1. The symbolically illustrated contacts K0 and K1 to Kn are usually realised in the form of output stages belonging to semiconductor units. The contacts K0 and K1 to Kn stand in connection with the inputs S of the call storage devices 27.0 and 27.1 to 27.n. The outputs Q of the call storage devices 27.0 and 27.1 to 27.n are connected with the inputs of a multiplexer 28 and an OR-member 29, the output of which is connected to the first input of the multiplexer 28. The multiplexer 28 beyond that stands in connection with the address bus AB and is connected at the output to the data input conductor CRUIN. The outputs Q of the call storage devices 27.0 and 27.1 to 27.n are connected by way of lines 11 with the multiplexers 28 and the OR-members of the lifts B and C. The call storage devices 27.0 and 27.1 to 27.n can be scanned by way of the multiplexer 28 and stored

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zone calls can be transferred into the microcomputer system 5 of the lift concerned. In this case, in the presence of at least one zone call, the first input of the multiplexer 28 is activated by way of the OR-member 29 and the associated address is interpreted as address of the main stopping place HH. The addresses associated with the remaining inputs of the multiplexer 28 are interpreted as addresses of zone calls.

As is known from the EP-B 0 062 141 mentioned in the description relating to Figure 3, the transfer of the zone calls into the microcomputer system 5 takes place in the manner that the microprocessor CPU signals its readiness for the reception of interruption demands CINT by a release signal CIEN. The DMA block is activated by the release signal and takes over the control by way of the address bus AB and the serial input and output bus CRU. By means of the addresses now generated by the DMA block, the call storage devices 27.0 and 27.1 to 27.n of the call-registering equipment 9 and a read-write storage device flag-RAM of the comparison equipment 10 are interrogated. In the comparison equipment 10, the contents of the call storage devices 27.0 and 27.1 to 27.n and the associated storage places of the read-write storage device flag-RAM are compared one with the other. In the case of inequality, the DMA operation is terminated and an interruption demand CINT is generated. The microprocessor CPU now carries out an interrupt program, during which it reads the data bit situated on the data input conductor CRUIN and writes it into the main stopping place storage device RAM1 under the address disposed on the address bus AB or into the zone call storage device RAM2 or, by way of a data conductor DO of the data bus DB, into the read-write storage device flag-RAM.

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According to Figure 5, the zone call storage device RAM2 consists of a first storage device RAM2', which displays storage places corresponding to the number of the zones and in which already allocated calls are stored. Further storage devices, which are associated with the zones Z0 and Z1 to Zn and which likewise display storage places corresponding to the number of the zones, are denoted by RAM2.0 and RAM2.1 to RAM2.n. Merely the detected zone calls, which have not yet been allocated to a certain cage, are transferred into the further storage devices RAM2.0 and RAM2.1 to RAM2.n by means of the procedure described in the preceding paragraph. The first storage device RAM2', the further storage devices RAM2.0 and RAM2.1 to RAM2.n, the main stopping place storage device RAM1 and the allocation storage device RAM5 are one interlinked with the other by way of a co-incidence circuit represented by AND-members 50 and 51. The co-incidence circuit, which is formed for each setting of the second scanner R2 by the microprocessor CPU on the basis of a program, has the effect that, on co-incidence of an allocation instruction and a zone call at the same main stopping place, the calls stored in the associated further storage device are transferred into the first storage device RAM2', whereby they are allocated and released for the scanning by the selector R3. According to the chosen example, merely the allocation storage device RAM5 for the upward direction of travel is illustrated in Figure 5. The allocation of a main stopping place call and the zone desired at the corresponding main stopping place takes place similarly as for the EP-B 0 032 213 acknowledged in the state of the art.

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Figure 6 shows a schematic illustration of a control equipment for the indication of the allocated zone calls at the main stopping place HH of the lift group ABC consisting of three lifts A, B and C. A respective indicating equipment D0 and D1 to Dn is provided for each gateway G0 and G1 to Gn and connected by way of further control circuits 71, 72 and 80, which are described more closely in the following, with microcomputer systems 5a, 5b and 5c associated with the lifts A, B and C. The one further control circuit 71 consists of three address decoders 74, three monoflops 75 and three AND-members 76 each displaying two inputs. The other further control circuits 72 and 80 consist merely of three AND-members 78 and 81. The address decoders 74 are each connected at the input with an address bus AB and a block release line ce of the associated microcomputer systems 5a, 5b and 5c. At the output side, the address decoders 74 stand in connection with the inputs of the monoflops 75, the outputs of which are each connected to a respective input of the AND-members 76, 78 and 81. The other inputs of the AND-members 76, 78 and 81 are connected by way of release lines L0 and L1 to Ln with the sensors S0 and S1 to Sn so that merely the associated indicating equipment D0 and D1 to Dn is switched free for the registration of a lift passenger and for the indication of the allocated lift.

CLAIMS:

1. Lift installation for zonal operation in a high building with at least one zone (Z0; Z1 to Zn), with at least one main stopping place (HH) and with a lift group (ABC), which consists of at least two lifts (A; B; C) and in which the lift cages of the lifts (A; B; C) consist of at least one compartment and manage the passenger traffic between the main stopping place (HH) and the zones (Z0; Z1 to Zn), wherein a call registering equipment is provided for registering the journeys desired by the lift users into the zones (Z0; Z1 to Zn) and wherein the relevant zone calls are immediately allocated for execution to the lift (A; B; C) with the best possible travelling conditions by a control equipment and wherein the lift (A; B; C) executing the desired journey is immediately made known to the lift user visually by an indicating equipment after the selection of the desired zone, characterised in that a gateway (G0; G1 to Gn), which is activated hands free, is provided for each zone (Z0; Z1 to Zn), wherein a sensor (S0; S1 to Sn) for detection of the lift users of the desired zone (Z0; Z1 to Zn) and an indicating device (D0; D1 to Dn) are arranged at each gateway (G0; G1 to Gn).
2. Lift installation according to claim 1, wherein the sensors are selected from the group consisting of light barriers, turnstiles, load pick-ups, infrared detectors, inductively or capacitively operating detectors, cameras and detectors operating on the radar principle or other equipment detecting the lift passenger are provided as sensors (S0; S1 to Sn).
3. Lift installation according to claim 1, characterised in that the equipment for registering the desired journeys comprises a call-registering equipment (9), in which contacts (K0, K1 to Kn) belonging to the sensors (S0; S1 to Sn) stand in connection with inputs (S) of call storage devices (27.0; 27.1 to 27.n) and outputs (Q) of the call storage devices (27.0; 27.1 to 27.n) are connected with inputs of a multiplexer (28) and an OR-

member (29), the output of which is connected to the first input of the multiplexer (28), which is connected with an address bus (AB) of a microcomputer system (5), wherein the outputs (Q) of the call storage devices (27.0; 27.1 to 27.n) are connected by way of lines (11) with the multiplexers (28) and the OR-members of the remaining lifts (B; C).

4. Lift installation according to claim 1, characterized in that the indicating equipments (D0; D1 to Dn) are connected by way of further control circuits (71; 72; 80) with microcomputer systems (5a; 5b; 5c) associated with the lifts (A; B; C), wherein a further control circuit (71) consists of three address decoders (74), three monoflops (75) and three AND-members (76) each having two inputs and that the other further control circuits (72; 80) consist of three AND-members (78; 81) and the address decoders (74) are each connected at the input with a respective address bus (AB) and a block release line (ce) of the associated microcomputer systems (5a; 5b; 5c) and that the address decoders (74) stand in connection at the output side with the inputs of the monoflops (75), the outputs of which are each connected to a respective input of the AND-members (76; 78; 81), wherein the other inputs of the AND-members (76; 78; 81) are connected with the sensors (S0; S1 to Sn) by way of release lines (L0; L1 to Ln).

5. Lift installation according to claim 3, characterised in that the microcomputer system (5) consists of a main stopping place storage device (RAM1), a zone call storage device (RAM2), a respective costs storage device (RAM4) for the upward and the downward direction of travel, a respective allocation storage device (RAM5) for the upward and downward direction of travel, scanners (R1; R2), a selector (R3), a program storage device (EPROM) and a microprocessor (CPU), which is connected by way of the address bus (AB), a data bus (DB) and a control bus (STB) with the storage device (RAM1 to RAM5; EPROM).

6. Lift installation according to claim 5, characterised in that the zone call storage device (RAM2) consists of a first storage device (RAM2'), which has storage places corresponding to the number of the zones and in which already allocated calls are stored, and that the zone call storage device (RAM2) consists of further storage devices (RAM2.0; RAM2.1 to RAM2.n), which are associated with the zones (Z0; Z1 to Zn) and likewise have storage places corresponding to the number of the zones (Z0; Z1 to Zn), into which storage places are transferred those detected zone calls which have not yet been allocated to a specific lift cage.

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Fig. 1

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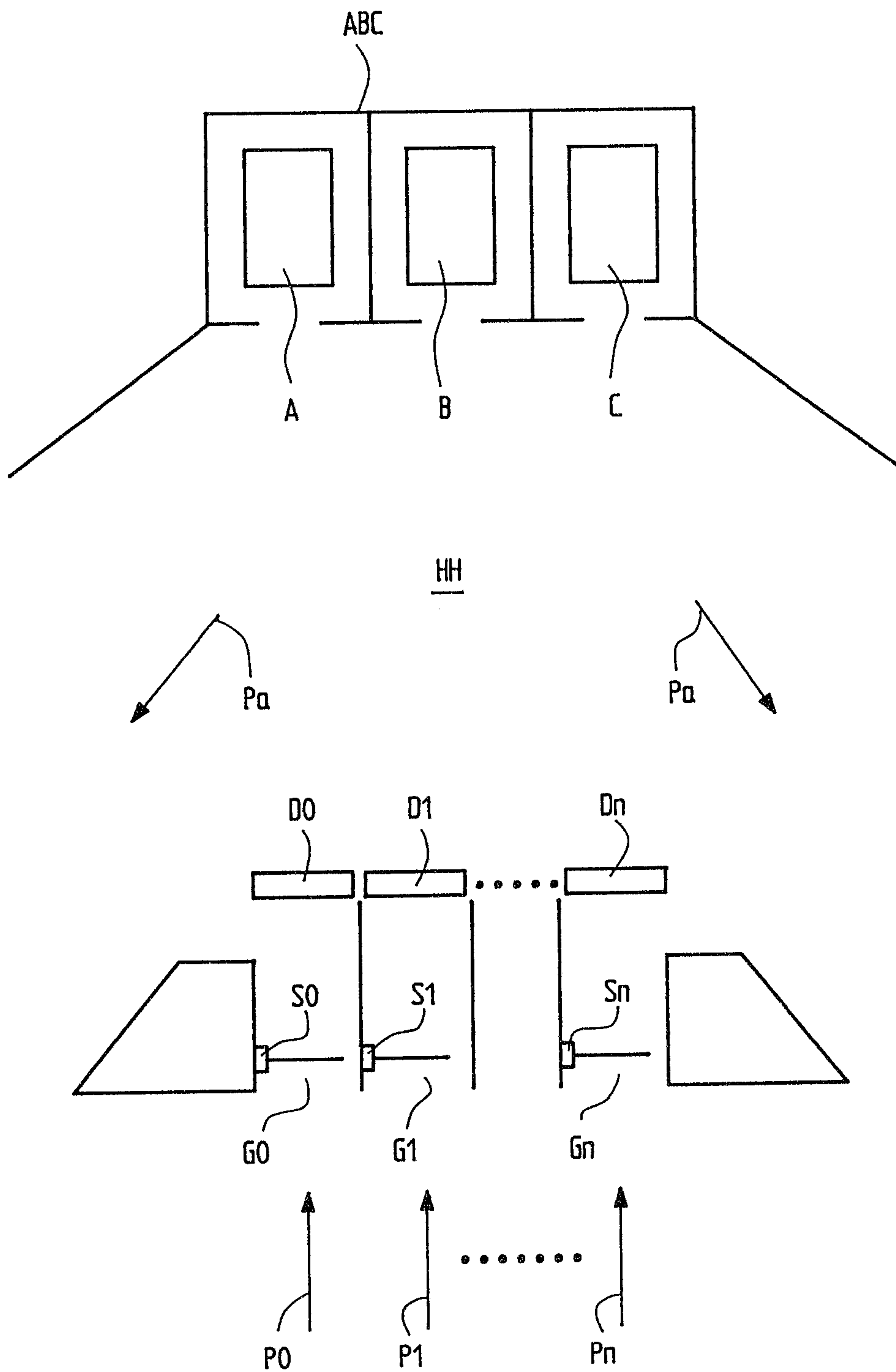


Fig. 2

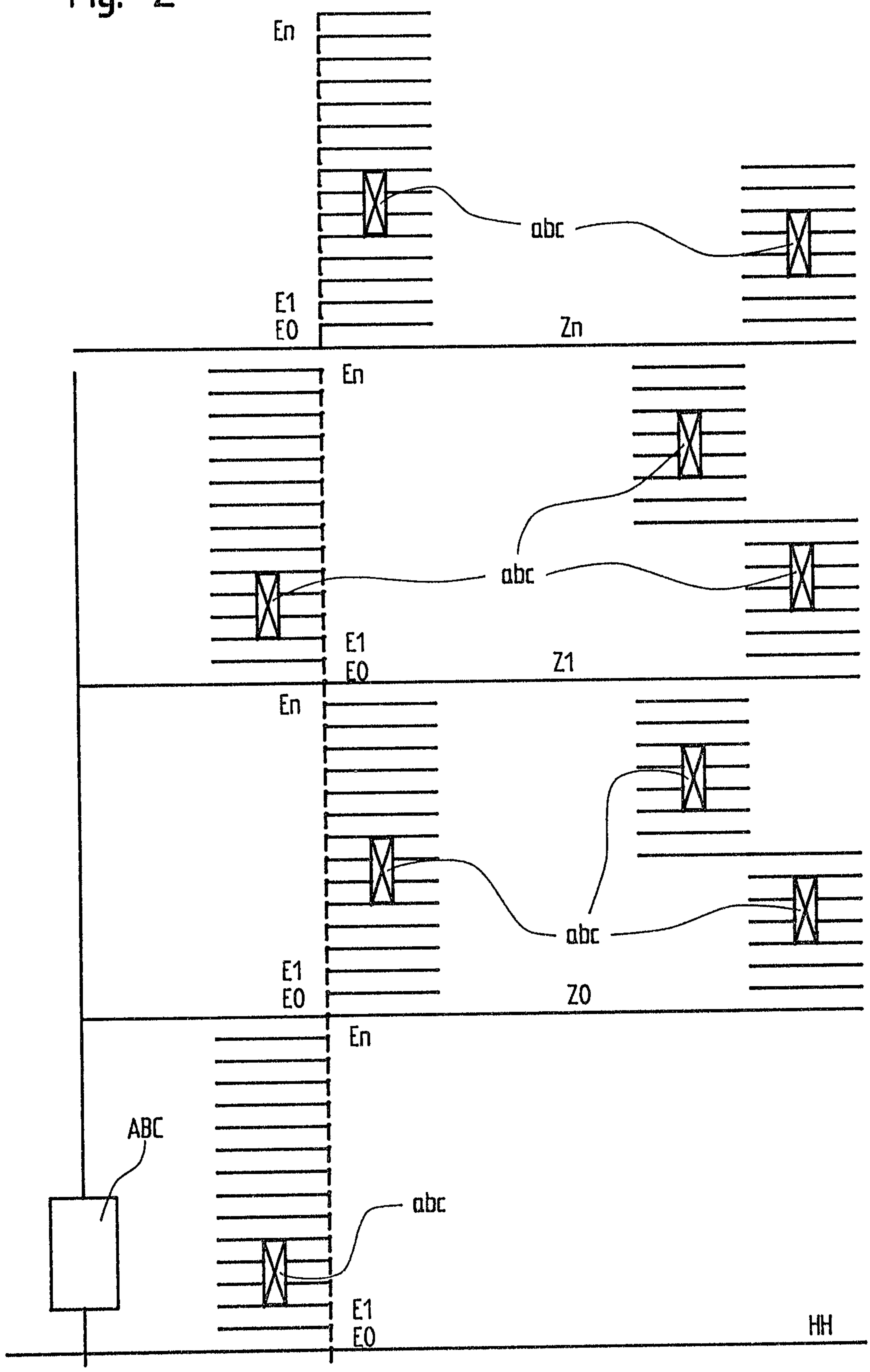


Fig. 3

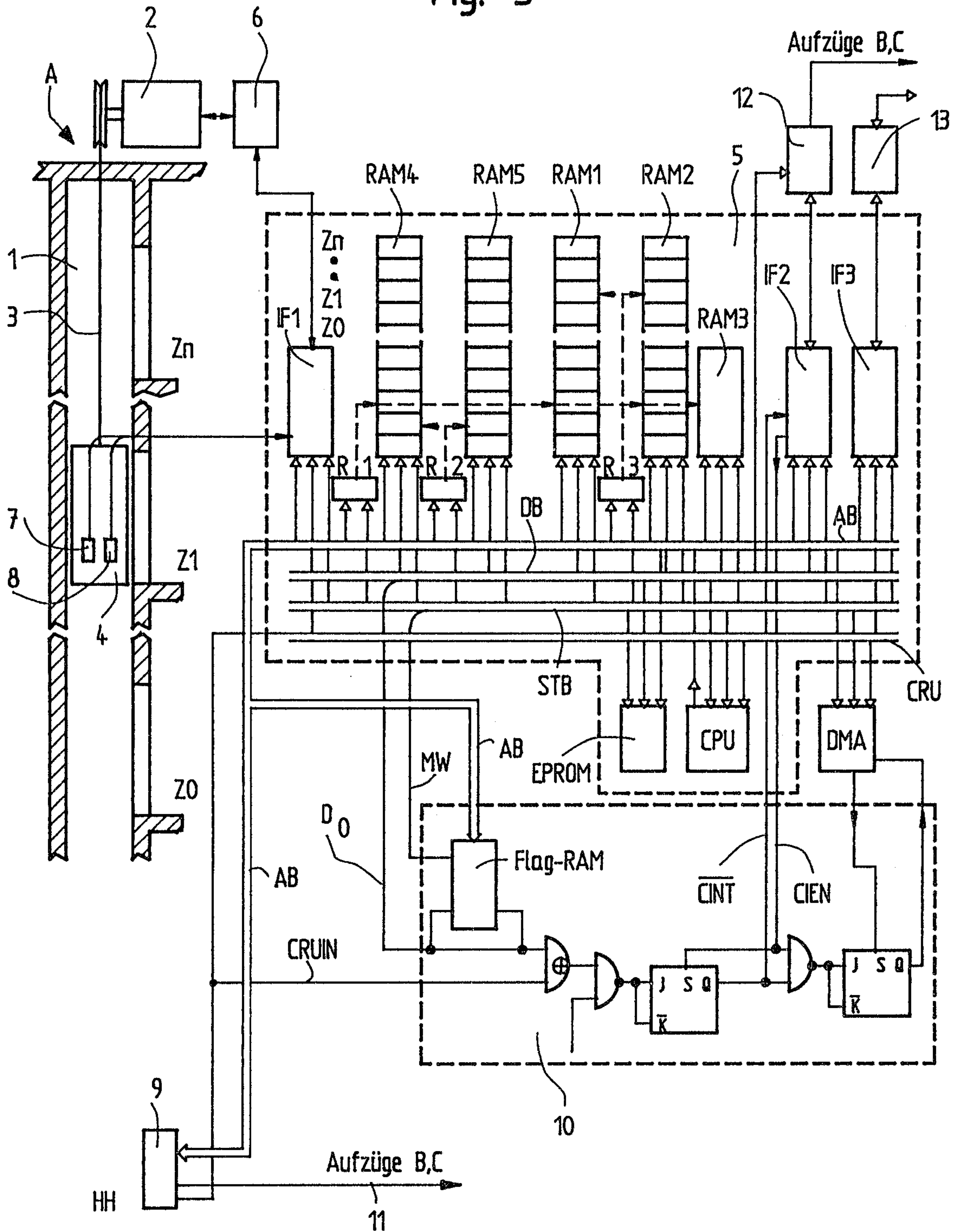


Fig. 4

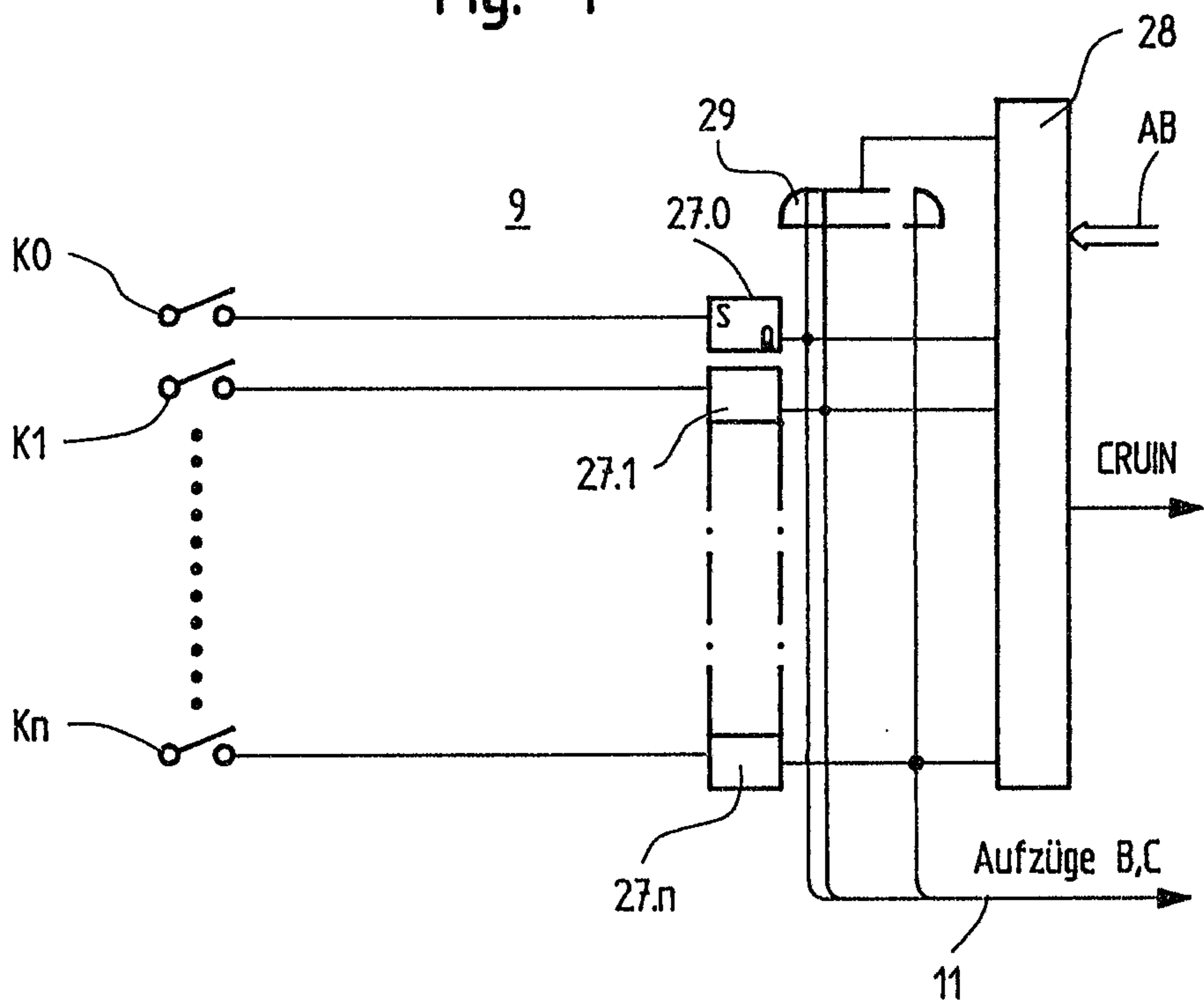


Fig. 5

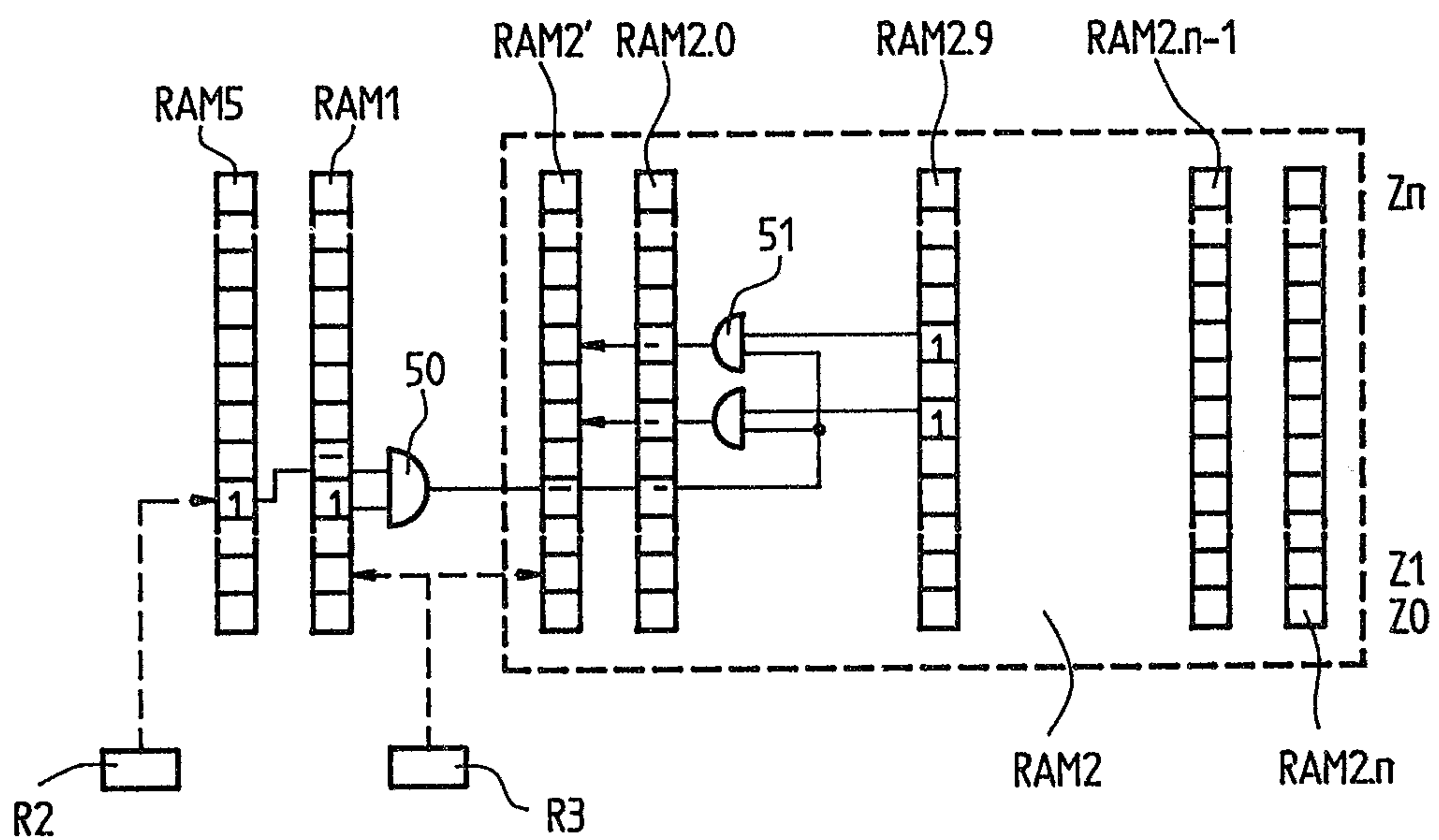


Fig. 6

