

[54] MULTI-BANK ELEVATOR SYSTEM
HAVING MOTION AND POSITION
INDICATOR

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[22] Filed: Apr. 16, 1968

[21] Appl. No.: 721,731

[52] U.S. Cl. 340/21, 340/183, 340/415

[51] Int. Cl. B66b 3/02

[58] Field of Search 340/19-21, 150,
182, 183, 413

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[57] ABSTRACT

A single panel position and motion indicator is connected successively to each bank of a transportation system having several banks of vehicles, such as elevators, to indicate the status of each bank of the system. Provision is made for overriding the sequential operation of the indicator for the purpose of indicating continuously the status of any one of the banks.

20 Claims, 6 Drawing Figures

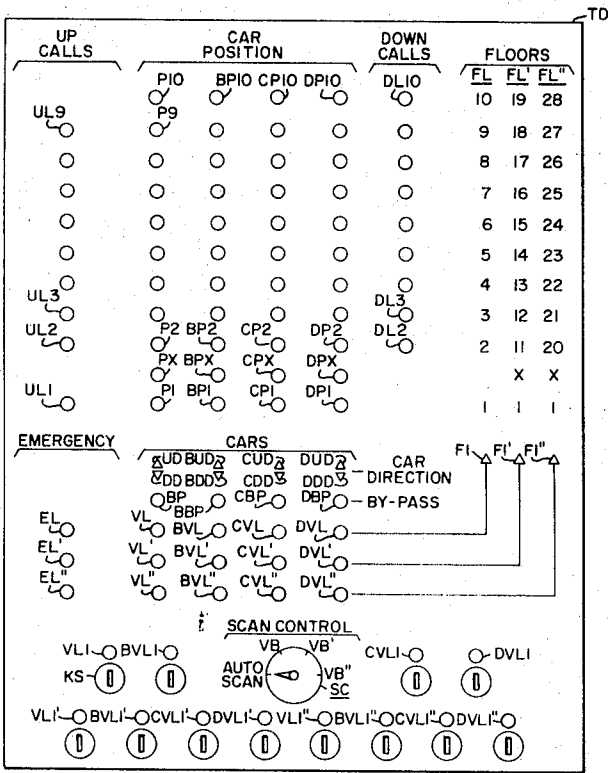


FIG. 5.

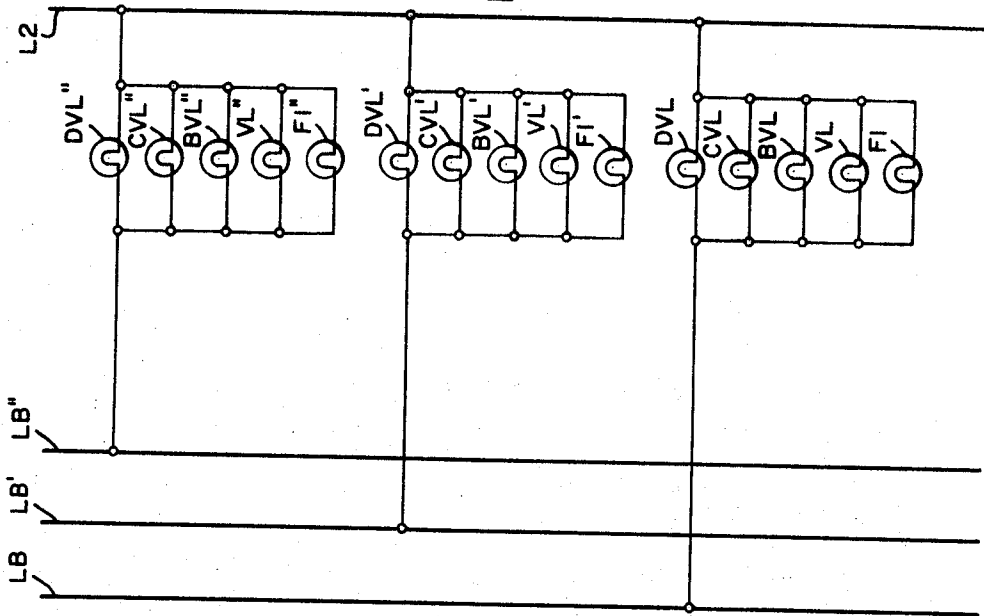
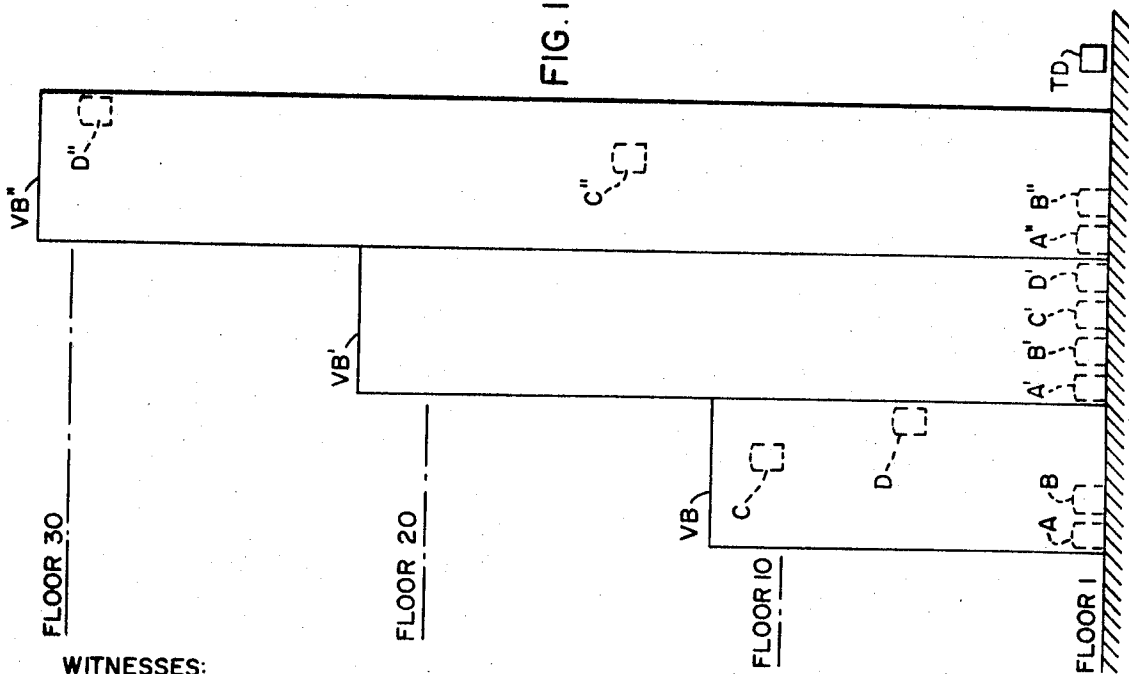


FIG. 1.



WITNESSES:

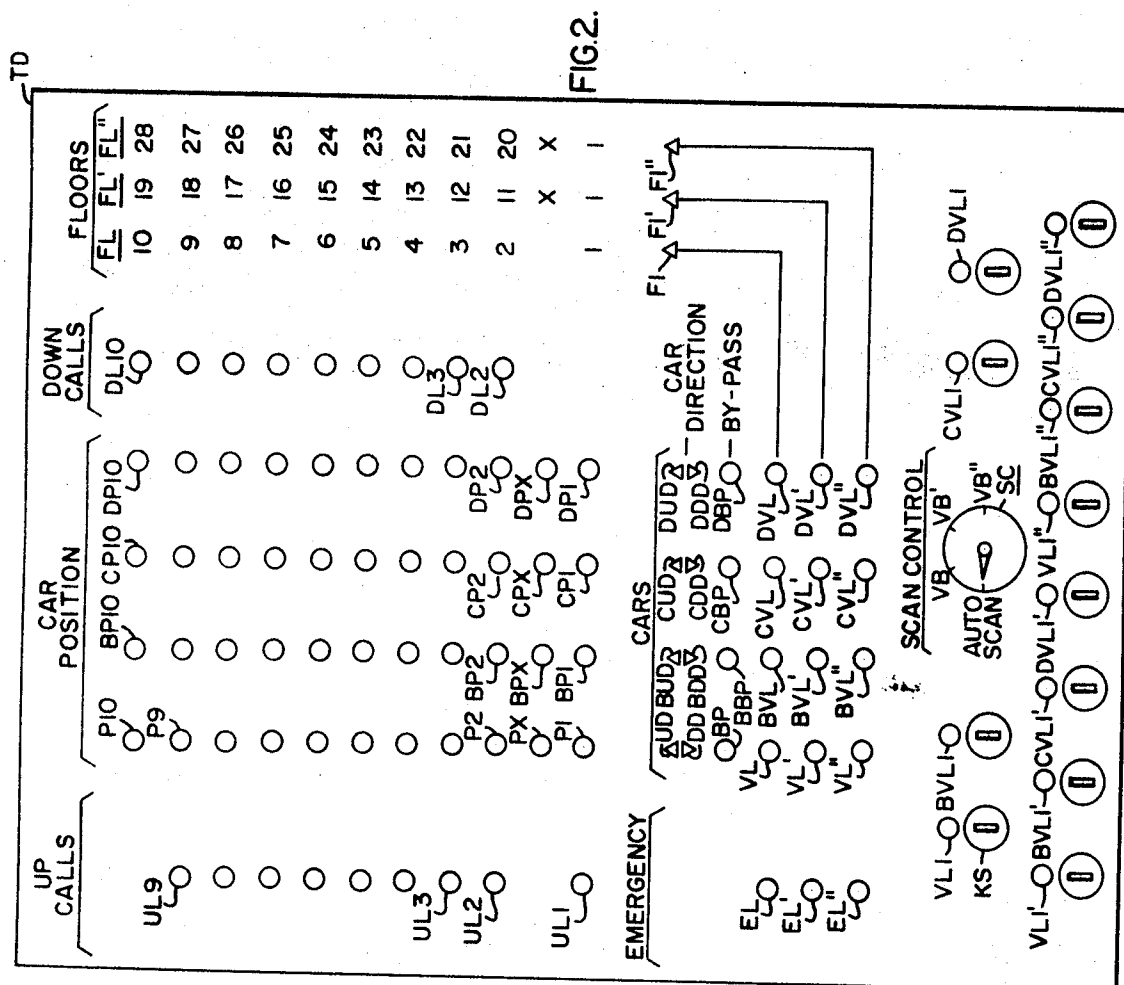
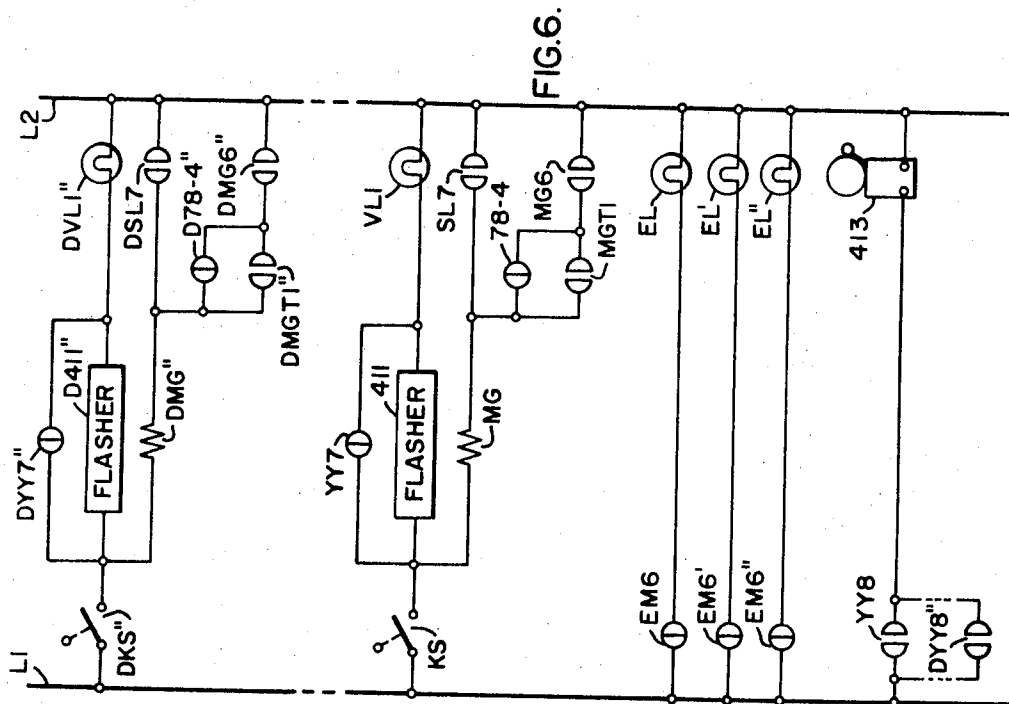
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MULTI-BANK ELEVATOR SYSTEM HAVING MOTION AND POSITION INDICATOR

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to a vehicular system having vehicles arranged in a plurality of banks and it has particular relation to an indicator for indicating the operation of any number of such banks.

Although the invention is applicable to vehicles of various descriptions arranged for operation in horizontal directions, vertical directions or in directions intermediate the horizontal and vertical directions, it is particularly suitable for an elevator system having a plurality of elevator cars arranged in a plurality of banks for serving the various landings or floors of a building and will be described as applied to such an elevator system.

2. Description of the Prior Art

In plural bank elevator systems it has been the practice to provide a separate panel position and motion indicator or traffic director panel for each of the banks. This practice not only results in substantial initial and maintenance costs but requires substantial space.

SUMMARY

In accordance with the invention a single panel motion and position indicator is provided to indicate the operation of a number of banks of elevator cars in a given building. A scan system is arranged to display consecutively and intermittently the operational condition of each bank of cars from the single indicator. Provision is made for overriding the scan system for the purpose of displaying continuously the operational condition of any of the banks. The override may be manually controlled or it may be in response to a predetermined condition of one of the banks.

It is therefore an object of the invention to provide a plural bank vehicular system with a single indicator for indicating the status of any of the banks.

It is a second object of the invention to provide a system as set forth in the preceding paragraph wherein a scan system sequentially displays the operational condition of each of the banks.

It is a third object of the invention to provide a system as set forth in the preceding paragraph with overriding means for displaying continuously the operational condition of any of the banks.

BRIEF DESCRIPTION OF THE DRAWINGS

Other objects of the invention will be apparent from the following description taken in conjunction with the accompanying drawings in which:

FIG. 1 is a view in front elevation of an elevator system embodying the invention;

FIG. 2 is a view in front elevation of a panel position and motion indicator embodying the invention;

FIGS. 3 to 6 are schematic views with circuits shown in straight line form of a control system suitable for controlling the indicator of FIG. 2.

DESCRIPTIONS OF THE PREFERRED EMBODIMENTS

Referring to the drawings FIG. 1 shows an elevator system having several banks of elevator cars. Although any number of banks may be employed it will be assumed for present purposes that three banks VB, VB' and VB'' are provided. Each of the banks may have any

desired number of vehicles or cars. For present purposes it will be assumed that each of the banks has four elevator cars.

The banks of vehicles or cars may be of any desired construction. However in order to simplify the presentation of the invention it will be assumed that each of the banks is similar to that shown in the Santini et al. U.S. Pat. No. 2,740,495. Unless otherwise stated the conventions employed in such patent will be employed here. By reference to the aforesaid patent it will be understood that the vehicle bank VB has four elevator cars A, B, C and D. Each component of the banks VB' and VB'' is identified by the same reference character employed for the bank VB with the addition of a prime for the bank VB' and of a double prime for the bank VB''. Thus the elevator car A' of the bank VB', and the elevator car A'' of the bank VB'' correspond to the elevator car A of the bank VB.

In FIG. 1 a bank VB is arranged to serve landings or floors 1 to 10 inclusive of a building. A bank VB' is arranged to serve the first landing or floor and landings 11 to 19 inclusive of the same building. For the bank VB' the landings or floors 2 to 10 inclusive may constitute an express zone through which the elevator cars run without stopping. The bank VB'' is assumed to serve a first floor and floors 20 to 28 inclusive of the same building. In this case the floors 2 to 19 inclusive constitute an express zone through which the cars of the bank VB'' run without stopping.

In order to display the status of the elevator system a panel position and motion indicator is provided which may form a part of a traffic director panel TD. This panel is shown located at the first or main floor but it is to be understood that similar information may be provided at any other desired points such as in a machine room. The status of each of the banks is displayed sequentially on the panel. For example the condition of the bank VB may be displayed for ten seconds followed by the display of the status of the bank VB' for ten seconds and thereafter followed by the display of the status of the bank VB'' for 10 seconds. This cycle of display may be continued indefinitely. As previously explained, under certain conditions the panel may be arranged to display information continuously for any one of the banks.

Referring to FIG. 2 the panel TD has three vertical rows of numerals representing floors of the buildings. Thus the row FL contains numerals 1 to 10 arranged in the order of the floors and representing the floors 1 to 10 inclusive which are served by the bank VB. The numerals in the row FL' represent the floors 1 and 11 to 19 arranged in the order of the floors and served by the bank VB'. In this row the floors 2 to 10 inclusive constitute an express zone which is represented by the letter X. Finally the row FL'' contains the floors represented by the numerals 1 and 20 to 28 inclusive arranged in the order of the floors and served by the bank VB''. Here the floors 2 to 19 constitute an express zone which is represented by the letter X.

At any one time the information displayed on the panel TD is specific to only one of these rows FL, FL' or FL''. The specific row which is effective is indicated by the lighting of one of three lamps FL, FL' or FL'' which are associated respectively with the banks VB, VB' and VB''. Each lamp if desired may be located behind a jewel which in FIG. 2 is given the shape of an arrow pointing to the associated row of numerals.

Lamps VL, BVL, CVL and DVL when illuminated indicate that cars A, B, C and D of the bank VB are in service and that this bank is being displayed on the panel TD. It will be noted that these lamps are arranged in a horizontal row.

In an analogous manner the lamps VL', BVL', CVL' and DVL' are arranged in a horizontal row and are illuminated only when the associated cars of the bank VB' are in service and the operation of this bank is being displayed on the panel TD.

In an analogous manner lamps VL'', BVL'', CVL'' and DVL'' are illuminated when the respective cars of the bank VB'' are in service and their operation is being displayed on the panel.

The lamps VL, VL' and VL'' of the A cars of the three banks are in a vertical row which also contains car position lamps P1, PX and P2 to P10 inclusive arranged in the order of the floors. Similarly the lamps BVL, BVL' and BVL'' for the B cars of the three banks are arranged in a vertical row which also contains position lamps BP1, BPX and BP2 through BP10 arranged in the order of the floors. In a third vertical row are arranged the lamps CVL, CVL' and CVL'' for the C cars and position lamps CP1, CPX and CP2 to CP10. Finally a fourth vertical row contains the lamps DVL, DVL' and DVL'' for the D cars of the three banks together with the position lamps DP1, DPX and DP2 to DP10 inclusive.

Horizontal and vertical lines through any illuminated car position lamp provide the coordinates for locating any car in the building. For example assume that the lamp P9 is illuminated. A vertical line through this lamp indicates that the illumination represents the position of one of the A cars of the three banks depending on which of the lamps VL, VL' and VL'' is illuminated. A horizontal line through the same position lamp indicates that the car is at the 9th floor, the 18th floor or the 27th floor depending on which of the three lamps F1, F1' and F1'' is illuminated. Thus if the lamps P9, VL and F1 are illuminated the elevator car A of the bank VB is located at the 9th floor. As a further example if the lamps P9, VL'' and F1'' are illuminated the elevator car A'' of the bank VB'' is located at the 27th floor. If the elevator car A' is in its express zone and if the lamp F1' is illuminated the lamp PX also is illuminated to indicate that such car is in its express zone. If the lamp P1 is illuminated one of three cars associated therewith must be at the first floor for the reason that all cars serve the first floor.

When one of the lamps VL, VL' and VL'' is illuminated one of the direction arrows UD for up direction or DD for down direction in the same vertical row is illuminated for the purpose of indicating the direction for which is set the car having its lamp VL, VL' or VL'' illuminated. If the elevator car A, A' or A'' is conditioned to bypass, a bypass lamp BP will be illuminated when the lamp VL, VL' or VL'' associated with the bypassing car is also illuminated. Direction and bypass lamps are similarly provided for the B, C and D cars of the three banks.

A vertical row of up-floor-call registering lamps is provided for indicating registered up floor calls. Each of these lamps UL1 to UL9 is horizontally aligned with the appropriate one of the car position lamps for the associated floor. Thus if the lamp UL9 is illuminated the horizontal line passing through said lamp indicates that an up floor call has been registered for the 9th,

18th or 27th floor dependent on which of the lamps F1, F1' and F1'' is illuminated.

In an analogous manner lamps DL2 to DL10 inclusive arranged in a vertical row in the order of the floors indicate when a floor call is registered requiring service in the down direction. Thus if the lamp DL9 is illuminated a horizontal line through this lamp indicates that a down floor call is registered for the 9th, 18th or 27th floor dependent on which of the lamps F1, F1' and F1'' is illuminated.

For each of the banks a dispatcher may be employed for automatically dispatching elevator cars from a predetermined floor. Should the main dispatcher fail an auxiliary dispatcher may be arranged to take over automatically the dispatching function for each of the banks. For indicating failure of one or more of the main dispatchers three lamps EL, EL' and EL'' are provided. The illumination of any one of the lamps EL, EL' and EL'' indicates failure of the main dispatcher for the associated one of the banks VB, VB' and VB''.

A lamp is provided for each of the elevator cars for the purpose of indicating when illuminated that the associated elevator car is in service. For example lamps VL1, VL1' and VL1'' are provided respectively for the A cars of the three banks VB, VB' and VB''.

Below each of the lamps a key switch KS is located. Each of the key switches may be operated for the purpose of placing the associated elevator car in or out of service.

Finally, the panel TD includes a scan control SC having a four-position knob. With the knob in the "auto-scan" position illustrated in FIG. 2 the system is arranged to present sequentially on the panel TD information concerning the status of each of the banks. For example information concerning the bank VB is displayed for a period such as 10 seconds. This is followed by a display for a period of 10 seconds of information concerning the bank VB'. The cycle is completed by information concerning the bank VB'' which may also be displayed for 10 seconds. This cycle may be repeated indefinitely.

When the knob of the scan control SC is turned to a position VB the system is arranged to show continuously on the panel TD information concerning the bank VB. Rotation of the knob to the position VB' arranges the system to show continuously on the panel TP information concerning the bank VB'. Finally rotation of the knob to the position VB'' arranges the system to show continuously on the panel TD information concerning the bank VB''.

Turning now to the circuits for providing the desired operation of the panel TD FIG. 3 shows a positive bus L1 and a negative bus L2 representing a suitable source of direct current. Three selector relays BR, BR' and BR'' are employed for selecting respectively the banks VB, VB' and VB'' for presentation on the panel TD. When the selector relay BR is energized and picked up it closes its make contacts BR1 to connect an auxiliary positive bus LB to the main positive bus L1. Circuits connected between the auxiliary positive bus LB and the common negative bus L2 then are effective for presenting on the panel TD the status of the bank VB. In a similar manner when the selector relay BR' picks up it closes its make contacts BR1' to connect an auxiliary positive bus LB' to the main positive bus L1 for the purpose of presenting the status of the bank VB' on the panel TD. Pickup of the selector relay BR'' connects

the auxiliary positive bus LB'' through the make contacts BR1'' to the main positive bus L1 for the purpose of displaying the status of the banks VB'' on the panel TD.

The energization of the selector relays is controlled in part by the scan control SC. When this control is in its "autoscan" condition the selector relays are energized successively in repetitive cycles through a sequencer SQ. This sequencer may be of any construction suitable for successively energizing the selector relays. For illustrative purposes the illustrated sequencer SQ is of the commutator type wherein a movable contact SQ2 is rotated about its axis at a uniform rate. Three commutator segments SQ1, SQ1' and SQ1'' are located to be engaged successively and repetitively by the movable contact SQ2. The coil of the selector relay BR is connected between the commutator segment SQ1 and the negative bus L2. Similarly the selector relays BR' and BR'' have their coils connected respectively between the commutator segments SQ1' and SQ1'' and the negative bus L2. During each revolution of the movable contact SQ2 the coils of the three relays are successively connected for energization across the buses L1 and L2 through the scan control SC, break contacts ME1 of a master relay ME and a switch 401.

Under certain conditions it may be desirable to display the status of certain of the banks for periods longer than those employed for the remainder of the banks. For example if a down peak occurs on the bank VB' during a period in which the banks VB and VB'' are subjected to relatively light traffic the system may be arranged to display the status of the bank VB' for longer periods of time. To this end the switch 401 may be manually opened and a switch 403 may be manually closed to replace the sequencer SQ by a sequencer SQA. The sequencer SQA is similar to the sequencer SQ except for the dimensions of the three commutator segments. By inspection of FIG. 3 it will be noted that the sequencer SQA is arranged to display the status of the bank VB' for a longer period during each revolution of the movable contact.

Although the switches 401 and 403 may be manually operated, if the down peak or other governing condition occurs at a definite time each day these switches may be controlled by a timer to open and close at the required times. Alternatively if the bank B' has a relay which places it on down peak operation this relay may be arranged to operate the switches 401 and 403. Such a relay DP is shown in the aforesaid Santini et al patent.

Provision is made for overriding the sequencer. Thus if the scan control is operated to its position VB the selector relay BR is connected across the buses L1 and L2 and the sequencer is rendered ineffective. Similarly operation of the scan control to its positions VB' and VB'' connects the selector relays BR' and BR'' for energization across the buses L1 and L2.

Certain undesirable conditions occurring on any one of the banks also may operate to override the sequencer. Such a condition may be over-long operation of a door-hold button on one of the elevator cars or of a safety edge on one of the car doors if such a condition obtains on the bank VB while the scan control is in its "autoscan" position. Thus if a door is held in the bank VB contacts EB1 of an emergency relay EB connect the selector relay BR across the buses L1 and L2 for energization. In a similar manner such a condition occurring on the banks VB' or VB'' results in closure to

make contacts EB1' or EB'' to energize the selector relay BR' or BR''. The circuits for the relays BR' or BR'' are completed through break contacts EB2. Consequently if the condition occurs simultaneously on the bank VB and one of the other banks only the selector relay BR is energized. Also when the selector relay BR'' is energized through the make contacts EB1'' the energizing circuit is completed through the break contacts EB2'. Consequently if a similar condition is present on both of the banks VB' and VB'' only the selector relay BR' is energized through these circuits.

The emergency relays EB, EB' and EB'' may be energized and picked up in response to undesirable conditions respectively occurring in the banks. For illustrative purposes it is assumed that this condition involves undue holding of the door of one of the elevator cars as represented by pickup of the timing relay YY in the aforesaid Santini et al patent for the elevator car A or by pickup of a corresponding relay for any of the remaining cars of the three banks. Make contacts YY6 operated by the aforesaid relay YY and corresponding contacts for the remaining cars of the bank VB are connected in parallel for the purpose of connecting the emergency relay EB across the buses L1 and L2. Consequently undue holding of the door of any of the elevator cars of the bank VB results in pickup of the emergency relay EB. In a similar manner emergency relays EB' and EB'' are picked up as a result of undue holding of any of the doors of the banks VB' and VB'' respectively.

The master relay ME is connected for energization across the buses L1 and L2 through make contacts EB3, EB3' and EB3'' in parallel of the emergency relays EB, EB' and EB''. When ME picks up, its break contact ME1 opens the L1 line to the automatic sequencers SQ and SQA.

Illumination of the up floor lamp UL9 indicates that an up floor call is registered for the 9th, 18th or 27th floor depending upon which of these banks is being displayed on the panel TD at the time of such illumination. To this end the lamp is controlled by make contacts of floor call registering relays UR for the three floors. The construction and operation of such relays UR will be understood from the description of similar relays employing the reference character UR in the aforesaid Santini et al. patent. It will be noted that the lamp UL9 is connected between the bus auxiliary LB and the bus L2 through make contacts 9UR8 of an up floor call registering relay associated with the 9th floor and a rectifier RE. The lamp also is connected between the auxiliary bus LB' and the bus L2 through make contacts 18UR8' of an up floor call registering relay associated with the 18th floor and a separate rectifier RE. Finally the lamp is also connected for energization between the auxiliary positive bus LB'' and the common negative bus L2 through make contacts 27UR8'' of an up floor call registering relay associated with the 27th floor and a separate rectifier RE. The rectifiers prevent one of the auxiliary positive buses from supplying current to the others of the auxiliary positive buses when the contacts of one of the up floor call registering relays is closed.

In a similar manner each of the lamps UL2 to UL8 is associated with a separate group of three floors the numbers of which are shown in FIG. 2. Inasmuch as all three banks serve the first floor the lamp UL1 is controlled by three separate make contacts 1UR8, 1UR8'

and 1UR8'' operated by the up floor call registering relay 1UR for the first floor.

In an analogous manner illumination of the down lamp DL10 indicates that a down floor call has been registered for the 10th, 19th or 28th floor dependent on which of the three banks is being displayed at the time of such illumination. This lamp is controlled by make contacts operated by down floor call registering relays DR similar to those identified by the same designation in the aforesaid Santini et al. patent. Thus the lamp DL10 is connected between the auxiliary positive bus LB and the common negative bus L2 through make contacts 10DR8 of a down floor call registering relay for the 10th floor and a rectifier RE. Further the lamp DL10 may be energized by connecting it across the auxiliary positive bus LB' and the negative bus L2 through make contacts 19DR8' of a down floor call registering relay for the 19th floor and a rectifier RE. Finally the lamp may be energized by connecting it across the auxiliary positive bus LB'' and the negative bus L2 through make contacts 28DR8'' of a down floor call registering relay associated with the 28th floor and a separate rectifier RE. In a similar manner each of the lamps DL2 to DL9 when illuminated represents that a down floor call has been registered for one of three floors the numbers of which will be apparent from an inspection of the panel TD shown in FIG. 2.

Each of the position lamps P1, PX and P2 to P10 in FIG. 4 when illuminated indicates the presence at the associated floor of one of the three A cars dependent on which of the banks is being displayed at the time of such illumination. To this end each of the cars is provided with a row of contact segments located on the associated floor selector and arranged in the order of the floors. These contact segments are engaged by a brush which moves in accordance with the motion of the associated car. For example the elevator car A of the bank VB has a row of contact segments j1 to j10 arranged in the order of the floors 1 to 10 inclusive. The contact segment for the floor at which the car is positioned is engaged by a brush jj which moves in accordance with the motion of the elevator car A. In a similar manner the elevator car A' for the bank VB' has contact segments j1', jX' and j11' to j19' arranged in the order of the floors. The contact segment jX' corresponds to the positioning of the elevator car A' in its express zone. These contact segments are engaged by a brush jj' which moves in accordance with the motion of the elevator car A'. The elevator car A'' has a row of contact segments j1'', jX'' and j20'' to j28'' arranged in the order of the floors. The contact segment jX'' corresponds to the location of the elevator car A'' in its express zone. These contact segments are engaged by a brush jj'' which moves in accordance with motion of the elevator car A''.

The brushes jj, jj' and jj'' are connected respectively to the auxiliary positive buses LB, LB' and LB''. The lamp P10 is connected between the contact segment j28'' and the negative bus L2 through a separate rectifier RE. Similarly the lamp is connected between the segments j19' and j10 and the negative bus L2 through separate rectifiers. Thus if the elevator car A is at the 10th floor (brush jj engages the contact segment j10) and if the bank VB is being displayed, the position lamp P10 is illuminated to indicate the presence of the elevator car A at the 10th floor. On the other hand if the elevator car A' is at the 19th floor (brush jj' engages the

contact segment j19') and if the bank VB' is being displayed (make contacts BR1' are closed), the lamp P10 is illuminated to indicate the presence of the elevator car A' at the 19th floor. If the elevator car A'' is at the 28th floor (brush jj'' engages the contact segment j28'') and if the bank VB'' is being displayed (auxiliary positive bus LB'' is connected to the main bus L1 through the contacts BR1'') the lamp P10 is illuminated to indicate the presence of the car A'' at the 28th floor. Each of the position lamps P1 and P2 to P10 operates in a similar manner to show the location of one of the A cars at the associated floor. Inasmuch as the elevator car A does not have an express zone a jX contact segment is not shown for such car. The lamp PX thus indicates presence of one of the elevator cars A' or A'' in the associated express zone when the lamp is illuminated.

The rectifiers RE are employed for preventing feed from one of the auxiliary buses to the other auxiliary buses through brushes and contact segments associated with the position lamps.

The position lamps for the B, C and D cars of the three banks are similarly associated with the various buses.

The directions of the elevator cars A, A' and A'' are shown by an up direction arrow or lamp UD and a down direction arrow or lamp DD. When the up direction lamp UD is illuminated it indicates that one of the elevator cars A, A' or A'' is set for up travel dependent on which of the banks is being displayed by the panel TD at the time of illumination. The up direction lamp is controlled by make contacts provided on up direction relays which are similar to the up direction relay W shown in the aforesaid Santini et al patent. Thus for the elevator car A the up direction lamp UD is connected across the auxiliary bus LB and the negative bus L2 through make contacts W14 provided on the up direction relay of the aforesaid Santini et al patent and a rectifier RE. For the elevator car A' the up direction lamp UD is connected between the auxiliary positive bus LB' and negative bus L2 through make contacts W14' (on the up direction relay for the elevator car A') and a separate rectifier RE. For the elevator car A'' the up direction lamp UD is connected between the buses LB'' and L2 through make contacts W14'' (on the up direction relay for the elevator car A'') and a separate rectifier RE. Thus illumination of the lamps VL'' and UD indicate that the elevator car A'' is set for up travel.

The down direction lamp DD for the elevator cars A, A' and A'' is associated with the buses in a manner similar to the association of the up direction lamp UD except that the make contacts of the up direction relays are replaced by corresponding contacts X14, X14' and X14'' of the down direction relays. Each of these down direction relays is similar to the down direction relay X of the aforesaid Santini et al. patent except for the addition of the illustrated contacts. Thus if the make contacts X14'' are closed and the lamp DD is illuminated together with the lamp VL'' the elevator car A'' is known to be set for down direction. The direction lamps BUD and BDD, CUD and CUD and DDD are similarly associated with the B, C and D cars of the three banks respectively. The rectifiers RE again prevent undesired feed of current from one of the auxiliary positive buses to the other auxiliary positive buses when one of the sets of contacts is closed.

The bypass lamp BP when illuminated indicates a bypassing operation of one of the three elevator cars A, A' or A'' dependent on which of the banks is being displayed by the panel TD at the time of such illumination. By reference to the aforesaid Santini et al patent it will be noted that opening of the contacts LMS2 of a load weighing switch result in a bypassing operation. For present purposes the load weighing switch also closes contacts LMS6.

A bypass lamp BP is connected between the buses LB and L2 through the contacts LMS6 of the load weighing switch and a rectifier RE. Thus if the panel TD is displaying the bank VB (bus LB is connected to the positive bus L1) and if the elevator car A is loaded to an extent sufficient to cause bypassing (contacts LSM6 are closed) the bypass lamp is illuminated. In an analogous manner the bypass lamp BP is connected across the buses LB' and L2 through contacts LMS6' and a separate rectifier RE for the elevator car A'. For the elevator car A'' the bypass lamp BP is connected across the buses LB'' and L2 through contacts LMS6'' and a separate rectifier RE. Bypass lamps BBP, CBP and DBP similarly are associated with the B, C and D cars respectively of the three banks.

The lamps F1, VL, BVL, CVL and DVL all are connected in parallel between the buses LB and L2. Thus when the bank VB is being displayed (bus LB is energized) all of these lamps are illuminated. In an analogous manner the lamps F1', VL', BVL', CVL' and DVL' all are connected in parallel between the buses LB' and L2 for illumination when the bank VB' is being displayed. Finally the lamps F1'', VL'', BVL'', CVL'' and DVL'' all are connected in parallel between the buses LB'' and L2 to indicate when illuminated that the bank VB'' is being displayed.

In the aforesaid Santini et al patent a motor-generator starting switch MG for the elevator car A is connected across buses L1 and L2 through certain contacts. The only difference in the present case is that this circuit is completed through a key-operated switch KS. In addition closure of the switch connects a lamp VL1 across the same buses through break contacts YY7 which open when an undesired operation of the elevator car A occurs. For present purposes it will be assumed that break contacts YY7 are operated by the timing relay YY of the aforesaid Santini et al. patent. These contacts open when the door of the elevator car A are held open for an unduly long time.

The contacts YY7 are connected in shunt across a flasher 411. Consequently when the contacts YY7 open, the flasher is introduced into the circuit for the purpose of causing the lamp VL1 to flash or operate intermittently. This flashing of the lamp VL1 indicates that an undesirable operation is occurring for the elevator car A.

Similar circuits are employed for each of the elevator cars. Thus for the elevator car D'' of the bank VB'' a key-operated switch DKS'' controls motor-generator starting circuits for the car D'' and also controls the illumination of the lamp DVL1''.

In the Suozzo U.S. Pat. No. 2,695,077 an emergency relay EM is employed for controlling the operation of an emergency dispatcher. Break contacts EM6 are added to this relay for the purpose of controlling the illumination of the emergency lamp EL for the bank VB. The lamp is connected through these contacts across the buses L1 and L2. Contacts EM6' and EM6''

for similar relays control the illumination of the emergency lamps EL' and EL'' for the banks VB' and VB'' respectively.

Desirably a common buzzer or bell 413 is placed in operation when any undesired operation of the system occurs. For illustrative purposes it will be assumed that make contacts YY8 are added to the timing relay of the aforesaid Santini et al patent for the elevator car A. These contacts together with similar contacts for each of the elevator cars are connected in parallel for the purpose of controlling the connection of the buzzer or bell 13 across the buzzer L1 and L2. Consequently if the door of any of the elevator cars is held unduly the contacts YY8 or similar contacts for such car are closed to energize the buzzer or bell.

I claim as my invention:

1. In a vehicular system comprising a structure having a plurality of landings, a plurality of banks of vehicles, each of said banks including a plurality of vehicles, means for moving said vehicles and stopping said vehicles at a plurality of said landings to provide transport for said landings, display means for substantially simultaneously displaying the status of the vehicles in any one of said banks in relation to the structure, and control means for each of said banks for coupling the display means selectively to each of the banks, said display means comprising a first display device responsive to the control means for indicating the specific bank to which the display means is coupled, and a second display device common to said banks and having first and second display conditions, and supervising means responsive to a predetermined condition of the bank to which the display means is coupled for operating the second display device from the first to the second display condition, and sequence means operating the control means to couple the display means sequentially to the banks for sequentially presenting displays corresponding to a predetermined condition for each of said banks.

2. A vehicular system as defined in claim 1 wherein each of said displays of the second display device includes means representing vehicle position.

3. A vehicular system as claimed in claim 1 in combination with preference means responsive to a predetermined condition for controlling said display means to present continuously displays specific to one of said banks.

4. A vehicular system as claimed in claim 3 wherein said preference means is responsive to an improper operation occurring in one of said banks.

5. A vehicular system as claimed in claim 3 wherein said preference means comprises a manually-operable device and means responsive to a manual operation of said last-named device for controlling said display means to present continuously one of said displays specific to one of the banks.

6. A vehicular system as claimed in claim 1 wherein said second display device comprises a common display unit, said supervising means being responsive to the position of a vehicle in each of the banks to which the display means is coupled by the control means for sequentially portraying on said common display unit the position of a vehicle in each of said banks.

7. A vehicular system as claimed in claim 6 wherein each of said banks serves a different group of said landings, said supervising means controlling said common display unit to portray sequentially the position of a ve-

hicle in each of said banks with respect to a different landing.

8. A vehicular system as claimed in claim 6 wherein said display means comprises a separate first display device for each of said banks, said control means including means operating the first display device corresponding to the bank to which the display means is coupled.

9. A vehicular system as claimed in claim 1 wherein said display means comprises second display devices equal in number to the maximum number of landings served by any of the vehicles.

10. A vehicular system as claimed in claim 1 wherein said vehicles comprise elevator cars, each of said banks serving a different group of said landings, said display means comprising a row of up landing-call indicating devices equal in number to the maximum number of landings from which up landing calls may be registered for any of said banks, a row of down landing call indicating devices equal in number to the maximum number of landings from which the down landing calls may be registered for any of said banks, and a plurality of rows of car position indicating devices, the number of rows of car position indicating devices being equal to the maximum number of cars in any of said banks, said sequence means being effective for each step of the sequence for rendering the display means effective for indicating landing calls registered and car positions corresponding to the associated step of said sequence.

11. A system as claimed in claim 10 in combination with means for indicating the specific bank under display by the display means.

12. A system as claimed in claim 11 wherein each of a plurality of said landing-call indicating devices represents a different landing for each of said banks, in combination with means indicating the landing represented by each of the landing-call indicating devices for each of the banks coupled to the display means.

13. A system as claimed in claim 6 wherein said display means comprises identification means for displaying a separate identification display continuously for the duration of each sequence step associated with a separate one of said banks.

14. A system as claimed in claim 13 wherein said common display unit when activated represents a different landing for each of said banks, a plurality of spaced associating means each representing a separate one of said different landings, each of said identification displays being located to point out the effective one of the associating means.

15. A system as claimed in claim 1 in combination with a separate signal device having three display conditions for each of said vehicles, means for transferring each of the vehicles from inoperative to operative condition and for transferring the associated signal device from a first to a second of the display conditions, and means responsive to an abnormal condition of each of said vehicles for transferring the associated signal device to a third of the display conditions.

16. A system as claimed in claim 1 wherein each of the banks comprises a plurality of elevator cars serving a separate group of landings in a building, said display means comprising a plurality of vertical rows of first signal devices, each row indicating car position for a separate one of the cars in one of the banks, a vertical row of second signal devices each indicating in signalling condition a call for up service from a separate land-

ing served by the cars in one of the banks, a vertical row of third signal devices each indicating in signalling condition a call for down service from a separate landing served by one of the banks, a plurality of vertical rows of landing designators, each of said last-named rows designating the landings served by a separate one of said banks, said signal devices and designators being arranged in horizontal rows with each of the horizontal rows including the signal devices specific to a separate landing for each of said banks and including a separate designator for each of said banks to designate a separate landing for each of the banks, and a separate depicting signal device for each vertical row of said designators for depicting when in signalling condition that the associated row of designators is effective.

17. A system as claimed in claim 16 in combination with a plurality of vertical rows of fourth signal devices, a separate one of such rows being aligned with each of the vertical rows of first signal devices, the fourth signal devices being arranged in a plurality of horizontal rows, a separate one of the last-named rows being provided for each of the banks, each of said depicting signal devices when in signalling condition depicting a separate horizontal row of said fourth signal devices, whereby each of the fourth signal devices may be arranged to indicate the condition of a separate one of the cars, said sequence means including means for operating the appropriate one of the depicting signal devices and the appropriate horizontal row of the fourth signal devices, means for operating each of the vertical rows of first signal devices in response to the position of the appropriate car for each of the sequence steps, and means for operating the second and third signal devices to represent calls for service from the landings for each of the sequence steps.

18. A system as claimed in claim 17 in combination with preference means responsive to a predetermined condition in any of said banks for rendering said sequence means in-effective and for conditioning said display means to display continuously the status of the vehicles in the bank having said predetermined condition, said preference means including means manually operable for conditioning the display means to display continuously the status of the vehicles in any one of said banks.

19. In a position and motion indicator for a plurality of banks of elevator cars, each of the banks comprises a plurality of elevator cars serving a separate group of landings in a building, a first legend indicating car position, a plurality of vertical rows of first signal devices associated with said legend, whereby each row can indicate car position for a separate one of the cars in one of the banks, a second legend indicating up calls, a vertical row of second signal devices associated with said second legend, whereby each second signal device can indicate in signalling condition a call for up service from a separate landing served by the cars in one of the banks, a third legend indicating down calls, a vertical row of third signal devices associated with said third legend, whereby each third signal device can indicate in signalling condition a call for down service from a separate landing served by one of the banks, a fourth legend indicating landings, a plurality of vertical rows of landing designators associated with said fourth legend whereby each of said last-named rows can designate the landings served by a separate one of said banks, said signal devices and designators being ar-

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ranged in horizontal rows with each of the horizontal rows including the signal devices specific to a separate landing for each of said banks and including a separate designator for each of said banks to designate a separate landing for each of said banks, and a separate depicting signal device for each vertical row of said designations for depicting when in signalling condition that the associated row of designations is effective.

20. A system as claimed in claim 19 in combination with a plurality of vertical rows of fourth signal devices, a separate one of such last-named rows being aligned with each of the vertical rows of first signal devices, the fourth signal devices being arranged in a plurality of horizontal rows, a separate one of the last-named row being provided for each of the banks, each of said de-

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15 picting signal devices when in signalling condition depicting a separate horizontal row of said fourth signal devices, whereby each of the fourth signal devices may be arranged to indicate the condition of a separate one of the cars, said sequence means including means for operating the appropriate one of the depicting signal devices and the appropriate horizontal row of the fourth signal devices, means for operating each of the vertical rows of first signal devices in response to the position of the appropriate car for each of the sequence steps, and means for operating the second and third signal devices to represent calls for service from the landing for each of the sequence steps.

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