March 1, 1960 S. A. HORNUNG 2,926,756

GROUP SUPERVISORY SYSTEM FOR ELEVATORS

Filed Nov. 17, 1958 5 Sheets-Sheet 1

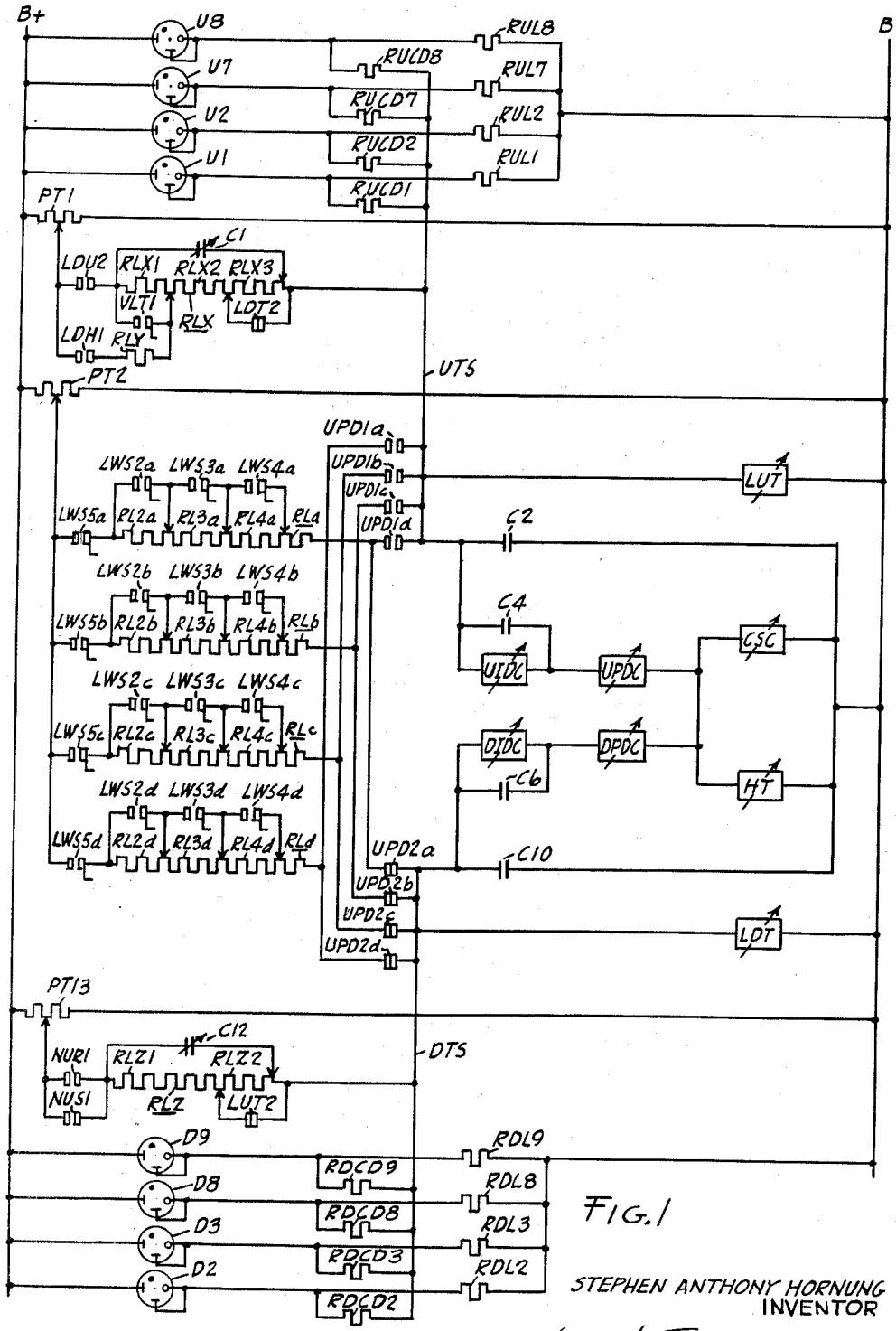


FIG. 1

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GROUP SUPERVISORY SYSTEM FOR ELEVATORS

Filed Nov. 17, 1958 5 Sheets-Sheet 2

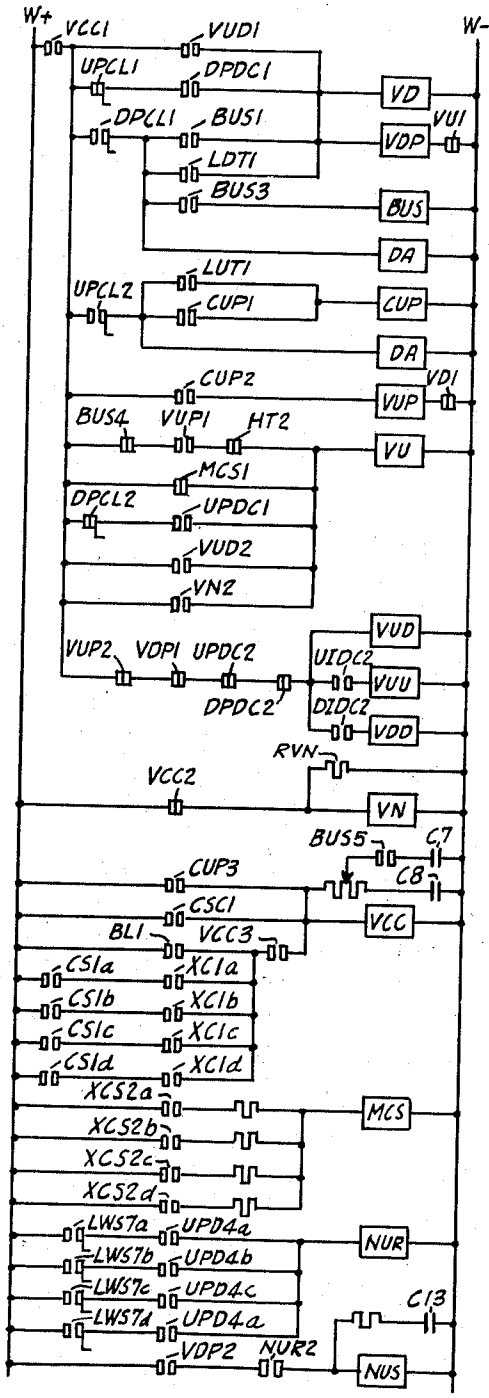


FIG. 2

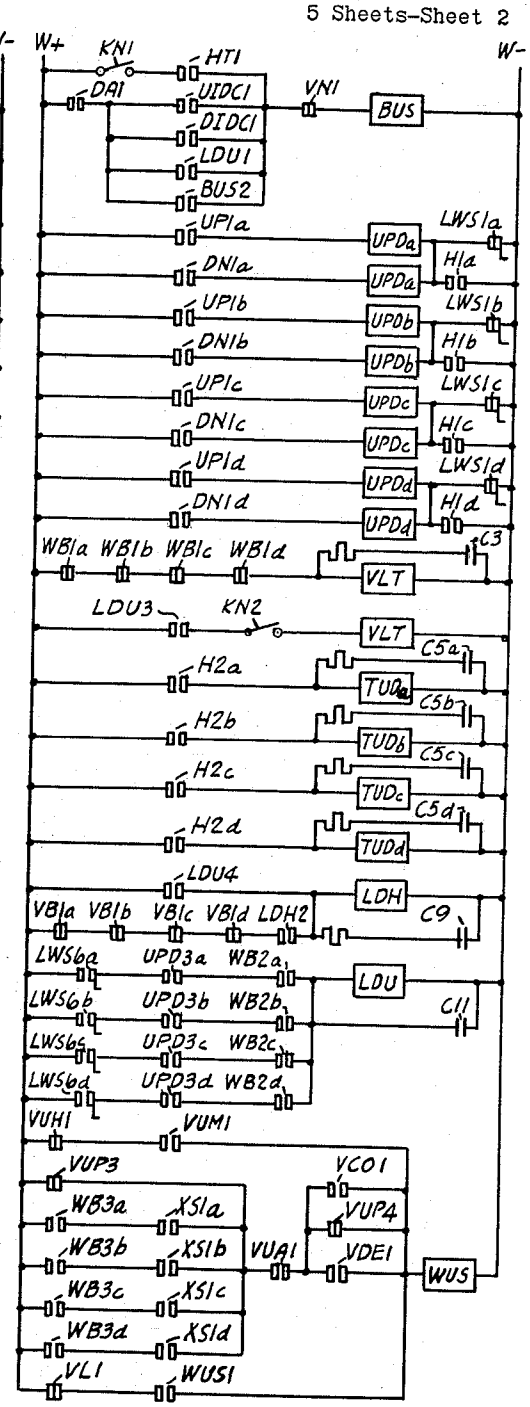


FIG. 3

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GROUP SUPERVISORY SYSTEM FOR ELEVATORS

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5 Sheets-Sheet 3

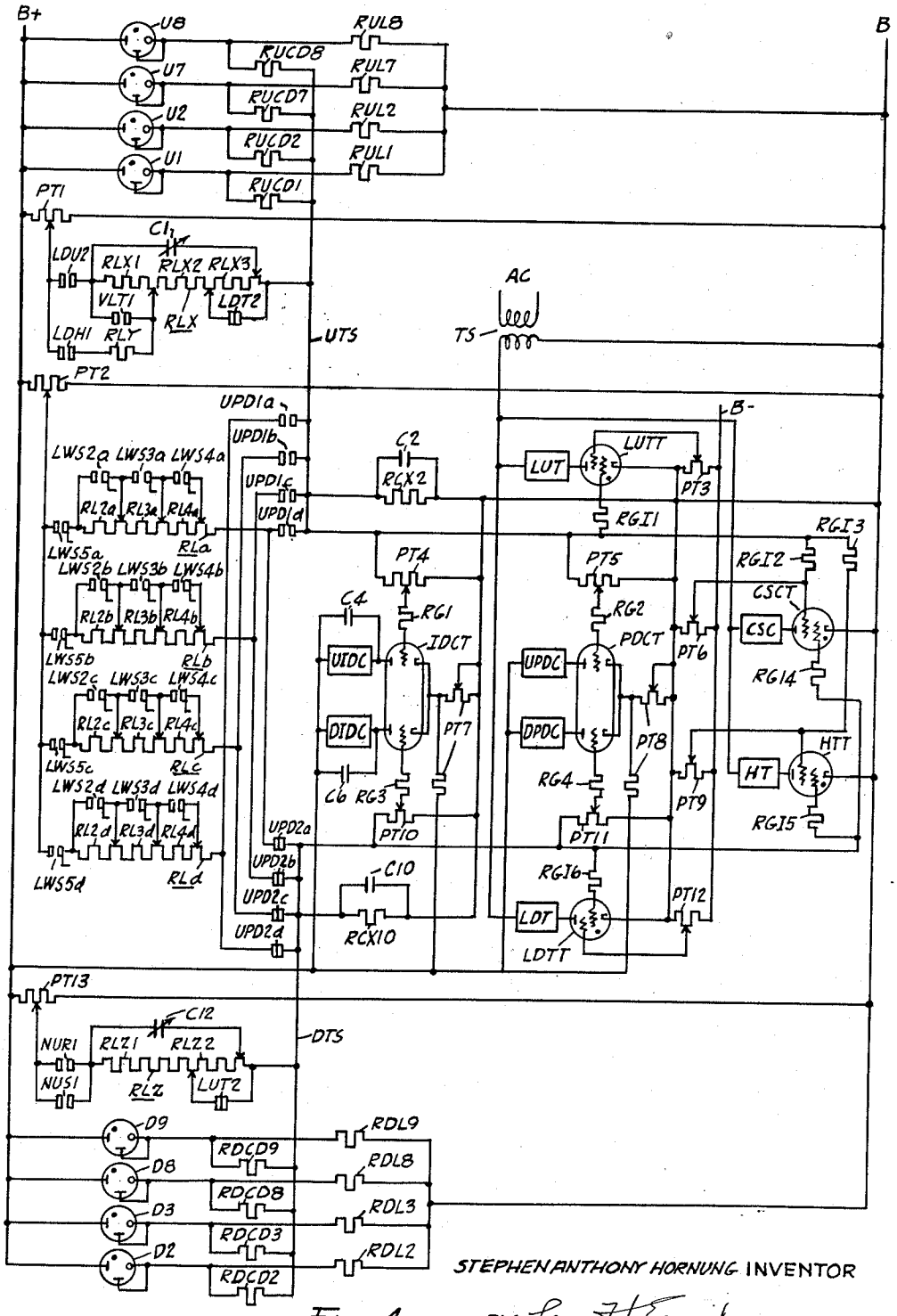


FIG. 4

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GROUP SUPERVISORY SYSTEM FOR ELEVATORS

Filed Nov. 17, 1958 5 Sheets-Sheet 4

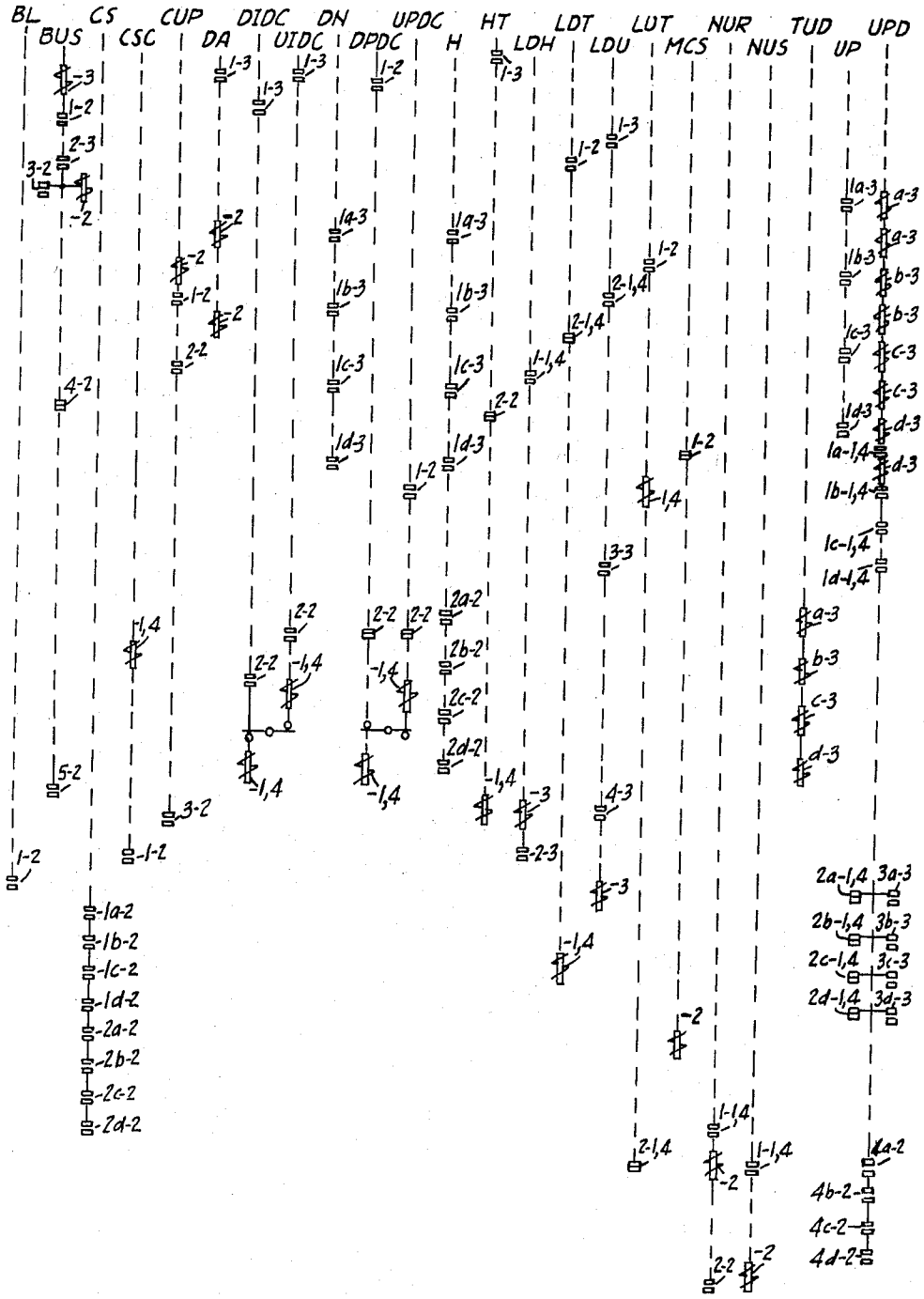


FIG. 5a

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GROUP SUPERVISORY SYSTEM FOR ELEVATORS

Filed Nov. 17, 1958 5 Sheets-Sheet 5

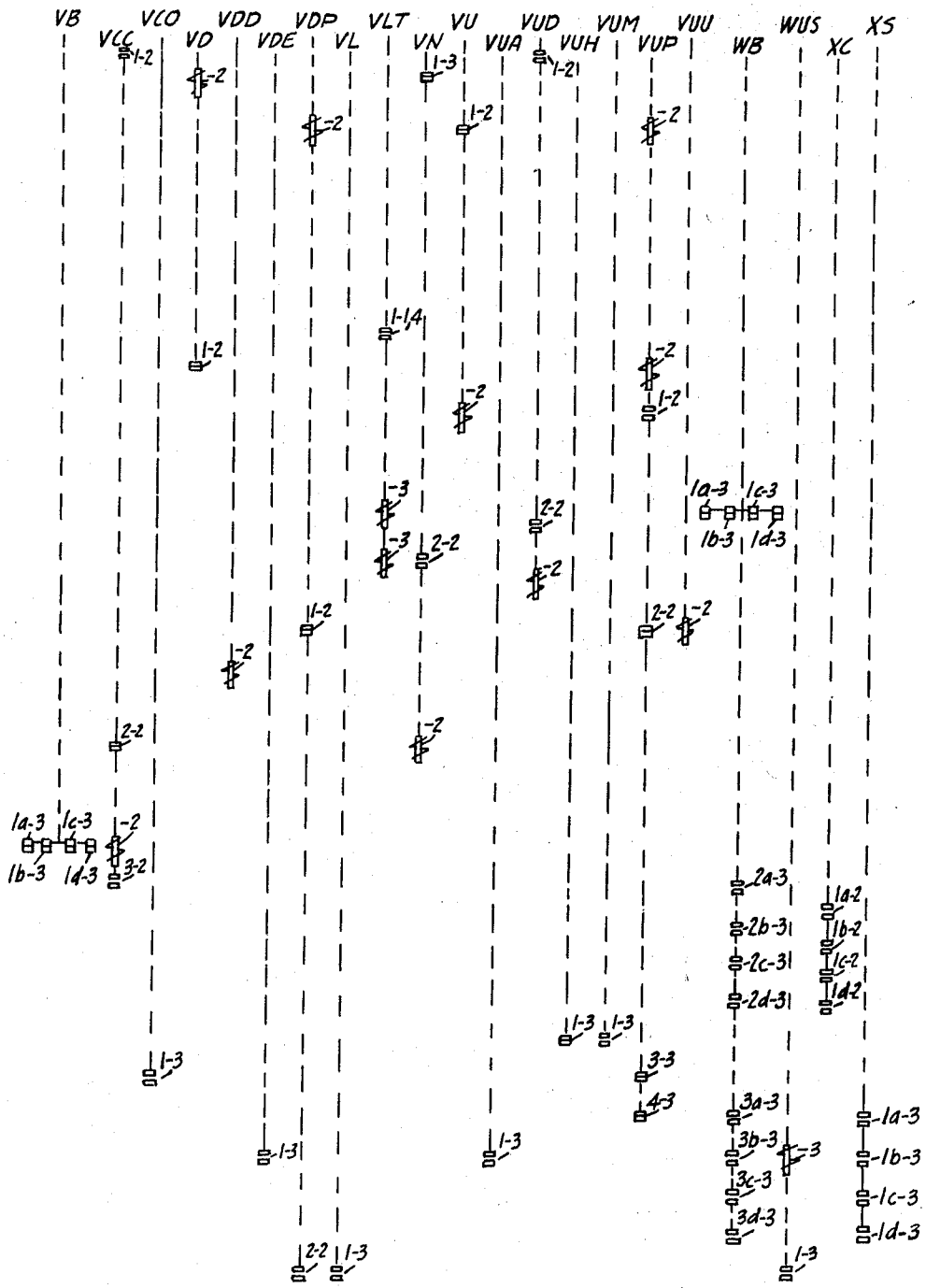


FIG. 5b

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United States Patent Office 2,926,756 Patented Mar. 1, 1960

2,926,756

GROUP SUPERVISORY SYSTEM FOR ELEVATORS

Stephen Anthony Hornung, New York, N.Y., assignor to Otis Elevator Company, New York, N.Y., a corporation of New Jersey

Application November 17, 1958, Serial No. 774,513

31 Claims. (Cl. 187—29)

The invention relates to group supervisory systems for elevators.

In many plural elevator installations, dispatching mechanism is employed for coordinating the operation of the elevators. As service demand conditions vary during the day, the mode of operation of the elevators is changed so as to provide service best suited for the particular service demand conditions. For example in office buildings, the building is populated in the morning, creating up peak traffic conditions, and is depopulated in the evening, creating down peak traffic conditions. Such conditions may also exist at noon as a result of occupants leaving for and returning from lunch. At other times during the working day substantially balanced traffic conditions exist and, at times during this period, traffic in one direction may predominate over that in the other. Also intermittent or night service conditions prevail during the nonworking day.

Systems have been devised for automatically switching over from one mode of operation to another to suit traffic conditions.

There are many factors which have a bearing on traffic conditions and there is considerable advantage in totalizing these factors and weighting them in their exercise of control of the transfer between the different operating modes. It is also of advantage to delay the transfer of mode of operation until a trend is indicated and to control the amount of this delay in accordance with the traffic conditions. Among the factors which may be utilized to measure traffic conditions are unanswered calls registered from landings served by the cars and the loads in the cars. These are factors which are weighted in carrying out the invention.

The object of the invention is to provide an improved control of the transfer between operating modes of an elevator system.

One feature of the invention is to utilize the time before dispatching takes place that a car selected for dispatching has a certain acquired load as a factor controlling the transfer between operating modes.

Another feature is to utilize the load in each car traveling in a given direction as a factor controlling the transfer between operating modes and to maintain the influence of this factor for a certain time interval after the load decreases to a certain value.

Another feature is to effect the transfer between operating modes by way of anticipation under certain traffic conditions.

In carrying out the invention according to the preferred arrangement, a summation is continuously made of up traffic and a summation is continuously made of down traffic. These traffic summations are utilized to control the selection of different operating modes. Among the factors controlling up traffic summation are the number of up landing calls in registration and the amount of load in each car set for upward travel. Among the factors controlling the down traffic summation are the number of down landing calls in registration and the amount of

load in each car set for downward travel. The summations are made of current increments indicative of these traffic controlling factors. These current increments are totalized for each direction and fed to the coils of differential relays which act to control the operating modes. Also a summation is made of both up and down traffic information which is also utilized to control the operating modes.

Other factors are utilized to control the operating modes. One of these is the taking on by a car selected for dispatching from the lower terminal of or of more than a certain load. This factor is given weight dependent upon the time before the dispatching takes place that such load is acquired and is given further weight dependent upon the time before the expiration of a certain time interval after the selection takes place that such load is acquired. Another factor is the departure from the lower terminal of an up car with a load at or above a certain amount under conditions where no other car is available for selection as the next car to be dispatched. This factor is given a weight dependent upon the time that expires after the departure before another car becomes available. The weight of these factors is further increased when there is no down traffic. Still another factor which is given weight in controlling the transfer between operating modes is a down car with a load at or above a certain amount and increasing the weight when there is light up traffic. The system is arranged so that the effect of changes in traffic conditions is gradual so that if the change is only temporary, no change in operating mode is effected. However, when a certain load is acquired in a selected car at the lower terminal, or a certain load is acquired in a car set for down, a test is made to ascertain whether conditions are such that the system warrants a change in operating mode and, if it is, the change is made by way of anticipation.

Features and advantages of the invention will be gained from the above description and from the appended claims.

In the drawings:

Figures 1, 2 and 3 taken together constitute a simplified schematic wiring diagram embodying the invention of circuits for registering traffic demand and circuits controlled by the traffic demand circuits for conditioning an elevator system to provide different modes of operation to suit different traffic conditions;

Figures 4, 2 and 3 taken together consitute similar wiring diagram circuits embodying a modified form of the invention; and

Figures 5*a* and 5*b* are key sheets for Figures 1, 2 and 3, showing the electromagnetic switches in spindle form, these figures also serving as key sheets for Figures 4, 2 and 3.

The invention will be illustrated, by way of example, as applied to the dispatching and control system of the Glaser and Hornung Patent No. 2,589,242 which is illustrated for a four car installation serving nine floors and a basement. The operating programs provided by the system of this patent are for heavy up traffic which is termed Up Peak, for traffic in both directions but with more in the up direction which is termed Heavier Up, for substantially equal traffic in both directions which is termed Balanced, for traffic in both directions but with more in the down direction which is termed Heavier Down, for heavy down traffic which is termed Down Peak and for intermittent traffic which is termed Night, but may also be termed Off Hour or Intermittent. The invention as applied to the system of the Glaser and Hornung patent contemplates automatically switching from one of these programs to another as traffic conditions dictate. While the preferred arrangement contemplates a dispatching and control system with operating programs according to this Glaser and Hornung patent, it is to

be understood that the invention may be applied to other forms of dispatching and control systems in which different operating programs having similar or different features are provided to meet different traffic conditions.

To facilitate and simplify the disclosure, only the circuits for automatically switching over from one program to another are shown. These are illustrated as arranged to control the electromagnetic switches of the aforesaid Glaser and Hornung patent which set that system for these different programs. In view of the various simplifications in the circuits of the Glaser and Hornung patent and those which have been illustrated, it is to be understood that many changes may be made in adapting this invention to commercial installations and to comprehensive dispatching and control circuits not shown herein.

Reference will first be made to the system of Figures 1, 2 and 3. The electromagnetic switches employed in the system illustrated are designated as follows:

BL —Landing call relay
BUS —Business day switch
CS —Car cut out relay
CSC —Continuous service transfer control relay
CUP —Clock up peak relay
DA —Daytime switch
DIDC —Down interim traffic relay
DN —Down direction switch
DPDC —Down peak relay
H —Field and brake switch
HT —Heavy traffic switch
LDH —Load dispatch hold switch
LDT —Light down traffic switch
LDU —Load dispatch up indicating switch
LUT —Light up traffic switch
MCS —Multiple car in service switch
NUR —Down heavy loaded car switch
NUS —Timed down heavy loaded car switch
TUD —Time delay switch
UIDC —Up interim traffic relay
UP —Up direction switch
UPD —Traffic direction switch
UPDC —Up peak relay
VB —Bottom terminal availability relay
VCC —Continuous call switch
VCO —Multiple car switch
VD —Down traffic switch
VDD —Down interim traffic switch
VDE —Detent switch
VDP —Down peak switch
VL —Instantaneous reset switch
VLT —Group selection timed switch
VN —Night traffic switch
VU —Up traffic switch
VUA —Auxiliary up signal switch
VUD —Interim traffic switch
VUH —Up holding switch
VUM —Up manual signal switch
VUP —Up peak switch
VUU —Up interim traffic switch
WB —Bottom terminal selection switch
WUS —Up group dispatch switch
XC —Highest car call relay
XS —Call above relay

Throughout the description which follows, these letters will be applied to the respective switch coils and, with reference numerals appended thereto, they will be applied to the respective switch contacts. Differentiation will be made between the different elevators by appending to the characters employed to designate the various elements of the system lower case letters *a*, *b*, *c* and *d* indicative of the different elevators. Switches LWS are load switches for weighing the loads in the cars and may be mechanically operated, as beneath the car platforms. Contacts UPCL1, UPCL2, DPCL1 and DPCL2 are operated by a twenty four hour clock.

The circuits are shown in "across-the-line" form in which the coils and contacts of the various switches are separated in such manner as to render the circuits as simple and direct as possible. The relationship of the coils and contacts may be seen from Figures 5*a* and 5*b* wherein the switches are arranged in alphabetical order with the coils and contacts of the various switches positioned on spindles. The coils and contacts are related to the wiring diagrams by applying to the particular coil or contact the number of the figure in which it occurs, this being appended following a dash to the particular designation for the contacts. Each coil and contact is positioned on the spindle sheet in horizontal alignment with its position on the particular wiring diagram. Thus to locate contacts DIDC1 for example, referring to spindle sheet 5*a* it will be found that contacts number 1 of switch DIDC have applied thereto following a dash the numeral 3. This means that these contacts appear in Figure 3. The contacts may then be located by aligning the sheet on which Figure 3 appears with the sheet on which Figure 5*a* appears and will be found in Figure 3 in alignment with the contacts in Figure 5*a*.

The electromagnetic switches are illustrated in de-energized condition and switch UPD and DA which are of the latching type are shown in reset condition. Switch UPD has two coils, one an operating or set coil (upper) and the other a reset coil (lower). Switch DA also has an operating or set coil (lower) and a reset coil (upper). Switch BUS has an operating coil and a holding coil.

Of the above electromagnetic switches, TUD, VD, VDD, VDP, VN, VU, VUD, VUP and VUU are switches of the aforementioned Glaser and Hornung patent with the circuits for their coils illustrated. Electromagnetic switches BL, CS, DN, H, UP, VB, VCO, VDE, VL, VUH, VUM, WB and XC are also switches of the aforementioned Glaser and Hornung patent, only contacts of these switches being illustrated, it being understood that the circuits for their coils are as illustrated in the Glaser and Hornung patent.

The coils of the interim traffic relays DIDC and UIDC are coils of a differential relay which exercises control over operation to suit interim traffic conditions which is heavier in one direction than the other. For this reason, they are shown side by side on the spindle sheet with a walking beam connection between the spindles to indicate that it is a differential relay. The same applies to the coils of peak relays DPDC and UPDC, these being coils of a differential relay which exercises control over operation to suit peak traffic conditions.

The direct current supply lines for the circuits of Figure 1 are designated B+, B while the direct current supply lines for the circuits of Figures 2 and 3 are designated W+ and W—.

The coils of these differential relays are supplied with currents in accordance with traffic conditions, these currents being fed to the coils in weighted increments. Referring to Figure 1, the up coils of the differential relays are fed with an increment of current for each up landing call registered. Similarly, the down coils of the differential relays are fed with an increment of current for each down landing call registered. For purposes of simplification, it will be assumed that these cars do not serve a basement. The up landing call registering circuits for floors 3 to 6 and the down landing call registering circuits for floors 4 to 7 are omitted for convenience, they being the same as for the floors for which the circuits are illustrated. As in the Glaser and Hornung patent, the calls are registered on touch button tubes U and D. RUL and RDL are loading resistors for tubes U and D respectively. RUCD are up call demand resistors through which current indicative of service demand due to unanswered up landing calls is fed to the up coils of the differential relays by way of traffic summation circuit UTS. Similarly RDCD are down call demand resistors through which current in-

dicative of service demand due to unanswered down landing calls is fed to the down coils of the differential relays by way of down traffic summation circuit DTS.

The coils of the differential relays are also subject to current increments in accordance with loads carried by the cars. These currents are supplied to the differential relay coils through resistors RL, one for each car. The amount of each of these resistors included in the circuit is controlled by a plurality of load switches LWS, illustrated as four, those for car *a* for example being designated LWS5*a*, LWS2*a* LWS3*a* and LWS4*a*, and set to operate at say 15%, 30%, 50% and 70% of the rated car load. Accordingly each of the resistors is divided into sections designated, for example for car *a*, as RL2*a*, RL3*a* and RL4*a*, each section being adjustable as indicated. Current increments are fed to the coils of the differential relays in accordance with the amount of load in the respective cars. These resistors are also subject to contacts of traffic direction switch UPD of the respective cars so that load current increments for cars set for up are fed by way of up traffic summation circuit UTS to the up coils of the differential relays and for cars set for down are fed by way of down traffic summation circuit DTS to the down coils of the differential relays.

Weight is given other factors in controlling the up coils of the differential relays. One of these factors is the taking on by a selected car at the lower terminal of a certain load. The weight of this factor is increased by taking on this load within a certain time interval after the car is selected, to an extent dependent on the time before said interval expires that the load is acquired. Another factor is the time that elapses after the departure from the lower terminal of an up car with a certain load until the next car becomes available for selection for dispatching. The influence of these factors is obtained by the current supplied by way of circuit UTS to coils UIDC and UPDC through resistor RLX, subject to contacts of switch LDU and resistor RLY subject to contacts of switch LDH, resistor RLX being divided into three sections designated RLX1, RLX2 and RLX3. The weight of these factors is increased when there is little down traffic, this operation being effected by the control of resistor section RLX3 by contacts of switch LDT. Resistors RLX and RLY are subject to capacitor C1. Resistor section RLX1 is subject to contacts of switch VLT. This operation will be understood as the description proceeds.

Also, weight is given a down travelling car with a certain load in controlling the down coils of the differential relays. This is effected through the control of current supplied through resistor RLZ by way of circuit DTS to coils DIDC and DPDC, subject to contacts of switches NUR and NUS, resistor RLZ being divided into two sections RLZ1 and RLZ2. The weight of this factor is increased when there is little up traffic through the control of resistor section RLZ2 by contacts of switch LUT. Resistor RLZ is subject to capacitor C12. Here again, the operation will be understood as the description proceeds.

The coil of light up traffic switch LUT is connected to circuit UTS so as to be subject to the same current increments as the up coils of the differential relays. Similarly the coil of light down traffic switch LDT is connected to circuit DTS so as to be subject to the same current increments as the down coils of the differential relays. The coil of continuous service transfer control relay CSC and the coil of heavy traffic switch HT are subject to the total current flow in the up traffic summation circuit UTS and the down traffic summation circuit DTS. The pull in characteristics of the differential relays, of switches LUT, LDT and HT and of relay CSC are adjustable, as by spring tension and air gap adjustments. This is indicated by diagonal arrows through the coils. Capacitors C4 and C6 control the functioning of coils UIDC and DIDC of the differential relay which exercises control under interim traffic conditions. Capacitors C2 and C10 control the functioning of the coils UPDC and DPDC of the differential relay which exercises control under peak traffic conditions and the coils of switches CSC and HT. VD1, VD2 and VD13 are voltage dividers used to control the value of the voltages utilized in the load factor circuits feeding the up and down traffic summation circuits UTS and DTS.

The circuits for the coils of switches UPD, LDU, VLT, LDH, NUR and NUS are shown in Figures 2 and 3. These figures include circuits for conditioning the system for different modes of operation to suit different traffic conditions. Also, other control circuits are shown. It is believed that the operation of these circuits will be understood from the description of operation of the system represented by Figures 1, 2 and 3.

In describing the operation of the system, it will be assumed that it is operating under the Intermittent (night service) program, switch VN being operated under this condition, and that an influx of incoming traffic at the lower terminal is near. Assume also that car *a* provides service under the Intermittent program. Under such assumption the motor generator set for car *a* is in operation and the motor generator sets for the other cars are shut down. Circuits for effecting this operation are not shown but this may be done, for example, in a manner similar to that set forth in the patent to Glaser and Hornung No. 2,761,528, granted September 4, 1956.

Assume now that, when car *a* arrives at the lower terminal, there are several incoming passengers waiting there and enter the car. This causes the closing of load switch LWS5*a* to complete a circuit through resistor RL*a* by way of the up traffic summation circuit UTS for the up coils UIDC and UPDC of the differential relays and the coils of continuous service transfer control relay CSC and heavy traffic switch HT. This supplies sufficient current to the coil of relay CSC to cause its operation, subject to a small time delay to effect the charging of capacitor C2 to a voltage value sufficient to effect the operation. Upon operation, relay CSC engages contacts CSC1 to complete a circuit for the coil of continuous call switch VCC. This switch operates to engage contacts VCC1 to complete a circuit through contacts VN2 for the coils of up traffic switch VU and up peak switch VUP. It also separates contacts VCC2 to disconnect the coil of night service switch VN from the supply lines. The release of switch VN is delayed by resistor RVN to enable contacts VN2 to remain engaged long enough to effect the operation of switches VU and VUP. Switch VUP, upon operation, engages contacts VUP1 to establish a holding circuit for itself and switch VU through contacts BUS4 and HT2. The operation of switches VU and VUP throws the system to the Up Peak program as explained in the aforesaid Glaser and Hornung Patent No. 2,589,242. In effecting this program change, the motor generator sets for cars *b*, *c* and *d* may be started as set forth in the aforesaid Glaser and Hornung Patent No. 2,761,528. On the other hand, the motor generator sets may be started on a selective basis.

When the system is thrown to the Up Peak program as a result of the operation of switch CSC, upon switch CSC releasing it separates contacts CSC1 to disconnect the coil of switch VCC from the supply lines. Switch VCC does not release immediately due to the discharge of capacitor C8. This may hold the system on the Up Peak program for say 30 seconds. When switch VCC releases, it separates contacts VCC1 to return the system to the Intermittent program.

Should a landing call, or a car call for an in service car, be in registration at the time switch CSC releases, a circuit is maintained for the coil of switch VCC to prevent the system returning to the Intermittent program. In case of a landing call, the circuit for the coil

of switch VCC is through contacts BL1 and VCC3. In case of a car call, in car *a* for example, the circuit is through contacts CS1*a*, XC1*a* and VCC3.

If no more than say two cars are in service, insufficient current is supplied by way of the CS2 contacts of such cars to the coil of multiple car in service switch MCS to maintain that switch operated. As a consequence, contacts MCS1 engage to maintain a circuit for the coils of switches VU and VUP, provided that contacts VCC1 are in engagement. Thus under such conditions, the system can operate only under the Intermittent program or the Up Peak program.

The system may also be thrown to the Up Preak program by clock switch contacts UPCL2. Contacts UPCL2 are set to close at a certain time in the morning and remain closed for a certain period coextensive with the duration of the up peak traffic condition. For convenience it will be assumed that the system has not already been thrown to the Up Peak program by relay CSC at the time that contacts UPCL2 close. The closing of contacts UPCL2 completes a circuit for the coil of clock up peak relay CUP, provided there is sufficient up service demand to cause operation of switch LUT, the circuit being through contacts VCC1 and LUT1. Switch LUT is preferably set to operate before relay CSC in response to the total current in circuit UTS. Relay CUP engages contacts CUP3 to cause operation of switch VCC. It also engages contacts CUP2, completing another circuit for the coils of switches VUP and VU, which operate as above to throw the system to the Up Peak program. Switch VUP as before engages contacts VUP1 to establish a self holding circuit for itself and switch VU. Switch CUP also engages contacts CUP1 to establish a self holding circuit through contacts UPCL2. Thus, once the system has been thrown on the Up Peak program by the operation of the clock, it remains on this program until contacts UPCL2 open. Also clock operated contacts UPCL1 act to prevent during this period the completion of a circuit through contacts DPDC1 for the coils of switches VD and VDP. Contacts UPCL2 also complete a circuit for the set coil of daytime switch DA. This switch operates to latch contacts DA1 in engagement, the purpose of which will be seen as the description proceeds.

It is preferred not to run cars without calls while the system is operating under the Up Peak program, particularly when it is maintained on this program for an extended period as by the clock. This is effected through the control of the up group dispatch switch WUS by contacts XS1 and WB3 of the respective cars. These contacts are rendered effective during the up peak period by the separation of contacts VUP3. With this arrangement, a circuit can not be completed by the engagement of contacts VUA1 at the end of the dispatching timing interval to effect the operation of switch WUS and thus the dispatching of the selected car, say car *a*, the contacts WB3*a* for which are in engagement, unless there is a call in registration to which this car is subject to cause engagement of contacts XS1*a*.

Assume now during this clock controlled Up Peak program that an operation of load dispatch up indicating switch LDU takes place. This is effected as follows. When a car, say car *a*, has been selected, its contacts WB2*a* close. If this car takes on a certain load, say 50% full load, its contacts LW6*a* close to complete through contacts WB2*a* and UPD3*a* a circuit for the coil of switch LDU. Contacts LW6*a* may be set to operate at the same time as contacts LDS*a* of the aforesaid Glaser and Hornung Patent No. 2,589,242, in which event, the operation of switch LDU indicates that an up load dispatch operation is to take place. Switch LDU, upon operation, engages contacts LDU1 to complete a circuit through contacts DA1 and VN1 for the coil of business day switch BUS. This switch operates to engage contacts BUS2, establishing a self holding circuit. It also separates contacts BUS4 so that for the duration of the clock controlled Up Peak program, switches VU and VUP are maintained operated by way of contacts CUP2. It is also quite likely that switch BUS will be operated during the clock controlled Up Peak program by up interim traffic relay UIDC. Operation of relay UIDC causes the engagement of contacts UIDC1 to complete the circuit for the coil of switch BUS.

When the clock controlled up peak period expires, contacts UPCL2 open. This breaks the circuit for the coil of relay CUP which releases to separate contacts CUP2, breaking the circuit for the coils of switches VU and VUP. Switch VUP upon releasing engages contacts VUP2 to complete a circuit by way of contacts VCC1, VDP1, UPDC2 and DPDC2 for the coil of interim traffic switch VUD. Switch VUD operates to throw the system to the Balanced program as explained in the aforementioned Glaser and Hornung Patent No. 2,589,242. Incident to this operation, switch VUD engages contacts VUD1 and VUD2 to cause operation of down traffic switch VD and up traffic switch VU respectively, contacts VD1 and VU1 separating as a result to prevent operation of peak switches VUP and VDP respectively.

It may happen that due to heavy up traffic, up peak relay UPDC will be operated at the time that the clock controlled up peak period expires. Under such conditions, contacts UPDC1 will be engaged, maintaining the system in operation under the Up Peak program until the heavy up traffic condition subsides.

The clock controlled up peak period may expire under conditions where switch BUS is not operated. Should this occur, when contacts UPCL2 open, relay CUP releases to separate contacts CUP3. Assuming that contacts CSC1 are not engaged, this breaks the circuit for the coil of switch VCC which upon expiration of its time delay releases to return the system to the Intermittent program. However, once switch BUS has operated to register a business day, its contacts BUS5 connect capacitor C7 across the coil of switch VCC. This acts to prevent the release of switch VCC and thus the return of the system to the Intermittent program for a longer period, say five minutes, after the disconnection of the coil from the supply lines.

In addition to the system being thrown to the Balanced program from the clock controlled Up Peak program, it may be thrown to the Balanced program from the switch VCC controlled Up Peak program. This is effected by heavy traffic switch HT, the coil of which is connected in parallel with the coil of switch CSC. Switch HT is operated when there is considerable total up and down traffic. This switch, upon operation, separates contacts HT2, breaking the holding circuit for the coils of switches VU and VUP. Switch VUP upon dropping out engages contacts VUP2 to complete, as before, a circuit for the coil of switch VUD, causing the system to be thrown to the Balanced program. Switch HT may also be used when switch KN1 is closed to establish a circuit by its contacts HT1 for the coil of switch BUS, causing the operation of switch BUS to register a business day.

The system may be thrown to the Down Peak program by clock switch contacts DPCL1, provided there is sufficient down traffic, indicated by the engagement of contacts LDT1, or it is a business day, indicated by the operation of switch BUS. Assuming the latter condition, upon the engagement of clock contacts DPCL1 a circuit is completed through contacts VCC1 and BUS1 for the coil of switch VD and through contacts VU1 for the coil of down peak switch VDP. The operation of these switches throws the system over to the Down Peak program as set forth in the aforesaid Glaser and Hornung Patent No. 2,589,242. At the same time, contacts DPCL1 complete a circuit through contacts VCC1 and BUS3 for the holding coil for switch BUS. This maintains contacts BUS1 in engagement and thus the system

on the Down Peak program until contacts DPCL1 open at the end of the clock controlled down peak period. Also a circuit is completed by contacts DPCL1 for the reset coil of switch DA. Switch DA separates contacts DA1 to break the circuit for the operating coil of switch BUS, this switch being maintained operated by its holding coil as above explained. Contacts DPCL2 separate at the same time that contacts DPCL1 engage to prevent, during the clock controlled down peak period, the completion of a circuit through contacts UPDC1 for the coils of switches VU and VUP. Also contacts VDP1 separate to prevent during this period completion of a circuit for the coil of any of switches VUD, VU and VDD.

Assume now that the system is operating under the Balanced program and that a condition arises under which the summation of up traffic current increments exceeds the summation of down traffic current increments. This results in greater current flow in circuit UTS than in circuit DTS. If the difference in current flow is great enough, and is sustained long enough to effect sufficient charging of capacitors C2 and C4, coil UIDC overcomes coil DIDC with the result that contacts UIDC2 engage, completing a circuit through contacts VCC1, VUP2, VDP1, UPDC2 and DPDC2 for the coil of up interim traffic switch VUU. This throws the system over to the Heavier Up program, as explained in the aforementioned Glaser and Hornung Patent No. 2,589,242, switch VUD and thus switches VU and VD being maintained operated. The system may also be thrown to the Heavier Up program from the switch VCC controlled Up Peak program, provided contacts UIDC2 are in engagement at the time that switch HT operates to separate contacts HT2.

Assume now that conditions become such that the summation of up traffic current increments more greatly exceeds the summation of down traffic current increments. If the difference in current flow in the traffic summation circuits UTS and DTS is great enough to indicate an up peak condition, and is sustained long enough to effect sufficient charging of capacitor C2, coil UPDC overcomes coil DPDC with a result that contacts UPDC1 engage and contacts UPDC2 separate. The separation of the latter contacts breaks the circuit for the coils of switches VUD and VUU, causing the release of these switches and, as a result of the separation of contacts VUD1, the release of switch VD. Contacts UPDC1 bypass contacts VUD2, maintaining switch VU operated and causing operation of switch VUP, contacts VD1 closing as a result of the release of switch VD. The operation of switches VU and VUP throws the system over to the Up Peak program.

Assume again that the system is operating under the Balanced program and that a condition arises under which the summation of down traffic current increments exceeds the summation of up traffic current increments. This results in greater current flow in circuit DTS than in circuit UTS. If the difference in current flow is great enough and is sustained long enough to effect sufficient charging of capacitors C6 and C10, coil DIDC overcomes coil UIDC with the result that contacts DIDC2 engage, completing a circuit through contacts VCC1, VUP2, VDP1, UPDC2 and DPDC2 for the coil of down interim traffic switch VDD. This throws the system over to the Heavier Down program, as explained in the aforesaid Glaser and Hornung Patent No. 2,589,242, again switches VUD, VU and VD being maintained operated.

Assume now that conditions become such that the summation of down traffic current increments greatly exceeds the summation of up traffic current increments. If the difference in current flow in the traffic summation circuits UTS and DTS is great enough, and is sustained long enough to effect sufficient charging of capacitor C10, coil DPDC overcomes coil UPDC with the result that contacts DPDC1 engage and contacts DPDC2 separate. The separation of contacts DPDC2 breaks the circuit for the coils of switches VUD and VDD with a result that switches VUD, VU and VDD release. The engagement of contacts DPDC1 completes a circuit through contacts VCC1 and UPCL1 (it being assumed that the clock controlled up peak period is over) for the coils of switches VD and VDP, the circuit for the coil of switch VDP also extending through contacts VU1. Thus switch VD is maintained operated and switch VDP is operated, which throws the system over to the Down Peak program.

It may happen that, while the system is operating under the Balanced program, peak traffic conditions suddenly arise. Assume, for example, that the sudden peak traffic is in the up direction. Owing to the time constants involved, due to the relative sizes of capacitors C2 and C4, relay UPDC operates before relay UIDC, acting through contacts UPDC2 to prevent the operation of switch VUU, thus causing the operation through contacts UPDC1 of switches VUP and VU to throw the system over to the Up Peak program directly without first going to the Heavier Up program. Similar operation is had in case of sudden down peak traffic, the system, due to the prior operation of relay DPDC, being thrown to the Down Peak program directly, without first going to the Heavier Down program.

So long as peak traffic conditions are sustained, the system remains on the peak program. However, when the peak traffic decreases, the system is thrown to the heavier traffic program. For example, assume that the system is operating under the Down Peak program. Under such conditions, both relays DPDC and DIDC are operated. Upon the sustained decrease in down traffic to decrease the value of the current supplied to the coil of relay DPDC over that supplied to the coil of relay UPDC to a certain value, relay DPDC releases. The resulting separation of contacts DPDC1 breaks the circuit for the coils of switches VD and VDP which release. The engagement of contacts DPDC2 along with contacts VDP1 completes a circuit for the coil of switch VUD and through contacts DIDC2 for the coil of switch VDD. As a result, switches VDD, VUD and VD operate, throwing the system over to the Heavier Down program. In a similar manner, should the preponderance of down traffic over up traffic decrease still further to a point where relay DIDC releases, the separation of contacts DIDC2 causes release of switch VDD, throwing the system over to the Balanced program.

Similarly, when the system is operating under the Up Peak program and the difference between total up traffic and total down traffic decreases to a certain value and is sustained long enough, relay UPDC releases, completing a circuit by its contacts UPDC2 for the coils of switch VUD and VUU, throwing the system over to the Heavier Up program. Likewise, when this difference decreases to a certain lesser value, relay UIDC releases, causing release of switch VUU to throw the system over to the Balanced Program.

The relative values of the call demand resistors RUCD and RDCD and load controlled resistors RL and dependent on the characteristics of the particular installation. In general, say for a fifteen floor installation, each of the load switches LWS5 and LWS2 upon operation, causes an increase in current supplied to the differential relay coils in an amount equivalent to that provided by say the registration of two and a half landing calls; and each of load switches LWS3 and LWS4, upon operation, causes an increase in current supplied to the differential relay coils in an amount equivalent to that provided by the registration of three landing calls. Subject to other factors, this may be scaled down for a lesser number of floors and scaled up for a greater number of floors.

When a car is set for upward travel, the load controlled resistor RL for that car is conditioned by engaged contacts UPD1 of the traffic direction switch for that car for control of the current supplied to up traffic summation circuit UTS. Similarly, when a car is set for downward travel, the load controlled resistor RL for that car is con-

ditioned by engaged contacts UPD2 for that car for control of the current supplied to down traffic summation circuit DTS. The traffic direction switch UPD for each car is controlled by the direction switches UP and DN and load switch LWS1 for that car to prevent an operation (or reset) of the switch, when a stop is made under conditions where there is to be a change in direction of car travel, by passengers in the car to be discharged until the load in the car decreases to a certain low value, or until the car is started in the opposite direction. For example, as say car *a* arrives at the lower terminal, switch UPD*a* is in reset condition so that initially contacts UPD2*a* are in engagement. As the stop is made, contacts DN1*a* separate and contacts UP1*a* engage. Also contacts H1*a* separate so that the set coil of switch UPD*a* cannot be energized by way of contacts UP1*a* until the load in the car has decreased to a value to permit the engagement of the contacts of load switch LWS1*a*. In this way service demand current due to passengers being discharged at the lower terminal is prevented from being supplied to the up traffic summation circuit UTS.

As pointed out before, other factors control the amount of current supplied to the up traffic summation circuit. One of these is the taking on by a selected car at the lower terminal of a certain load and increasing the weight of this factor by an amount dependent upon the time before the expiration of a certain time interval after the car is selected that the load is acquired. The operation is obtained through the control of resistor RLX. This resistance is connected to influence the amount of current supplied to the up traffic summation circuit UTS by operation of a load switch which may be the load dispatch up indicating switch LDU and has been so illustrated. As pointed out before, this switch is operated when a car, say car *a*, has been selected, indicated by the engagement of contacts WB2*a* and has taken on a certain load, indicated by the operation of load switch LWS6*a*. Contacts UPD3*a* prevent the establishment of this circuit by a load to be discharged from the car after its arrival at the lower terminal. Upon operation, switch LDU engages contacts LDU2 to connect resistor RLX to circuit UTS.

When a car, say car *a*, is selected for up dispatch from the lower terminal, switch WB*a* also separates contacts WB1*a* to disconnect the coil of group selection timed switch VLT from the supply lines. This switch does not release immediately, being delayed for a certain period, say six seconds, by the discharge of capacitor C3. When switch VLT has not released when contacts LDU2 engage, contacts VLT1 short circuit resistor section RLX1 to cause a certain amount of current to be supplied to circuit UTS by way of resistor RLX. Should switch VLT release before switch LDU operates, then contacts VLT1 are separated at the time that contacts LDU2 engage so that less current is supplied to circuit UTS by way of resistor RLX. Should the down traffic be so light that switch LDT is released, contacts LDT2 are engaged, short circuiting section RLX3 of resistor RLX, to increase the current flow by way of this circuit to circuit UTS. This is another factor controlling current flow to the up traffic summation circuit.

Load dispatch of the selected car can not be effected until time delay switch TUD for the selected car releases after the stop is made. The coil of this switch, say for car *a*, is disconnected by contacts H2*a* from the supply lines as the stop is made, but is delayed in releasing by the discharge from capacitor C5*a*, say for nine seconds. When no car is at the lower terminal at the time a car is dispatched, the next car is selected upon its arrival at the lower terminal. Under such conditions, the time delays for switches TUD and VLT start to run at substantially the same time. When the load dispatch takes place, switch WB*a* releases to separate contacts WB2*a*, breaking the circuit for the coil of switch LDU. This switch is delayed in releasing, say for one second, by the discharge of capacitor C11. Thus current is supplied to the up traffic summation circuit UTS by way of resistor RLX for the time that switch LDU is operated. Thus the quicker the car takes on sufficient load to operate switch LDU, the longer the current is supplied to circuit UTS and the longer the time it is effective for charging capacitors C2 and C4. This action is increased if switch VLT has not released before switch LDU operates and further increased if switch LDT is released, in each case by increasing the amount of current supplied to circuit UTS. This arrangement acts to augment the action of other up traffic measuring factors, especially that provided by the control of resistors RL, as the resistor RL for the selected car, say car *a*, will be connected in circuit and partially short circuited under the assumed conditions. The net result is to cause the change to the Heavier Up program or Up Peak program to be effected more quickly. This is further augmented by the action of capacitor C1 which acts to insert the resistor gradually in circuit and thus to provide a pulse of current, additional to that supplied to circuit UTS so that if the difference in traffic conditions is such as to warrant the program change, this pulse will effect the immediate switchover by way of anticipation, counteracting the effect of the capacitors C2 and C4. The amount of the resistor short circuited by capacitor C1 depends upon the requirements of the particular installation and may be only a portion of section RLX2 or may exclude section RLX3.

Switch VLT may be provided with a holding coil illustrated as rendered effective by the closing of lamp switch KN2. With such arrangement should switch LDU operate before switch VLT releases, the engagement of contacts LDU3 completes a circuit for the holding coil of switch VLT to maintain switch VLT operated until the car is dispatched.

When switch LDU operates, it also engages contacts LDU4 to cause operation of load dispatch hold switch LDH. When switch LDU releases as a result of the load dispatch taking place, the separation of contacts LDU4 does not break the circuit for the coil of switch LDH if no other car is available for selection as the engagement of contacts VB1 for the dispatched car, say contacts VB1*a* for car *a*, completes a holding circuit for switch LDH by way of contacts LDH2. The maintaining of switch LDH operated is assured by capacitor C9 which discharges current into the coil of switch LDH should there be a momentary disconnection of the coil from the supply lines.

Switch LDH, upon operation, engages contacts LDH1 to connect resistor RLY in parallel with resistor section RLX1. Should contacts VLT1 be engaged at this time, resistor RLY is short circuited. When switch LDU releases as a result of the load dispatch operation under conditions where no other car is available for selection at the lower terminal, contacts LDH1 cause current to be supplied to circuit UTS by way of resistor RLY and resistor sections RLX2 and RLX3. This circuit is maintained until another car arrives at the lower terminal to become available, at which time contacts VB1 for that car separate to break the holding circuit for the coil of switch LDH. This switch then drops out to separate contacts LDH1, disconnecting the circuit through resistor RLY to the up traffic summation circuit UTS.

The control exercised by switch LDH is still another factor which controls the amount of current supplied to the up traffic summation circuit. This control enables the load for the next selected car to be anticipated under conditions where no car is at the lower terminal to take on passengers. The load in the departing car is indicative of what the load will be in the next car and thus serves as a basis on which the estimate is made. Also, the longer time that elapses after the departure of the dispatched car before another car becomes available, the more load that car will accumulate. This feature is desirable as it enables a proper balance to be made

with respect to down traffic summation, which is more readily measurable.

Other factors also control the amount of current supplied to the down traffic summation circuit. One of these is the taking on of a certain load by a down car, either at the point it becomes set for down, say at the upper terminal, or on its downward trip. The operation is obtained by the control of resistor RLZ. This resistor is connected to influence the amount of current supplied to the down traffic summation circuit DTS by operation of down heavy loaded car switch NUR. The coil of switch NUR is controlled by load switches LWS7, one for each car. When the load in a car, say car *a*, reaches a certain amount, say 70% of full load, switch LWS7*a* closes for completing a circuit for the coil of switch NUR. This circuit can not be completed until switch UPD*a* is reset to down condition. Load switch LWS1*a* prevents the establishment of the circuit for the reset coil of switch UPD*a* by contacts DN1*a* until after the car has had a chance to empty when the stop is made. If enough people remain in the car on a reversal stop, switch H*a* engages contacts H1*a* to cause the reset of switch UDP*a* incident to the starting of the car in the down direction. Switch UPD*a*, upon being reset, engages contacts UPD4*a* to enable the circuit for the coil of switch NUR to be completed.

Switch NUR, upon operation, engages contacts NUR1 to connect resistor RLZ to circuit DTS, thus increasing the amount of current supplied to the down coils of the differential relays. If there is light up traffic at the time that contacts NUR1 close, contacts LUT2 are in engagement, short circuiting resistor section RLZ2 and thus increasing the current flow by way of this circuit to circuit DTS. This arrangement acts to augment the action of other down traffic measuring factors, especially that provided by the control of resistors RL, as the resistor RL for the car affected will be connected in circuit and partially short circuited under the assumed conditions. The net result is to cause the change to the Heavier Down program or Down Peak program to be effected more quickly. This is further augmented by the action of capacitor C12 which acts initially as a short circuit for the resistor and thus to insert it gradually in circuit. This provides a pulse of current to test whether the difference in traffic conditions is such as to warrant a program change to heavier down or down peak operation. If it is, the pulse will effect the immediate switchover by way of anticipation, counteracting the effect of capacitors C6 and C10. The amount of the resistor short circuited by capacitor C12 depends upon the requirements of the particular installation and may exclude section RLZ2 or may be only a portion of section RLZ1.

Switch NUR, upon operation, also engages contacts NUR2 which act, provided the system is on or is thrown over to the Down Peak program so that contacts VDP2 are engaged, to complete a circuit for the coil of switch NUS. This switch operates to engage contacts NUS1, bypassing contacts NUR1 in the circuit connecting resistor RLZ to the down traffic summation circuit. The discharge of capacitor C13 acts to maintain switch NUS operated, say for ten seconds, after the release of switch NUR. This maintains resistor RLZ connected in circuit and thus tends to maintain the system on the Down Peak program for this time interval. As a result the system is prevented from being switched off the Down Peak program by temporary conditions, when such switch off is not warranted. More specifically, when switch NUR is operated, the car which caused the operation will be automatically bypassing down calls on its downward trip and thus make the trip more quickly to the lower terminal. Thus, the action of switch NUR to insert resistor RLZ would be of shorter duration. Switch NUS, by maintaining resistor RLZ connected for a longer period, acts to remember that the car which caused the operation of switch NUR during down peak acted to bypass down calls.

There may occur, especially in certain installations, periods of considerable traffic in both directions. It is preferred to prevent the automatic switchover to a heavier traffic or peak program under such conditions even though the difference in traffic in the two directions is sufficient to cause such switchover under lighter traffic conditions. Such an arrangement is illustrated in Figure 4. In this arrangement, instead of the current supplied to traffic summation circuits being fed direct to the coils UIDC, DIDC, UPDC and DPDC of the differential relays, they are utilized to control electronic tubes IDCT and PDCT which in turn control the operation of the relays. These tubes may be dual triode vacuum tubes, such as a 6SN7. With this arrangement, switches LUT, LDT and HT and relay CSC are also controlled through tubes LUTT, LDTT, HTT and CSCT respectively. These latter tubes are illustrated as gaseous discharge tubes, such as a 2050. In this figure the traffic summation circuits are the same as those in Figure 1. The circuits of Figure 4 control those of Figures 2 and 3, the same as with Figure 1. The key sheets of Figures 5*a* and 5*b* apply to Figure 4 as well as to Figure 1. PT3, PT4, PT5, PT6, PT7, PT8, PT9, PT10, PT11 and PT12 are additional voltage dividers utilized to adjust the potentials of various elements of the tubes. Resistors RGI are control electrode isolating resistors for the gaseous discharge tubes. Resistors RG are series grid resistors for vacuum tubes IDCT and PDCT. Coils UIDC and DIDC of the interim traffic differential relay are connected in the plate circuits of tube IDCT while coils UPDC and DPDC of the peak traffic differential relay are connected in the plate circuits of tube PDCT. These plate circuits are supplied with direct current from supply lines B+, B. The coils of switches LUT, LDT, CSC and HT are connected in the anode-cathode circuits of tubes LUTT, LDTT, CSCT and HTT respectively. These anode-cathode circuits are supplied with alternating current from the secondary winding of transformer TS connected to alternating source AC, superimposed upon direct current from supply lines B, B—. Capacitors C2, C4, C6 and C10 serve the same purpose as in the circuits of Figure 1, capacitors C4 and C6 being connected across coils UIDC and DIDC respectively and capacitors C2 and C10 being connected across resistors RCX2 and RCX10 respectively, subject to the currents in up traffic summation circuit UTS and down traffic summation circuit DTS respectively.

The operation of the circuits of Figure 4 taken in conjunction with those of Figures 1 and 2 is similar to that provided by the circuits of Figure 1, taken in conjunction with those of Figures 1 and 2 previously described. When the current in up traffic summation circuit UTS or down traffic summation circuit DTS, or both, rises to a certain value, the voltage applied to the appropriate control electrode or both electrodes of tube CSCT causes the tube to conduct and thus causes operation of switch CSC. When there is considerable total up and down traffic, the voltages applied to the two control electrodes of tube HTT add to cause the tube to conduct and thus cause operation of switch HT. When there is more than light up traffic, the voltage applied to the control electrode of tube LUTT causes the tube to conduct and thus causes operation of switch LUT. Similarly, when there is more than light down traffic, voltage applied to the control electrode of tube LDTT causes the tube to conduct and thus causes operation of switch LDT.

Referring now to the control of tubes IDCT and PDCT, the voltages applied to the upper control grids of these tubes are taken off voltage dividers PT4 and PT5 and the voltages applied to the lower control grids of these tubes are taken off voltage dividers PT10 and PT11. The voltage drop across each of voltage dividers PT4 and PT5 is proportional to the total current supplied to circuit

UTS while the voltage drop across each of voltage dividers PT10 and PT11 is proportional to the total current supplied to circuit DTS. The points on these voltage dividers to which the grids are connected are such that in each case the grid is negative with respect to the cathode for which it is provided. As the current in the traffic summation circuit to which the grid is subject arises, the grid becomes less negative with respect to the cathode, causing increasing current flow in the plate circuit controlled by that grid and thus in the coil of the differential relay in that plate circuit. Thus, for example, in the case of tube IDCT, should conditions become such that the current flow through coil UIDC becomes sufficiently greater than that through coil DIDC, the differential relay operates to cause switchover to the Heavier Up program.

Due to the characteristics of the tube, when the grid voltage reaches a value such that there is zero potential drop between the grid and the cathode, further increase in current in the traffic summation circuit results in increased potential drop in the grid resistor without changing the grid voltage. As a result there is no further increase in plate current with further increase in current in the traffic summation circuit. Thus if, at the time that the difference in current supplied to the two traffic summation circuits is sufficient to cause operation of say the interim traffic differential relay to switch over to a heavier program, the current flow in the one half of tube IDCT is at or above a certain value the current flow in the other half, due to saturation, can not reach a value to cause sufficient difference in current flow to cause the switchover to take place. The same applies to the operation of tube PDCT to effect a switch over to a peak program. This prevents a switch over to a heavier traffic program or a peak program under conditions where there is considerable traffic in both directions such that a program change would not be warranted.

As changes can be made in the above described system and many apparently different embodiments of this invention can be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown on the accompanying drawings be interpreted as illustrative only and not in a limiting sense.

What is claimed is:

1. In a dispatching and control system for a plurality of elevator cars, mechanism for dispatching the cars from a given floor, means for selecting the cars for said dispatching by said mechanism, means for causing said dispatching of the cars to be under a first mode of operation suited for certain traffic conditions, means for causing said dispatching of the cars to be under a second mode of operation under which the traffic in a direction away from said given floor exceeds that in the other direction by an amount which is greater than under said first mode of operation, means for automatically switching over from said first mode of operation to said second mode of operation, means responsive to a selected car taking on at said given floor a load at or above a certain amount for controlling operation of said switching means, and means for increasing the effect of said load responsive means when said certain amount of load is acquired before the expiration of a certain interval after the selection of such car takes place.

2. In a dispatching and control system for a plurality of elevator cars, mechanism for dispatching the cars from a given floor, means for selecting the cars for said dispatching by said mechanism, means for causing said dispatching of the cars to be under a first mode of operation suited for certain traffic conditions, means for causing said dispatching of the cars to be under a second mode of operation under which the traffic in a direction away from said given floor exceeds that in the other direction by an amount which is greater than under said first mode of operation, means for automatically switching over from said first mode of operation to said second mode of operation, means responsive to a selected car taking on at said given floor a load at or above a certain amount for controlling operation of said switching means, and means for weighting the effect of said load responsive means in accordance with the amount of time before the expiration of a certain interval after the selection of such car takes place that said certain amount of load is acquired.

3. In a dispatching and control system for a plurality of elevator cars, mechanism for dispatching the cars on their upward trips from a lower terminal floor, means for selecting the cars for said dispatching by said mechanism, means for causing said dispatching of the cars to be under a mode of operation suited for substantially equal up and down traffic conditions, means for causing said dispatching of the cars to be under a mode of operation suited for more traffic in the up direction than in the down direction, means for automatically switching over from said mode of operation suited for substantially equal up and down traffic to said mode of operation suited for more traffic in the up direction than in the down direction, means responsive to a selected car taking on at the lower terminal floor a load at or above a certain amount for controlling operation of said switching means, and means for weighting the effect of said load responsive means in accordance with the amount of time before the expiration of a certain interval after the selection of such car takes place that said certain amount of load is acquired.

4. In a dispatching and control system for a plurality of elevator cars, mechanism for dispatching the cars on their upward trips from a lower terminal floor, means for selecting the cars for said dispatching by said mechanism, means for causing said dispatching of the cars to be under a mode of operation suited for substantially equal up and down traffic conditions, means for causing said dispatching of the cars to be under a mode of operation suited for more traffic in the up direction than in the down direction, means for automatically switching over from said mode of operation suited for substantially equal up and down traffic to said mode of operation suited for more traffic in the up direction than in the down direction, means responsive to a selected car taking on at the lower terminal floor a load at or above a certain amount for controlling operation of said switching means, means for increasing the effect of said load responsive means in accordance with the time before dispatching takes place that such load is acquired, and means for further increasing the effect of said load responsive means in accordance with the amount of time before expiration of a certain interval after selection of such car takes place that such load is acquired.

5. In a dispatching and control system for a plurality of elevator cars; mechanism for dispatching the cars from a given floor; means for selecting the cars for said dispatching by said mechanism; means for causing said dispatching of the cars to be under a mode of operation suited for substantially equal up and down traffic conditions; means for causing said dispatching of the cars to be under a mode of operation suited for heavier traffic in the up direction; means for causing said dispatching of the cars to be under a mode of operation suited for up peak traffic; means for automatically switching over between said modes of operation; and means for controlling operation of said switching means in switching over from said mode of operation for substantially equal up and down traffic conditions to said mode of operation for heavier traffic in the up direction and from said mode of operation for heavier traffic in the up direction to said mode of operation for up peak traffic comprising, means responsive to a selected car taking on at the lower terminal floor a load at or above a certain amount for exercising a portion of said control of said switching means, and means for weighting the effect of said load responsive means in accordance with the amount of time

before the expiration of a certain interval after the selection of such car takes place that said certain amount of load is acquired.

6. In a dispatching and control system for a plurality of elevator cars; mechanism for dispatching the cars from a lower dispatching floor; means for selecting the cars for said dispatching by said mechanism; means for causing said dispatching of the cars to be under a mode of operation suited for certain traffic conditions; means for causing said dispatching of the cars to be under a mode of operation suited for greater traffic in the up direction than during said certain traffic conditions; means for switching over from said mode of operation suited for certain traffic conditions to said mode of operation suited for greater traffic in the up direction; a differential relay having an up coil and a down coil acting in opposition to each other; a source of current; means for supplying current to said down coil in an amount representing a summation of down traffic conditions; and means for supplying current to said up coil in an amount representing a summation of up traffic conditions, said last named means comprising, means responsive to a selected car taking on at said lower dispatching floor a load at or above a certain amount for supplying current to said up coil, and means for causing said load responsive current to rise to a certain value more quickly, the sooner before the expiration of a certain interval after the selection of such car takes place that said certain amount of load is acquired, said relay acting upon a certain preponderance of up traffic over down traffic to cause operation of said switching means automatically to effect said switchover.

7. In a dispatching and control system for a plurality of elevator cars; mechanism for dispatching the cars from a lower dispatching floor; means for selecting the cars for said dispatching by said mechanism; means for causing said dispatching of selected cars to take place at timed intervals; means responsive to a selected car taking on a load at or above a certain amount for causing said dispatching of that car ahead of the timed interval; means for causing said dispatching of the cars to be under a mode of operation suited for certain traffic conditions; means for causing said dispatching of the cars to be under a mode of operation suited for more traffic in the up direction than in the down direction; means for switching over from said mode of operation suited for certain traffic conditions to said mode of operation suited for more traffic in the up direction than in the down direction; a differential relay having an up coil and a down coil acting in opposition to each other; a source of current; means for supplying current to said down coil in an amount representing a summation of down traffic conditions; and means for supplying current to said up coil in an amount representing a summation of up traffic conditions, said last named means comprising, means responsive to a selected car taking on at said lower dispatching floor said load for effecting said dispatch of the car for supplying current to said up coil in accordance with the amount of time before the expiration of a certain interval after the selection of such car takes place that said certain amount of load is acquired, said relay acting upon a certain preponderance of current supplied to said up coil over that supplied to said down coil to cause operation of said switching means automatically to effect said switchover.

8. In a dispatching and control system for a plurality of elevator cars; mechanism for dispatching the cars from a lower dispatching floor; means for selecting the cars for said dispatching by said mechanism; means for causing said dispatching of the cars to be under a mode of operation suited for certain traffic conditions; means for causing said dispatching of the cars to be under a mode of operation suited for more traffic in the up direction than in the down direction; means for switching over from said mode of operation suited for certain traffic conditions to said mode of operation suited for more traffic in the up direction than in the down direction; a differential relay having an up coil and a down coil acting in opposition to each other; a source of current; means for supplying current to said down coil in an amount representing a summation of down traffic conditions; means for supplying current to said up coil in an amount representing a summation of up traffic conditions, said last named means comprising, means responsive to a selected car taking on at said lower dispatching floor a load at or above a certain amount for supplying a portion of said current to said up coil, means for increasing the amount of such portion of current when said certain amount of load is acquired before the expiration of a certain interval after the selection of such car takes place; and means for causing any increase in the amount of current supplied to each of said coils to take place gradually, said relay acting upon a certain preponderance of current supplied to said up coil over that supplied to said down coil to cause operation of said switching means automatically to effect said switchover.

9. In a dispatching and control system for a plurality of elevator cars; mechanism for dispatching the cars from a lower dispatching floor; means for selecting the cars for said dispatching by said mechanism; means for causing said dispatching of the cars to be under a mode of operation suited for substantially equal up and down traffic; means for causing said dispatching of the cars to be under a mode of operation suited for heavier traffic in the up direction than in the down direction; means for causing said dispatching of the cars to be under a mode of operation suited for up peak traffic; means for switching over between said modes of operation; a heavy traffic differential relay; a peak traffic differential relay, each differential relay having an up coil and a down coil acting in opposition to each other; a source of current; means for supplying current to said down coils in an amount representing a summation of down traffic conditions; means for supplying current to said up coils in an amount representing a summation of up traffic conditions, said last named means comprising, means responsive to a selected car taking on at said lower dispatching floor a load at or above a certain amount for supplying a portion of said current to said up coils, means for increasing the amount of such portion of current when said certain amount of load is acquired before the expiration of a certain interval after the selection of such car takes place; and means for causing any increase in the amount of current supplied to each of said coils to take place at a rate dependent upon the amount of increase, said heavier traffic relay acting upon a certain preponderance of current supplied to its up coil over that supplied to its down coil to cause operation of said switching means automatically to effect switchover from said mode of operation suited for substantially equal up and down traffic to said mode of operation suited for heavier traffic in the up direction, and said peak traffic relay acting upon a certain greater preponderance of current supplied to its up coil over that supplied to its down coil to cause operation of said switching means automatically to effect switchover from said mode of operation suited for heavier traffic in the up direction to said mode of operation suited for up peak traffic.

10. In a dispatching and control system for a plurality of elevator cars; mechanism for dispatching the cars from a lower dispatching floor; means for selecting the cars for said dispatching by said mechanism; means for causing said dispatching of the cars to be under a mode of operation suited for certain traffic conditions; means for causing said dispatching of the cars to be under a mode of operation suited for more traffic in the up direction than in the down direction; means for switching over between said modes of operation; a differential relay hav-

ing an up coil and a down coil acting in opposition to each other; a source of current; means for supplying current to said down coil in an amount representing a summation of down traffic conditions; means for supplying current to said up coil in an amount representing a summation of up traffic conditions, said last named means comprising, means responsive to a selected car taking on at said lower dispatching floor a certain amount or more of load for supplying a certain amount of said up traffic summation current to said up coil; means for increasing said certain amount of current when said certain amount of load is acquired before the expiration of a certain time interval after the selection of such car takes place; and means for causing any change in the value of current supplied to said up coil to take place gradually, said relay acting upon a certain preponderance of current supplied to said up coil over that supplied to said down coil to cause operation of said switching means automatically to effect switchover from said mode of operation suited for certain traffic conditions to said mode of operation suited for more traffic in the up direction than in the down direction and acting upon a decrease in the value of current supplied to said up coil over that to said down coil to a certain value to cause operation of said switching means automatically to effect switchover back to said mode of operation suited for certain traffic conditions.

11. In a dispatching and control system for a plurality of elevator cars; mechanism for dispatching the cars from a lower dispatching floor; means for selecting the cars for said dispatching by said mechanism; means for causing said dispatching of the cars to be under a mode of operation suited for substantially equal up and down traffic; means for causing said dispatching of the cars to be under a mode of operation suited for heavier traffic in the up direction than in the down direction; means for causing said dispatching of the cars to be under a mode of operation suited for up peak traffic; means for switching over between said modes of operation; a heavy traffic differential relay; a peak traffic differential relay, each differential relay having an up coil and a down coil acting in opposition to each other; a source of current; means for supplying current to said down coils in an amount representing a summation of down traffic conditions; means for supplying current to said up coils in an amount representing a summation of up traffic conditions, said last named means comprising, means responsive to a selected car taking on at said lower dispatching floor a load at or above a certain amount for supplying a portion of said current to said up coils, means for increasing the amount of such portion of current when said certain amount of load is acquired before the expiration of a certain interval after the selection of such car takes place; and means for causing any change in the amount of current supplied to each of said coils to take place at a rate dependent upon the amount of change, said heavier traffic relay acting when a certain preponderance of current supplied to its up coil rises over that supplied to its down coil to cause operation of said switching means automatically to effect switchover from said mode of operation suited for substantially equal up and down traffic to said mode of operation suited for heavier traffic in the up direction and to effect a switchback to said mode operation suited for substantially equal up and down traffic when the excess of current supplied to its up coil over that supplied to its down coil decreases to a certain value, and said peak traffic relay acting upon a certain greater preponderance of current supplied to its up coil over that supplied to its down coil to cause operation of said switching means automatically to effect switchover from said mode of operation suited for heavier traffic in the up direction to said mode of operation suited for up peak traffic and to effect a switchback to said mode of operation suited for heavier traffic in the up direction when the excess of current supplied to its up coil over that supplied to its down coil decreases to a certain value.

12. In a dispatching and control system for a plurality of elevator cars, mechanism for dispatching the cars from a given floor, means for causing said dispatching of the cars to be under a mode of operation suited for certain traffic conditions, means for causing said dispatching of the cars to be under a mode of operation suited for other traffic conditions, switching means for automatically switching over from said mode of operation for certain traffic conditions to said mode of operation for other traffic conditions, and means responsive to a car leaving said given floor with a load at or above a certain amount under conditions where no other car is available to receive passengers at that floor for exerting control of said switching means until another car becomes available.

13. In a dispatching and control system for a plurality of elevator cars; mechanism for dispatching the cars from a lower terminal floor; means for selecting the cars for said dispatching by said mechanism; means for causing said dispatching of the cars to be under a mode of operation suited for certain traffic conditions; means for causing said dispatching of the cars to be under a mode of operation suited for greater traffic in the up direction than during said certain traffic conditions; switching means for automatically switching over from said mode of operation for certain traffic conditions to said mode of operation for greater traffic in the up direction; and means for controlling operation of said switching means in effecting said switchover comprising, means responsive to a selected car leaving the lower terminal floor with a load at or above a certain amount under conditions where no other car is available for selection as next to be dispatched from the lower terminal floor for exercising a portion of said control of said switching means, and means for rendering said car leaving responsive means ineffective as son as another car becomes available.

14. In a dispatching and control system for a plurality of elevator cars; mechanism for dispatching the cars from a lower dispatching floor; means for selecting the cars for said dispatching by said mechanism; means for causing said dispatching of the cars to be under a mode of operation suited for certain traffic conditions; means for causing said dispatching of the cars to be under a mode of operation for a certain preponderance of traffic in the up direction over that in the down direction; an up traffic summation circuit; a down traffic summation circuit; means responsive to the difference in current supplied to said traffic summation circuits for causing switchover between said modes of operation; means for supplying current to said down traffic summation circuit in an amount representing a summation of down traffic conditions; means for supplying current to said up traffic summation circuit in an amount representing a summation of up traffic conditions, said last named means comprising, means responsive to a selected car leaving said lower dispatching floor with a certain amount or more of load under conditions where no other car is available as next to be dispatched from the lower terminal floor for supplying a certain portion of said current to said up traffic summation circuit, and means for rendering said car leaving responsive means ineffective as soon as another car becomes available; and means for causing the effect on said switchover means of any increase in the value of curernt supplied to each of said traffic summation circuits to take place gradually, said switchover means acting upon the effect thereon of a preponderance of current supplied to said up traffic summation circuit over that supplied to said down traffic summation circuit reaching a certain value to cause switchover from said mode of operation suited for certain traffic conditions to said mode of operation suited for a certain preponderance of traffic in the up direction over that in the down direction.

15. In a dispatching and control system for a plurality

of elevator cars; mechanism for dispatching the cars from a lower dispatching floor; means for selecting the cars for said dispatching by said mechanism; means for causing said dispatching of the cars to be under a mode of operation suited for certain traffic conditions; means for causing said dispatching of the cars to be under a mode of operation suited for a certain preponderance of traffic in the up direction over that in the down direction; means for switching over between said modes of operation; a differential relay having an up coil and a down coil acting in opposition to each other; a source of current; means for supplying current to said down coil in an amount representing a summation of down traffic conditions; means for supplying current to said up coil in an amount representing a summation of up traffic conditions, said last named means comprising, means responsive to a selected car leaving said lower dispatching floor with a certain amount or more of load under conditions where no other car is available for selection as the next car to be dispatched from said lower terminal floor for supplying a portion of said up traffic summation current to said up coil, and means for rendering said car leaving responsive means ineffective as soon as another car becomes available; and means for causing any increase in the value of current supplied to said up coil to take place gradually, said relay acting upon a certain preponderance of current supplied to said up coil over that supplied to said down coil to cause operation of said switching means automatically to effect switchover from said mode of operation suited for certain traffic conditions to said mode of operation suited for a certain preponderance of traffic in the up direction over that in the down direction.

16. In a dispatching and control system for a plurality of elevator cars; mechanism for dispatching the cars from a terminal floor; means for causing said dispatching of the cars to be under a mode of operation suited for certain traffic conditions; means for causing said dispatching of the cars to be under a mode of operation suited for certain other traffic conditions; switching means for switching over from one of said modes of operation to the other; and means for exercising control over said switching means in accordance with the difference of traffic in one direction over that in the other, said last named means comprising, means responsive to a certain increase in traffic conditions in a given direction for exercising a certain control of said switching means, and means for temporarily increasing the effect of such control when such increase occurs.

17. In a dispatching and control system for a plurality of elevator cars; mechanism for dispatching the cars from a terminal floor; means for causing said dispatching of the cars to be under a mode of operation suited for certain traffic conditions; means for causing said dispatching of the cars to be under a mode of operation suited for certain other traffic conditions; switching means for switching over from one of said modes of operation to the other, said switching means having electroresponsive actuating means; a source of current; means for supplying current to said electroresponsive actuating means in accordance with the difference of traffic in one direction over that in the other, said last named means comprising means responsive to a certain increase in traffic conditions in a given direction for supplying a portion of said current to said electroresponsive actuating means; delaying means for causing any increase in the value of current supplied to said electroresponsive actuating means to take place gradually; and means for temporarily increasing the amount of such current portion when such increase occurs to counteract the effect of said delaying means so that, if said difference in traffic conditions is sufficient for effecting said switchover, the switchover will be effected immediately by way of anticipation.

18. In a dispatching and control system for a plurality of elevator cars; mechanism for dispatching the cars from a lower terminal floor; means for selecting the cars for said dispatching by said mechanism; means for causing said dispatching of the cars to be under a mode of operation suited for certain traffic conditions; means for causing said dispatching of the cars to be under a mode of operation suited for greater traffic in the up direction than during said certain traffic conditions; switching means responsive to up traffic being greater than down traffic by a certain amount for switching over from said mode of operation for certain traffic conditions to said mode of operation for greater traffic in the up direction; means for supplying control current to said switching means representative of down traffic conditions; and means for supplying control current to said switching means representative of up traffic conditions, said last named means comprising, means responsive to a certain change in up traffic conditions for supplying a portion of said control current representative of up traffic conditions, and means for temporarily increasing the amount of said portion of control current when such change occurs.

19. In a dispatching and control system for a plurality of elevator cars; mechanism for dispatching the cars from a lower dispatching floor; means for selecting the cars for said dispatching by said mechanism; means for causing said dispatching of the cars to be under a mode of operation suited for certain traffic conditions; means for causing said dispatching of the cars to be under a mode of operation suited for a certain preponderance of traffic in the up direction over that in the down direction; an up traffic summation circuit; a down traffic summation circuit; means responsive to the difference in current supplied to said traffic summation circuits for causing switchover between said modes of operation; means for supplying current to said down traffic summation circuit in an amount representing a summation of down traffic conditions; means for supplying current to said up traffic summation circuit in an amount representing a summation of up traffic conditions, said last named means comprising, means responsive to a selected car taking on at said lower dispatching floor a certain amount or more of load for supplying a certain portion of said current to said up traffic summation circuit; means for causing the effect on said switchover means of any increase in the value of current supplied to each of said traffic summation circuits to take place gradually; and means rendered effective by operation of said load responsive means for causing a pulse of current to be supplied to said up traffic summation circuit, said switchover means acting upon the effect thereon of a preponderance of current supplied to said up traffic summation circuit over that supplied to said down traffic summation circuit reaching a certain value to cause switchover from said mode of operation suited for certain traffic conditions to said mode of operation suited for a certain preponderance of traffic in the up direction over that in the down direction.

20. In a dispatching and control system for a plurality of elevator cars; mechanism for dispatching the cars from a lower dispatching floor; means for selecting the cars for said dispatching by said mechanism; means for causing said dispatching of the cars to be under a mode of operation suited for certain traffic conditions; means for causing said dispatching of the cars to be under a mode of operation suited for a certain preponderance of traffic in the up direction over that in the down direction; means for switching over between said modes of operation; a differential relay having an up coil and a down coil acting in opposition to each other; a source of current; means for supplying current to said down coil in an amount representing a summation of down traffic conditions; means for supplying current to said up coil in an amount representing a summation of up traffic conditions, said last named means comprising, a resistance, means responsive to a selected car taking on at said lower dispatching floor a certain amount or more of load for connecting said coil to said source through said resistance to supply a portion of said up traffic summation current to said up coil; means

for causing any increase in the value of current supplied to said up coil to take place gradually; and a capacitor connected across at least a portion of said resistance for causing a pulse of current to be supplied to said up coil when said connection through said resistance is made, said relay acting upon a certain preponderance of current supplied to said up coil over that supplied to said down coil to cause operation of said switching means automatically to effect switchover from said mode of operation suited for certain traffic conditions to said mode of operation suited for a certain preponderance of traffic in the up direction over that in the down direction.

21. In a dispatching and control system for a plurality of elevator cars; mechanism for dispatching the cars from a lower dispatching floor; means for selecting the cars for said dispatching by said mechanism; means for causing said dispatching of the cars to be under a mode of operation suited for certain traffic conditions; means for causing said dispatching of the cars to be under a mode of operation suited for more traffic in the up direction than in the down direction; means for switching over between said modes of operation; a differential relay having an up coil and a down coil acting in opposition to each other; a source of current; means for supplying current to said down coil in an amount representing a summation of down traffic conditions; means for supplying current to said up coil in an amount representing a summation of up traffic conditions, said last named means comprising, a resistance, means responsive to a selected car taking on at said lower dispatching floor a certain amount or more of load for connecting said up coil to said source through said resistance to supply a portion of said up traffic summation current to said up coil, means for short circuiting a portion of said resistance when said certain amount of load is acquired within a certain interval after selection of the car takes place; means for causing any increase in the value of current supplied to said up coil to take place gradually; and a capacitor connected across at least a portion of said resistance, said relay acting upon a certain preponderance of current supplied to said up coil over that supplied to said down coil to cause operation of said switching means automatically to effect switchover from said mode of operation suited for certain traffic conditions to said mode of operation suited for more traffic in the up direction than in the down direction, and said capacitor acting to cause a pulse of current to be supplied to said up coil when said connection through said resistance is made so that if the difference in traffic conditions is sufficient for effecting said switchover, the switchover will be effected immediately by way of anticipation.

22. In a dispatching and control system for a plurality of elevator cars; mechanism for dispatching the cars; means for causing said dispatching of the cars to be under a mode of operation suited for certain traffic conditions; means for causing said dispatching of the cars to be under a mode of operation suited for greater traffic in the down direction than during said certain traffic conditions; switching means for causing the switchover from said certain mode of operation to said mode of operation suited for greater traffic in the down direction, said switching means having electroresponsive actuating means; a source of current; means for supplying current to said electroresponsive actuating means in accordance with the difference of traffic in the down direction over that in the up direction, said last named means comprising means responsive to a certain increase in traffic in the down direction for supplying a portion of said current to said electroresponsive actuating means; delaying means for causing any increase in the value of current supplied to said electroresponsive actuating means to take place gradually; and means for temporarily increasing the amount of such current portion when such increase occurs to counteract the effect of said delaying means so that, if said difference of traffic in the down direction over that in the up direction is great enough for effecting said switchover, the switchover will be effected immediately by way of anticipation.

23. In a dispatching and control system for a plurality of elevator cars; mechanism for dispatching the cars; means for causing said dispatching of the cars to be under a mode of operation suited for certain traffic conditions; means for causing said dispatching of the cars to be under a mode of operation suited for greater traffic in the down direction than during said certain traffic conditions; switching means for causing the switchover from said certain mode of operation to said mode of operation suited for greater traffic in the down direction; a differential relay having an up coil and a down coil acting in opposition to each other; a source of current; means for supplying current to said up coil in an amount representing a summation of up traffic conditions; means for supplying current to said down coil in an amount representative of down traffic conditions, said last named means comprising, a resistance, means responsive to a car set for down taking on a certain amount or more of load for connecting said down coil to said source through said resistance to supply a portion of said down traffic summation current to said down coil, delaying means for causing any increase in the value of current supplied to each of said coils to take place gradually; and a capacitor connected across at least a portion of said resistance, said relay acting upon a certain preponderance of current supplied to said down coil over that supplied to said up coil to cause operation of said switching means to effect said switchover, and said capacitor acting to cause a pulse of current to be supplied to said down coil when the connection through said resistance is made so as to counteract the effect of said delaying means so that, if said difference of traffic in the down direction over that in the up direction is great enough for effecting said switchover, the switchover will be effected immediately by way of anticipation.

24. In a dispatching and control system for a plurality of elevator cars; mechanism for dispatching the cars from a lower dispatching floor; means for causing said dispatching of the cars to be under a mode of operation suited for certain traffic conditions; means for causing said dispatching of the cars to be under a mode of operation suited for a certain preponderance of traffic in one direction over that in the other direction; means for registering traffic conditions for one direction of car travel; means for registering traffic conditions for the other direction of car travel; means responsive to said certain preponderance of traffic conditions for said one direction over traffic conditions for said other direction for causing switchover from said mode of operation suited for certain traffic conditions to said mode of operation suited for a certain preponderance of traffic in said one direction; and means operable to prevent operation of said switchover means to effect said switchover in response to said certain preponderance of traffic conditions for said one direction over traffic conditions for said other direction under conditions where said traffic conditions for said other direction exceeds a certain amount.

25. In a dispatching and control sytem for a plurality of elevator cars; mechanism for dispatching the cars from a lower dispatching floor; means for causing said dispatching of the cars to be under a mode of operation suited for certain traffic conditions; means for causing said dispatching of the cars to be under a mode of operation suited for a certain preponderance of traffic in one direction over that in the other direction; a differential relay having two coils acting in opposition to each other; a source of current; means for supplying current to one of said coils in an amount representative of traffic conditions in said one direction; means for supplying current to the other of said coils in an amount representative of traffic conditions in said other direction, said relay being responsive to a certain difference in the current supplied to said one coil over that supplied to said other coil for

causing switchover from said mode of operation suited for certain traffic conditions to said mode of operation suited for a certain preponderance of traffic in said one direction; and means operable to prevent, when the current supplied to said other coil is above a certain amount, the current supplied to said one coil reaching a value above that supplied to said other coil by an amount sufficient to effect said switchover.

26. In a dispatching and control sytem for a plurality of elevator cars; mechanism for dispatching the cars from a lower dispatching floor; means for causing said dispatching of the cars to be under a mode of operation suited for certain traffic conditions; means for causing said dispatching of the cars to be under a mode of operation suited for a certain preponderance of traffic in one direction over that in the other direction; a differential relay having two coils acting in opposition to each other; a source of current; means for supplying current to one of said coils in an amount representative of traffic conditions in said one direction; means for supplying current to the other of said coils in an amount representative of traffic conditions in said other direction; means for causing any increase in the value of current supplied to each of said coils to take place gradually, said relay being responsive to a certain difference in the current supplied to said one coil over that supplied to said other coil for causing switchover from said mode of operation suited for certain traffic conditions to said mode of operation suited for a certain preponderance of traffic in said one direction; and means for preventing the current supplied to said one coil exceeding a certain amount so that when the current supplied to said other coil is at or above a certain lesser amount the current supplied to said one coil can not become great enough to provide said current difference to effect said switchover.

27. In a dispatching and control sytem for a plurality of elevator cars; mechanism for dispatching the cars; means for causing said dispatching of the cars to be under a mode of operation suited for substantially equal up and down traffic conditions; means for causing said dispatching of the cars to be under a mode of operation suited for a certain preponderance of traffic in one direction over that in the other direction; means for causing said dispatching of the cars to be under a mode of operation suited for a certain preponderance of traffic in said other direction over that in said one direction; a differential relay having two coils acting in opposition to each other; a source of current; means for supplying current to one of said coils in an amount representative of traffic conditons in said one direction; means for supplying current to the other of said coils in an amount representative of traffic conditions in said other direction; means for causing any increase in the value of current supplied to each of said coils to take place gradually, said relay being responsive to a certain difference in the current supplied to said one coil over that supplied to said other coil to cause switchover from said mode of operation suited for substantially equal up and down traffic to said mode of operation suited for said certain preponderance of traffic in said one direction, and being responsive to a certain difference in the current supplied to said other coil over that supplied to said one coil to cause switchover from said mode of operation suited for substantially equal up and down traffic to said mode of operation suited for said certain preponderance of traffic in said other direction; and means for preventing the current supplied to each of said coils exceeding a certain amount so that, when the current supplied to either of said coils is at or above a certain lesser amount, the current supplied to the other coil can not become great enough to provide the current difference to operate the relay.

28. In a dispatching and control system for a plurality of elevator cars; mechanism for dispatching the cars; means for causing said dispatching of the cars to be under a mode of operation suited for substantially equal

up and down traffic conditions; means for causing said dispatching of the cars to be under a mode of operation suited for a certain preponderance of traffic in one direction over that in the other direction; means for causing said dispatching of the cars to be under a mode of operation suited for peak traffic in said one direction; a heavier traffic differential relay having two coils acting on opposition to each other; a peak traffic differential relay having two coils acting in opposition to each other; a source of current; means for supplying current to one of said coils of each relay in an amount representative of traffic conditions in said one direction; means for supplying current to the other of said coils of each relay in an amount representative of traffic conditions in said other direction; means for causing any increase in the value of current supplied to each of said coils to take place gradually, said heavier traffic relay being responsive to a certain difference in the current supplied to said one coil of that relay over that supplied to said other coil of that relay to cause switchover from said mode of operation suited for substantially equal up and down traffic to said mode of operation suited for said certain propenderance of traffic in said one direction, and said peak traffic relay being responsive to a certain greater difference in the current supplied to said one coil of that relay over that supplied to said other coil of that relay to cause switchover from said mode of operation suited for said certain preponderance of traffic in said one direction to said mode of operation suited for peak traffic in said one direction; and means for preventing the current supplied to said one coil of said heavier traffic relay exceeding a certain amount and for preventing the current supplied to said one coil of said peak relay exceeding a certain greater amount so that, when the current supplied to said other coil of said heavier traffic relay is at or above a certain lesser amount, the current supplied to said one coil of that relay can not become great enough to provide the current difference to operate that relay and so that, when the current supplied to said other coil of said peak traffic relay is at or above a certain lesser amount, the current supplied to said one coil of that relay can not become great enough to provide the current difference to operate that relay.

29. In a dispatching and control system for a plurality of elevator cars; mechanism for dispatching the cars; means for causing said dispatching of the cars to be under a mode of operation suited for substantially equal up and down traffic conditions; means for causing said dispatching of the cars to be under a mode of operation suited for a certain preponderance of traffic in one direction over that in the other direction; means for causing said dispatching of the cars to be under a mode of operation suited for peak traffic in said one direction; heavier traffic means responsive to a certain difference in the traffic in said one direction over that in the other to cause switchover to said mode of operation suited for said certain preponderance of traffic in said one direction; peak traffic means responsive to a certain greater difference in the traffic in said one direction over that in the other to cause switchover to said mode of operation suited for peak traffic in said one direction; and means for delaying the operation of said heavier traffic means by an amount to prevent its operation before operation of said peak traffic means upon any sudden increase in traffic in said one direction sufficient to result in said greater difference in traffic in said one direction over that in the other, whereby said switchover is made direct from said mode of operation suited for substantially equal up and down traffic to said mode of operation suited for peak traffic in said one direction.

30. In a dispatching and control system for a plurality of elevator cars; mechanism for dispatching the cars; means for causing said dispatching of the cars to be under a mode of operation suited for substantially equal

up and down traffic conuditions; means for causing said dispatching of the cars to be under a mode of operation suited for a certain preponderance of traffic in one direction over that in the other direction; means for causing said dispatching of the cars to be under a mode of operation suited for peak traffic in said one direction; a heavier traffic relay responsive to a certain difference in the traffic in said one direction over that in the other to cause switchover from said mode of operation suited for substantially equal up and down traffic to said mode of operation suited for said certain preponderance of traffic in said one direction; a peak traffic relay responsive to a certain greater difference in the traffic in said one direction over that in the other to cause switchover from said mode of operation suited for said certain preponderance of traffic in said one direction to said mode of operation suited for peak traffic in said one direction; means for causing the effect of any increase in amount of traffic in said one direction on said heavier traffic relay to take place gradually; and means for causing the effect of any increase in the amount of traffic in said one direction on said peak relay also to take place gradually but at a faster rate so that, in case of any sudden increase in traffic in said one direction sufficient to result in said greater difference in traffic in said one direction over that in the other, said peak traffic relay becomes effective to cause switchover direct from said mode of operation suited for substantially equal up and down traffic to said mode of operation suited for peak traffic in said one direction before operation of said heavy traffic relay can take place.

31. In a dispatching and control system for a plurality of elevator cars; mechanism for dispatching the cars; means for causing said dispatching of the cars to be under a mode of operation suited for substantially equal up and down traffic conditions; means for causing said dispatching of the cars to be under a mode of operation suited for a certain preponderance of traffic in one direction over that in the other direction; means for causing said dispatching of the cars to be under a mode of operation suited for peak traffic in said one direction; a heavier traffic differential relay having two coils acting in opposition to each other; a peak traffic differential relay having two coils acting in opposition to each other; a source of current; means for supplying current to one of said coils in an amount representative of traffic conditions in said one direction; means for supplying current to the other of said coils in an amount representative of traffic conditions in said other direction; said heavier traffic relay being responsive to a certain difference in the current supplied to said one coil of that relay over that supplied to said other coil of that relay to cause switchover from said mode of operation suited for substantially equal up and down traffic to said mode of operation suited for said certain preponderance of traffic in said one direction, and said peak traffic relay being responsive to a certain greater difference in the current supplied to said one coil of that relay over that supplied to said other coil of that relay to cause switchover from said mode of operation suited for said certain preponderance of traffic in said one direction to said mode of operation suited for peak traffic in said one direction; capacitance means for causing any increase in the value of current supplied to said one coil of said heavier traffic relay to take place gradually; and capacitance means for causing any increase in the value of current supplied to said one coil of said peak relay also to take place gradually but at a faster rate so that, in case of any sudden increase in traffic in said one direction sufficient to cause said certain greater difference in current supplied to said one coil of said peak relay over that supplied to the other coil of that relay, said peak traffic relay becomes effective to cause switchover direct from said mode of operation suited for substantially equal up and down traffic to said mode of operation suited for peak traffic in said one direction before operation of said heavy traffic relay can take place.

No references cited.

Notice of Adverse Decision in Interference

In Interference No. 92,041 involving Patent No. 2,926,756, S. A. Hornung, GROUP SUPERVISORY SYSTEM FOR ELEVATORS, final judgment adverse to the patentee was rendered Sept. 17, 1965, as to claim 24.

[*Official Gazette May 17, 1966.*]

Disclaimer

2,926,756.—*Stephen Anthony Hornung*, New York, N.Y. GROUP SUPERVISORY SYSTEM FOR ELEVATORS. Patent dated Mar. 1, 1960. Disclaimer filed Jan. 28, 1966, by the assignee, *Otis Elevator Company*.

Hereby enters this disclaimer to claim 24 of said patent.

[*Official Gazette May 24, 1966.*]