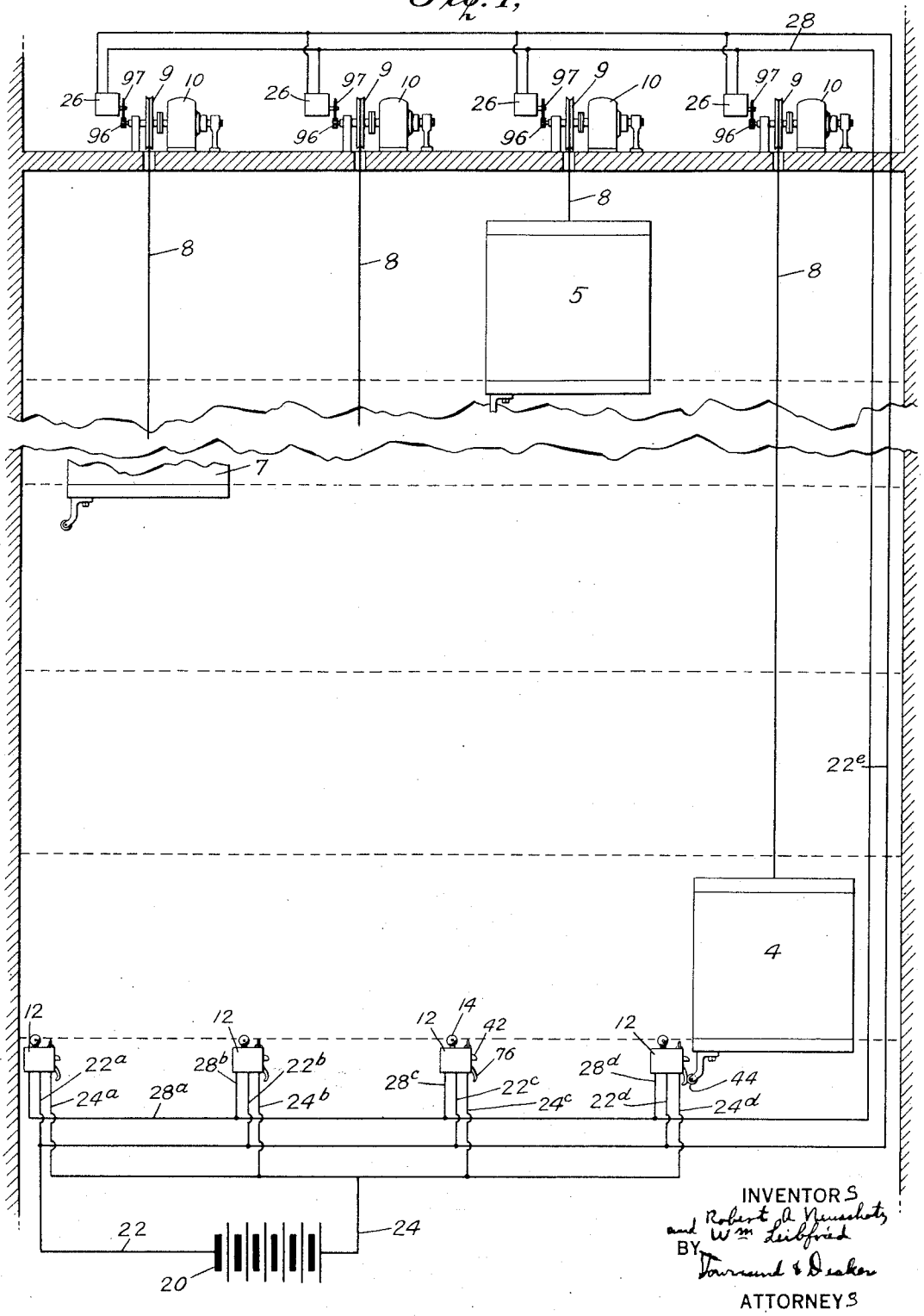
Feb. 13, 1934. R. A. NEUSCHOTZ ET AL 1,947,097

ELEVATOR SIGNALING MECHANISM

Filed Jan. 15, 1926 2 Sheets-Sheet 1

Fig. 1,



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Fig. 2.

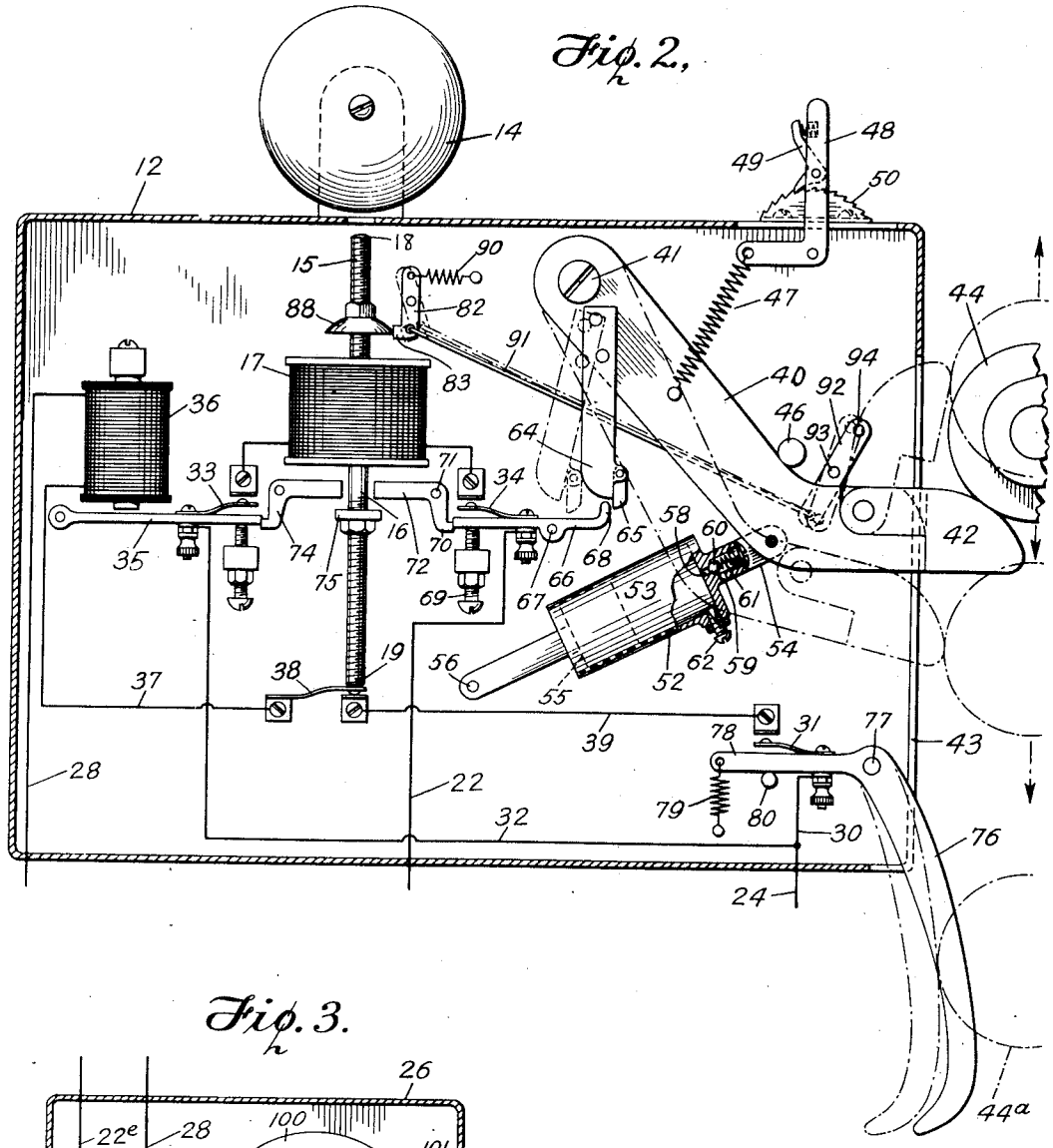
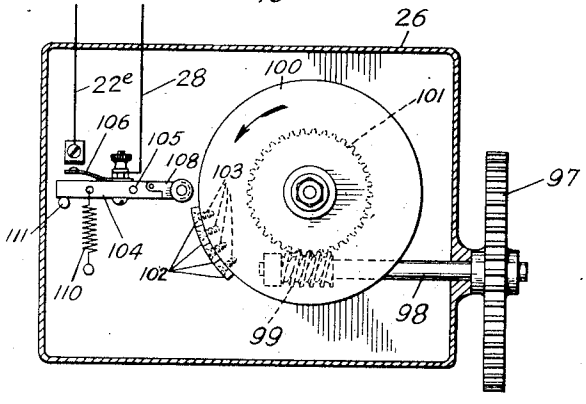


Fig. 3.



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ELEVATOR SIGNALING MECHANISM

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18 Claims. (Cl. 177—336)

This invention relates to improvements in elevator dispatching mechanism in an elevator system employing a plurality of elevators.

It is one of the primary objects of the invention to provide a signal for each elevator operated upon the approach of any other elevator of the system.

It is another object to delay the operation of the controlling mechanism of this signal until the elevator to be signaled has remained at the landing a predetermined length of time.

The invention also contemplates individual signaling devices for each elevator which devices may be set by the approach of the elevator to be signaled at a given landing and, when the signaling apparatus has once been operated, to maintain the same in inoperative condition until the signaled elevator has been moved from said landing.

These and other objects will appear more fully from the following description when considered in connection with the drawings in which:

Fig. 1 illustrates diagrammatically a bank of elevators showing our dispatching apparatus applied thereto.

Fig. 2 is a sectional view of the signaling device and operating mechanism therefor.

Fig. 3 is a similar view of a remote control for the signaling device.

Referring to the details of the drawings, there is diagrammatically shown in Fig. 1 a plurality of elevator cars 4, 5 and 7 supported in the illustration shown by cables 8 adapted to be wound upon drums 9 controlled in the usual manner by an electric or other motor 10. It is to be understood that the elevators may be of any preferred construction and may be operated by any preferred mechanism, the details of the controlling mechanism forming no part of the present invention.

The dispatching mechanism includes a plurality of signaling devices indicated generally at 12, there being preferably one such device for each elevator positioned at any floor or landing where it is desired to have the elevators started. We prefer to control the elevators from the main or ground floor of the building served although obviously they may be dispatched from any other preferred landing. To this end the signaling devices 12, one for each of the elevators, is shown as positioned adjacent the ground floor.

The signal proper in the present instance is shown as a bell 14 positioned to be engaged by the movable operator 15, the operator embodying a movable magnetic core 16 mounted for movement through the solenoid 17 energized as hereinafter described. It will be understood that as the electric current passes through the solenoid 17 the magnetic piston extending from a point 18, normally positioned adjacent one end of the solenoid, to the point 19, positioned beyond and beneath the other end of the solenoid, the movable operator or core 15 will be elevated to sound the bell 14. It is to be understood that the audible signal 14 is merely used to illustrate the invention and that if desired a visual or other signal may be employed without departing from the invention.

The source of electrical energy or generator is indicated at 20, conductors 22 and 24 leading from the generator 20, the conductor 22 having branch lines 22*a*, 22*b*, 22*c* and 22*d*, leading to the signaling apparatus 12. The conductor 24 likewise has branch lines 24*a*, 24*b*, 24*c* and 24*d*, leading into the box 12. The power line 22 also includes a conductor 22*e* leading to the remote control devices 26 described below. The return lines from the control devices 26 are indicated at 28, the devices 26 preferably being connected in parallel with the lines 22*e* and 28 so that any of said devices 26 may close the circuit 22*e*, 28. The power line 28 extends from the controls 26 to the signaling devices 12 and has branch lines 28*a*, 28*b*, 28*c* and 28*d* leading into the control boxes 12.

Referring now to Fig. 2 wherein there is disclosed one complete signaling apparatus, it will be seen that the power line 24 is branched to provide conductor 30 leading to the circuit closer 31 and conductor 32 leading to the circuit closer 33 leading into one terminal of the solenoid 17. The power line 22 extends to the circuit closer 34 for completing the circuit through the solenoid 17. The conductor 28 leading from the remote control 26 includes an electro-magnet 36 the coils of which terminate in a conductor 37 leading to a circuit closer 38, the conducting line 39 connecting the circuit closers 38 and 31.

Referring now to the details of the construction of the signaling apparatus, there is disclosed a lever 40 pivoted as at 41 to the casing 12 and including a hinged tip 42 extending through the slotted opening 43 of the casing 12. The lever 40 is constructed to be engaged by the control arm 44 positioned on the elevator body so that as the elevator descends it will move the lever 40 downwardly into the dotted line position shown in Fig. 2. The lever is elevated to its original and normal full-line position in engagement with the stop member 46 by means of the spring 47 preferably adjustable as by means of the lever 48

held in locked position by means of the latch 49 and rack 50. There is provided a dashpot mechanism indicated generally at 52, the dashpot including a cylindrical casing 53 having an extension 54 pivotally connected to the lever 40. A piston 55 is slidably mounted within the casing 53, one end thereof being pivotally secured to the box 12 as indicated at 56. An opening 58 leads from the interior of the casing 53 and communicates with an outside opening 59 permitting the air within the casing 53 to be exhausted through said openings. The opening 58 is normally closed by means of a ball valve 60 which may be normally compressed over the opening 58 by means of the spring 61. An adjustable leak or bypass 62 may be provided so that when the opening 58 is entirely closed, a certain amount of air may be drawn therethrough into the casing 54. It will be seen that by means of the above described construction, when the lever 40 is depressed, the air within the casing 53 is forced outwardly through openings 58 and 59, the ball valve 60 being readily displaced to permit of the escape of the air. When the lever 40 is released from the operator 44, the spring 47 tends to elevate the same into engagement with the stop member 46, this movement being obstructed by means of the dashpot 52 so that the lever 40 is slowly moved into its original position under the influence of the spring 47. The speed of movement of the lever 40 or, in other words, the amount which the lever is delayed in reaching its original and normal position, may be controlled either by the lever 48 and spring 47 or by means of the bypass 62.

The lever 40 carries a rigid arm 64 having a pivoted finger 65 movable in one direction with respect to the arm 64. A pivoted circuit controlling lever 66 pivoted as at 67 carries the circuit closer 34 adjacent one end thereof and an extension 68 positioned to be engaged by the finger 65. The lowered or inoperative position of the lever 66 may be adjusted by means of the set screw 69 or other equivalent mechanism. A lever 70 pivoted as at 71 includes the weighted end 72 tending to rotate the lever constantly in a counter-clockwise direction. Thus, when the lever 40 is depressed and the arm 64 moved to the left as seen in Fig. 2, the finger 65 rides freely over the extension 68 of the lever 66 to substantially the position shown in dotted lines in Fig. 2. Upon a release of the tip 42 from the operator 44 of the elevator, the spring 47 draws the lever 40 slowly back to normal position, this movement being delayed by means of the dashpot 52, the valve 60 being then in closed position. When the finger 65 reaches the extension 68 in its return movement, the lever 66 is rocked clockwise about its pivot 67 closing the switch 34, the parts being maintained in this closed position by means of the latch lever 70. The control circuit for the solenoid 17 is normally maintained in open condition by means of the circuit closer 33 carried by the armature 35 adapted to be moved by means of the electro-magnet 36. The armature 35 when drawn upwardly by means of the electro-magnet 36 closes the circuit closer 33, the armature being maintained in elevated position by means of the lever 74 constructed similarly to the lever 70. The levers 70 and 74 are extended to a position adjacent the movable operator 15, the latter being provided with releasing mechanism shown as a disk 75 so that, upon an operation of the operator 15, the levers 70 and 74 are released to again open the circuits at 33 and 34. The circuit for controlling the electro-magnet 36 includes the circuit closers 33 and 31, the former being normally maintained in closed position by means of the operator 15 which, as shown in the present embodiment of the invention, utilizes the weight of the operator 15 to bear upon the upwardly tensioned circuit closer 38 to maintain the same normally in closed condition. The circuit closer 31 is mounted on the control lever 76 pivoted as at 77, the lever being normally pressed outwardly by means of the control spring 79 which draws the extension 78 of the lever into engagement with the stop member 80. The lever 76 is positioned to be engaged by the operator 44 carried by the elevator after the said operator has passed and operated the lever 40 as above described. The normal position of the operator 44 of the elevator when the latter is at the signaling landing is indicated in dotted lines at 44*a*, the dotted line position of the lever 76 maintaining the circuit closer 31 in closed position.

When the signaling device has been operated, in particular when the solenoid 17 has been energized, to move the operating member 15 upwardly into engagement with the bell 14, it is temporarily retained in raised position with the circuit opened at 38 by means of the pivoted latch 82 having an extension 83 constructed to engage beneath the stop member 88 movable with the operator. Lever 82 is tensioned for engagement bneath the stop member 88 by means of the spring 90 or otherwise. In order that the operator 15 may be released when the elevator departs from the landing provided with the signaling apparatus, a cable 91 is attached to the lever 82 and to a control lever 92 pivoted as at 93 to the casing 12. The lever 92 is provided with an extension 94 positioned to be engaged by the tip 42 of the lever 40 when the elevator and its control member 44 move upwardly past the lever 40. The position of the tip 42 when releasing the latch 82 is indicated in dotted lines in Fig. 2.

The mechanism employed for controlling the circuits adjacent the casing 12 has been described. Before the electro-magnet 36 can be operated it is necessary to close the circuits 28 and 22*e*. Since this is the final control for the solenoid 17 which operates the signal it is necessary to provide mechanism which will give the starting signal prior to the arrival of a second elevator at the main floor. It is preferred to give the starting signal upon the approach of any other elevator when the latter is within four or five floors or any desirable distance removed from the main floor. Obviously no signal should be given when the elevators are moving upwardly past the signaling floor. The details of the mechanism for accomplishing this function are indicated in Figs. 1 and 3. The shaft of the motor 10 carries a relatively small spur gear 96 which meshes with an enlarged gear 97 rigidly secured to the shaft 98, the latter carrying a screw gear 99 meshing with a worm nut 101 carried by the control disk 100. The control disk 100 carries a plurality of removable operating lugs 102 secured to the disk by means of the screws 103 or otherwise. A lever 104 positioned within the casing 26 is pivotally supported at 105 and carries a circuit closer 106 adjacent one end thereof and an operating tip 108 adjacent the other end. The tip 108 is constructed to move the lever 104 when engaged in one direction only, namely downwardly, according to the construction shown. The lever 104 is normally moved in a counter-clockwise direction to open the circuit at 106 by means of the

spring 110, the normal position of the lever being determined by the stop member 111.

According to the above described construction the disk 100 is rotated substantially one revolution when the corresponding elevator moves through its entire limits, the reducing gear 96, 97 and 99 being so proportioned as to achieve this result. When the elevator is moved downwardly according to the present construction the disk 100 is rotated in a counter-clockwise direction as indicated by the arrow in Fig. 3. When the terminal lug 102 engages the tip 108 of the lever 104, the circuit is closed at 105 to operate the electro-magnet 36 and solenoid 17 as described below. The exact time at which this operation may take place may be changed to suit different conditions by removing or adding certain of the operating lugs 102. As shown, the number and arrangement of the operating lugs 102 on the disk 100 are such as to cause the lever 104 to keep the contact members 106 closed after they are engaged until the elevator arrives close to the point where it will operate its lever 40. Hence, if one car arrives at the terminal and operates its lever 40 at any time while another car is within the zone so defined, the first car will receive its dispatching indication at the termination of the time interval imposed by dashpot 52. When the elevator again rises from the main floor the disk 100 is rotated to the same extent in the opposite direction, the tip 108 being readily displaceable without effecting the circuit closer 106.

Referring now briefly to the operation of the device, it will be seen that as the initial elevator approaches the ground floor or other floor at which the signaling mechanism has been located, the operator 44 will depress the lever 40 and pass downwardly for engagement with the lever 76 to close the circuit as at 31. The spring 47 then draws upon the lever 40 and, subject to the dashpot 52, gradually elevates the lever 40 until the finger 65 has engaged and depressed the extension 68 of the lever 66 to close the circuit at 34. Either before or after the circuit is closed at 34 when another elevator approaches the signaling floor and is within a predetermined distance away from the same, said other elevator moves the lever 104 to close the circuit at 106 for energizing the electro-magnet 36 to elevate armature 35 and close the solenoid operating circuit at 33. Either the circuit closer 33 or 34 dependent on which is first operated, will be held in elevated position by means of the latch levers 74 and 70 respectively until the solenoid 17 has been energized and the operator 15 moved for creating the signal, the single operation of the solenoid opening the circuit at 38 leading to the electro-magnet 36 and simultaneously elevating the ends of the latches 74 and 70 thereby opening the circuit at 33 and 34. The operator 15 is maintained in elevated position by means of the latch 82 until the elevator operator 44 has moved upwardly into engagement with the tip 42 to release the latch 82, after which the parts will be again maintained in their normal, inoperative condition.

It is to be understood that the present embodiment of the invention is merely illustrative of the basic concept of the invention and that other constructions may be substituted for the specific embodiments hereof. For example, the audible signal 14 may be displaced by a visual or other signal and, if preferred, such signal may be mounted directly on the elevator instead of on the elevator shaft adjacent the preferred landing.

We claim as our invention:

1. In combination with a plurality of elevator shafts and elevators movable therein, a dispatching system including individual signaling devices for said elevators positioned adjacent a predetermined landing, means actuated by the approach of the corresponding elevator to a point near said landing for preparing said signaling devices for operation, means controlled by the approach of another of said elevators within a predetermined distance of said landing for operating said signaling device after the same has been prepared for operation and means for delaying operation of said signaling device until the elevator to receive the signal has remained at said landing a predetermined time.

2. In combination with a plurality of elevator shafts and elevators movable therein, a dispatching system including individual signaling devices for said elevators positioned adjacent a predetermined landing, means controlled by the position of the elevator to receive the signal for preparing said signaling devices for operation, means controlled by another of said elevators for actuating said signal, and means for maintaining said signaling devices in an inoperative condition for a predetermined time after the actuation thereof and means operated by movement of said signaled elevator for releasing said signaling device for subsequent operations.

3. In an elevator dispatching mechanism, an electric signaling device, a controlling circuit therefor including a source of electrical energy, said circuit being normally open at a plurality of points, means controlled by the movements of the elevator to be signaled for closing said circuit at one point and means for maintaining the same temporarily in closed condition, means for delaying the closing of said circuit for a predetermined time interval after the same has been operated, additional means controlled by another of said elevators for closing said circuit to operate said signal, and means actuated by the operation of said signal for opening said circuit to deenergize said signaling device.

4. In combination with a plurality of elevator shafts and elevators movable therein, a dispatching system including individual signaling devices for said elevators, means actuated by the approach of the corresponding elevator to a point near a predetermined landing for preparing said signaling devices for operation, means controlled by the approach of another of said elevators within a predetermined distance of said landing for operating said signaling device after the same has been prepared for operation and means for delaying operation of said signaling device until the elevator to receive the signal has remained at said landing a predetermined time.

5. In an elevator dispatching system for a plurality of cars each operable in an individual hatchway past a plurality of landings, a dispatching device for each car for determining the time at which that car is to leave one of said landings, means operably responsive to the presence of said car at said landing and the presence of another of said cars within a predetermined distance of said landing for operating said dispatching device, and timed means for preventing the operation of said dispatching device until the lapse of a predetermined time.

6. In an elevator dispatching system for a plurality of cars each operable in an individual

hatchway past a plurality of landings, a dispatching device for each car for determining the time at which that car is to leave one of said landings, means operable by the arrival of one of said cars at said landing for operating the dispatching device for that car at a predetermined time thereafter, and means operable in accordance with the movement of another of said cars for rendering said operating means ineffective to operate said dispatching device until another of said cars approaches within a predetermined distance of said landing.

7. In an elevator dispatching system for a plurality of cars each operable in an individual hatchway past a plurality of landings, a dispatching device for each car for determining the time at which that car is to leave one of said landings, means operable by the arrival of one of said cars at said landing for operating the dispatching device for that car at a predetermined time thereafter, means operable in accordance with the movement of another of said cars for rendering said operating means ineffective to operate said dispatching device until another of said cars approaches within a predetermined distance of said landing, means for preventing a second operation of said dispatching device, and means operably responsive to departure of the dispatched car for releasing said last mentioned preventing means.

8. In an elevator dispatching system for a plurality of cars each operable in an individual hatchway past a plurality of landings, a dispatching device for each car for indicating the time at which that car is to leave one of said landings, means operably responsive to arrival of one of said cars at said landing for operating the dispatching device for that car, means for delaying the operation of said dispatching device until said car has remained at said landing for a predetermined length of time, and means operably responsive to the movement of another of said cars for preventing the operation of said dispatching device until another car approaches within a predetermined distance of said landing.

9. In an elevator dispatching system for a plurality of cars each operable in an individual hatchway past a plurality of landings, a dispatching device for each car for indicating the time at which that car is to leave one of said landings, a timed device for each dispatching device, means operable by the arrival of one of said cars at said landing for setting the timed device corresponding to said car into operation to actuate the associated dispatching device at a predetermined time after the arrival of said car at said landing, and means operably responsive to the movement of another of said cars for preventing the operation of said dispatching device until another car approaches within a predetermined distance of said landing.

10. In a dispatching mechanism for a plurality of elevator cars operable to and from a landing, a dispatching device for determining the time of departure of said cars from said landing, a controlling circuit for connecting the dispatching device to a source of electrical energy, and means for closing said circuit including means for initiating the closing of said circuit when one of said cars arrives at said landing, timed means for preventing the closing of said circuit for a predetermined interval after the arrival of said car at said landing, and further means for preventing the closing of said circuit until another car approaches within a predetermined distance of said landing.

11. In a dispatching mechanism for a plurality of elevator cars operable to and from a landing, a dispatching device for determining the time of departure of said cars from said landing, a controlling circuit for connecting the dispatching device to a source of electrical energy, said circuit including a plurality of normally open switches in series relation, means controlled by the movements of one of said cars for initiating the closing of one of said switches, means for delaying the closing of said switch for a predetermined interval after the same has been initiated, and further means operated by any of the other cars for closing another of said switches to operate said dispatching device.

12. In an elevator dispatching mechanism, a dispatching device for determining the time of departure of a car from a landing, a control circuit for connecting the dispatching device to a source of electrical energy, a control lever positioned to be engaged by said car, a switch disposed to be actuated by said lever for closing said circuit, cooperating means disposed to be operated by a second car for closing said circuit, and a dashpot for delaying the operation of said switch and the closing of said circuit for a predetermined time after the operation thereof by said first named car.

13. In a dispatching mechanism for a plurality of elevator cars operable to and from a landing, a dispatching device for determining the time of departure of said cars from said landing, a controlling circuit for connecting the dispatching device to a source of electrical energy, said circuit including a plurality of normally open switches in series relation, means controlled by the movements of one of said cars for initiating the closing of one of said switches, means for delaying the closing of said switch for a predetermined interval after the same has been initiated, further means operated by any of the other cars for closing another of said switches to operate said dispatching device, means controlled by the operation of said dispatching device for opening said circuit to deenergize said dispatching device, means for maintaining said circuit in open condition after operation thereof, and means operably responsive to departure of the dispatched car for releasing said last mentioned means.

14. In an elevator dispatching mechanism, a dispatching device for determining the time of departure of a car from a landing, a control circuit for connecting the dispatching device to a source of electrical energy said circuit including a plurality of normally open switches, means actuated by the movement of the car for closing one of said switches, latch mechanism for maintaining said switch closed, further means operated by another car for closing another of said switches to operate said dispatching device and latch mechanism for maintaining the same closed, and means for causing a delay in the closing of the circuit for a predetermined time after said first named car-operated means is operated.

15. In an elevator dispatching mechanism, a dispatching device for determining the time of departure of a car from a landing, a control circuit for connecting the dispatching device to a source of electrical energy, said circuit including a plurality of normally open switches, means actuated by the movement of the car for closing one of said switches, latch mechanism for maintaining said switch closed, further means oper-

ated by another car for closing another of said switches to operate said dispatching device and latch mechanism for maintaining the same closed, and means operably responsive to actuation of the dispatching device for releasing both of said latch mechanisms.

16. The combination of a plurality of travelling cars, each having a starting position, starting signaling means for said cars, means operated by the movement of a car on its return toward its starting position but not by the movement of the car away from the starting position for causing the operation of the signaling means for any car at its starting position, means for adjusting the point at which the returning car causes the operation of said signaling means, and means for delaying the operation of said signaling means with respect to each car during the lapse of a predetermined time interval.

17. The combination of a plurality of travelling cars, each having a starting position, starting signaling means for said cars, means controlled by the movement of a car on its return toward its starting position for causing the starting of the operation of the signaling means for another car, means for adjusting the point at which the returning car starts the operation of said signaling means on another car, and means for delaying the operation of said signaling means with respect to each car during the lapse of a predetermined time interval.

18. The combination of a plurality of traveling cars each having a starting position, starting signaling means for said cars, means controlled by the movement of any car toward its starting position but not by the movement of the car away from the starting position for causing the operation of the signaling means for any car at its starting position, the signaling means being inoperative for any car when it is not at its starting position, and means for delaying the operation of said signaling means with respect to each car during the lapse of a predetermined time interval.

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