July 8, 1952 J. E. SHIRLEY 2,602,524

REMOTE-CONTROL SYSTEM FOR CARS MOVING IN A DEFINED PATH OF TRAVEL

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FIG. 1.

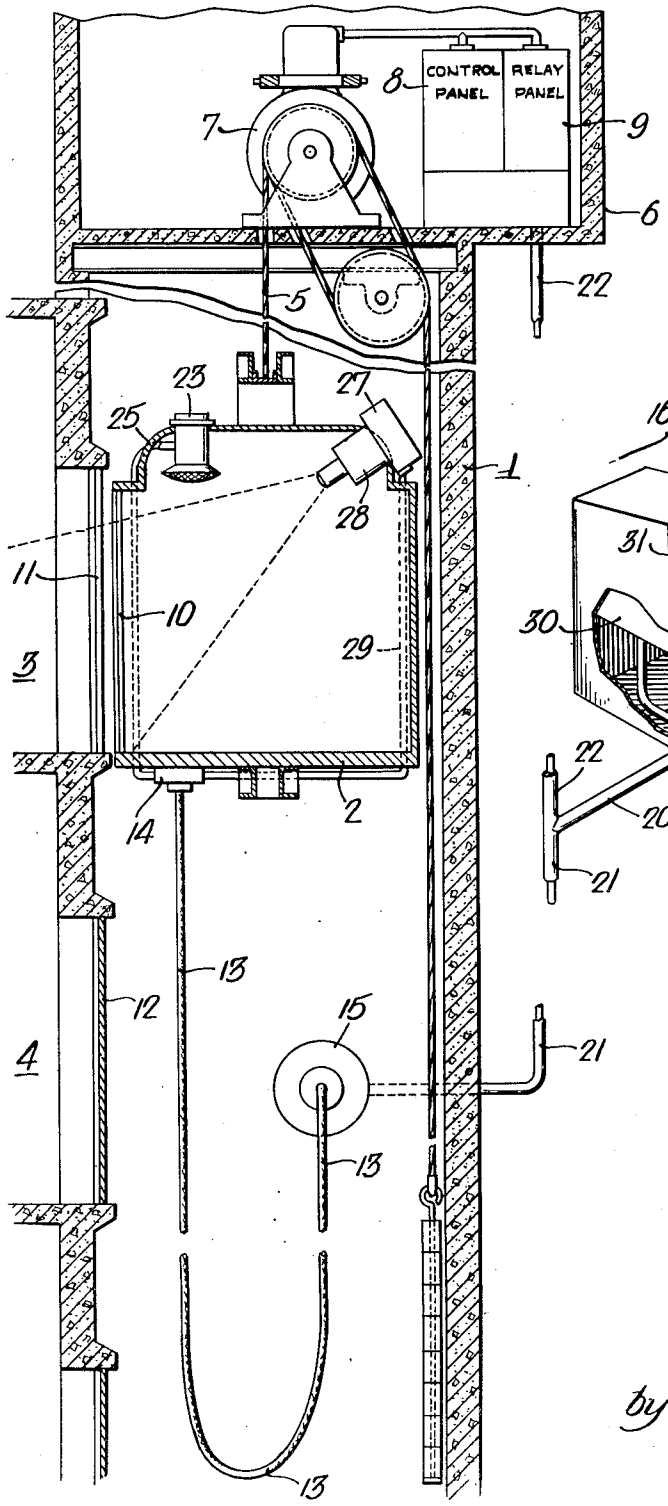
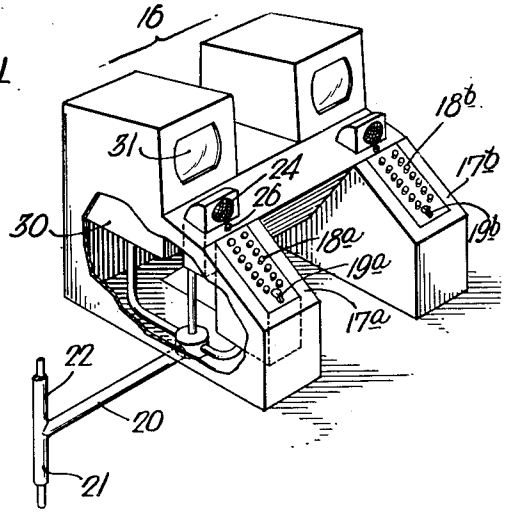


FIG. 2.



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REMOTE-CONTROL SYSTEM FOR CARS MOVING IN A DEFINED PATH OF TRAVEL

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4 Claims. (Cl. 187—29)

1

This invention relates to remote control of a car which is movable in a defined path of travel along which there are various stations at which the car may be stopped. The invention is particularly applicable to remote control of an elevator car moving in a vertical shaft along which there are floor stations. Accordingly, the invention will be described hereinafter with particular reference to such application.

One object of the invention is to provide a system or arrangement by which an operator, at a fixed location, may control the operation of a car along a defined path of travel.

Another object of the invention is to provide such a system for remote control of one or more elevator cars by an operator at a stationary control station.

Heretofore, elevator cars have been individually controlled from within the car itself by an operator or, in the case of a so-called automatic elevator, by a passenger using the car. While the latter type of elevator is useful in some instances, it is not practical in office buildings and like places where the elevator traffic is quite heavy, particularly at certain times of the day. Therefore, most elevator cars are operated by an operator within the car. In addition to the floor area required for a given passenger capacity, each elevator car must have floor area to accommodate the operator, and when this additional area is multiplied by the height of the building, it is apparent that substantial building space must be allotted for operation of a single elevator car. In the case of a high building this space becomes very great. Furthermore, many buildings have a substantial number of elevators, and this multiplies accordingly the building space which must be so allotted.

By the present invention, there is provided a novel system or arrangement which eliminates the need for an operator within an elevator car, and which makes it possible for a single operator to operate more than one elevator from a fixed remote control location. Thus, the invention effects substantial economy in building space, as will be apparent from the foregoing discussion. It also effects a saving in personnel costs.

The invention may be clearly understood from the following description with reference to the accompanying drawing, wherein

Fig. 1 is a sectional view of a portion of an elevator shaft and an elevator car therein equipped for remote control according to the present invention; and

Fig. 2 is a perspective view showing control apparatus at a remote control station.

2

Referring to Fig. 1, there is shown a conventional elevator shaft 1 within which the elevator car 2 moves, there being floor stations along the vertical elevator shaft, two such stations being represented at 3 and 4. The elevator car 2 is suspended by means of the cable 5, and it is conventionally operated by means of mechanism which may be located at the top of the elevator shaft within a room or compartment 6. Such mechanism includes an electric motor 7 and control and relay panels 8, 9. In this conventional elevator installation, the elevator door 10 and the door 11 or 12 at a floor station open automatically when the elevator car stops at that floor station, and these doors close in response to manipulation of a control element, such as a lever, within the elevator car, the operator operating such control element when the door area is clear. The same manual control causes the elevator car to start. Also, in the conventional installation, the operator selects floors by depressing buttons provided within the elevator car. The control functions are performed electrically, and the necessary electrical conductors extending to the elevator car are carried by a flexible cable 13 which has one end connected to the bottom of the elevator car, as at 14, and which has the other end connected to a stationary terminal box 15 mounted on the elevator shaft approximately midway of the height thereof. The flexible cable 13 is sufficiently long to permit movement of the elevator car to both extremities of the vertical shaft 1.

In order to achieve the purposes of the present invention, the above-mentioned operator controls, heretofore located in the elevator car, are disposed at a remote control station which may be located at any convenient location, preferably on the ground floor. In contemplation that a single operator will remotely control two elevators, there is shown in Fig. 2 a duplex control assembly 16 which is assumed to be located at the remote control station. This assembly includes two similar control boards 17*a* and 17*b* having floor selection buttons 18*a* and 18*b*, and also having control levers 19*a* and 19*b*. These elements correspond exactly to those conventionally located in the elevator car, and the disposition of these elements at the stationary remote control station merely involves the proper running of the electrical conductors for the desired purpose. For operation of the elevator car door 10, the necessary wires extend from the remote control position within a cable 20 and a branch cable 21 extending to the terminal box 15. The necessary wires for control of the ele-

vator by means of the push buttons 18a also extend within the cable 20 and within a branch cable 22 to the control equipment 8, 9. It will be understood that wires similarly extend from the second section of the duplex control assembly 16 for control of a second elevator not shown.

In further accordance with the present invention, provision is made for two-way sound transmission between each elevator car and the remote control position, and provision is also made for picture transmission from the elevator car to the control position. As shown in Fig. 1, the elevator car 2 is equipped with a conventional microphone-speaker device 23 which may be mounted at the top of the car as illustrated. At the remote control position (Fig. 2) a similar device 24 is arranged in a convenient position. These two devices preferably are interconnected by means of wires extending through cables 13, 20 and 21, and through pipe conduit 25, to provide a conventional two-way sound communication system which may include amplifiers. Such a system is well-known, it having been used for inter-office communication and other such purposes for a long time. Located at the control position is the switch button 26 which conditions the system for transmission in the direction opposite to that for which the system is normally conditioned. In the present instance, it is preferable to have the sound transmission system normally conditioned for transmission from the elevator car to the control position so that the operator may hear any sound originating at the elevator car. Then, when the operator desires to speak to the passengers in the car, he has only to press the button 26 and to hold it depressed while he speaks. The button is spring biased so that it returns to its normal position when released.

While two-way radio-telephony might be employed for sound communication between the car and the control station, it is obviously much simpler to use a system of the character above described.

For picture transmission as above mentioned, the elevator car 2 is equipped with portable television transmitting unit 27 including a television camera 28 which is arranged to view at least the door area. Preferably, the camera is mounted at the top of the elevator as illustrated. The television signal produced by the transmitter unit preferably is transmitted over wires within pipe conduit 29 and within cables 13, 20 and 21 to a television receiver 30 located at the control position, the picture screen 31 of the receiver being arranged for viewing by the operator.

While space transmission of the television signal might be employed, it is obviously more convenient and better to use wire transmission. Of course, known transmission techniques, such as coaxial cable transmission, may be utilized.

It will be understood from the foregoing that the sound and picture transmission equipments are of conventional nature, and the present invention is not concerned with the details thereof. Therefore, further illustration or description is unnecessary.

For control of second elevator (not shown) by the same operator, similar equipment may be provided on the second elevator and on the second section of the duplex control assembly 16.

By means of the apparatus provided by the present invention, an operator is enabled to control an elevator car from a remote location just as though he were in the car. He has before him a picture of at least the door area of the car,

and he is able to hear any sounds originating at the car. Thus, he can receive any instructions from the passengers as to the floors desired, and he can also speak to the passengers. Moreover, the invention makes it possible for a single elevator operator to control more than one car. The invention effects substantial economy in space because the only space required for operation of one or more elevator cars is that required for the operator and the equipment at the control position. With this system, the floor area required to accommodate an operator is not multiplied by the height of the building, and therefore the required space is relatively small.

While a particular embodiment has been illustrated and described, it will be understood that the invention is not limited thereto but contemplates such modifications as may occur to persons skilled in the art.

I claim:

1. In combination, an elevator shaft and floor stations therealong having doors, an elevator car movable in said shaft and having a door for entrance or exit at the various floor stations, a supporting cable suspending said car from the top of said shaft for movement of the car in the shaft, means including an electric motor for actuating the car, a remote control station, means including selectable manually-operable elements at said control station corresponding to the various floor stations for controlling said motor to cause stoppage of said car and for opening the doors at each floor station selected, means including another manually-operable element at said control station for closing the doors and for controlling said motor to start the car, means providing two-way communication between said car and said control station, and means providing picture transmission from said car to said control station, said last means including a camera tube arranged on said car to view at least the door area, and a picture tube arranged at the control station for viewing by an operator at said station, whereby the operator is enabled to control the car from said station, by manipulation of said elements, according to the intelligence received by him at the control station.

2. In combination, an elevator shaft and floor stations therealong having doors, an elevator car movable in said shaft and having a door for entrance or exit at the various floor stations, a supporting cable suspending said car from the top of said shaft for movement of the car in the shaft, means including an electric motor for actuating the car, a flexible cable extending from said car to a position along said shaft, said last-mentioned cable being of sufficient length to permit movement of said car to the extremities of said shaft, a remote control station, means including selectable manually-operable elements at said control station corresponding to the various floor stations for controlling said motor to cause stoppage of said car and for opening the doors at each floor station selected, means including another manually-operable element at said control station for closing the doors and for controlling said motor to start the car, said last-mentioned cable serving to accommodate electrical wiring between said control station and said car, two-way telephonic sound transmission means extending between said car and said control station over said last-mentioned cable, said sound transmission means being normally conditioned for sound transmission from said car

to said control station, manually-operable means at said control station to condition said sound transmission means for sound transmission from said control station to said car, and picture transmission means extending between said car and said control station over said last-mentioned cable, including a camera tube arranged on said car to view at least the door area, and a picture tube arranged at the control station for viewing by an operator at said station, whereby the operator is enabled to control the car from said station, by manipulation of said elements, according to the visual and aural intelligence received by him at the control station.

3. A control station for remote control of an elevator car movable in a shaft along which there are floor stations, comprising a support structure including a control panel, a plurality of manually-operable stop-controlling elements on said control panel corresponding to the various floor stations, a manually-operable start-controlling element on said control panel, picture reproducing means on said support structure arranged for observation by an operator while manipulating said elements, and sound transmitting and reproducing means on said support structure for use by the operator while manipulating said elements.

4. A control station for remote control of two elevator cars movable in shafts along which there are floor stations, comprising a duplex control assembly each station of which includes a control panel, a plurality of manually-operable stop-controlling elements on said control panel corresponding to the various floor stations along the shaft of the elevator to be controlled, a manually-operable start-controlling element on said control panel, picture reproducing means arranged in association with said elements for observation by an operator while manipulating said elements, and sound transmitting and reproducing means arranged in association with said elements and said picture reproducing means for use by the operator while manipulating said elements.

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No references cited.