

[54] **CONSOLE CONTROL FOR BEDS WITH INTER-LOCKING SWITCH OPERATORS**

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[52] U.S. Cl. **200/5 R, 200/52**

[51] Int. Cl. **H01h 9/26, H01h 35/00**

[58] Field of Search **200/50 C, 42, 44, 5, 6, 42, 200/52, 61.19, 42 R, 42 T**

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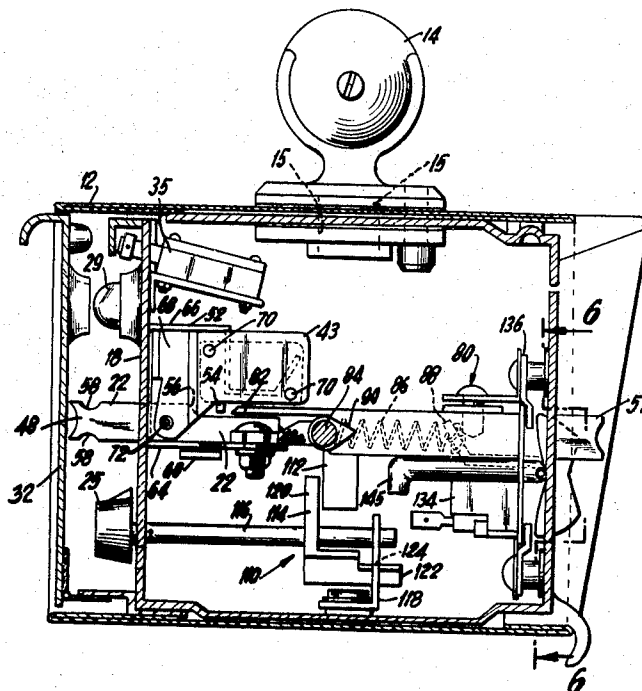
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[57] **ABSTRACT**

A console control is disclosed for operating a hospital bed between various positions required by medical prescription and/or the comfort of the patient. The console control includes a first control panel available to the patient for moving the bed between several positions or to accomplish the control of appliances such as a television and the like. Another control panel is provided in the console control for the use of a medical attendant to accomplish bed position control as well as control of the various appliances as may be operated from the console. The medical attendant's control panel is dominant and includes means to inactivate selectively one or more controls located on the patient's control panel. Locking means are provided for the medical attendant's control panel to prevent unauthorized access to the console control.

14 Claims, 9 Drawing Figures



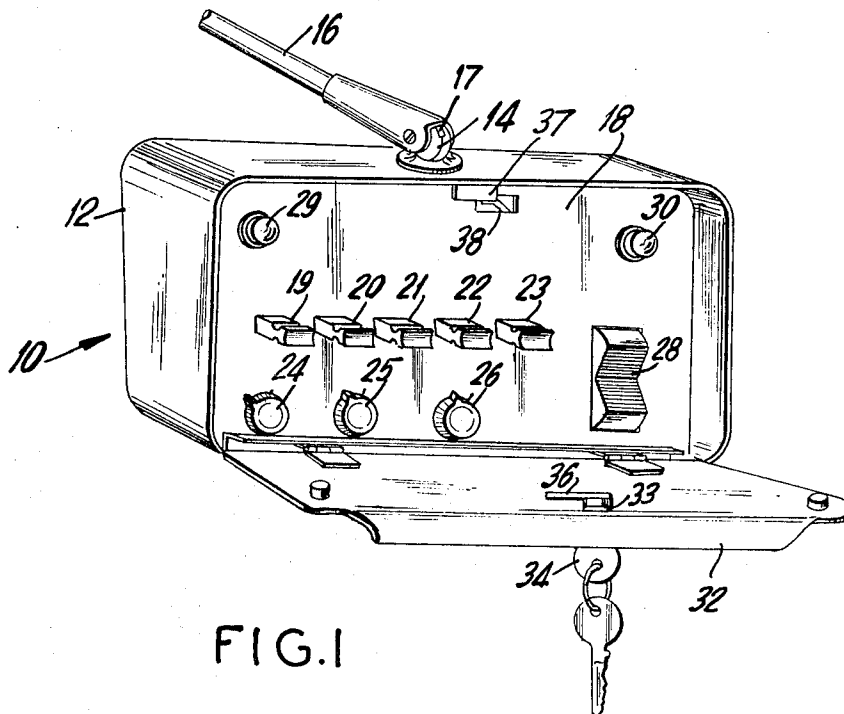


FIG. 1

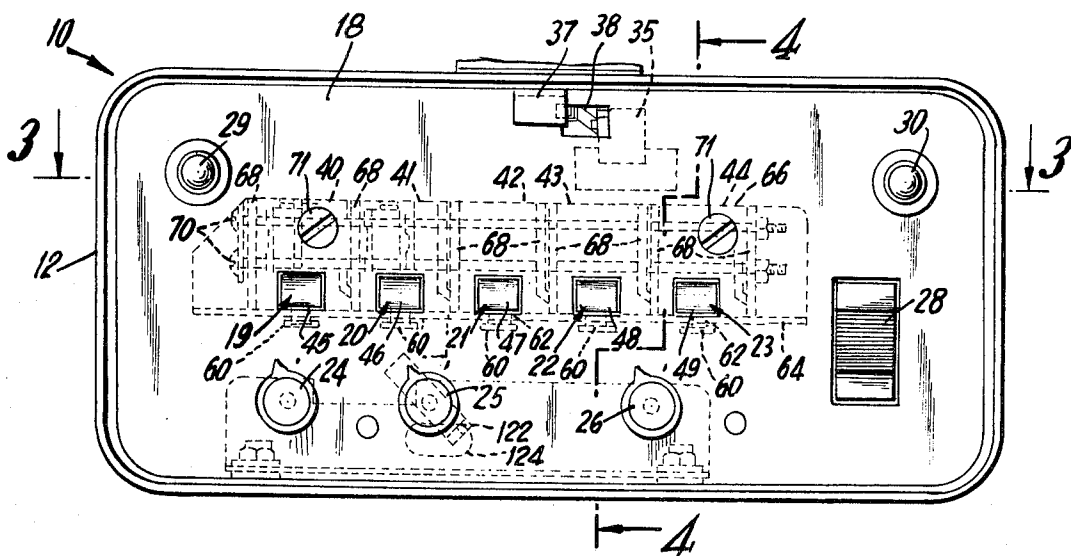


FIG. 2

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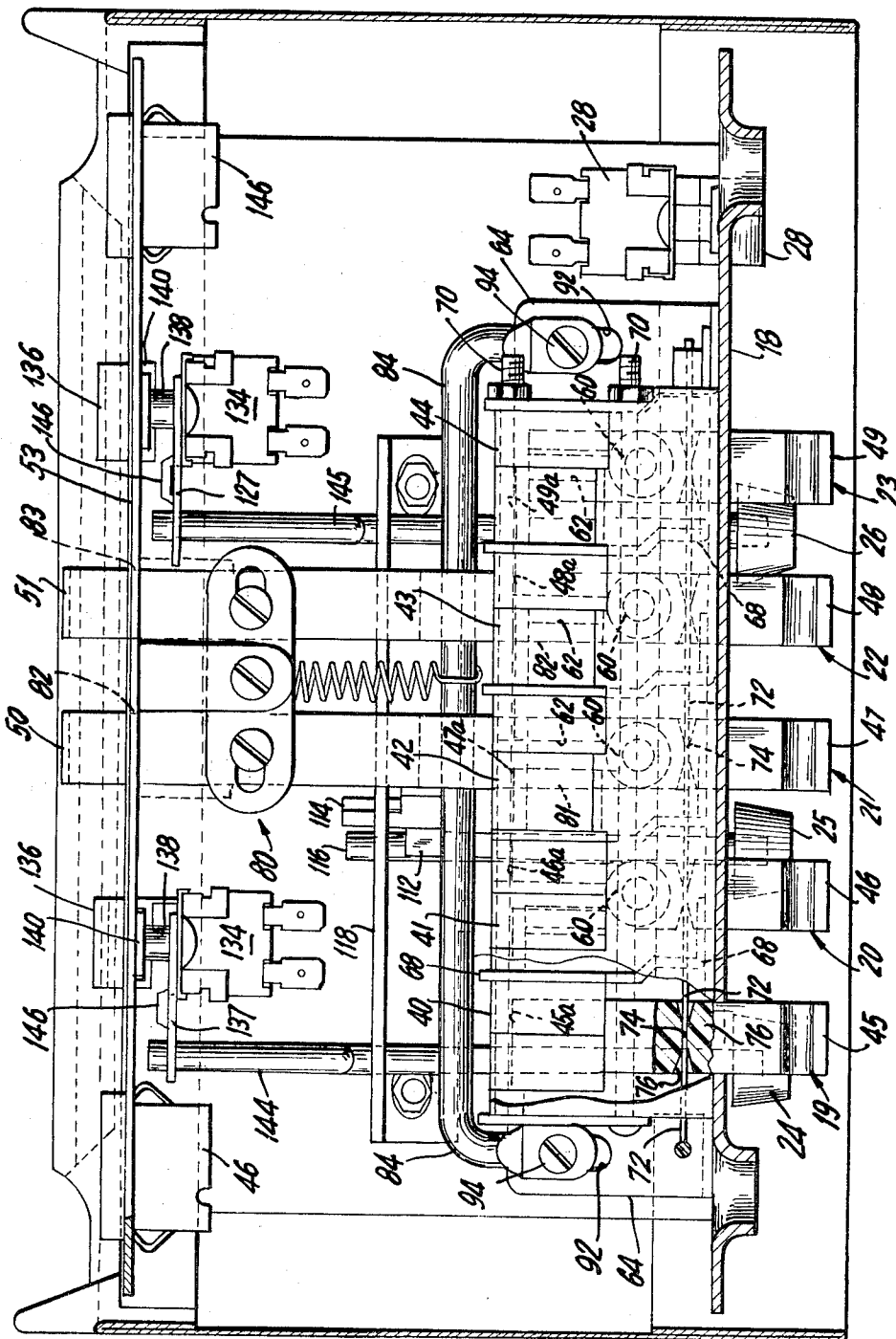


FIG. 3

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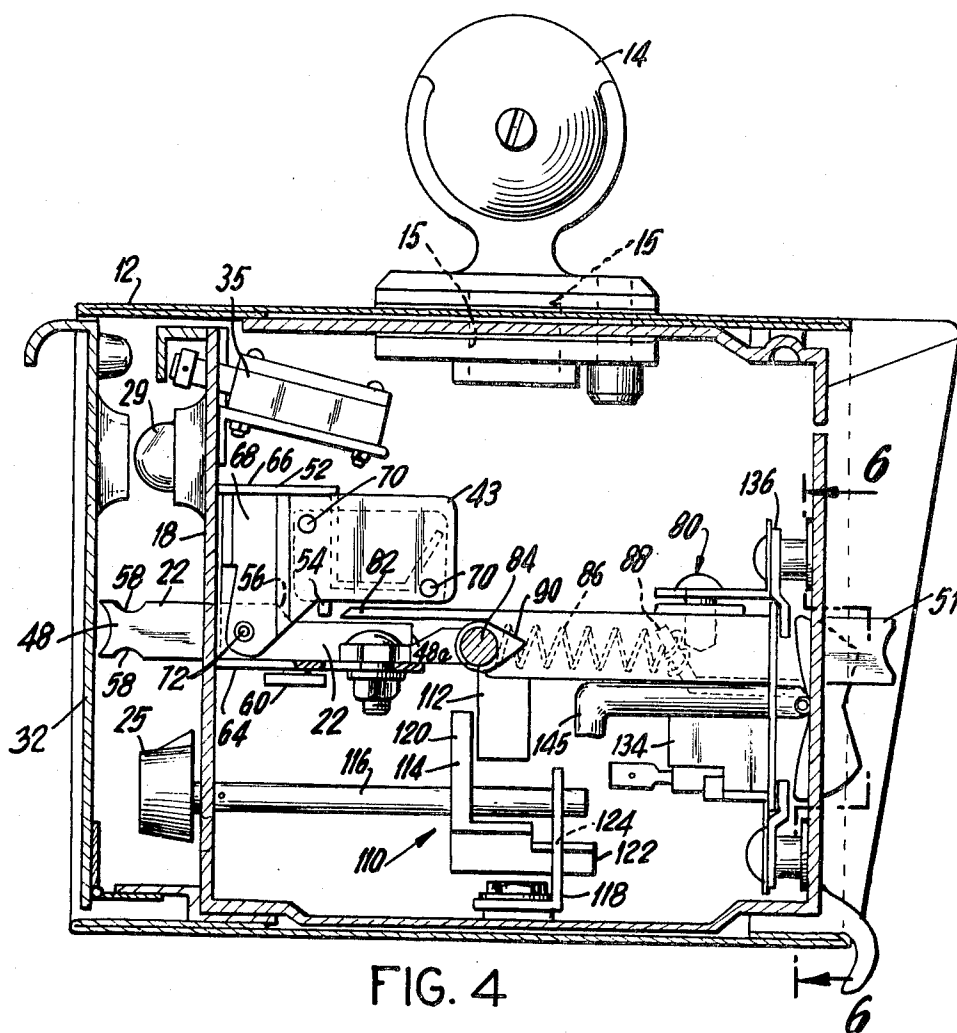


FIG. 4

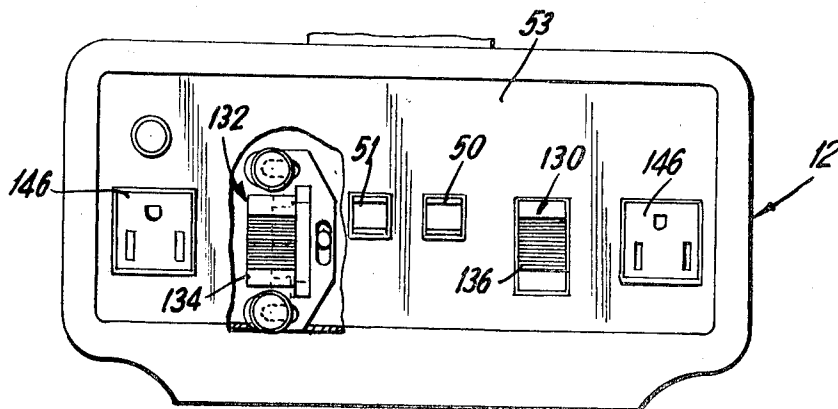


FIG. 5

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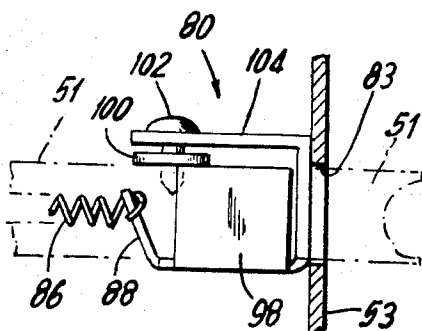


FIG. 9

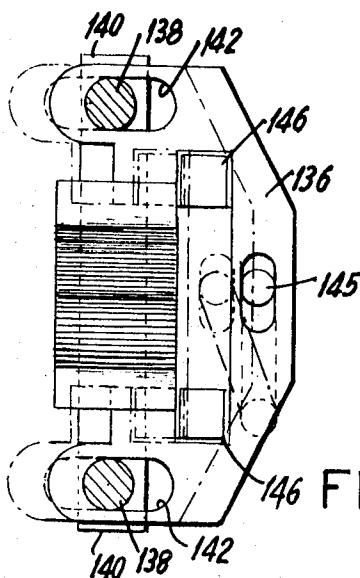


FIG. 6

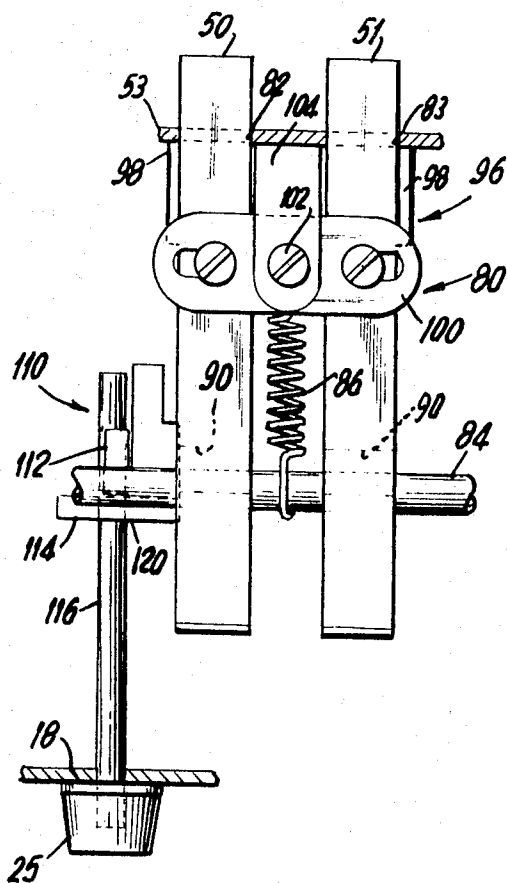


FIG. 7

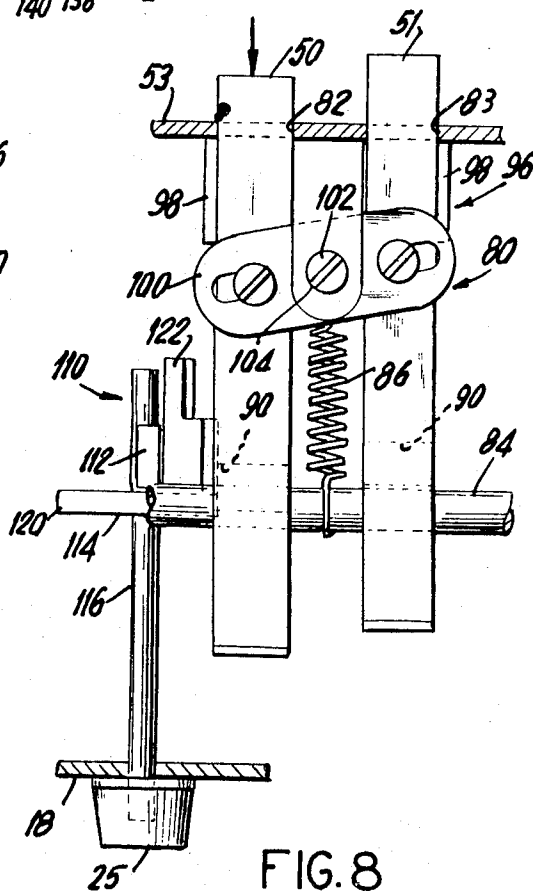


FIG. 8

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CONSOLE CONTROL FOR BEDS WITH INTER-LOCKING SWITCH OPERATORS

BACKGROUND OF THE INVENTION

Hospital beds are movable between various positions to provide for medically prescribed patient positioning in various cases as well as positions for the comfort of the patient. Typically, a hospital bed may be moved so that the mattress is inclined with the head end lowered and with the feet end raised or with the head end raised and the feet end lowered. These are the so-called Trendelenberg and reverse Trendelenberg positions. Similarly the mattress may be movable so that the headrest may be elevated to a sit up position and the knee rest or foot rest portions of the bed may be moved as desired. In other positions the mattress may be maintained in a level condition but may be elevated or lowered with respect to the bed frame. Beds of this kind are equipped with suitable position changing mechanisms for achieving various mattress positions. Ordinarily, the control devices for changing bed position are located at the foot end of the bed and as such are available only to a medical attendant who must be summoned by the patient for a change of bed position.

During time of convalescence, hospital patients generally desire various appliances such as a radio, television, electric shavers, electric blankets and the like. It may also be desirable to provide an intercom system for patient-nurse communications. To fill one or more of these desideratum would require a collection of wire, outlets, and control devices which are easily misplaced or which are difficult for partially immobilized patients to reach. Therefore, the patient may require a medical attendant to assist him in locating misplaced outlets or control devices and the like.

The present invention provides a console control which serves as a central location for various control devices used in connection with hospital beds and patients. The console control is arranged to provide for maximum convenience and utility for both the patient as well as hospital personnel. Summary of the Invention

The console control is a self-contained unit enclosed in a cabinet having a first set of controls identifiable as a medical attendant's (or nurse's) control panel and a second set of controls identifiable as a patient's control panel. Typically, the two control panels are positioned in opposite sides of the cabinet as for example the front and rear panels. The medical attendant's control panel dominates the patient's control panel because in certain situations it may be necessary or desirable to inactivate the patient's control panel so that the patient can neither adjust the position of the bed or activate other appliances which are controlled from the console. For this purpose, interlocks are accessible at the medical attendant's control panel which inactivate selectively the control devices available to the patient.

The console control is arranged with sets of interlocking controls on the medical attendant's and the patient's control panels to prevent more than one control from being activated at a given time. The controls are arranged so that by actuating one control, the other controls are automatically inactivated. In this manner conflicting signals or instructions are not transmitted to the bed moving mechanism.

The console control is of rugged construction and contains relatively simple components which are easy

to manufacture and to maintain or service. The console control is mounted at the end of an articulated arm and so may be moved to various positions within the reach of the patient or of the medical attendant. The console control may also be dismounted from the articulated arm for servicing as may be necessary. A cover which may be locked is provided for the medical attendant's control panel. If desired, the control console may be entirely inactivated by blocking out the patient control panel and by thereafter locking the cover to the medical attendant's control panel.

OBJECTS OF THE INVENTION

It is an object of the invention to provide a console control by which a hospital bed as well as other appliances may be activated.

It is another object of the present invention to provide a console control having a patient control panel as well as a medical attendant control panel.

It is a further object of the present invention to provide a console control having a patient's control panel and a medical attendant's control panel in which the medical attendant's control panel contains means for inactivating the patient's control panel.

It is a further object of the present invention to provide a console control for a hospital bed operative to move the bed between various positions as may be medically prescribed or as may be indicated for patient's comfort in which certain controls are provided for accomplishing the bed movement with means to prevent the actuation at one time of more than one control.

Other and further objects of the present invention will become apparent upon an understanding of the illustrative embodiment of the invention now to be described or will occur to one skilled in the art upon employment of the invention in practice.

A preferred embodiment of the invention has been chosen for illustrating in describing the principles of the invention and is shown in the accompanying drawings wherein:

FIG. 1 is a perspective view of the console control showing in particular the medical attendant's control panel;

FIG. 2 is a front elevational view of the medical attendant's control panel of the present invention;

FIG. 3 is an enlarged section view taken along line 3—3 of FIG. 2;

FIG. 4 is an enlarged section view taken along line 4—4 of FIG. 2;

FIG. 5 is a side elevational view in reduced scale of the patient's control panel of the console control of FIG. 1;

FIG. 6 is a component of one of the interlocking means used in the console control;

FIGS. 7 and 8 are plan views illustrating in different positions a second interlocking means used for inactivating the patient's control panel according to the present invention;

FIG. 9 is a side elevation view of the interlock illustrated in FIGS. 7 and 8.

Referring now to the drawings, in particular to FIG. 1, the console control 10 includes a cabinet 12 having means as for example, a swivel joint 14 for attachment of the cabinet to an articulating arm 16. The articulat-

ing arm is useful in holding the control console in various convenient positions for the patient and the medical attendant. As best shown in FIG. 4, the switch joint 14 is preferably hollow at 15 to provide a convenient and safe location for leading electrical wiring out of the interior of the console. The swivel joint includes a suitable slot 17, FIG. 1, to allow the electric wiring to pass through the swivel into the articulated arm 16 and ultimately to a power source or to the appliances and mechanisms controlled by the console.

The console control as shown in FIG. 1 includes a medical attendant's control panel 18 having a plurality of controls 19-23 for moving the bed to various positions, as indicated above. In addition, the control panel 18 includes a plurality, preferably three control knobs 24-26 for interlocking and inactivating control means located on the patient's control panel, in a manner more fully described below. A rocker switch 28 may be provided as desired for controlling any suitable appliance such as a bed lamp or a television. The console control may include one or more lamps 29, 30 for illuminating the control panel. A hinged cover 32 having a suitable lock 33 and key 34 are provided so that the medical attendant may close and lock the medical attendant's control panel should such action be required. As best shown in FIGS. 2 and 4, a lamp switch 35 is provided for turning off the lamps 29, 30 when the cover is closed and locked. The locking arm 36 (FIG. 1) (when in locked position behind a catch 37) engages and moves a switch arm 38 so as to open the switch 35 for turning off lamps 29 and 30.

Referring now to FIGS. 2, 3 and 4, the bed position controls 19-23 at the medical attendant's control panel comprise a plurality of switches 40-44 which are activated by suitable push buttons 45-49. The switches may be wired as desired to control the movement of the bed mattress to a preassigned bed position. One or more of these switches 42 and 43 have corresponding push buttons 50, 51 (FIG. 3) located at the rear panel or the patient control panel 53 of the console control. Preferably, the patient is allowed to control only certain of the movements of the bed, for example, the patient may be allowed to control the headrest and the footrest mechanisms for moving the bed. The other positions, Trendelenberg, reverse Trendelenberg and the high or low mattress position controls 19, 20 and 23 respectively are generally used for medical purposes and the patient would not normally adjust the bed to these positions. Consequently, the patient's control panel contains, in the preferred embodiment of the invention, only two bed position controls.

As best shown in FIG. 4, the push button 48 activates its microswitch 43 which is mounted in a suitable frame 52 within the control console cabinet 12. The microswitch includes a contact arm 54 which is moved by an inclined surface 56 on the push button 48. When the push button is moved in, it will remain in that position until the desired bed movement is accomplished at which time limit switches (not illustrated) will stop movement of the bed. It will be observed that the push button is suitably contoured at 58 so that the push button may be withdrawn by hand, if desired, to stop mattress movement at an intermediate position, i.e. before the limit switches stop the mattress movement. Each of the push buttons has a depending foot 60 which is

mounted in a guide slot 62 (FIGS. 2 and 3) in the support frame 52 for sliding movement with respect to the control console.

The microswitch and push button support frame 52 includes as best shown in FIGS. 3 and 4, a base plate 64, a top plate 66, and vertical divider plates 68 which define separate chambers for the microswitch housings 40-44. As noted above the base plate includes slots 62 for slidably receiving the depending foot 60 of each push button. A pair of stay bolts 70 hold the frame and microswitch assembly together. The frame may be attached to the inner surface of control panel 18 in any well-known manner as by machine screws 71 (FIG. 2).

Referring to FIG. 3, it will be observed that the push buttons 45-49 are interlocked so that only one switch 40-44 at a time may be activated. A cable 72 is threaded through a hole 74 in the body portion of each push button 45-49 and the cable is provided with a predetermined slack so that only one push button may be moved to an operative position at a given time. While a given push button is being pressed into operative position, the cable 72, because of its threaded relation and predetermined slack, will return any depressed push button to a fully withdrawn (i.e., inoperative) position. It will be observed in FIGS. 3 and 4 that the cable is also threaded through the vertical divider plate 68 which separate the push button. By this arrangement, the cable is able to exert a withdrawing force on the individual push buttons. The push buttons 45-49 are suitably grooved 76 to accommodate the cable movement through various push button positions.

It is to be observed that the push buttons 45-49 tend to remain in the depressed position until withdrawn by hand or by the depressing of another push button. This arrangement is preferred at the medical attendant's control panel to eliminate the need for the medical attendant to remain at bedside while the mattress moving mechanism completes its full excursion. Limit switches (not shown) will stop the mattress moving mechanism at a predetermined position.

The patient control push buttons 50 and 51 are preferably arranged so that:

1. a push button selected must be held in the depressed position by the patient to continue bed movement,

2. only one push button may be moved to operative position at a time thereby to prevent conflicting signals from being sent to the mattress moving mechanism and,

3. push button actuation may be entirely blocked by means of an interference control located at the medical attendant's control panel.

Referring now to FIGS. 3, 4, 7 and 8, the push buttons 50 and 51 are supported at one end by an interlock frame 80 and suitable openings 82, 83 in patient's control panel 53. At their other end, the push buttons are supported by a transverse restraining bar 84. The restraining bar is spring loaded by means of a suitable spring 86 and anchor 88 which is fixed to the interlock frame at the patient's control panel. By this arrangement, the spring loaded restraining bar 84 supports and restrains each push button 50 and 51 in the withdrawn or inoperative position (shown in FIGS. 4 and 7). Consequently, it is necessary to hold the buttons 50 and 51 to continue movement of the mattress to the desired

position. Each push button is notched at 90 to receive the restraining bar. As best shown in FIGS. 3 and 4, the restraining bar is slidably mounted at slots 92 by suitable bolt 94 in the base plate 64 of the microswitch frame 52.

As shown in FIG. 4, the restraining bar 84 is located in spaced relation to the inward ends 45a - 49a (FIG. 3) of the medical attendant's push buttons 45 - 49. The restraining bar will return any depressed push button 45 - 49 to outward, inactive position when a patient push button 50, 51 is actuated inwardly. In this manner an interlock is provided between the patient's push buttons and the medical attendants such buttons to prevent conflicting signals from being sent to the bed moving mechanism.

Referring now to FIGS. 7, 8 and 9, it will be observed that the push buttons 50 and 51 are provided with an interlock mechanism 96 to prevent both push buttons from being depressed simultaneously.

Preferably the interlock mechanism 96 includes the interlock frame 80 which is attached in a suitable manner (e.g., machine screws) to the patient's control panel 53. The interlock frame has upstanding side walls 98 which define a channel for slidably supporting each of the push buttons 50, 51. The push button interlock is accomplished by means of an yoke bar 100 which rides atop the push buttons 50 and 51. The yoke bar is pivoted at 102 to an overhead support arm 104. Therefore, as the one push button is depressed, the yoke bar 100 pivots and moves the other push button outward to the inoperative position. This interlock prevents the patient from depressing both push buttons at the same time.

The push buttons 50 and 51 may be entirely inactivated by a block mechanism 110 shown best in FIGS. 4, 7 and 8. The block mechanism is operated from the medical attendant's control panel which includes a control knob 25 for this purpose. In the preferred embodiment, the operation of the block mechanism centers about the transverse restraining bar described above. By blocking the slidably mounted restraining bar, the push buttons 50 and 51 will be unable to make contact with their respective microswitch arms 54. For this purpose, the restraining bar has a depending block 112 which cooperates with an interference plate 114 for blocking movement of the restraining bar and push buttons. The interference plate 114 is suitably mounted on the control knob shaft 116. As shown best in FIGS. 2 and 4, the shaft is supported between the panel 18 and a support plate 118. The interference plate 114 is basically L shaped so that the upper part 120 of the interference plate may be moved into and out of interfering or blocking relation with respect to the restraining arm block 112. The toe portion 122 of the interference plate registers with an oval opening 124 (FIG. 2) in the support plate 118 to provide suitable limits to the back and forth movement of the interference plate.

The patient's control panel 53 (FIG. 5) is provided with one or more controls 130, 132 for operating remotely located appliances such as a bedlamp, a radio or television, and the like. These appliance controls are preferably switches 134 having suitable rocker push buttons 136 at the patient's control panel. These controls are normally available to the patient, but it may be desirable for the medical attendant to inactivate these

appliance controls. For this purpose, the medical attendant's control panel is provided with control knobs 24, 26 (FIG. 2) for inactivating the patient's appliance controls.

The operation of the medical attendant's control knobs 24 and 26 centers about the movement of an interference plate 137 (FIGS. 3-6) into position to prevent movement of the rocker push button 136. As best shown in FIGS. 3 and 6, the control switches 134 are mounted by suitable bolts 138 and plate 140 in space relation from the spring loaded rocker arm push button 136. By shifting the interference plate 137 into the space between the push button 136 and the switches 134, the patient's appliance controls may be inactivated.

The interference plate includes slots 142 which mount the plate for slidable movement into and out of the path of the rocker push button. Sliding movement of the interference plate is accomplished by means of eccentric shafts 144 and 145 which are suitably supported at the panel 18 and plate 118 (FIG. 3). A pair of embossments 146 on each plate interfere with the movement of the rocker push button.

By turning control knobs 24 and 26 either of the rocker switches 136 may be inactivated since the interference plate 137 physically blocks movement of the rocker switches 136. In this manner, the medical attendant has control over these controls at the patient's control panel.

The patient's control panel may also include one or more power outlets 146 for general usage by the patient. These outlets may be controlled by the rocker switch 28 at the medical attendant's control panel by means of suitable wiring (not shown).

It will be observed that applicant has disclosed a new and useful console control which is advantageous for both the patient and the medical attendant.

What is claimed is:

1. A control for the movement of a bed comprising a cabinet console, means for positioning the cabinet console within the reach of a patient in the bed,
- a pair of fixed substantially parallel console panels within said cabinet console,
- a bed positioning actuating switch means disposed between said panels,
- interlocked switch actuator means extending from both the panels, one of said panels also containing a further switch means for controlling said bed movement,
- a rotatable controllable means disposed on the other panel for interlocking and inactivating said interlocked switch actuator means, and
- a lockable pivotally openable cover means for said last named panel for precluding unauthorized use of the controls of the other of said panels.
2. A control for establishing the movement of a bed comprising
 - a cabinet console having a plurality of substantially opposite panels,
 - a plurality of switches in one of the panels for controlling the operation of the bed moving mechanism,
 - a first set of push buttons for selectively operating the switches,

a second and separate set of push buttons also for selectively operating the switches from the other panel, and means controlled from the second set of push buttons for preventing the first set of push buttons from operating the switches when the second set is operated.

3. A control mechanism for establishing and controlling the movement of a bed comprising a cabinet having a plurality of spaced opposing and substantially parallel panel members, a plurality of means within the cabinet for controlling the bed moving means, the panels being arranged with push buttons which control the actuation of the bed moving means, the bed moving means being actuatable also by a push button from either of the panels means included in the other panel for selectively blocking the operation of the first panel push buttons, means interconnecting the push buttons on said two panels to prevent the actuation of more than one control means at a time, and means interconnecting the push buttons on said control panels to prevent actuation of more than one control means at a time.

4. The control defined by claim 3 which further includes means cooperating with the push buttons of the panel first named and of the other panel to prevent the actuation of more than one control means at a time.

5. The control defined by claim 4 which further includes means for closing and locking the second of the two control panels.

6. The control mechanism for a movable bed comprising first and second control panels positioned substantially parallel to each other, a frame member, a plurality of switches mounted in side by side relationship on said frame member, each switch having a switch arm, said switches being adapted to control a mechanism for moving the bed to selected positions, a plurality of push buttons mounted on said frame and extending through the second panel for contacting and moving the switch arms of the mechanism control switches, means interconnecting the second panel push buttons to prevent more than one push button from being actuated simultaneously, a traverse bar within the frame at a point spaced from the second panel for supporting a plurality of switches of the first panel, said transverse bar being adapted for sliding movement with respect to said frame member so that the first panel push buttons may push the transverse bar and depress corresponding switch arms of the switches, and means for blocking the movement of the transverse bar thereby to prevent the operation of the first panel push buttons.

7. The control defined by claim 6 wherein the transverse bar is positioned adjacent to the second panel push button so that the transverse bar, when moved by a first panel push button, will return any depressed second panel push button to its inoperative position.

8. The control defined in claim 6 comprising, in addition, spring loading means to urge the transverse bar to a position where the first panel push buttons are out of contact with the switch arms.

9. The control as defined in claim 6 wherein the blocking means comprises a shaft rotatably mounted between the front panel and the frame, an interference plate mounted on the shaft, said plate having a depending toe member, the said frame having an opening through which the said toe protrudes, a depending block mounted on said transverse bar in a position for registration with the interference plate so that by rotating the shaft the interference plate confronts the depending block to prevent actuating the corresponding switch, and means provided by the depending toe member of the interference plate extending through the opening in the frame to limit rotary movement of the interference plate.

10. The control as defined in claim 6 wherein the first panel interconnecting means comprises a frame member mounted on said first panel, the frame member including a channel member for slidably receiving the first panel push buttons, an overhead support arm for the frame, a yoke member pivotally mounted in dependent relationship from said overhead support arm, said pivotal mounting being located between said push buttons, and means for pivotally connecting the yoke member to each of said push buttons so that an inward movement of one push button produces an outer movement of the other of said push buttons.

11. A mechanism for controlling the movement of a bed comprising, a frame member having a pair of substantially parallel panel member, a plurality of switch means mounted on one of the panels of said frame, said switch being adapted to control a bed moving device individually to a plurality of selected positions, a first set of actuating means mounted for movement to establish and inactivate contact with said switch means, a transverse bar slidably mounted in spaced relation on said switch means, a second set of actuating means for said switch means also mounted for movement to activate and open said switch means, said second actuating means being supported by said transverse bar so that the movement of the transverse bar controls the contact with said switch means, and means for blocking movement of the transverse bar to prevent the second set of actuating means from contacting the switch means.

12. A mechanism for controlling the movement of a bed comprising a frame member, a plurality of switches mounted on said frame, each switch having an arm for closing and opening the switch, a first set of switch actuating means slidably mounted on the frame for movement into actuating contact with said switch arms,

means interconnecting the first set of switch actuating means to prevent more than one of said set from being moved into actuating contact at one time,

a transverse bar slidably mounted on said frame and adapted to contact and move said first set of switch actuating means out of contact with said switches, a second set of switch actuating means mounted for movement into actuating contact with said switches, the second set of actuating means being in contact with the transverse bar so that moving an actuating means of the second set transversely will move any actuating means of the first set out

of contact with a switch.

13. The mechanism of claim 12 which further includes

means for blocking movement of the transverse bar to prevent operation of said second set of actuating means.

14. The mechanism of claim 12 which further includes

means for interconnecting the second set of actuating means so that only one of the second set may be moved into actuating contact with a switch.

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