Another object is to provide a control device for use on adjustable beds which is relatively simple in structure, relatively inexpensive to install, and which is positive in operation.

Another object is to provide for locking the control device so as to prohibit unauthorized operation thereof.

In accordance with this invention the control device for controlling the operation of the power means which control the adjusted positions of a mattress support to one's comfort comprises a mounting device or control box which can be readily attached to the under structure or side frame of an adjustable hospital bed or the like. Within the box are a plurality of pivotally mounted control lever means, one for controlling each of the respective power operated means for effecting the various adjusted positions of the bed. Each of the levers are constructed of relatively slidably mounted or nested sections which can be readily extended to operative position to a point above the mattress and which can be retracted to an in-operative position to a point below the mattress. Frictional holding means are provided to retain the respective sections of the individual control levers in their respective operative extended positions. Means for adjusting the force of the holding means is also provided. Each of the lever means in turn is operatively connected by a linkage means to an appropriate switch means connected in circuit with the power operated means controlled thereby. Accordingly, the appropriate switch means is readily energized by the movement of shifting of the associated lever means laterally. Locking means are provided for positively securing the respective lever means in their inoperative retracted position so as to prohibit any accidental or unintentionally operation of the lever means when stowed in their retracted positions.

Therefore, a feature of this invention resides in the provision of a control means for use in conjunction with adjustable bed structures which include a series of lever means, each of which is constructed of nested or telescoping members than can be extended between operative and inoperative positions wherein they are rendered readily accessible and convenient to use in the operative position thereof, and inaccessible and free from interference with the care and treatment of the patient in the inoperative position thereof.

Another feature resides in the provision of a frictional holding means for maintaining the respective lever sections in operative position and whereby the lever sections may be retracted or stowed merely by overcoming the friction force maintaining the respective lever sections in their extended positions.

Another feature resides in the provision of a means for adjusting the force for which the frictional engaging means maintained the lever sections in their respective extended positions.

Another feature resides in a locking means by which the control levers are rendered immobile in the retracted positions of the levers.

Other features and advantages will become more readily apparent when considered in view of the drawings and description in which:

FIG. 1 is a diagrammatical side elevation view of an adjustable bed structure illustrating the high and low horizontal position of the mattress support;

FIG. 2 is a schematic representation of the mattress support showing the hinged foot section thereof in an adjusted knee elevated position;
FIG. 3 is a schematic showing of the mattress support adjusted with the head end section in elevated adjusted position;

FIG. 4 is a schematic illustration of the mattress support inclined to a horizontal with the head end portion up;

FIG. 5 illustrates schematically the position of the mattress support in tilted position with respect to the horizontal with the head end positioned down;

FIG. 6 illustrates a vertical end sectional view of the control device in accordance with this invention taken along line 6--6 of FIG. 8;

FIG. 7 is a front elevation view of the control device of the instant invention having parts thereof shown in section;

FIGS. 8 and 8a are respective half plan views of the control device taken along line 8--8 of FIG. 7 wherein FIG. 8 constitutes the left half of the plan view, and FIG. 8a constitutes the right half of the plan view.

Referring to the drawings, FIGS. 1 to 5 illustrate an adjustable bed 10 in the various adjusted positions of which such beds are susceptible. Generally, the adjustable bed 10 of the type disclosed is popularly used as hospital or sick bed and it is comprised generally of a head end section 14 and a foot frame 11. There are respectively, interconnected by horizontally disposed side frame members, e.g., angle structural members 13 and 14 or the like. Supported on the bed frame described is a mattress support 15. In adjustable beds, of the type herein illustrated, the mattress support 15 is formed of a plurality of hinged sections as shown in FIGS. 1 to 5. The mattress support 15 illustrated comprises four hinged sections 15A, 15B, 15C, 15D connected together about pivot points 16, 17 and 18. Not shown, but as is well understood by those skilled in the art, are independently operated means operatively associated with the mattress support 15 for adjusting the same in any of its respective positions. For example, as shown in FIG. 1 the mattress support can be adjusted vertically with the support 15 maintained parallel to the horizontal between a high and low position as indicated in FIG. 1, or any other horizontal position immediately therebetween. As shown in FIG. 2 the foot sections 15C and 15D are adjusted to a knee raised position with the head end portion 15A horizontally disposed. In FIG. 3 the mattress support 15 is adjusted with the head end portion 15A thereof elevated with respect to the horizontal plane of the mattress support. In FIG. 4 the mattress support 15 is adjusted to a tilted position in which the head end portion 15A of the mattress support is raised above the foot end portion 15D. And in FIG. 5 the mattress support 15 is adjusted in a tilted position in which the head end portion is disposed below the foot end portion. Of course, it will be understood that various combinations of the respective adjusted positions are readily obtained by appropriate operation of respective control means which control the operation of the independent power means (not shown).

In accordance with this invention the control device 20 for controlling the respective power means is secured to the frame of the bed. Essentially, the control device 20 comprises a control box 21 which is connected by means of a Z-shaped bracket 22 to a vertical plate 23 connected between the side frame members 13 and 14, preferably adjacent to the foot end of the bed. The control device comprises essentially a horizontal plate 24 and a connected rear cover section 25. The front plate 24 comprises a formed piece having circumferentially extending insulated flange portions to define a top wall 24A, a bottom wall 24B and connected side walls 24C, the top and bottom wall portions 24A, 24B being provided with insulated lip portions 26, 27 respectively. The top wall 24A is also provided with cut-outs 28 through which the respective control lever means 29, 30 and 31 extend.

As shown in FIGS. 1 and 6, the rear cover or wall 25 of the box extends between the insulated flange or lip 27 of the lower wall portion 24B and the lowermost angle member 14 of the bed side frame. The upper insulated lip or flange 26 of the control box 21 connects to the Z-shaped bracket 22 by which the box 21 is supported on the bed frame.

Located to one side of the control box 21 on the flange 14A of the lower angled brace on the side frame are the respective switches 32, 33, 34 which control the operation of the respective power means to effect the various adjustments or combination thereof as illustrated in FIGS. 1 to 5. For example, switch 32 is connected to the power operated means which control the flexing of the foot portions 15C, 15D of the mattress support 15 to adjust the various knee elevated positions. Switch 33 is connected in circuit with a power operated means which controls the elevation of the head section 15A of the mattress support. Switch 34 activates the power operated means for vertically adjusting the high and low positions of the mattress support 15. Connected to the circuit with the high-low switch 34 is a three position selector switch 35 which is utilized to determine the inclination of the mattress, i.e. whether the head or foot end is to be inclined up or down, or be maintained horizontal. As shown, switch 35 is marked "head," "both" or "foot." This means that with the selector switch positioned in the "head" position, the actuation of the high-low switch 34 will cause the mattress support 15 to tilt in a position indicated in FIG. 4. With the selector switch 35 positioned in the "both" position the mattress support 15 will slide vertically and parallel to the horizontal plane upon actuation of the high-low switch, as illustrated in FIG. 1. With the selector switch 35 positioned in the "foot" position, actuation of the high-low switch 34 will cause the mattress support 15 to assume an adjusted position illustrated in FIG. 5. The power means and switch means for controlling the opposing ends of the mattress support are well known, and need not be further described since this invention has to do with the control for actuating the respective switch means.

In accordance with this invention the switch means, that is the knee, head, and high-low switches are operatively connected with unique control lever means 29, 30, 31 which are adapted to be moved between operative extended position, and retracted inoperative position. One such lever means is operatively connected to each of the respective switch means. In accordance with this invention each of the respective lever means 29, 30, 31 comprise a pair of nested sections which include a rectangular shaped section or rail 40 which is wholly disposed within the confines of the control box 21. Connected to the back side 40A of each of the respective rail sections is a U-shaped spacer bracket 41 by which the respective rail sections 40 are pivotally connected to the Z-shaped support bracket 22 by screw pivot 42. Thus, it will be noted that each of the respective rail sections 40 is movable about its pivot screw 42 a limited angular amount. Operatively associated with each of the respective rail sections 40 is a slideable lever section 43 which is adapted to be slidably mounted with respect to rail 40 so as to extend between an operative extended position and an inoperative retracted position. As shown in FIGS. 6 and 7, the extended operative position of the slideable lever section 43 is shown in solid line whereas the retracted inoperative position of the respective lever section is illustrated in dot-dash line. Thus, it will be readily apparent that the slideable lever sections 43 can be readily moved between operative position wherein the respective levers are rendered readily accessible and inoperative position wherein they are stowed in an out of the way position below the level of the mattress.

In order to determine the position of the slideable lever section 43 with respect to its respective rail sections in the operative position thereof, a frictional engagement means is provided for holding the slideable lever section 43 in its extended position. As shown in FIG. 6, the frictional...
holding means comprises a friction plate 44 which has its bearing surface coated with a suitable felt material or other friction restraining surface 45 and which is arranged to bear against the surface of the slidable lever section 43. The friction plate 44 is maintained in position by a pair of holding means, which comprise a friction plate 44 which exerts the force which the friction plate 44 exerts upon the slidable lever member 43. If desired, suitable friction bearing buttons 47 may be disposed between the side and front walls of the ram member 40 and the slidable lever member 43 so as to insure axial alignment of the slidable lever section 43.

Connected to the lower end of each slidable mounted lever section 43 is a stop 48 which in the retracted position of the slide section 43 is adapted to engage a stop plate 49 fixed to the front wall 24 of the control box 21. With the construction thus far described it will be readily apparent that the slidable lever section 43 of the respective levers can be readily shifted between the operative and inoperative position merely by overcoming the force exerted by the friction plate 44 on the slidable section of the lever. The arrangement is such that when the respective levers are extended to their operative position, the hand knob 50 connected thereto, will extend above the surface of the mattress on the mattress support 15 and thus be readily accessible to the operator. When the respective levers 29, 30, 31 are stowed in their retracted position the knob or upper ends 50 of the respective lever sections 43 are flush with the mattress, and are thus disposed out of the way and free from interference with the care of the patient.

As shown in FIG. 8 each of the lever rail sections 40 has connected thereto an L-shaped bracket 51 one arm of which is horizontally disposed. In accordance with this invention the "L" bracket 51, connected to each of the lever rail sections 40, is operatively connected through a linkage means to one of the switches. For example, the lever means 29 is interconnected by a linkage 55 to head switch 33. Similarly, the control lever 60 controlling the adjustment of the foot end of the mattress support is interconnected to the knee activating switch 32 by a linkage connection 56, and the lever means 31 controlling the high-low adjustments is connected to the high-low switch 34 by linkage 57. The linkage connection comprises a member which connects the bracket 51 of the respective levers to its corresponding switch so that a direct connection is afforded therebetween.

To maintain the respective levers and their connected linkages in neutral position, a toggle spring means 58 is operatively associated with each of the interconnecting linkage members. As shown in FIGS. 7 and 8A, the toggle spring means 58 comprises a pair of angularly disposed coil springs 58A, 58B which have one end thereof connected to the linkage member, preferably at a common point and have their other ends connected to a bracket 59 fixed to the bed side frame member. Thus, it will be apparent that movement of the respective levers either to the left or to the right, as indicated by arrow in FIG. 7, will cause the lever to be placed under spring tension. Thus, upon release of the lever after the adjusted position effectuated thereby has been reached, the lever is automatically returned to its neutral position due to the spring action operating thereon.

To secure the respective levers 29, 30, 31 in their retracted inoperative position and to render them immovable so to avoid any accidental operation thereof, a locking means is provided. As seen in FIGS. 6 and 7, the locking means comprises an angularly bent plate 60 to define a locking member having a vertical section 60A and a lateral offset portion 60B. The locking member is hinged to a bracket 63 secured to the rear cover 25 of the control box 21 about a hinged pin 61. A spring means 62 is connected between a bracket 63 secured to the rear cover 25 and the lateral offset portion 60B so as to normally bias the locking plate 60 into unlocked position.

In the illustrated embodiment the operation of the locking plate 60 is disposed so as to be under the influence of a key operated latch means 64. The latch means 64 is associated with a conventional tumbler type lock 65 whereby displacement of the latch member 64 pivots the locking plate 60 into the unlocked position. The offset portion 60B of the tumbler barrel of the lock 65 is rotated, the latching portion connected thereto will overcome the force of the spring 62 causing the locking plate 60 to pivot in a clockwise direction to a position wherein the offset portion 60B is horizontally disposed, as indicated in dark lines as viewed in FIG. 6. Accordingly, the offset position of the locking plate 60 is provided with notched out portions 60C having configurations substantially similar to that of the slidable sections of the respective lever means. Thus in the operative or locked position of the locking plate 60, the notched out portions 60C will accommodate the respective lever sections 43. The control lever stop 48 which extends laterally beyond the ends of the lever sections 43 serves to prohibit withdrawal of the lever section 43 from the control box 21 when the locking plate 60 is disposed in operative locked position as seen in FIGS. 6 and 7. Thus with the locking plate 60 disposed in operative position and locked therein under the action of the key lock, it will be apparent that accidental displacement of the operating levers 29, 30, 31 is prohibited. It is to be noted that the tolerances of the notched out portions 60C of the locking plate 60 which receive the respective lever sections 43 are such that any play therebetween is insufficient to effect operation of the switch means. The operation of the control device is as follows. The locking plate 60 must be first released by insertion of the proper key in the tumbler lock 65. With the locking plate 60 released, the lever offset 43 of the lever controlling the particular adjustment desired is retracted to its extended position as indicated in FIG. 7. It will be apparent that either one or all of the control levers 29, 30, 31 may be extended to their operative position depending on which of the particular adjustment is required. Thus, by the appropriate displacement of the respective levers 29, 30, 31 either to the right or left will cause the switch means operatively associated therewith to close the circuit to the particular power operated means which controls the movement of the respective sections of the mattress support 15 or the mattress so that appropriate adjustment can be made. When the proper adjustment has been reached, the control lever 60 is released, and due to the action of the toggle spring 58 operating thereon is returned to its neutral position. After the desired adjustments have been made, each extended lever section 43 is retracted to its stowed position merely by applying a downward force sufficient to overcome the friction of the friction plate 44 operating thereon. With the lever sections 43 disposed in their retracted position, the key may be again rotated to shift the locking plate 60 to locked position and thereby insure that the respective levers are locked and immobile in their retracted inoperative position.

From the foregoing, it will be readily apparent that the operation of the levers 29, 30, 31 is rendered simple and convenient, and that they can be brought to a readily accessible and convenient position to control the desired operation of the bed, and that in their stowed or retracted position the respective levers are disposed entirely clear of the mattress and are free from interference with any activity which is required to be conducted in and around the bed. Also, by stowing the respective levers 29, 30, 31 out of the way, and below the level of the mattress, the transfer of a patient in and out of bed can be readily facilitated without danger of activating the controls associated with adjustable beds. It will be further apparent that the operation of the respective levers is rendered impossible when they are locked in their stowed position, since the locking plate 60 prohibits any displacement of the lever either to the right or left, which is necessary.
to actuate the switch means operatively associated therewith.

While the instant invention has been disclosed with reference to a particular embodiment thereof, it is to be appreciated that the invention is not to be taken as limited to all the details thereof as modifications and variations thereof may be made without departing from the spirit and scope of the invention.

We claim:

1. A control device adapted to be connected to a power operated adjustable bed and positioned relative thereto so as to be disposed below the level of the mattress on said bed comprising
   (a) control box mounted on the frame of said bed below one level of the mattress,
   (b) a telescoping lever means including a first section pivotally connected in said box for movement between operative and inoperative position, and a second lever section slidably mounted with respect thereto for longitudinal movement therealong between extended and retracted positions,
   (c) a switch means,
   (d) and means interconnected said first lever section to move switch means whereby said switch is actuated upon movement of said first section to operative position when said second section is in the extended position.

2. The invention as defined in claim 1 including
   (a) means for operating on said second lever section for maintaining said latter section in extended position relative to said first lever section.

3. A control device used on a power operated adjustable bed comprising
   (a) means for mounting the control device so as to be located below a mattress supported on said bed,
   (b) telescoping lever means including a first lever section pivotally connected to said mounting means for movement between operative and inoperative position, and a second lever section slidably mounted with respect to said first lever section for movement between extended and retracted positions with respect thereto whereby in the extended position said second lever section extends above the lever of the mattress,
   (c) a switch means on the bed frame,
   (d) and means interconnected said first lever section to said switch means whereby said switch is actuated upon movement of said first lever section to operative position,
   (e) and means for securing said second lever section in the retracted position so as to render said lever inoperative.

4. For use on a bed having an adjustable mattress support and power operated means for controlling the adjusted positions of said mattress support, the improvement of
   (a) control device for effecting selective operation of said power means, said device including a mounting means,
   (b) a plurality of telescoping operating levers mounted in said mounting means,
   (c) each of said levers including a first section pivotally connected to said mounting means, and a movable section slidably mounted with respect to said first section for movement between operative extended position and inoperative retracted position relative to said first section,
   (d) a plurality of switch means connected in circuit with the power means and adapted to actuate the power means for effecting the respective adjustments of the mattress support,
   (e) and means interconnecting each of said first sections of the respective levers to one of said switch means whereby movement of the respective levers effects actuation of the switch means operatively connected thereto.

5. The invention as defined in claim 4 and including a friction means operating on the slideable section of the respective levers for maintaining the same in the extended position thereof.

6. The invention as defined in claim 4 and including locking means for rendering said levers inoperative in the retracted position thereof.

7. A control device for a power operated adjustable bed comprising
   (a) a box means mounted on said bed,
   (b) a plurality of telescoping lever means mounted in said box means,
   (c) each of said lever means including a first section pivotally connected to said box means for movement between operative and inoperative position, and a second section slidably mounted with respect to said first mentioned means for movement between extended and retracted positions,
   (d) a plurality of switch means,
   (e) and means interconnecting the first section of the respective lever means to a corresponding switch means whereby said switch is actuated upon movement of said first section to operative position,
   (f) and means for locking and securing said second sections of the respective levers in the retracted position thereof so as to render the same immobile and thus prohibit unintentional actuation of said lever means.

8. For use on a bed having a mattress frame which can be raised, lowered or inclined with respect to a horizontal datum plane, and which frame includes individually adjustable, pivotally connected head and foot portions, and power means for effecting the respective adjustments, the improvement of
   (a) a control means for controlling the operation of the power means for moving the frame or the respective head and foot portions thereof to any adjustable position,
   (b) said control means including a mounting means,
   (c) a plurality of levers, each of said levers being actuated to effect a given adjustment, and each of said levers including
   (d) a rail section pivotally connected to said mounting means,
   (e) a slideable lever section telescopically mounted in each of said rail sections for movement between operative extended positions and inoperative retracted position,
   (f) means disposed within each of said rail sections frictionally bearing on the slideable section mounted therein whereby said friction means retains the slideable section fixed relative to its respective rail section.
   (i) and means for locking each of said control levers in the retracted positions thereof.

9. The invention as defined in claim 8 wherein said locking means includes
   (a) an angled locking plate hinged for movement between locked and unlocked positions, and
   (b) said angled plate having notched out portions for confining the slideable section of the respective levers in the retracted position thereof and in the locked position of said plate.

10. For use in a power operated hospital bed having a mattress support which can be raised, lowered or inclined with respect to a horizontal datum plane, and which
mattress support includes individually adjustable head and foot end sections, and independently operated power means for effecting the individual adjusted positions of said mattress support and its end sections when energized, the improvement of
(a) a control device for moving the mattress support and/or the respective head and foot end sections to any of the adjusted positions,
(b) said control device including a mounting box adapted to be secured to the bed,
(c) three control lever means mounted in said box, each of said lever means controlling a given adjustment of said mattress support,
(d) each of said lever means including a rail section, 
(e) and a slide section, said slide section being telescopically mounted in said rail section for movement between extended operative position and retracted inoperative position,
(f) means pivotally mounting the rail section of the respective lever means to said box to provide the respective rail sections with limited lateral movement about its pivot,
(g) means for frictionally retaining each of said slide members in their respective extended positions,
(h) means for adjusting the force with which said friction plate bears against said slide section,
(i) a switch means operatively associated with each of said control lever means, each of said switch means being connected in a circuit with the power means for effecting a given adjustment of said mattress support,
(j) a linkage connection connecting the rail section of each of said lever means to its associated switch means whereby lateral displacement of said lever about its respective pivot means actuates its respective switch means,
(k) means for returning said lever means in their neutral positions,
(l) and locking means for securing the respective slide sections of said levers in their respective retracted position so as to render said lever means immobile so as to prohibit unintentional actuation of said lever means.

11. The invention as defined in claim 10 wherein said means for returning the respective lever means to neutral position includes a toggle spring means operatively connected to said linkage.

12. For use in a power operated hospital bed having a mattress support which can be raised, lowered or inclined with respect to a horizontal datum plane, and which mattress support includes individually adjustable head and foot end sections, and independently operated power means for effecting the individual adjusted positions of said mattress support when energized, the improvement of
(a) a control device controlling the operation of said power means for moving the mattress support and/or its respective head and foot end sections to any of the adjustable positions of said mattress support,
(b) said control device including a mounting box adapted to be secured to the bed,
(c) control lever means mounted on said box, each of said lever means controlling a given adjustment of said mattress support,
(d) each of said levers including a first section,
(e) and a second section, said slide section being telescopically mounted in said second section for movement between extended operative position and retracted inoperative position,
(f) means pivotally mounting said first section of the respective lever means to said box to provide the respective first sections with limited lateral movement about its pivot,
(g) means for frictionally retaining each of said second sections in their respective extended positions,
and means for latching said lock plate in locked position.

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