MANUAL CONTROL FOR A MOTORIZED HOSPITAL BED

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The present invention relates to manual control for a motorized hospital bed.

The invention is particularly adapted for use in connection with hospital beds of the general type disclosed in my copending application Serial No. 108,495 filed May 9, 1961, wherein motorized mechanisms are provided for raising and lowering the head and knee sections of the bed and for raising and lowering the entire bed.

The primary objects of the invention are to provide a manual control device having an electric cord or cable which can be plugged into a receptacle in a hospital bed, by means of which the bed can be operated either by an attendant or by the bed patient himself when the latter is advisable; to provide such a device which comprises an outer casing having an upper housing in which are mounted the operating parts, and a handle depending from the housing by means of which the device may conveniently be held in the hand and operated; to provide such a device which has an escutcheon plate mounted in the open front of the casing's upper housing through which plate extend three pairs of vertically spaced pushbuttons, a first pair for actuating mechanism for moving the bed's head section up on down, a second pair for actuating mechanism for moving the bed's knee section up on down; to provide such a device in which the escutcheon plate bears the inscriptions Head, Bed and Knee between the respective pairs of vertically spaced pushbuttons and in which the upper and lower pushbuttons of each pair bear inscriptions denoting Up and Down respectively; to provide such a device in which six electric switches for completing circuits to energize motors for operating the bed and its several parts, are mounted inside the casing's upper housing and behind said escutcheon plate, said switches being vertically elongated and being mounted on a rear plate in side-by-side relation to form a single compact row; to provide novel means for interconnecting the single row of six switches with the six pushbuttons in such a way that the pushbuttons are conveniently oriented, i.e., with an upper row of three Up pushbuttons and a lower row of three Down pushbuttons; to provide novel means whereby the Up and Down pushbuttons may be distinguished by "feel" as well as visually; and in general to provide such a manual control for a motorized hospital bed which is convenient in use, simple in construction, reasonably economical in manufacture and attractive in appearance.

An illustrative embodiment of the invention is shown in the accompanying drawing, wherein:

FIGURE 1 is a perspective view of the new manual control for a motorized hospital bed;

FIGURE 2 is a front elevational view of the device, the lower handle portion of the outer casing therefor being broken away in this view;

FIGURE 3 is a vertical sectional view of the outer casing of the device taken on line 3--3 of FIGURE 2 and showing the operating parts inside the casing in side elevation;

FIGURE 4 is a bottom plan view of the inner operating parts of the device, the outer casing being shown fragmentarily;

FIGURE 5 is a vertical sectional view of certain of the inner operating parts of the device, the plane of section being indicated at 5--5 in FIGURE 3;

FIGURE 6 is a vertical sectional view of the inner operating parts of the device, the plane of section being indicated by line 6--6 of FIGURE 5;

FIGURE 7 is a rear sectional view of a rear mounting panel of the device;

FIGURE 8 is a vertical sectional view of the device taken on lines 8--8 of FIGURES 3 and 4, with the outer casing shown fragmentarily; and

FIGURE 9 is a wiring diagram illustrating the electrical connections of the device.

Referring now in detail to this drawing, an outer casing 10 which may desirably be made of molded plastic material, has a forwardly open upper housing part 11 in which are mounted the operating parts of the device, and a depending hollow compartment 12 for accommodating the housing 11 and having an opening 13 in its lower end for the accommodation of an electric cable 14 passing from the exterior of the casing through the opening 13 and the hollow handle 12 and into the housing 11.

A dielectric rear mounting panel 15 is secured within the housing 11 as by means of screws 16 passing through openings 17 in the panel 15 and into threaded bosses 18 molded in the casing at diametrically opposite corners of the housing. An escutcheon plate 19 is secured to the rear mounting panel 15 in forwardly spaced, parallel relation thereto by means of channel brackets 20 secured to the rear plate 15 by rivets 21, and the escutcheon plate 19 is in turn secured to the channel brackets 20 by screws 22. The escutcheon plate 19 has six pushbutton openings therethrough which are arranged to provide an upper row of three Up pushbutton openings designated 23, 24 and 25, and a lower row of three Down pushbutton openings designated 26, 27 and 28.

Six elongated electric switches generally designated 29, 31, 32, 33, 34 and 35 of conventional construction are mounted on the rear mounting panel 15 in vertically elongated disposition and in side-by-side relation in a single row for compactness. As best seen in FIGURE 6, each of these switches comprises an upper angle bracket 36 secured by a rivet 37 to the panel 15 and having a forwardly extending arm 38, an operating arm 39 pivotally mounted on the forward end of arm 38, and a switch arm 40 having its upper end pivotally engaged at 41 with the arm 38 and connected to the upper end of the operating arm 39 by a tension spring 42. A lower, generally W-shaped bracket 43 has an arm 44 extending upwardly opposite switch arm 40, a rearwardly extending portion 45, a downwardly extending portion 46 secured by a rivet 47 to the rear panel 15, and a lower portion 48 extending rearwardly through an opening 49 in the rear panel. The contact points of each electric switch comprise a rivet 50 in the rear panel 15 and a point 51 which engages an upwardly extending arm 44 of the lower bracket 43. The switches are wired in series, current being introduced to switch 35 through a lead wire 52 (see FIGURES 3, 7 and 9), and conducted from switch to switch through connecting elements 53 secured to the rear panel by means of rivets 37 and rivets 50 previously described. Thus the switches are all in constant readiness to supply current through one or another of the lead wires 54, 55, 56, 57, 58 or 59 to complete a circuit for actuating a relay for energizing a motor in the bed to perform the operation desired. The lower rivets 21 which secure the channel brackets 20 to rear panel 15, also serve to secure a stop bar 60 to said rear panel for limiting turning movement of the switches' operating arms 39.

For actuating the operating arms 39 of the six electric switches there are provided six pushbutton elements which are not aligned in a single row as are the switches but
which are oriented to provide an upper row of three Up pushbuttons and a lower row of three Down pushbuttons. These six pushbutton elements are seen in rear elevation in FIGURE 5. The reader would bear in mind that certain parts are shown as viewed from the front in FIGURES 2 and 8 with the Head section operating elements on the left, whereas in FIGURES 5, 7 and 9 the parts are oppositely viewed from the rear with the Head section operating elements on the right.) The upper pushbutton elements 61, 62 and 63 have, respectively, upper pushbutton heads 64, 65 and 66 which extend through the upper pushbutton openings 23, 24 and 25 in the escutcheon plate 19, leg portions 67, 68 and 69 which extend angularly downwardly so as to pass between the escutcheon plate and the operating arms of alternating switches 31, 33 and 35, and feet portions 70, 71 and 72 which extend from the lower ends of the leg portions 67, 68 and 69 horizontally below the lower pushbutton openings and which bear against the rear surface of the escutcheon plate 19. The lower pushbutton elements 73, 74 and 75 have, respectively, lower pushbutton heads 76, 77 and 78 which extend through the lower pushbutton openings 26, 27 and 28 in the escutcheon plate 19, leg portions 79, 80 and 81 which extend angularly upwardly so as to pass between the escutcheon plate and the operating arms of intervening switches 30, 32 and 34, and feet portions 82, 83 and 84 which extend from the upper ends of leg portions 79, 80 and 81 horizontally above the upper pushbutton openings and which bear against the rear surface of the escutcheon plate 19.

The outer forward ends of the upper and lower pushbutton heads bear inscriptions denoting Up and Down respectively, and the escutcheon plate 19 bears the inscriptions Head, Bed and Knee between the three pairs of upper and lower pushbuttons. As a further aid to distinguishing the Up pushbuttons from the Down pushbuttons, the outer forward ends of the former are convex while the outer forward ends of the latter are concave. Thus the pushbuttons can readily be distinguished in the dark or by a blind patient.

**Operation**

The tension springs 42 (see FIGURE 6) of the six electric switches normally urge the upper ends of operating arms 39 rearwardly and the lower ends of these arms 39 forwardly so as to press the pushbutton elements forwardly to inactive positions. Springs 42 also normally urge the arms 40 rearwardly into contact with rivets 50 so that all of the switches are normally connected to lead wire 52 through the upper angle brackets 36, switch arms 40, rivets 50, connecting elements 53 and rivets 37. Lead wire 52 is connected to one pole of a source of low voltage electric current (not shown), the other pole of which source of current is connected to six relays for energizing motors to operate the various parts of a hospital bed, the relays and motors being mounted on the bed. Lead wires 54, 55, 56, 57, 58 and 59 connect the switches 30, 31, 32, 33, 34 and 35 respectively to the six relays so that a circuit can be completed through the manually control to actuate any one of said relays and thus energize a motor to move the bed's head section up or down, or to move the entire bed up or down, or to move the bed's knee section up or down. Inasmuch as the control of all six circuits is practically the same only one of them is described below in detail.

Assuming the patient or attendant desires to lower the head section of the bed, he would press the pushbutton 76 inscribed DN beneath the inscription Head on the escutcheon plate 19, as indicated in FIGURES 6 and 9. This would pivot the entire pushbutton element 73 about the line of engagement of said element's foot 62 with the escutcheon plate, as a fulcrum, of the operating arm 39 on switch 30, being located approximately midway between the upper pushbutton opening 23 and lower pushbutton opening 26 and directly to the rear of and in contact with the angularly upwardly extending leg portion 79 of pushbutton element 73, would thus be deflected rearwardly. The upper end of this operating arm would cause the switch arm 40 of switch 30 to snap forwardly past center into contact with the contact point 51 of switch 30. This would complete a circuit from lead wire 52 through the switch arms 40, rivets 50, connecting elements 53, rivets 37 and upper angle brackets 36 of the other switches, through switch arm 40, contact point 51 and lower angle bracket 46 of switch 30, and through lead wire 54 to actuate the proper relay for energizing the motor for lowering the head section of the bed. It will be seen that only one of the relay circuits can be completed at any one time to operate a part of the bed, which is desirable. If two or more of the pushbuttons are pressed at the same time, only the circuit nearest the lead wire 52, toward the left as seen in FIGURE 9, will be completed.

It will thus be seen that the invention provides a convenient and efficient manual control for a motorized hospital bed, and while but one specific embodiment of the invention has been herein shown and described it will be understood that numerous details thereof may be altered or omitted without departing from the spirit of the invention as defined by the following claims.

I claim:

1. A manual control for a motorized hospital bed, comprising: a rear mounting panel; an escutcheon plate spaced forwardly of and parallel to said rear mounting panel, said plate having a pair of vertically spaced pushbutton openings therethrough; a pair of elongated electric switches mounted on the rear mounting panel in vertically elongated disposition and in horizontally spaced relation and approximately equidistant from a vertical plane through the centers of said pushbutton openings and normal to said rear mounting panel and said escutcheon plate, said switches having operating arms spring-pressed forwardly toward areas of said escutcheon plate approximately midway between said pushbutton openings; a rigid upper pushbutton element having an upper pushbutton head extending through said upper pushbutton opening and an integral leg portion extending angularly downwardly so as to pass between the escutcheon plate and the operating arm of one of said switches and provided with an integral lower foot portion extending from the lower end of said leg portion horizontally below said lower pushbutton opening and serving as a fulcrum about which said upper pushbutton element pivots when said upper pushbutton head is depressed to operate the adjacent switch; and a rigid lower pushbutton element having a lower pushbutton head extending through said lower pushbutton opening and an integral leg portion extending angularly upwardly so as to pass between the escutcheon plate and the operating arm of the other of said switches and provided with an integral upper foot portion extending from the upper end of its leg portion horizontally above said upper pushbutton opening and serving as a fulcrum about which said lower pushbutton element pivots when said lower pushbutton head is depressed to operate the adjacent switch.

2. A manual control for a motorized hospital bed, comprising: a rear mounting panel; an escutcheon plate spaced forwardly of and parallel to said rear mounting panel, said plate having an upper row of three horizontally spaced upper pushbutton openings therethrough and a lower row of three lower pushbutton openings therethrough spaced vertically below said upper pushbutton openings respectively to form three pairs of upper and lower pushbutton openings; six vertically elongated electric switches mounted on the rear mounting panel and arranged side-by-side in a single row, each pair of operating arms spring-pressed toward areas of said escutcheon plate approximately midway between the upper and lower pushbutton openings of each pair; three rigid upper pushbutton elements having upper pushbutton heads exp
tending through said upper pushbutton openings and integral leg portions extending angularly downwardly so as to pass between the escutcheon plate and the operating arms of alternating switches and provided with integral lower foot portions extending from the lower ends of said leg portions horizontally below said lower pushbutton openings and serving as fulcrums about which said upper pushbutton elements pivot when said upper pushbutton heads are depressed to operate the adjacent switches respectively; and three rigid lower pushbutton elements having lower pushbutton heads extending through said lower pushbutton openings and integral leg portions extending angularly upwardly so as to pass between the escutcheon plate and the operating arms of the intervening switches and provided with integral upper foot portions extending from the upper ends of said leg portions horizontally above said upper pushbutton openings and serving as fulcrums about which said lower pushbutton elements pivot when said lower pushbutton heads are depressed to operate the adjacent switches respectively.

3. A manual control for a motorized hospital bed according to claim 2 in which all of the parts recited in claim 2 are enclosed in a forwardly opening upper housing part of a casing having a handle depending from the housing.

4. A manual control for a motorized hospital bed according to claim 3 in which the handle of the casing is hollow and communicates with the interior of said housing, said handle having an opening in its lower end for the accommodation of an electric cable passing from the exterior of the casing through said handle and into said housing.

5. A manual control for a motorized hospital bed, comprising: a forwardly opening housing; an escutcheon plate mounted in the open front of the housing and having pairs of vertically spaced pushbutton openings there-through; rigid upper pushbutton elements mounted in the housing and having pushbutton heads extending through the upper pushbutton openings, integral leg portions extending angularly downwardly in the rear of said escutcheon plate and integral lower foot portions extending from the lower ends of said leg portions horizontally below the lower pushbutton openings; rigid lower pushbutton elements mounted in the housing and having pushbutton heads extending through the lower pushbutton openings, integral leg portions extending angularly upwardly in the rear of said escutcheon plate, and integral upper foot portions extending from the upper ends of said leg portions horizontally above the upper pushbutton openings; electric switches mounted in the housing and having operating arms spring-pressed forwardly into engagement with the leg portions of said pushbutton elements respectively and the foot portions of all of said pushbutton elements serving as fulcrums about which said elements pivot when the heads thereof are depressed to operate said switches respectively.

6. A manual control for a motorized hospital bed according to claim 5 characterized by having three pairs of vertically spaced pushbutton openings and three pairs of pushbutton elements associated therewith, and by having six electric switches arranged side-by-side in a single row.

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