United States Patent [19]

Burst et al.

[11] **3,919,540**

[45] **Nov. 11, 1975**

[54] **SAFETY LIGHT**

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[73] Assignee: **Hill-Rom Company, Inc.,** Batesville, Ind.

[22] Filed: **Apr. 11, 1974**

[21] Appl. No.: **459,921**

[52] **U.S. Cl.** ..... **240/2 R;** 52/28; 240/4; 240/41.6; 240/51.11 R; 240/73 R

[51] **Int. Cl.**[2] **F21V 33/00**

[58] **Field of Search** ..... 240/2 R, 2 W, 4, 9 R, 41.6, 240/51.11 R, 73 R, 73 DA; 52/28; 5/2 R

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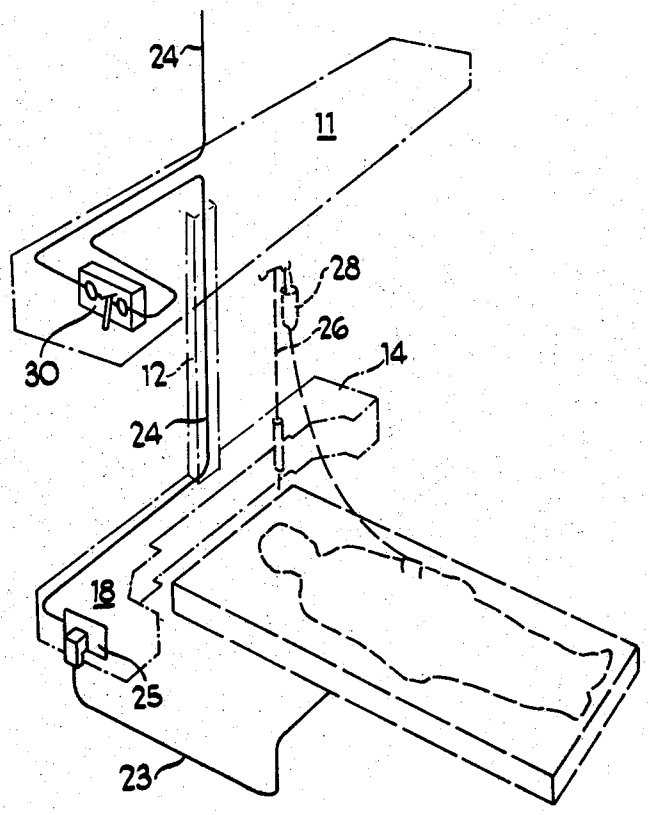
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Primary Examiner—Richard L. Moses

[57] **ABSTRACT**

A light assembly for a hospital room head wall having means for positioning a bed with respect to the light, means providing a source of electrical energy for the bed and means responsive to interferring movement of the bed with the light to interrupt the supply of electrical energy to the bed.

12 Claims, 9 Drawing Figures



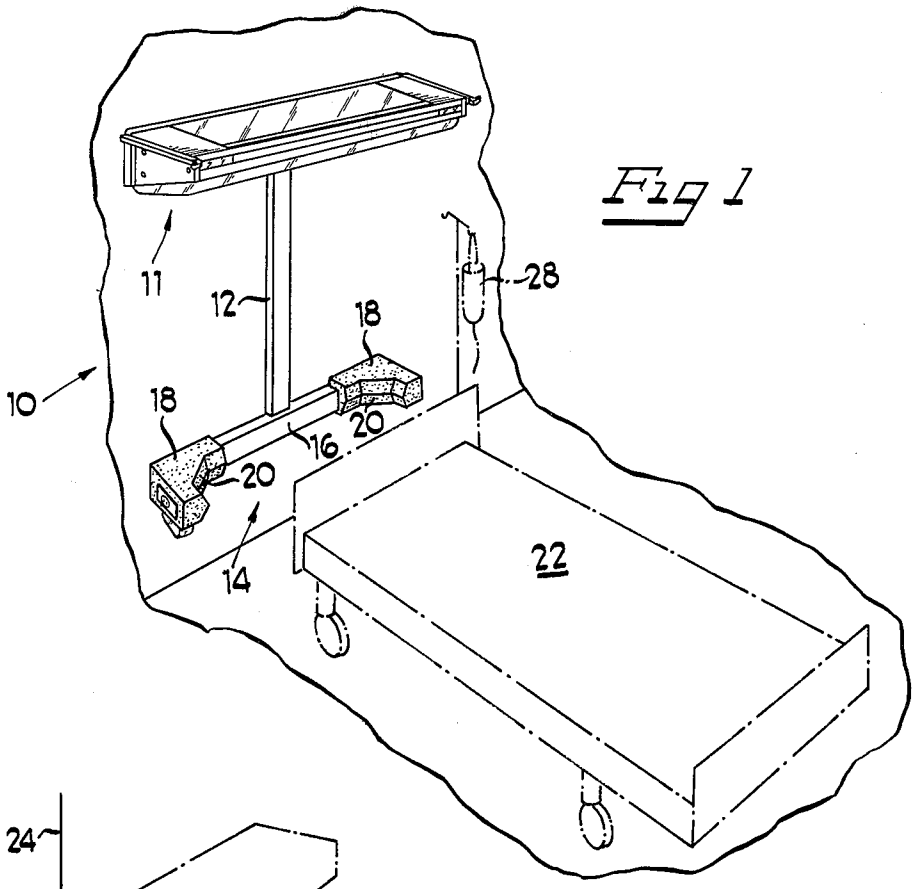


Fig 1

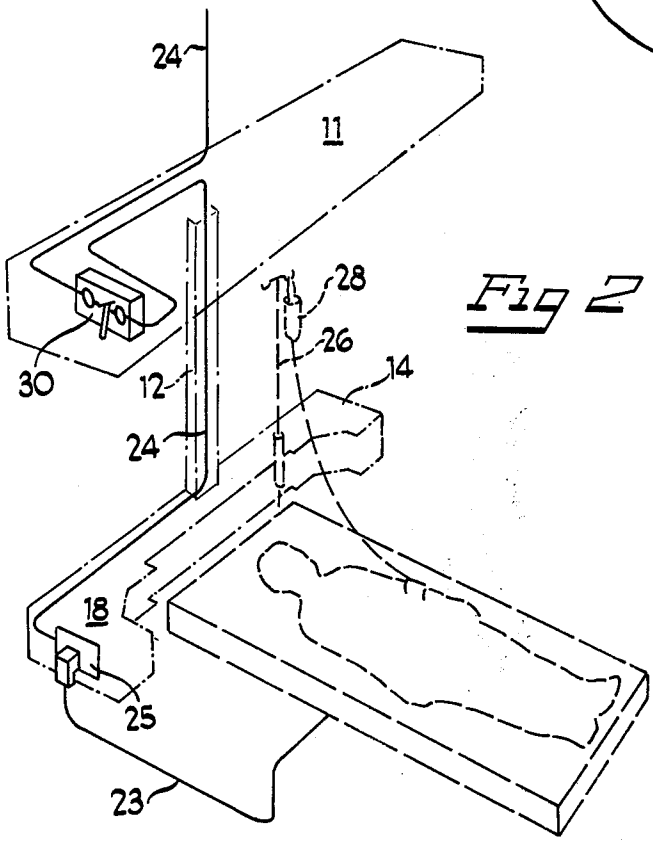


Fig 2

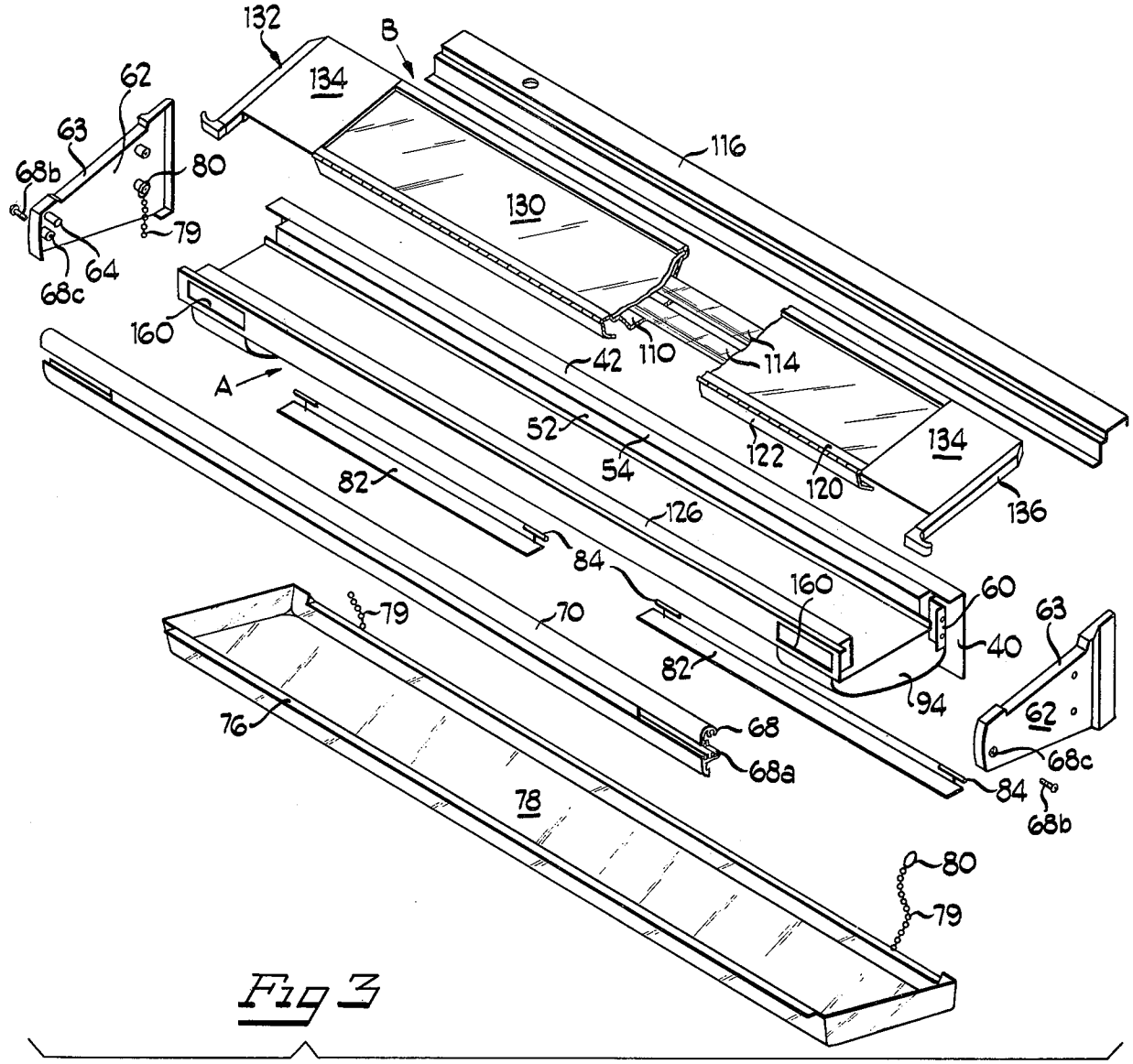

132
B
134
62
63
68b
80
79
64
68c
116
130
160
A
42
110
114
52
54
122
120
134
136
82
126
84
160
60
63
40
62
94
68c
84
68b
79
70
82
76
68
68a
78
80
79

Fig 3

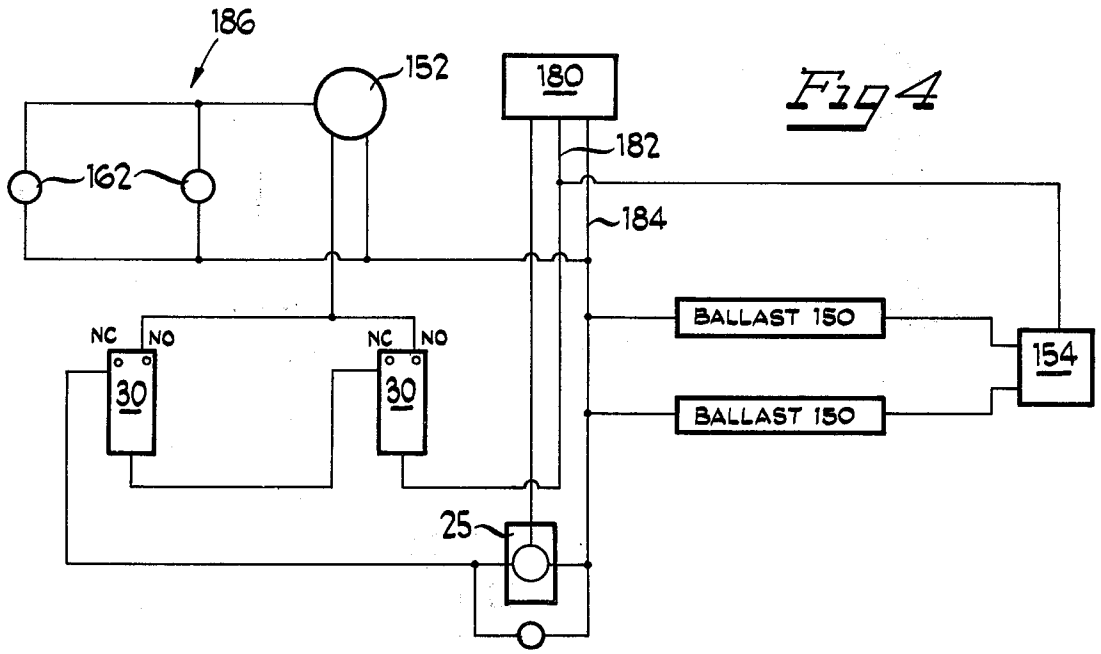

186
152
180
182
162
184
NC
NO
30
NC
NO
30
BALLAST 150
BALLAST 150
154
25

Fig 4

Fig 5

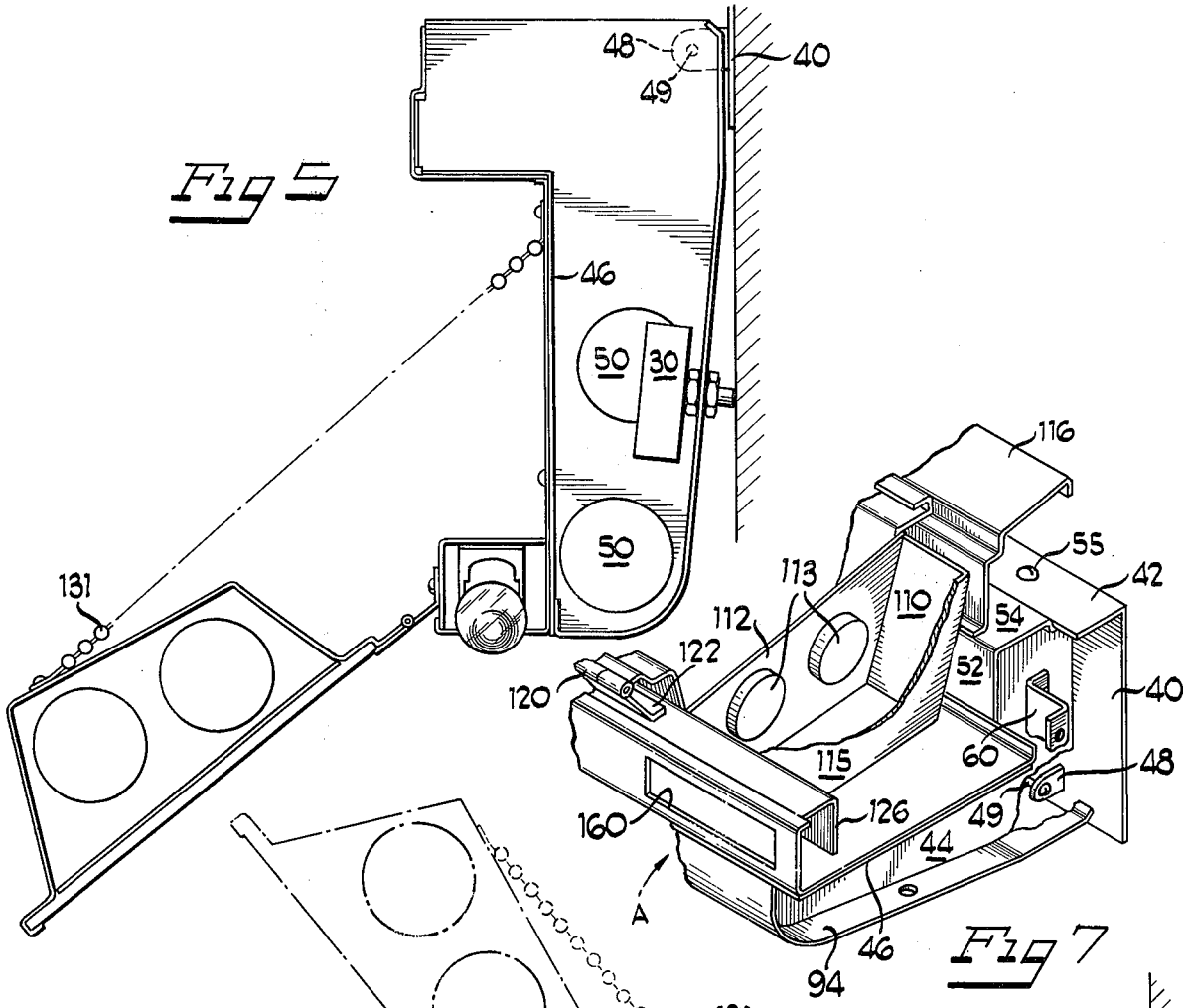


Fig 7

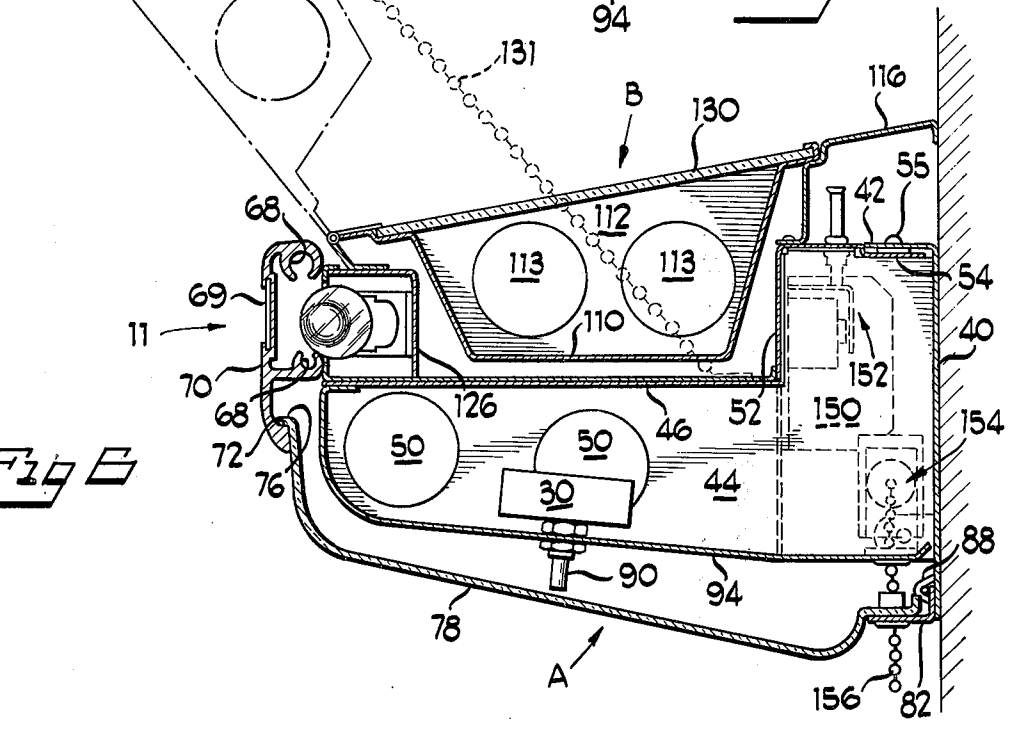


Fig 6

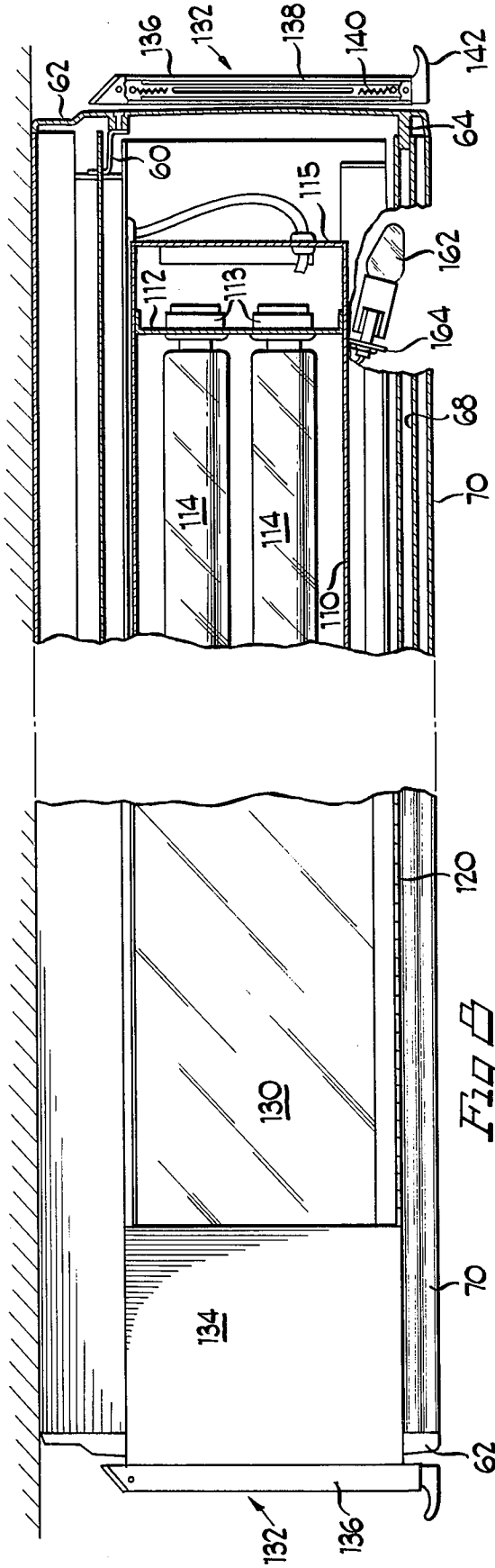

62
136
132
138
140
142
64
60
115
112
113
162
164
68
70
114
110
120
130
134

Fig 8

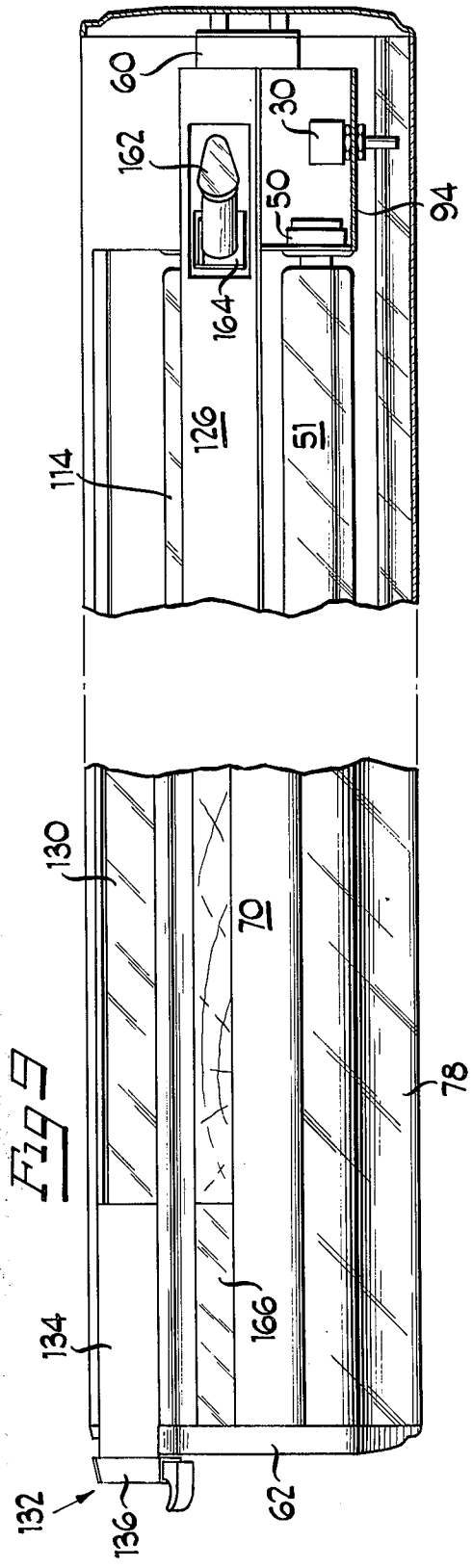

60
30
162
50
94
164
126
51
114
130
70
78
134
166
132
136
62

Fig 9

SAFETY LIGHT

BACKGROUND OF THE INVENTION

This invention relates to a light fixture adapted to be mounted on a wall. A most appropriate use of the invention is in conjunction with a hospital or nursing home bed where it provides functions and capabilities not previously available to patients, examining doctors and nurses.

In hospitals and nursing homes, light facilities must be properly located to provide light to the room, to the patient's bed and sufficient light for a medical examination of the patient by the doctor and the hospital or nursing home staff. Each of these lighting requirements differ both in intensity and in direction. Further, when light fixtures are utilized, their structure must be such as to avoid or preclude interference with the operation of electrically operated hospital beds. For example, the IV rod utilized to support intravenous solutions is usually mounted upon the bed to move vertically with it. This vertical movement of the IV rod has been a cause of damage to wall mounted light fixtures. Accordingly, a most desirable hospital light fixture would be one which provided both the intensity and direction of light necessary to perform various functions, and at the same time have a design and structural features which would preclude damage of the light fixture upon operation of the hospital bed.

SUMMARY OF THE INVENTION

In order to provide some or all of the desirable features and characteristics suggested above, the instant invention includes a wall mounted light assembly having a light unit for emitting light; a guide means for properly locating a hospital bed with respect to the light unit, and a safety means which prohibits interference between the bed and the light fixture. The light unit includes a normal overhead wall mounted direct reading light and an indirect light which can be moved to a second examining position for increasing the intensity of the light directed towards the hospital bed. Additionally, this unit includes an electrically actuated safety circuit which interrupts power delivery to the hospital bed in the event of an undesireable elevation of the bed.

Accordingly, it is an object of the instant invention to provide a light assembly having some or all of the desirable features and characteristics mentioned above. It is also an object of the instant invention to provide an inexpensive simply manufactured lighting assembly for a hospital room or a nursing home room which provides alternative lighting capabilities to adequately serve the needs of the patient, the examining staff and the doctors in terms of light intensity and location. Too, it is an object of this invention to provide a light unit which provides desirable lighting capabilities regardless of whether the unit is used alone or in combination with the entire light assembly. Finally, it is an object of our invention to provide a light assembly which incorporates a safety circuit to avoid damaging physical interference between an electrically operated hospital bed and the light unit.

DESCRIPTION OF THE DRAWINGS

The manner in which these and other objects of the instant invention are obtained will be made clear by consideration of the following specification and the drawings in which:

FIG. **1** is a perspective view of a preferred embodiment of the instant invention mounted upon a wall ready to receive a hospital bed which is indicated in dotted lines;

FIG. **2** is a schematic circuit diagram depicting the safety features of the instant invention, with the light unit and associated bed being indicated in dotted lines;

FIG. **3** is an exploded view in perspective of the light unit of the instant invention with portions broken away;

FIG. **4** is a preferred embodiment of the circuit diagram of our invention;

FIG. **5** is a side elevation view in section of a portion of the light unit and illustrates a method of mounting same to a vertical wall;

FIG. **6** is a side elevation view of the mounted light unit with the indirect light unit being depicted by dotted lines in its second examining position;

FIG. **7** is an enlarged perspective view of one end of the preferred embodiment of the lighting system with portions broken away;

FIG. **8** is a plan view of the light unit of the preferred embodiment of the instant invention with portions broken away; and

FIG. **9** is an elevation view of the light unit with portions broken away.

DETAILED DESCRIPTION

As disclosed in the preferred embodiment of FIG. **1**, the light assembly **10** of the preferred embodiment includes a light unit or fixture **11** which carries fluorescent light tubes. This unit is mounted to the wall in a manner subsequently described. Depending from the light unit **11** is a vertical center rail **12** which extends downwardly for attachment to a guide means **14.** The guide means may include a hollow horizontal rail **16** carrying at each end molded end pieces **18** which may be formed of a polyethylene or other thermoplastic material. The interior surfaces of these end pieces include inwardly inclined guide surfaces **20** which are spaced apart for engagement with the bed posts of the head end of the bed **22.** As the bed is pushed towards the wall, these surfaces **20** laterally guide the bed to center it beneath the light unit **11.** Accordingly, the desired cooperation between a hospital bed **22** and the light assembly **10** is depicted in FIG. **2** in which the guide means **14** have centered the bed directly below the light fixture **11.**

The circuit of FIG. **2** discloses an electrical conductor **24** extending from the wall into the light fixture **11** and down the hollow center rail **12** into the horizontal guide means **14.** As noted in both FIGS. **1** and **2,** at least one of the molded end pieces **18** is provided with a receptacle **25** which is utilized for directing electrical power through power cord **23** to the electrically operated bed **22** for vertical or other movement. Indicated in phantom is an IV rod **26** carrying a container **28** of an intravenous solution which is being fed to a patient. Since the IV rod extends above the bed, and is usually mounted to move vertically with the bed, it may also be elevated so as to engage and strike the light fixture **11** of the instant invention. To prevent damage to the fixture **11,** a safety switch **30** is inserted in the conductor **24** delivering power to the electrically operated bed. As subsequently described, undesirable upward movement of the bed and the IV rod will cause the safety switch to actuate, stopping further upward movement of the bed

and providing indicating signals to the hospital staff that the bed has been raised to an undesirable height. This circuit arrangement will be discussed in more detail subsequently.

FIGS. 3 and 5–7 disclose the details of the light fixture 11. This unit is carried by a mounting bracket 40 affixed to the vertical wall by conventional means. For purposes subsequently explained, the bracket 40 extends for the length of the light unit 11 and has a horizontal flange 42 extending outwardly from the wall. Pivotally connected to the mounting bracket 40 adjacent each end is an L-shaped support assembly 44 which carries an elongated divider panel 46 dividing the lighting unit into two compartments. The first compartment A comprises a direct lighting unit which provides light downwardly for the benefit of the patient. An upper compartment B above the panel 46 comprises an indirect lighting unit, the details of which will be subsequently explained.

FIG. 7 discloses the interconnection between the mounting bracket 40 and the L-shaped support members 44 which serves as a frame member. Each member 44 has an aperture adjacent the bottom portion thereof to permit a pivotal attachment of each with two brackets 48 carried at opposite ends of the mounting bracket 40. Thus, bolt 49 may pass through the mounting brackets 48 and the apertures to pivotally connect each member 44 to the brackets.

In addition to supporting the unit 11 upon mounting bracket 40, each support member 44 has two sockets 50 for mounting two fluorscent tubes 51 (FIG. 9) which extend for the length of unit 11 between these opposing members 44. These tubes comprise the direct light compartment A.

After the pivotal connection is made (shown in FIG. 5) the light unit 11 is rotated to a horizontal position and connected to the top of mounting bracket 40 through a horizontal extension 54 of the divider panel 46. To form this extension 54, the divider panel 46 is first bent at a 90° angle to form vertical section 52. Then, the panel is again bent at 90°, to extend horizontally toward the wall below flange 42 of the mounting bracket. After the light fixture 11 has been rotated clockwise into the horizontal position, bolts 55 are inserted through the apertures of the horizontal flange 42 and into the upper horizontal extension 54 of divider panel 46 to lock the unit in the horizontal position.

With reference to FIGS. 3 and 6, the remaining components of the direct light unit can be described. On each support member 44 is mounted an S-shaped end bracket 60 by welding or other means. This bracket has a flange perpendicular to the wall and is provided with apertures for mounting end plates 62 preferably formed of plastic. On the inner surface of end plates 62 are bosses which space the end plate from the brackets 60 while bolts extending through apertures centered in the bosses attach the plates to the end brackets 60.

The end plates 62 also have on each of their interior surfaces a projection 64 adapted to mate with and extend into upper recesses 68 of a front cover 70 and to permit pivotal rotation of said front cover thereupon. This front cover is preferably formed of a thermoplastic and has the cross sectional shape disclosed in FIG. 6 which includes the upper recess 68, a horizontal portion 69 and a lower recess 68*a*. Below the horizontal portion and the lower recess is an inturned flange or lip 72 which also extends for the entire length of the front cover and the light fixture 11. Openings 68*c* are provided in each end plate 62 for receiving machine screws 68*b* which extend into lower recesses 68*a* of front cover 70 to secure this cover in its closed position.

This inturned flange 72 is adapted to receive outwardly extending flange 76 of a transparent plastic lens 78 which extends underneath the direct lighting unit. A similar flange at the rear end of the lens 78 is supported by a bottom hinge 82 which includes an L-shaped piece of sheet metal (FIG. 3) having at the top thereof extending pins 84 on each end. These pins are adapted to engage support brackets 88 (See FIG. 6) which are carried by the mounting bracket 40. As shown in FIG. 3, it may be desirable to divide the bottom hinge 82 into two separate pieces, one for each side of the light fixture 11. Thus, the lens 78 is free to move vertically upward, and is restrained from downward movement by flanges at the front and at the rear of the light unit 11. To facilitate replacement of the fluorescent tubes 51 of compartment A, a chain 79 is affixed to each end of lens 78. At the free end of the chain is a ring 80 which is mounted on the bosses of end pieces 62. Thus, when machining screws 68b are removed from recesses 68*a*, the front cover may be rotated outwardly about upper projection 64 to permit the lens 78 to be lowered, and held by chains 79. Such exposes tubes 51 to facilitate repair and/or replacement.

Upward movement of the lens is permitted in the event the IV rod 26 (discussed with reference to FIG. 2) should be elevated to such a height that it strikes the light fixture 11. Continued upward movement causes the lens 78 to actuate a switch button 90 of safety switch 30. Preferably, such a safety switch is carried at each end of the light fixture 11 just inside the end plates 62 and are supported by sheet metal pieces 94 which may be spot welded or otherwise joined to the L-shaped support members 44. Engagement of the safety switch button 90 by the lens 78 will disconnect the electrical circuit extending to the outlet 25 on the bumper guide means 14 which terminates the delivery of electrical power to the bed unit and precludes further elevation thereof. As subsequently discussed, the actuation of safety switch 90 may also actuate indicator lights and a buzzer to indicate that the bed has been elevated to an interfering height.

The indirect lighting compartment B, as shown in FIGS. 6, 7 and 8, comprises an elongated carrier member 110 which has at each end a first partition wall 112 carrying sockets 113 which receive elongated fluorscent lighting tubes 114. A second partition wall or end member 115 closes the end of carrier 110 and carries a conductor for delivering electric power to these tubes. Supporting the rearward end of the carrier member 110 is an elongated light support member 116 which has an inclined section extending downwardly from the wall terminating in an indentation to receive a flange of the support member 110. From this indentation, the light support member 116 extends downwardly and engages the horizontal extension 54 of divider member 46. The forward end of the indirect light carrier 110 terminates in a hinge section 120 connected by a pin to another hinge section 122 mounted upon a square tubular member 126 extending for the length of the lighting fixture 11. The bottom side of the tubular member 126 may extend across divider panel 46 and be attached to it by metal screws or welding.

The tubular member 126 also carries indicator lights which provide a visual signal that the bed and its IV rod

has been elevated too high. Thus, each end of this member terminates in an exposed cut-out **160.** Adjacent each cutout is mounted an indicator light **162** by a bracket **164** welded to the tubular section. Forward of the indicator light is the front cover **70.** As shown in FIG. **9,** the portion of the front cover in juxtaposition with the cut-outs **160** is removed and replaced by a lens **166** to permit transmission of light outwardly of the panel **70.** This indicator lens **166** may be a transparent plastic which is merely slid into recessses molded into the front panel piece. If desired, these lenses may carry printed material such as "pull out bed" or "lower bed" to indicate interference between the IV rod and the lens **78.**

The indirect light unit is also provided with a lens **130** which is retained by U-shaped flanges at both the front and rear end of the support member **110** as shown in FIG. **7.** The indirect light unit normally provides light from the fluorscent tubes upwardly against the ceiling of the room. However, hinge members **120** and **122** permit rotation of this unit for approximately 130° to the dotted line position shown in FIG. **6** where it is retained by chain member **131.** If such is done, the indiret light unit will provide additional light intensity to the bed positon below the light assembly, and may conveniently be used by examining doctors or nurses. This rotation is facilitated by pivot handles **132** (See FIG. **8**) attached at each end of the indirect light unit by a flat metal plate **134** welded or otherwise fixed to carrier member **110.** To provide leverage, the handle has an outside tubular member **136** which is rigidly constrained for pivotal movement with the plates **134.** Telescoping within this outer member **136** is an inner member **138** which is biased inwardly by a spring **140** and has a finger or projection **142** extending outwardly therefrom. When the examining lights are to be used, one merely grasps the projection **142** and pulls outwardly to telescope the inner member to provide leverage in rotating the indirect light unit until all of the slack is taken up in the chain member **131.** When returned to its normal position, the metal plates **134** rest within recesses **63** of end pieces **62.**

The circuitry and ballasts **150** for both light units are contained in the rearward portion of the light fixture **11.** These components may be mounted to the sheet metal in any conventional manner. Additionally, and as indicated at dotted lines, this space may contain a buzzer **152** and a four-way switch **154,** the switch having a chain **156** extending downwardly for actuation of the indirect or direct lamps, or both.

This four-way switch has an "off" position, an "on" position for the direct and indirect light units, and a fourth position which actuates both of these lighting units.

Referring now to FIG. **4,** the electrical circuit can be understood. In this figure, a source **180** is connected in series by a conductor **182** through two safety switches **30** to the outlet **25.** Another conductor **184** completes the circuit with the source. Each of the switches **30** located at opposite ends of the light unit **11** are of the single pole, double throw type, preferably having a snap action. They would be biased to a normally closed position so as to normally provide electrical energy to the receptacle **25.** In the event the IV rod is extended so as to interfere with the light assembly **10,** the lens **78** willl be pushed upward so as to actuate the switch button **90** of one of the safety switches **30** to move the switch from the normally closed position to the normally open position. This switch activation will interrupt the series circuit leading to the outlet **25** on the bumper guide assembly so as to deprive the bed of electrical power necessary for further elevation, thus precluding damage to the light fixture **11.** Simultaneously with the switch **30** moving from its normally closed position to its normally open position, a second safety circuit **186** is actuated. This circuit contains two indicator lights **162** which are connected to the return line **184.** When these indicator lights come on, they may be observed through the cut-outs **160,** and the small lens **166** positioned at each end of the front cover **70.** This circuit **186** may also include a buzzer **152** which provides an audio signal that the bed has been elevated too high.

Additionally, FIG. **9** discloses that the electrical circuit is interconnected to the indirect and direct lighting circuits. Thus, conductor **182** is also directed to a four position rotary stepping switch **154** for delivery of current to the ballast for the direct and indirect reading lights.

Accordingly, applicant has disclosed a light assembly which operates to properly position a bed, and to provide direction of the light to the bed of different intensities. Finally, a safety unit has been provided which will preclude undesirable or damaging elevation of the bed and an associated IV rod **26** which might otherwise damage the light fixture. Obviously, the light fixture **11** may be used along or in conjunction with the bed guide.

We claim:

1. A safety light assembly comprising:

a. an elongated horizontal light fixture adapted to be mounted on a wall;

b. a bumper assembly adapted to be attached to a wall below said light fixture and having guide means for locating a hospital bed thereof centrally of said light fixture, said bumper assembly having an electrical outlet for delivering electric energy to said hospital bed;

c. an electric circuit adapted for connection to a source of energy and extending through said light fixture to said electrical outlet; and

d. a movable switch in said circuit and carried by said light fixture responsive to interfering movement of said bed with said light fixture to disrupt the supply of electric energy to said bed.

2. An apparatus as recited in claim **1** in which said light fixture carries means for indicating intereference between said light and said bed.

3. An apparatus as recited in claim **2** in which said indicator means includes audio and visual indicating devices.

4. An apparatus as recited in claim **1** in which said light fixture comprises a light device for directing light upwardly and a light unit for directing light downwardly upon a bed centered by said bumper assembly.

5. A hospital light assembly comprising:

a. a mounting bracket;

b. an elongated light fixture mounted upon said bracket to extend horizontally outward from said bracket;

c. a first lighting unit exposed underneath said light fixture to provide direct light downwardly;

d. a second lighting unit exposed above said assembly providing light upwardly; and

e. means for pivoting said second lighting unit about a horizontal axis to direct its light downwardly.

6. An apparatus as recited in claim **5** in which:

a. said second lighting fixture comprises an elongated support member carrying fluorscent lighting tubes; and

b. said means for pivoting said second lighting fixture comprises hinge means for rotating said support member from a generally horizontally position to a position for directing light downwardly.

7. An apparatus as recited in claim **5** in which:

a. said means for pivoting said second lighting unit comprises hinge means carried by said fixture along its forward edge away from the wall; and

b. extendible levers for pivoting the unit about said hinge means.

8. An apparatus as recited in claim **5** in which said first and second lighting units are provided with transparent lenses.

9. An apparatus as recited in claim **5** in which:

a. said light assembly carries guide means for centering a bed directly below said first lighting unit.

10. A safety light assembly comprising:

a. a light fixture adapted to be mounted on a wall above an electrically operated bed; and

b. safety switch means carried by said light fixture for precluding damaging interference between equipment carried by said bed and said light fixture.

11. An apparatus as recited in claim **10** in which said safety switch means includes:

a. an electrical circuit adapted for connection to a source of electric energy extending through said light unit to said bed; and

b. switch means within said circuit for interrupting electric power delivery to said bed upon physical contact between said equipment and said light fixture.

12. A light assembly comprising:

a. an enlongated light fixture adapted to be mounted on a wall to extend outwardly therefrom;

b. said fixture having a first light unit for directing light downwardly and a second light unit for directing light upwardly; and

c. means for pivoting said second light unit for directing light downwardly.

* * * * *