SAFETY SIDE MECHANISM

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A safety side mechanism for hospital beds is constructed of telescoping members forming a trapezoid which may be opened to form a safety side structure and collapsed to form a structure which may be pivoted underneath the mattress support. The structure is spring loaded to aid in its opening and to prevent sudden collapse. Locking means hold the structure in both the open and closed position.

6 Claims, 13 Drawing Figures
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SAFETY SIDE MECHANISM

BACKGROUND OF THE INVENTION

Extensible side rails for hospital beds and the like are well known in the art. Usually called safety sides, they are normally adapted to extend to an operating position to prevent the bed occupant from falling during periods of sleep or unconsciousness. They also are preferably collapsible to a closed position so that a nurse or other attendant may have ready access to the occupant or to the bed clothes.

A problem posed by prior art safety sides is the extra width they add to the bed and the normal difficulty in extending and collapsing them. Mechanisms for solving these problems have been proposed but such devices are normally complicated and expensive.

The device of the present invention is a mechanically efficient safety side which is light, easy to extend and collapse and which may be stowed in its collapsed position next to the bed frame, and thus not appreciably increasing the normal width of the bed.

BRIEF DESCRIPTION OF THE INVENTION

The improved safety side of this invention comprises a pair of side members which are pivotally attached to a base member and to a pair of rail members, forming a trapezoid when in its extended or open position. The rail members are telescoping members and when the side members are folded inwardly, telescope inwardly and become shortened thereby. The side members are each pivotally attached to a push arm. Operating within the base member is an equalizer tensioning means which coacts with the two push arms to bias them, and thus the side members, in their open or extended position. Coacting with the tensioning means in the base member are means to equalize the position of the push arms and thus insure equal positioning of the side members throughout their operation.

SPECIFIC DESCRIPTION OF THE INVENTION

The invention will be more clearly explained by reference to the attached drawings in which:

FIG. 1 represents a side view of a safety side according to the concept of the invention as viewed from the inside;

FIG. 2 is a view of the embodiment of FIG. 1 in its closed, or collapsed, position;

FIG. 3 is an enlarged cross section of the point of attachment of one of the push arms to the side member, taken along line 3—3 of FIG. 1;

FIG. 4 is an enlarged cross section of the point of attachment of one of the push arms to the equalizer tensioning mechanism operating in the base member taken along the line 4—4 of FIG. 1;

FIG. 5 is a cross sectional view of the mounting plate taken along the line 5—5 of FIG. 1;

FIG. 6 is an enlarged view in cross section of the adjusting mechanism indicated in the broken circle 6 of FIG. 1;

FIG. 7 is a top view of the equalizer mechanism;

FIG. 8 is an enlarged view of the method of attachment of the roller chain to the equalizer bar as indicated at the broken circle labeled 8 of FIG. 7;

FIG. 9 is a side view of the equalizer assembly of FIG. 8;

FIG. 10 is a view of the embodiment of FIG. 1 from the outside;

FIG. 11 is a cross sectional view of the left stowing pivot arm taken along the line 11—11 of FIG. 10;

FIG. 12 is a cross sectional view of the right stowing pivot arm taken along the line 12—12 of FIG. 10; and

FIG. 13 is a view of the locking mechanism taken along the line 13—13 of FIG. 10.

Turning now to the drawings, reference numeral 10 indicates generally the novel safety side of this invention which comprises a pair of side members 12 and 14, a base member 16, a top rail member 18 and a lower rail member 20. The rail members 18 and 20 are telescoping members, member 18 being composed of an outer member 18' and an inner member 18'' and bottom rail 20 being made up of outer member 20' and inner member 20''.

The top rail 18 is pivotally connected to side members 12 and 14 by pivotal connectors 22 and 24 respectively. Bottom rail member 20 is pivotally connected to side members 12 and 14 by means of pivotal connectors 26 and 28 respectively.

The base angles formed by sides 12 and 14 with base 16 are bridged by push arms 30 and 32. The upper end of push arm 30 is pivotally connected to side member 12 and the upper end of push arm 32 to side member 14. FIG. 3 illustrates more clearly this attachment. Stud 34 extends through a hole in the push arm 30 holding retaining ring 36, nylon washers 38 and 40 and the push arm in pivotal relation to the side rail. Stud 34 is pressed through a hole of slightly smaller diameter resulting in the press fit as shown by curled edges 42 and 44 of FIG. 3. Other means of fastening stud 34 in side 12 may of course be used.

The lower ends of push arms 30 and 32 are pivotally connected to an equalizer-tensioning mechanism which operates within base member 16 as shown in FIG. 1 and in more detail in FIG. 3. Slots 46 and 48 in base member 16 permit lateral movement of the lower ends of the push arms by pivoting pins connected thereto between during the inward and outward movement of the lower ends as the side rail 10 is extended and collapsed.

Referring to FIG. 5 there is shown side rails 12 and bracket 126 to which the side rails are attached by means of a nut 140 and bolt 141. The side rails are adapted to be moved in one direction or another upon release of the detent on the other bracket 126 which is released by movement of the lever arm 130.

Referring now to FIGS. 7 and 9, there is shown the equalizer-tensioning mechanism of the novel side rail of this invention which generally is attached along the inner surface of base 16. Generally, the mechanism comprises a pair of opposed freely sliding push-pull bars, one of which is attached to one push arm and the other being attached to the other push arm. The push-pull arms are inter-connected by means of a biasing member, such as a spring or an elastic cord which tend to maintain, or return the push-pull arms in or to their adjusted relative positions, thereby also maintaining side rails 12 and 14 in position.

Turning now to FIGS. 7 and 9, reference numerals 50 and 52 designate the push-pull arms of the equalizer-tensioning mechanism, the arms overlapping each other and each extending substantially the entire length of the bed. The outer extremity of each push-pull arm is attached to a roller chain shown at 54 and 56. The
detail of the attachment is shown in FIG. 8, the double link of the chain being held in fixed relation to arm 52 by a pair of studs 58 and 60, spacers 62 and 64 and connecting link 66. The roller chains 54 and 56 pass over sprockets 68 and 70 and are attached to the other push-pull arm in the same manner as illustrated in FIG. 8. Thus, as the push-pull arms move laterally back and forth in the base 16, their connection to each other through roller chains 54 and 56 maintain their relative movement reciprocal, that is to say, movement of push-pull arm 50 results in an equal and opposite movement of push-pull arm 52.

Roller chain sprockets 68 and 70 are rotatably connected to adjustable sprocket holes 72 and 74. As shown in more detail in FIGS. 1 and 6, an adjusting screw 76 operates through a threaded hole in the sprocket yoke 72 and against an adjusting plate 78 which is integral with base member 16. Thus, as viewed in FIG. 6, rotation of screw 76 in a clockwise direction moves sprocket yoke 72 to the right and with it sprocket 68. This has the effect of increasing the distance between sprockets 68 and 70. Adjustment of a similar adjusting mechanism of sprocket yoke 74 has a similar effect. Thus by means of the two adjusting mechanisms, the relative positions of push-pull arms 50 and 52 may be regulated.

Push-pull arms 50 and 52 are interconnected by biasing means. As shown in FIGS. 7 and 9 this biasing means comprises an elastic cord 80 terminating in hooking means 82 and 84. The hooks extend through holes 86 and 88 in push-pull arms 50 and 52 respectively. As will be readily apparent the biasing means 80 tend to return the push-pull arms in their relative positions and when displaced to return them thereto.

The lower ends of the push arms 30 and 32 bridging sides 12 and 14 and base member 16 are each pivotally attached to one of the push-pull arms. The attachment of means of studs operating through slots 46 and 48 in base 16 is shown in more detail in FIG. 4. Pivot pin 90 extends through aligned holes in push arm 30, slot 46, spacer 92, roller 94, spacer 96 and is fastened to push-pull member 50. It is held in position by swedge ring 98 with split washers 102 and 104 helping to reduce friction. Pin 90 attached to one push-pull arm, operates in a slot in the other. Thus, motion of the push arms 30 and 32 is thus transmitted to and controlled by the equalizer-tensioning assembly.

One especially desirable feature of this invention is the mounting mechanism whereby the improved safety side is mounted to the side rail of a hospital bed and may be swung into a stowed position which does not add appreciably to the width of the bed when the side rail is in the collapsed and stowed position. This pivotal attachment means is most clearly illustrated in FIGS. 10–12.

Referring to FIGS. 11 and 12, reference numeral 106 indicates the side rail of a bed. A pair of clamp members 108 and 110 are adapted to be held on the top and bottom edges of the side rail, the clamp members 108 and 110 terminating in L-shape extremities to fit on the inside of the rail, as shown at 112 and 114. Bolt member 116, coacting with threaded recess or nut 118, bolts the clamp means firmly about the side rail. Clamp means 108 and 110 also hold pivoting pin 120 about which the inner end of pivot arm 122 swivels. At the outer extremity or end of pivot arm 122 a second pivot pin 124 is adapted to move in a bearing aperture in the pivot arm and is pivotally attached at the upper and lower ends through matching holes in mounting bracket 126. A biasing spring, 128 is disposed around outer pivot pin 124 and is attached to the pivot arm bearing to bias the pivot arm to its outward or extended position.

FIG. 13 illustrates one of a pair of latching mechanisms which lock the side rail 10 in its collapsed or down position. A latch release lever 130 pivots about pin 124 to depress latch pin 132 against the action of latch pin biasing spring 134. Pin 132 extends outwardly through mounting plate 126 and into a locating hole 14a in side 14. When the side 14 is moved upwardly, a detent 140 engages in the locating hole 14a under the pressure of spring 141. In order to move the side 14 from this position, it is necessary to depress the latch release lever 130 causing the pin 132 to engage and depress the detent 140 moving it out of locking hole 14a to permit movement of the side 14.

Thus it is seen from the foregoing description that there is provided herewith a mechanically simple safety side mechanism which has all the utility of the more complicated device of the prior art. In addition, the improved safety side of this invention provides a compact structure by virtue of its unique telescoping feature and one which may be stowed along the bedside in a neat and compact manner without adding appreciably to the width of the bed a feature much desired in beds of this type.

It will thus be seen that the objects set forth above, among those made apparent from the preceding description, are efficiently attained and, since certain changes may be made in the above apparatus without departing from the scope of the invention, it is intended that all matter contained in the above description and shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. For hospital beds, a safety side mechanism comprising:
   a base member;
   at least one telescoping side rail member substantially parallel to said base member;
   a pair of side members pivotally attached to said base and said rail member; said base, said side rail and said side members forming a trapezoid;
   said side members being biased toward an extended position with respect to said base member;
   a pair of push arm members connected between respective side members and said base member and biasing means connected between the lower ends of said push arm members for urging said trapezoid into said extended position;
   said base member including slots in which said lower ends of said push arm members reciprocally move as said safety side mechanism is moved from the extended to the collapsed positions;
   said biasing means comprising a pair of parallel spaced apart overlapping push-pull bars, a connecting means connecting adjacent ends of said push-pull bars for permitting equal and opposite movement between said push-pull bars and a spring means connecting the intermediate portions of said push-pull bars for permitting equal and opposite movement between said push-pull bars and a spring means connecting the intermediate portions of said
push-pull bars tending to urge said push-pull bars toward each other so that said safety side mechanism is urged toward the extended position; and
pivot attachment means for pivotally attaching said mechanism to a frame member of said hospital bed adapted to be pivoted alongside said frame member when said trapezoid is in a collapsed position defined by said side, rail and base members being substantially parallel so that said mechanism in said collapsed position does not substantially extend beyond the normal width of said bed.

2. A safety side mechanism according to claim 1, wherein said connecting means comprises a rotatable sprocket wheel fixed to the frame of said bed and a roller chain engageable with the teeth of said sprocket wheel.

3. For hospital beds, a safety side mechanism comprising:
- a base member;
- at least one telescoping side rail member substantially parallel to said base member;
- a pair of side members pivotally attached to said base and said rail member; said base, said side rail and said side members forming a trapezoid;
- said side members being biased toward an extended position with respect to said base member;
- pivotal attachment means for pivotally attaching said mechanism to a frame member of said hospital bed adapted to be pivoted alongside said frame member when said trapezoid is in a collapsed position defined by said side, rail and base members being substantially parallel so that said mechanism in said collapsed position does not substantially extend beyond the normal width of said bed;
- and locking means for locking said safety side mechanism in the extended and collapsed position comprising a movable lever and a mounting plate fixedly attached to the bed frame, said lever cooperating with said frame to lock said safety side mechanism in said collapsed position.

4. A safety side mechanism according to claim 3, wherein said mounting plate includes an opening and said lever actuates engageable means for engaging said opening.

5. A safety side mechanism according to claim 4, wherein said engageable means comprises a biasing spring movable against a latch pin, said latch pin engaging said hole in said plate for locking said safety side assembly in said collapsed position.

6. A safety side mechanism according to claim 4, wherein said engageable means comprises a detent actuated by said lever for engaging said hole in said plate and locking said safety side assembly in said extended position.

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