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SAFETY SIDE RAIL FOR PATIENT SUPPORT OR THE LIKE

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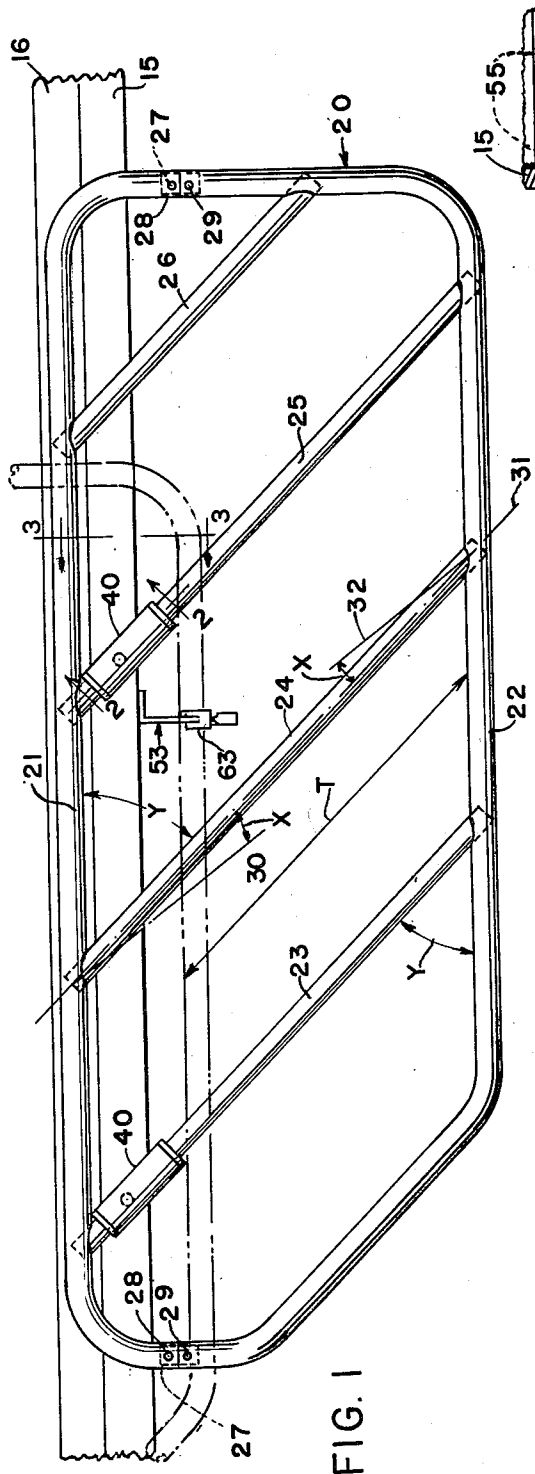


FIG. 1

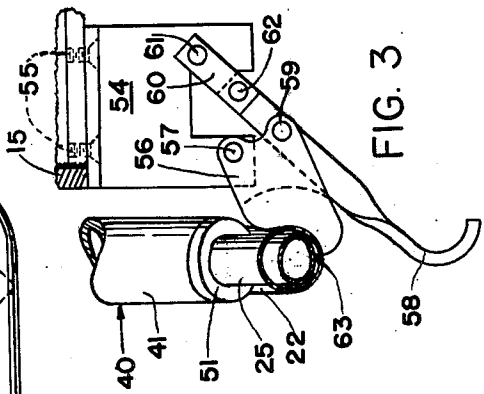


FIG. 3

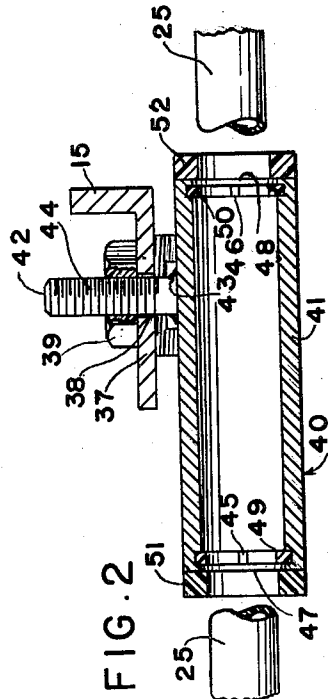


FIG. 2

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## SAFETY SIDE RAIL FOR PATIENT SUPPORT OR THE LIKE

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This invention relates to safety side rails for patient supports and the like.

An object of this invention is to provide particularly for patient supports, a safety side rail including a safety side adapted to be raised to a position in which it will preclude a patient's rolling off of the support in a side-ward direction.

Another object of this invention is to provide a safety side rail for a patient support, the safety side portion of which side rail is adapted to be raised into patient-restraining position and lowered to a retracted, non-interfering position.

Another object of this invention is to provide a device of the above character, the safety side portion of which is adapted to move when released or to be moved in a smooth, positive, quiet manner without cocking or jamming from its raised or operative position to its lowered or retracted position.

A further object of this invention is to provide a side rail of the above character, the safety side portion of which is adapted to be locked in operative position in rigid, rattle-free relation to the patient support and adapted to move gravitationally to the lowered, retracted position when released and be moved to the raised or operative position, in a smooth, positive, quiet manner without cocking or jamming, and with minimum jarring of the patient support.

Another object of this invention is to provide a safety side rail which is non-rattling when its safety side portion is secured in operative position.

Another object of this invention is to provide a safety side constructed in a manner that the component parts thereof are in stressed relation to each other in a rigid unitary, rattle-free structure.

Another object of this invention is to provide a method of making internally stressed, rattle-free, safety sides for safety side rails.

Another object of this invention is to provide for a safety side rail of the above character a side rail guide adapted to co-operate therewith in a manner such that movement of the safety side between raised, operative and lowered retracted positions is smooth, quiet, and accompanied by transmission of minimum jarring vibrations to the patient support.

A further object of this invention is to provide a guide of the foregoing character which establishes the limits of safety side movement relative to a supporting device for humans and with which the safety side supported may be secured in raised, operative position relative to the supporting device for humans, the safety side being urged into stressed, non-rattling relation by a latch.

The above and other objects and features of this invention will be apparent to those having ordinary skill in the art to which this invention pertains.

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In the accompanying drawings and the following description of the embodiment disclosed therein, like reference characters indicate like parts.

In the drawing:

FIG. 1 is a view in elevation of a safety side rail embodying the instant invention in relation to fragmentary portions of a patient support, the safety side being shown in full lines in lowered or retracted relation to the support and fragmentally in dot-dot-dash lines in raised or operative relation to the support;

FIG. 2 is a view in section taken along a line 2—2 in FIG. 1, more clearly illustrating details of construction of the side rail guide; and

FIG. 3 is a fragmentary view partly in section taken along a line corresponding to line 3—3 in FIG. 1, but showing the latch co-operating with a fragmentary portion of a safety side in raised or operative position in simultaneous co-operative relation to a fragmentary portion of a side rail guide.

Safety sides or safety side rails are useful in conjunction with various devices for supporting human beings. Such devices include beds, stretchers used in ambulances, or other conveyances, hospital beds, stretcher carts used in hospitals for moving patients from place to place, and as supports for patients in a recovery room following an operation, and prior to return of the patient to the conventional hospital bed. Safety side rails embodying the instant invention may be provided for use in conjunction with devices of the foregoing character and the safety side thereof may be raised to operative position and lowered or retracted to permit sidewise entry or departure of a person from such a supporting device. Safety side rails embodying the instant invention have safety sides which may be raised and lowered smoothly so as to eliminate objectionable jarring vibrations of the support during raising and lowering of the safety side. The non-cocking and non-jamming co-operation between the safety side and the guides therefor contributes substantially to the smooth operation, as does the inclined direction of movement of the safety side.

In FIG. 1 of the drawing a fragmentary portion of a support such as a portion of a hospital stretcher cart frame 15 and patient cushioning pad 16 supported thereon are shown in relation to safety side 20, side rail guides 40 and latch 53.

The safety side 20 shown in FIG. 1 has a rim comprising upper rim portion 21 and lower rim portion 22 joined together in complementary relation by aligning plugs 27 to which they are respectively secured by pins 28, 29. Cross members 23, 24, 25, and 26 are each supported in parallel relation by and co-operate with rim portions 21 and 22, which they intersect at an acute angle Y. Rim portions 21 and 22 of the safety side shown in the drawing may be fabricated from cylindrical metal tubing, for example, welded steel tubing, while cross members 23, 24, 25 and 26 are lengths of similar tubing of smaller diameter. Spaced apertures are provided at predetermined locations in rim portions 21 and 22, each adapted to co-operatively receive a portion of a respective cross member 23, 24, 25, or 26. The cross member receiving apertures are of a size and shape as will result in tight binding engagement between rim and cross members when the safety side is in the assembled condition shown

in FIG. 1. When cross members are cylindrical, as are members 23, 24, 25, and 26, shown, the apertures may be drilled in the rim portions 21 and 22, with a drill bit having a diameter equal to the diameter of the cross member. However, the bit is advanced with its axis coinciding with a line 30 which is more nearly perpendicular to the rim portion being drilled than the axis or center line 31 of cross member 24, which line 30 intersects at the surface of the rim portion 21. The magnitude of the angle X included between lines 30 and 31 is selected so that the aperture cut by the drill will be large enough to permit easy insertion of the end portion of a cross member such as 24, when its axis or center line 31 nearly coincides with the drilling axis 30, but which is small enough that cross member 24 will bind tightly in non-rattling relation to rim portion 21 when it is swung to the relative position in which it is shown in FIG. 1. The other cross member receiving apertures in rim portion 21 are drilled in like manner with the drill bit advancing along lines parallel and corresponding to line 30. The cross member receiving apertures in rim portion 22, are preferably drilled in like manner, but with the drill bit advancing along lines parallel to line 30, but corresponding to line 32 which is parallel to, spaced from, and not in co-linear relation to line 30. Cross members 23, 24, 25, and 26 are inserted into co-operating relation to rim portions 21 and 22 when those parts are in relative positions such that lines 30, 31 and 32 coincide. Thereafter, rim portion 21 is shifted toward the left, relative to portion 22 as viewed in FIG. 1, into the relative relation in which the rim portions 21, 22 are shown in FIG. 1 and secured by plugs 27 and pins 28, 29. The apertures in rim portions 21, 22 may, as explained above, be made by drilling or in any other manner in which apertures of such nature may be provided.

A pair of side rail guides 40 are provided in cooperating relation to respective cross-members 23, 25 and are adapted to cooperate with frame 15 to mount safety side 20 in operative relation to the device for supporting a human. Each side rail guide 40, as shown in FIG. 2, has a rigid, tubular frame 41, secured in integral relation to radially projecting mounting stud 42, as by weld metal 43. Stud 42 is adapted to extend through spacer 37, clearance aperture 38 in frame 15, and into threaded cooperation with nut 39. That is, threads 44 on stud 42 co-operate with the threads of nut 39. Spacer 37 is thus clamped between adjacent portions of frame 15 and guide frame 41. Frame 41 is an elongated tubular member in which inwardly facing annular grooves 45, 46 are provided. Grooves 45, 46 are respectively located adjacent the mouths or ends 47, 48 of frame 41 and are adapted to receive bearing rings 49, 50. Bearing rings 49, 50 are supported in grooves 45, 46 in aligned relation for closely conforming to the surface of the cross member, such as 25, co-operating therewith. The bearing rings 49, 50 are preferably made of a bearing material which requires little or no lubrication, is resistant to substances to which it may be exposed when in use, and which tends to deaden or reduce noises produced by sliding or shifting of the cross member, such as 25, therein. I have found that bearing rings of synthetic resin type bearing materials such as nylon, tetrafluoroethylene polymers known as Teflon and similar materials are quite satisfactory. As shown in FIG. 2, bearing rings 49, 50 may be of split-ring form which eases installation in the grooves 45, 46 of frame 41 and minimizes the chance of damage to the bearing rings during installation. The bearing rings 49, 50 project radially inwardly from grooves 45, 46 and thus co-operate with and support a cross member such as 25 in spaced relation to frame 41 through which the cross member extends. Resilient bumper rings 51, 52 of rubber-like material, are secured respectively to the end faces 47, 48 of frame 41 by a suitable adhesive cement.

The side rail guides 40 are preferably placed in co-

operative relation to the respective cross members 23 and 25 between rim portions 21 and 22 incident to assembly of the safety side 20.

The side rail guides 40 and safety side 20, when so assembled, form a unit readily securable to a support. A pair of appropriately spaced clearance holes 38 are provided in frame 15 for stud portions 42. A spacer 37 is provided annularly of stud 42 between frame 15 and side rail guide frame 41 as shown in FIG. 2. Nut 39 co-operates with frame 15 and the threads 44 of stud 42 so that each of the side rail guides 40 is firmly secured to frame 15.

When the side rail guides 40 are in cooperative relation to frame 15 and cross members 23, 25 of safety side 20 (as shown in FIG. 1), they support the safety side 20 for movement between limits of a range of travel indicated by arrow T in FIG. 1 and in a direction parallel to cross members 23 and 25. The limit lowered or retracted position is shown in full lines in FIG. 1, and in that position upper rim portion 21 is in co-operative abutment with bumper rings 52. The opposite limit of movement of safety side 20 corresponds to the raised or operative position of that safety side with reference to the human support and is indicated in FIG. 1 by dot-dot-dash lines. In the raised operative position, lower rim portion 22 of safety side 20 is in abutment with resilient bumper rings 51 of the side rail guides 40. A latch 53 is provided for securing safety side 20 in the raised operative position.

The latch 53 shown in FIGS. 1 and 3, has a bracket or base 54 adapted to be secured by screws 55 to a portion of the frame 15 of the human supporting device. Clamp shoe 56 is pivotally secured to bracket 54 by pin 57 and to clamp handle 58 by pin 59. A link 60 is pivotally secured to bracket 54 by pin 61 and to clamp handle 58 by pin 62. When clamp handle 58 is swung in counter-clockwise direction, as viewed in FIG. 3, clamp shoe 56 is retracted as it swings counter-clockwise about pin 57 and link 60 swings clockwise about pin 61. When the latch 53 is in the advanced or safety side securing position shown in FIG. 3, clamp handle 58 and clamp link 60 co-operate as a locked toggle linkage bracing clamp shoe 56 so its face 63 engages rim portion 22 and urges the same upwardly and outwardly to stress safety side 20 into firm, non-rattling co-operation with resilient bumper ring 51 and the bearing rings 49, 50 of associated side rail guides 40 co-operating with said safety side 20 and frame 15.

Having thus described what presently appears to be a preferred embodiment of the invention, it will be apparent to those having ordinary skill in the art to which this invention pertains, that various modifications and changes may be made in the illustrative embodiment, without departing from the spirit or the scope of the appended claims.

Therefore, what is claimed as new and is desired to be secured by Letters Patent is:

1. In a support for humans, the combination comprising a pair of spaced guides mounted in generally horizontal alignment with the axes of the guides lying parallel to each other and being disposed at a substantial inclination from the vertical, a safety side having a pair of spaced inclined members each parallel to the axes of said spaced guides, the said spaced inclined members being slidably mounted in said pair of spaced guides for movement between operative and retracted positions, and a latch for securing the safety side in operative position.

2. In a support for humans, the combination comprising a generally horizontal support, a pair of spaced guides mounted thereon at locations in generally horizontal alignment with the axes of the guides lying parallel to each other and being disposed at a substantial inclination from the vertical, a safety side having a pair of spaced inclined members each parallel to the axes of said spaced guides, the said spaced inclined members being

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slidably mounted in said pair of spaced guides for movement between operative and retracted positions, and a latch for securing the safety side in operative position.

3. A safety sided support for a human, said safety sided support comprising in combination a support, a safety side, a pair of safety side supporting guides secured to said support and guiding said safety side incident to translatory inclined raising and lowering of said side between operative position and lowered retracted position, and a latch comprising a clamp shoe movable between retracted position and safety side holding and stressing position, a link secured for pivoting about an axis fixed in relation to said support, a handle lever pivotally secured to and extending between the clamp shoe and link, said handle lever and link forming a toggle linkage adapted to move said clamp shoe between said retracted position and said safety side holding and stressing position and for securing said clamp shoe in co-operating relation to said safety side for stressingly securing said safety side in non-rattling relation to said guides and in operative position relative to said support.

4. In a safety side for a support for humans, a combination comprising a plurality of unitary cross members, upper and lower complementary rim-forming members, said upper and lower rim-forming members having formed therein a plurality of bores, the bores of the upper and lower rim-forming members being disposed in coacting pairs, the axis of each bore of each coacting pair of bores being misaligned one with respect to the other, each of said unitary cross members having integrally formed therewith opposed end portions, the opposed end portions of each of said unitary members being bindingly engaged in respective bores of the coacting pairs of bores and means joining said upper and lower complementary rim-forming members into a rim with the sole connection between the unitary cross members and the upper and lower rim-forming members being provided by the binding engagement of the opposed end portions of said unitary cross members and the respective bores of the coacting pairs of bores whereby the rim is stressed by and stresses the cross members to provide a stressed rattle-free assembly.

5. In a safety side for a support for humans, the combination comprising a plurality of elongate hollow cross-members, hollow upper and lower complementary rim-forming members having elongate portions and each rim-forming member adapted to co-operatively receive a respective corresponding end portion of each of said cross-members with said cross-members in parallel relation to each other and extending obliquely relative to the elongate portions of said rim-forming members, and means joining said upper and lower complementary rim-forming members in rim-forming relation in which the rim-forming members bindingly engage the cross-members and are stressed by and stress said cross-members supported thereby against relative movement, whereby a stressed assembly may be provided.

6. A safety side rail guide comprising an elongate tubular frame having a radially outwardly projecting mounting portion adjacent one end thereof, a pair of split rings of bearing material, two annular grooves in the interior face of said tubular frame, each groove being disposed adjacent a respective end of said frame and adapted to receive a portion of one of said split rings for supporting a portion of a safety side for sliding movement through said tubular frame in spaced relation thereto, and a pair of resilient rubber-like bumper ring members, each secured to a respective end of the tubular frame and adapted to resiliently engage the rim of a safety side adjacent the limits of its movement.

7. A safety side rail guide in accordance with claim 6, characterized by the fact that the split rings are non-metallic dry type bearing material and supported by the tube frame to bound an aperture substantially conform-

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ing to the cross section of the portion of the safety side slidable therein.

8. A safety side rail for a human supporting device having a general support plane of reference, said safety side rail comprising a safety side having a peripheral rim portion spanned by parallel cross-members, a pair of safety side guides secured to said supporting device and each co-operating with a respective one of said cross-members to guide said safety side for movement parallel to a plane perpendicular to said support plane of reference and obliquely of the line of intercept of said reference plane with said perpendicular plane and for establishing retracted and raised operative limit positions of safety side movement and means for securing said safety side in raised operative position.

9. For a human supporting device having a general support plane of reference, the combination comprising a support, a safety side having a peripheral rim spanned by parallel cross-members supported and mechanically stressed by and mechanically stressing said rim, a pair of safety side guides secured to said support and each co-operating with a respective one of said cross-members to guide said safety side for movement parallel to a plane perpendicular to said support plane of reference and obliquely of the line of intercept of said reference plane with said perpendicular plane, each guide having an elongate tubular frame having open-mouthed ends, radially inwardly extending bearing members supported in the tubular frame adjacent the mouths thereof, and axially extending bumper members of rubber-like material secured respectively to opposite ends of and bounding the mouths of the tubular frame, each of said bearing members bounding an aperture corresponding to the cross section of the cross-member supported therein for sliding movement, said safety side guides co-operating with said rim to establish raised and retracted positions in which portions of said rim engage respective bumper members, and means for securing said safety side in raised limit position and simultaneously urging same into binding relation to said guide bearing members for retaining said safety side in rigid non-rattling relation to said support plane of reference.

10. A safety side rail for a device for supporting a human, said safety side rail comprising in combination a substantially flat safety side having length and width and at least one elongate cross member extending obliquely of the length and width thereof, and a safety side guide in co-operating relation to said cross member and adapted to co-operate with and be supported by a device for supporting a human, said safety side being supported by said guide for inclined movement in an upright plane adjacent said support for a human.

11. A safety side rail for a device for supporting a human, said safety side rail comprising in combination a substantially flat safety side member having length and width and at least a pair of parallel elongate cross members extending obliquely of the length and width thereof, and a pair of safety side guides, each guide in co-operating relation to a respective one of said cross members and adapted to co-operate with and be supported by a device for supporting a human, said safety side member being supported by said guides for inclined straight-line movement in an upright plane adjacent said support for a human.

12. In a safety side for a support for humans, an article of manufacture comprising in combination a rim having a plurality of pairs of apertures, each pair of apertures being positioned in predetermined mis-alignment with each other, a plurality of elongate members each having its ends received in a respective pair of apertures and in binding relation to said rim, whereby a plurality of said elongate members are supported in parallel relation and the cooperative mechanical engagement of said rim with said elongate members precludes rattling of said rim and elongate members.

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13. In a safety side for a support for humans, the combination comprising a plurality of cross-members, a rim having a plurality of sections, cross-member receiving apertures in said rim, each of said cross-members having portions adjacent each end thereof received in said rim apertures, the size and shape of each of said rim apertures being related to the cross-section of the portion of the cross-member received therein such that the cross member is easily inserted therein at one angle and is securely held and supported therein at a second angle, 10 and means joining the ends of said rim sections to bindingly support each of said cross-members at the said

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second angle, whereby the rim is stressed by and stresses each of said cross-members supported in binding relation to said rim at said second angle and a stressed rattle-free assembly is provided.

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