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(54) **BED HAND RAILS**

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(57) **ABSTRACT**

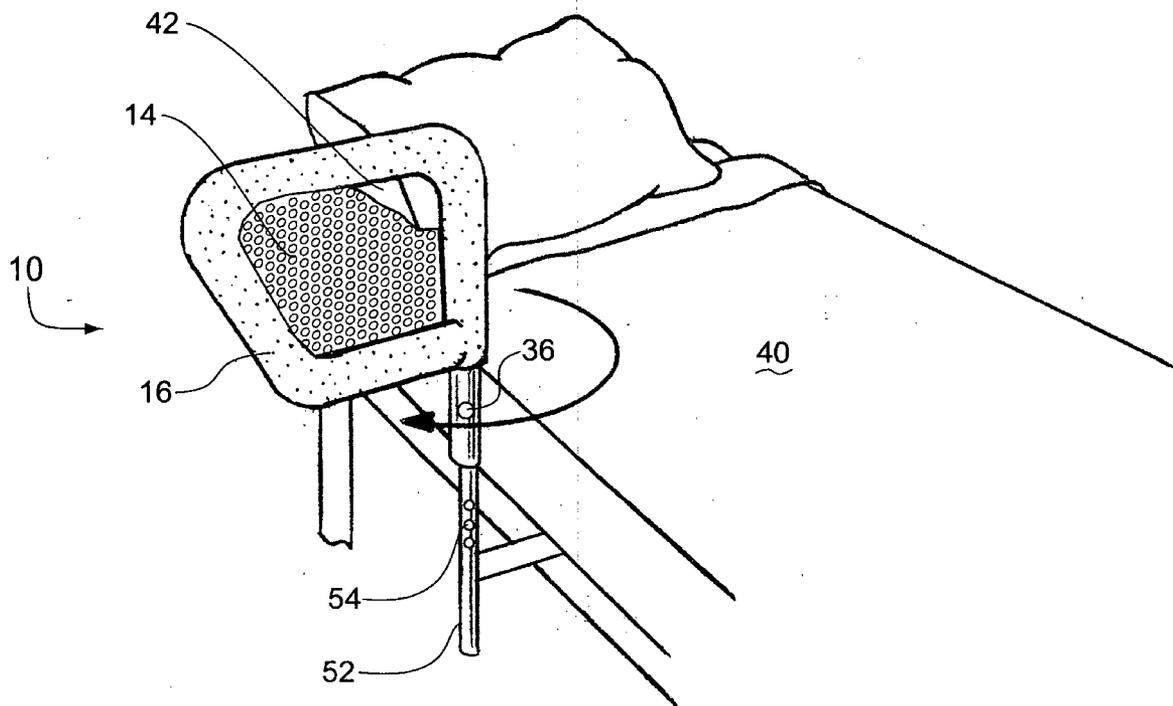
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Related U.S. Application Data

(60) Provisional application No. 60/756,491, filed on Jan. 5, 2006.

These bed hand rails are for use with rotatable hand grip rails on a bed. The rails comprise an arrangement of rails forming the hand grip rails, wherein the hand grip rails form an annular space; and a rigid or semi-rigid, perforated metallic cover is attached to the hand grip rails and covers the annular space. The cover has a rigidity that is substantially resistant to penetration by an appendage of a person.



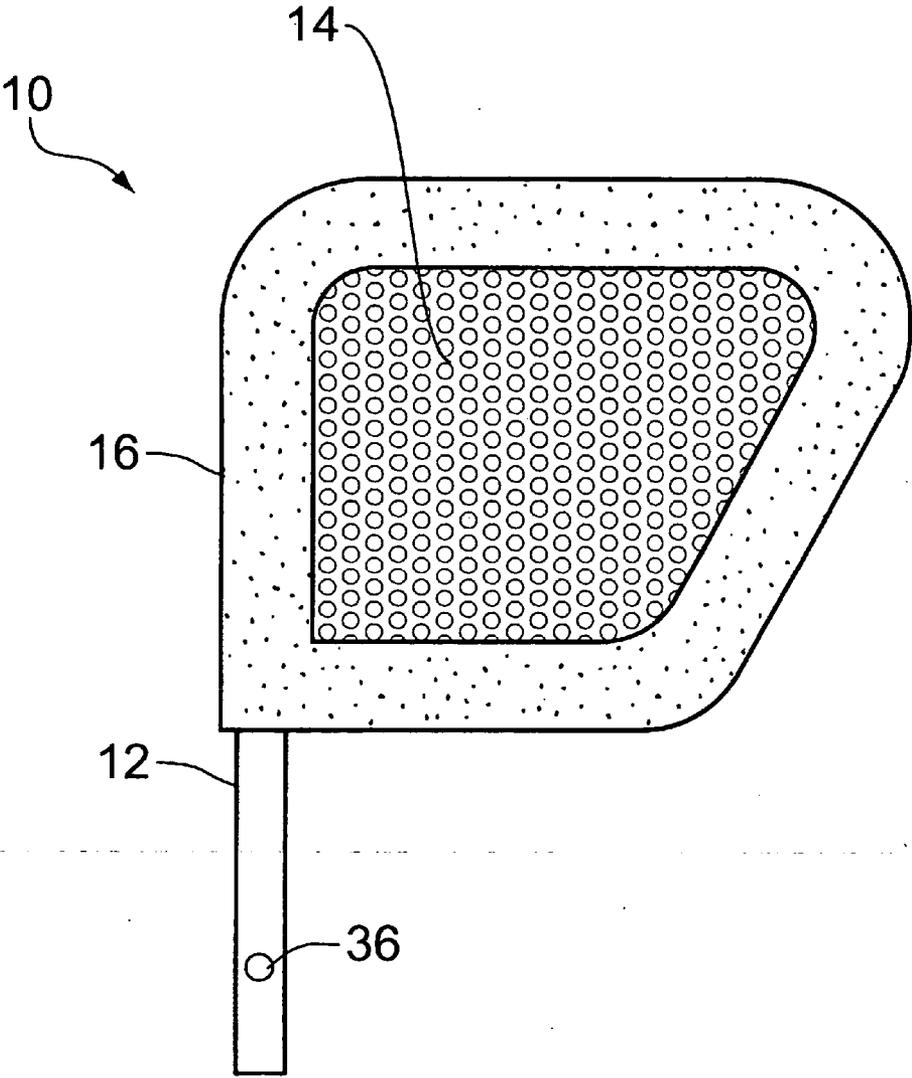


Figure 1

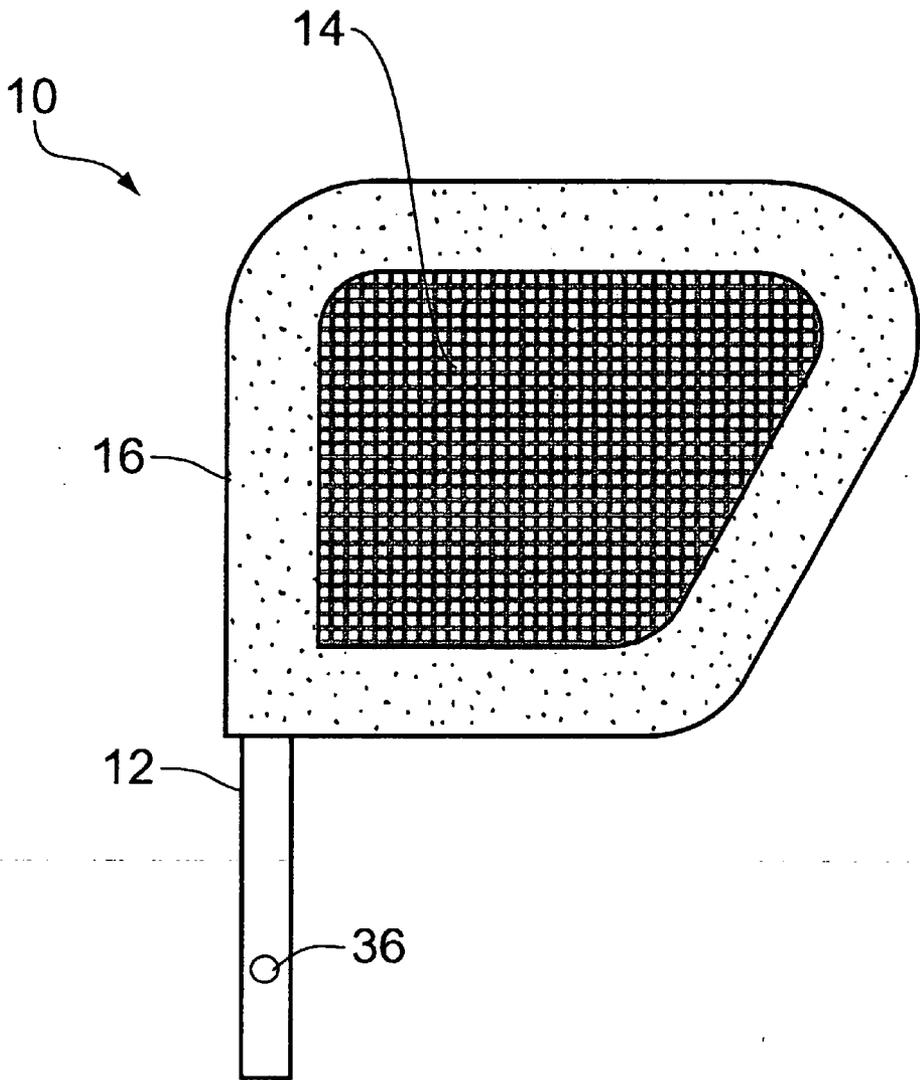


Figure 2

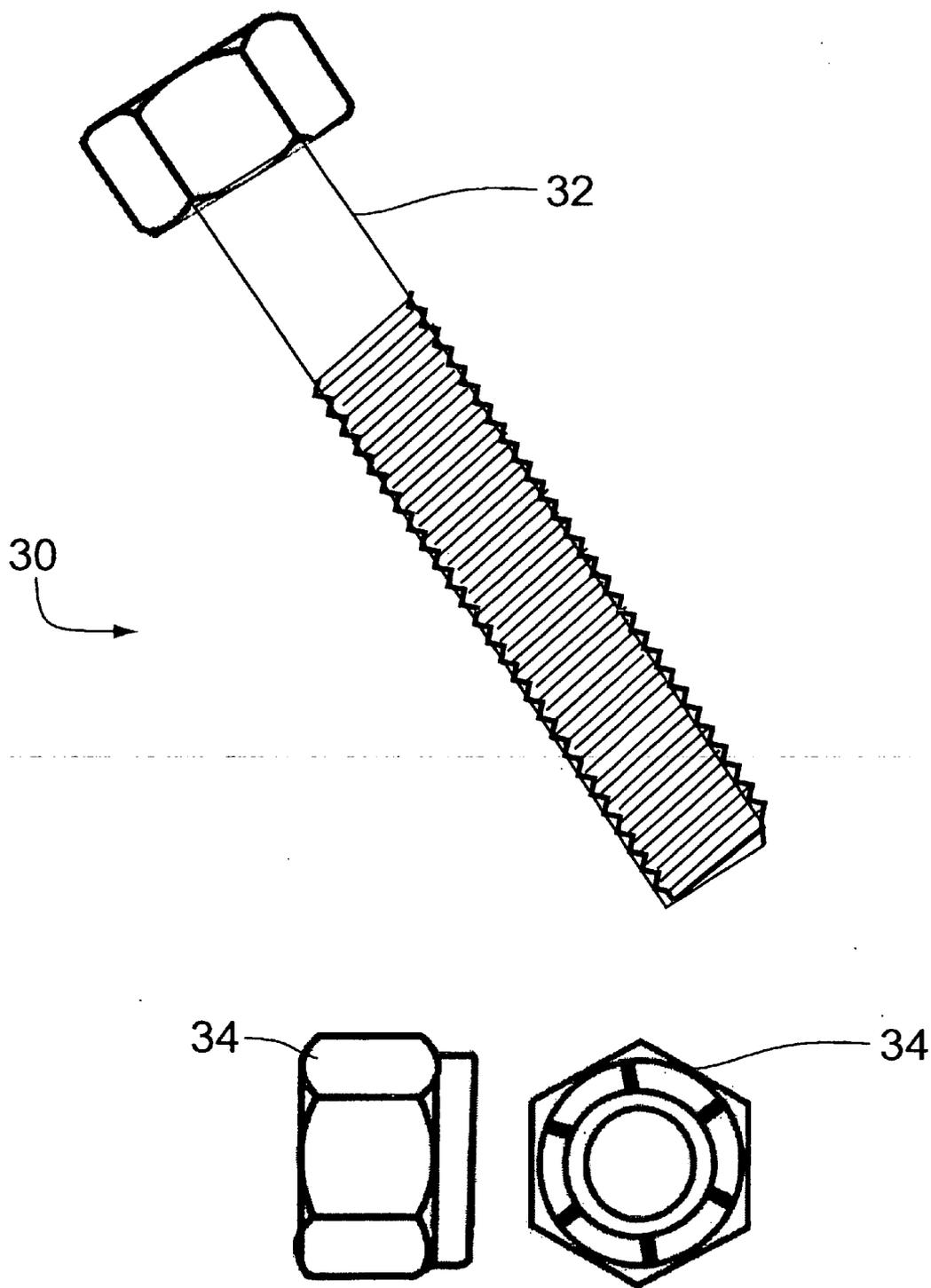


Figure 3

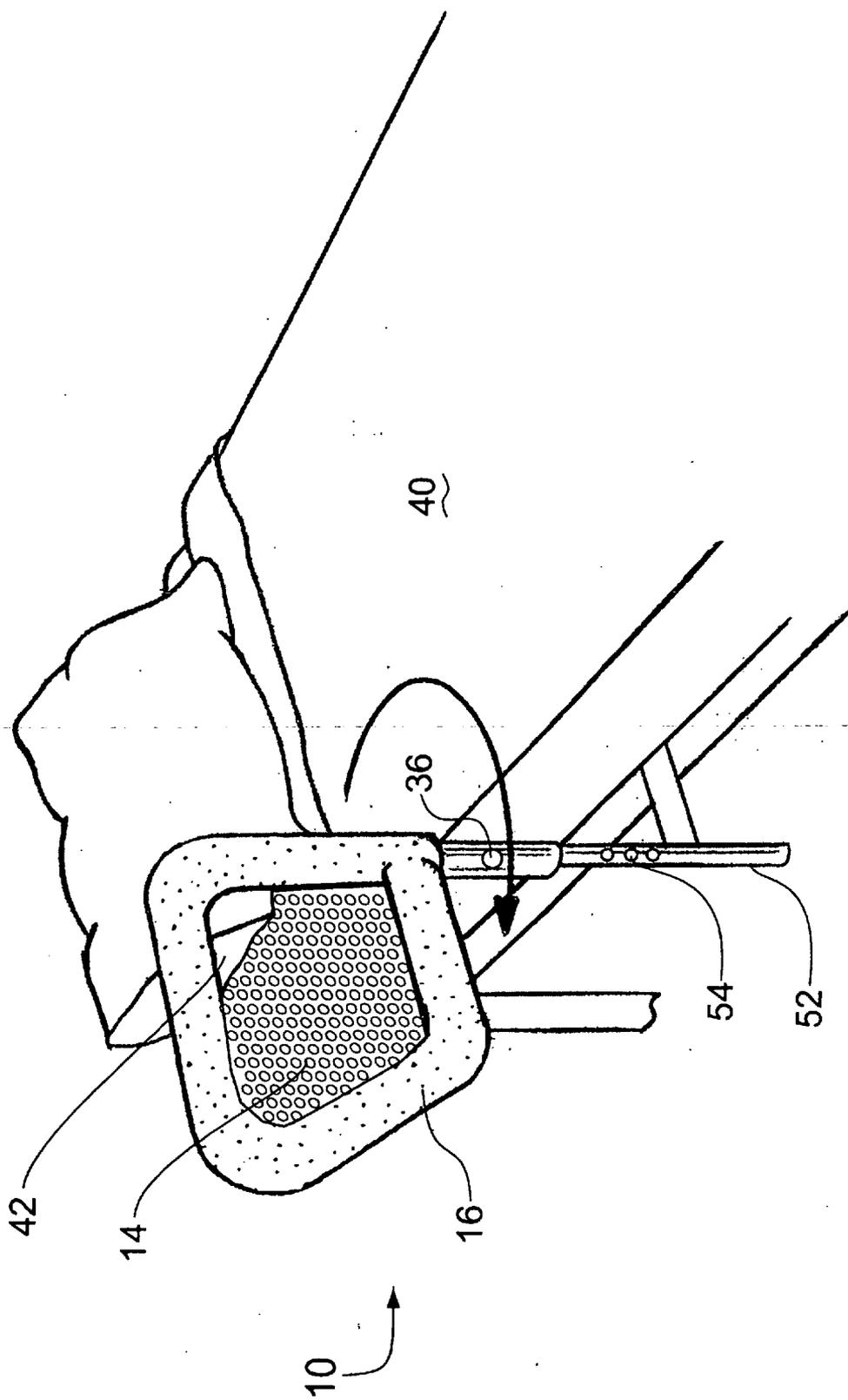


Figure 4

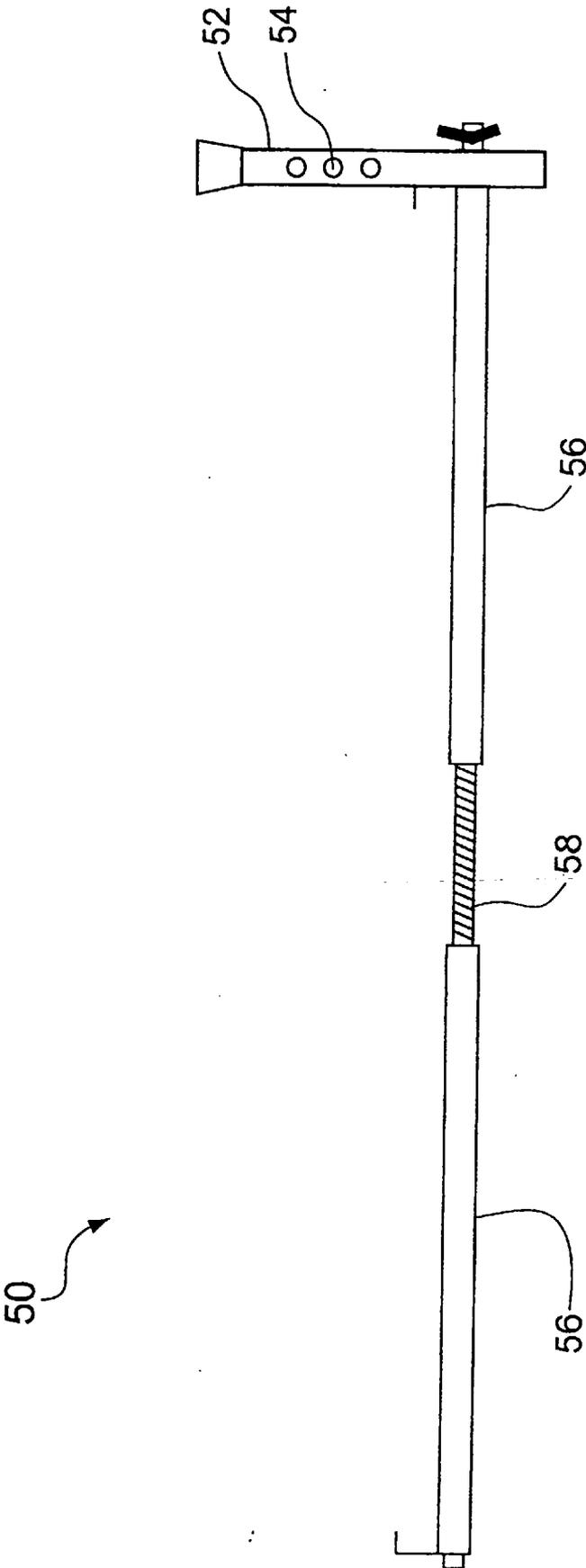


Figure 5

BED HAND RAILS

CROSS REFERENCE TO RELATED APPLICATION

[0001] This application claims the benefit of U.S. provisional patent application Ser. No. 60/756,491 filed Jan. 5, 2006.

TECHNICAL FIELD

[0002] This invention relates to bedside handrails for hospital and nursing home beds. In the preferred embodiment, the handrail or grab bar rotates or pivots.

BACKGROUND OF THE INVENTION

[0003] Hospital beds traditionally had some type of collapsible side rail on each side of the mattress, so that a patient on the bed cannot inadvertently roll off of the bed and receive serious injuries from a fall to the floor. Padded covers, bumper wedges and the like also are used with the bed-rails to improve the comfort and safety of patients in long-term care facilities.

[0004] One recent development is a padded gap protector that provides zero clearance no matter what the articulated position of the bed is. The pad remains in compression with the mattress and closes the gap between the mattress and side rails. The pad provides a zero gap when the mattress is in a horizontal position and when the mattress is secured in an articulate position such as an elevated position. The gapless bed rail pads are described in U.S. Pat. No. 6,347,422 issued on Feb. 19, 2002, which herein is incorporated by reference.

[0005] Another recent development is an enabler cover for hand rails used with hospital and nursing home beds. The industry often refers to these hand rails as grab bars, positioning bars and the like. U.S. Pat. No. 6,629,325 issued on Oct. 7, 2003, which herein is incorporated by reference, discloses an enabler cover for use with hand rails on a bed which comprises a pad which fits around the rails of the hand rails. The pad, including a cover material, defines an interior space formed of the material. The material is flexible, non-abrasive and substantially resistant to penetration by an appendage of a person. The pad also includes a foam material filling the interior space defined by the cover material. Further, the cover material includes a means for enabling the enabler cover to fit around the rails of the hand rails. A mesh cover then covers any opening in the hand rails.

[0006] The hand rails prevent, to some extent, a resident from falling out of bed. Internal bed positioning or assistance into and out of bed is the major use. Hand rails typically have a tubular frame which mounts to the bed frame. The hand rails may rotate up to 360° and lock into a number of positions. The hand rails, however, have an open center with the tubular frame circumscribing the opening. During operation or in a stationary position, a limb or other body part should not extend through the opening. As a result, a need remains for improving these hand rails.

SUMMARY OF THE INVENTION

[0007] This invention provides yet other improvements for hand rails used with hospital and nursing home beds.

Instead of a mesh cover enclosing the open center of the hand rails, I employ a perforated metal cover. The perforated metal cover may be a plate, wire mesh and the like. Unlike the flexible mesh of my previous cover, the metal cover is rigid or semi-rigid and welded to the tubular frame circumscribing the opening. The metal cover is very durable and survives the everyday use of long term care beds, yet is flexible enough to be substantially resistant to penetration by an appendage of a person.

[0008] Instead of the tubular pad of my earlier invention, I now use a spray on rubbery material. This spray on protection provides protection cushioning yet is very durable and survives the everyday use of long term care beds.

[0009] In my prior invention, the hand rails rotate 360° and lock firmly and safely into position with a pin and hole. Height adjustment also was carried out with the pin and hole arrangement. With time, however, the pins and holes wear and don't provide firm and safe positioning. I now use a lock bolt and lock nut assembly for rotation and height adjustment. The locking assembly is very durable and survives the every day use of long term care beds.

[0010] Other objects and advantages of the present invention will become apparent to those skilled in the art upon a review of the following detailed description of the preferred embodiments and the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] FIG. 1 shows a first embodiment of a perforated metal cover according to this invention.

[0012] FIG. 2 shows a second embodiment of a rigid or semi-rigid wire mesh cover according to this invention.

[0013] FIG. 3 shows a lock nut and lock bolt assembly according to this invention.

[0014] FIG. 4 shows a hand rail, bed, and cover according to this invention.

[0015] FIG. 5 shows an assembly and post for the supporting hand rail.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT(S)

[0016] FIG. 1 shows bed hand rail 10 according to this invention. Rail 10 comprises an arrangement of rails 12 circumscribing an annular space. Cover 14 covers the annular space and is welded to the inside edges or rails 12 defining the annular space. Cover 14 preferably is a perforated metal plate. Rubbery cushion 16 is sprayed onto rails 12.

[0017] FIG. 2 shows another embodiment for cover 14 for hand rail 10. In this embodiment, cover 14 is a rigid or semi-rigid wire mesh.

[0018] The rubbery material of cushion 16 of this invention may vary widely. Generally, it is a thermoplastic polymer produced by the condensation reaction of a polyisocyanate and a hydroxyl-containing material, e.g., a polyol derived from propylene oxide or trichlorobutylene oxide. The basic polymer unit is formed as follows: R₁NHCOOR₂.

[0019] A preferred urethane is RUBATEX ⅜" WALL: FIRE RATED (ASTM E-84 ME; 25 flame or less; 50 smoke

or less). The urethane generally has a density less than 0.25 lbs/ft³. Preferably, the urethanes are flame-resistant and have a low smoke value. This usually is accomplished by incorporating a metallic salt such as aluminum trihydrate. Typically, the materials should have a flame spread of 25 or less and a smoke value of less than 400 according to standard ASTM tests.

[0020] Rubbery cushion 16 also may comprise rubber and a resin component containing at least one ethylene-vinyl acetate copolymer (EVA). Ethylene vinyl acetate copolymers useful in the invention containing at least 15% by weight vinyl acetate. The resin component may contain only ethylene vinyl acetate copolymer or a mixture of EVA copolymers.

[0021] The rubbers, latexes or elastomers of this invention may vary widely. Examples of such elastomers include neoprene, EPDM, i.e., ethylene-propylene-diene terpolymer, SBR, i.e., styrene-butadiene rubber, nitrile rubber, and chlorinated polyethylene. Other eligible examples of rubbers include chlorosulfonated polyethylene, chlorinated polyethylene, ethylene-propylene rubber, isoprene-isobutylene rubber, chlorinated or brominated butyl rubber, and nitrile-butadiene rubber.

[0022] Natural rubber latex for cushion 16 can be any widely used centrifuged or creamed natural rubber latex such as NC 35% from ENNAR adjusted to the proper KOH number and PH value for proper reaction to standard curing agents and accelerators common to the trade.

[0023] Styrene butadiene rubber for cushion 16 is a low styrene SBR type such as 27% styrene that will crosslink and cure with the same cure package as incorporated in the formulation for the curing of the natural rubber. The SBR polymer will adhere in a satisfactory manner either alone or in combination with natural rubber to the top surface of rails 12.

[0024] The metals of cover 14 may vary widely. For example cover 16 may be made iron, copper, aluminum and the like. Alloys such as carbon steels may be used as well. Molybdenum improves the toughness and wear resistance of steel alloys. Corrosion and oxidation resistance of steel is increased with the addition of chromium or nickel (stainless steel). These metals and alloys may be used in either the perforated metal plates or the wire mesh. Rigidity may be controlled by the number of holes in the plate or the openness of the wire mesh. Rigidity also is controlled by the thickness or diameter of the wire. The holes or spaces may vary with caution not to make them too large. A limb or other body part should not extend through the opening. The holes or openings are such that cover 14 is substantially resistant to penetration by an appendage of a person.

[0025] FIG. 3 shows a lock nut and lock bolt according to this invention. FIG. 3 shows lock assembly 30 which comprises lock nut 32 and lock bolt 34. Rails 12 in FIGS. 1 and 2 show lock hole 36. Lock bolt 34 may be prepositioned in lock hole 36. Lock bolt 34 may be loosened somewhat to allow for proper assembly. Lock assembly 30 is used to securely lock bed hand rail 10 in its various position regarding height adjustment position. Lock hole 36 extends through rails 12. Typically, one lock assembly 30 is employed with each bed hand rail 10. The assembly locks height adjustment. Another assembly may be used, if desired to lock the rotation position.

[0026] FIG. 4 shows a hand rail, bed and cover according to this invention. FIG. 4 shows bed hand rail 10 in position on long term care bed 40. Rails 12 form annular space 42 and cover 14 covers space 42. Spot welds (not shown) are on the outside of rails 12 away from an occupant of bed 40.

[0027] FIG. 5 shows a post and assembly for supporting the hand rail. Assembly 50 includes vertical post 52. Post 52 includes three sets of holes support post 52. Lock bolt 32 passes through hole 36 of rail 12. Lock bolt 32 also passes through one set of holes 54 for height adjustment. Lock bolt 34 then secures rail 12 to post 52.

[0028] The following example further illustrate this invention.

EXAMPLE I

[0029] A preferred hand rail is a modified version of a Arcorail System. See FIG. 4. This hand rail rotates 360° and locks firmly and safely in four positions. Prior to rotation, loosen lock assembly 30 enough to allow for rotation. To rotate the hand rail, grip it close to where the center and top rail meet. Pull up lightly and turn it in either direction to a desired 90° position. To lock the hand rail, lower it. You will feel it drop slightly into the 90° position. Push the hand rail from side to side to ensure that it will not move out of position. Next, tighten lock nut 32 and lock bolt 34 to prevent rotation. To exit and enter the bed, rotate hand rail and lock it perpendicular at a right angle to the mattress. Sit down on the opposite side of the hand rail furthest from your pillow. To sit up or to reposition while in bed, grasp the hand rail by the center rail.

EXAMPLE II

[0030] In the preferred embodiment, cover 14 is a perforated metal plate made of stainless steel. Cover 14 typically has holes that are one half inch in diameter. Usually the holes are uniform in size. However, uniform hole size is not required. In addition to these embodiments, persons skilled in the art can see that numerous modifications and changes may be made to the above invention without departing from the intended spirit and scope thereof.

I claim:

1. A bed hand rail for use with rotatable hand grip rails on a bed comprising:

an arrangement of rails form an annular space; and

a rigid or semi-rigid, perforated metallic cover attached to the hand grip rails and covering the annular space.

2. A hand rail according to claim 1 wherein the metallic cover is a perforated metal plate.

3. A hand rail according to claim 1 wherein the metallic cover is a metallic, wire mesh.

4. A hand rail according to claim 1 wherein the metallic cover is made of stainless steel.

5. A hand rail according to claim 1 wherein the cover has a rigidity that is substantially resistant to penetration by an appendage of a person.

6. A hand rail according to claim 1 wherein the cover includes holes therein such that the cover has a rigidity that is substantially resistant to penetration by an appendage of a person.

7. A hand rail according to claim 1 including a rubbery coating coated onto the hand grip rails.

8. A hand rail according to claim 7 wherein the rubbery coating is a spray on material.

9. A hand rail according to claim 7 wherein the rubbery coating is a urethane.

10. A hand rail according to claim 7 wherein the rubbery material is a natural or synthetic rubber.

11. A hand rail according to claim 7 wherein the rubbery coating has a density less than 0.25 lbs/ft³.

12. A hand rail according to claim 1 including at least one lock assembly to securely lock the bed rail in various position regarding height adjustment and rotated position.

13. A hand rail according to claim 12 including one lock assembly for height adjustment and a second lock assembly for a rotation position.

14. A hand rail according to claim 12 wherein the rotatable hand grip rails are adapted to rotate 360°.

15. A hand rail according to claim 12 wherein the rotatable hand grip rails are adapted to firmly lock in position.

16. A hand rail according to claim 12 wherein the rotatable hand grip rails lock in four positions.

17. A hand rail according to claim 12 wherein the four positions are spaced apart 90°.

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