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(54) Title: MOVEABLE RAIL SYSTEM FOR BED ASSEMBLIES

(57) Abstract: A bedside support device is provided that is attachable to a bed assembly. The bedside device of an embodiment includes a mounting member attachable to the bed assembly, and a support bar attached to the mounting member. The support bar has a base portion rotatably mounted to the mounting member and is moveable relative to the mounting member between first and second positions. The support bar has a handle portion attached to the base portion and is moveable in a plane relative to the bed assembly as the base portion moves between the first and second positions. A locking mechanism coupled to the support bar to releasably lock the support bar in one or more intermediate position between the first and second positions.

## MOVEABLE RAIL SYSTEM FOR BED ASSEMBLIES

## CROSS-REFERENCE TO RELATED APPLICATION(S)

**[0001]** This application is a non-provisional patent application that claims priority to Provisional Patent Application No. 60/588,678 filed on July 16, 2004, entitled, "Bed Side Rail Method and Apparatus," which is incorporated herein by reference thereto.

## TECHNICAL FIELD

**[0002]** The present invention is directed to accessories for beds, and more particularly to rail systems for bed assemblies.

## BACKGROUND OF THE INVENTION

**[0003]** Conventional bedside support devices are provided to assist patients or other individuals in need of a certain amount of support when getting into or out of bed or repositioning themselves in the bed. Many of the conventional devices include static portions rigidly attached to a central lateral portion of a bed or adjacent to structure that oftentimes places a patient in an undesirable position, such as in the event the patient is caught between the static rigid portion and a side region of the bed. Current rehabilitation equipment used on beds, such as those provided in hospitals, nursing homes, home healthcare facilities, etc., have been historically inadequate to meet the needs of the young and/or elderly disabled populations.

**[0004]** Physical environment and an individual's physical condition are two factors that prevent a disabled person from reaching a maximum exercise and, thus, physical potential. Current studies have shown that conventional systems, such as the "overhead trapeze" system has potentially been the cause for rotator cuff injuries in the chronically disabled American veterans. This overhead system is limited to allowing a patient to reach above his/her head and pull himself/herself up in bed closer to the headboard.

Elderly disabled people typically lack the range of motion necessary, the strength, the dexterity to grasp, or the cognitive capacity to use such a device for maximum bed mobility.

**[0005]** Other hospital bed accessory innovations have focused on allowing patients to reach a bar fixed somewhere along the length-wise portion of the bed and pulling themselves to a seated position at the edge of the bed. The fixed bars are configured to allow the patient to support their weight as the patient transfer themselves from the bed to another surface, such as a bedside commode, a wheelchair, or a personal chair at the side of the bed. These "enablers" fall short of providing the user with a variety of options and multiple tasks required in moving while on the bed, such as turning from side-to-side, pulling oneself up in bed closer to the headboard, pulling oneself to a seated position at the side of the bed, supporting oneself to stand, or balancing oneself to transfer from one surface to another and back again.

**[0006]** Traditionally designed and positioned "side rails" have been used by patients to move about in bed, but due to the positioning of the rail fixed to the lengthwise portion of the bed, the patient must move themselves around the rail and adapt to the device's set position, rather than the device adapting to the patient and the patient's movement. Furthermore, the traditional "side rail" was designed to keep a patient from falling out of bed by defining the boundaries of the bed as well as providing a conventional location for bed controls, call lights, reading lights, and the like.

**[0007]** The present invention overcomes drawbacks experienced in the prior art and provides additional benefits.

#### BRIEF DESCRIPTION OF THE DRAWINGS

**[0008]** Figure 1 is an isometric view of a bedside support device in accordance with an embodiment of the present invention.

**[0009]** Figure 2 is a side elevation view of the bedside support device of Figure 1.

**[0010]** Figure 3 is an enlarged isometric view of a securing mechanism of the bedside support device of Figure 1.

**[0011]** Figure 4 is an isometric view of a person laying down and grasping a handle region of the bedside support device of Figure 1 shown mounted on a bed assembly.

**[0012]** Figure 5 shows the person in a seated orientation and grasping the handle region of the bedside support device in a first position to aid in raising herself from the bed.

**[0013]** Figure 6 shows the person in a standing position adjacent to the bed and grasping the bedside support device located in an intermediate position to provide mobile assistance to the person.

**[0014]** Figure 7 shows the person in a standing position grasping the handle region of the bedside support device located in a second position relative to the bed.

**[0015]** Figure 8 is a side elevation view of the bedside support device mounted to a bed assembly, partially shown in phantom lines with the bedside support device shown in a raised position.

**[0016]** Figure 9 is a side elevation view with a partial cutaway showing the bedside support device in a lowered, stowed position.

**[0017]** Figure 10 is a partially exploded and cutaway view of a lower portion of the bedside support device of an embodiment.

**[0018]** Figure 11 is a cross-sectional view of the bedside support device taken substantially along lines 11-11 of Figure 10.

**[0019]** Figure 12 is a partial side elevation view of the base region of the support bar of Figure 1 shown removed from the mounting device.

**[0020]** Figure 13 is a partial side elevation view of another embodiment of a base region of a support bar.

**[0021]** Figure 14 is a partial side elevation view of another embodiment of a base region of the support bar.

**[0022]** Figure 15 is a partial side elevation view of another embodiment of a base region of the support bar.



**[0023]** Figure 16 is a partial side elevation view of another embodiment of a base region of the support bar.

**[0024]** Figure 17 is a top plan view of a bedside support device with a handle region of the support bar shown in solid lines in a first position and shown in phantom lines in two alternate positions, and with the bed frame being shown in phantom lines.

**[0025]** Figure 18 is a cross-sectional view taken substantially along lines 18-21--18-21 of Figure 17.

**[0026]** Figure 19 is a cross-sectional view of another embodiment taken substantially along lines 18-21--18-21 of Figure 17.

**[0027]** Figure 20 is a cross-sectional view of another embodiment taken substantially along lines 18-21--18-21 of Figure 17.

**[0028]** Figure 21 is a cross-sectional view of another embodiment taken substantially along lines 18-21--18-21 of Figure 17.

**[0029]** Figure 22 is a side elevation view of a bedside support device in accordance with another embodiment of the present invention.

**[0030]** Figure 23 is a schematic isometric illustration of a bed assembly with the bed support members of Figure 22 shown mounted on corners of the bed frame, with exercise members connected to the bedside device for use by a person on the bed.

**[0031]** Figure 24 is a schematic isometric view of a bed assembly with the bedside support devices of Figure 22 shown mounted to the corners of the frames and in a second position relative to the bed, with exercise members attached thereto for use by a person on the bed.

**[0032]** Figure 25 is a side elevation view of a bedside support device in accordance with another embodiment.

**[0033]** Figure 26 is a schematic isometric illustration showing a bed assembly with the bedside support device of Figure 25 attached to a bed frame, with exercise members connected thereto for use by a person on the bed.

**[0034]** Figure 27A is a side elevation view of a bedside support device in accordance with yet another embodiment of the present invention.

**[0035]** Figure 27B is an enlarged isometric view of a lower portion of the bedside support device of Figure 27A.

**[0036]** Figure 28 is a schematic isometric illustration showing a partial bed assembly with the bedside support device of Figure 27A attached thereto with the handle region shown in multiple positions relative to the bed.

**[0037]** Figure 29 is a schematic isometric illustration of Figures 27A and 28, and showing a person grasping the bedside support device while in a second position.

**[0038]** Figure 30 is a schematic isometric view of a bed assembly with a bedside support device in accordance with another embodiment of the present invention.

**[0039]** Figure 31 is an enlarged isometric view of a handle portion of the bedside rail device of Figure 30 shown with a person's arm engaging a contoured handle portion.

**[0040]** Figure 32 is a schematic isometric illustration of a bed assembly with a bedside support device in accordance with another embodiment attached to the bed and shown in a lowered and locked position.

**[0041]** Figure 33 is a schematic isometric illustration of the bed and bedside support device of Figure 32 with the bedside support device shown in a raised and locked position for assisting a person on the bed to move or adjust their position on the bed.

#### DETAILED DESCRIPTION

**[0042]** In the following description, certain specific details are set forth in order to provide a thorough understanding of various embodiments of the invention. However, one skilled in the art will understand that the invention may be practiced without these details. In other instances, well-known structures associated with beds and other structures with which the rail systems of the present invention can be used have not been shown or described in detail to avoid unnecessarily obscuring the description of the embodiments.

**[0043]** A bedside support device 20, in accordance with one embodiment, is shown in Figure 1 in one embodiment. The general environment for the bedside support device 20 is shown in Figure 4 in one embodiment where the device 20 is mounted to a bed 10. The bed 10 of the illustrated embodiment has a bed frame 11 with corner regions 12 and side or lateral regions 13. For purposes of reference, an axis system 14, shown in Figures 1 and 4, includes a longitudinal axis 15, a lateral axis 16, and a vertical axis 17 all generally orthogonal to each other. Of course the axis system 14 is for general reference purposes only.

**[0044]** As shown in Figure 1, the bedside support device 20 comprises a mounting region 22 and a support bar 24 rotatably connected to the mounting region. The mounting region 22 has a pivot attachment member 26 that is fixedly attached to a base frame 28 at a juncture 34. In one embodiment, the base frame 28 comprises a first member 30 and a second member 32 are fixedly attached at the juncture 34. The components of the mounting region 22 can be joined or permanently attached to one another. The first and second members 30 and 32 of the base frame 28 are in an orthogonal relationship and are adapted to be fitted to a corner region 12 of the bed frame 11 as shown in Figure 4. In one embodiment, the mounting region 22 is made from a suitable metal in a configuration, such as channel iron or angle iron to be adapted to handle the transmitted loads from the support bar 24.

**[0045]** The pivot attachment member 26 in one form is a tubular sleeve 40 having an internal bushing or bearing (discussed below) to provide rotation of the support bar 24 substantially about a vertical axis. The support bar 24 of the illustrated embodiment has an inverted, generally L-shape when the support bar is mounted in the pivot attachment member 26. The support bar 24 has a base region 60 that defines a vertical leg of the inverted "L" shape, and a handle region 62 that defines a horizontal leg of the inverted "L" shape. The base region 60 is rotatably received in the pivot attachment member 26 such that the support region 62 is free swinging relative to the bed 10 (Figure 4) for movement between first and second positions, as discussed below. The base region 60 can also be removably attached to the pivot attachment member 26, so the support bar 24 can be completely removed from the pivot attachment member.

**[0046]** The internal bushing or bearing 23 provides an internal cavity adapted to receive the lower portion of the base region 60 of the support bar 24. As shown in Figure 3, the base region 60 extends through the pivot attachment member 26. In one embodiment, the pivot attachment member 28 has a securing mechanism 46 having a spring-loaded pin device adapted to be received by one of a plurality of channels 48, shown in Figure 3. There can be multiple channels 48 in the base region 60 of the support bar 24 that allow for height adjustment of the support bar's handle region 62 relative to the mounting region 22, and thus relative to the bed 10 (Figure 4). In the embodiments of Figure 3, an interior channel behind the pivot attachment member 26 is present where the securing mechanism 26 has an internal pin extending therein at least partially into the channel 48.

**[0047]** As shown in Figure 3, the channels 48 are positioned along a radial portion of the base region 60. The channels 48 are shaped and sized so the pin of the securing mechanism 26 can ride in the channels as the support bar 24 is rotated between the first and second positions relative to the pivot attachment member 26. Each channel 48 has a first engagement surface 50 and a second engagement surface 52 at opposite ends of the channel. These engagement surfaces 50 and 52 are radially spaced apart and are adapted to be engaged by the outer cylindrical surface of the pin of the security mechanism 46 in order to limit the rotational range of the support bar 24 beyond the first and second positions. By providing a plurality of slots 48 in the base region 60, the height of the support bar's handle region 62 can be effectively adjusted relative to the bed.

**[0048]** The support bar 24 is adapted to be positioned in a first position with the handle region 62 adjacent to and in alignment with the lateral region 13 of the bed 10. The support bar 24 can rotate so the handle region 62 moves away from the lateral region 13 of the bed 10 toward a second position, for example if a person laterally pushes against the handle portion, either advertently or inadvertently. The channels 48 of the illustrated embodiment allow the support bar 24 freely to rotate (i.e., without a locked intermediate position) relative to the mounting region through approximately a 90° range of motion between the first and second positions. Other embodiments can provide channels

48 that allow the support bar 24 to freely swing through a larger or smaller range of motion.

**[0049]** The base region 60 as described above is adapted to cooperate with the pivot attachment member 26 of the mounting region 22 to provide a one degree of freedom motion of rotation substantially about a vertical axis. Other embodiments of repositioning the support bar 24 can be obtained such as the use of a linkage system instead of a rotational system. However, a pivot rotation about a substantially vertical axis is one way of allowing repositioning of the handle region 62 with respect to the bed 10.

**[0050]** As shown in Figure 2, the handle region 62 of the support bar 24 comprises a substantially horizontally extending grasping area 63. Essentially, the base region 60 and handle region 62 are fixedly connected at a joinder portion 64. In one embodiment, the base region 60, joinder portion 64 and handle region 62 are integrally connected and formed of a single piece of metal tube bent or otherwise oriented at approximately at a ninety-degree angle, however, other angle relationships can be employed. Further, the lower portion of the base region 60 as mentioned above is adapted to extend through the open chamber region of the pivot attachment member 26 to provide the limited rotational movement therein.

**[0051]** In one embodiment, resistance to the rotation of the base region 60 about a vertical axis can be provided to dampen the rotational movement of the handle region 62. This can be accomplished by having a sleeve or bearing constricted to provide circumferential friction about the base region 60. This could be advantageous where it is desired to have a handle region 62 that repositions with a certain degree of resistance to provide some stability but will reposition in the event the patient or other person pushes hard enough laterally against the handle region.

**[0052]** Now referring to Figure 4, a person 70 is shown lying in the bed 10. As shown in this figure, the person (e.g., a patient) uses the support bar 24 by positioning the support bar in a first position adjacent to and aligned with the lateral side 13 of the bed 10. The person 70 grasps the handle region 62 and places a load thereto having laterally inward and/or vertically downward force vectors. This load is transmitted to the base

region 60 and through the pivot attachment member 26 and the mounting region 22. The mounting region 22 in one embodiment is fixedly attached to the corner region 12 of the bed 10. This mounting region 22 in one embodiment should be positioned at the bed's corner region to allow the handle region 62 to move away from the bed 10 and not act as an obstacle if or when the person moves out of the bed, advertently or inadvertently.

**[0053]** Now referring to Figure 5, the support bar 24 in the first position is rotationally blocked from moving past the first position toward the bed 10 because the pin of the securing mechanism 46 engages the end surface 50/52 of the channel 48. The person 70 can pull laterally and push downwardly against the handle region 62 for assistance in moving from a laying-down position to a sitting up position. The support bar 24 is also positioned so the handle region 62 is above the plane of the bed's top surface 49 so the person 70 can sit on the bed with his or her legs under the handle region 62 when the support bar 24 is in the first position. Therefore, the person 70 can then use the support bar 62 to assist in moving from the bed to a standing position.

**[0054]** The person 70 can exert a vertical load downwardly on the handle region 62 of the support bar 24 and can flex his/her upper torso and exert a laterally inward force to position his/her center of gravity near the handle region 62 and over his/her feet. As the person 70 stands up, as shown in Figure 6, the support bar 24 is rotated away from the first position a short distance so person 70 can move himself/herself to a stable standing position next to the bed while holding the handle region. As discussed above, the support bar 24 is freely rotatable between the first and second positions. In other words, the support bar 24 does not lock in any intermediate position between the first and second positions. Accordingly, handle region 62 freely pivots about the vertical axis of the base region 60 toward the second position. The person 70 can continue to put a downward force upon the handle region 62 as the support bar 24 is rotating to assist in moving to or from the bed. This is particularly advantageous when the person 70 is getting up after a period of not being on his/her feet. The support bar 24 allows the person 70 to move back toward the bed 10 because the handle region 62 freely allows this reverse motion toward the first position so the person can sit back down on the bed as shown in Figure 5.

**[0055]** If the person 70 feels that he/she can travel away from the bed 10, he/she can reposition the handle region 62 to the second position shown as Figure 7. The person 70, if confident to walk without any assisting device, can then release and move away from the support bar 24. Alternatively, a mobile bipedal motion assisting device, such as a walker, could be positioned near the support bar 24 when in the second position so the person 70 could transfer themselves to the motion assisting device.

**[0056]** The bedside support device 20 of the embodiment discussed above with the free-swinging movement of the support bar 24 between first and second positions relative to the bed is particularly effective and beneficial for patients suffering from cognitive impairment problems. Cognitive impairment can greatly restrict a person's mobility from a bed, particularly a hospital bed. Accordingly, this bedside support device 20 provides a wonderful assistance to facilitate a person's/patient's mobility. The bedside support device 24 also provides some control over a person's/patient's mobility from a bed 10 because the support bar 24 can be removed from the pivot attachment device 26, while the mounting region 22 can remain on the bed. Alternatively, the entire bedside support device can be removed from the bed 10.

**[0057]** In one embodiment shown in Figures 8 and 9, the bedside support device 20 includes the support bar 24 with three vertically staggered, elongated channels 48 formed, machined, or otherwise provided in the lower portion of the support bar's base region 60. The channels 48 are shaped and sized to removably receive the pin 40 of the securing mechanism 46. The pin 40 can be retracted relative to the channels 48 to allow for vertical adjustment of the support bar's base region 60 in the pivot attachment member 26, thereby allowing for vertical adjustment of the handle region 62 relative to the bed 10 (shown in phantom lines).

**[0058]** The securing mechanism 46 of the illustrated embodiment extends into a horizontally oriented tubular body 41 attached to the larger, vertically oriented tubular body 43 of the pivot attachment member 26. The securing mechanism 46 has the pin 40 that extends through the horizontally oriented tubular body and partially into the vertically oriented tubular body 43 of the pivot attachment member 26. A spring 42 is contained in the horizontally oriented tubular body 41 and is coupled to the pin 40 to urge the pin

radially inwardly a selected distance into the vertically oriented tubular body 43 so as to extend into the channel 48 aligned with the pin. The spring 42 is retained in the horizontally oriented tubular body 41 by a cap 47 secured to the distal end of the body. The pin 40 slidably extends through an aperture in the cap 47. A handle 44 is provided on the end of the pin 40 extending from the cap 47. The handle 44 is configured so a person can grasp the handle and pull the pin radially outwardly so as to move the pin out of a channel 48 aligned with the pin.

**[0059]** The pivot attachment member 26 of the illustrated embodiment is configured so the handle of the securing mechanism 46 is generally pointing inwardly toward the under portion of the bed. Other embodiments can have the securing mechanism 46 in other locations on the pivot attachment member 26. For example, in one embodiment, the securing mechanism can be pointing away from the underside of the bed and be accessible without having to reach under the bed frame. Other embodiments can have different orientations of the securing mechanism 46.

**[0060]** If the base region 60 of the support bar 24 is positioned so a channel 48 is not adjacent to the pin 40, the pin will be urged, via the spring 42 or other urging mechanism, radially inwardly against the outer surface of the base region. Accordingly, when the pin 40 is positioned within one of the multiple channels 48, the pin retains the support bar 24 in the selected vertical position relative to the bed.

**[0061]** In the embodiment illustrated in Figure 8, the support bar 24 is in a first vertical position, referred to as an extended position, so the handle region 62 is positioned above the upper surface 49 of the bed 10. The base region 60 has a length to provide the sufficient space between the handle region 62 and the bed's upper surface 49. The length of the base region 60 is also configured to allow the handle region 24 to be moved from the extended position, shown in Figure 8, downwardly to a lowered, stowed position shown in Figure 9. In one embodiment, the handle region 62 in the stowed position can be above or below the bed's upper surface 49. Accordingly, when the support bar 24 is in the first position, the handle region is aligned with and adjacent to the lateral edge of the bed and below the upper surface. In this stowed position, the support bar 24 can be moved out of the way so it does not provide an obstruction for the person 70 on the bed.

**[0062]** In an alternate embodiment, a locking aperture 70 can be provided in the support bar's base region 60 above the plurality of channels 48. The locking aperture 70 is shaped and sized to receive the pin 40 of the securing mechanism 46. The locking aperture 70 can be positioned to removably receive the pin 40 when the support bar 24 is in the lowered, stowed position. Accordingly, the support bar 24 in one embodiment is configured to be temporarily locked or otherwise securely held in a position with the handle position with the handle region immediately adjacent to the bedside 10. This configuration prevents or restricts the support bar's handle region 62 from inadvertently moving away from the bed when the support bar is in the lowered position.

**[0063]** In yet other embodiments, it is preferred that the support bar 24 remain rotatable (i.e., not locked) when in the lowest height-adjustable position. In another embodiment, a collar or other projection 73 can be provided on the base region 60 above the channels 48. The collar/projection 73 can be a separate piece (e.g., a full or partial sleeve, one or more pins, etc.) attached to the base region or an integral member (e.g., a nub) formed in the base region 60. The collar/projection 73 has an outer diameter greater than the inner diameter of the pivot attachment member 26, so the collar/projection will prevent the base region of the support bar 24 from moving too far vertically through the pivot attachment member 26 relative to the bed.

**[0064]** In one embodiment, the collar/projection 73 can be positioned on the base region 60 at a location so that, when the support bar 24 is in the lowered position (preferably the lowest height adjustable position with the handle region still above the surface of the bed), the collar/projection is adjacent to the pivot attachment member 26 (shown in Figures 8 and 10 in phantom lines). In the embodiment that includes the collar/projection 73 not integrally formed in the base region, the collar/projection can be attached to the support bar with fasteners, adhesive, friction fit, or a position engagement (e.g., with a peg screwed into the base region).

**[0065]** Figure 10 is a partially exploded cross-sectional schematic view of the bedside support device 20 of one embodiment showing the support bar's base region with the plurality of channels 48, the locking aperture 70 spaced above the pivot attachment member 26 with upper and lower tubular sleeves or bearings 23 and the pin 40, spring 4?

and handle 40 as discussed above. In one embodiment, the bearings 23 can be tubular bushings can be a nylon-type bushing that provides a desirable coefficient of friction between the support bar 24 and the inner surface (cylindrical or conical) of the bearings. In another embodiment, the bushing 23 can be made of other material, including metal (steel, stainless steel, steel alloys, or other metals and alloys) plastics, composites, or other material that would provide the needed wear-resistance, coefficient of friction, and engagement with the support bar 24. In one embodiment, the lower bearing has a surface defining the opening that accommodated the pin 40 of the securing mechanism 46. The bearings 23 can have upper and lower annular lips adapted to engage the upper and lower surfaces of the pivot attachment device. Other embodiments can have other constructions to provide for the rotatable retention of the support bar 24 for rotation about a vertical axis 68.

**[0066]** Figure 11 is a cross-sectional view taken substantially along line 11-11 of Figure 10 showing the channel 48 and the relative positioning of the pin 40 in the channel. As shown in Figure 11, the pin 40 is configured to block radial movement of the support bar's base region 60 beyond the first and second positions by engaging the first and second engagement surfaces 50 and 52 of the channel. In one embodiment, that range of motion is approximately 90 degrees. In other embodiments, the range of motion as defined by the distance between the first and second engagement surfaces 50 and 52, can be greater or lesser than 90 degrees.

**[0067]** Figure 13 is a side elevation view of a base region 60 of a support bar 24 of another embodiment. In this embodiment, the base region 60 includes a plurality of the channels 48 therein and vertically spaced apart. The base region 60 also includes a plurality of vertically and radially staggered locking apertures 72 formed above each of the channels 48. A locking aperture 70 can be provided on the base region 60 for some embodiments at a location for temporarily locking the support bar 24 in the stowed position as discussed above. The offset locking apertures 72 are shaped in size to allow the pin 40 of the securing mechanism 46 (Figure 10) to extend into each locking aperture so as to retain the support bar 24 in a fixed vertical and radial position relative to the base frame 28 (Figure 1). The offset locking apertures 72 can be positioned at a variety of radial

positions on the base region. In one embodiment, the offset locking apertures 72 are provided to retain the support bar 24 at the second position (e.g., with the handle region approximately perpendicular to the lateral regions of the bed) and an intermediate position between the first and second positions. The intermediate position of one embodiment the intermediate position can be approximately 45 degrees relative to the lateral region 13 of the bed. In other embodiments, additional locking apertures 72 can be provided in the base region 60.

**[0068]** In another embodiment illustrated in Figure 14, the base region 60 of the support bar 24 has a plurality of the channels 48 as discussed above, and a single locking aperture 72 is positioned above each of the channels. The locking aperture 72 are positioned relative to the channels so as to releasably retain the support bar so the handle region 62 is at a selected angle relative to the bed. For example, the locking aperture 72 can be positioned to releasably retain the support bar 24 so the handle region 62 is at approximately a 90 degree angle relative to the bed. In another embodiment, the locking aperture 72 can be positioned so the handle region 62 is oriented at approximately 45 degrees relative to the bed when in the locked position. In another embodiment, the locking aperture 72 can be positioned relative to a channel 48 to retain the support bar 24 so the handle region 62 is at a position in the range of 0-180 degrees, inclusive, relative to the lateral region 13 of the bed 10 (Figure 4).

**[0069]** Figure 15 is a partial side elevation view of the support bar's base region 60 in accordance with yet another embodiment. In this illustrated embodiment, the support bar 24 has a plurality of vertically and radially offset locking apertures 72. Each locking aperture 72 is adapted to releasably receive the pin 40 of the securing mechanism 46 (Figure 8) to temporarily retain the handle region 62 of the support bar 24 in one of the plurality of angular positions relative to the bed 10 (Figure 4). The embodiment of Figure 15 is, thus, not a free swinging support bar. Instead, the support bar 24 can be adjusted vertically and radially between a plurality of locked positions.

**[0070]** In another embodiment illustrated in Figure 16, the base region 60 of the support bar 24 includes a plurality of sets 55 of vertically and radially off set channels 48. Each channel set 55 allows for both vertical and radial adjustment of the handle region 62

relative to the bed 10 (Figure 4). In the illustrated embodiment, each channel set 55 has three vertically and radially offset channels 48, although other embodiments can have a greater or fewer number of channels in each set. Each channel set 55 can have the same number of channels, or in other embodiments, the channel sets can include different numbers of the channels 48.

**[0071]** In the illustrated embodiment of Figure 17, the support bar 24 is shown in solid lines with the handle region 62 in a first position adjacent to and aligned with the side of the bed, as discussed above. The handle region 62 is movable from the first position shown in solid lines radially about a vertical axis extending through the base region 60 to an intermediate position, such as the one shown in phantom lines, and to a second position (also shown in phantom lines) substantially perpendicular to the first position. In one embodiment discussed above, the support bar 24 can be the free swinging bar that does not lock in an intermediate position between the first and second positions and can swing therebetween. In other embodiments, including those discussed below, the support bar 24 may be temporarily restrained (but not locked) in intermediate positions between the first and second positions. Such restraint can be provided by as an example friction or contoured detents in the channels 48, or other configurations.

**[0072]** As shown in Figure 17, the bedside support device 20 is configured so the mounting region 22 is attached to a corner portion of the bed frame 11 (shown in phantom lines) with the pivot attachment member 26 substantially at the intersection of the base frame's first and second members 30 and 32. In other embodiments, the pivot attachment member 26 can be located in other locations relative to the first and second members 30 and 32 of the base frame 28.

**[0073]** The base frame 28 of the mounting region 22 is shaped in size to securely attach to the frame 11 of the bed 10. The base frame 28 can be configured to partially extend over and attach to the frame. In the illustrated embodiment, the first and second members 30 and 32 of the base frame 28 can include a plurality of mounting apertures therein, as shown in Figure 17, that axially align with apertures in the frame 11. Accordingly, the base frame 28 can be secured to the frame by conventional fasteners that extend through the mounting apertures. In other embodiments, other secure-

fastening means can be used to attach the mounting region 22 to the bed frame 11. As an example, quick release devices can be used to temporarily attach the bedside support device 20 to the bed 10. In other embodiments, the first and second members of the base frame may be welded, adhered, fixed or otherwise permanently attached to a bed frame 11, such as in the corner regions.

**[0074]** Figures 18-21 show examples of the cross-sectional shapes that the first and second members 30 and 32 can have in alternate embodiments. As seen in Figure 18, each of the first and second members 30 and 32 have a modified U-channel shape cross-section wherein the upper horizontal leg is longer than the lower horizontal leg. This modified U-channel shape can be provided to accommodate certain bed frame shapes or configurations, such as bed frames having square-tube frame members. In another embodiment, shown in Figure 19, the first and second members 30 and 32 have a full U-channel shape cross-section with upper and lower horizontal legs of substantially equal length. The horizontal legs of these first and second members 30 and 32 in Figures 18 and 19 extend over the top and bottom portions of the bed frame 11 (Figure 17).

**[0075]** In another embodiment shown in Figure 20, the first and second members 30 and 32 have an inverted L-shaped cross-section. In this embodiment, the horizontal top leg extends over the top surface of the frame 11 and can be attached thereto, either permanently or temporarily as discussed above. In another embodiment shown in Figure 21, the first and second members 30 and 32 have an L-shaped cross-section. In this embodiment, a horizontal bottom leg is positioned adjacent to the bottom surface of a bed frame 11 and is attached thereto, again either permanently or temporarily as discussed above.

**[0076]** Figure 22 is a side elevation view of a bedside support device 100 in accordance with another embodiment of the present invention. The bedside support device 100 includes a mounting region 102 having a base frame 104, a pivot attachment member 106 attached to the base frame, and a securing mechanism 108 attached to the pivot attachment member having substantially the same configuration as the embodiments discussed above. The bedside support device 100 also includes a support bar 110 having a similar shape and configuration of the tubular portion that defines the base region 60

and the handle region 62 as discussed above. In this illustrated embodiment, the support bar includes a plurality of attachment loops 112 fixedly connected to the handle region 62. This embodiment with the loops is particularly well suited for use as rehabilitation equipment for patients/persons that need to undergo physical therapy or otherwise conduct rehabilitation exercises, as discussed in greater detail below.

**[0077]** In the illustrated embodiment, the support bar 110 is manufactured of a rigid tubular material, such as a metal tube or a rigid plastic or composite material. The attachment loops are also rigid members securely fixed to the handle region 62 and extend vertically upward from the handle region. Other attachment loops 112 can be securely attached to the handle portion and extend vertically downwardly (or at other angles) from the handle region 62. In one embodiment, the attachment loops 112 are shaped metal rods welded onto the handle portion 62 of the support bar. In the illustrated embodiments, the attachment loops 112 are configured to attach to rehabilitation exercise devices and to resist lateral and vertical loads applied to them by a patient/person.

**[0078]** In yet another embodiment, support bar 110 can include a corner attachment loop 114 attached in the corner area 64 between the handle region 62 and the base region 60. In yet other embodiments, temporary attachment loops (example shown in phantom lines in Figure 25) can be removably attached to the support bar 110, so as to provide a loop structure on the support bar that can withstand loads applied during use of the bedside support device.

**[0079]** The support bar 110 of the illustrated embodiment of Figure 22 can be configured to releasably lock in selected positions or otherwise prevented from rotation in a particular direction relative to the bed (Figure 23) as discussed above based upon the rehabilitation use or other intended use of the bedside support device 100 of this alternate embodiment.

**[0080]** The illustrated embodiment of the bedside support device 100 has the upper attachment loops 112, the corner loop 114, and the lower attachment loops 112 shown in phantom lines on the bottom of the handle region. In other embodiments, a greater or fewer number of attachment loops or corner loops can be provided on the support bar

110. As an example, a support bar can have only one upper or lower attachment loop 112, or an additional corner loop 114 can be provided that extends upwardly away from the support bar's corner portion 64, essentially opposite the corner loop as illustrated in Figure 22. Other loop configurations and combinations can also be provided in other embodiments. Accordingly, the bedside support device 100 provides a multi-functional system that allows for removable, changeable support bars 110 that can adapt to different users needs, such as rehabilitation needs.

**[0081]** As best seen in Figure 23, the bedside support device 100 of the illustrated embodiment can be used to assist in rehabilitation of a person 70 on the bed 10. In the illustrated embodiment, elastic therapy bands 116 are attached to the attachment loops 112 on the support bar 110. The therapy bands 116 could be attached to the corner loop 114 also. The therapy band 116 is configured so the person 70 can grasp it and pull against the band, for example during rehabilitation exercises.

**[0082]** In the embodiment illustrated in Figure 23, a plurality of bedside support devices 100 are attached to the four corner areas 12 of the bed 10. The bedside support devices 100 are attached in the similar manner as discussed above. The support bars 110 of the illustrated embodiment are in the first position such that the handle region 62 is adjacent to and aligned with the side portion of the bed 10. The support bars 110 can have the free swinging configuration discussed above because the support bars would not move past the first position. Alternatively, the support bars 110 could be temporarily locked in the first position. The support bars 110 can also be removable from the pivot attachment member 106.

**[0083]** As best seen in Figure 24, the bedside support devices 100 of the illustrated embodiment can also be positioned relative to the bed 10 so the handle regions 62 are substantially parallel to the head end and/or foot end of the bed 10. In this embodiment, therapy bands 116 or other members can be secured to the attachment loops 112 or corner loop 114 above the head of the bed and below the foot of the bed. A person 70 can then utilize the therapy bands or other equipment for rehabilitation exercises or other therapy activities as identified by the healthcare professional. The support bars 110 of the illustrated embodiment can be releasably locked in this position adjacent to the head

and/or foot ends of the bed. In another embodiment, the support bars 110 can be configured so as to be free swinging between first and second positions such that the support bar 110 is at the end of a range of motion when parallel to the head or foot of the bed. Therefore, the support bars 110 can be used in a variety of configurations, either releasably locked or a free swinging configuration while providing an anchor structure for the therapy bands or other devices.

**[0084]** These bedside support devices 100 allow a person 70 in the bed to conduct a wide range of rehabilitation exercises without having to move out of the bed. Such rehabilitation exercises can be a critical component of recuperation for a person. The person 70 can be taught a variety of different exercise techniques based on their individual needs as identified by healthcare professionals. In the illustrated embodiment, the support bars 10 can be vertically adjusted relative to the base frame, such as discussed above.

**[0085]** In the detailed description, the bedside support devices 100 as shown in Figures 22-24 are corner-mounted devices. In another embodiment shown in Figures 25 and 26, a bedside support device 130 is configured to attach to the bed frame 11 (Figure 26) along the lateral region 13 between the foot and head ends of the bed. In this alternative embodiment, the support bar 110, attachment loops 112, and corner loops 114 can be substantially the same as discussed above and used in a similar manner. The mounting region 132 of this alternative embodiment, however, has a substantially straight base frame 134 shaped and sized to securely attach along the side of the bed frame 11 (Figure 26).

**[0086]** The base frame 134 of the illustrated embodiment has a plurality of mounting apertures 136 configured to receive fasteners or other mounting mechanisms that engage the bed frame 11 to securely hold the mounting region 132 on the bed frame. In one embodiment, the base frame 134 can be removably attached to the bed frame 11. In another embodiment, the base frame 134 can be permanently fixed onto a bed frame 11. In yet another embodiment, the base frame 134 can be an integral component or a portion of the bed frame 11. A pivot attachment member 138 similar to the pivot attachment members discussed above is mounted to the base frame 134 and configured to receive

the support bar 110, such as described above. In the illustrated embodiment, the base frame 134 can be configured with a similar cross sectional shape as discussed above and shown in Figures 18-21. The base frame 134 can be metal, plastic, composite, or other sufficiently rigid material suitable to anchor the bedside support device 130 to the bed frame 11.

**[0087]** In one embodiment, the bedside support device 130 can be positioned in one of the plurality of locations along the bed frame 11 as may be appropriate for a particular use. In another embodiment, the base frame 134 and/or the pivoting attachment member 138 may be adjustably connectable to the bed frame 11 for lateral positioning of the support bar 110 relative to the bed. In yet another embodiment, the pivoting attachment member 138 may be connected, releasably or permanently to a base frame portion integral to the bed frame 11.

**[0088]** In the embodiment illustrated in Figure 26, the support bar 110 is connectable to the pivoting attachment member 138 and is positionable in one of a plurality of positions relative to the bed 10. In the illustrated embodiment, the support bar 110 can be configured to releasably lock in a rehabilitation position such that the handle region 62 of each support bar extends inwardly and over the upper surface 49 of the bed 10. In this rehabilitation position, therapy bands 116 or other devices can be releasably connected to the attachment loops 112, the corner loop 114, or directly to the grasping portion 63 of the handle region.

**[0089]** In another embodiment, the bedside support device 130 can have a plurality of rehabilitation positions, including a position where the handle region 62 is substantially perpendicular to the edge of the bed 10 and other rehabilitation positions at other angular orientations relative to the edge of the bed. The support bar 110 can also be positioned so that the handle region 62 is adjacent to and aligned with the edge of the bed 10. The support bar 110 can be releasably locked in any one of these positions, such as by providing locking apertures and/or channels 48 as described above to receive the pin 40 of the securing mechanism 46.

**[0090]** In one embodiment, the bedside support devices 130 are configured to be attached to the right and left sides of a bed 10 generally at the point of a person's hip articulation when laying on the bed. The support bars 110, when locked in any one of the rehabilitation positions, can resist forces from, as an example, the therapy bands, or other therapy equipment. The support bars 110 also can resist forces exerted directly to the handle region 62 by the person 70 grasping and pushing or pulling on the handle region 62 of each support bar. Accordingly, the support bars 110 allow a person to perform selected exercises for, as an example, upper and lower body exercises using therapy bands, ropes, pulleys, or other exercises that may be suggested by, as an example, a healthcare professional.

**[0091]** One of the benefits of the bed frame support devices 100 and 130 is they allow the bed to be used as an exercised location and alleviate the need for expensive, inaccessible equipment or specialized exercise rooms for patients. Accordingly, the person 70 can pull on the bands and ropes or other therapy equipment attached to the support bars while staying on the bed to exercise specific gross or fine motor muscle groups. The physical therapist, nurse, or other healthcare professional could then customize an exercise routine for the patient. In this embodiment, all of the support bar 110 can be height adjustable and/or releasably fixable in selected positions. The support bars 110 are releasably retained in the pivoting attachment member 138 but are easily removable. The support bars 110 can be interchangeable with other bars in the same pivoting attachment member as may be suitable for a required locking or free swinging configuration, depending upon the configuration of the support bars base region with the channels and/or locking apertures.

**[0092]** In one embodiment, a rehabilitation system can be provided by combining a plurality of the bedside support devices 100 and bedside support devices 130 that could be attached or attachable to a bed. As an example, a rehabilitation system could include six bedside support devices, four of which are the corner mounted bedside support devices 100 and two of the side-mounted bedside support devices 130. This rehabilitation system allows a facility to configure one or more beds in a plurality of different configurations to accommodate selected rehabilitation exercises or other needs of

patients. Such a rehabilitation system provides for significant flexibility and variability for rehabilitation program for patients having different needs while using all of the same equipment.

**[0093]** The bedside support devices 100 and 130 of the rehabilitation system can also include temporary loop structures that can be removably attached to the support bars 110, such as at the handle regions 62. The temporary removable loop structures can be slipped over the handle regions 62 or otherwise releasably attached to the handle region or the base region 60 to provide additional structure to which equipment, bands, ropes, pulleys, or other structures can be releasably attached for selected activities, such as rehabilitation exercises or the like.

**[0094]** Figure 27A is a side elevation view of a bedside support device 150 in accordance with another embodiment of the present invention. The bedside support device 150 has a mounting region 102, a base frame 104, a pivot attachment member 106 with a securing mechanism 108, and a support bar 110 with substantially the same construction as the embodiments described above, except as described below. In this alternate embodiment, the support bar 110 has one or more handles extending upwardly from the grasping area 63 of the handle region 62. The handles 154 are positioned so that a person can either grip the vertically-oriented handles or the horizontally-oriented grasping area 63 of the handle region 62 as appropriate for the needs and abilities of the person.

**[0095]** The bedside support device 150 can be configured so the support bar is movable between one of a plurality of positions relative to the bed, as best seen in Figures 28 and 29. The support bar 110 of the illustrated embodiment is movable relative to the bed 10 between a first position, wherein the handle region 62 is adjacent and aligned with the side of the bed 10, a second position wherein the handle region projects outwardly away from the bed, such as perpendicular to the side of the bed. The support bar 110 can also be positioned and temporarily restrained in an intermediate position between the first and second positions. In other embodiments, the support bar 110 can be positioned in a number of intermediate positions between the first and second positions relative to the

bed 10. Alternatively, the support bar can be free swinging between the first and second positions as described above.

**[0096]** In the illustrated embodiment, the bedside support device 150 is also configured to allow the support bar to move into temporarily restrained or locked positions at or between the first, second, and intermediate positions. In one embodiment, the support bar 110 and the pivot attachment member 108 are configured in a lift, rotate, and lock configuration. In this lift, rotate, and lock configuration, the support bar 110 can be retained in a substantially locked orientation when each of in the first, second, and intermediate positions. The support bar 110 is released from the locked orientation by slightly lifting the support bar vertically and rotating the handle region 16 relative to the bed. For example, when the support bar 110 is in the first position, the person can lift the handle region 62 so the support bar moves out of the locked orientation and rotate the handle region toward the intermediate position. As the handle region 62 gets to the intermediate position, the support bar drops into another temporarily locked position that prevents additional rotational movement of the handle region 62 relative to the bed. Accordingly, the support bar 110 can be moved from the intermediate position to the second position by lifting the handle region 62 and rotating it to the second position wherein the support bar automatically drops into the locked position (unless the person continues to lift up on and hold the support bar out of the temporarily locked position).

**[0097]** This lift, rotate and lock configuration allows a person 70 to use the support bar 110 to assist in transferring themselves from one location to another, such as between the bed and a chair or a mobile assist device. As an example, a person 70 can be sitting in a chair with the support bar 110 in the second position or the intermediate position, as shown in Figure 28. The person 70 can use the support bar 110 when in the temporarily locked position to assist them in standing from the seated position in the chair. The person 70 can balance or support themselves with assistance from the support bar. The person 70 can then move toward to the bed 10 using the support bar 110 as a stabilizing member by lifting the support bar slightly to unlock and allow rotational movement of the bar toward to the first position. As the person 70 moves the support bar 110 to the first position, the support bar will drop into the locked position.

**[0098]** In the illustrated embodiment, the support bar 110 can rotate between locked positions, but the support bar will react vertical loads during the rotational movement between the first, intermediate, and second positions. Accordingly, the person 70 can push downwardly against the handle region 62 to support themselves as they move and transfer to or away from the bed 10. During the transfer portion, the person 70 can grab either the handles 154 or the grasping region 63. This lift, rotate, and lock configuration can also be used with an embodiment that does not have the handles 154 on the support bar 110.

**[0099]** As best seen in Figure 27B, the pivot attachment member 106 and the base region 60 of the support bar 110 on one embodiment can be configured in a lift, rotate, and lock configuration wherein a pin 160 extends radially outward from the support arm's base region. The pin 160 can be positionable in one of a plurality of vertical positions on the base region 60. In one example, the pin 160 can be a threaded member that screws into one of a plurality of threaded apertures formed in the base region 60. The threaded apertures can be vertically aligned or can be radially offset.

**[00100]** The pin 160 is shaped and positioned to fit into one of a plurality of slots 162 formed in an upper portion of the pivot attachment member 106. When the pin 160 is aligned with a slot 162, the support bar drops so the pin is positioned within the slot. The pin 160 slot 162 work together to prevent rotational movement of the handle region 62 of the support arm 110 when the pin is positioned in a slot. In the illustrated embodiment, three slots 162 are shown that correspond to the first, intermediate and second positions of the handle region 62, as described above. When the handle region 62 of the support bar 110 is lifted by the person, the pin 162 is lifted out of the slot 162, so the handle region can rotate. As the handle region 62 is rotated, the pin 162 moves relative to the pivot attachment member 106, for example, toward another slot.

**[00101]** The pin 160 of the illustrated embodiment is configured to ride over the upper edge of the pivot attachment member 106 before the pin 160 gets to another slot 162. Accordingly, this upper edge of the pivot attachment member 106 allows the support bar 110 to rotate until the pin 160 is an alignment with another one of the slots 162, at which time the pin drops into the slot and is blocked from additional rotational movement. This is

one embodiment of a lift, rotate, and lock configuration. Other embodiments can be provided that allow for the lift, rotate, and lock movement of the support bar 110 as described above.

**[00102]** The support bar 110 allows a person with, as an example, poor balance to stabilize themselves while leaning on the handle region and taking small steps toward or away from the bed 10 as the support bar moves between the locked positions. Therefore, the person 70 can move to and from the bed in an independent manner or without excessive assistance from another person. Such an arrangement helps reduce physical stress on a caregiver by providing a tool that takes the weight of a disabled or weak person off of the caregiver and onto the support bar 110. The bedside support device also increases the independence of the person that may allow for improvement in muscle strength in the upper and lower body. It also may improve range of motion in the fingers, hands, or trunk of the person.

**[00103]** In one embodiment of the bedside support device 150, the height of the handle region 62 may be adjustable relative to the bed surface 49 as discussed above. The handle region 62 may be provided with a grip material, such as a soft, foam grip. Other embodiments can use texturing to provide a gripping surface on the handle region. For example, the gripping region can have a knurled surface or the like. The handles 154 can also be provided with a gripping material, such as foam, texturing, or other selected surface.

**[00104]** Figure 30 is a schematic isometric view of a bed 10 with a bedside support device 200 in accordance with another embodiment of the present invention. Figure 31 is an enlarged isometric view of a portion of a support bar 202 of the bedside support device 200 of Figure 30. In this alternate embodiment, the bedside support device 200 includes a mounting region 203, a base frame 204, and pivot attachment member 206 having a configuration substantially identical to any one of the above described embodiments. The support arm 202 is rotatably and movably connected to the mounting region 203 in substantially the same manner as the embodiments described above. The support arm can be free swinging or releasably lockable in any one of a selected number of positions relative to the bed also as described above.

**[00105]** The support arm 202 of the illustrated embodiment has a contoured handle region 208 that is provided with an ergonomic contour that allows a person, such as a disabled or injured person to engage and hold onto the support bar. In the illustrated embodiment, the contoured handle region 208 includes a contoured bend that allows a user laying on the bed to grasp or hook onto the contoured handle region with, as an example, his/her arm at the elbow area, as shown in Figure 31. The contoured portion 210 of the handle region can have any one of a plurality of contoured shapes as may be ergonomically desirable for particular intended needs of patients or other users. In the illustrated embodiment, the contoured portion 210 provides a curvature that curves inwardly toward the bed so as to shorten the distance a patient must reach before engaging the contoured handle region 208. Accordingly, the contoured handle region 208 of the support arm 202 allows people with physical conditions that restrict the length of their reach to be able to grasp or engage the support arm 202 and assist themselves in moving about in the bed 10.

**[00106]** The contoured handle region 208 of the illustrated embodiment can be provided with a soft foam cover material that allows for a comfortable grasping area. In other embodiments, the contoured handle region 208 can have other gripping features, such as a knurled or other textured surface. Alternatively, the contoured handle region 208 can be a smooth and polished region, depending upon the needs and intended use of the bedside support device 200. In one embodiment, the contoured handle region 208, including the contoured portion 210, is substantially horizontal relative to the bed. In another embodiment, the contoured handle region 208 can have some vertically displaced portions so as to provide a three-dimensional contoured configuration on the handle region.

**[00107]** Figures 32 and 33 are isometric views of a bedside support device 250 attached to a bed 10 in accordance with another embodiment of the present invention. In the illustrated embodiment, the bedside support device 250 includes a mounting region 102, a base frame 104, and a pivot attachment member 106 with a securing mechanism 108 having a configuration substantially the same as identified in the above embodiments except as described below. In this alternate embodiment, a support bar 260 is removably

connected to the pivot attachment member 106 and is vertically adjustable relative to the bed 10. The support bar 260 in this embodiment is not free swinging. Instead, the support bar 260 is releasably lockable in a plurality of vertical positions relative to the bed and restricted from rotational movement. The support bar 260 is also movable between a stowed position (Figure 32) and a raised position (Figure 33). The handle region 62 of the support bar 260 in this embodiment remains in the same angular orientation relative to the bed when in the stowed position and the raised, position. Accordingly, the support arm 260 can be positioned in the stowed position below the upper surface 49 of the bed 10 so as to be out of the way and not provide an obstruction to the person 70 in the bed 10. It is to be noted that the illustrated embodiment is configured for use by persons having mobility problems or difficulties, but not be persons who are cognitively impaired.

**[00108]** In the raised position, the person 70 can grasp the handle region 62 of the support bar 260 to assist in moving themselves about in bed. In the illustrated embodiment, the bedside support devices 250 are positioned at the corners of the bed. The bedside support devices 250 can be provided at either the head of the bed or the foot of the bed with the handle regions 62 positioned substantially parallel to the side of the bed. The support bar 260 when in the raised position (and restricted from rotational movement) allows a person, such as a disabled person, to move about in bed and even sit up at the edge of the bed with his or her legs under the handle region. Accordingly, the support arm 260 does not block the person from moving to the seated position. The locked feature of the support arm 260 when in the raised position allows the person 70, such as someone with poor balance from weakness, injury, orientation, or other reasons, to use the support bar to maintain themselves in a seated position. The person 70 can apply vertical and lateral loads against the locked support arm so as to help retain themselves in the desired position, such as the seated position. In such a position, the person 70 may be able to independently (i.e., with assistance from a care giver) move in the bed 10 to the seated position, lean against the support bar 260, and perhaps draw a food tray or table up to the bed during meal time.

**[00109]** In one embodiment the bedside support device 250 are attached to the corners of the bed frame 11 at the foot end of the bed 10. This positioning of the bedside

support device 250 with the handle region 62 extending forwardly and parallel to the lateral side of the bed allows a person 70 to retain themselves in a seated position on the bed's edge and also allows them to move themselves as far up along the bed as needed to assist in lying down in an optimum position near the head of the bed. The support bar 260 in this embodiment does not provide a physical or visual obstruction near the head of the bed. Accordingly, the support bar provides a structure that allows the person to move about in bed. The support bar 260 is also configured such that the user can move around the handle region 62 of the support bar, such as when the user wants to stand up from a seated position on the bed. The person can then use the locked support bar 26 for stabilizing themselves, so the person can lean on the bar for safety while near the edge of the bed. The position of the handle region 62 relative to the bed surface could also be controlled by articulating the bed to raise or lower portions of the bed relative to the bedside support device. In yet another embodiment, the bedside support device can be attached to a portion of the bed, so the bedside support device moves with the moving portion of the bed frame (e.g., at the head end or the foot end) as the bed is raised, lowered, or articulated.

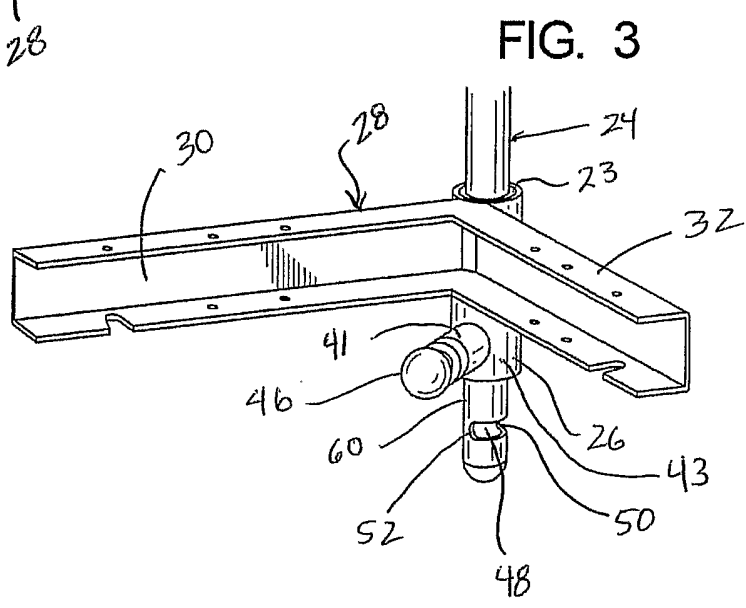
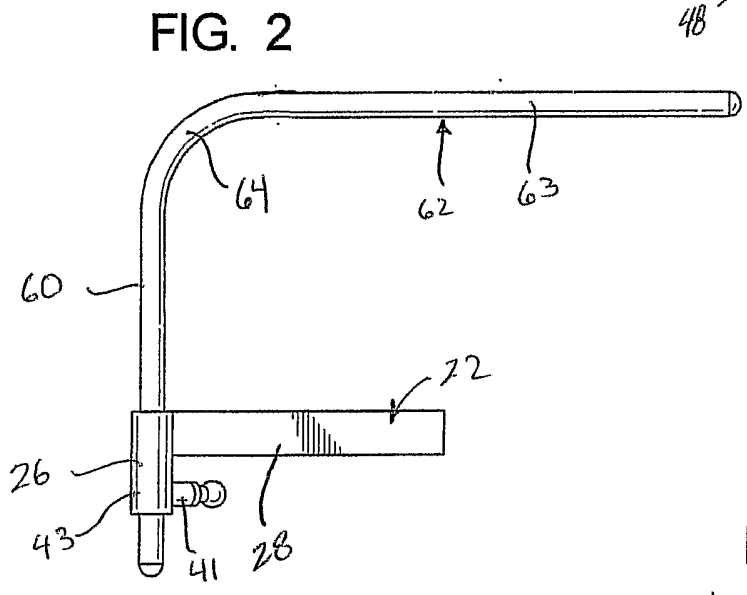
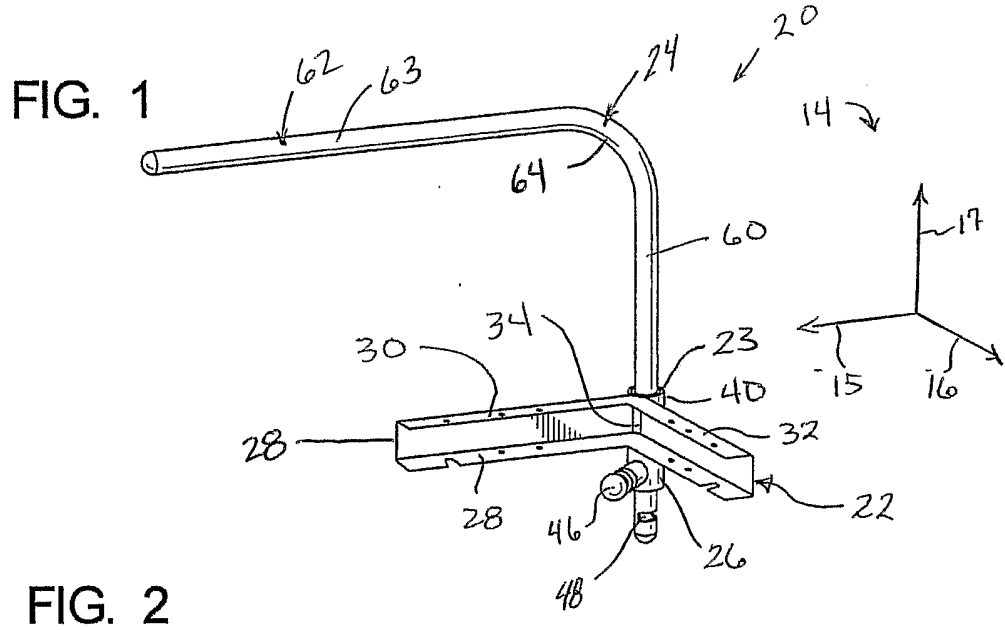
**[00110]** As an example, the mounting regions can be attached to the corners or side of a bed frame that moves between a tilted upward position, such as a seated position, and a fully reclined, horizontal position. Accordingly, the bedside support device moves with the bed frame.

**[00111]** From the foregoing it will be appreciated that, although specific embodiments of the invention have been described herein for purposes of illustration, various modifications may be made without deviating from the spirit and scope of the invention. Accordingly, the invention is not limited except as by the appended claims.

## CLAIMS

I claim:

- [c1] 1. A bedside support device attachable to a bed assembly, comprising:
- a mounting member attachable to the bed assembly;
  - a support bar attached to the mounting member, the support bar having a base portion rotatably mounted to the mounting member and being moveable relative to the mounting member between first and second positions, the support bar having a handle portion attached to the base portion and being moveable in a plane relative to the bed assembly as the base portion moves between the first and second positions; and
  - a locking mechanism couplable to the support bar to releasably lock the support bar in one or more intermediate positions between the first and second positions.



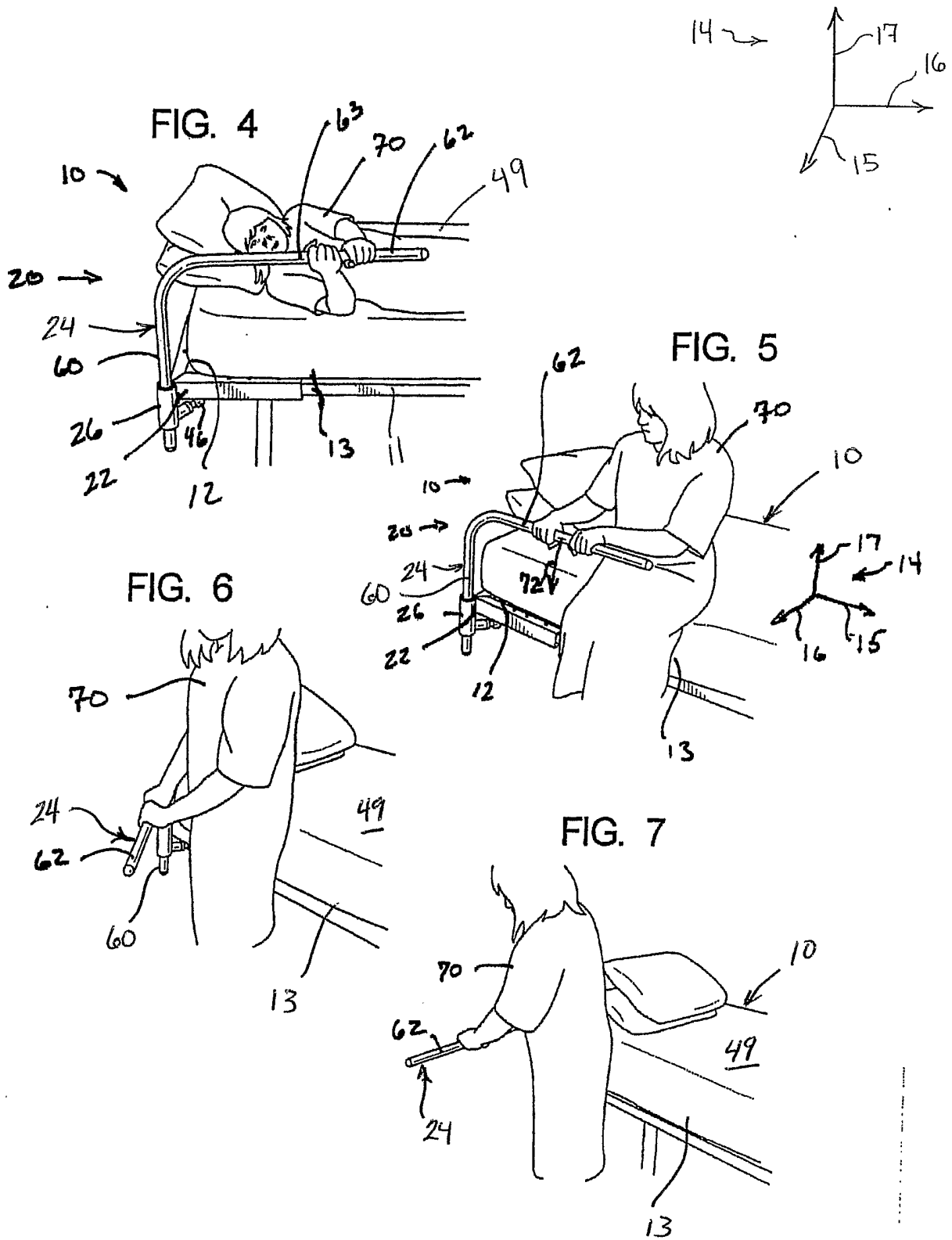
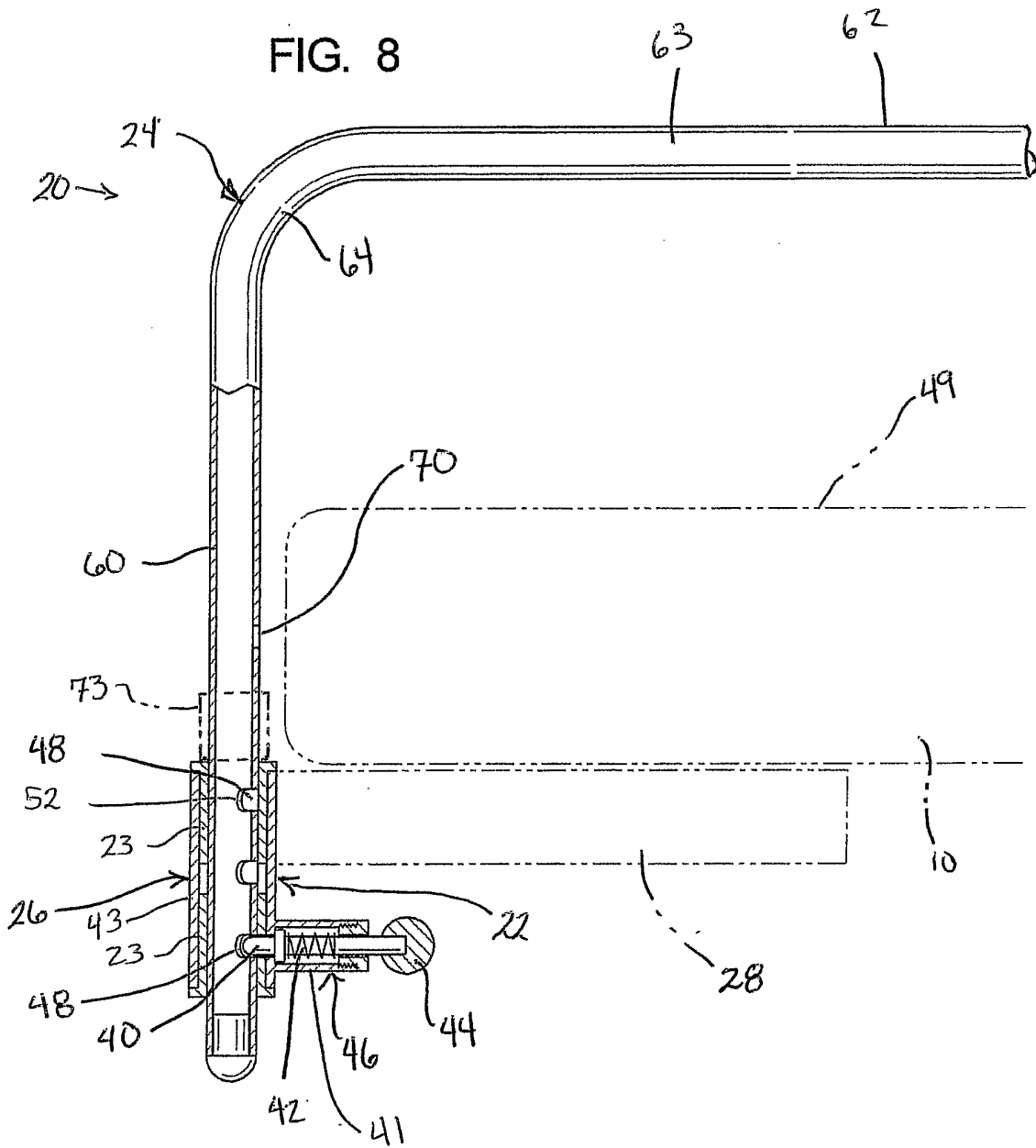


FIG. 8





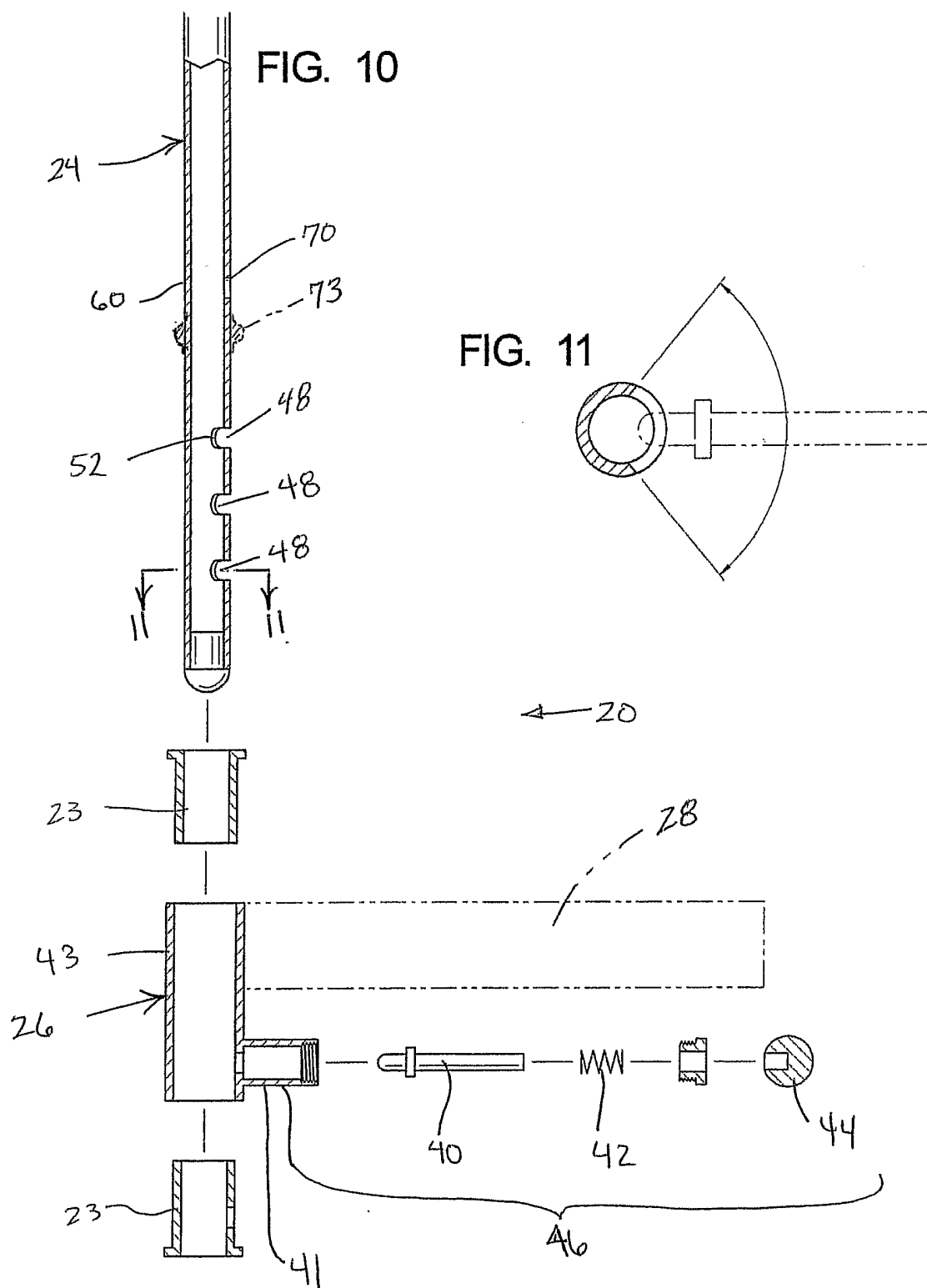


FIG. 12

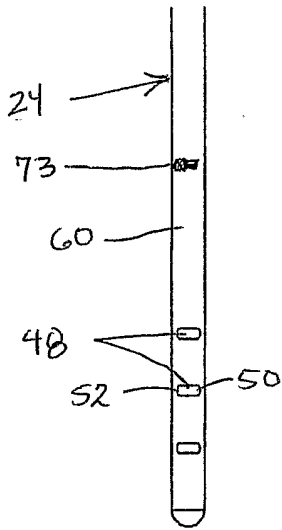


FIG. 13

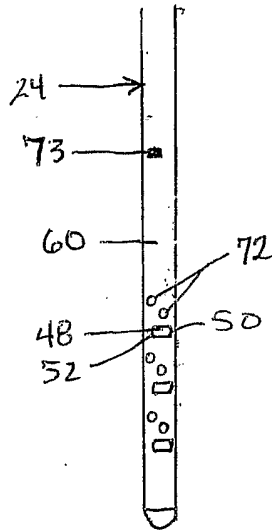


FIG. 14

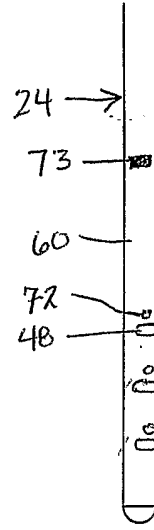


FIG. 15

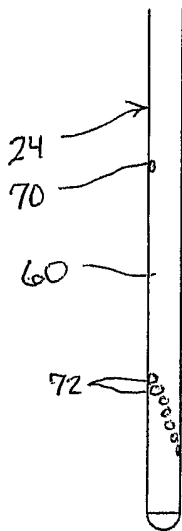
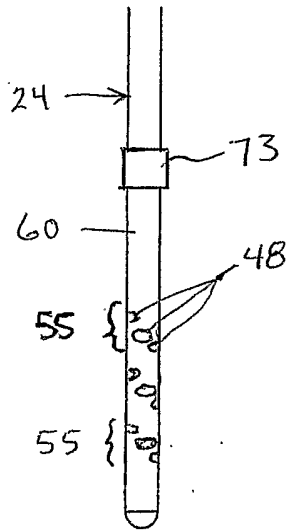


FIG. 16



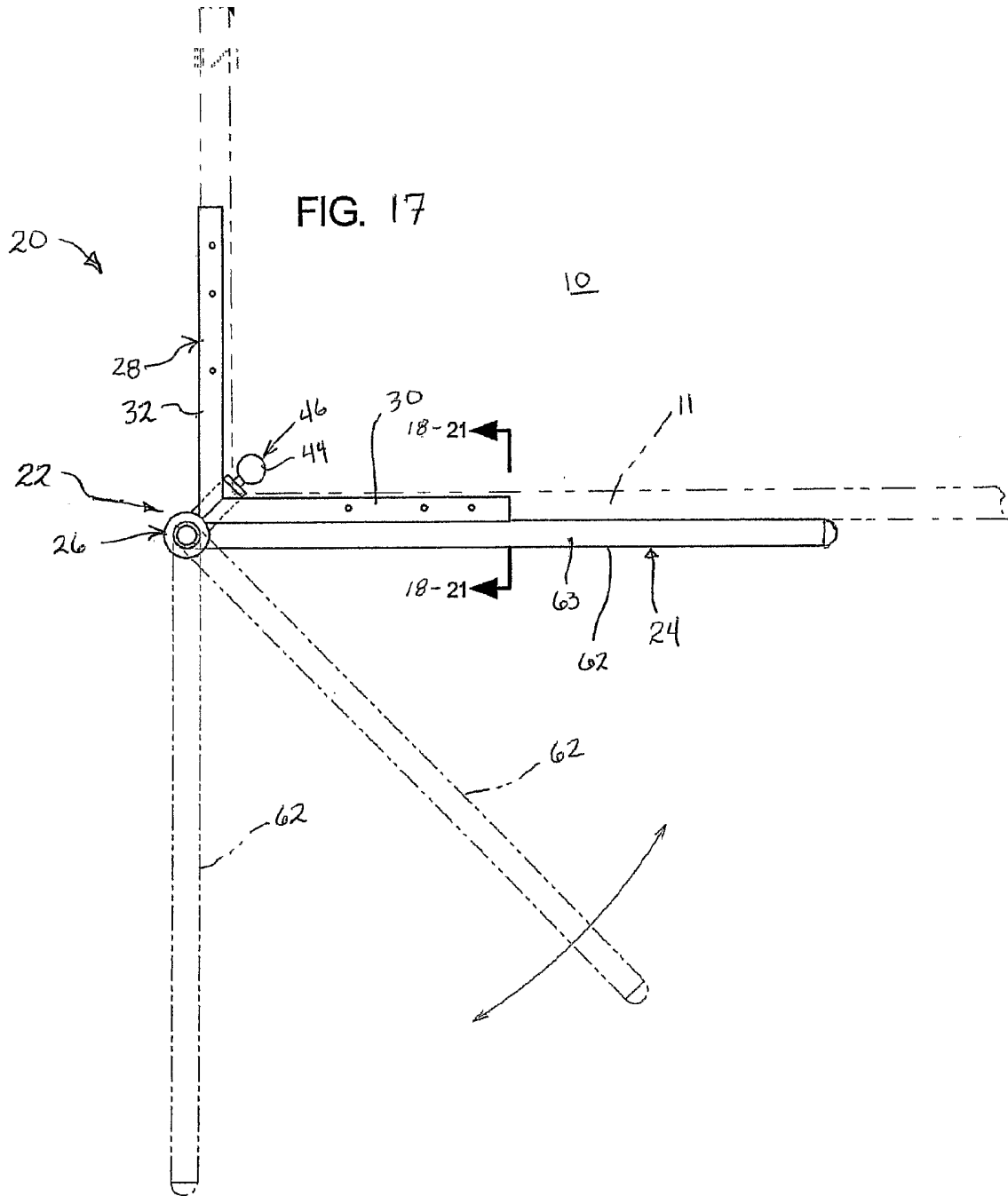
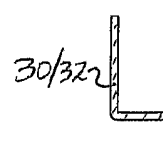
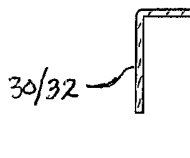
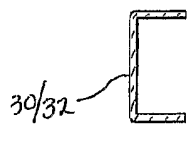
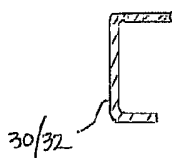


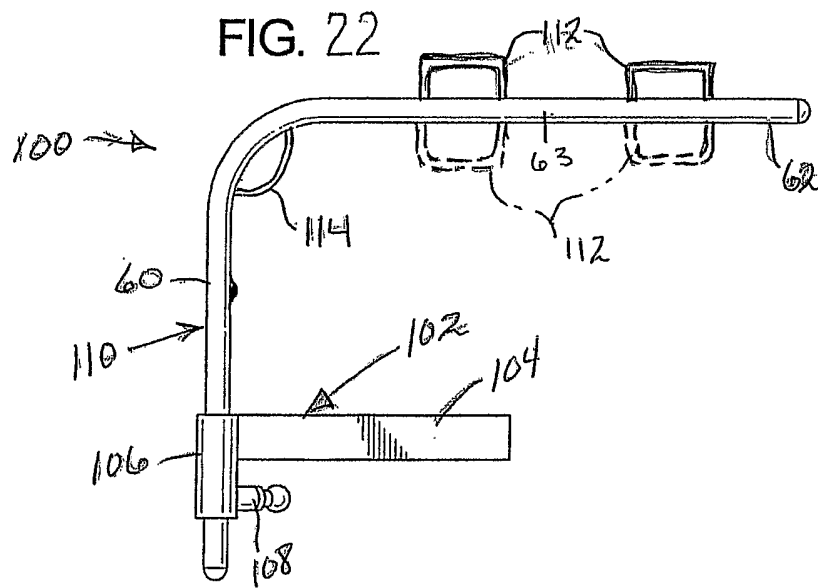
FIG. 18

FIG. 19

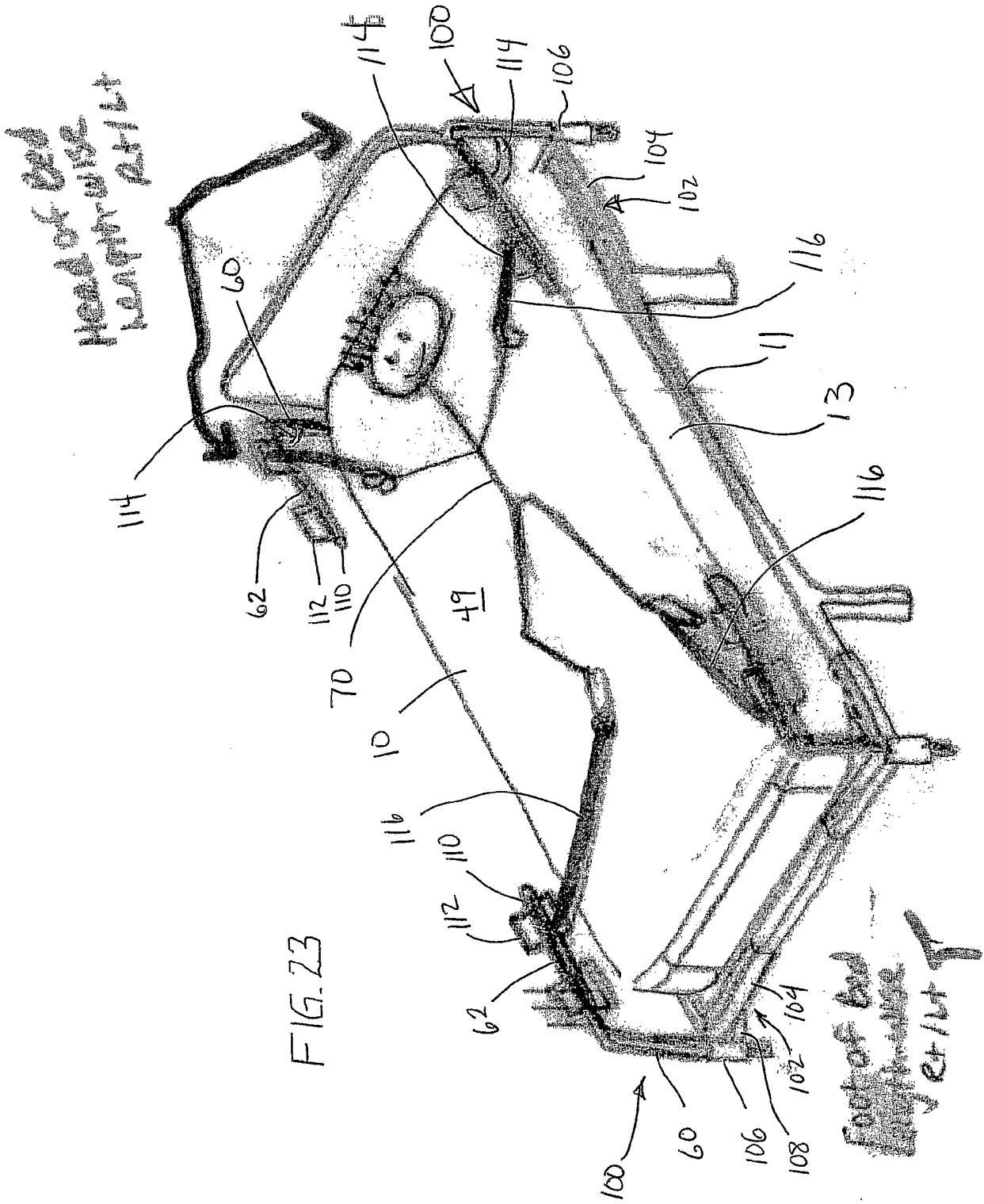
FIG. 20

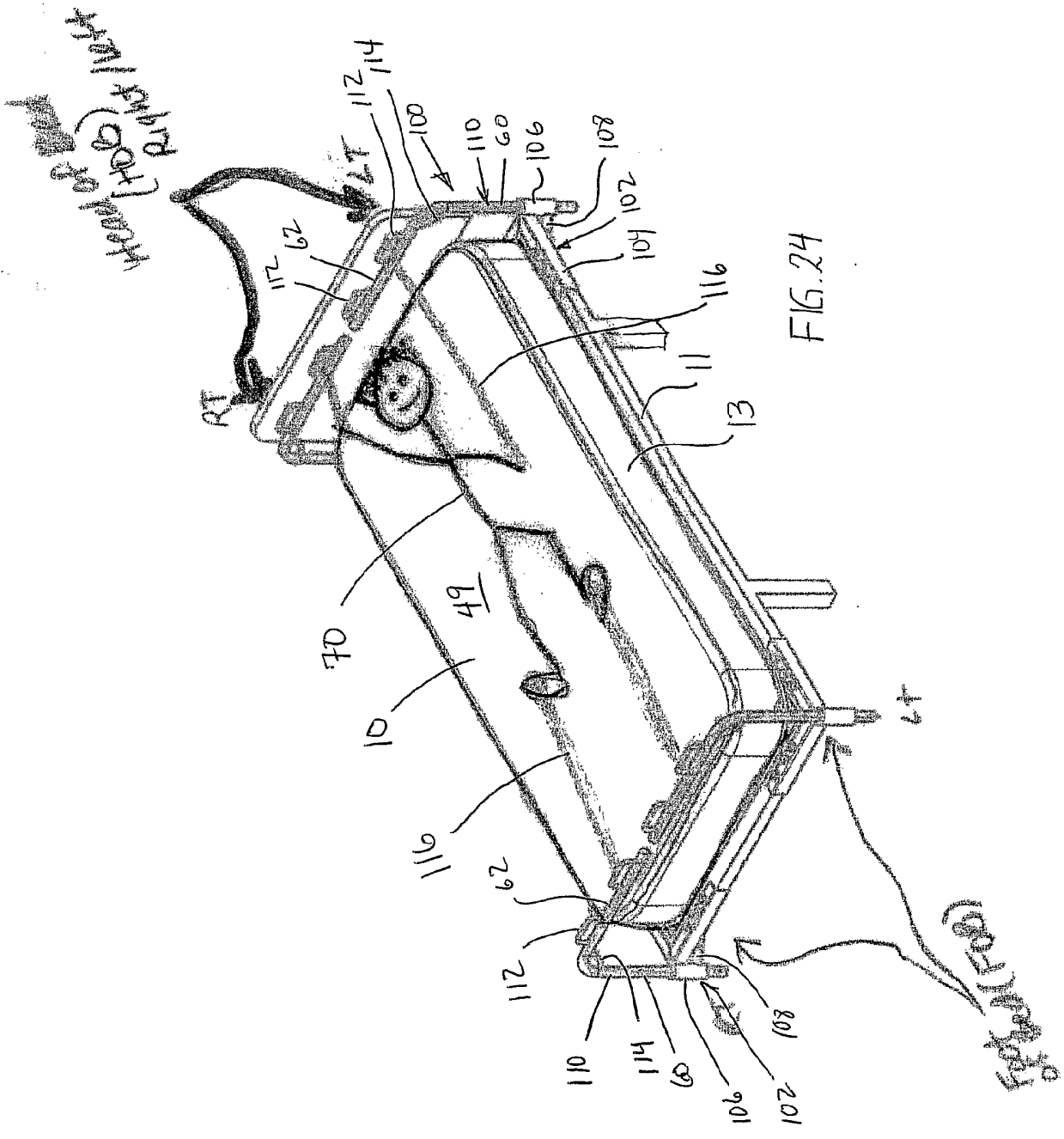
FIG. 21

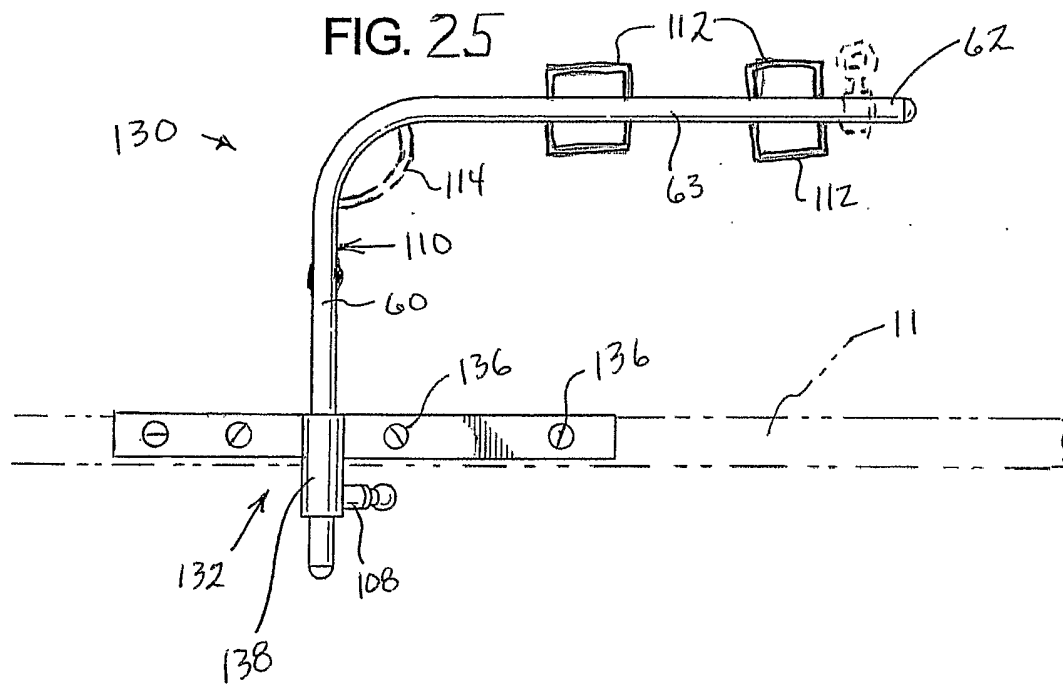




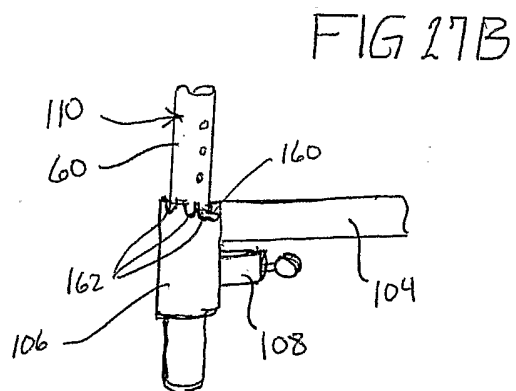
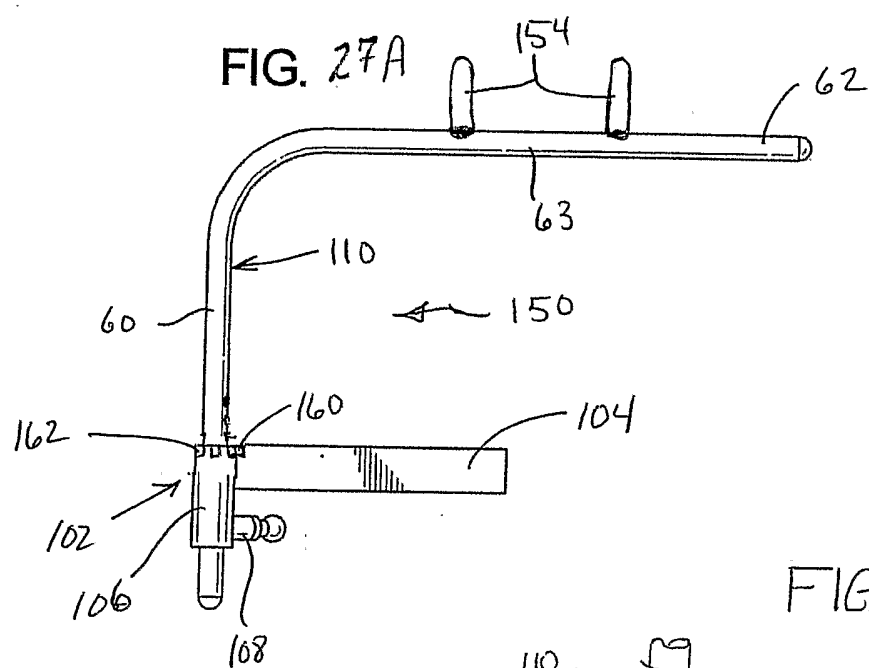
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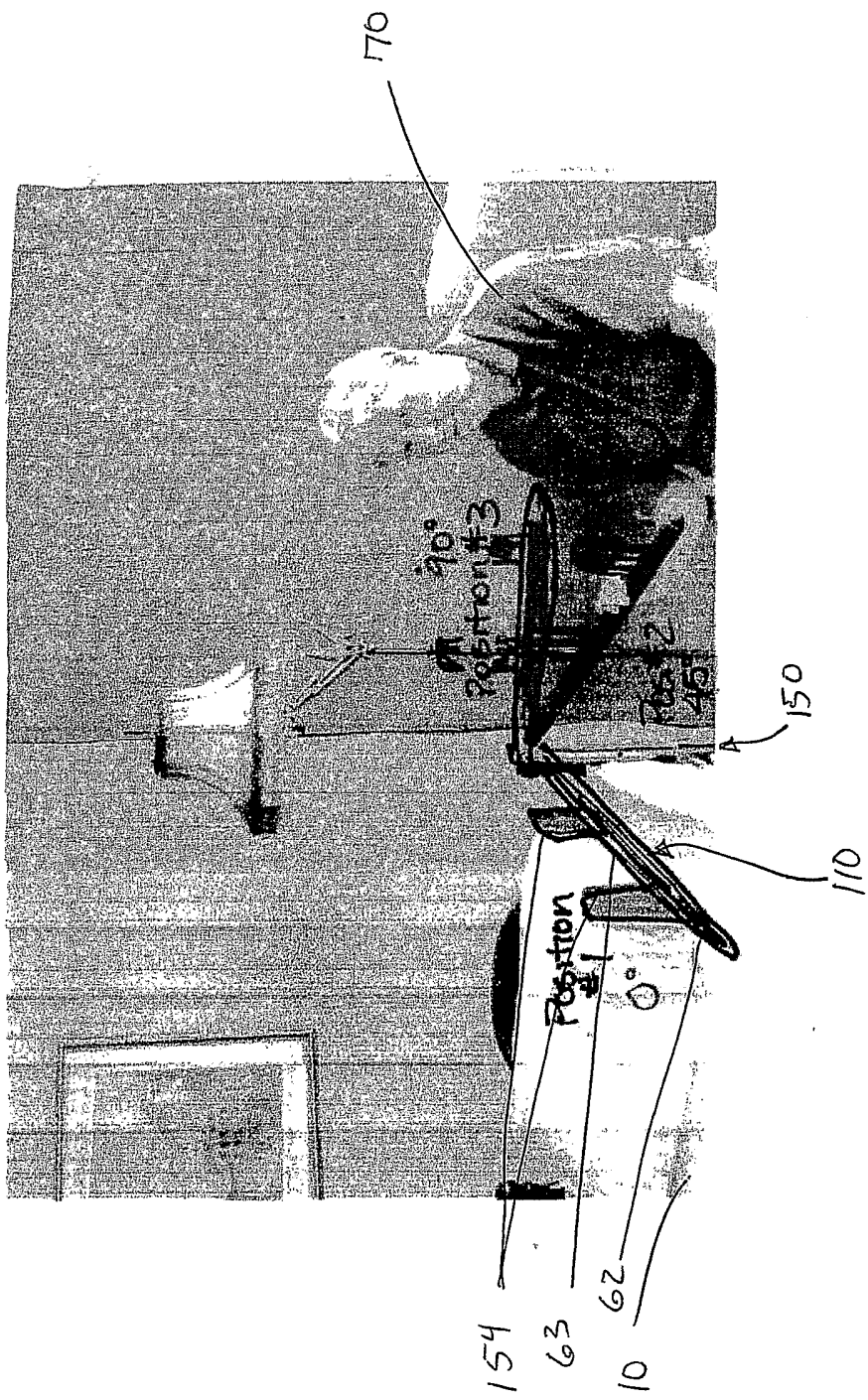


FIG. 28

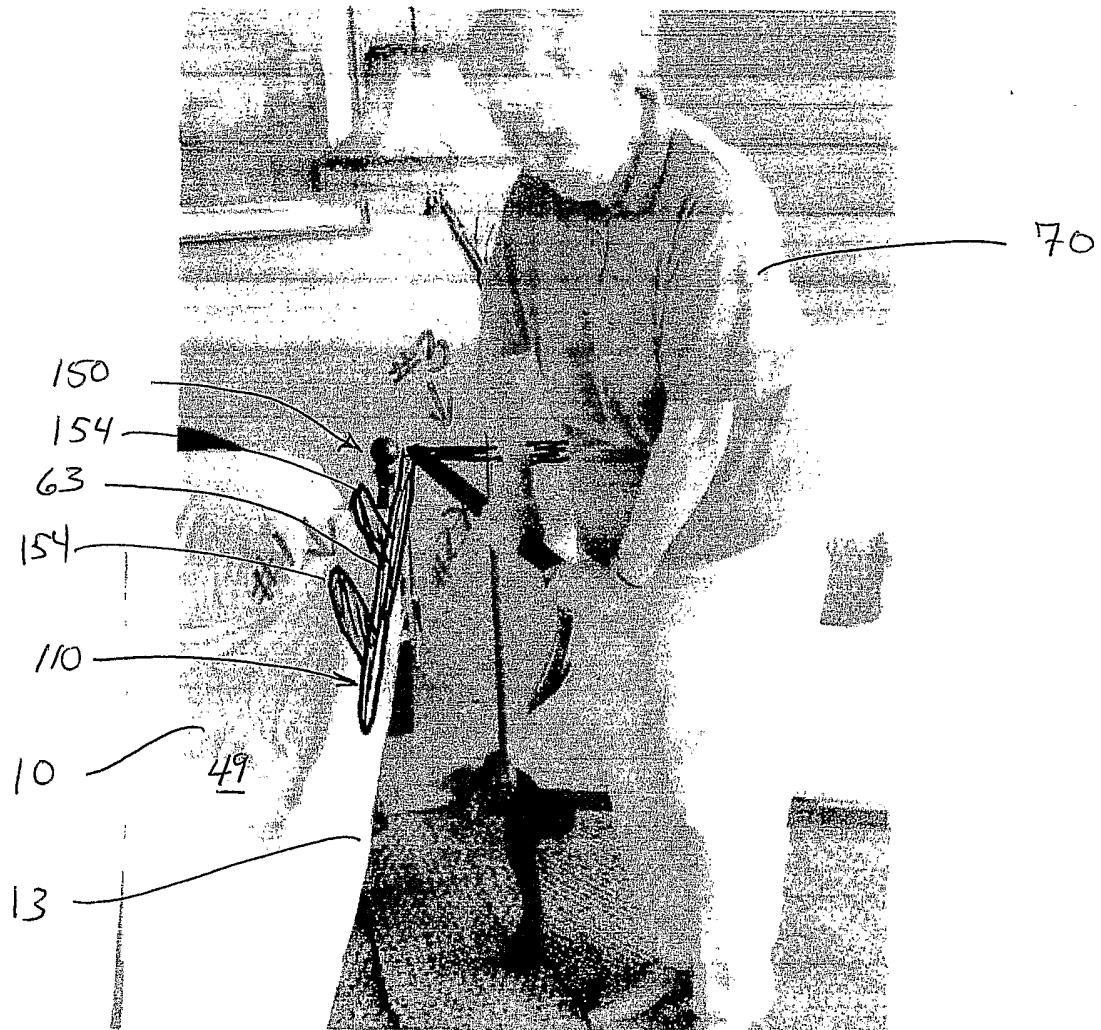


FIG. 29

