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Pedestal end for patients bed

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(56) Related Art
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ABSTRACT

A hollow pedestal bed end for a rise and fall patient's bed is made of reduced width to fold over the mattress frame and pass through a door opening. The inner faces of the paired bed ends each have a slot through which a mattress frame bracket projects. A wheeled carriage inside the bed end rides on an upright guide and the bracket projects from the guide. The rise and fall motion is supplied by a linear actuator whose small movements are multiplied by a third order lever. The frame is thus lifted by a pair of such pedestal ends.

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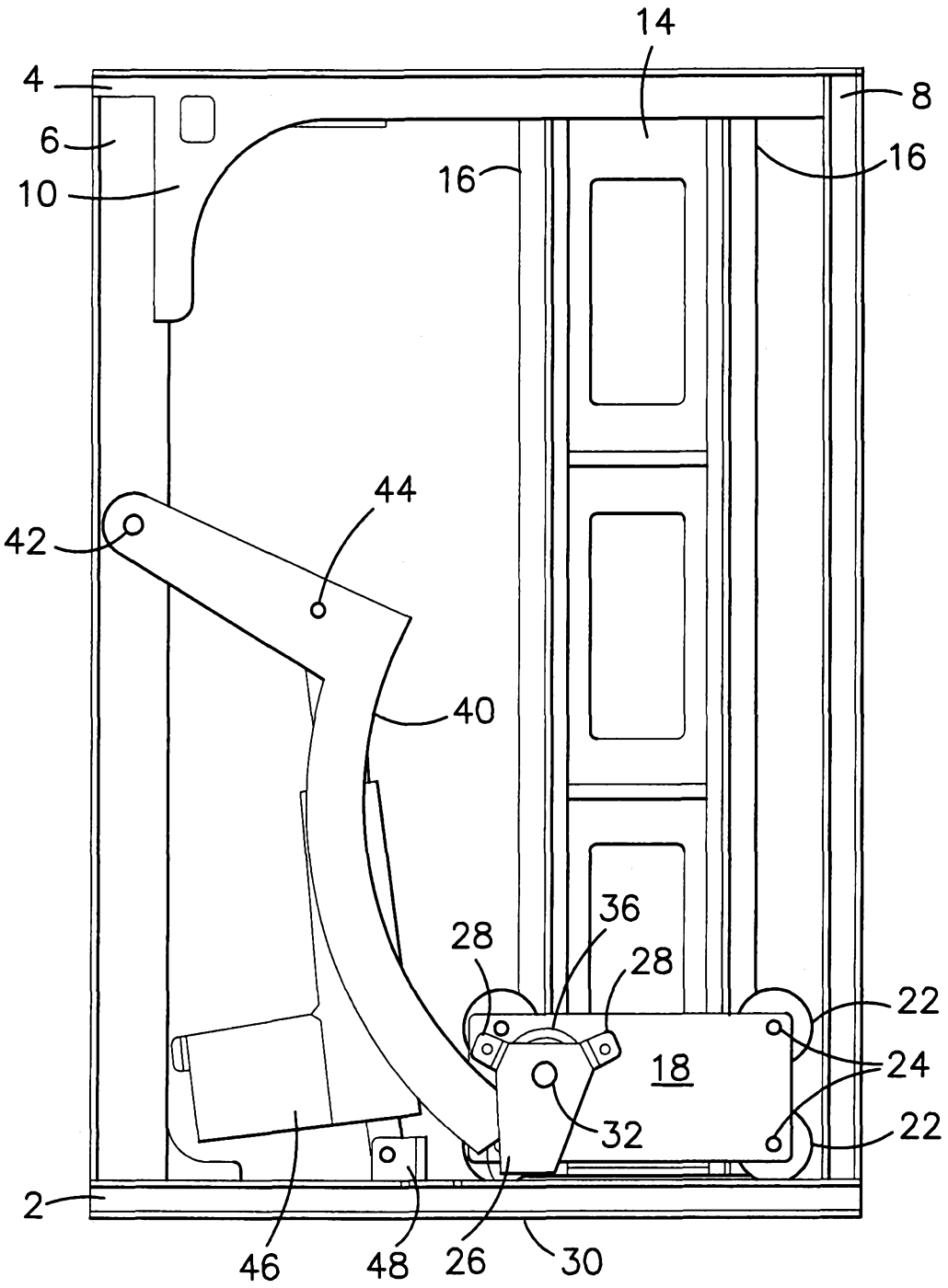


FIGURE 1

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Regulation 3.2

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COMPLETE SPECIFICATION

FOR A STANDARD PATENT

(ORIGINAL)

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Invention Title: **PEDESTAL END FOR PATIENTS BED**

Details of Associated Provisional Application(s): No(s):
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The following statement is a full description of this invention, including the best method of performing it known to us:

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TITLE: PEDESTAL END FOR PATIENTS BED

FIELD OF THE INVENTION

This invention concerns patients beds used in nursing establishments and old peoples homes.

BACKGROUND OF THE INVENTION

Such beds have a rise and fall facility and frequently also have a folding facility so that

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the patient can be given inclined back support or lie in a position with the head higher than the feet.

The rise and fall motion is commonly provided by actuators which rely on a telescopic unit powered by screw and nut mechanism. Linak A/S of Denmark supply such linear actuators.

In our Patent No. 2002301101 we describe rise and fall patients beds in which a wheeled carriage has a pair of lugs which project through a pair of slots in the front face of a generally planar bed head enclosed in sheet steel. Such carriages descend almost to the floor level and have an electrically driven screw which raises and lowers the carriage. The carriage rises to care height, namely the level at which it is comfortable for staff to handle a patient without stooping. While being reliable and constructionally stable, the bed ends are as wide as the mattress frame, namely 900mm and 1000mm high. Thus passage through doors is only possible if the ends are detached from the mattress frame so that the mattress can be turned on its side. The mechanism tends to be noisy and slow taking 40-50 seconds to execute the full range of movement.

SUMMARY OF THE INVENTION

In its broadest aspect the invention provides a bed pedestal for a rise and fall patients bed, comprising a body, upright guides in the body which extend from floor level to care height, a mattress frame support with means to attach the support to a mattress frame which is moveable in the guides, a lever pivoted to the body alongside the guides which applies force to lift the frame support, an actuator connected between the lever and the body such that the lever multiplies the actuator motion to exert the required range of rise and fall from floor level to care height.

More particularly, the inventions apparatus aspect provides a bed end for a rise and fall patients bed, comprising a body, upright guides in the body which extend from floor level to care height, a mattress frame support with means to attach the support to a mattress frame which is moveable in the guides, a lever pivoted to the body alongside the guides which applies to lift the frame support, an actuator connected between the lever and the body such that the lever multiplies the actuator motion to exert the required range of rise

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and fall.

The mattress frame support may be a carriage with pairs of wheels. The wheels may be of V-section. Flanged wheels are also useful.

The upright guides may be a pair of mutually parallel tracks which extend between upper and lower horizontal structural members of the body.

The mattress frame support may project through an upright slot in the body of the bed pedestal. The slot may lie at or near the central vertical axis of the bed end.

The frame support may have a plate projecting through the slot at 90° to the plane of the body. The plate may have bolt holes for connection to brackets fixed to the end of the mattress support frame.

The lever may be part of a third order system. The lever may be arcuate in shape and free to roll under a rotatable follower extending from the carriage. The lever may be shaped to impose a relatively constant load on the actuator as the lever tilts from a floor position to a maximum height position.

The actuator may be hydraulic, pneumatic or screw driven. Actuators in which an electrically driven screw drives a nut inside a telescoping tube are convenient for this purpose.

The lever may have a straight leg with a pivot at one end and a C-shaped leg extension at the opposite end. This shape imposes minimal side thrust on the carriage as the lever raises the carriage. The lever may be mounted on a stile fixed parallel to the guides between the upper and lower horizontal structural parts of the body. The arrangement of the lifting mechanism side by side with the guides and carriage permits the body of the bed end to be narrower than the bed ends of the prior art.

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BRIEF DESCRIPTION OF THE DRAWINGS

One embodiment of the invention is now described with reference to the accompanying drawings, in which:

Figure 1 is a front view of the lifting mechanism with the sheet metal cover removed.

Figure 2 is a perspective of Figure 3.

Figure 3 is a perspective of the pedestal before wheels are attached.

Figure 4 is a side view of the pedestals with one partially disconnected from the mattress frame showing how the pedestals may tilt parallel to allow passage through a doorway.

Figure 5 is a sectional plan showing the way in which the sheet metal covers and door enclose the pedestal.

DETAILED DESCRIPTION WITH RESPECT TO THE DRAWINGS

Referring to Figures 1-3, the pedestal frame is made from a rectangular section base tube 2, a top channel section rail 4 supported by a channel section pivot stile 6 and a rectangular section stile 8. Pivot stile 6 has a gusset 10. A pair of inclined outriggers 12 extend from the two stiles and the lower ends act as sockets for the reception of castor wheels (not shown). The welded rectangular steel frame components are made of 3mm sheet steel. The frame is 520mmW x 743mm H.

A carriage guide 14 lies off-centre and consists of an upstanding sheet of 3mm steel with two sides 16 bent to form a V-section edge. The guide lies inside the upper top channel section rail and is welded to the top and bottom rails. The carriage 18 is an 8mm plate which acts as a lift wheel support and bent at 90° to form a projecting mattress frame support bracket 20 (see Figure 3).

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Four V-section wheels 22 revolve on axles 24 projecting from the corners of the plate. The wheels 22 ride up and down the guides and rest on the base tube rail 2 when the mattress frame is in the floor position, namely the lowest extent of its travel.

The outer face of the carrier plate 18 carries a triangular bearing plate 26 spaced from the carrier plate by brackets 28 and foot 30. Stub axle 32 spans the gap between the parallel plates and lies alongside the guide closest to the pedestal centre. Stub axle 32 carries grooved wheel 36 and lies in the path of steel arm 38 which is pivoted 445mm up pivot stile 6. Arm 38 has a straight portion and a curved portion 40 which is concave with respect to grooved lift wheel 36 and terminates just beyond it. The arm pivot 42 in the pivot stile is 281.5mm from the centre of the grooved wheel 36.

The arm 38 has a thrust pin 44 lying 140mm from the pivot pin 42 close to the confluence of the straight portion and the curved position. An electrically driven LINAK® screw actuator 46 is pivotally mounted on bracket 48 fixed to base tube 2 between the carriage and the pivot stile 6. The thrust arm applies force to the arm which underlies grooved wheel 36 and when the actuator elongates wheel 36 rotates and carriage 18 rises.

The arrangement is a third order lever, the actuator pivot being laterally displaced 200mm from the stile pivot 42.

Mechanical advantage is not as important as compactness of the mechanism and initially the actuator draws four amps falling to two amps as the carriage reaches the working height of the mattress frame, namely 500mm.

Referring now to Figure 4, the bracket 20 has a pair of bolt holes at 60mm centres which allows connection to the pair of brackets 50 projecting from the end of the mattress frame 52.

Referring now to Figure 5, the pedestal frame is enclosed by sheet steel covers 60 which embrace the sides of the frame and extending around the inner face where together they define a central slot 62 (see Figure 4). The purpose of the slot which extends the full

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height of the pedestal (743mm) is to allow the mattress frame bracket 20 to protrude and be accessible for bolting to the mattress frame.

The covers wrap the sides of the frame and extend to the opposite face of the pedestal which is closed by removable access panel 64. This allows servicing of the working parts. The top of the frame is covered by a polished timber batten 66. Outriggers 12 are secured to the stiles by bolts.

We have found the advantages of the above embodiment to be:

1. Reduction in size means that the pedestal width plus wheels stays within the 900mm width of the mattress frame.

2. The folding of the bed ends on to the face of the mattress and frame allows the bed to be turned on its side as a unit and, if placed on a furniture skate, can be wheeled through doors.

3. Quietness and speed of operation. The mattress frame moves from floor to maximum height in 20-30 seconds.

It is to be understood that the word "comprising" as used throughout the specification is to be interpreted in its inclusive form, ie. use of the word "comprising" does not exclude the addition of other elements.

It is to be understood that various modifications of and/or additions to the invention can be made without departing from the basic nature of the invention. These modifications and/or additions are therefore considered to fall within the scope of the invention.

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CLAIMS

1. A bed pedestal for a rise and fall patients bed, comprising a body, upright guides in the body which extend from floor level to care height, a mattress frame support with means to attach the support to a mattress frame which is moveable in the guides, a lever pivoted to the body alongside the guides which applies force to lift the frame support, an actuator connected between the lever and the body such that the lever multiplies the actuator motion to exert the required range of rise and fall from floor level to care height.

2. A bed pedestal as claimed in Claim 1, wherein the mattress frame support is a carriage with pairs of wheels.

3. A bed pedestal as claimed in Claim 1 or 2, wherein the upright guides are a pair of mutually parallel tracks which extend between upper and lower horizontal structural parts of the body.

4. A bed pedestal as claimed in any one of Claims 1-3, wherein the attachment means is a projection which extends from the carriage and projects through an upright slot in the body of the bed pedestal.

5. A bed pedestal as claimed in Claim 4, wherein the projection is a bracket projecting through the slot at 90° to the plane of the body for attachment to the mattress frame.

6. A bed pedestal as claimed in Claim 4 or 5, wherein the slot lies at or near the central vertical axis of the body.

7. A bed pedestal as claimed in any one of Claims 3-6, wherein the upright guides are parallel inturned edges of an upright plate, the edges being of V-section which act as tracks for V-section carriage wheels.

8. A bed pedestal as claimed in any one of Claims 1-7, wherein the lever is part of a third

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order lever system.

9. A bed pedestal as claimed in Claim 8, wherein the lever has a straight leg with a pivot at one end and a C-shaped leg extension at the opposite end.

10. A bed pedestal as claimed in Claim 8 or 9, wherein the lever is mounted on a stile fixed parallel to the guides between the upper and lower horizontal structural parts of the body.

11. A bed having at each end a bed pedestal as claimed in any one of Claims 1-10.

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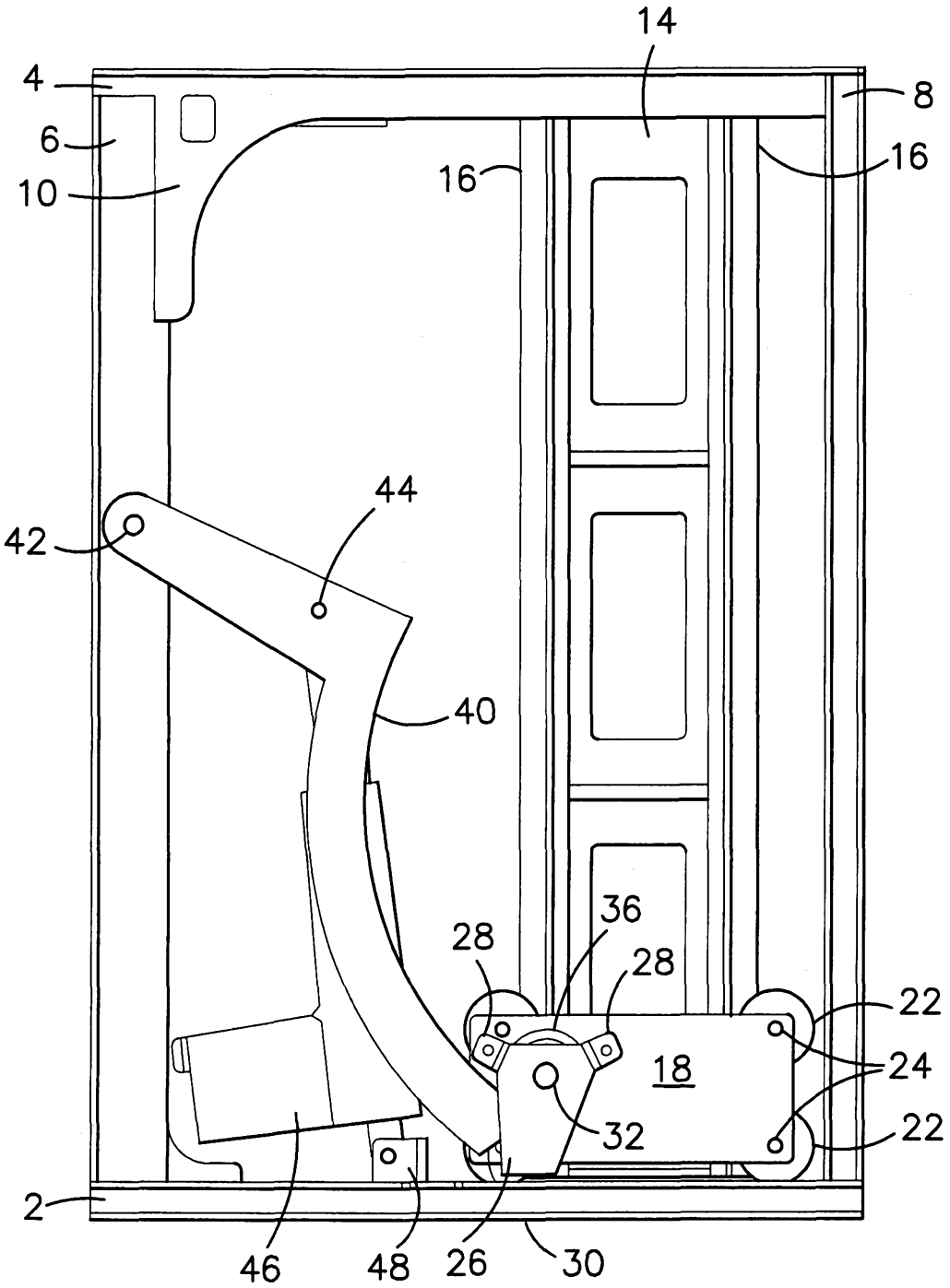


FIGURE 1

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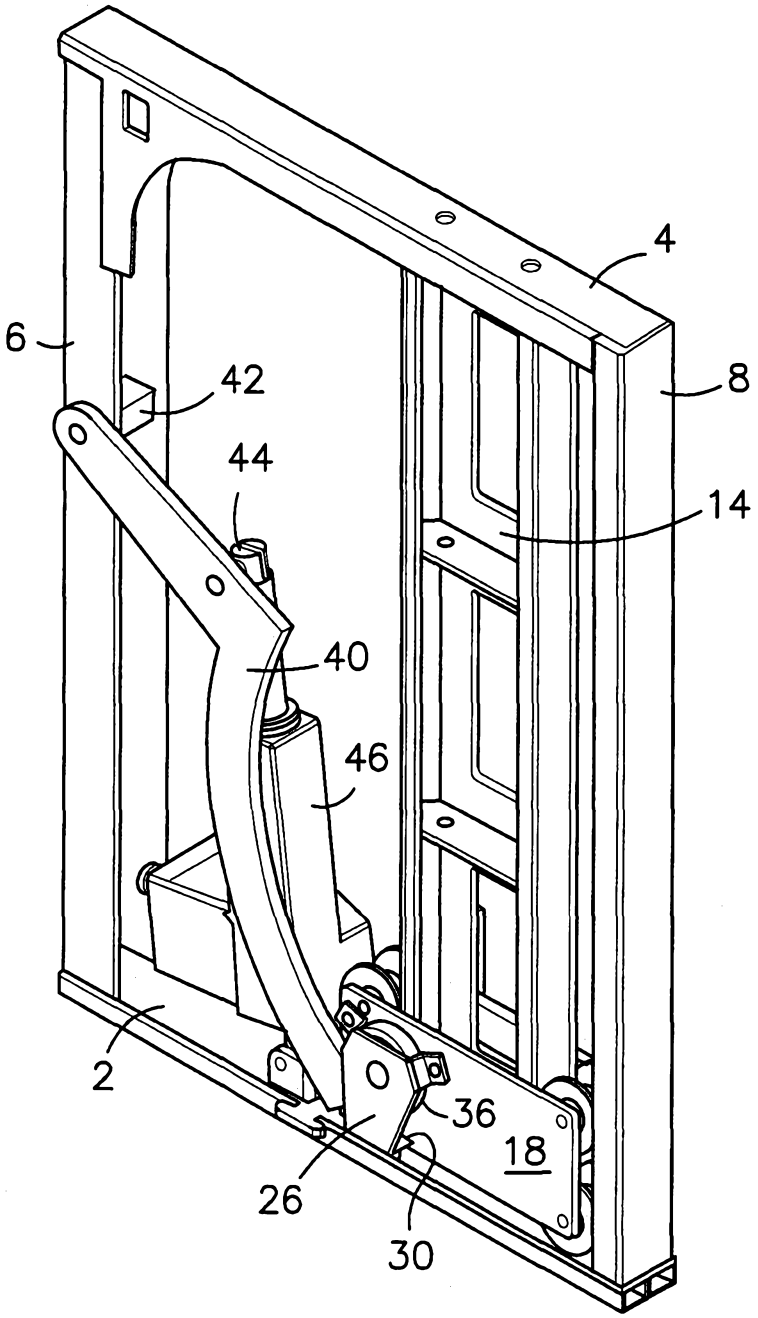


FIGURE 2

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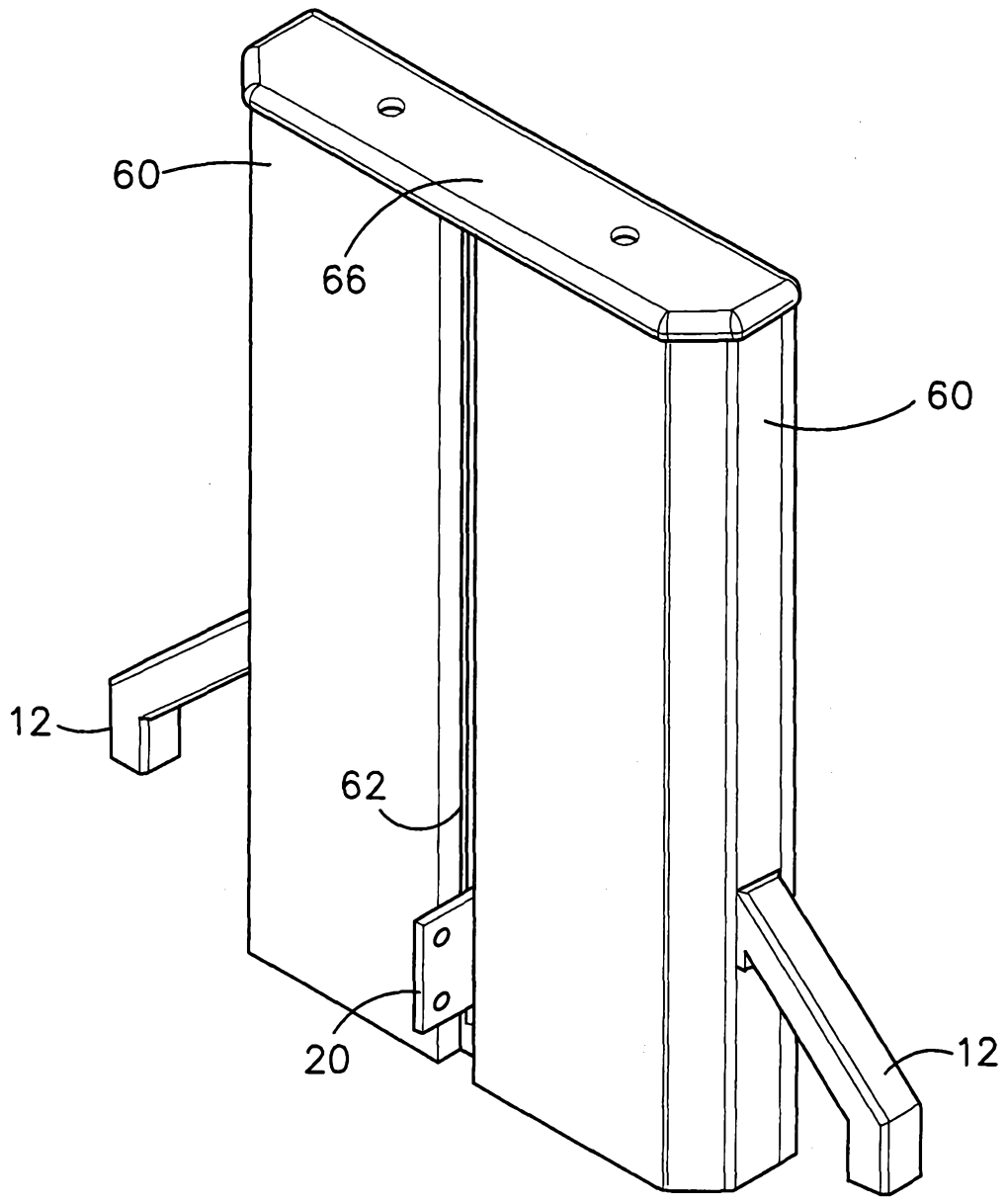


FIGURE 3

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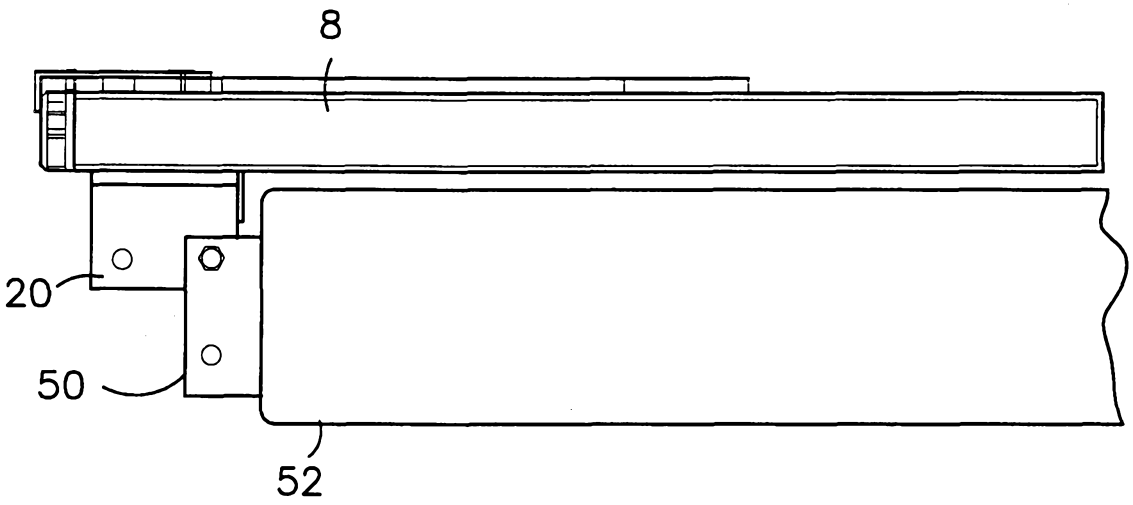


FIGURE 4

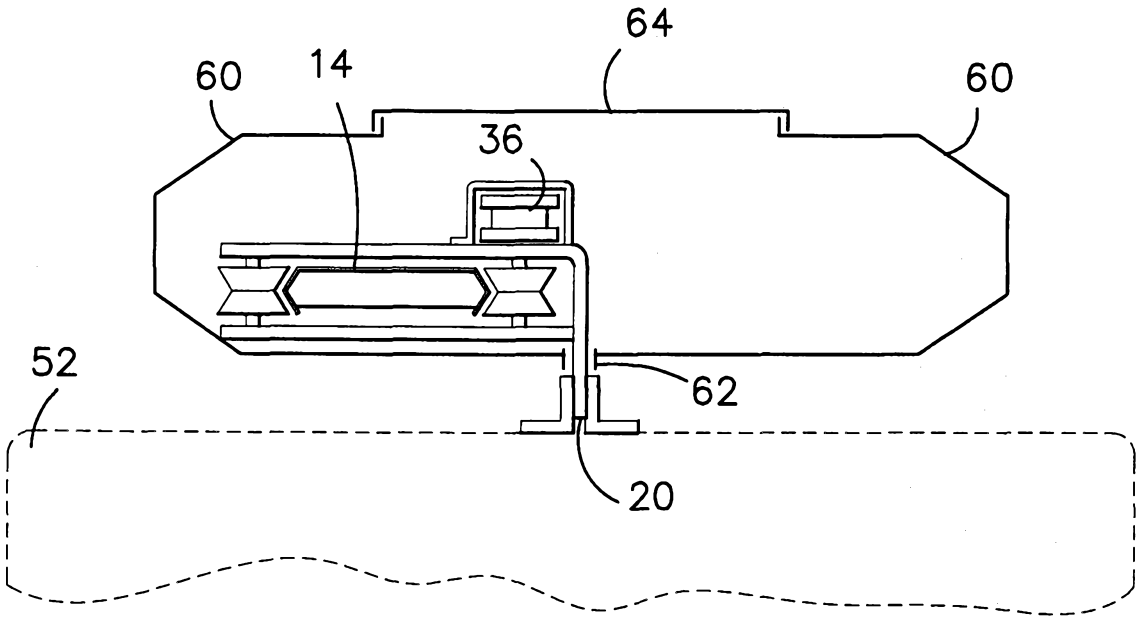


FIGURE 5