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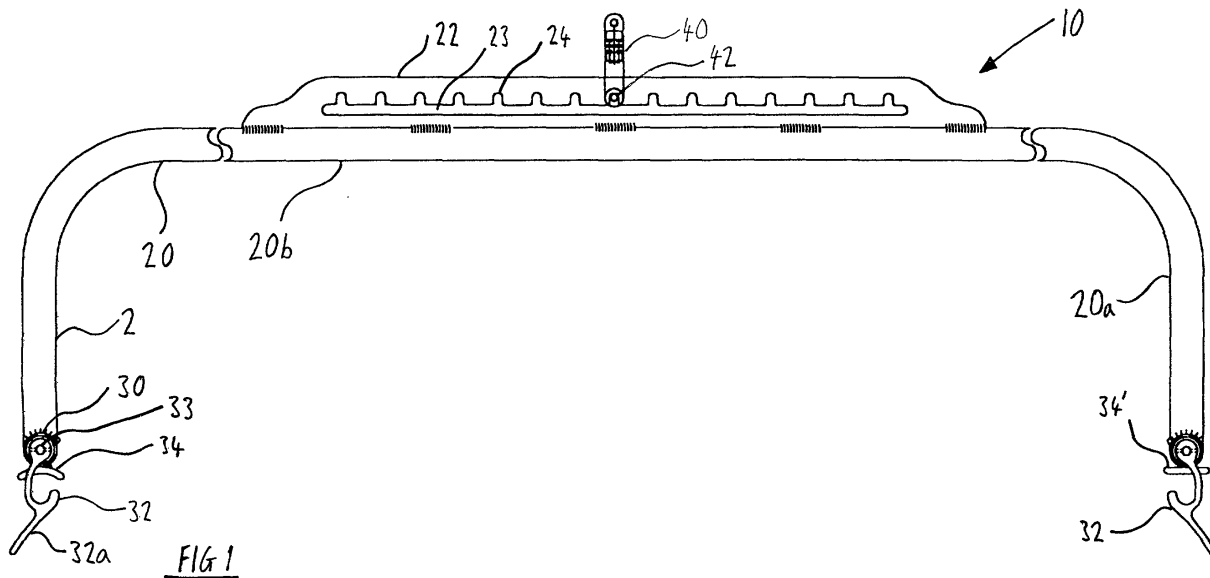
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(54) **Apparatus for lifting**

(57) Apparatus (10) for lifting the body of a person includes a carrier bar (20) with a respective end bar (30) at each end thereof. The ends of the end bars (30) are provided with a respective latch (32) for engaging a peripheral lip of a tray on which the body that is to be lifted rests. The apparatus (10) also includes a pivot member

(40) which is suspended from a cable of a crane and which is operable to engage structure of the lifting apparatus (10) so as to lift the apparatus (10) and the tray engaged thereby. The pivot member (40) is selectively positionable relative to the apparatus (10), so as to maintain the tray, and the body thereon, substantially horizontal.



## Description

**[0001]** This invention is directed towards apparatus for lifting bodies of living patients or of dead persons.

**[0002]** Conventional equipment for lifting dead bodies includes a carry bar suspended from a crane by a pivot point mounted midway along the bar. The bar includes a series of straps of flexible material attached at regular intervals therealong. One example of conventional equipment has ten such straps. Each strap is attached to the bar by one of its ends and has a respective hook at its other end. The conventional equipment also includes a number of bands, each band being a wide strip of flexible material and having a reinforced hole at either end thereof. In lifting a dead body, the bands are placed underneath and transverse the body so that the reinforced holes are accessible at either side of the body. Each hook is hooked through a respective one of the holes and the bar is raised under operation of the crane such that the straps tend to raise the bands, which in turn take the weight of the body and allow lifting thereof.

**[0003]** A problem associated with such conventional equipment is that the straps tend to damage the dead body by cutting into the tissue thereof. In addition, difficulty can be experienced in placing the bands underneath the body, particularly if the body is unusually heavy.

**[0004]** In lifting the bodies of living patients, such as those having sustained a spinal injury, similar equipment is sometimes used. However, a supporting "blanket" or "sling" may be used in place of the bands. The blanket or sling is, in effect, one big band with a series of reinforced holes running along each of two opposite edges. In lifting the patient, the blanket or sling is placed underneath the patient, each hook is hooked through a respective hole and lifting is performed in a similar fashion.

**[0005]** The blanket or sling may be considered disadvantageous in tending to disturb and move parts of the body during lifting. This may lead to the exacerbation of any existing injuries. Placing the blanket under the patient prior to lifting may also prove problematic.

**[0006]** It is an object of this invention to address one or more of these problems.

**[0007]** According to a first aspect of this invention there is provided an apparatus for lifting a human or animal body positioned on carrier means, the lifting apparatus being attachable to the carrier means so that the carrier means is liftable thereby, and the lifting apparatus being further attachable to suspension means so as to be suspendible therefrom at least at one pivot point, wherein the lifting apparatus is arranged such that the pivot point is moveable relative thereto so as to vary the angular attitude of the carrier means, and hence of the body thereon, relative to the horizontal.

**[0008]** The carrier means is preferably stretcher means.

**[0009]** The stretcher means may be a conventional

stretcher; it may be a rigid member; it may be substantially planar and thereby resemble a tray. The stretcher means may include a rigid or flexible support structure arranged to support a human or animal body placed thereon. Preferably the stretcher means is resistant to bending along a longitudinal axis thereof, the longitudinal axis substantially corresponding to the length of the body on the stretcher means

**[0010]** The carrier means may be for carrying a body whilst in a substantially sitting position. The carrier means may be a sling or some such other conventional device arranged for carrying a substantially sitting body.

**[0011]** Preferably the pivot point is moveable between locations in which it is towards the head of the body and locations in which it is closer to the feet or tail of the body. Preferably the pivot point is moveable in a substantially linear direction.

**[0012]** The lifting apparatus may include an intermediate member moveable relative to the remainder of the lifting apparatus, the intermediate member being attachable to the suspension means at the pivot point and being such that it at least partially suspends the remainder of the lifting apparatus therefrom. The intermediate member may be slidable relative to the remainder of the lifting apparatus. The intermediate member may be slidable manually; it may be slidable by remotely-operated means; it may be slidable under the influence of an actuator; it may be slidable under the influence of pneumatic, hydraulic or electrical means, for example an electrical servomotor. The intermediate member may be a collar disposed around structure of the lifting apparatus and slidable along that structure.

**[0013]** The lifting apparatus may include a plurality of pivot locations spaced from one another and each arranged to receive therein a pivot member attached to the suspension means. Each pivot location may be disposed in the structure of the lifting apparatus. Some or all of the pivot locations may be holes through the structure of the lifting apparatus. Some or all of the pivot locations may be notches in the structure of the lifting apparatus.

**[0014]** The lifting apparatus may include a number of pivot members fixed thereto, the pivot members being spaced from one another and each arranged to receive structure of the suspension means therearound. Preferably the pivot locations are arranged in a linear series.

**[0015]** The lifting apparatus may include engagement means arranged to engage structure of the stretcher means and thereby to attach the lifting apparatus to the stretcher means. The engagement means may be arranged to abut the structure of the stretcher means so as to allow lifting of the stretcher means when the lifting apparatus is itself lifted. The engagement means may hook around structure of the stretcher means. The engagement means may include at least one latch-type device operable to latch around structure of the stretcher means upon presentation of the lifting apparatus thereto.

**[0016]** According to another aspect of this invention there is provided lifting apparatus for lifting a human or animal body resting on stretcher means, the lifting apparatus including engagement means operable to latch around structure of the stretcher means upon presentation of the lifting apparatus thereto such that the stretcher means, and hence the body thereon, is liftable by lifting the lifting apparatus.

**[0017]** The lifting apparatus of the other aspect is preferably attachable to a suspension means and liftable thereby.

**[0018]** The engagement means may latch around structure of the stretcher means upon substantially uni-directional presentation of the lifting apparatus thereto. In a preferred embodiment, the engagement means are pivotably mounted hooks arranged so as to be angularly displaced upon initial contact with the stretcher means into a position from which they are subsequently angularly displaceable as a result of their weight so as to hook around structure of the stretcher means

**[0019]** The engagement means may also include one or more stops arranged to maintain a minimum distance between the engagement means and the stretcher means.

**[0020]** Specific lifting apparatus in which the invention is embodied is now described by way of example only and with reference to the accompanying drawings, in which:

Figure 1 is a side elevation of a the lifting apparatus; and

Figure 2 is a plan view of the lifting apparatus;

**[0021]** Figure 1 and Figure 2 show lifting apparatus 10 suitable for lifting the body of a person. The lifting apparatus 10 includes a carry bar 20 and two end bars 30. The carry bar is formed from a steel tube, end portions 20b of which have been bent relative to a straight mid portion 20a so as to form a U-shape. Each of the end bars 30 is attached, at its midpoint, to a respective one of the ends of the carry bar 20 so as to be perpendicular to the plane of the u-shaped carry bar 20. The end bars 30 are shown "end-on" in Figure 1, but are shown more clearly in the plan view of Figure 2. The end bars 30 are steel tubes and are attached to the carry bar 20 by welding. The mid portion 20a of the carry bar is approximately 2m long so that the end bars 30 are slightly more than 2m apart.

**[0022]** The straight mid portion 20a of the carry bar 20 has a planar bracket 22 welded to it. The bracket 22 projects from the carry bar 20 in a direction that is away from the end portions 20b of the carry bar and so as to be coplanar with it. The bracket 22 extends for approximately 1m along the mid portion of the carry bar 20 and projects approximately 70mm away from it. The bracket has an opening 23 in it that has a longitudinally extending portion and a series of spaced notch-shaped recesses 24 extending laterally therefrom. Each notch-shaped

recess 24 has a mouth portion with parallel sides leading to a rounded end portion.

**[0023]** Each end of each end bar 30 is provided with a respective set of engaging means, there being four sets of engaging means in total. Each set of engaging means includes a latch 32 and a stop 34. Each latch 32 is pivotably mounted about a pin 33 that is located in the respective end of the respective end bar 30 so as to be coaxial therewith. The latch 32 is generally hook-shaped and has a base portion that pivotally engages the pin 33. A head portion of the hook includes a lever portion 32a. The lever portion 32a is such that, when the latch 32 depends freely from the pin under the action of gravity, the lever portion 32a lies obliquely with an upper portion thereof adjacent the open mouth of the hook and a lower portion diagonally remote from the open mouth of the hook. The two respective latches 32 on each end bar 30 are orientated such that the open mouths thereof face the open mouths of the respective latches on the other end bar 30.

**[0024]** Each stop 34 is positioned on a side of the respective end bar 30 furthest from the carry bar 20 and spaced inwardly from the respective adjacent latch 32. Two forms of stop 34, 34' are shown in Figure 1. In one form, the stops 34 are arcuate, the outside diameter of which is adjacent the end bar 30. In another form, the stops 34' are each a substantially flat surface.

**[0025]** The lifting apparatus 10 also includes a pivot member 40. The pivot member 40 is a stirrup-like component having a u-shaped portion, the ends of which are linked by a pivot pin 42. The pivot pin 42 extends through the channel 23 of the bracket 22, with the u-shaped portion of the pivot member 40 straddling the bracket 22 and on the side thereof furthest from the carry bar 20.

**[0026]** In operation, the u-shaped portion of the pivot member 40 is suspended from suspension means, such as a cable of a crane (not shown). The pivot pin 42 is located in one of the notches 24 in the channel 23 of the bracket 22 so that the lifting apparatus 10 is suspended from the cable of the crane. The pivot pin may be moved between different ones of the notches 24 until one is found that results in the mid portion of the carry bar 20 lying substantially horizontally, with the end portions thereof pointing downwards.

**[0027]** To lift a body placed on stretcher means such as a rigid mortuary tray, the lifting apparatus 10 is placed above the tray (not shown) so that each of the four ends of the end bars 30 lies substantially above a respective corner of the tray. The crane is then operated to lower the lifting apparatus 10 towards the tray. The first parts of the lifting apparatus to contact the tray are the lever portions 32a of the latches 32. The lever portions contact a peripheral lip or bar of the tray and are pushed outwards thereby, causing each latch 32 to rotate about the pin 33. This continues for each latch 32 until the respective mouth portion thereof is adjacent the lip or bar, at which point the latch 32 is free to reverse it previ-

ous rotation and hook around the lip or the bar. In this way, the latches 32 latch onto the tray. Further lowering of the lifting apparatus 10 is resisted by the stops 34 abutting the lip or the bar.

**[0028]** The crane is then be operated to lift the lifting apparatus 10 and hence the tray to which it is attached. As the centre of mass of the body will most likely not lie below the notch 24 in which the pivot pin 42 is located (ie the pivot point), such lifting will tend to result in the tray, and the body placed thereon, rotating. This may result in the body sliding off the tray and is therefore to be avoided.

**[0029]** To alter the angular attitude of the tray and achieve a substantially horizontal attitude or one in which the head of the body is slightly above the feet (ie "head-up") or one in which the head of the body is slightly below the feet (ie "head-down"), the pivot pin 42 can be placed in a different one of the notches 24. Positioning the pivot pin 42 in a different notch will result in a slightly different angular attitude of the tray, and hence of the body, being attained.

**[0030]** In the case where the lifting apparatus is used to lift a live patient reposed on a stretcher, or a similar device, excessive rotation of the stretcher and body is also to be avoided. However, rather than a horizontal attitude, a head-up position in which the patients head is slightly above his or her feet may be favoured for reasons of patient comfort. This is particularly the case where the patient is obese, as a head-up position is advantageous in reducing the pressure placed on the patients internal organs.

## Claims

1. Apparatus for lifting a human or animal body positioned on carrier means, the lifting apparatus being attachable to the carrier means so that the carrier means is liftable thereby, and the lifting apparatus being further attachable to suspension means so as to be suspendible therefrom at least at one pivot point, wherein the lifting apparatus is arranged such that the pivot point is moveable relative thereto so as to vary the angular attitude of the carrier means, and hence of the body thereon, relative to the horizontal.
2. Apparatus according to claim 1, wherein the pivot point is moveable between positions in which it is towards the head of a body on the carrier means and positions in which it is closer to the feet or tail of the body.
3. Apparatus according to any one of claims 1 to 2, wherein the lifting apparatus includes an intermediate member moveable relative to the remainder of the lifting apparatus, the intermediate member being attachable to the suspension means and at least

partially suspending the remainder of the lifting apparatus, movement of the intermediate member relative to the remainder of the lifting apparatus equating to movement of the pivot point relative thereto.

4. Apparatus according to claim 3 wherein the intermediate member is slidable relative to the remainder of the lifting apparatus.
5. Apparatus according to any one of claims 3 to 4, wherein the intermediate member is a collar disposed around structure of the lifting apparatus and slidable along that structure.
6. Apparatus according to any of the preceding claims, wherein the lifting apparatus includes a plurality of pivot locations spaced from one another and each arranged to receive therein a pivot member attached to the suspension means.
7. Apparatus according to claim 6, wherein each pivot location is disposed in the structure of the lifting apparatus.
8. Apparatus according to claim 7, wherein some or all of the pivot locations are holes through the structure of the lifting apparatus, or notches in the structure of the lifting apparatus.
9. Apparatus according to any one of the preceding claims, wherein the lifting apparatus includes a number of pivot members fixed thereto, the pivot members being spaced from one another and each arranged to receive structure of the suspension means therearound.
10. Apparatus according to any preceding claims wherein the carrier means is for carrying a body that is in a sitting position.
11. Apparatus according to any one of claims 1 to 9, wherein the carrier means is stretcher means for supporting a substantially recumbent body.
12. Apparatus according to claim 11, wherein the stretcher means is a substantially rigid tray-like member.
13. Apparatus according to claim 11 or claim 12, wherein the lifting apparatus includes engagement means arranged to engage structure of the stretcher means and thereby to attach the lifting apparatus to the stretcher means so as to allow lifting of the stretcher means when the lifting apparatus is itself lifted.
14. Apparatus according to claim 13, wherein the engagement means is operable to hook around struc-

ture of the stretcher means.

15. Apparatus according to claims 13 or claim 14,  
wherein the engagement means includes at least  
one latch-type device operable to latch around  
structure of the stretcher means upon presentation  
of the lifting apparatus thereto. 5
16. Lifting apparatus for lifting a human or animal body  
resting on stretcher means, the lifting apparatus in-  
cluding engagement means operable to latch  
around structure of the stretcher means upon pres-  
entation of the lifting apparatus thereto such that the  
stretcher means, and hence the body thereon, is lift-  
able by lifting the lifting apparatus. 10 15
17. Lifting apparatus according to claim 16, wherein the  
lifting apparatus is attachable to a suspension  
means and liftable thereby. 20
18. Lifting apparatus according to claim 16 or claim 17,  
wherein the engagement means is operable to latch  
around structure of the stretcher means upon sub-  
stantially unidirectional presentation of the lifting  
apparatus thereto. 25
19. Lifting apparatus according to any one of claims 16  
to 18, wherein the engagement means are pivotably  
mounted hooks arranged so as to be angularly dis-  
placed upon initial contact with the stretcher means  
into a position from which they are subsequently an-  
gularly displaceable as a result of their weight so as  
to hook around structure of the stretcher means 30
20. Lifting apparatus according to any one of claims 16  
to 19, wherein the engagement means includes one  
or more stops arranged to maintain a minimum dis-  
tance between the engagement means and the  
stretcher means. 35

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