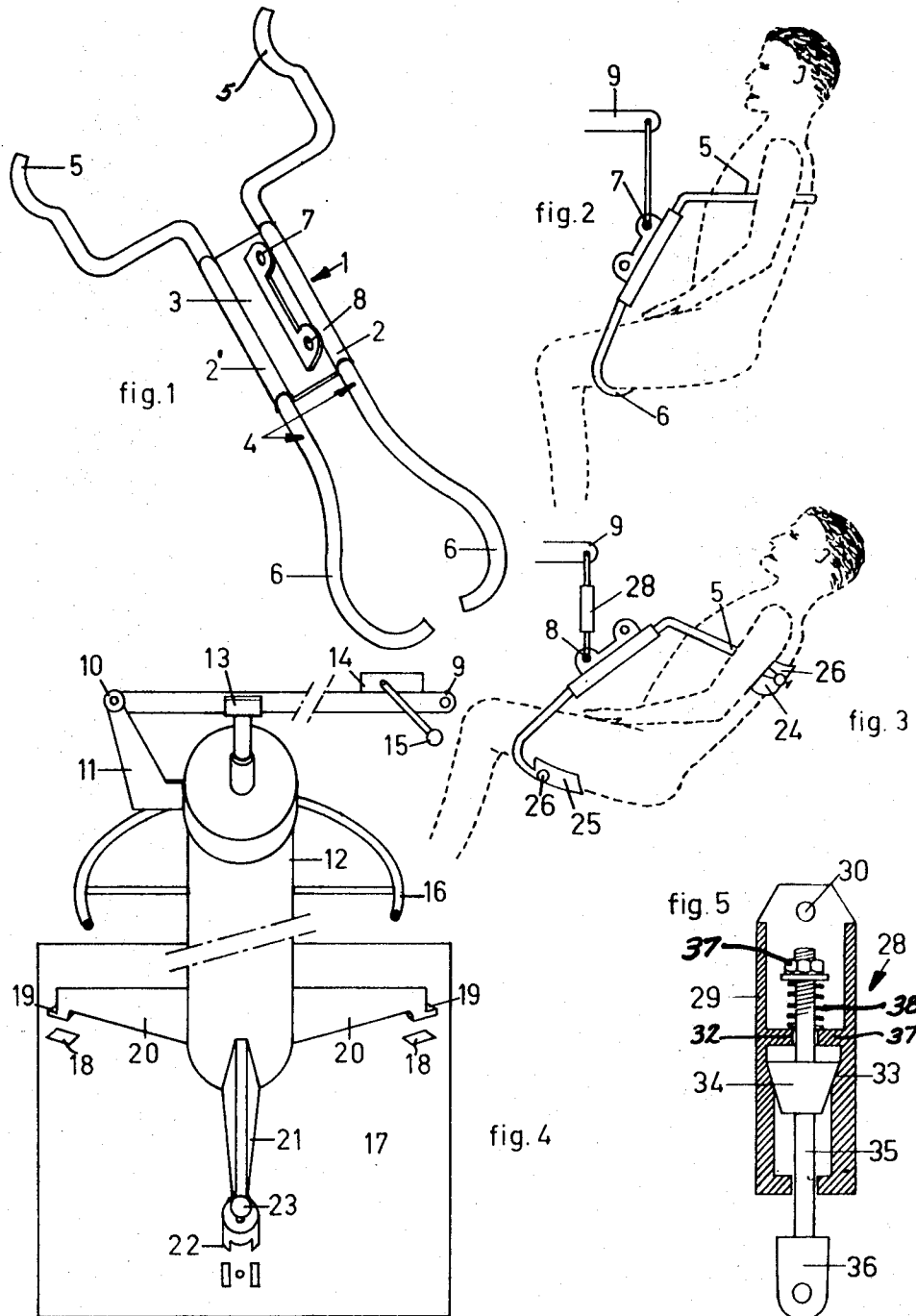


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CARRYING ASSEMBLY FOR DISABLED OR DISEASED PERSONS, AND
LIFTING DEVICE FOR SUCH AN ASSEMBLY
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ABSTRACT OF THE DISCLOSURE

A carrying device for persons who are disabled or ill, including a plurality of hooking members for supporting a person under the arms and behind the shoulders, and under the thighs, which hooking members are self-closing under the weight of the person to be lifted and which may be placed in position for use by the person himself, either when sitting in a wheelchair or lying in bed; and a lifting device for such carrying means, adapted to be operated by the person who is disabled and is to be lifted, and including means for preventing undesired rotational movements of the carrying device around substantially vertical axes during the lifting of such a person.

BACKGROUND OF THE INVENTION

Lifting disabled, ill or infirm persons, for instance for bathing or the like, is often very difficult, especially in the case of heavy persons, and particularly when those assisting or lifting the infirm person cannot take the most favorable position, for instance near a bathtub.

Known devices for lifting disabled persons generally comprise a seat or the like, as well as a strap which is to be placed behind the body near the shoulders and under the arms and attached to the lifting device, such strap acting as a backing support.

Such known devices have several disadvantages, a principal one of which is that the disabled or diseased person must always be assisted by others, since, particularly when sitting in a wheelchair or the like or lying in bed, they cannot attach the strap themselves, or, in the most favorable case, can accomplish this only with much trouble. Furthermore, such devices are only suitable for lifting such a person in a sitting attitude, which is, for bathing, not always desirable, since then the person must be lifted rather high in order to allow the feet to clear the edge of the bathtub. Moreover, the lifting device, which is often provided with running wheels, must be operated by another person, and the person to be lifted should remain within the vertical silhouette of the supporting base, in order to prevent the lifting device from overturning. Consequently, the possibilities for displacement near a bathtub or the like are often heavily restricted by the extending feet of the device.

Thus, for disabled persons having no permanent or continuous nursing, there is an urgent need for a simple lifting device which may be operated by the disabled person himself, and having supporting means which may be fixed without the help of others.

SUMMARY OF THE INVENTION

It is an object of the invention to provide a carrying assembly and a lifting device for a person carried by such assembly which eliminates the disadvantages of the prior devices, and allowing a disabled or infirm person to help himself without the aid of others.

This is accomplished by providing a carrying assembly which is engageable with a lifting device and which com-

prises means for supporting the shoulders under the arms and the thighs near the knees, characterized in that the said supporting means are formed by two pairs of hooking members. Each such member has a hooking portion which is placed under one of the arms of the person to be lifted, to support the shoulders, and another such portion which fits around the outer side of one of the thighs, to support the latter at the lower side near the corresponding knee. The said members are rotatably connected to a common elongated coupling element lying, in the operative position, in front of the person to be lifted and substantially in his plane of symmetry, the axes of rotation of the hooking members extending substantially parallel to the longitudinal axis of said coupling element, and having such a mutual spacing that the lifted person's weight causes a torque to be exerted on the hooking portions so that the members are rotated toward one another.

Furthermore, support plates or cushions adapted to the shape of the body parts to be supported may be attached to the hooking portions by means of ball joints or the like, which may be locked in a desired position.

Both hooking members at the left and right hand side respectively may be rigidly coupled with one another by means of a shaft, but in many instances it is preferred to mount them in an independently rotatable manner; thus, the coupling element preferably comprises two parallel tubes rigidly connected to one another and serving as rotation bearings for the respective hooking members. Furthermore, the coupling element may be provided with a pair of ears, to be connected to the lifting device and being arranged so that the person to be lifted may be supported in either a sitting or lying attitude. In order to prevent accidental jamming of limbs, stops may be provided limiting the allowable inward movement of the hooking members.

The coupling element may be provided with a central locking means adapted to lock the hooking members in their innermost position, in order to prevent the hooking portions thereof from inadvertently releasing the lifted person, and said locking means may be constructed in such a manner as to become operative automatically, as soon as the lifting assembly is loaded. Moreover, this assembly may comprise a suspension element, a first and a second end part of this element being adapted to be attached to the lifting device and the coupling element respectively, which end parts are mutually rotatable around the longitudinal axis of the suspension element, and are coupled with one another by means of a friction coupling which is only operative in the charged condition.

A special lifting device for an assembly of this kind comprises an arm to be coupled with the coupling element of said assembly, said arm being pivotally connected with and being rotatable around the axis of a vertical stationary supporting column, said arm being movable around its pivot by means of a driving means, the operating element of said driving means being adapted to be brought within the reach of the person to be lifted, and more specifically, being mounted on said arm. Furthermore, a handwheel may be fixed around the column, the rim of said wheel being within the reach of the person to be lifted, in order to allow him to turn the arm around its vertical axis. Preferably, this handwheel may be mounted on said column so as to be movable within a small extent, said wheel being coupled with locking means preventing the rotation of said arm around its vertical axis, in order to allow the lifted person to disengage said locking means before rotating said arm. The supporting column may be detachably connected to a fixed floor plate by means of claws and at least one locking screw.

The lifting arm and the associated driving means may be constructed as a separate unit which is loosely supported in the column and may be separated therefrom,

especially for allowing the use of a single lifting unit, together with a number of supporting columns fixed in different points.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an enlarged perspective view of a carrying assembly according to the invention;

FIG. 2 is a fragmentary side elevation of the assembly, showing a first mode of using it;

FIG. 3 is a fragmentary side elevation of the assembly, showing a second mode of using it, as well as a modified form of some parts of the assembly;

FIG. 4 is a perspective view of a lifting device particularly designed for the carrying assembly; and

FIG. 5 is an enlarged sectional side elevation of a suspension element indicated in FIG. 3.

In FIG. 1 a preferred embodiment of a carrying assembly according to the invention is shown, comprising a coupling element 1 consisting of two parallel tubes 2 and 2', which are connected to one another by a transverse plate 3. A pair of elongated rods 4 are rotatably mounted in the tubes 2 and 2'. The opposite ends 5 and 6 of these rods are bent into hooking portions in a particular manner, such that the rods comprise hooking members. More specifically, the lower end or hooking portions 6 are curved inwardly toward one another in the plane of the rods, in a complementary fashion, while the upper end or hooking portions 5 extend upwardly away from the plane of the rods themselves and then laterally, to form smoothly curved hooks. Also, the transverse plate 3 is provided with a pair of upstanding centrally located ears 7 and 8, which may be connected to a lifting device. As illustrated, the ears 7 and 8 may comprise end portions of a rigid unitary element.

FIG. 2 shows the use of such an assembly for lifting a disabled person in a sitting attitude, for instance from a wheelchair. The upper hooking portions 5 are inserted under the arms, and the ends of these hooks will bear against the shoulder blades. The lower hooking portions 6 are hooked around the thighs, just above the knees. Since each upper hook portion 5 forms a unit with one of the lower hook portions 6, both such hook portions may be simultaneously rotated. This may be done by the person to be lifted himself. In this case, the uppermost ear 7 is connected to the arm 9 of a lifting device. It is to be noted that, as illustrated in FIG. 1, the ends of the hooks 5 and 6 contacting the shoulders and thighs respectively are separated by a large distance than the tubes 2, so that the weight of the person to be lifted exerts a torque which tends to move each of the two hooks 5 and the two hooks 6 towards one another, so that these hooks are self-closing under the weight of the person lifted.

Preferably, bearings are provided in the tubes 2 which have end stops that limit the rotation of the hooking members in such a manner that they may neither be opened too much or closed to such an extent that the lifted person is made uncomfortable or bruised. In a preferred embodiment, a central locking means is provided for locking the hooking members in their innermost rotated position, in order to prevent them from inadvertently releasing the lifted person. This locking means may simply comprise a link connectable between the hooking portions 5; such means may, however, be constructed in such a manner that it becomes operative automatically as soon as the assembly is loaded by the weight of the lifted person. This may, for instance, be accomplished by connecting the unitary element whose ends form the ears 7 and 8 to the transverse plate 3 by means of a pivot or rotatable connection, and by coupling such element to said locking means. Because such a locking means may be implemented in a great number of ways apparent to those skilled in the art, further description of possible such ways is not necessary.

It may be preferred in many instances to use upper hooks 5 which are rotatable separately from the associated lower hooks 6, to facilitate the correct positioning

of the upper hooks for some types of disabled persons, although in many instances the hooks 5 and 6 may form an integral unit, as mentioned above.

FIG. 3 shows the assembly in the case where the arm 9 is connected to the lower ear 8. The person is then lifted in a reclining attitude, which is especially favorable when placing the person into a bathtub, since it will then be easier to lift his feet over the elevated edge of the bathtub. FIG. 3 also shows a modification in the form of cushions or support plates 24 and 25 adapted to the shape of the shoulders and thighs respectively, and coupled to the hooking portions 5 and 6 by means of ball joints 26 or the like, allowing a complete adaptation of these cushions or support plates to the comfort of the user. The ball joints may be locked in the correct position by means of locking screws or the like. A special suspension element 28 indicated in FIG. 3 is described below.

FIG. 4 shows a simple lifting device which is specially adapted for the carrying assembly described above. This device comprises the arm 9 mentioned above, which is pivotally connected at 10 to a mounting bracket 11, the latter being attached to and rotatable around a vertical column 12. A hydraulic or other driving cylinder is mounted coaxially within the column 12 to the bracket, although it is to be noted that such cylinder may also be mounted alongside the column 12. The piston rod of said cylinder is connected to the arm 9, as by a channel-shaped bracket 13, so as to raise and lower such arm.

A small hydraulic or other such pump means 14 is mounted on the arm 9, and is provided with an operating handle 15 lying within the reach of the person to be lifted, who may also operate a detent valve. The pump actuates the drive cylinder, and it is possible to construct the drive cylinder and the pump means as a unit, and to connect the pump and its operating handle with one another by means of a Bowden cable or the like, for easy operation by the person to be lifted.

As soon as a disabled person has moved his wheelchair to the vicinity of the device, he can place the hooking portions 5 and 6 into the proper position, and he can lift himself by operating the pump 14.

Around the column 12 a circular handrail 16 is fixed, such that the rim of the rail lies within the reach of the lifted person, who may grip the rail and turn the arm 9, in order to move himself to a desired point at which he may lower himself again. Preferably, rail 16 is movable to some extent, either around its axis or vertically, and is coupled with locking means for preventing the rotation of the arm 9 around the vertical axis of the column 12, in order to disengage this locking means whenever rotation of the arm is desired.

The column 12 is fixedly attached to the floor at an appropriate position, for instance between a lavatory and a bathtub, so that a disabled person may utilize either at will and without the help of others. The hooks 6 are arranged in such a manner that, when using the lavatory, the disabled person may arrange his clothing himself.

As shown in FIG. 4, the column 12 may be connected to the floor by means of a fixed floor plate 17 provided with holes 18. Sloping or horizontal anchoring pins 19 on two feet 20 attached to the column may be inserted in these holes, and a third foot 21 is provided with directing pins 22 and a locking screw 23. Thus, the device may be easily removed. If the feet 20 and 22 are provided with rollers fitting into cavities in the plate 17, the disabled person may attach the device to the floor plate himself, since only the screw 23 is to be turned by him. It is, however, also possible to construct the lifting arm 9 and the associated driving means as a separate unit which is loosely supported in the column 12 and may be easily separated therefrom. This allows the use of a single lifting unit together with a number of supporting columns fixed at appropriate locations within the home.

FIG. 5 shows a cross section of the suspension element 28 indicated in FIG. 3. This element consists of a tubular

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body 29, provided at its upper end with a hole 30 or the like, by which the element may be coupled to the arm 9, as indicated. The body 29 comprises a transverse partition 31 with a central aperture 32, and a conical or bevelled seat 33 below said partition. In the lower part of the bore of this body a frusto-conical body 34 is provided which fits within the conical seat 33 and is connected to a central rod 35, the lower end of which is provided with a connecting means 36 to be coupled with one of the ears 7 or 8. The upper end of rod 35 is threaded and receives a nut 37, and a coil spring 38 is placed between the partition 31 and nut 37, thus urging the bar 35 upwards to keep the body 34 from closing the bore inside body 29 by fully engaging the conical seat 33. As soon as the rod 35 is loaded by the weight of a person to be lifted, the body 34 is forced against the seat 33, and the friction between both prevents rotation of the lifted person around the axis of the element 28. Before applying the carrying assembly to the body of the person, however, this assembly is freely rotatable.

It will be apparent that the lifting device may be provided with an electric motor driving a screw spindle or the like, or with an electric oil pump, in which case the control means may include a switching mechanism having push buttons or the like. The advantage of a hydraulic driving medium is that locking in any position is possible, and nevertheless, the lowering may take place at any desired speed.

The present invention may be embodied in other forms without departing from the spirit thereof.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows.

1. A carrying assembly for cradling and lifting a disabled or infirm person, of the type having means for supporting the shoulders of such person under the arms and the thighs near the knees, said assembly comprising: means forming two pairs of hooking portions, such portions in the first pair being shaped to extend under the left and right arms respectively of the person to be lifted, and such portions in the other pair being shaped to partially encircle the left and right thighs respectively; means mounting said hooking portions in a rotatable manner from a position disposed in front of the person to be lifted and substantially in his plane of symmetry; said

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means establishing axes of rotation for said hooking portions which extend generally parallel to the person being lifted; and said hooking portions having a shape and being mounted by said means such that the lifted person's weight creates a torque exerted on the hooking portions causing the said portions in at least one of said pairs thereof to be rotated toward one another.

2. The assembly of claim 1, including support plate members coupled to said hooking members in a pivotal manner.

3. The assembly of claim 1, including shaft means interconnecting said two pairs of hooking portions.

4. The assembly of claim 1, wherein at least some of said hooking portions are mounted to be separately rotatable from other such portions.

5. The assembly of claim 3, wherein said mounting means comprises a coupling element having a pair of parallel tubes rigidly coupled with one another and serving as rotation bearings for said shaft means.

6. The assembly of claim 5, including an attachment member secured to said coupling element and having a pair of spaced ear portions adapted to be connected to a suspending member, said ear portions disposed and arranged so that the person to be lifted is supported in a sitting or lying attitude respectively when the suspension member is connected to opposite ones of said ear portions.

7. The assembly of claim 1, including a suspension element for coupling said means mounting said hooking portions to a lifting member, said element having a first and a second end part adapted to be attached to the lifting member and to the mounting means, respectively, and means between said end parts mounting the same for relative rotation, said last-mentioned means including a friction lock which is operative only in the loaded condition.

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