

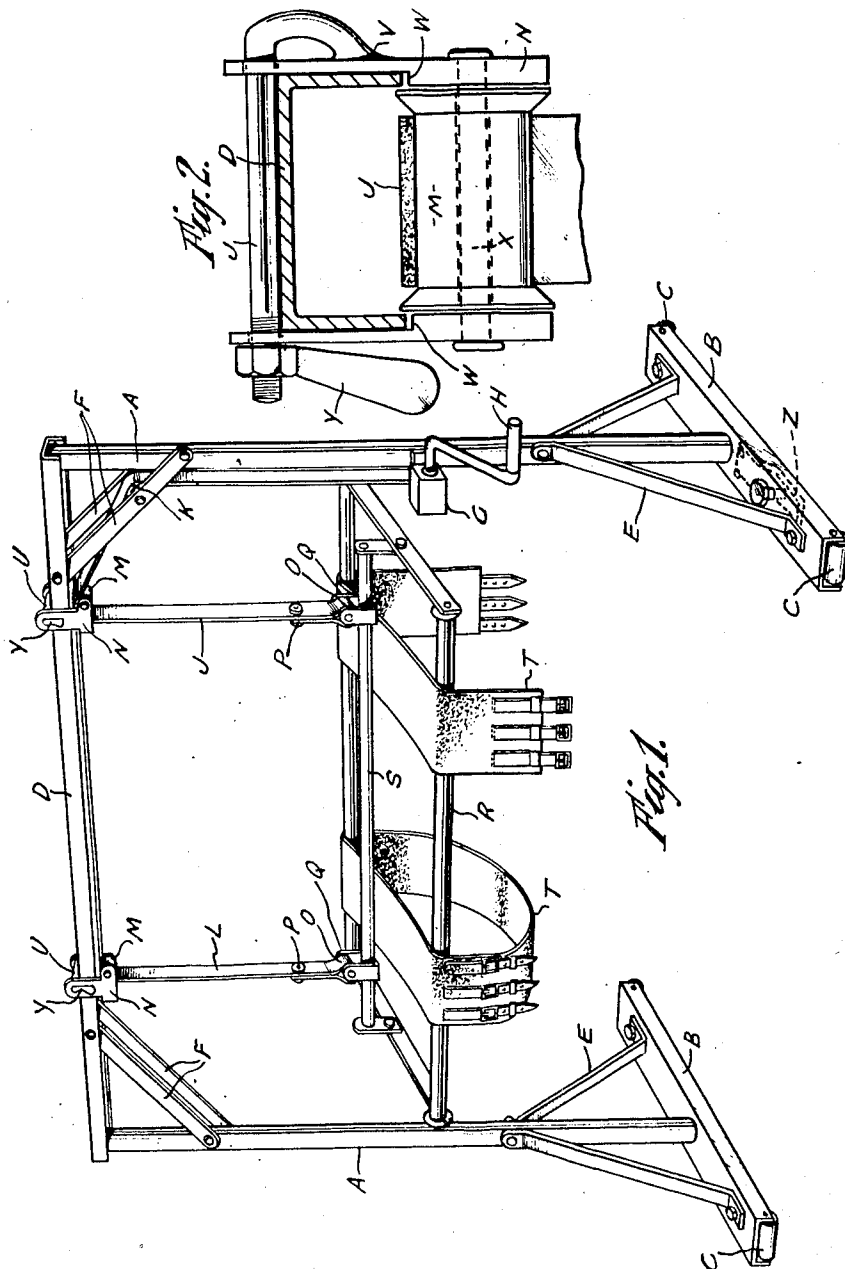
March 27, 1951

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2,546,688

INVALID LIFTING APPLIANCE AND THE LIKE

Filed Oct. 1, 1947



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# UNITED STATES PATENT OFFICE

2,546,688

## INVALID LIFTING APPLIANCE AND THE LIKE

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Application October 1, 1947, Serial No. 777,290  
In Great Britain October 17, 1946

2 Claims. (Cl. 5-86)

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This invention relates to hospital appliances and the like for use in cases where the patient is unable to leave the bed. In such cases every time the bed has to be made, the patient has to be lifted. This requires skill if the condition of the patient is serious, and may necessitate getting the assistance of several persons.

The object of the invention is to provide a hoist whereby the patient can be lifted off the bed and be held comfortably suspended for any desired length of time, for example, whilst the bed is being made or the bed linen changed; means may also be provided whereby the patient can be turned over, whilst suspended, either by the attendant or by his own effort.

A hoist made according to the present invention comprises a movable stand, a winch or other winding means mounted on said stand, cords, cables, belting or the like, hereinafter referred to as belting, extending from said winch over suitable pulleys or rollers to depend from said stand and slings or other supporting means for attachment to a patient suspended from said belting, said stand may conveniently be of trestle or other suitable form having a top member supported between two pillars mounted on feet provided with rollers or wheels, said pillars being spaced apart a sufficient distance to be positioned with the top member longitudinally arranged over the bed. The pulleys or rollers may be carried on shoes mounted on and slidably adjustable as to position on said top member. The slings may comprise endless belts supported on a frame suspended from free ends of said belting, the arrangement being such that upon operation of the winch, a patient may be hoisted and lowered as desired, whilst disposed in the slings.

In order that the invention may be clearly understood and readily carried into effect, reference is directed to the accompanying drawing, wherein:

Fig. 1 is a perspective view of a hospital appliance in accordance with the invention.

Fig. 2 is a sectional elevational of a detail.

Referring to the drawing, the form of hoist illustrated comprises a stand consisting of two tubular metal pillars A, A mounted on inverted channel section feet B, B provided with a roller C at each end thereof. The pillars A, A are suitably spaced apart and are bridged by a top member D also formed from inverted channel section metal, the attachment to the upper ends of the pillars being by bolts or screws passing through the top members and into plugs fitted into the said upper ends of the tubes. The pillars A, A are

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suitably braced to the feet and to the top member for rigidity by stays E, E and F, F respectively. A gear box G is fitted to one of the pillars A containing a worm and worm wheel (not shown) the worm being mounted in suitable bearings in the box, the worm shaft being extended to form a cranked handle H outside the box. The worm meshes with a worm wheel mounted on a shaft in suitable bearings, which shaft also carries a roller rigidly fitted thereto to which one end of a belt J is attached, the belt extending up and over another roller K located between the stays F connecting said pillar A with the top member D. A second length of belting L is attached at one end to the first mentioned belt by rivets or the like at a point between the roller K fitted to said stays F and a further roller M carried in a slidably adjustable shoe N carried on the inverted channel section member D, so that the attached length of belting depends from the roller carried by said shoe, the first mentioned belting extending horizontally along underneath the top member of the stand, passing over and depending from a roller M carried by a second slidably adjustable shoe N mounted in spaced relation to the first mentioned shoe N on the top member D of the stand. The lower portion of each length of belting depending from the rollers M is formed into a loop O, which loop may be adjustable as to length by providing a series of holes in the belting to allow the end thereof to be turned up to be attached to itself to form a loop of given length by means of a bolt passing through the selected holes in the two thicknesses of belting or a bolt F provided with a nut may be used to make a permanent joint. A bracket Q is attached to the said looped ends of each belt, the brackets supporting a rectangular frame R by means of a rod S disposed parallel underneath the top member D of the stand. The frame R is of sufficient length to enable two or more detachable slings or belts T (made "endless" by straps and buckles) to be supported on the two lower side members which may be in the form of rollers.

The adjustable shoes N carried on the top member D of the stand are each formed of a pair of side plates which lie against the front and back of the top member (see Figure 2) respectively. The upper ends are provided with apertures through which is passed a bolt screwed into a screw-threaded aperture in the plate on the other side but free in the aperture in the one side, at which end the bolt is bent down and the end is brazed or welded to the outer face of said

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plate at a suitable point below the adjacent aperture aforesaid.

Each plate is thicker and wider at its lower end and is provided with a shoulder W which engages under the free edge of the adjacent limb of the inverted channel section top member of the stand. Through an aperture in the thick portion of each plate is passed the spindle X carrying the belt pulley or roller, which is flanged at each end, said spindle being riveted to the plate at one end and the other end thereof being free in its aperture, the arrangement being such that the upper bolt U described herein as bent over at one end is free in the same side plate as the free end of the pulley spindle. The upper bolt extends outside the side plate at the end opposite to that which is bent over, which extension is screw-threaded and provided with a nut having an integral handle Y which, on turning to tighten the nut, draws the two plates firmly on to the top member in the predetermined position, but at the same time leaving the belt pulley free to be rotated about its spindle. By this arrangement, the shoes can be slackened and slid along the top member of the stand to any desired position, and made secure.

The feet of the stand are formed from lengths of inverted channel section metal, one at the base of each pillar and disposed at right angles to the top member. A roller is mounted on a spindle disposed between the limbs of the channel at each end thereof so that the stand can be moved sideways into position over the bed so that the suspended roller and slings or belts are in a position immediately above the patient to be lifted. The stand from pillar to pillar is of such length as to permit of the pillars clearing the head and foot of the bed in the operation of pushing the stand sideways, as stated, to straddle the bed from end to end.

In operation, assuming the stand to be placed in position over the bed as herein described, a sling or belt is passed under the patient's back and also his or her legs and passed over the long roller sides of the rectangular frame suspended from the rollers carried by the shoes slidably mounted on the top member of the stand and the ends secured together by straps and buckles, or other suitable means. To lift the patient, the handle associated with the gear-box attached to one of the pillars of the stand is turned to wind the belting on the drum fixed on the worm wheel shaft aforesaid. In so doing, the patient is lifted from the bed. On cessation of the winding operation, the patient will remain suspended due to the fact that the reduction ratio between the worm and worm wheel is in the order of 16 to 1, which, of course, means that a quick turning movement of the handle effects only a gradual lift of the patient and a braking condition when turning of the handle ceases, without the need for catches or other auxiliary means for maintaining the patient in raised position above the bed.

In cases where it is required to turn the patient bodily whilst suspended, endless belts or the like would be employed so that these could run com-

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pletely over the longitudinally disposed rollers. If in a condition to do so, the patient could turn himself over by his own effort, in which case, a strap could be suspended from the top member of the stand which would be pulled to effect the turning over movement.

Detail modifications may be made in the structure without departing from the spirit of the invention, for example, the stand could be of trestle form, the slidable shoes could be of other construction to that described whilst conforming to the particular requirements. Further, instead of one long roller for the slings or belts, two or more separate rollers may be provided.

What I claim and desire to secure by Letters Patent is:

1. An invalid lifting appliance comprising a movable stand having a pair of uprights spaced apart and bridged by a top member, a pair of rollers the axes of which extend transversely to the length of the top member, supported by the top member and adjustable longitudinally thereof, flexible traction means trained over said rollers each having a depending end portion, a sling-supporting frame supported by the depending end portions of the traction members, and winding means on one of said uprights to which the other end portions of the traction means are secured, said flexible traction means being connected together at a point between the winding means and the roller nearest the upright which supports said winding means.

2. An invalid lifting appliance comprising a movable stand having a pair of uprights spaced apart and bridged by a top member, a pair of rollers the axes of which extend transversely to the length of the top member, supported by the top member and adjustable longitudinally thereof, flexible traction means trained over said rollers each having a depending end portion, a sling-supporting frame supported by the depending end portions of the traction members, and winding means on one of said uprights to which the other end portions of the traction means are secured, said sling-supporting frame comprising a rectangular frame member and a rod extending parallel to the top member in a vertical plane therewith and in spaced relation above the rectangular frame, and the side arms of the rectangular frame member being rollers which extend parallel to the rod.

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