

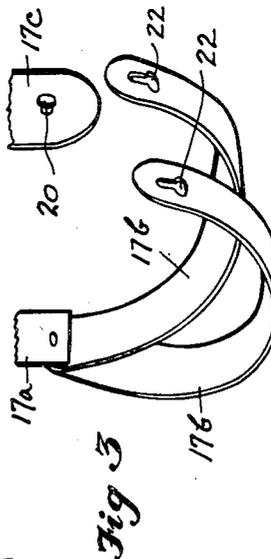
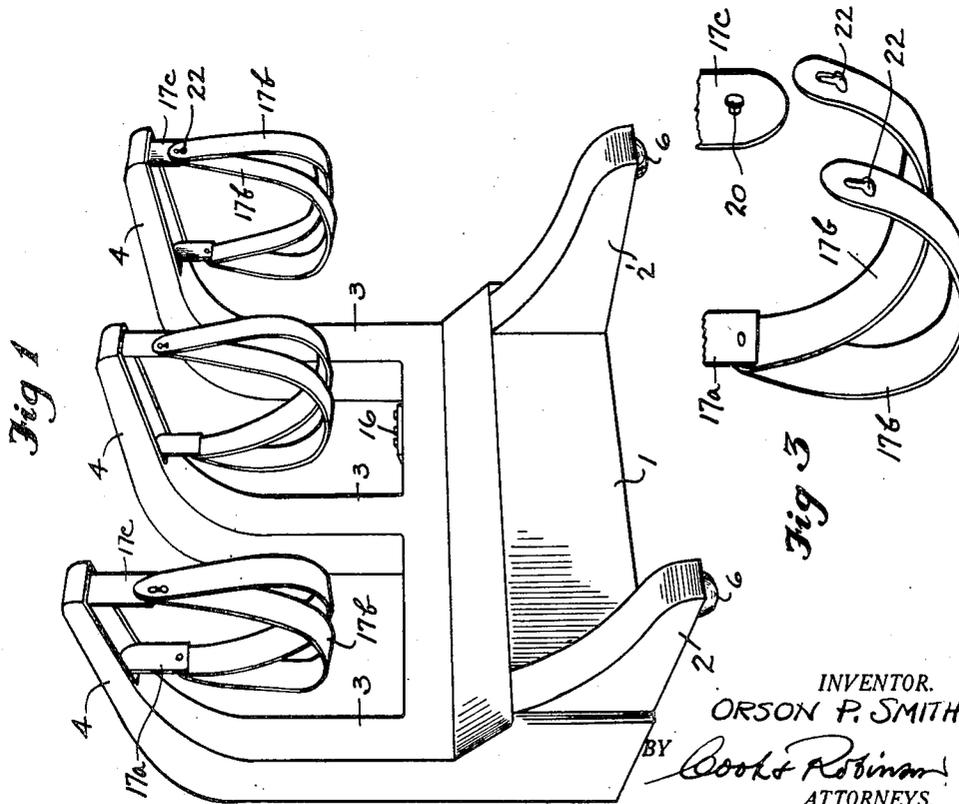
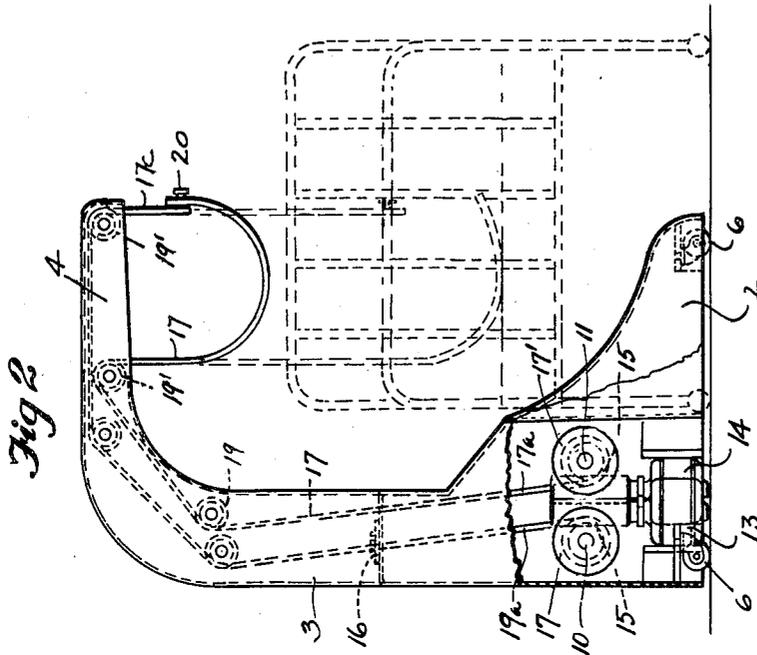
Jan. 17, 1950

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INVALID LIFT

2,494,591

Filed March 9, 1948

2 Sheets—Sheet 1



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2 Sheets-Sheet 2

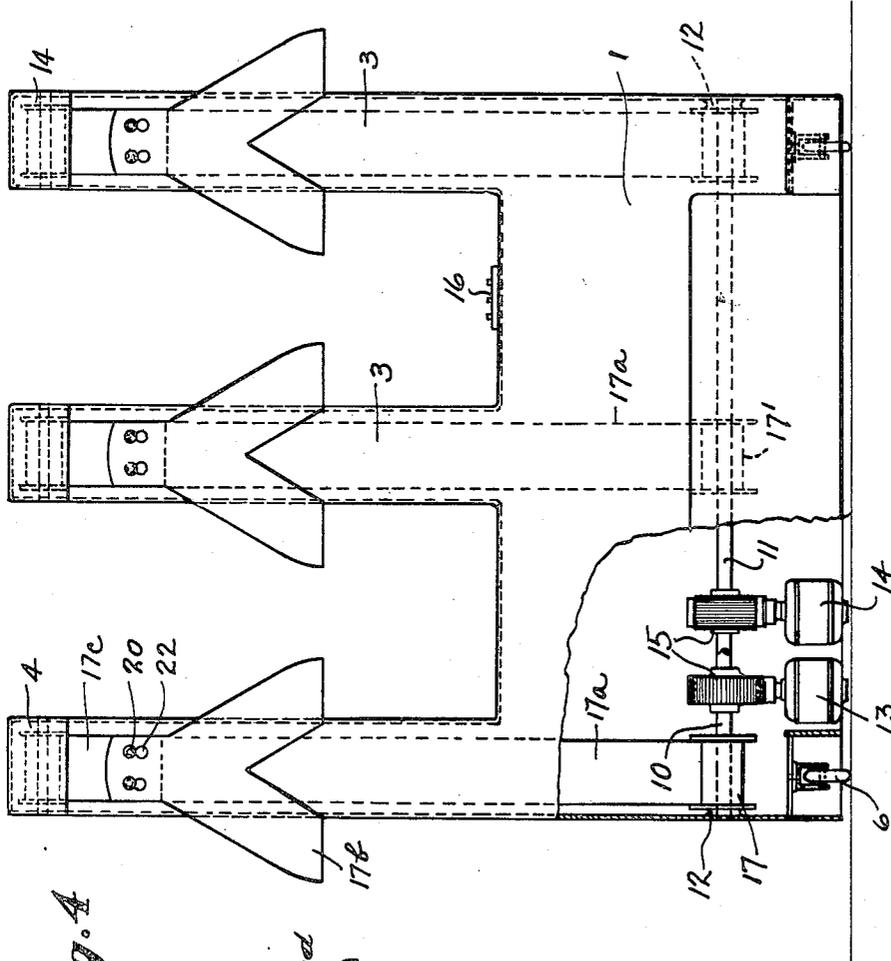


Fig. 4

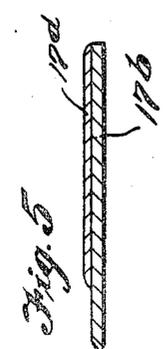


Fig. 5

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# UNITED STATES PATENT OFFICE

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## INVALID LIFT

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3 Claims. (Cl. 5-86)

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This invention relates to invalid handling equipment, and it has for its principal object the provision of a portable means, or device, whereby invalids, or others who are bedridden, or immobilized by reason of injury, or while anaesthetized, may be raised and turned for any purpose, such as for the application of bandages; for an easier application of dressings or treatment; for a change in position of rest; for bedmaking and also for moving the patient from one location to another.

More specifically stated, the objects of the present invention reside in the provision of a portable crane comprising, in its embodiment, a plurality of looped belts suspended therefrom for support of the patient therein, and in the provision of winding drums operable for shortening or extending the belt loops to raise or lower the patient while supported therein, and in the provision of control means for shortening or extending the loops by individually drawing in, or lengthening, the runs at one side or the other, thereby to cause the patient to be rolled or turned to one side or the other, depending upon the run of the belt that is shortened or extended.

It is also an object of the present invention to provide the several supporting loops with disconnectible ends to permit of an easy application of a belt beneath the patient. Also, to provide means for stiffening the disconnectible end portions of the belts to facilitate their being projected beneath the patient while lying in bed.

Other objects of the invention reside in the details of construction and in the combination of parts and in their mode of operation, as will hereinafter be fully described.

In accomplishing these and other objects of the invention, I have provided the improved details of construction, the preferred forms of which are illustrated in the accompanying drawings, wherein—

Fig. 1 is a perspective view of the device.

Fig. 2 is an end elevation of a device embodied by the present invention, illustrating its position relative to the bed in its ordinary use and with a part broken away for purpose of illustration.

Fig. 3 is a perspective view of the belt loops with parts disconnected.

Fig. 4 is a front elevation.

Fig. 5 is a sectional detail of an end portion of one of the belts.

Explanatory to the present invention, it will here be stated that, heretofore, devices and equipment of various kinds have been employed for the handling of invalids, either by the invalid him-

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self, or by an attendant. However, to my knowledge, such devices as heretofore made have been permanently attached to the bed frame or to other fixtures not independently movable. Also to my knowledge no device heretofore has been made in which control of one or more lifting belts was provided for a simultaneous extension, or retraction, of the runs of the opposite sides of a supporting sling or loop, nor has there been any separate control provided for either run of the loop as a means of controlling the direction of turning the patient.

The present device differs mainly in the following respects from those devices heretofore used: First, it is portable, or movable from room to room, or from bed to bed; second, it is independent of other equipment; third, it has a plurality of supporting belts under positive control for raising, lowering, or turning the patient, while supported thereby, in either direction; and fourth, the loops of the belts have provision for disconnection to permit their easy application beneath the patient.

Referring more in detail to the drawings—

The device, in its present preferred form of construction, comprises a base housing 1 of substantial length, and provided with horizontal legs 2 and 2' extending from its opposite ends. These legs are of equal length and are extended laterally to the same side, as seen best in Fig. 1, to underlie the bed, shown in dotted lines in Fig. 2, on which the patient to be handled is located.

At the opposite ends of the housing 1 and at an intermediate point are upright standards 3 integral with the base housing. Each of these, at its upper end, has a laterally extending arm 4 integral therewith. The standards are of equal height and this height is such that the arms 4 will overlie the bed at a substantial distance thereabove so as not to interfere with an easy handling of the patient. Also, these arms are extended laterally to substantially the same extent as are the legs 2, but usually not beyond them, so as to avoid overbalance.

The base portion of the housing 1, and the lateral legs 2 and 2' are equipped with supporting castors 6 to provide for an easy movement of the device from place to place. Preferably these castors are of the swivel type to permit of an easy movement of the device in any direction.

Mounted within the housing 1, and lengthwise thereof, are two shafts 10 and 11 revolvably supported in suitable bearings, and adapted to be separately driven by means of reversible electric motors 13 and 14, each of which motors is con-

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nected to its corresponding shaft through the medium of a reduction gear mechanism as indicated at 15. The electric motors are fixed or supported in any suitable manner in the housing 1 and are connected in circuit under control of circuit control switch mechanism indicated generally at 16, and whereby either motor may be caused to operate in either direction independently of the other, or both motors may be operated in unison in either direction, or in unison in opposite directions.

Fixed respectively to the shafts 10 and 11 at spaced intervals, and in alignment with the three standards 3, are paired belt winding drums 17-17', and associated with each pair of drums is a belt 17a having its opposite ends, respectively, fixed to the drums 17-17'. The runs of the belt extend from their drums, upwardly, and pass over guide wheels, or rollers 19 mounted in the standards, and also over rollers 19' in the lateral arms. The loops of the belts depend to equal extent downwardly from the arms, as shown in Fig. 1, and by proper direction of rotation of the winding drums the runs of the belts may be extended either individually, or in unison, to lower the loops to an extent that will permit their receiving the patient.

By reference to Fig. 1 it will be observed that when the device is in position for its use, the arms 4 overlie the bed. With the loops of the several belts placed about the patient on the bed, it is apparent that winding in on the runs of the belts, in unison, will cause the patient to be lifted directly upward and clear of the bed. Then, by either raising or lowering one run of the belt while the other is held still, or by operating the motors in a manner to cause an opposite relative movement of the two runs of the loops, the patient may be turned, and the extent to which he is turned is dependent upon the distance of relative travel of the opposite sides of the loop in opposite directions.

To facilitate an easy application of any belt loop to the patient, it has sections that are adapted to be disconnected. This is illustrated best in Figs. 2 and 3, wherein, at one side of the loop, a section of the belt, designated by reference numeral 17c, is provided with a flat-headed stud 20 projecting therefrom, which is designed to be projected through keyhole slot 22 in the other sections 17b of the loop. This arrangement provides that upon disconnection of the sections, one or the other may be projected beneath the patient and then again attached to close the loop.

To facilitate the projection of the detached end of a section 17b beneath the patient while he is on the bed, this portion of the belt may be equipped with a coating of relatively stiff Celluloid, or any similar material, as at 17d in Fig. 5, which will give sufficient stiffness and smoothness to the piece that it may be pushed beneath the patient.

It is also desirable that the belts, along the normal loop-forming portions, be widened to give easier support for the patient. Therefore the belts are either widened at these points, as shown in Fig. 4, or two sections, as seen in Figs. 1 and 3, may be employed.

It is to be understood also that the belts, for the greater part of their length, outside the normal loop-forming portions, might be in the form of cables rather than wide belts, and that sheaves might replace the wide rollers, thus to cut down width of the standards and arms.

Assuming the device to be so constructed, its use would be as follows:

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With the patient resting on the bed, should it be desired, for any reason, to raise or turn him, or to otherwise change his position, the present equipment is rolled to position so that the lateral arms 4 overlie the bed after the fashion as illustrated in Fig. 1. The electric motors are then set in motion by proper manipulation of switch controls to pay out the belts to lower the loops to an extent that they may receive the patient. Then one of the disconnected sections of each loop is projecting beneath the patient and again attached to its complementary part to close the loop. Then, if it is desired merely to raise the patient, both motors are set into operation at the same speed to draw in the belts and cause the patient to be lifted directly upward. If it is desired to turn the patient after he has been raised to a certain position, a relative opposite movement of the two runs of the loops causes this turning action. If it is desired to transport the patient, he may be lifted clear of the bed and moved with the equipment to the desired location.

It is to be understood that this type of equipment might comprise a single suspending belt, or it may have two or more. However, it has been found most practical, for ordinary hospital use, to employ the three loops, as herein illustrated. It has also been found desirable to provide a divided or widened belt at the loop portion so as to give a wider and easier support for the patient. However, this feature is not essential to the operation of the device.

It is also apparent that various details in construction are possible and without departing from the spirit of the invention. Therefore, I do not desire that the claims appended hereto should be confined strictly to the device as illustrated, but that they shall be given an interpretation consummate with the scope of the invention herein disclosed. It is believed that the gist of the invention resides not in the details of construction, but broadly in the provision of a portable unit for the purpose set forth.

Having thus described my invention, what I claim as new therein and desire to secure by Letters Patent is:

1. A device of the character described, comprising a portable base, a plurality of standards erected in substantial alignment along one side of the base, arms extended from the upper ends of the standards to overlie the base, belt guide rolls in said arms and standards, a pair of winding shafts in said base, belt winding drums on said shafts, belts with ends fixed, respectively, to the drums of the two shafts and extended over said guide rolls and forming loops depending from the said arms to co-act for the support of a person therein and means for effecting an individual control of each shaft for separately winding in either direction, or in unison.

2. A device of the character described, comprising a base housing having lateral legs adapted for extension beneath a bed, standards supported by the base to extend above the level of the bed and equipped at their upper ends with lateral arms to overlie the bed at a substantial distance thereabove, a pair of winding shafts in said base lengthwise thereof, winding drums on said shafts in paired relation, a plurality of belts with ends attached, respectively, to paired drums, belt guide rollers in said arms, whereby said belts are guided and from which said belts depend from the arms to form loops; said loops being aligned to receive and to conjointly support a person therein above the bed, a winding means for each shaft, and

operable for rotating the shafts to cause said loops to be paid out or drawn in, or the parts thereof at opposite sides to move relative to each other in the same or in opposite directions.

3. A portable base, a plurality of standards 5 erected in alignment along one side of the base with arms extended from their upper ends and overlying the base, belt guide rolls in said arms and standards, a pair of winding shafts in the base lengthwise thereof, belt winding drums on 10 the shafts, belts with opposite ends fixed respectively to the drums of the two shafts for winding thereon and extended over said guide rolls and forming the loops depending from said arms to cooperate in the support of a prone person 15 therein, and means for individually controlling the winding of said shafts in either direction.

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