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This invention relates to a combined hoisting apparatus and carrier for lifting and moving heavy objects more particularly for lifting and carrying invalids.

A primary object of the invention is to so construct an apparatus of this character that a sick or injured person or other heavy inert body may be easily placed on the lifter and carried to any desired place with a minimum effort and with little discomfort to the patient.

Another object of the invention is to provide an apparatus of this character having interchangeable carriers to adapt it for various uses.

Still another object is to provide a carrier having detachable supporting arms or fingers and which is adjustable to various angles to suit the comfort of the patient being supported thereby.

Another object of the invention is to so construct an apparatus of this character which when not in use the members of the carrier may be collapsed to occupy a minimum amount of space and yet may be quickly set up for use when desired.

In carrying out these objects, the invention is susceptible of a wide range of modification without departing from the spirit of the invention or sacrificing any of the advantages of the claimed invention; there being shown in the drawings for illustrative purposes a preferred and practical form, in which:

Figure 1 represents a side elevation of one form of my lifting and carrying apparatus embodying this invention;

Fig. 2 is a plan view thereof with the sections of the carrier arranged in longitudinal alignment to form a flat supporting surface;

Fig. 3 is a transverse vertical section taken on the line 3-3 of Fig. 1;

Fig. 4 is an enlarged plan view with parts broken out showing the connection between the sections;

Fig. 5 is a transverse section taken on the line 5-5 of Fig. 1;

Fig. 6 is a similar view taken on the line 6-6 of Fig. 1;

Fig. 7 is a detail sectional view showing the floor engaging clamps for holding the apparatus against accidental movement;

Fig. 8 is a detail perspective view of one of the fingers or perches;

Fig. 9 is an enlarged detail perspective view of a portion of the frame from which the sections of the lifter are constructed;

Fig. 10 is a plan view showing another form of carrier used in connection with the lifting apparatus;

Fig. 11 is a side elevation thereof;

Fig. 12 is a detail perspective view of one of the ends of a portion of the carrier shown in this form of the invention;

Fig. 13 is a detail side elevation showing the joint between the sections of the carrier; and

Fig. 14 is a detail perspective view showing on an enlarged scale the detachable connection of the cross members with the sides of the carrier.

Fig. 15 is a detail of one of the end extension members.

In the form shown in Figs. 1 to 9 is illustrated a substantially triangular base member 1 mounted on suitable casters 2 to provide for the movement of the apparatus from place to place, a spring pressed floor brace 10 being shown for holding the apparatus against movement when desired. The spring may be of any suitable or desired construction being here shown in the form of a spring-pressed floor engaging member 11 having a shank or stem 12 extending through the upper face of the base 1 and connected with a lever 13 fulcrumed intermediate its ends at 14 and provided at its free end with a foot rest 15 so that when desired to move the apparatus all that is necessary is to depress the foot rest 15 which releases the floor engaging member 11 and permits the apparatus to roll from one place to another.

Mounted on this supporting base 1 is a hydraulic pump 3 of any suitable or desired construction, being here shown in the form of a cylinder 4 having a plunger 5 mounted therein with a fluid inlet 6 controlled by a foot lever 7.

An outer cylinder 8 surrounds and is spaced from the cylinder 4 and over which
is permitted to slide a sleeve 9 carried by the plunger to render the pump oil and water proof, the sleeve rising and falling with the plunger.

The sleeve-like casing 9 which has a tight sliding fit over the cylindrical casing 8 has its upper end reduced and offset inwardly to form a shoulder 9a which is designed to engage the upper end of cylinder 8 and limit the lowering of the plunger 5 and prevent its covering the fluid inlet opening 6.

It will thus be seen that this casing 9 performs the triple function of a fluid tight connection for the lifter and plunger; an auxiliary guide for the plunger to strengthen and prevent tilting of the lifter, and as a stop to limit the lowering of the plunger and the lifter carried by it.

This pump 3 is shown mounted on one corner of the triangular base 1 so that the two other corners or projections may be projected or inserted under the bed or other object from which the invalid is to be lifted and which also provides means for balancing any weight placed on the carrier which moves with the plunger.

The carrier 20 shown in Figs. 1 to 3 is composed of a center section 30 to the ends of which are hinged connected end sections 40 and 50. The central section 30 has a lateral extension 31 one face thereof which carries a sleeve 32 adapted to slide on the plunger 5 and to be fixedly secured thereto by a suitable fastener here shown in the form of a bolt 33. This central section 30 is provided at its ends with concave portions shown at 34 in Fig. 4 beyond the edge of which projects a worm gear 35 carried by a shaft 36 journaled in bearings at opposite sides of the section 30 and equipped at one end with an operating handle 37. This worm 35 is designed to mesh with a worm gear 51 carried by the adjacent end of the end section or arm shown at 30 in Fig. 4 and by means of which the sections may be adjusted at different angles to suit the convenience of the operator. The end and central sections of the carrier are pivotally connected by bolts 38 and each of these sections is provided on its upper face with a plurality of longitudinally spaced laterally opening finger receiving sockets, those on section 30 being numbered 39 and on sections 40 and 50, 41 and 52, respectively.

These sections are also provided on their upper faces at their opposite edges with laterally spaced lugs 42 between each pair of which is designed to be mounted one of the supporting fingers or perches 43. These perches or arms 43 are constructed preferably as shown in detail in Fig. 8 being tapered in thickness toward their outer ends and provided at their inner ends on their lower faces with longitudinally extending lips 44 spaced from the body portion of the perch to form a socket for engagement with the edge of the section in connection with which the perch is to be used, as is shown clearly in Fig. 3. These perches 43 each has at its inner end a longitudinal extension 46 to enter and fit the socket 41 and provided with a shoulder 47 which is designed to abut the outer face of the socket and limit the insertion of said end 46. This end 46 is preferably apertured as shown at 48 for reception of a spring pressed catch 49 designed to assist in holding the perch in operative position.

The end sections 40 and 50 preferably are provided with terminal extensions 45 and 55 respectively to provide for the lengthening of the carrier when found necessary. These extensions are made exactly alike and hence one only will be described in detail.

The extension 45 shown in Fig. 15 is provided at its rear end with longitudinally extended laterally spaced pins 56 which are designed to enter sockets 57 formed in the outer ends of the end sections to receive these pins and which are frictionally held engaged therewith.

The carrier 20 may be made of any suitable material, preferably of metal and when not in use the fingers 43 may be detached and the end sections or wings swung downward so as to occupy a minimum amount of space and if desired they may be entirely disconnected from the pump plunger 5 by loosening the fastening bolt 53 and lifting the carrier from the plunger. This provides for the use of other devices in connection with the plunger or pump.

It is of course understood that the perches 43 are designed to be slipped under the body to be lifted and owing to their tapered construction will pass easily thereunder without engaging the object should it be other than a person. It is also obvious that by manipulating the handles 37 to actuate the worm gears 35 the sections 40 and 50 may be adjusted at any desired angle relatively to the central section and made in the form of a chair-like support as shown in Fig. 1 or spread out flat as shown in Fig. 2. It is also understood that raising or lowering of the plunger 5 by admitting pressure fluid through the opening 6 or releasing the fluid will operate to raise or lower the carrier at the will of the user.

The base member 1 is mounted on casters and after the object to be lifted has been placed on the carrier 20 the apparatus may be rolled to the desired place and the patient or other object removed from the carrier or allowed to remain thereon as may be desired.

In the form shown in Figs. 10 to 14 the supporting base 1 and the pump 3 are the same as that shown in the other figures the difference residing in the carrier and in the means for supporting it which is raised or lowered by the pump.

Mounted on the plunger 5 in Fig. 11 is a
crane 60 which includes a tubular upright 61 designed to fit over the upper end of the plunger 5 and having extending laterally from its lower end arm 62. This arm 62 has mounted in its outer end a worm 63 operable by a handle 64 and which meshes with a worm gear 65 fixed to one end of a shaft to which one end of a cable 66 is attached. This cable 66 extends through an opening in the upright 61 and passes over a pulley 67 carried by a laterally extending arm 70 of the crane. This arm 70 has its front portion 71 connected with the body thereof by a swivelled joint and a clamp 72 is located at this joint and connected with the upper end of a channel-iron bar 73 which also extends through the opening in the upright 61 through which the cable 66 passes and has its other end engaged with the arm 62 of the crane and held in adjusted position by means of a pin passing through said arm and through one of the series of apertures 74 in the iron or bar 73.

The cable 66 after passing over the pulley 67 passes around another pulley 68 carried by the front portion 71 of the crane arm and extends around a pulley 81 connected with a carrier presently to be described. This cable after passing under pulley 81 is connected with the free end of the arm 71 and thus adjustably supports the stretcher with which the pulley 81 is connected.

The stretcher 80 shown in Figs. 10 and 11 is composed of three adjustably connected sections 82, 83, and 84, 82 being the central section and 83 and 84 the end sections which are hinged and adjustably connected and preferably have their side members made of angle irons L-shaped in cross section as shown at 85 in Fig. 14. The side members of the end sections 83 and 84 are connected at their outer ends by rods 86 and 87, respectively, which fit in thimble or socket members 88 carried by the side bars of the stretcher as shown clearly in Fig. 12. Hinge rods or pintles 89 connect the inner ends of the side bars of the end sections with each other and with the ends of the center section 82 as shown clearly in Fig. 10. These rods 89 have handles 90 at one end, said rods forming hinge pintles for the sections. The adjacent sections are provided with a worm 33a and a worm gear 51c meshing with each other as those shown in the other figures and which are operable by a handle 37a for adjusting the sections relatively to each other.

The side bars of the sections intermediate their ends are connected by slats 91 provided at each end with key-hole slots 92 designed for engagement with headed studs 93 carried by the side bars and which are equivalent of the perches shown in the other figures.

While the crane is shown supporting a stretcher obviously it may be used for hoist-