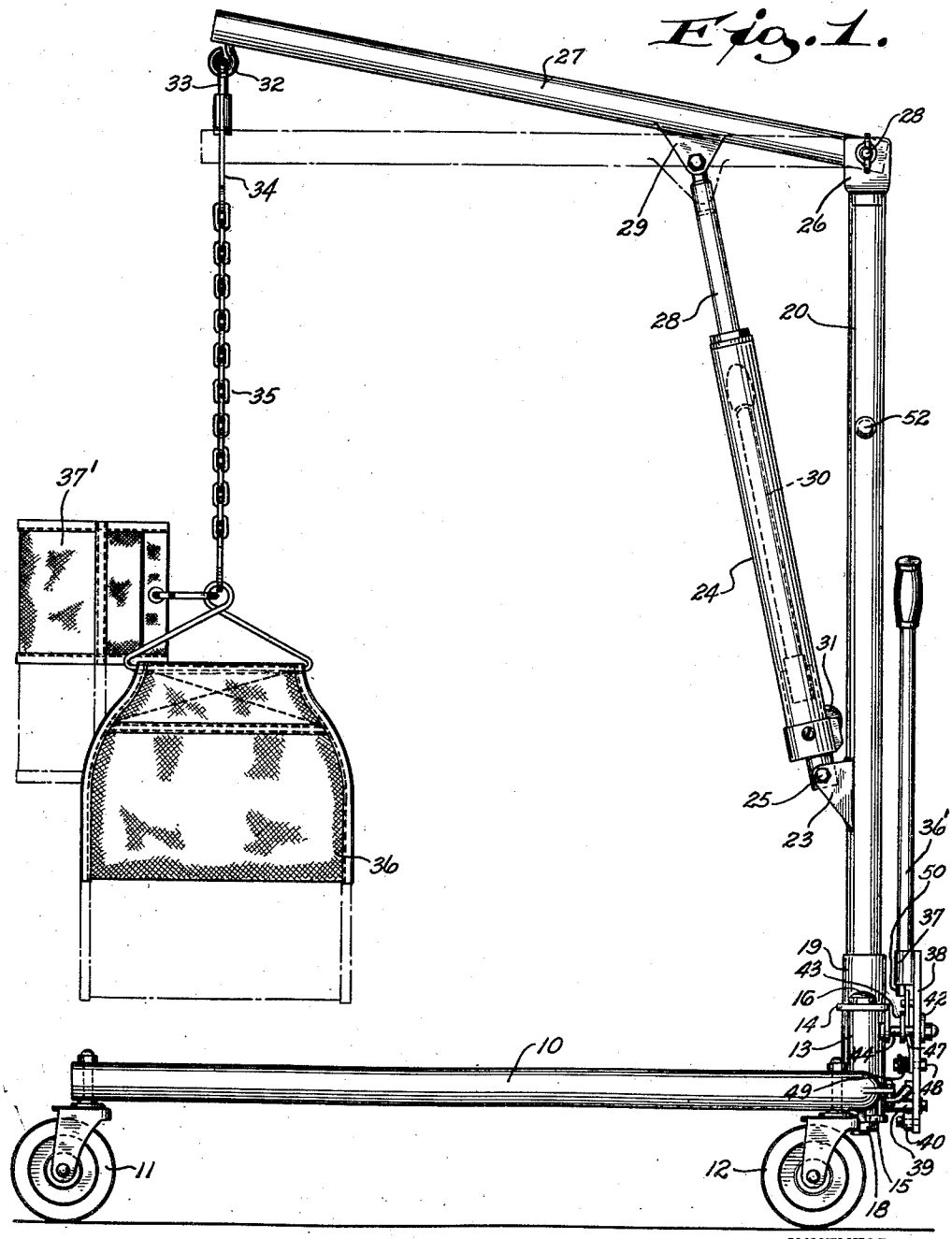
Jan. 28, 1958 T. R. HOYER ET AL 2,821,406

ADJUSTABLE BASE INVALID LIFT

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Fig. 1.



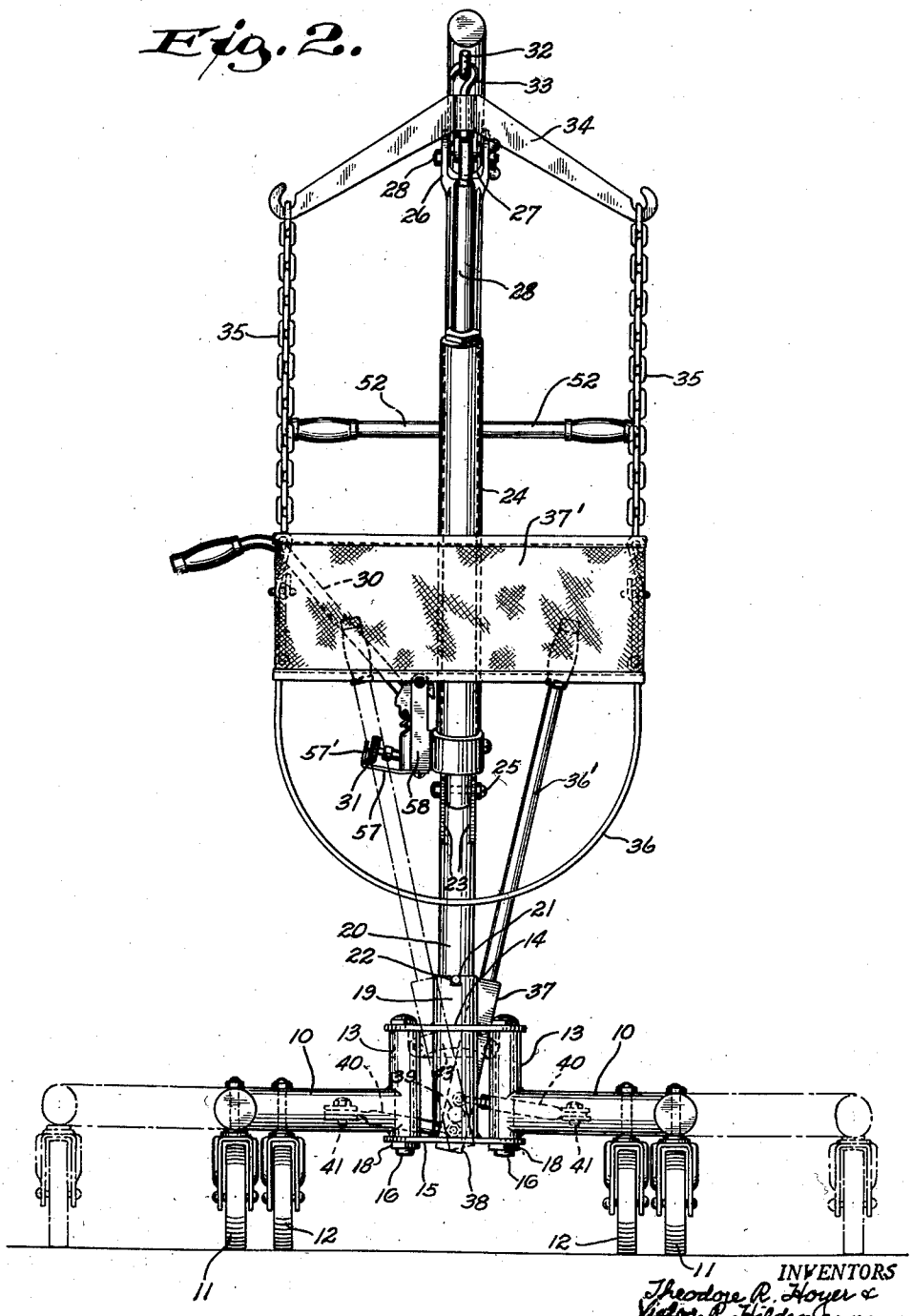
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Fig. 2.



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Fig. 3.

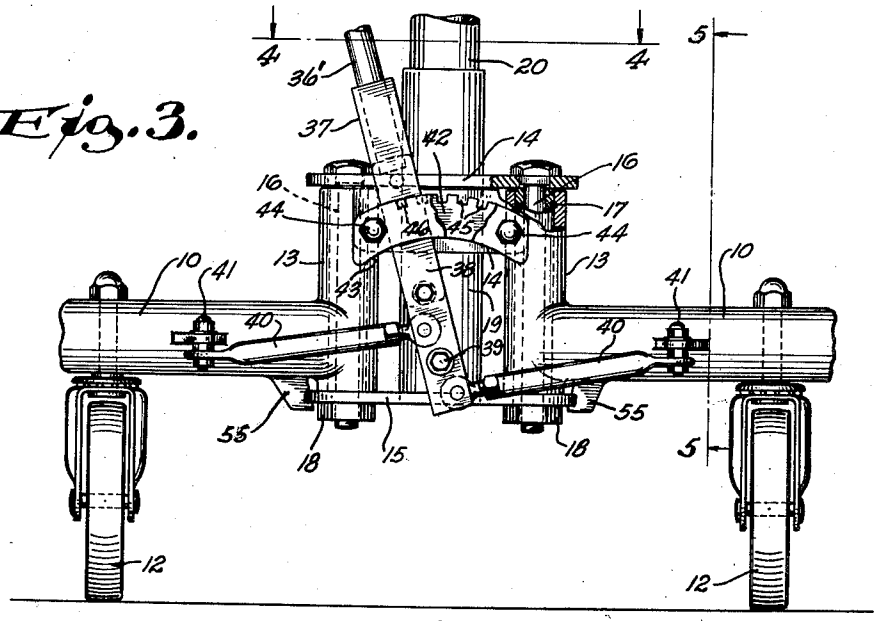


Fig. 4.

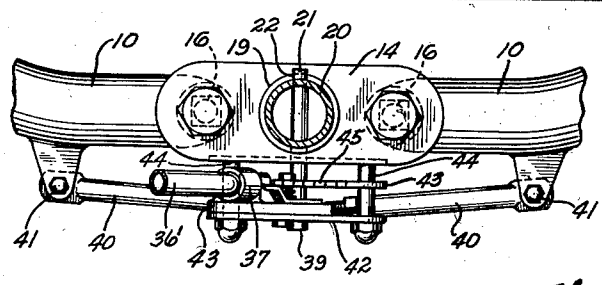


Fig. 6.

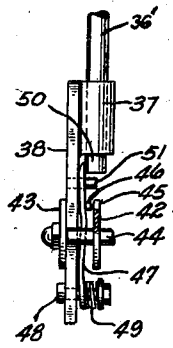
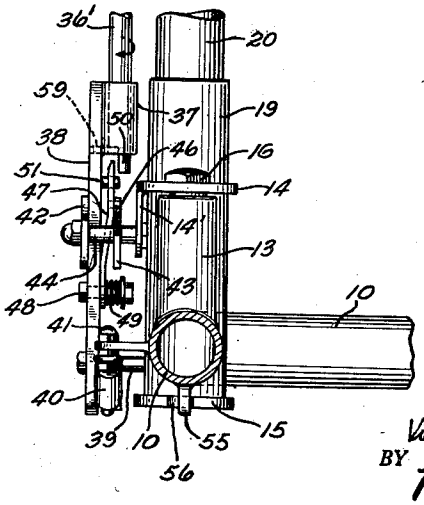


Fig. 5.



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ADJUSTABLE BASE INVALID LIFT

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Application July 21, 1954, Serial No. 444,764

2 Claims. (Cl. 280—34)

This invention relates to improvements in adjustable base invalid lifts.

For incapacitated or physically handicapped persons invalid lifts find great utility and acceptance. Customarily these invalid lifts include a wheeled U-shaped horizontal base, an upright post or mast, an arm pivotally mounted on an upper portion of the mast for movement in a vertical plane and from the outer end of which slings or a saddle are depended, and power means between the upright post or mast and the vertically swingable arm.

Invalid lifts are very useful in respect to transferring a patient or incapacitated person from a bed to a wheelchair or vice versa, or in transferring and transporting the patient to some other article of furniture, appliance or conveyance. In connection with an invalid lift of the type under consideration, it is necessary that the space between the arms forming the U-shaped base be sufficiently great to receive therebetween a wheel chair or other article of furniture or appliance of considerable width. It is furthermore necessary that the overall width of the horizontally disposed U-shaped base be limited in order that the lift may be wheeled through relatively narrow doorways, halls, aisles and the like.

With the foregoing in mind, it is therefore, a primary object of the present invention to provide an invalid lift wherein the U-shaped base is adjustable as to width or spread whereby the base may be spread to permit the entrance thereinto of a wheel chair or wider article of furniture, and which can thereafter be contracted in width to adapt the lift for wheeled passage through a restricted doorway or hall.

A further object of the invention is to provide an adjustable base invalid lift wherein the width of the base can be adjusted by the operator of the lift while the patient is supported by the lift and during wheeled movement of the lift.

A further object of the invention is to provide an adjustable base invalid lift in which the operator of the lift can cause the U-shaped base of the lift to be spread or contracted through simple lever means accessible to the attendant in a standing position.

A further object of the invention is to provide an adjustable base invalid lift having easily operated mechanical means for locking the lift base in any of its positions of adjustment.

A further object of the invention is to provide an adjustable base invalid lift which can be readily disassembled to permit storage thereof in a limited space.

A further object of the invention is to provide an adjustable base invalid lift which is of very simple construction, which is easy and convenient to operate, which is strong, durable and safe, and which is well adapted for the purposes described.

In the accompanying drawings in which the same reference characters indicate the same parts in all of the views:

Fig. 1 is a side view of the improved adjustable base invalid lift;

Fig. 2 is an end view of the lift viewed from the open end of the U-shaped base, there being a broken line showing of the base in a relatively spread condition;

Fig. 3 is an enlarged fragmentary view of the closed end portion of the lift base showing the base adjusting mechanism and the means for locking the base in a position of adjustment;

Fig. 4 is a fragmentary detail sectional view taken on line 4—4 of Fig. 3;

Fig. 5 is a fragmentary detail sectional view taken on line 5—5 of Fig. 3; and

Fig. 6 is a fragmentary view, partly in section, of the lock operating rod and associated members, the rod being in a turned locking position relative to its position in Fig. 5.

As will be observed from the drawings the base of the improved invalid lift is generally in the form of a horizontally disposed U, formed of two complementary hook-shaped half sections **10**, preferably of tubular metallic stock, hingedly joined together at their adjacent inner ends. The U-shaped base is open at one end (the left hand end in Fig. 1) and the outer ends of the complementary base sections **10** have swivellingly mounted thereon supporting wheels or casters **11**. Each complementary base section **10**, toward the hinged closed end of the base, swivellingly carries another supporting wheel or caster **12**. The inner end portion of each base section **10** terminates in an integral upstanding hollow post portion **13**. The two post portions of the complementary base sections **10**, in the assembled condition of the base, are slightly spaced apart and are connected by plates **14** and **15** which engage the upper and lower ends, respectively of the posts **13**, being held thereto by pivot bolts **16** which extend vertically through the hollow posts **13** and are surrounded by bushings **17** (see Fig. 3). The lower end portions of the pivot bolts **16** have threaded thereon retaining nuts **18**. At this point it may be stated that due to the hinged mounting of the inner ends of the complementary base sections **10** the same may be moved to widen or restrict the opening at the outer end of the base by means hereinafter to be explained.

Integral with the lower connecting plate **15** and mounted on the same between the posts **13** is an upwardly directed cylindrical socket **19** which extends through an opening therefor in the upper plate **14** and which is adapted to removably receive the lower end portion of a vertical mast **20**. In practice the mast, when inserted in the socket is properly located and held against turning movement by a transverse pin **21** on the mast entering a slot **22** therefor in the upper peripheral portion of the socket.

On an intermediate portion of the mast **20**, directed toward the open end of the wheeled base, are a pair of spaced apart lugs **23** between which the lower end portion of an hydraulic jack cylinder **24** is pivotally mounted on a transverse pivot pin **25**. The upper extremity of the mast **20** is bifurcated as at **26** and within said bifurcated portion the inner end portion of a vertically swingable arm **27** is removably pivotally mounted on a pivot bolt **28**. The arm **27** extends from the mast **20** toward the open end of the U-shaped base at an elevation thereabove and is adapted to be moved in a vertical plane by the hydraulic jack whose upwardly extending piston **28** is pivotally connected to depending lugs **29** on the arm **27**. The hydraulic jack includes an operating lever **30** extending laterally outwardly from the base portion of the jack cylinder, which lever is operatively associated with the jack mechanism so that when it is reciprocated hydraulic fluid will be forced below the lower end of the piston **28** within the cylinder **24** to project the piston **28** and thereby cause the outer end of the arm **27** to be raised. With a weight imposed on the outer

end of the arm 27 said arm can be caused to swing downwardly by manipulating a control knob 31 projecting from the base of the jack cylinder which relieves the hydraulic pressure acting on the inner end of the jack piston. An angled plate 57 (see Fig. 2) is secured at its inner end to the base of the jack lever mounting 58 and the angled outer end portion 57' of said plate extends adjacent the hydraulic pressure control knob 31 and limits the distance said knob may be turned outwardly thereby preventing undesired detachment of the turnable knob 31 and possible loss of hydraulic fluid.

At the outer end of the vertically swingable arm 27 there is a depending eyed member 32 which can be removably engaged by a hook 33 swingably mounted on the upper end of a spreader bar and hanger 34. As will appear most clearly from Figs. 1 and 2 the opposite hooked extremities of the spreader bar and hanger 34 may be removably engaged by the upper ends of chains 35 or other flexible suspension means by which a saddle 36 and back support 37' may be shiftably suspended from the movable outer end of the arm 27 for supporting and moving an incapacitated person or patient who is to be transported or shifted by the entire invalid lift assemblage with the swivel mounting of the hook 33 permitting the suspended patient to be turned, if necessary. While the saddle and back support are illustrated as being depended from the supporting chains 35, it is possible to use under shoulder and leg straps in lieu thereof which are engaged at their upper ends with the hooked extremities of the spreader bar and hanger 34. Also the spreader bar and hanger 34 can be dispensed with and the saddle supporting chains 35 may be connected directly to the eyed member 32, if desired.

One of the principal features of the present invention is the mechanism which permits an attendent who is pushing or operating the lift in a standing position to mechanically spread or contract the companion base sections 10 so as to widen or constrict the entrance to the U-base whenever desired to permit the base to receive or straddle a chair, piece of furniture or appliance of any width within certain limits and to thereafter narrow the span between the outer ends of the base sections to facilitate wheeled passage of the lift through a narrow doorway, hall or other restricted area.

For the purpose of permitting the lift attendant or operator to adjust the width of the base while standing at the rear of the lift or pushing the same, an upright hand lever 36' is provided whose lower end revolubly and removably extends into a socket 37 therefor integral with and inwardly offset from the upper end of a bar 38 which is pivotally mounted inwardly of its lower end on a horizontal pivot 39 projecting rearwardly from the lower end of the socket 19. The inner ends of oppositely directed arms 40 are pivotally connected to vertically spaced apart portions of the bar 38 on opposite sides of the pivotal mounting 39 thereof and are respectively pivotally connected at their outer ends, as at 41, to lugs on the curved end portions of the complementary base sections 10. It will thus be seen that a pivotal movement of the hand lever 36' from its full line position in Fig. 2 to the broken line position of Fig. 2 will, through the arms 40, cause the base sections 10 to be swung from the relatively narrow or constricted position shown in full lines to the spread broken line position, and a reverse movement of the hand lever 36' will move the complementary base sections from the relatively spread position to an narrower position. Intermediate positions are also obtainable.

The invention also includes means for locking the base sections 10 in any position of adjustment. The post supported top plate 14 has a downturned flange 14' on which are mounted in spaced relaiton a pair of curved plates 42 and 43. The bar 38, which is pivotally moved through the hand lever 36', is confined between the curved plates 42 and 43 for swinging movement in a vertical plane and is limited in its movement in each direction by the bolts 44 which spacedly mount the curved plates 42 and 43 on the downturned flange 14'. The upper margin of the inner curved plate 43 is formed with a series of spaced-apart notches or recesses 45 which are adapted to be selectively engaged and disengaged by a stub pin 46 projecting laterally from an intermediate portion of a latch plate 47 having its lower end yieldingly mounted on a bolt 48 which carries on its shank a confined coil spring 49 which normally exerts pressure against the lower end of the latch plate 47 in a manner so as to cause its offset upper end to yieldingly engage a face portion of the curved plate 43 and thereby cause the stub pin 46 to engage any of the plate notches 45 with which it might be in registration, depending upon the position of the bar 38 and the consequent spread of the base sections 10. The bolt 48 yieldingly mounts the latch plate 47 on an inner face portion of the lower end of the pivotal bar 38.

A portion of the hand lever 36' which is revolubly engaged within the socket 37 extends below the socket and is mutilated or formed with a depending semicircular cam surface 50 (see Figs. 5 and 6). When the hand lever 36' is turned in its socket so as to remove the depending cam surface 50 from the upper end portion of the latch plate 47, the upper portion of the latch plate being guided on a laterally projecting pin 51, the upper end portion of the latch plate is permitted to be yieldingly urged away from the face portion of the bar 38 to project the latch plate carried stub pin 46 into one of the locking notches 45 of the plate 43. This will serve to lock the bar 38 in an adjusted position and hence the complementary base sections 10 will be held in a set position. Should it be desired to adjust the base sections to increase or diminish the spread thereof, it is merely necessary for the operator or lift attendant to turn the hand lever 36' within the socket 37 to shift the cam projection 50 from the position of Fig. 5 to the plate engaging position of Fig. 6 which removes the stub pin 46 from a plate aperture 45. Turning movement of the hand lever 36' in both directions is limited by contact of the side edges of the cam projection 50 with a pin 59 (see Fig. 5) mounted in the lower portion of the socket 37, which pin also serves to locate and hold the lower end of the lever 36' within its socket. Consequently, the attendant is then free to pivotally swing the hand lever 36', which, through the arms 40 will pivotally move both of the base sections 10 to spread or contract the same, as desired.

From Figs. 3 and 5 it will be observed that the inner end portions of the base sections 10 are provided with depending integral lugs 55 which extend into slots 56 in the lower plate 15. This arrangement limits the swinging movement of the base sections in both directions thereby preventing tipping of the entire lift mechanism should the adjusting mechanism become impaired or the arms 40 become detached.

The improved adjustable base invalid lift is susceptible of easy and rapid disassembly to permit storage of the lift in a limited space or to facilitate packing and transportation thereof. The mast 20 and parts carried thereby may be entirely removed from the base carried socket 19 and the hand lever 36' may be removed from its base carried socket 37. Further, the chains are detachable from the outer end of the vertically swingable arm 27 and the saddle 36, back support 37' or shoulder and leg slings may be disengaged and arranged in a small package. To further compact the mast and arm assembly the pivot bolt 28 may be removed so as to fold the arm 27 and hydraulic jack against the mast. If the improved lift is carried in the disassembled condition described it may be easily set up for use at any time or point of destination.

In order to remove a patient from a bed or stationary piece of furniture, it is merely necessary to position the saddle 36 under the seat of the patient and adjust the back support 37', with the U-shaped base being positionable under the bed or in embracing relation to the side

portions of the stationary support. Then, by manipulating the operating lever **30** of the hydraulic jack the arm **27** will be moved in a vertical plane so as to elevate the outer end of said arm raising the saddle and the patient supported thereby to a proper elevation. Then the entire lift, with the patient supported thereby may be wheeled to a remote point for the subsequent deposit of the patient, or a wheel chair can be positioned between the complementary members **10** of the base to receive the patient after the arm **27** and saddle are lowered through manipulation of the hydraulic fluid control knob **31**. A particular feature of the improved lift is the means whereby the base **10** may be spread or contracted while the lift is stationary or in movement to adapt the spread of the base to a chair or other support of any width within certain limits, or to permit passage of the left through a narrow doorway or hall. In the latter event the base is constricted. The attendant may easily push or pull the lift by engaging handle bars **52** projecting laterally from an upper portion of the mast **20**. The lift operator or attendant in a standing position is free to manipulate the hand lever **36'** to adjust the base, and by turning the hand lever in its socket, the locking mechanism is engaged with or released from the notched plate **43** which affords convenient means for preventing undesired spreading or constriction of the base relative to its adjusted position.

While an hydraulic jack has been shown and described as the instrumentality interposed between the mast and the vertically swingable arm for raising and lowering said arm, it should be understood that a mechanical jack or other motion transmitting means could be substituted therefor.

The improved adjustable base invalid lift is simple in construction and operation, is exceedingly adaptable and is well suited for the indicated purposes.

What is claimed as the invention is:

1. In a lift for transferring an invalid in a sitting posture, a U-shaped, horizontal, wheeled base member formed of a pair of complementary sides having curved adjacent inner end portions, a hinge connection between the adjacent inner end portions of the base member sides to permit relative spreading movements of the sides of the base member, an upwardly directed lever pivotally

mounted adjacent said hinge connection for swinging movement in a vertical plane, a lever operator revolubly carried by the lever and normally operable to pivot the lever, bars connected directly to said lever on opposite sides of its pivotal mounting extending to rear portions of said base member sides for swinging them on said hinge connection to spread or constrict the open end of the base member, and a latch for releasably locking said lever and the base member sides in various positions of adjustment operated by turning movements of the lever operator.

2. In an invalid lift, a U-shaped, horizontal, portable base member formed of a pair of complementary sides having adjacent inner end portions, a hinge unit between the adjacent inner end portions of the base member sides to permit relative spreading movements of the sides of the base member, an upwardly directed lever pivotally mounted on said hinge unit for swinging movement in a vertical plane, oppositely directed bars connected to said lever on opposite sides of its pivotal mounting extending to said base member sides for swinging them on said hinge connection to spread or constrict the open end of the base member, an extension handle movably engaged with said lever, a latch pin plate on said hinge unit formed with a series of spaced recesses, and a latch pin yieldingly associated with said lever and selectively engageable with said plate recesses to hold the lever and base member sides in a desired position of adjustment, movements of the extension handle relative to the lever controlling projection or retraction of the latch pin relative to a plate notch.

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