Aug. 24, 1943. J. A. RUPPRECHT 2,327,671

WALKER MECHANISM FOR INVALIDS

Filed Sept. 10, 1941 2 Sheets-Sheet 1

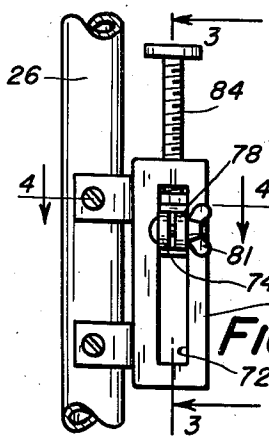


FIG_2

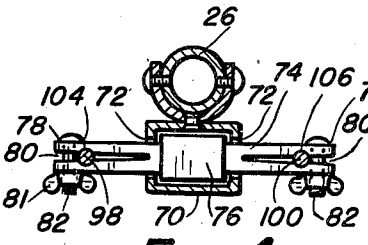


FIG_4

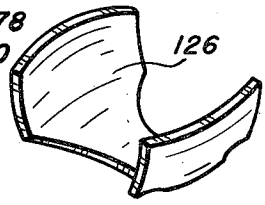


FIG_5

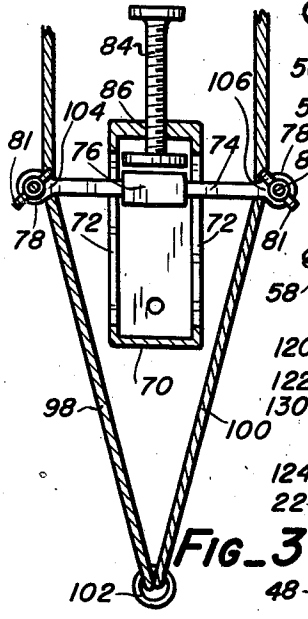


FIG_3

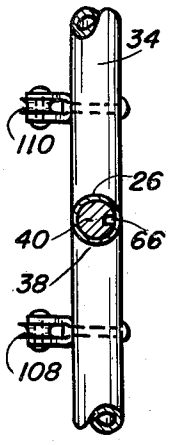


FIG_6

FIG_1

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WALKER MECHANISM FOR INVALIDS

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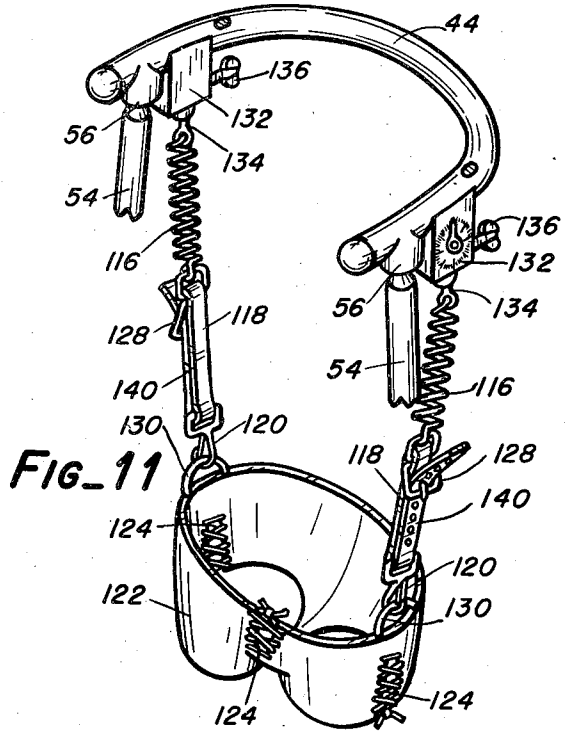


FIG_11

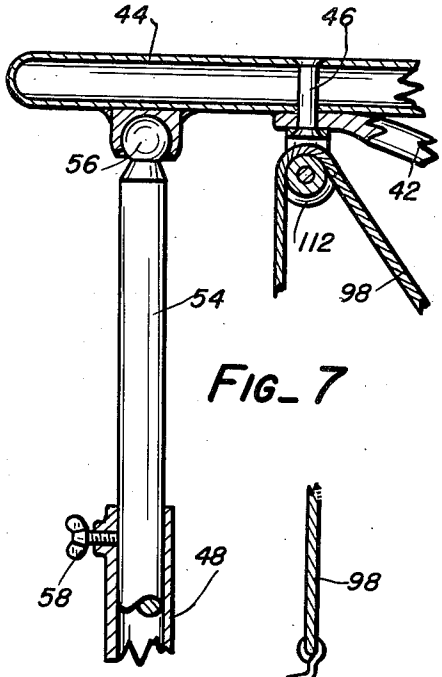


FIG_7

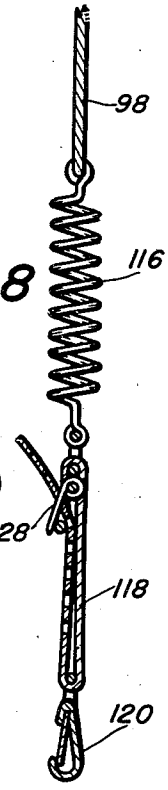


FIG_8

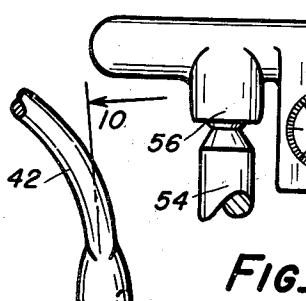


FIG_12

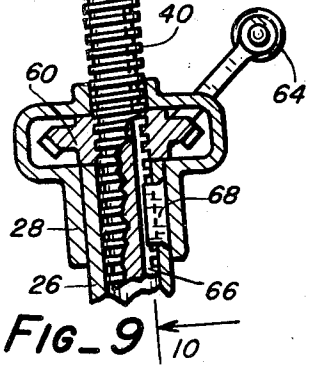


FIG_9

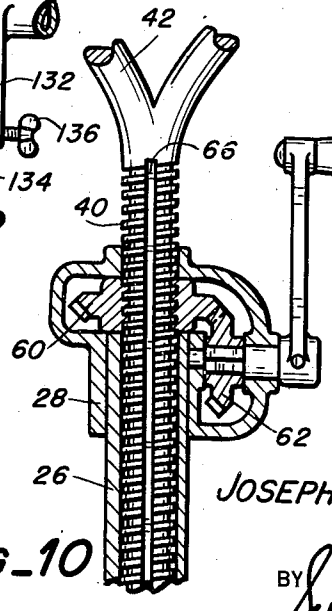


FIG_10

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UNITED STATES PATENT OFFICE

2,327,671

WALKER MECHANISM FOR INVALIDS

Joseph A. Rupprecht, Seattle, Wash.

Application September 10, 1941, Serial No. 410,273

11 Claims. (Cl. 272—70)

This invention relates to improvements in a walker mechanism for invalids and more particularly to an apparatus or appliance which may be used by physicians to control the weight pressure allowed on the legs of invalids in cases of leg fractures, breaks, sprains, cut tendons, and so forth, during the healing stages and to assist the invalid in regaining full use of his physical processes. This invention is also useful in the treatment of infantile paralysis and other illnesses involving loss or impairment of muscular coordination, and weaknesses, as it allows the attending physicians to prescribe and control body pressure on legs, while allowing patients full freedom for needed exercise.

The device entirely eliminates any danger of re-injury or added injury which is possible during the use of crutches. My device, through the principles involved, acts as an aid in making walking motions and by systematic weight increases on the legs, as prescribed by the physician, allows a gradual strengthening of the muscles and re-coordination of the nerves to the end that full articulation may be hastened and made easy.

In the rehabilitation of invalids who are suffering from the disability of using the lower limbs, it is an important consideration that the person gradually apply the body weight to the healing legs or limbs, so that the weak member, muscles, or the like may take up the strain of carrying the body in a gradual manner and in a manner that may be periodically increased or varied. When the undertaking is left to the judgment of the invalid, often he will take upon himself too strenuous a burden for the condition that he is trying to cure and great harm will be done.

It is an important object of my invention to provide a walker mechanism for invalids, which mechanism, in addition to supporting the invalid, may also be periodically adjusted to vary the load the invalid may place upon the lower extremities and to carefully gauge that load, previous to allowing its support by the invalid.

Another object of the invention is the provision of a walker for invalids in which device the entire body weight of the invalid is carried in suspending means and can be applied to the extremities of the invalid only when desired by him.

A further object of the invention relates to the provision of gauge scales in a walker by which the load that the invalid's legs are to carry may be carefully gauged before the invalid actually uses the walker, and which scale may be released of its load during use of the walker by the invalid.

Still another object of the invention relates to the provision of a vertically adjustable yoke for supporting the upper portion of the torso of an invalid during use of a walker, and from which yoke the lower portion of the torso may be suspended.

Other objects and advantages of the invention will be more apparent during the course of the following description.

In the drawings and in the accompanying specification I have shown and described a preferred form of my invention, but it is specifically pointed out that changes and alterations may be made within the scope of the subjoined claims without departing from the principles disclosed herein.

In the drawings—

Figure 1 is a perspective view of my walker mechanism for invalids,

Figure 2 is a side elevational view of the cable stopper used in my assembly,

Figure 3 is a vertical cross-sectional view through the cable stopper, taken on line 3—3 of Figure 2,

Figure 4 is a cross-sectional view taken on line 4—4 of Figure 2,

Figure 5 is an inner liner which may be inserted in the supporting trunk of my device,

Figure 6 is a fragmentary plan view showing leader sheaves attached to the horizontal cross brace of the walker frame,

Figure 7 is an enlarged sectional view of the yoke member, the ball and socket arrangement for the telescopic side braces and the locking means for the same,

Figure 8 is a cross-sectional view of the supporting strap and snap which is attached between the suspender spring and the trunks,

Figure 9 is a vertical sectional view of the bevel gear and screw employed in my device,

Figure 10 is a view taken on line 10—10 of Figure 9,

Figure 11 is a perspective view of a modified form of my device, and

Figure 12 is an enlarged view of the gauge scale employed in Figure 11.

The numeral 14 designates the frame and the support bar for my walker. This frame consists of the two side bars 16 and 18 joined by the tie-bar 20 used as a cross brace in the form of an H frame. The ends of the two side bars 16 and 18 are turned down as at 22 and casters

24 are pivoted in the turned-down ends 22 so that the whole device may be easily rolled over a floor, freely in any direction with the minimum of friction.

Rising from the center portion of the tie-bar 20 is the upright front support bar 26 which carries the housing 28 for the bevel gear mechanism. Secured to the approximate center of the side bars 16 and 18 are forwardly inclined brace legs 30 and 32 which are L-shaped and have inturned ends 34 that join with the front support bar 26 at 38.

Adapted to be adjusted vertically in the front support bar 26 is a screw 40 which carries a yoke-supporting fork 42. A support or yoke 44 is secured as by the rivets 46 to the fork 42. A pair of opposed yoke supporting legs 48 and 50 rest in the ball and socket joint shown at 52 and rise therefrom. The telescopic legs 54 fit into the tubular legs 48 and 50 and have ball and socket or pivotal connections to the yoke at 56. These yoke legs have to be adjusted for differences in heights to which the yoke is adjusted with relation to the front support bar 26. The telescopic legs 54 may be locked in any adjusted position in the yoke legs 48 and 50 by the wing nuts 58.

The yoke can be adjusted to any height by means of the two meshed bevel gears shown at 28. The housing of the bevel gears is secured to the front support bar 26. An internally threaded bevel gear 60 engages on the threaded leg 40 and is in mesh with the bevel gear 62 which is rotatable by the crank 64. When the crank 64 is rotated, which action revolves gear 62, the gear 60 will be turned and the threads on its interior will raise or lower the screw 40. The screw 40 has a keyway 66 cut in its front face and the key 68 in the leg 26 keeps the yoke 44 from shifting.

A cable stopper 70 is attached to the lower front of the brace rod 26 above the gauge-scale 71 and below the bevel gear assembly 28. The function of this stopper is to assume the load carried on the scale 71 and to allow disconnection of cables running to the gauge-scale where weight adjustment has been made.

When such adjustment is made and the gauge-scale is relieved of the load, subsequent and forceful movements of the patient in the suspending means will not be translated directly to the relatively sensitive mechanism of the gauge-scale. The function of the cable stopper is primarily for such protective reasons, although it also serves to relieve the suspension means of any flexibility that would be imparted from the gauge mechanism as well as to firmly anchor the suspension means at one end.

The housing 70 of the cable stopper has the two slots 72 in opposed sides. Mounted to float freely in the stopper housing, is the horizontal spreader bar 74 which is secured to a guide block 76 within the housing 70 and extends outwardly on each side thereof. The horizontal spreader bar has the cable clamps 78 at its ends which are formed by bifurcating the spreader ends at 80. These are closed snugly about the cable by the wing-nuts 81 on bolts 82.

A set screw 84 which is threaded into the top of the housing at 86 is used as a stop to fix the guide block 76 in any desired position.

The gauge spring scale 71 is secured to the front cross tie bar 20 at 88. This gauge scale is used, first, for determining the weight of the patient and second for determining the weight pressure allowable on the legs as prescribed by the circumstances of the invalid's condition. The scale 71 is spring operated and has a pointer 90 which indicates on the indicia 92 the number of pounds pressure applied to the draft link 94 that is coupled to the indicator hand 90 by spring mechanism (not shown). The link 94 has the hook 96 at its outward end.

Two body supporting cables 98 and 100 are secured to a ring 102 which ring is engaged over a hook 96. The cables are then led upwardly into the ends of the spreader bar at 104 and 106 where they may be clamped. They are then passed over the leader sheaves 108 and 110, which sheaves are secured to the horizontal cross bar 34. Eventually the cables are led over the upper leader sheaves 112 and 114, which sheaves have clips that are secured by the rivets 46 to the yoke 44 and fork 42.

The suspender springs 116 are attached to the ends of the cables 98 and 100, and support the body suspension assembly. Adjustable webbing or straps 118 and snaps 120 attach the springs to the trunks 122. These trunks have sides and back adjustable to fit the wearer. This garment is adjusted by varying the laces 124 in the slits in the sides and back. An inner liner 126 is placed within the trunks and is used for sanitation.

The suspender straps are adjustable by means of the buckle and hole assembly shown at 128. The snap fasteners 120 are snapped into loops 130 which may be built into the trunks.

In the modified showing of Figures 11 and 12 the suspender springs are coupled directly to the indicating gauge scales 132. The draft links 134 of these scales can be locked in position by the set screw 136. In this showing the adjustments for length are made by the adjustable suspender straps 140.

Method of operation

The suspender springs 116 are two fold in action—first as the patient is lowered after the total weight has been determined, the springs will recoil in relation to the weight allowed upon the patient's legs, and thus will not disturb the adjustment made on the suspender straps in relation to the armpit rest or yoke 44 with the trunks. Second, the remaining coil of spring acts as a shock absorber and augments whatever strength the patient may have in making walking motions.

The construction over all is intended to give maximum mobility with the least expended effort. The forward slant of the front bar, by the action of the body thrust against it, helps the leg motion of the invalid to drive the apparatus forward.

The wide breadth of the bottom frame or chassis is intended to provide greater balance for safety. The bracing is so placed as to give the greatest amount of strength with a minimum of braces for lightness of construction.

In operation, after adjusting the suspender straps in relation to the armpit rest or yoke 44 to fit the patient, the patient is then placed in the apparatus with his feet suspended free of the floor, at which time his total weight is registered on the gauge scale. Then by gradually lowering by means of the gearing and front screw, the exact pressure on legs may be determined. For instance, if the gauge scale shows that the patient weighs 150 pounds and the allowable weight on the legs is 20 pounds, by gradually

lowering until the gauge shows 130 pounds, it is accurately determined that the patient is sustaining 20 pounds of total weight. The set screw of the cable stop is then screwed down firmly on the horizontal bar and the cables are free of tension to be released from the gauge scale.

When the cable is stopped off the suspension means for the hip-receiving portion will be anchored at one end and neither receive resilience from the gauge-scale nor transmit, during subsequent use, force that might be destructive to the elements of the gauge-scale.

I claim:

1. In an exerciser of the type employing a wheel carriage and a superstructure thereon adapted to partially support the human body by the armpits and from which body receiving means may be suspended, a gauge scale on said frame, suspension means associated with said scale for suspending a weight from said superstructure, and a body receiving element depending from said cable means whereby a body in said element will have its weight translated to said gauge scale, and clamp means to engage said suspension means to secure said body receiving element in adjusted position without disturbing the point of suspension of said element.

2. In an exerciser of the type employing a wheel carriage and a superstructure thereon from which body receiving means may be suspended, a gauge scale on said frame, suspension means associated with said scale for suspending a weight from said superstructure, a body receiving element depending from said suspension means whereby a body in said element will have its weight translated to said gauge scale, and means for relieving said scale of a weight applied thereto without disturbing the point of suspension of said element.

3. In an exerciser of the type employing a wheel carriage frame and a superstructure thereon from which person receiving means may be suspended, a yoke fixed to said superstructure to receive and support the shoulder portion of a person, a gauge scale on said frame, suspension means associated with said scale for suspending a weight from said superstructure, and a person receiving element depending from said suspension means whereby a person in said element will have its weight translated to said gauge scale.

4. An invalid walker comprising a wheeled carriage frame, a gauge scale on the frame and having means for translating a weight thereto, means for receiving and supporting the body of an invalid, suspension means between said body receiving means and said weight translating means on said gauge scale whereby the weight of a body is suspended in said receiving means and is indicated on the dial of said gauge, and means for locking said suspension means to relieve said scale of said weight on occasion while maintaining the body in suspended position.

5. An invalid walker comprising a wheeled carriage frame, a gauge scale on the frame and having means for translating a weight thereto, means for receiving and supporting the body of an invalid, suspension means between said body receiving means and said weight translating means on said gauge scale whereby the weight of the body is suspended in said receiving means and indicated on the dial of said gauge means, and means for clamping said suspension means in adjusted position to relieve said scale of the body weight on occasion.

6. An invalid walker comprising a wheeled carriage frame, a gauge scale on the frame and having means for translating a weight thereto, means for receiving and supporting the body of an invalid, a cable between said body receiving means and said weight translating means on said gauge scale whereby the weight of a body is suspended in said receiving means and is indicated on the dial of said gauge means, and a clamp for securing said cable to relieve said scale of the body weight on occasion.

7. An invalid walker comprising a wheeled carriage frame, a gauge scale on the frame and having means for translating a weight thereto, means for receiving and supporting the body of an invalid, a pair of cables between said body receiving means and said weight translating means on said scale whereby the weight of a body is suspended in said receiving means and is indicated on the dial of said gauge means, and means for clamping said cable in adjusted position to relieve said scale of said weight on occasion, said means comprising a housing having a vertically movable element therein and clamp arms extending outwardly from said element, each arm adapted to engage and clamp one said cable, and means for maintaining said movable element in adjusted position.

8. An invalid walker comprising a wheeled carriage frame, a gauge scale on the frame and including means for translating a weight thereto, means for receiving and supporting the person of an invalid, and suspension means between said person receiving means and said weight translating means on said gauge scale whereby the weight of a person in said receiving means is indicated on the dial of said gauge means.

9. An exercising mechanism comprising a supporting frame adapted to partially support the human body by the armpits, a gauge scale on said frame, suspension means depending from said gauge scale for translating a weight imposed upon the suspension means to said scale, hip supporting means on said suspension means, and means for relieving said scale of said weight on occasion.

10. In an invalid walker of the type employing a carriage frame having a superstructure thereon adapted to partially support the human body by the armpits and from which body supporting means may be suspended, a gauge scale on said frame having means for translating a weight thereto, a cable associated with said weight translating means and said superstructure for suspending a weight, spring means on said cable and a body receiving element depending from said spring means whereby an invalid in said element will have his weight resiliently translated to said gauge scale.

11. In an invalid walker of the type employing a carriage frame having a superstructure thereon adapted to partially support the human body by the armpits and from which body supporting means may be suspended, a gauge scale on said frame having means for translating a weight thereto, a cable associated with said weight translating means and said superstructure for suspending a weight, a body receiving element depending from said cable whereby an invalid in said element will have his weight translated to said gauge scale, and means for clamping said cable in adjusted position on occasion.

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