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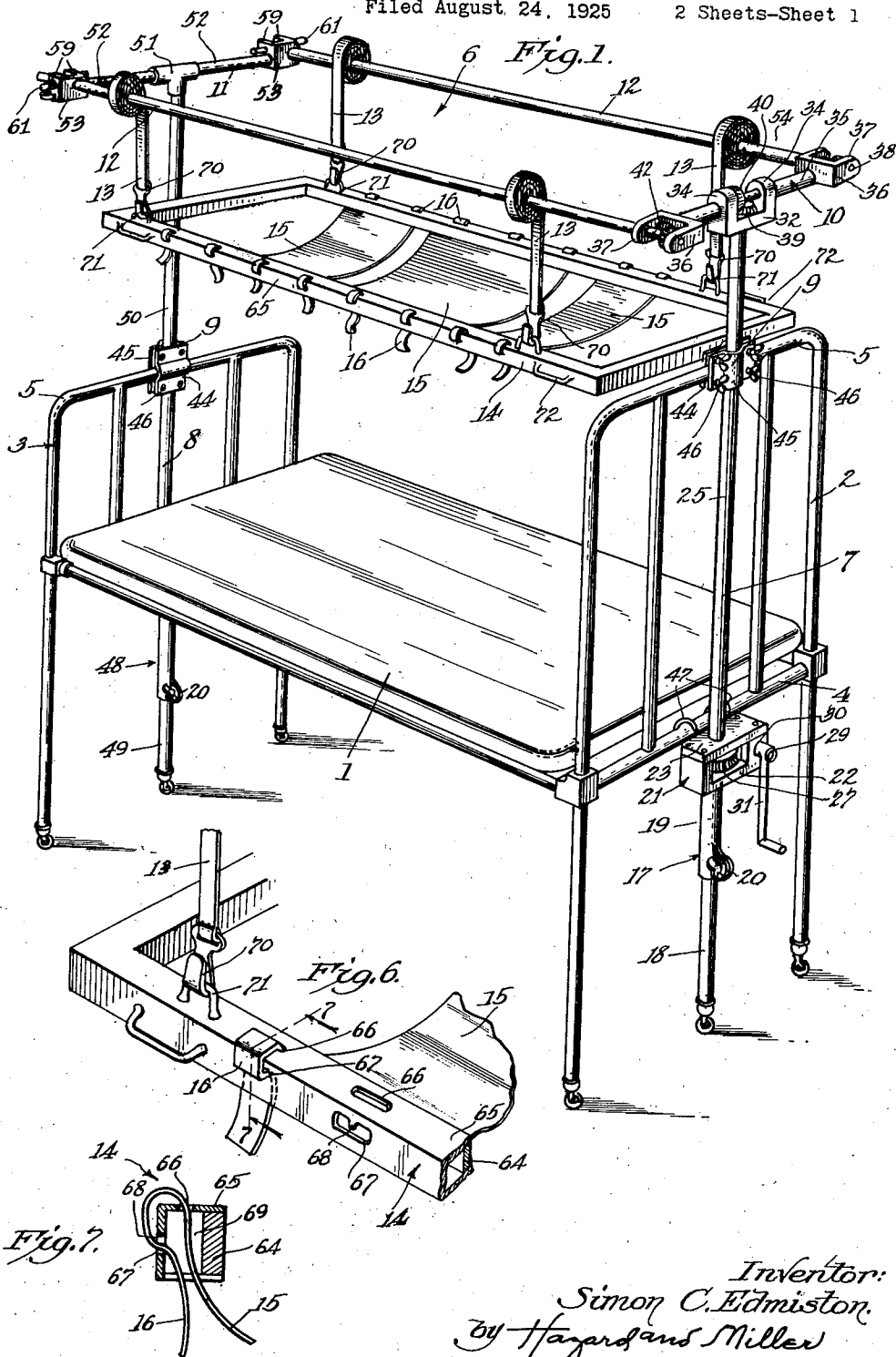
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HOSPITAL LIFT FOR INVALIDS

Filed August 24, 1925

2 Sheets-Sheet 1



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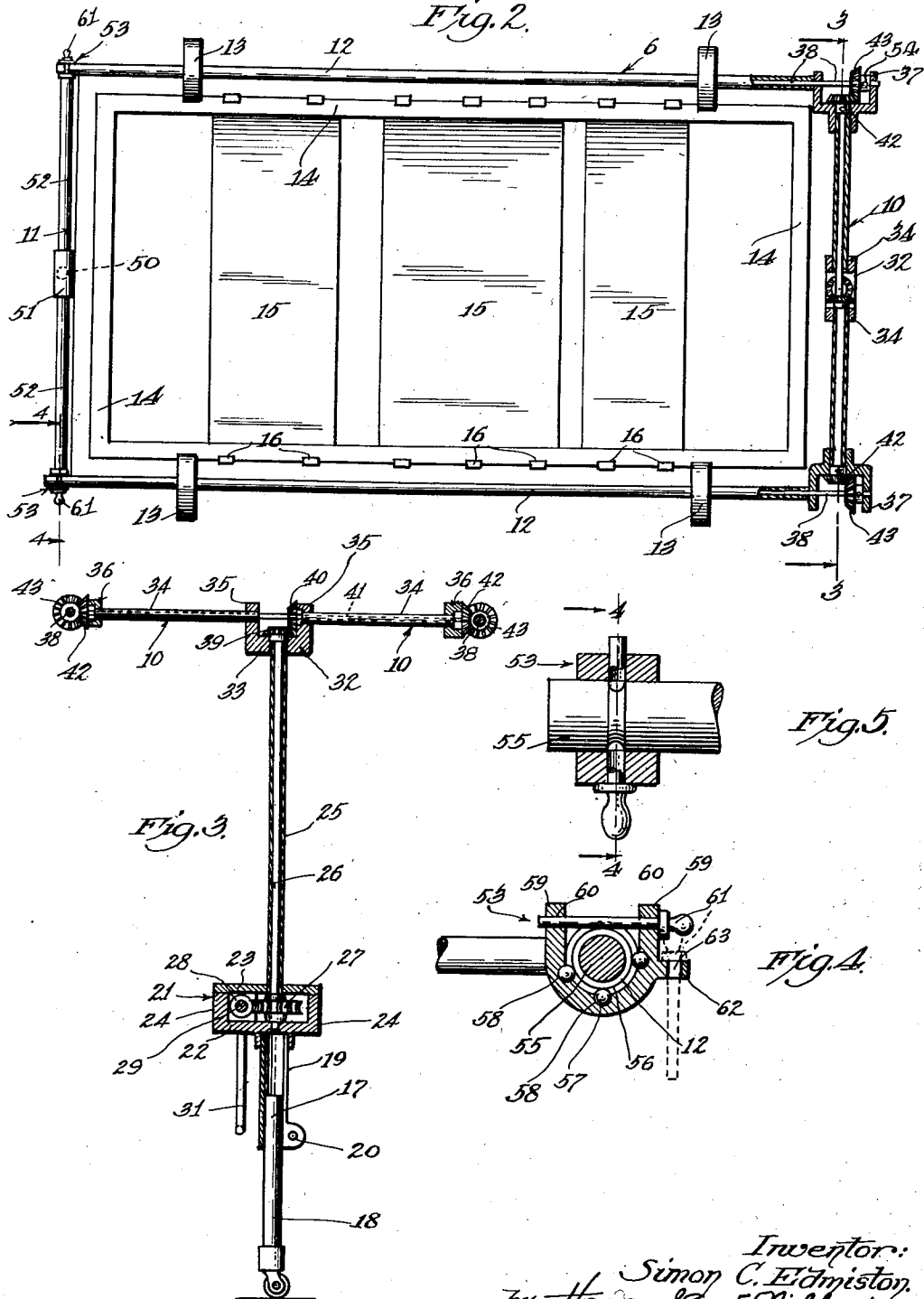
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# UNITED STATES PATENT OFFICE.

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## HOSPITAL LIFT FOR INVALIDS.

Application filed August 24, 1925. Serial No. 52,107.

My invention is a hospital lift for invalids adapted to be attached to a hospital bed or incorporated therewith as a permanent structure to lift an invalid on a stretcher type of frame above a bed and to hold the invalid so suspended.

My hospital lift for invalids comprises a pair of standards which may be placed at the head and foot of a bed and detachably secured thereto. Each standard supports a cross frame and a pair of rotary rails extend between the opposite sides of the cross frames and a stretcher support is suspended below the rails by means of straps. By a system of shafts and gears connected to the rotary rails and operated by a suitably positioned crank, the rails may be rotated to raise and lower the stretcher frame. This stretcher frame has a supporting web made in sections so that narrow strips can be passed underneath the invalid and then secured into the stretcher frame which may then be operated to lift the invalid.

In greater detail it may be stated that my invention embodies a vertical shaft in one of the standards geared to cross shafts in the cross frame supported thereby and by a system of bevelled gears operates the rotary side rails. The standards are provided with clamps which may readily be attached to a bed by thumb screws and the like and they are also made adjustable in length to accommodate different heights of beds. I also provide a particular form of device for securing the web passing under the patient to the stretcher frame by a pinching type of hold whereby the weight of the patient tightens the straps securing the web and allows quick attachment and detachment.

My invention will be more readily understood from the following description and drawings, in which;

Figure 1 is a perspective view of my hospital lift for invalids attached to a hospital type of bed.

Fig. 2 is a plan of the device showing the operating cross frame in section.

Fig. 3 is a vertical section of Fig. 2 on the line 3—3 in the direction of the arrows, showing the manner of operating the rotary side rails by means of a crank supported by the end standard.

Fig. 4 is a detail on the line 4—4 of Fig. 2 in the direction of the arrows, showing the retaining journal for the rotary side rails. This section is also on the line 4—4 of Fig. 5.

Fig. 5 is a plan of the construction of Fig. 4.

Fig. 6 is a perspective view of a corner of the stretcher frame, showing the arrangement for attaching the web thereto.

Fig. 7 is a cross section of one of the stretcher rails on the line 7—7 of Fig. 6, showing the manner of threading the web through the side rails.

Referring first to Fig. 1, a hospital bed is designated generally by the numeral 1, having a head 2 and a foot 3 each of which is provided with a base rail 4 and a top rail 5. My hospital lift is designated generally by the numeral 6 and is constructed with a head standard 7 and a foot standard 8, which may be secured by readily attachable and detachable clamps 9 to the bed. Each of these standards carries a cross frame, such as the frame 10 on the head standard and the fixed frame 11 on the foot standard. A pair of rotary side rails 12 are rotatably supported on the outer ends of said standards and have straps 13 attached thereto which are connected by hooks to the stretcher frame 14. This frame has a series of webs 15 secured thereto by lacing straps 16 and forms the direct support for the invalid.

The head standard 7 will be described in detail and is constructed substantially as follows; having reference to Figs. 1 and 3 in particular:

The standard has a lower telescopic leg 17 which is formed by a leg member 18 housed in a tube 19. This tube is split at its lower end and has a pair of ears 20 with a clamp screw therethrough so that the sections 18 and 19 of the telescopic leg may be readily clamped at different positions. This leg supports a gear casing 21 which is secured to the upper end of the tube 19 and is constructed with a bottom and top plate 22 and 23 having similar side plates 24. This structure supports a pipe 25 in which is carried a shaft 26, the shaft being rotatable by means of the worm gear 27 meshing with the worm 28 which is keyed on a shaft

29 journaled in bearing plates 30. A crank 31 is provided to rotate the worm and thereby the worm wheel and the shaft 26.

A gear bracket 32 is permanently secured 5 to the upper end of the pipe 25 and is constructed with a base 33 and a pair of ears 34. The cross frame 10 is supported by the gear bracket 32 and comprises a pair of tubular bars 34 permanently fixed to the 10 ears of the bracket 35 and each having a yoke 36 attached to its outer end. The arms 37 of the yoke provide journals for a stub shaft 38. The vertical shaft 26 housed in the pipe 25 has a bevel gear 39 secured to its upper end and operating in the gear 15 bracket 32. This gear meshes with a bevel gear 40 splined on a shaft 41 which extends through the tubular bars 34 to the yoke 36 in which a bevel gear 42 on the ends of the 20 shaft 41 mesh with bevel gears 43 on the stub shafts 38.

It will be seen by this means that a rotation of the crank 31 through the medium of 25 the worm 28 and worm gear 27 turns the vertical shaft 26, which through the medium of the bevel gears 39 and 40 rotates the cross shaft 41 which in turn through the bevel gears 42 and 43 at opposite ends thereof rotates the stub shafts 38.

As above mentioned the standards 7 and 8 are secured to the top rails 5 of the bed by means of clamps 9. These are shown 30 as constructed of a back plate 44 hollowed to engage the cross rail and a front plate 45 hollowed to engage the standard, the two plates being secured together by bolts 46 having thumb nuts thereon; thus forming a quick means for attaching and detaching a standard from the ends of the 40 bed. The gear casing 21 is provided with a pair of hooks 47 which may be clamped over the base rail 4 and thus hold the standard in proper position relative to the bed. In fact, it is unnecessary when using these 45 hooks that the telescopic section of the legs 17 should be clamped sufficiently tight to support the whole standard and the weight of the patient.

The foot standard 8 is of simpler construction as may be seen from Figs. 1 and 50 2. The standard has a telescopic leg 48 which may be of the same character as that utilized for the head standard 7, having a lower section 49 and an upper section 50 55 which is secured to the top rail 5 by means of the clamp 9. The upper section 50 has rigidly connected thereto a T 51 and the fixed frame 11 is formed by a pair of arms 52 threaded into the T and having bearing 60 brackets 53 at their outer ends. These brackets support at the foot end of the bed the rotary rails 12, which rails are preferably made of hollow tubing fitting over the stub shafts 38 and secured thereto by pins 65 54 as shown in Figs. 1 and 2. Thus the

rotation of the stub shafts turns the rails 12.

The type of bearing brackets 53 are shown particularly in Figs. 4 and 5 and are constructed substantially as follows: 70

A solid plug 55 is preferably inserted in the ends of the rails 12 and these rails are slightly grooved annularly as indicated at 75 56 so that the balls 57 will fit in these grooves. The balls themselves are supported in semispherical recesses 58 in the bearing brackets. The brackets are provided with a pair of upwardly extending lugs 59 having apertures 60 through which 80 is passed a pin 61, such pin engaging in the groove 56 of the rotary rails. The brackets 53 are formed with an additional lug 62 having an aperture 63 therethrough to hold the pin 61 after removal from the lugs 59 while the structure is being assembled or 85 disassembled.

The stretcher frame 14 is shown particularly in Figs. 1, 6 and 7 and is preferably constructed by forming a wood framing 64 90 having angle bars 65 forming a covering. These bars have a series of slots 66 in their upper face and a series of side slots 67 in their side faces. These latter slots are partially closed by a depending tongue 68. A cut-out section 69 is formed in the wood 95 framing opposite the slots above mentioned to allow threading of the web straps as hereafter described.

As above mentioned, there are a series of 100 webs 15 formed of suitable strong fabric adapted to be rolled underneath the patient and each section of web is provided with a plurality of straps 16 secured along the side edge. After the webs have been placed 105 underneath the patient, the frame forming the stretcher is raised or lowered by means of the straps 13 which as above mentioned are secured to the rotary rails 12 and engage the stretcher frame 14 by means of hooks 70 110 engaging eyes 71 on the frame. The stretcher frame may be grasped by the handle 72 in this operation. The straps 16 are then threaded upwardly through the cut-out section 69 of the wood frame, up through the 115 slots 66 and down through the slots 67. Then when the stretcher is elevated by operating the crank 31, the weight of the patient causes the tongue 68 to bite into the strap and form a tight buckling thereof and thus 120 lifting the patient from the bed.

It is believed that the operation and manner of use of my hospital lift will be obvious from the above description. On account 125 of using the worm and worm gear for operating the elevating mechanism there is no danger of the weight of the patient causing the straps to unwind and thus lower the stretcher frame when it is not so intended. It requires a positive operation of the crank 130 31 to lift or lower the patient but on account

of the gearing used it is a simple matter for a nurse to lift a heavy patient with my appliance.

5 It will be readily seen that the whole device may be easily disassembled. The head and foot sections are readily removable from a bed and the rotary rails 12 are easily disconnected from the bearing brackets 53 and from the stub shafts 38. If desired my hospital lift may be constructed as an integral unit with a hospital bed, in which case it could be materially simplified by the omission of the telescopic legs and other details. However, for general ready attachment and detachment from a bed the telescopic legs could be omitted and hooks similar to 47 utilized for both standards to hook them to the lower rails 4 at the head and foot of the bed.

20 My invention may be considerably modified in general features and also in details without departing from the spirit thereof and may also be modified to form an appliance for special treatment of an invalid.

25 Having described my invention, what I claim is:

1. A hospital lift comprising in combination a bed, a pair of standards secured to the head and foot of the bed, a cross frame secured at the top of each standard, a pair of rotary side rails journaled on the ends of the cross frames, a stretcher suspended from the side rails by straps and a system of shafts and gears extending through one of the standards and its cross frame to rotate the side rails to raise and lower the stretcher.

2. A hospital lift as claimed in claim 1, in which the system of shafts and gearing comprises a vertical shaft in one of the standards, a gear thereon, a crank operative gear to turn same, a cross shaft in the cross frame, a bevel gear connection between the vertical shaft and the cross shaft and bevel gears on the ends of the cross shaft meshing with gears on the side rails.

45 3. A hospital lift for invalids comprising in combination a bed and ends having

a top rail, a pair of post-like standards at opposite ends of the bed clamped to said top-rails, one of said standards being hollow and having a gear bracket at its upper end, a cross frame connected to said bracket, yokes secured to the ends of the cross frame, the other standard having a cross frame on its upper end, a pair of bearing brackets on the outer ends of said cross frame, a pair of side rails journaled in said yokes and the bearing brackets, a stretcher suspended by straps from the rotary rails and a shaft extending vertically through the hollow standard, cross shafts in the cross frame, means to rotate the vertical shaft and gearing transmitting motion therefrom to the side rails.

4. A hospital lift for invalids as claimed in claim 3, having in addition stub shafts journaled in the said yokes and the rotary rails telescopically connected to said stub shafts.

5. In a hospital lift, a standard formed of a tubular post, a gear casing secured to said post, a vertical shaft in said post, a gear bracket secured to the top of the hollow post, a pair of tubular bars connected to the gear bracket and extending sideways therefrom, a yoke secured to the end of each arm, a cross shaft through the tubular bars, bevel gearing connecting the cross shaft and the vertical shaft, stub shafts in the yokes and bevel gears between the cross shafts and the stub shafts, and gearing in the gear casing connected to the vertical shaft with means to operate said gearing to transmit rotary motion therefrom to the said stub shafts.

6. In a hospital lift as claimed in claim 5, having in addition a standard secured to the opposite end of the bed, a cross frame on the standard, rotary side rails journaled in said cross frame and connected to the stub shafts and a stretcher suspended by straps from the rotary rails.

In testimony whereof I have signed my name to this specification.

SIMON C. EDMISTON.