

April 10, 1945.

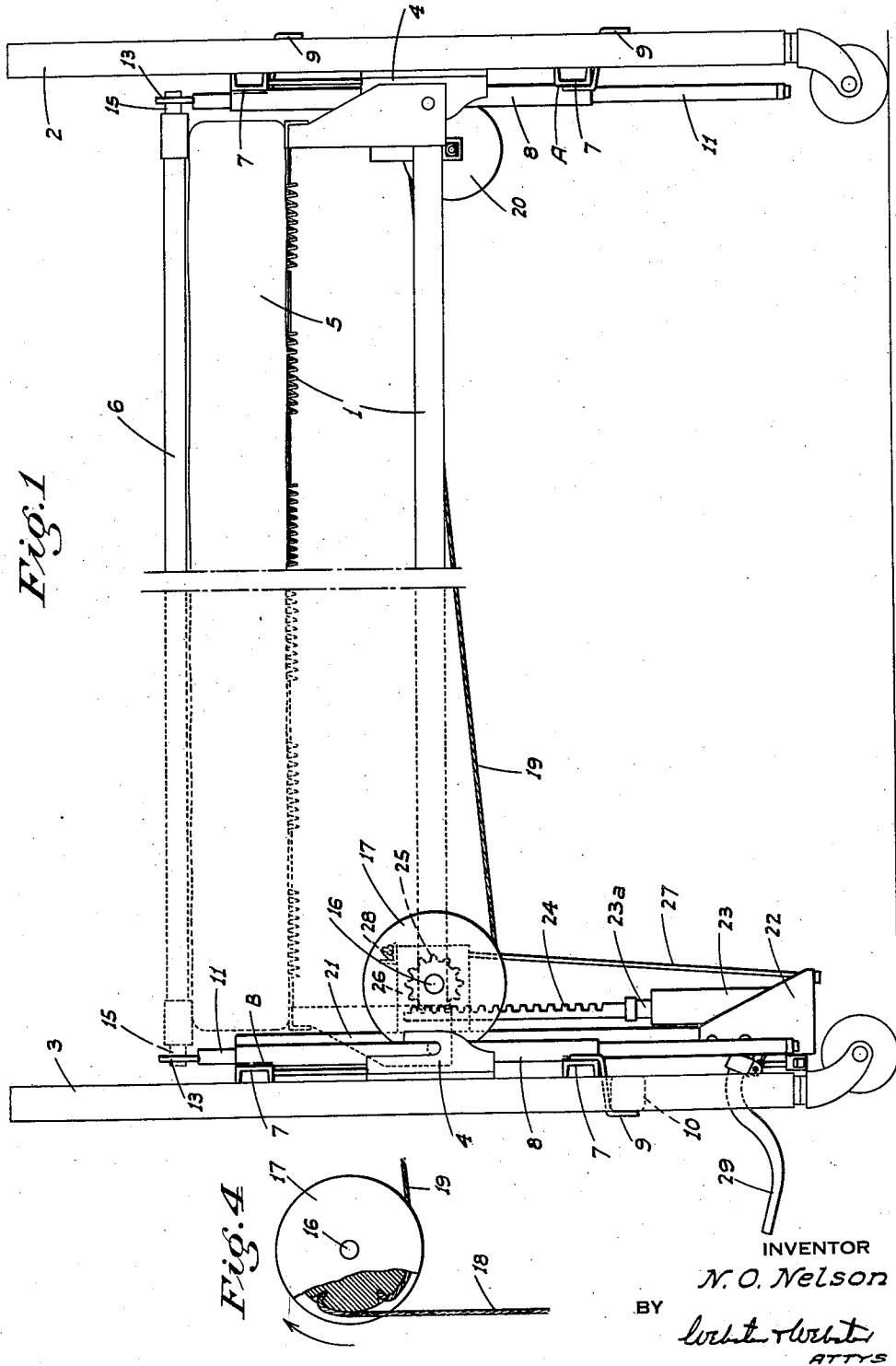
N. O. NELSON

2,373,590

HOSPITAL BED

Filed July 17, 1943

3 Sheets-Sheet 1



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Fig. 2

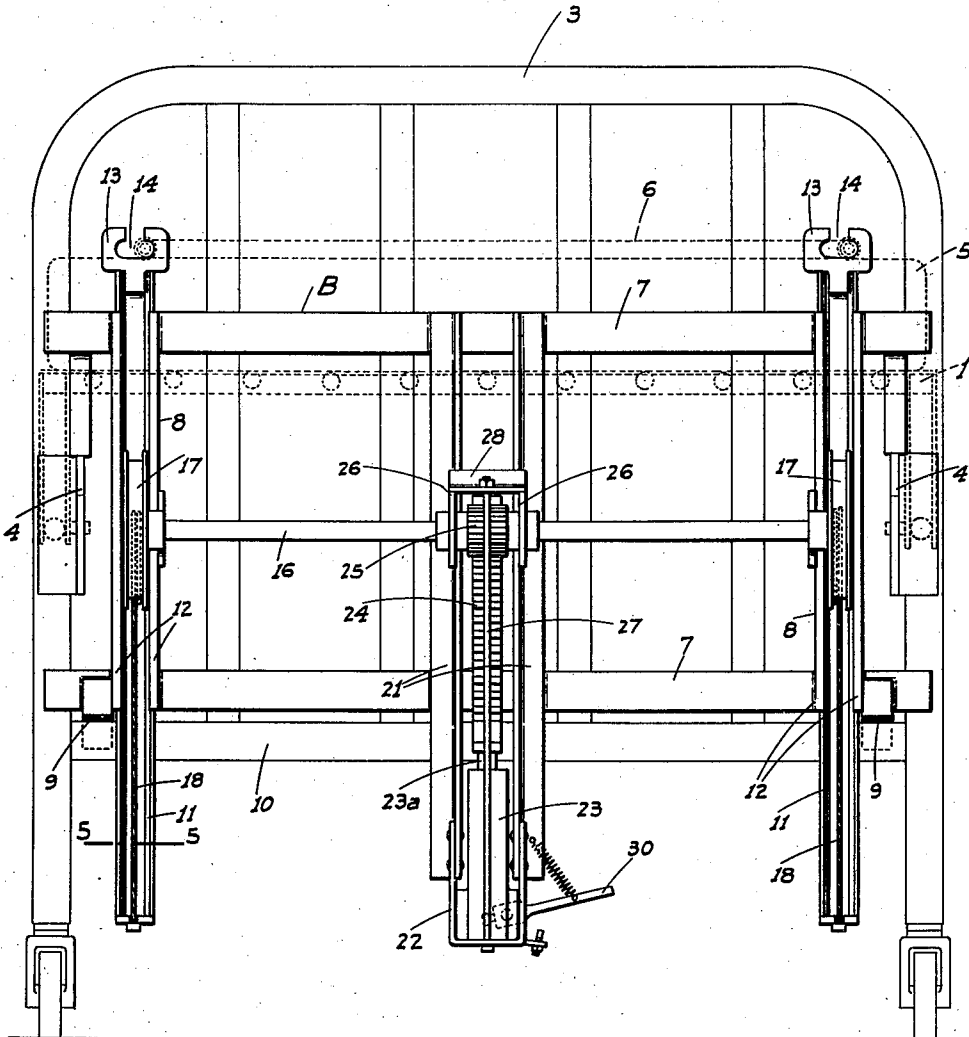
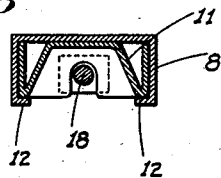


Fig. 5



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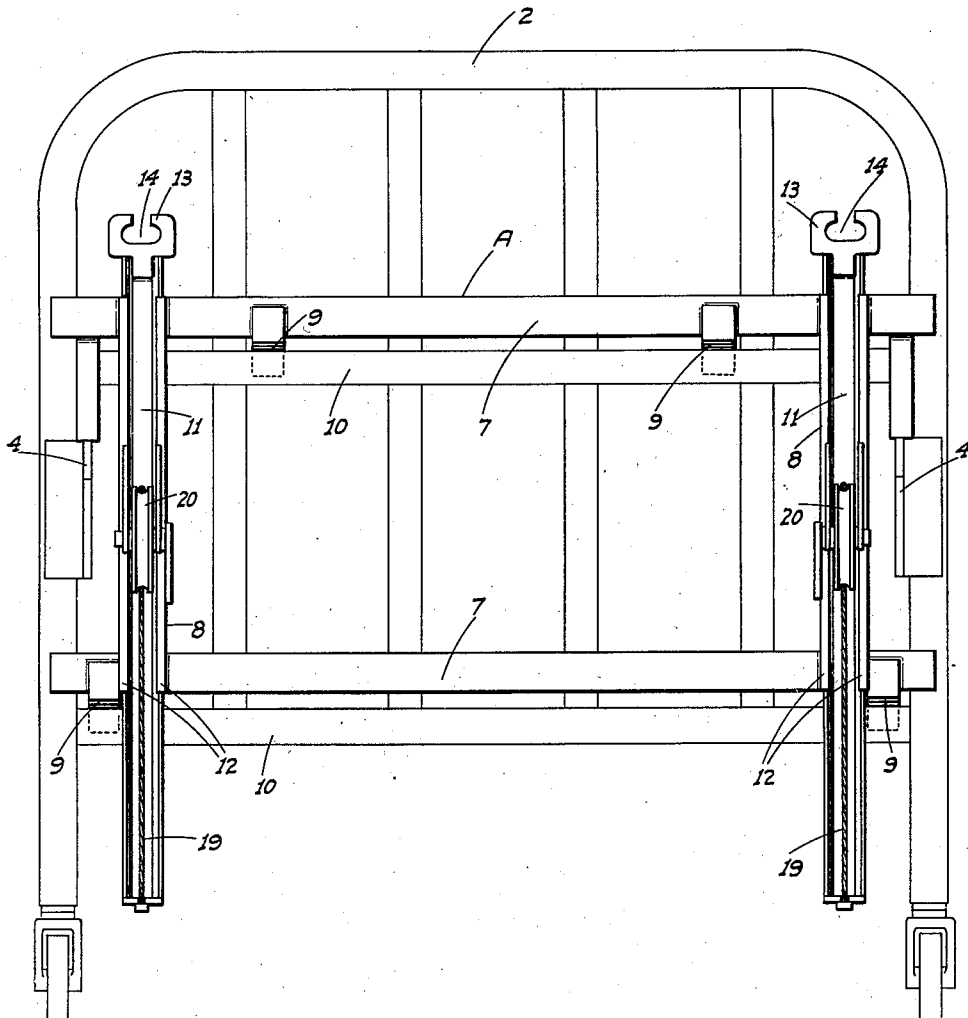
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Fig. 3



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HOSPITAL BED

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3 Claims. (Cl. 5—84)

This invention relates in general to improvements in hospital beds, and in particular the invention is directed to, and it is an object to provide, a hospital bed which includes in combination with a fracture frame, a novel, manually controlled arrangement to effect raising and lowering of said frame and the patient thereon when necessary. While here shown as an attachment to a bed, the device of course may be included as a unitary and initial part of the bed.

Another object of the invention is to provide a device of the character described which includes slides secured in connection with the fracture frame and mounted for vertical movement, and means to effect simultaneous up or down movement of said slides; said means including a rack and pinion assembly, and a hydraulic jack connected in operative or actuating relation to said assembly.

A further object is to provide a device as in the preceding paragraph including guided flexible cables or the like connected to said slides, in supported relation to the latter, the rack and pinion assembly being arranged to cause movement of said cables in an up or down direction selectively.

A further object of the invention is to provide a simple and compact device, and yet one which will be exceedingly effective for the purpose for which it is designed.

These objects I accomplish by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings similar characters of reference indicate corresponding parts in the several views:

Figure 1 is a foreshortened side elevation of a hospital bed embodying my invention.

Figure 2 is an elevation of the foot of the bed, detached and looking from the inside, showing the corresponding parts of the invention.

Figure 3 is an elevation of the head of the bed, detached and looking from the inside, showing the corresponding parts of the invention.

Figure 4 is a fragmentary view showing one of the cable drums, partly broken away, and the manner of attachment of the cables thereto.

Figure 5 is an enlarged cross section on line 5—5 of Fig. 2.

Referring now more particularly to the characters of reference on the drawings, the numeral 1 indicates a hospital bed frame and spring assembly supported at one end by a head unit, indicated generally at 2, and a foot unit, indicated generally at 3; the frame and spring assembly being connected to the head and foot units, as is

usual, by means of attachment brackets 4. The frame and spring assembly 1 terminate at corresponding ends in clearance relation to the head and foot units 2 and 3. The above is a conventional hospital bed and includes a mattress 5 disposed on the frame and spring assembly 1. In certain instances where the patient is wholly disabled, due to a serious fracture or the like, a device known as a fracture frame 6 is disposed on top of the mattress and comprises generally a rigid bordering frame and a fabric bed supported thereby; such fracture frame being raised and lowered as necessary to attend to the patient. My invention relates to the mechanism employed to raise and lower such fracture frame, and I make no claim to the latter.

My invention comprises the following structure:

Closely adjacent but inwardly of both the head unit 2 and foot unit 3 of the bed I mount frame structures A and B respectively, each of which includes a pair of horizontally vertically spaced cross beams 7 which are secured together adjacent their ends by means of vertically disposed inwardly facing channel members 8, the spacing of said channel members transversely of the bed being substantially equal to the width of the fracture frame 6 and the channels opening away from the adjacent bed unit. The frame structures of cross beams 7 and channels 8 are supported from the head unit 2 and foot unit 3 by means of hooks 9 which extend from the cross beams 7 at transversely spaced points and engage over corresponding cross rails 10 of the head and foot unit respectively. While in the present embodiment I removably support the frame structures by hooks 9, such structures could, if desired, be permanently attached to and formed as an integral part of the head and foot units of the bed.

In each of the channels 8 I mount a vertically movable slide 11 which is formed, in section, to symmetrically engage within the channel, as clearly shown in Fig. 5. The channel, at the outer edge of its side flanges, includes intumed lips 12 which secure the slide 11 against escape out of the channel in a lateral direction. The slide 11 includes in itself a channel portion which opens between the lips 12, as shown. At the upper end thereof each slide 11 is formed with an attachment or supporting yoke 13 having an upwardly opening inverted T-shaped slot 14 to receive a supporting boss 15 which projects from the adjacent and corresponding corner of the fracture frame 6.

It will be apparent that upon simultaneous and vertical movement of the slides 11 the fracture

frame 6 will be correspondingly moved relative to the mattress 5; such simultaneous movement of the slides 11 being accomplished through the medium of the following mechanism;

A horizontal shaft 16 is journaled in connection with and extends between the channels 8 of the frame structure B corresponding to foot unit 3, said shaft having drums 17 fixed thereon at its ends. Cables 18 are secured at their upper ends to the periphery of drum 17 and depend in the channel of the corresponding slides 11 to connection with said slides at their lower ends. Other cables 19 are likewise connected to the periphery of drums 17 for winding thereabout in the same direction as cables 18; the cables 19 extending from drums 17 lengthwise of the bed to a point adjacent the head unit 2 and thence pass over pulleys 20 secured in connection with the channels 8 of the corresponding frame structure A. From pulleys 20 cables 19 depend in the channel of the adjacent slides 11 and are connected to the lower ends of the latter. With rotation of shaft 16 in a direction to rotate drums 17, as shown by the arrow in Fig. 4, the cables 18 and 19 and wound on the corresponding drums, simultaneously raising all the slides 11 and consequently the fracture frame 6. The shaft 16 is forcefully and positively rotated in such direction by means of the following arrangement:

A pair of spaced vertical angle members 21 are secured in adjacent parallel relation to the cross beam 7 of the frame structure B; said angle members extending downwardly to a point adjacent but clear of the floor level, and at their lower ends said angle members are connected by a U-shaped support 22. A self-holding hydraulic jack 23 is fixed in connection with and upstands from support 22, the piston rod or plunger 23a of said jack projecting upwardly and being secured in rigid connection with a slidably mounted rack 24 which engages with a pinion 25 secured on shaft 16 between a pair of shaft supporting plates 26 mounted on angle members 21. A brace rod 27 extends from a top cross member 28 downwardly to the jack support 22. The jack is of a conventional type and includes an actuating pedal 29 which projects outwardly from the lower end of the bed-foot unit 3, while a spring-retained jack-releasing pedal 30 extends laterally from the jack. When the actuating pedal 29 is reciprocated up and down by a person's foot, the plunger 23a is raised and in turn the rack 24 causes rotation of pinion 25 and shaft 16 in a fracture-frame elevating direction. When the fracture frame has been raised to the desired extent, the jack, which is self-holding, maintains the frame in such position. To lower the frame the pedal 30 is depressed, whereupon the plunger 23a, together with the related or connected parts, may return to their normal or initial position, and which results due to the weight of the patient on the fracture frame.

From the foregoing description it will be readily seen that I have produced such a device as substantially fulfills the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described my invention, what I

claim as new and useful and desire to secure by Letters Patent is:

1. Elevating mechanism for a separate vertically movable, patient supporting frame on a hospital bed which includes a head unit, a foot unit, and a mattress frame spaced at its ends from corresponding ones of said units, a frame structure mounted on both the head and foot units in said space and including a pair of upstanding, transversely spaced channels, slides secured in said channels for vertical movement, means connecting the upper ends of said slides with the vertically movable frame, a pulley journaled adjacent each slide, the pair of pulleys corresponding to the foot unit being connected by a shaft, cables connected to the periphery of said pair of pulleys and depending to connection with corresponding slides, other cables connected to said pair of pulleys for winding thereabout in the same direction as said first named cables, said other cables extending intermediate their ends over the pulleys corresponding to the slides at the head unit and depending therefrom to connection with said slides, a self-holding manually controlled jack mounted on the frame structure corresponding to the foot unit, a rack connected to said jack for movement by the latter, and a pinion on said shaft in mesh with the rack, whereby upon operation of the jack the rack will operate the pinion to impart rotary movement to the shaft to respectively wind or unwind the cables on the shaft pulleys and thus correspondingly move the slides up or down to raise or lower the mattress frame.

2. Elevating mechanism for a vertically movable patient supporting frame on a hospital bed, such mechanism including a pair of transversely spaced, upstanding slides mounted for vertical movement adjacent each end of the bed and each slide being connected at its upper end to said frame, a pulley mounted adjacent each slide above the lower end thereof, a cable connected with the lower end of each slide and passing over its corresponding pulley, and means to exert a pull on all the cables simultaneously; such last named means including a shaft connected in driving relation to the two pulleys at one end of the bed, the two cables at one side of the bed being both secured to the driven pulley on that side, and means to impart rotation to the shaft; such latter means comprising a pinion on the shaft, a movable rack engaging the pinion, and a jack to impart movement to the rack and thence to the shaft through the pinion.

3. Elevating mechanism for a vertically movable patient supporting frame on a hospital bed which includes a head unit and a foot unit spaced from the frame, a pair of upstanding transversely spaced channel members interposed in each of the spaces between the head and foot members and the frame, respectively, vertically spaced and horizontally extending cross beams on each pair of channels, outwardly extending hooks on such beams, cross rails on the head and foot units, such hooks engaging said rails, slides secured in said channel members for vertical movement therein, means connecting the upper ends of said slides with the patient supporting frame, and means for simultaneously raising or lowering all of the slides to correspondingly raise or lower such frame.

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