Dec. 11, 1923. 1,476,902

W. A. McCOLLOUGH

INVALID'S BED

Filed Oct. 27, 1921 3 Sheets-Sheet 1

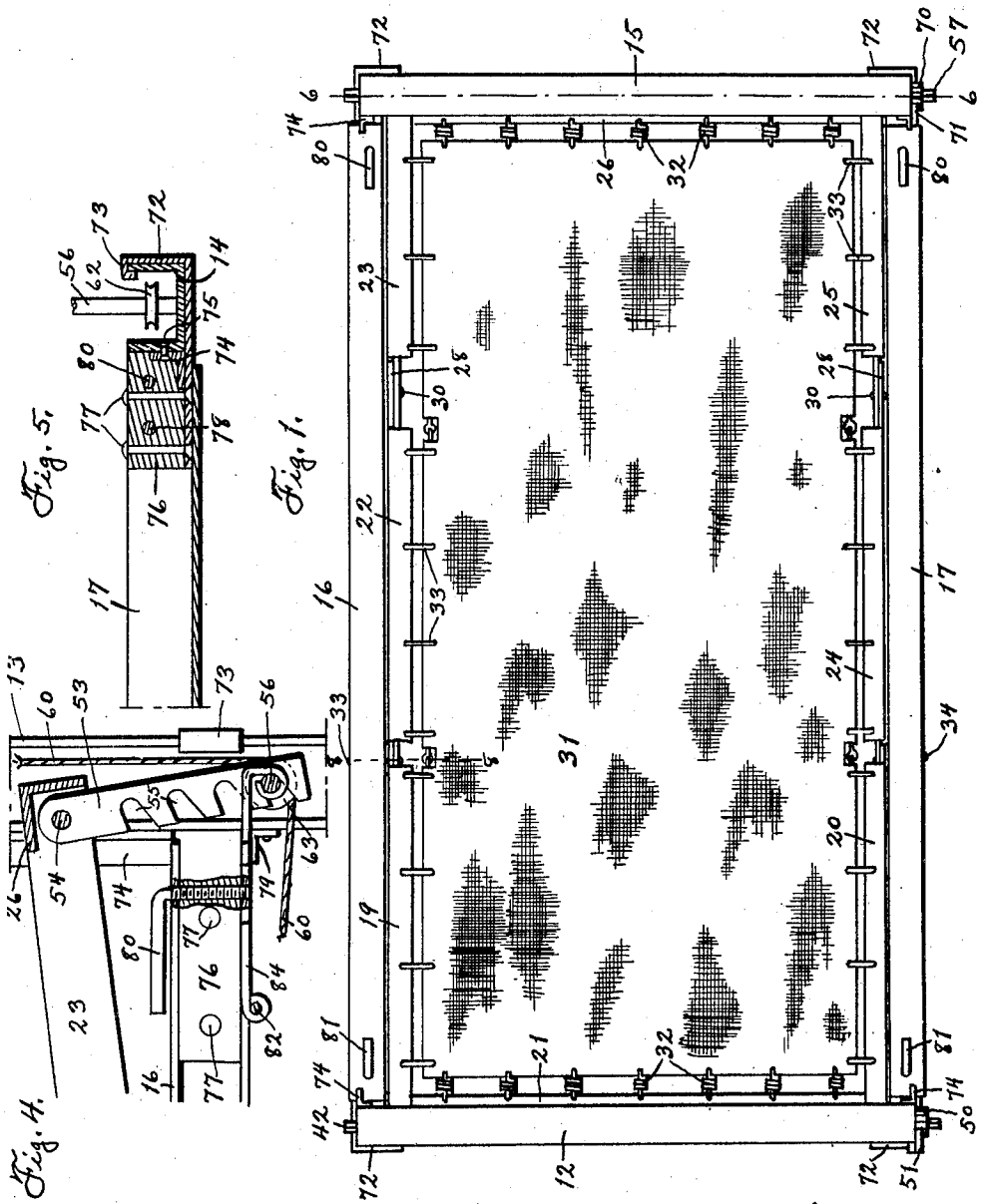

Fig. 5.

Fig. 1.

Fig. 4.

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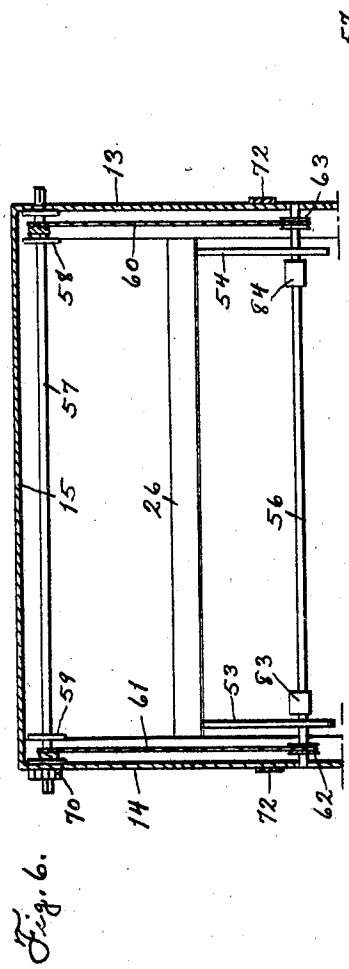

Fig. 6.

Fig. 2.

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Fig. 7.

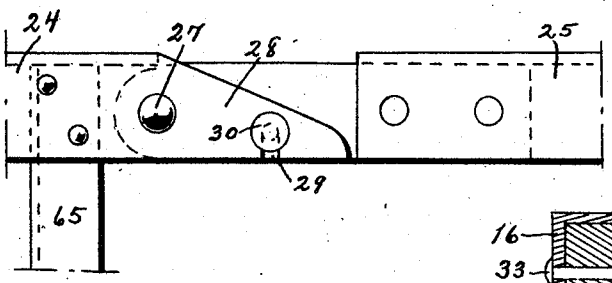


Fig. 8.

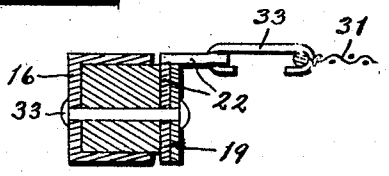
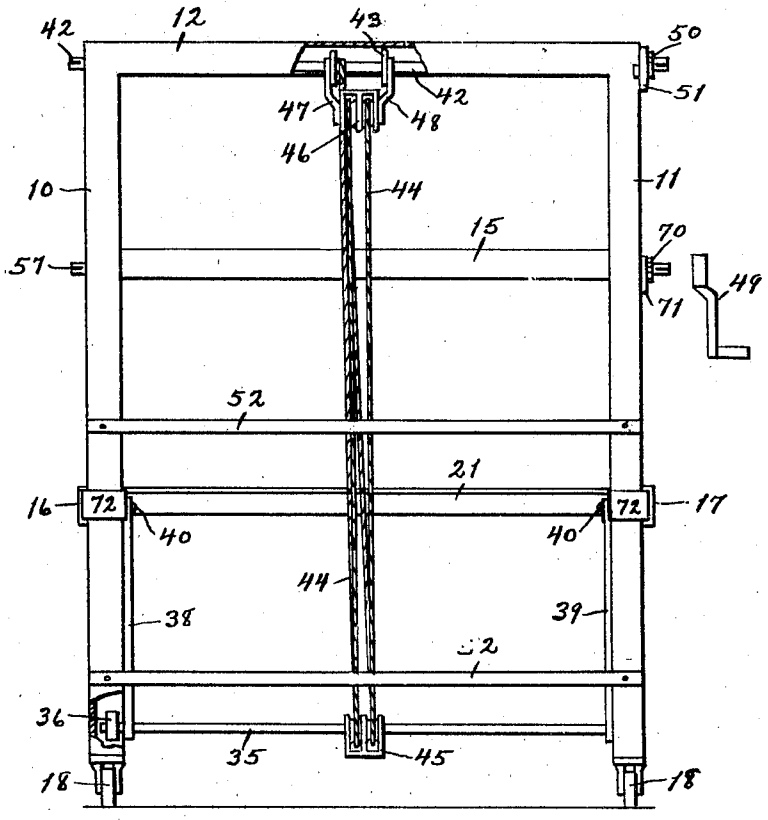


Fig. 3.



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UNITED STATES PATENT OFFICE.

WILLIAM A. McCOLLOUGH, OF WEBSTER CITY, IOWA.

INVALID'S BED.

Application filed October 27, 1921. Serial No. 510,779.

To all whom it may concern:

Be it known that I, WILLIAM A. McCOLLOUGH, a citizen of the United States of America, and resident of Webster City, Hamilton County, Iowa, have invented a new and useful Invalid's Bed, of which the following is a specification.

An object of this invention is to provide an improved construction for a bed particularly adapted for use by invalids and susceptible of being manipulated and adjusted in several different ways to suit the convenience and comfort of the patient or the convenience of those ministering to him.

Another object of this invention is to provide a bed adapted to be manipulated in such manner that the occupant may be raised to a reclining or sitting position with a minimum of disturbance and discomfort to the occupant and of effort on the part of the attendant.

A further object of this invention is to provide an invalid's bed having a rigid frame and movable head and foot sections each pivoted intermediate the ends of said frame, each section being movable to inclined position articulating on its pivot and said foot section being jointed between its ends and adapted to be elevated as to its central or jointed portion independently of the position of the head section.

A further object of this invention is to provide an improved invalid's bed having head and foot frames, side rails vertically adjustable thereon, and head and foot sections pivotally mounted on said side rails and adjustable as to inclination in various ways independently of the vertical adjustment of said side rails.

A further object of this invention is to provide improved means for operating and manipulating a pivoted member of an invalid's bed.

A further object of this invention is to provide mechanical means for breaking the joint and maintaining a jointed member in adjusted position.

With these and other objects in view, my invention consists in the construction, arrangement and combination of elements hereinafter set forth, pointed out in my claims and illustrated by the accompanying drawings, in which—

Figure 1 is a plan of my improved bed. Figure 2 is a side elevation of the same, partly in section, dotted lines indicating various adjusted positions of some of the members. Figure 3 is a head end elevation of the same, partly in section. Figure 4 is a detail sectional elevation, on an enlarged scale, illustrating means for adjusting the movable foot section of the bed. Figure 5 is a detail horizontal section, on an enlarged scale, on the line 5—5 of Figure 2. Figure 6 is a vertical section on the line 6—6 of Figure 1. Figure 7 is a detail elevation, on an enlarged scale, showing the joint of the movable foot section. Figure 8 is a detail cross-section, on an enlarged scale, on the line 8—8 of Figure 1.

In the construction of the device as shown the numerals 10, 11 designate head posts connected at their upper ends by a cross-bar 12, which may be integral with or separately formed and suitably connected to said posts; and the numerals 13, 14 designate foot posts, preferably of less height than the head posts and connected at their upper ends by a cross-bar 15. The numerals 16, 17 designate side rails connecting the head and foot posts in pairs, and the manner of such connection will be hereinafter described in detail. The posts, cross-bars and side rails preferably are formed of channel bars, but may be of other suitable members. The posts 10, 11, 13 and 14 preferably are supported by casters 18

A movable head section is provided and is mounted within and between the upper end portions of the main side rails 16, 17, and said head section is formed of spaced side members 19, 20 connected rigidly at their upper or head ends by a cross-bar 21, said members preferably being composed of angle bars. A movable foot section is likewise provided and is formed of side members 22 and 23 on one side of the bed, arranged end to end, and side members 24, 25 on the opposite side of the bed, end to end, the side members 23 and 25 being rigidly connected at their lower or foot ends by a cross-bar 26. The movable head and foot sections are arranged with their open ends in abutting relation and both are placed within the rectangular space formed by the side rails 16, 17 and the head and foot members of the bed frame, the side members of the movable sections being placed parallel and in contact with said side rails. The side members 22—23 and 24—25 of the foot section are

hinged together by rivets 27 (particularly see Figure 7) and the members 22 and 24 are formed with extensions 28 projecting beyond said pivots and having downwardly opening notches 29 adapted to engage studs 30 projecting laterally from the side members 23 and 25 respectively. This special joint permits an upward breaking of the members, articulating on the pivots 27, but prevents any downward movement of the pivoted ends beyond the common plane of the two members. The movable sections together support a suitable bed bottom 31, which may be of canvas or other suitable flexible material, and which may be suspended and yieldingly supported from the side and end members of said movable sections by means of spaced coil springs 32 and links 33. The movable sections together are of a combined length approximating that of the main side rails 16, 17, and both are pivoted at their inner or adjacent ends to said side rails by common pivots 33 and 34. Such pivots preferably are nearer the head than the foot of the bed, the movable head section being of considerably less length than the jointed foot section.

The channels comprising the head posts 10, 11 open inwardly toward the longitudinal median line of the bed and a rod or spindle 35 is arranged transversely, has its end portions projecting within said channels, and is adapted for vertical movement therein. Rollers 36, 37 are pivoted on the ends of the rod or spindle 35 and are arranged for rolling contact with the inner walls of the channeled posts 10, 11, to guide and steady the vertical movement of said rod or spindle. Pitmans or links 38, 39 are pivoted at one end each on the rod or spindle 35, adjacent the rollers 36, 37, and are pivotally and adjustably secured to the upper end portion of the movable head section, as by bolts 40 in the side rails of said section adapted to selectively engage holes 41 in said pitmans or links.

A shaft 42 is rotatively mounted within the channeled cross-bar 12, which opens downwardly, and a drum or spool 43 is mounted on and secured to the central portion of said shaft. A cable 44 is fixed to and adapted to be wound on the drum or spool 43. A pulley block 45 is pivoted to the central portion of the spindle 35 and another pulley block 46 is suspended immediately below the drum or spool 43, as by means of hangers 47, 48. The cable 44 is rove through the block 45, block 46 and block 45 in sequence and is attached at its other end to the block 46. Thus rotation of the shaft 42 will result in winding or unwinding the cable 44 relative to the drum or spool 43 and consequently in raising or lowering the spindle 35, the rollers 36, 37 traveling in the chaneled posts; and such movement results, through action of the pitmans or links 38, 39, in oscillating the movable head section on its pivots 33 and 34. The shaft 42 is provided with a suitable crank 49 for manual rotation thereof, and said crank may be detachable, as shown, so that it may be applied to either projecting end of the shaft. A ratchet 50 is provided on the shaft and is adapted to be engaged by a pawl 51 pivoted on one or the other of the posts, to prevent reverse rotation and movement of the parts at times and to hold the movable head section in any adjusted degree of inclination which may be desired. The arrangement is such that the operation of raising or lowering the head section is very easily performed, both as to the attendant and the occupant of the bed, who may thus be placed in any desired position of reclination without discomfort or great effort. It is to be understood the parts may be so arranged that the movable section may be adjusted even to a perpendicular position if desired, and I do not desire to be understood as limiting myself to the precise dimensions, arrangements and relative locations of parts shown.

The head posts 10, 11 may also be connected by cross-bars 52 of any desired number arranged below the upper cross-bar 12, to give the required strength and rigidity to the frame.

If desired the movable foot section may be adjusted manually to inclined position, either independently of or conjunctively with adjustment of the movable head section such as previously described, and as shown by solid lines in Figure 2. In such adjustment the side members 22—23 and 24—25 are in alinement and both members of the jointed foot section are in the same plane, the joint being supported against downward breaking by the arrangement shown in Figure 7 and previously described. The entire foot section articulates on the pivots 33, 34 and is adjusted by manual lifting force applied to the lower cross-bar 26. To hold it in adjusted position, brace members 53, preferably two in number, are pivoted at their upper ends to the lower end portion of the movable foot section, as on a cross-rod 54 (see Figure 4). The brace members are formed with series of notches 55 adapted to engage, selectively, a transverse rod 56 carried by the foot posts 13, 14, whereby the lower end of the movable foot section may be supported in selected elevated position.

At times it is desirable to break upwardly the joint of the foot section, the side members 22—23 and 24—25 articulating on the pivots 27, so that the knees of a patient may be elevated and his feet remain in lowered position, such position of the foot section being indicated by dotted lines in Figure 2; and mechanical means is provided for

accomplishing such adjustment and holding the parts in adjusted position. A shaft 57 is mounted for rotation in the rigid foot frame of the bed, preferably within the channeled cross-bar 15, which opens downwardly. Spools or drums 58, 59 are fixed to end portions of the shaft 57 and cables 60, 61 are provided and each is attached at one end to and adapted to be wound on one of said spools. The cables 60, 61 pass downwardly within and concealed by the channeled foot posts 13, 14 respectively, and around direction pulleys 62, 63, which may be pivoted on end portions of the cross-rod 56. The cables 60, 61 then pass forwardly through slots 64 in the posts 13, 14 and beneath the adjacent end portions of the side rails 16, 17 of the bed. Struts 65 are fixed to and extend downwardly from end portions of the side members 22 and 24 of the movable foot section, adjacent the joints in said section. One of the struts is shown in Figure 2, and it is to be understood that such member, and others associated therewith, are duplicated on the opposite side of the bed. Each strut 65 carries at its lower end a pulley 66, grooved to receive the cable 60 or 61. Pulleys 67 are suspended from the side rails 16, 17, at points between the struts 65 and posts 13, 14, as by means of brackets 68, and said pulleys also are grooved to receive the cables 60, 61. The cables 60, 61 pass forwardly from the posts 13, 14, over the pulleys 67, downwardly beneath and around the respective pulleys 66, thence upwardly and are attached at their ends to the side rails 16, 17, as by eyes 69. The shaft 57 is adapted to be rotated in any suitable manner, as by the detachable crank 49, and is provided with a ratchet 70 adapted to be engaged by a pawl 71 pivoted on one of the posts 13, 14 to prevent reverse movement of the parts. Rotation of the shaft 57 in one direction results in winding the cables 60, 61 on the spools 58, 59, thus applying upward draft on the struts 65 through the pulleys 66; thereby breaking the joints of the movable foot section and elevating the central portion of said section as desired and as indicated in Figure 2 by dotted lines.

At times it is desirable to adjust the entire bed bodily vertically in a horizontal plane, and for this purpose I have provided a sliding connection between the ends of the side rails 16, 17 and the respective posts 10, 11, 13 and 14. The sliding connection at one corner of the bed is shown in detail in Figure 5, and it is to be understood that it is identical at each of the corners of the bed. A strap 72 is formed with a recurved hook 73 at one end embracing and slidable relative to one margin of a channeled post such as 14. The strap passes across and in contact with the rear face of the post 14 and is then bent at an angle and passes across the outer or closed face thereof and projects beyond said post and within the open rear end of one of the side rails such as 17. An angle bar 74, which serves as a guide, is secured as by rivets 75 to the forward face of each channeled post such as 14, and is of a length compassing the extent of the desired range of vertical adjustment of the side rails. The outer face of said angle guide is flush with the outer face of the channeled post 14, and the strap 72 extends across said angle guide and in sliding contact therewith. A block 76 is fixed to the forward end portion of the strap 72, as by rivets 77 and said block is grooved at its rear end to fit and slidingly engage the angle guide 74. The block 76 occupies a position within the foot end portion of the side rail 17, and is adapted to be secured thereto by a bolt or pin 78 passing through registering vertical holes in said members. The side rails 16, 17, carrying with them the movable head and foot sections and the bed bottom 31, are adapted to be adjusted vertically in any desired manner and to desired extent, the straps 72 sliding on the respective posts 10, 11, 13, 14. Downward movement of the side rails 16, 17 is limited and said rails supported in their normal position by any suitable means such as brackets 79 carried in a common horizontal plane by the respective legs or posts 10, 11, 13, 14 and adapted to be engaged by end portions of said side rails.

The side rails may be locked to the foot portions of the movable foot section by means of angular bolts 80 and to the head portion of the movable head section by angular bolts 81, each of said bolts being threaded into vertical tapped holes in the respective blocks 76 and adjacent side rails, and having a head or button portion extending at an angle and adapted at times to be turned through an arc of substantially ninety degrees to overlie a side member 19, 20, 23 or 25.

Means also is provided for supporting the rear portion of the movable and jointed foot section when said section is broken and elevated at its center as hereinbefore described. A rod 82 extends transversely of the frame at a point near the foot posts or legs 13, 14 and in the same horizontal plane as the rod 56, said rod being supported and carried by the side rails 16, 17. Straps 83, 84 are hooked at their ends to engage the rods 56 and 82, and one of said straps is located near each side of the bed. The cross-bar 26 of the foot end of the movable foot section rests on and is supported by the straps 83, 84, and when the joint of the said section is broken, said cross-bar moves in sliding engagement with said straps and is supported thereby in the same horizontal plane ir-

respective of the inclination of the side members 23 and 25, as indicated in Figure 2.

I claim as my invention—

1. An invalid's bed, comprising a main frame including channel-shaped posts, a movable section within and extending throughout a portion of the horizontal length of said main frame and pivoted at one end thereto, a shaft rotatively mounted in and transversely of the upper portions of said posts, a spindle arranged transversely and having its end portions extending within and adapted for vertical movement relative to said channel-shaped posts, rollers on said spindle contacting the inner walls of said posts, connections between said shaft and spindle for raising and lowering the latter as the shaft is rotated, and pitmans providing pivotal connections between said spindle and the free end of said movable section.

2. An invalid's bed, comprising a main frame including channel-shaped posts and a channel-shaped cross-bar connecting their upper ends, a movable section within and extending throughout a portion of the length of the horizontal portion of said main frame, a shaft rotatively mounted in said channel-shaped cross-bar, a spindle transversely arranged and having its ends projecting within and adapted for vertical movement relative to said channel-shaped posts, rollers pivoted on said spindle and contacting the inner walls of said posts, a spool fixed to said shaft, a cable adapted to be wound on said spool and operatively connected to said spindle, and pitmans or links pivoted on said spindle and having adjustable pivotal connections with the free end of said movable section.

3. An invalid's bed, comprising a main frame including channel shaped posts the channels of which open inwardly toward the median line of the bed and a channel shaped cross-bar connecting the upper ends of said posts, the channel of said cross-bar opening downwardly, said main frame also including side rails slidable on and normally locked to said posts, a shaft arranged for rotation in said channel shaped cross-bar, a spindle arranged parallel with said shaft and having its ends extended within the channel shaped posts, operative connections between said shaft and spindle for raising or lowering the latter as the shaft is rotated, a bed section pivoted at one end to said side rails, links pivotally connecting said spindle to the free end of said bed section, and means for locking said side rails to the free end of said bed section so that said side rails may be raised when vertical strain is applied through said shaft, spindle and links.

4. In a bed, a channeled post and a channeled side rail, together with a connecting strap embracing one margin of a flange of said channeled post, extended across two faces of said post and entering the end of said channeled side rail and a block member mounted in said side rail and conjunctively with said strap secured thereto, said block member engaging a third face of said post.

Signed at Webster City, in the county of Hamilton and State of Iowa, this 24th day of September, 1921.

WILLIAM A. McCOLLOUGH.