Nov. 25, 1930. R. A. AUSTIN 1,782,672

APPLIANCE FOR INVALIDS

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Fig. 1.

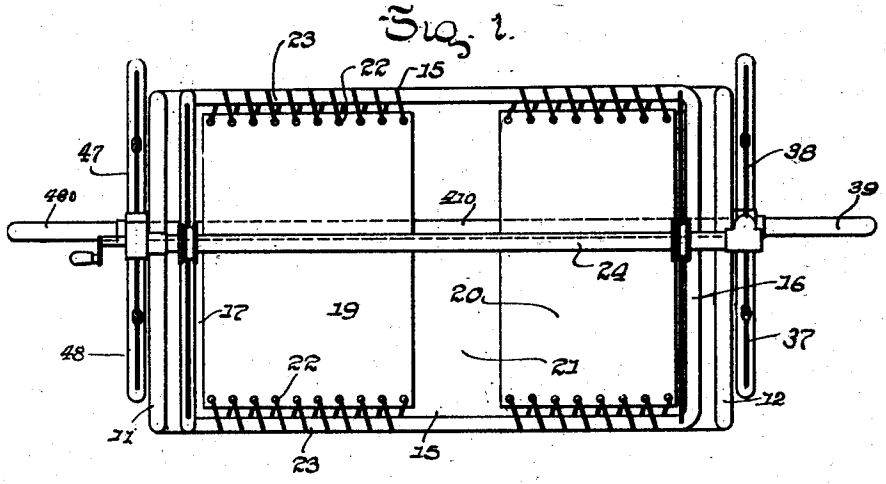
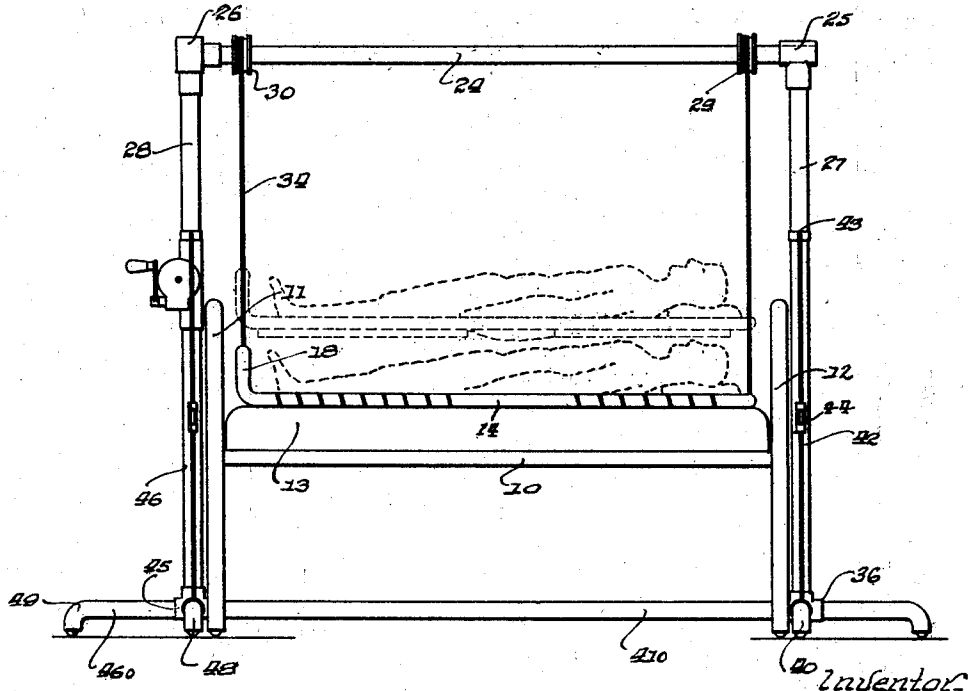


Fig. 2.



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Fig. 4.

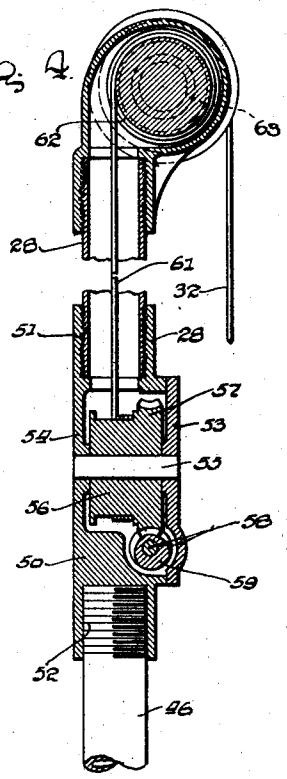


Fig. 5.

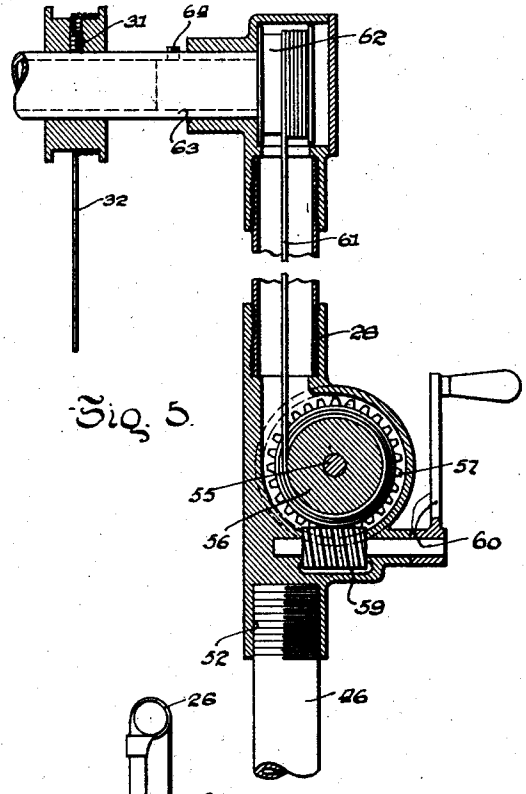


Fig. 6.

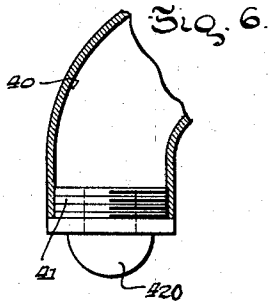
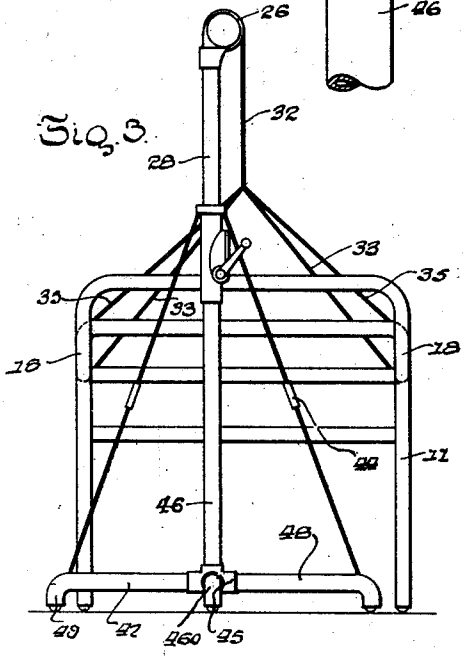


Fig. 3.



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UNITED STATES PATENT OFFICE

ROBERT A. AUSTIN, OF CHICAGO, ILLINOIS

APPLIANCE FOR INVALIDS

Application filed April 5, 1928. Serial No. 267,550.

This invention relates to appliances for invalids.

In the care of bed-ridden invalids, particularly those who are physically unable to help themselves, great difficulty is encountered in moving them into position so as to permit changes in bed clothing, to accommodate the functions of nature and the like. Heretofore, various contrivances have been employed such as hoists provided with cable and pulley or gearing systems which have complicated mechanism easily disarranged, and of such size and weight as to preclude ready transportation; further, devices of the character heretofore utilized are inconvenient for the reason that the invalids or patients must be placed within the hoisting contrivances before they can be moved about as desired; also hoisting devices of the character referred to have exposed mechanism subjecting the operator to the danger of injury by encountering the exposed parts, and the patient is also subjected to danger due to the unreliability of the pulley and ratchet mechanism commonly employed in connection with devices of this sort.

An object of this invention is to provide a mechanism which includes what is, in effect, an auxiliary bed adapted to rest upon the usual type of bed and having webbing which permits the patient to rest his weight upon the usual bed, the arrangement being such that the bed covers may be placed over the patient and over the auxiliary bed whereby hoisting mechanism may be utilized to lift the auxiliary bed with the patient and bed clothes thereon, leaving apertures exposed in the webbing by means of which the natural functions of the body may be attended to; also the bed clothes upon the bed proper may be readily changed without inconvenience to the patient.

A further object of the invention is to provide a portable hoisting mechanism of novel form for use in connection with the auxiliary bed, whereby the parts are connected together in such manner that the entire contrivance may be easily transported from place to place for use in connection with any number of different beds, as for instance, in a hospital.

A still further object of the invention is to provide a hoisting mechanism for invalids, wherein the supporting frame of the hoisting mechanism comprises hollow tubular members of light weight, the hollow construction of which is utilized for the positioning of portions of the operating mechanism therein for the purpose of entirely enclosing and concealing the same to prevent danger to operators of the mechanism and to afford a safe and substantial supporting frame which has a neat and attractive appearance.

Yet another object of the invention is to provide an invalid hoisting mechanism of the character referred to, wherein a worm gearing arrangement is employed in connection with the tubular members of the framework and operates, without locking devices of any kind, to support the auxiliary bed in any desired elevated position.

Other and further objects of the invention will more clearly appear from the description and claims hereinafter following.

In the drawings forming a part of this specification, Figure 1 is a top plan view of the auxiliary bed and hoisting mechanism forming the subject matter of this invention. Figure 2 is a side elevational view of the invention showing the same used in connection with a usual type of bed and illustrating a patient occupying the auxiliary bed. Figure 3 is an end elevational view of the appliance shown in Figure 2. Figure 4 is an enlarged fragmentary, vertical, sectional view of one of the standards of the hoisting mechanism disclosing means by which the mechanism is operated. Figure 5 is an enlarged, detailed sectional view similar to Figure 4, and showing the section taken through the supporting standard longitudinally of the hoisting mechanism. And Figure 6 is an enlarged, sectional view of a foot member utilized in connection with the invention.

As shown in the drawings, 10 denotes a bed of a usual type having a foot piece 11 and head piece 12, and provided with the usual spring and mattress, the mattress being indicated by the numeral 13. When used in connection with the invention, the bed 10 preferably has the usual sheet thereon, but no outer covering.

An auxiliary bed frame is provided, indicated generally by the numeral 14, said frame comprising tubular side members 15—15, a connecting head member 16 and a foot member 17. All of the members 15, 16 and 17 are in the form of hollow pipes or tubing, and the foot member 17 is offset to one side of the plane in which the members 15—15 and 16 lie and connected with the adjacent ends of the side members 15—15 by uprights 18—18. The purpose of offsetting the member 17 is to provide clearance for the feet of the patient occupying the auxiliary bed. The auxiliary bed is preferably provided with webs 19 and 20, these webs being of such length as to leave an opening 21 therebetween. The webs 19 and 20 are preferably made up of some strong, light material, such as canvas, each of the webs in the edges adjacent the side members 15, being provided with a plurality of grommets indicated at 22 through which flexible members 23 may be laced as indicated in the drawing, the flexible members being wound about the adjacent side members 15—15 of the frame. As before stated, the auxiliary frame 14 is of such character as to normally rest upon the top of the mattress 13, and when a patient is in position upon the frame, his weight is taken up by the mattress 13, due to the flexibility of the webs 19 and 20, so that the patient rests comfortably upon the bed 10 without suffering any inconvenience due to the presence of the frame 14. When the patient is in this position, outer covers of any suitable character may be placed over the patient and frame 14, and if desired, tucked in under the mattress 13 in the usual way.

Cooperating with the auxiliary bed 14 is a novel hoisting mechanism which includes a hollow shaft 24, the opposite ends of which are rotatably supported by bearing members 25 and 26 secured to upright standards 27 and 28. The shaft 24 has secured thereon in spaced relation, drums 29 and 30, each of the drums being of the same character and keyed to the shaft 24 by means of a set-screw indicated at 31 in Figure 5 so that each of the drums rotates with the shaft, the drum 29 being located adjacent the head of the auxiliary bed frame 14, while the drum 30 is located in line with the foot of said bed. To the drum 29 is attached a cable 32 which has diverging supporting portions 33, the outer ends of which are attached to the head of the auxiliary bed frame 14 adjacent the side members 15—15 as best shown in Figure 3, the cable 32 being adapted to wind upon the drum 29 and by reason of the fact that the drum is located somewhat inwardly of a vertical plane extending through the head end of the auxiliary bed 14, the cable 32 will wind evenly without jerking, upon the drum 29. The drum 30 has a cable 34 connected thereto having diverging portions 35—35 which are connected to the opposite ends of the foot member 17 of the auxiliary frame 14, the drum 30 also being located slightly to one side of a plane extending vertically through the foot member 17 so that the cable 34 winds smoothly upon the drum 30.

The standard 27 is made up of a single piece of pipe, the upper end of which is threaded into the casting 25, while the lower end of the standard 27 is threaded into a suitable aperture in a coupling 36. The coupling 36, in addition to the opening into which the lower end of the standard 27 fits, is provided with four horizontally extending nipples, three of which are adapted for the reception of portions of short lengths of pipe indicated at 37, 38 and 39, the pipes 37 and 38 extending transversely of the device, while the pipe 39 extends outwardly from the standard 27 longitudinally of the contrivance. Each of the pipes 37, 38 and 39 is provided with a curved foot portion indicated at 40 which is threaded for the reception of a plug 41 carrying a rubber castor 420 cemented into the plug, as best shown in Figure 6. The remaining nipple of the coupling 36 is adapted for the reception of a connecting piece 410 which extends to the lower end of the standard 28. Strut rods 42—42 are preferably connected to a collar 43 on the standard 27 and have their opposite ends connected to the outer portions of the transversely extending pipe 37 and 38, each of the straight rods having a turn buckle 44 embodied therein by means of which the tension of the struts may be adjusted.

The standard 28 at its lower end has a coupling 45 similar to the coupling 36, and provided with a threaded opening for the reception of the lower end of the pipe 46 forming part of the standard 28. The coupling 45 also has a threaded opening for the reception of the connecting piece 410. The coupling 45 also has threaded openings for the reception of horizontally extending pipes 46—47 and 48, each of these pipes having a turned portion forming a foot as indicated at 49, of the same character as the foot 40 illustrated in detail at Figure 6. Interposed between the upper pipe section of the standard 28 and the pipe section 46 is a cast gear housing 50, said gear housing being provided with threaded nipples 51 and 52 for the reception of the upper pipe section of the standard 28 and the lower pipe section 46. The housing 50 is provided with a detachable cap 53 and mounted in the cap 53 and the rear wall 54 of the housing is an axle 55 which supports a combined drum and gear indicated respectively by the numerals 56 and 57, the gear being of the worm type. Rotatably mounted below the axle 55 and substantially at right angles thereto is a shaft 58 carrying a worm 59 thereon, said worm being

disposed in mesh with the worm wheel 57. The outer end of the shaft 58 has mounted thereon a crank handle 60 by means of which the shaft 58 and the gear 59 are rotated, imparting rotation to the gear 57 and the drum 56 at a much slower speed. Secured to the drum 56 is a cable 61 adapted to wind upon the drum and said cable extends upwardly through the hollow interior of the upper pipe section of the standard 28, the cable 61 being adapted to wind upon a drum 62 rotatably mounted in the supporting casting 26. The drum 63 in turn is provided with a hub which fits in the end of the shaft 24 and is adapted to be rigidly secured in position by means of a set screw 64, the construction being of such character that when the drum 56 is rotated to wind up the cable 61 thereon, the shaft 24 and consequently the drums 29 and 30 are rotated to wind the cables 32 and 34 thereon so that the auxiliary bed frame 14 may be elevated. Due to the provision of the worm driving mechanism, it will be appreciated that the auxiliary frame 14 may be supported at any elevation without the use of any holding means such as pawl and ratchet mechanisms by reason of the worm gears preventing any unintended rotation of the parts.

In operation, assuming that the auxiliary bed frame is in its normal position resting upon the bed proper, the patient or invalid may recline upon the webbing of the auxiliary frame in such manner that he is supported by the bed proper. In this position, the bed covers may be placed over the invalid and over the frame and tucked in if desired in order to prevent any exposure of the patient. Assuming that it is necessary to change the sheeting of the bed proper or to place the patient in convenient position to permit the excretory functions of the body, the auxiliary bed 14 may be elevated by the hoisting mechanism carrying the patient upwardly, along with the outer coverings of the bed clothing, which permits access to be gained in the desired manner to accomplish the purposes referred to. The elevation of the auxiliary bed 14 is effected through rotation of the crank handle 60 imparting rotation to the worm wheel 57 and drum 56 at a slower rate so as to take in the cable 61 and through the connection of the cable with the drum 62, effecting corresponding rotation of the drums 29 and 30. Due to the large reduction in gear ratio, turning movement of the crank handle may be effected with a minimum of effort and because of the provision of the worm drive, the auxiliary bed may be maintained at any desired elevation due to the fact that the worm members will not move until positively actuated through rotation of the crank handle 60.

While I have herein shown and described what I now consider the preferred manner of carrying out my invention, the same is merely illustrative and I contemplate all changes and modifications that come within the scope of the claim appended hereto.

I claim:

In an invalid's appliance, an auxiliary bed frame adapted to rest upon a bed, said frame having head, foot and side members, said foot member being offset upwardly above the plane of the remaining bed members to afford clearance for the feet of the patient, and supporting means for the invalid disposed below the plane of the foot member and in the plane of the head and side members.

In witness that I claim the foregoing I have hereunto subscribed my name this 3rd day of April, 1928.

ROBERT A. AUSTIN.