C. W. LANE.
DEVICE FOR RAISING AND MOVING INVALIDS.
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INVENTOR

Charles W. Lane,

BY

Worth Algood,
ATTORNEY
UNITED STATES PATENT OFFICE.

CHARLES W. LANE, OF FISHKILL, NEW YORK.

DEVICE FOR RAISING AND MOVING INVALIDS.

953,962.


To all whom it may concern:

Be it known that I, CHARLES W. LANE, a citizen of the United States, and resident of Fishkill, in the county of Dutchess and State of New York, have invented certain new and useful Improvements in Devices for Raising and Moving Invalids, of which the following, in connection with the accompanying drawings, is a full, clear, and exact specification, sufficient to enable others skilled in the art to make and use my improvements.

My invention has relation to devices or appliances employed for the purpose of mechanically lifting and moving invalids or injured persons, for the comfort and convenience of the invalid as well as to make the task easy for the attendant.

The principal object of this invention is to provide or produce a simple, cheap, reliable and efficient device of the character above indicated, which may be easily and powerfully operated to raise or lower or move the patient in all desirable ways and which may be employed either in connection with or independently of any ordinary form of bedstead.

Subordinate objects are to provide means for rendering the device steady in any of the positions to which it may be adjusted, to provide for the instantaneous clutching or unclutching of the winding pulleys, to provide for the raising and lowering of the cranes to locate them at any desirable height, to make the crane posts and the lifting frame adjustable to conform to the width of the bed, and to provide simple and efficient means for clamping the lifting device in connection with the bed posts, when so desired.

To accomplish the foregoing objects and to secure other and further advantages in the matters of construction, operation, application and use, my improvements involve certain new and useful arrangements or combinations of parts, details of construction and principles of operation, as will be herein first fully described and then pointed out in the claims.

In the accompanying drawings which form part of this specification, Figure 1 is an end view showing an ordinary form of bed head with my improved lifting device applied in connection therewith, the cranes and the foot braces being shown as turned to one side, one of the cranes supporting a chair or sling at one side of the bed, the frame for the usual support of the patient being omitted. Fig. 2 is an elevation showing the side of the bed with the frame for supporting the patient sustained by the lifting device and inclined toward the front side of the bed, the foot brace being shown as turned in line with the side of the bed. Fig. 3 is a front elevation showing a portion of the elevating and lowering gear and means for clutching or unclutching the belt wheels, this view being on a scale enlarged beyond previous figures. Fig. 4, also enlarged, is a section and elevation showing the manner of mounting the vertically adjustable crane in and on the crane post and holding the former at the height to which it may be adjusted. Fig. 5 is a horizontal section and plan view illustrating the construction of a removable clamp by which the crane posts may be securely connected with the bed posts, whenever desired. Fig. 6 is a plan view, partly in section, showing the general construction and arrangement of the tubular frame for sustaining the canvas, the frame being adjustable as to width so as to make it conform to any width of bed, the canvas being omitted. Fig. 7 is a side elevation showing the head portion and foot portion of the frame hinged to the central part thereof, so that one portion may be elevated and the other allowed to drop down. Fig. 8 is a section and elevation showing two adjacent hinged portions of the frame and the interior sliding bolt by which the parts may be rigidly held in line. Fig. 9 is a side view partly in section and partly in elevation, showing the movable foot brace applied on the crane post, means for holding the foot brace in a position to which it may be turned and one of the clamps holding the crane post in position with respect to a bed post.

In these several figures, like reference characters, wherever they occur, are employed to indicate similar parts.

1, 1, represent the main standards of the device. These are hollow to receive the ends of the swinging cranes and may well be made of pipe of suitable interior diameter; and they are provided with casters, as 2, 2, at the bottom. The upper ends of these standards are suitably finished and provided with a track to receive the balls on which the cranes are made to move, as at 3.

4, 4, are the swinging cranes, being pref-
erably of metal and suitably bent to constitute vertical and horizontal arms, the vertical portion of each crane being made vertically adjustable in its corresponding tubular standard and turning therein. On each crane is a suitable collar, provided with a set screw of ample strength, as at 6, by which the position of the collar may be fixed when the proper adjustment is attained. When secured in place, the collar and the swinging crane become as one. The strain upon the crane being transmitted to the top of the standard through the collar, the crane then in effect rides upon the ball-bearing so that it may turn easily and smoothly and without noise. The cranes may be raised or lowered and set at any desired point so as to accommodate the device to the height of any ordinary bedstead or to the height of the ceiling of the room from the floor.

To keep the standards at the proper distance from each other, they are united by a cross-brace located at any convenient point, as at 7 and 8, one portion, as 7, being hollow and the other portion, as 8, being arranged to enter the hollow portion and to be fixed therein at the desired point by any suitable locking device, as by the set screw, 9.

This forms a telescopic union for the two standards by which they may be quickly set and firmly held at the proper distance from each other.

On the lower parts of the standards are applied foot braces, as at 10, 10, and these are arranged to be easily turned or swung, being about the length of the horizontal arms of the cranes and being intended to prevent the weight which may be sustained by the cranes or either of them from tipping the standards. When these foot braces are not required for use they may be swung parallel with the longer side of the bed (if used in connection with a bed) as in Fig. 2, or under the end of the bed as at the right of Fig. 1. Each of the foot braces is provided with a caster, as at 11, each caster being supplied with a shank capable of turning in an opening provided for it in the end of the foot brace. Set screws, as at 12, are for the purpose of preventing the shanks of the casters from turning; and when the casters are turned substantially in line with the foot braces and locked by the set screws, the foot braces will be prevented from swinging in or around the standards and thus they are held in any desirable position while the apparatus may be in use so as to avoid possibility of the cranes being tipped.

The two standards with the foot braces, the cranes and the cross brace, and with the hoisting and lowering means to be hereafter described, may be employed independently of any bed, if so desired; but ordinarily they will be used in connection with a bed, and therefore I provide means for clamping them in connection with the bed posts.

14 and 14 represent bed posts of any ordinary form, these being of metal in the example shown, but they may be of wood and of any desired size. To clamp the standards upon the bed posts, suitable clamps are provided, as best shown in Fig. 5. These are composed of similar arms, as 15, 15, hinged together, as at 16, and arranged to embrace one of the standards and a bed post, 14, a spacing block, as 17, being interposed between the standard and the bed post, and the two arms 15 being drawn together and locked by a suitable screw, as 18. Before the clamps are put in place, the standards, 1, 1, are separated to about the distance between the two posts on one end of the bed, preferably the head, and then the clamps may be located and fixed in place, as will be readily understood. As many of these clamps as may be desired may be employed, the purpose being to make a secure union between the bed and the lifting and moving apparatus.

49 represents one of the usual side bars of a bedstead and 20 represents one of the end bars, the usual spring and mattress and other furnishings of the bed being supported between these bars, these not being shown herein as being unnecessary to the present description.

For the purpose of raising or lowering the patient in whatever manner may be desired or necessary, the improved device is provided with straps of sufficient length, represented at 21, 22, 23 and 24, two for each crane, and these may be wound simultaneously, or two by two, or either one may be wound without disturbing the others, according to the manner in which it may be desired to move the patient or otherwise employ the apparatus. The straps each run upon a pulley, as 25, on the end of each crane, back to a pulley, as 26, over the vertical portion of each crane, and thence down to their appropriate winding drums or wheels mounted upon the standards.

The manner of operating the winding drums or wheels, and thus operating the lifting device, is best illustrated in Fig. 3. 27 and 28 represent two portions of the driving shaft, these portions being arranged to telescope one with the other and to be locked at the point to which they may be adjusted by a suitable set screw, as 29. The purpose of thus making the driving shaft adjustable is to easily accommodate it to the distance by which the two uprights may be separated. The driving shaft turns in suitable bearings, represented at 30, 30, securely fixed upon the uprights, and the shaft is to be turned by any approved form of crank or handle applied on each end, preferably
an ordinary form of ratchet handle, as indicated at 31. The driving shaft carries driving gears, as at 32, which mesh with suitable gears, as 33, by which it turns the shafts 34 on which the winding drums are mounted. 35, 36, represent the drums by or on which the straps are to be wound, and these drums are loosely mounted upon the shafts 34 and arranged to turn thereon except when clutched and compelled to turn in connection therewith. The clutches are of a very simple and positive character so as to obviate difficulty in operating and possibility of slipping when the device is in use.

Each drum is provided with an enlargement, 36, suitably recessed so as to receive the end of a clutch block 37, 38, as at 38, on a collar, 39, which is slipped upon the end of the shaft 34 and held in place by a suitable set screw, 40. When the clutch block 37 is in engagement with the winding drum as in Fig. 3, then the shaft 34 and the winding drum 35 are compelled to turn together, as will be readily understood. To release either of the winding drums so that they will not turn, it is only necessary to swing the clutch block 37 back and out of engagement with the winding drum.

For convenient lifting, moving or turning the patient, I employ a suitable frame with which the straps 21, 22, 23 and 24 may be easily and quickly connected. This frame is supplied with a canvas or other fabric suitably stretched and secured thereon, as at 41, and this is ordinarily interposed between the patient and the bed. The canvas is preferably tubular and the end portions, 42, 43, are made adjustable in the portions 44, 45 so as to adapt the frame to any width of bed in connection with which it may be desired to use it. The telescopic portions of the frame may be held together by suitable set screws. The head section of the frame, 46, is hinged to the middle portion, 47, as at 48, 49, so that the head section may be elevated with reference to the central portion; and the foot portion is hinged as at 49, 42, so that this portion may swing down with reference to the middle portion. The hinges 48, 49, are similar in construction but reversed in position. At each hinge joint a suitable locking bolt is supplied to secure the adjacent parts in a rigid manner when desired or necessary. One of these bolts is represented at 50 and it moves back and forth in the middle section and may be projected into the adjacent section, as indicated in Fig. 8, to lock the two parts together.

The sliding bolts are provided with projecting studs, as at 51, and these move in suitable slots as at 52.

The straps 21, 22, 23 and 24 are detachably connected with the frame in any suitable manner; and they are preferably supplied with strong springs, as 53, for the purpose of obviating any sudden jars or shocks during the movements of the frame. The upper or head section of the frame may be supplied with a raised portion, as at 54, to constitute a head rest or pillow for the patient. This head rest is movable with the section of the frame to which it is applied and secured thereto so that it cannot drop down when the end of this section is elevated. When the frame is to be elevated in a horizontal position, the sections thereof are locking by suitable adjustment of the sliding bolts and all the winding drums are thrown into gear by the clutches. The straps being connected with the ends of the frame and the driving shaft being properly turned, the frame and the burden thereon will be raised in the desired manner and it may then be swung to one side, if desired, to clear the bed. By releasing the drums on either side and turning those on the other side, one side of the frame will be elevated, as for the convenient and easy turning of the patient.

When it is desired to elevate the head section of the frame, the locking bolts in connection therewith are pushed back, the two straps connected with the foot section are released and those in connection with the head section are wound. To lower the end of the foot section, the straps 21, 22 are disconnected from this section and connected with the middle section, as at the points 55, 56, and the corresponding locking bolts slid back. Then by winding all the straps, the middle and head sections will be elevated and the foot section allowed to swing down by its own weight. By raising the head section and lowering the foot section, the patient may be brought to a sitting posture, somewhat as in an ordinary chair.

At 56 is a strip or band of canvas or other suitable material arranged to be moved upon the frame and over the canvas 41 to cover the opening in the latter when the commode, with which the device is peculiarly well adapted to be used, is not in position.

At 57, Fig. 1, is shown an ordinary form of sling or seat for the patient, the same being connected with one of the straps and represented as swung toward one side of the bed, indicating one manner in which the device may be employed for lifting or sustaining the patient when it may be undesirable to employ the frame.

The improved device is quite simple in construction and may be easily understood and operated by the attendant for the convenient, safe and easy lifting and moving of the patient, and it is equally applicable for hospital use or for use in any other situation.

Having now fully described my invention, what I claim as new herein and desire to secure by Letters Patent, is:

1. In devices for raising and moving in-
valids, the combination with a swinging crane, of a tubular standard therefor, said standard being provided with a caster at the bottom and with a ball track fixed upon its upper extremity, the crane being vertically adjustable in the standard and its weight and the weight of its load being sustained upon the top of the standard, and a collar for maintaining the crane at any height to which it may be adjusted.

2. In devices for raising and moving invalids, the combination with a swinging crane, of a tubular standard therefor, said standard being provided with a caster at the bottom and with a ball track fixed upon its upper extremity, a collar adjustable upon the crane, a screw for locking said collar on the crane in any position to which it may be adjusted, and balls interposed between the collar and said ball track, the crane being vertically adjustable to any point in its tubular standard and its weight and the weight of its load being sustained upon the top of the standard.

3. In devices for raising and moving invalids, tubular standards and swinging cranes vertically adjustable in said standards and sustained upon the tops thereof, in combination with a two part cross brace extending between the standards, said cross brace being adjustable as to its length and provided with a screw for securing it at the point to which it may be adjusted, to regulate and maintain the distance between the tubular standards.

4. In devices for raising and moving invalids, the combination of a tubular standard, a swinging crane mounted in and made vertically adjustable in said standard, and a foot brace applied upon the standard and arranged to be freely moved around and without disturbing the standard, substantially as and for the purposes set forth.

5. In devices for raising and moving invalids, the combination with a tubular standard provided with a caster at its bottom and a vertically adjustable swinging crane mounted in and sustained upon the top of said standard, of a movable foot brace applied around the standard above the caster thereon and movable around the standard without disturbing the same, said foot brace being supplied with a caster near its outer end, and means for locking the caster with respect to the foot brace, substantially as and for the purposes set forth.

6. In devices of the character set forth, the combination with tubular standards and swinging cranes mounted therein and supported thereupon, said standards being adjustable toward and from each other, of detachable clamps composed of hinged arms recessed to embrace both the tubular standards and the bed posts, means for locking the hinged arms, and blocks for interposition between the tubular standards and bed posts, for the objects specified.

7. In devices of the character set forth, the combination with a tubular standard and a swinging crane mounted therein and sustained upon the top thereof, of two independently movable straps on said swinging crane, winding drums for said straps supported upon the standard, and means for operating said drums either separately or simultaneously or in pairs, as explained.

8. In devices of the character set forth, the combination with tubular standards and swinging cranes mounted therein and sustained upon the top thereof, of four independently movable straps, two for each crane, a winding drum for each of said straps supported in pairs upon the two standards, and means for operating the said drums from a single shaft either separately or simultaneously or in pairs, as explained.

9. In devices of the character set forth, the combination with tubular standards and swinging cranes mounted therein and sustained upon the top thereof, of four independently movable straps, two for each crane, separate winding drums for said straps supported in pairs upon the standards, and a single driving shaft for operating the said drums either separately or simultaneously or in pairs, said driving shaft being made lengthwise adjustable and provided with means for turning it, substantially as set forth.

10. In devices of the character set forth, the combination with tubular standards and swinging cranes mounted therein and sustained upon the top thereof, of four independently movable straps, separate winding drums for each of said straps supported in pairs upon the standards, a single shaft for turning the drums either separately or simultaneously or in pairs, the drums being loosely mounted upon their shafts, and means for compelling them to turn with their shafts and to disconnect them therefrom, substantially as set forth.

11. In devices of the character set forth, the combination with a tubular standard and a swinging crane mounted therein and sustained upon the top thereof, of independently movable straps, separate winding drums for each of said straps supported upon the standard and means for turning the drums, the drums being each loosely mounted upon a shaft, and collars provided with hinged arms for clutching the drums or either of them, the collars being secured upon the shaft, substantially in the manner and for the purposes set forth.

12. In devices of the character set forth, a frame for sustaining the patient, said frame being composed of three parts jointed together and covered with a suitable material, combined with means for moving the
entire frame or the end sections thereof or either of said sections, as explained.

13. In devices of the character set forth, a frame for sustaining the patient, said frame being composed of three parts united as explained and covered with a suitable material, combined with means for raising one or both sides of the frame or the outer ends of the end sections thereof either separately or simultaneously, as explained.

Witnesses:

Ezra Ketcham,
James Adriance.

CHARLES W. LANE.