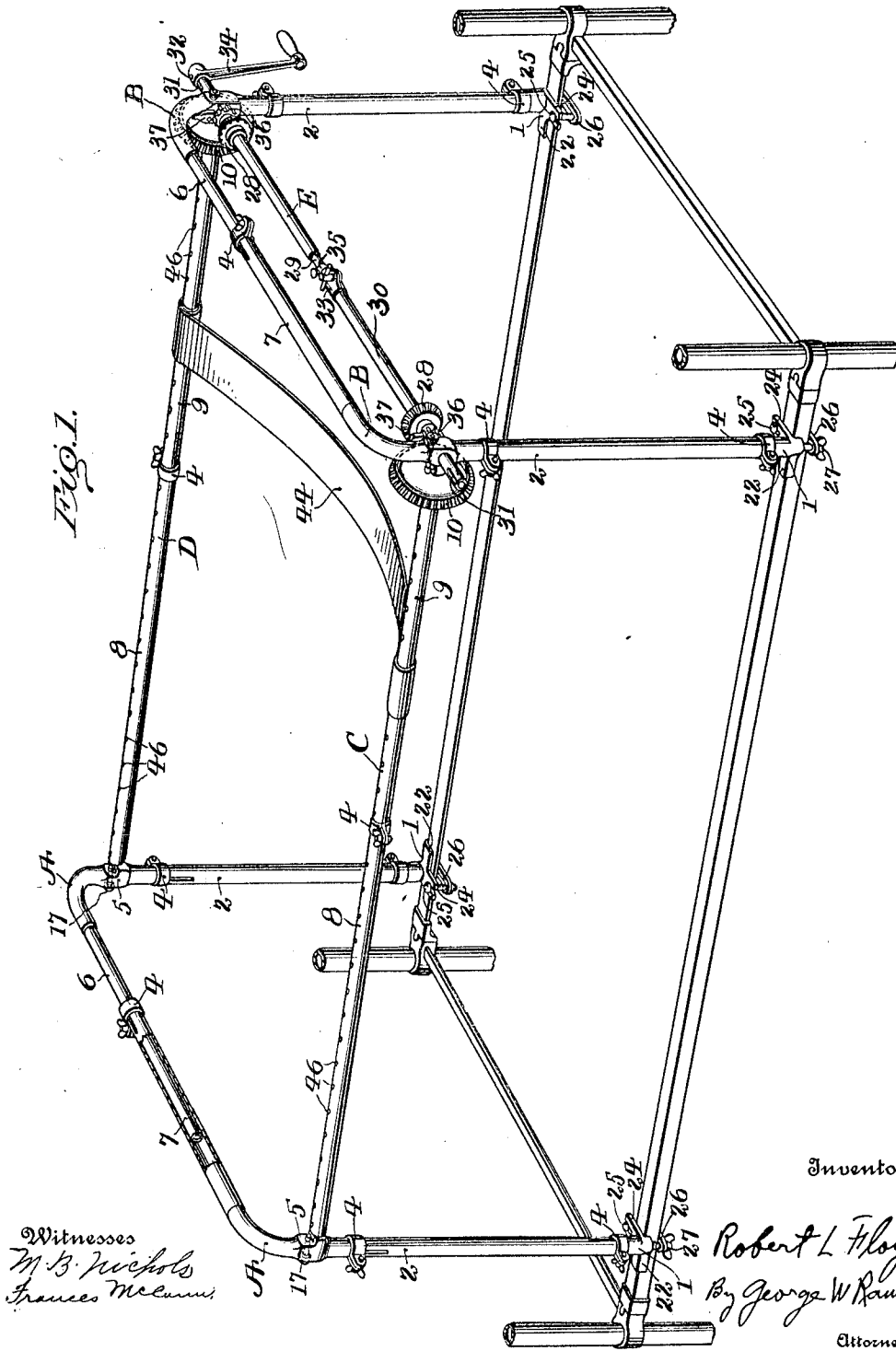


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APPLICATION FILED NOV. 23, 1914.

1,273,600.

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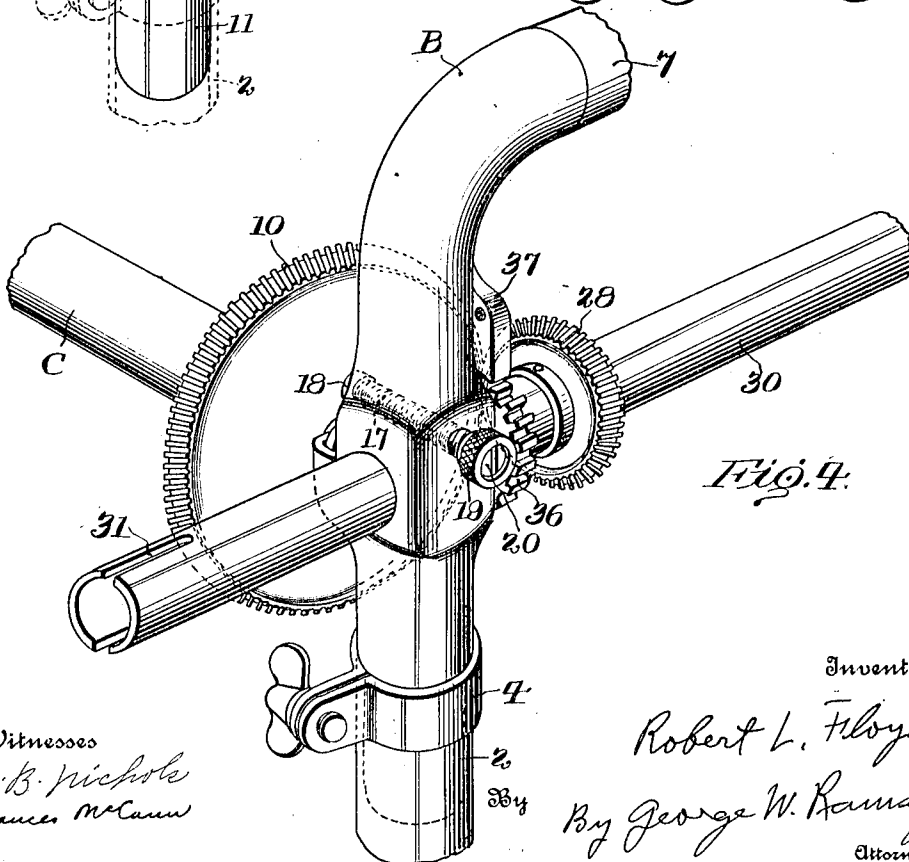
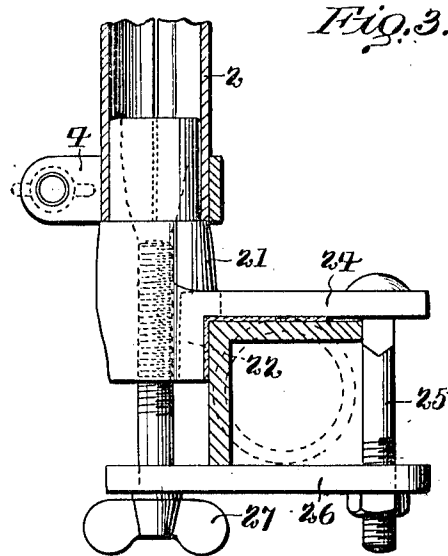
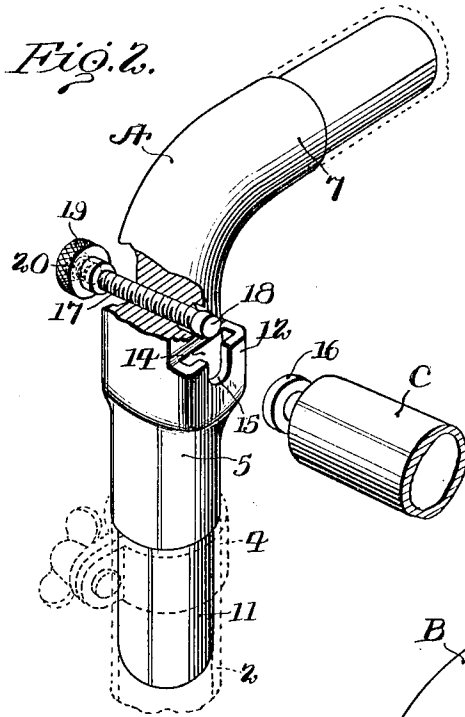
4 SHEETS—SHEET 1.



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Fig. 5.

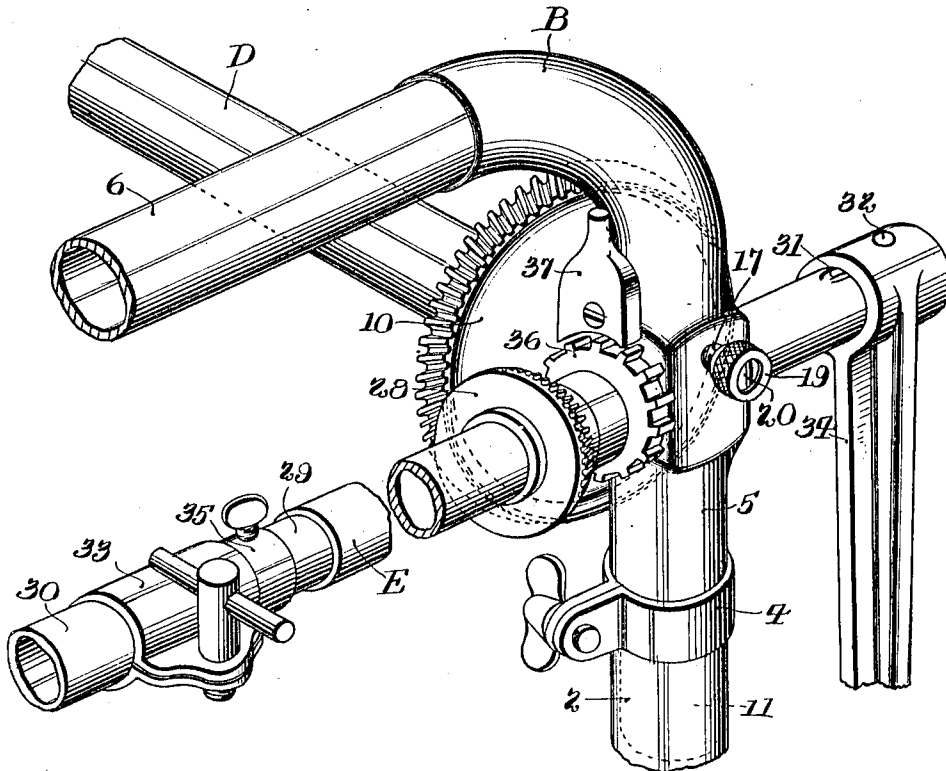
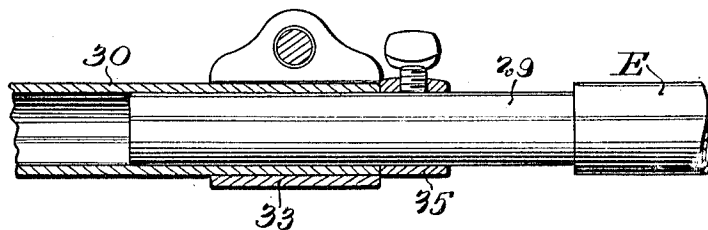


Fig. 6.



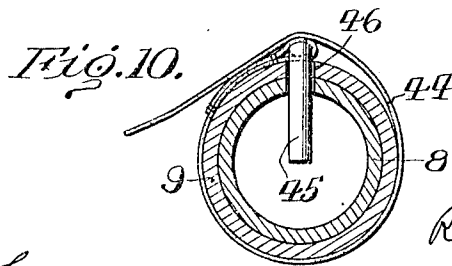
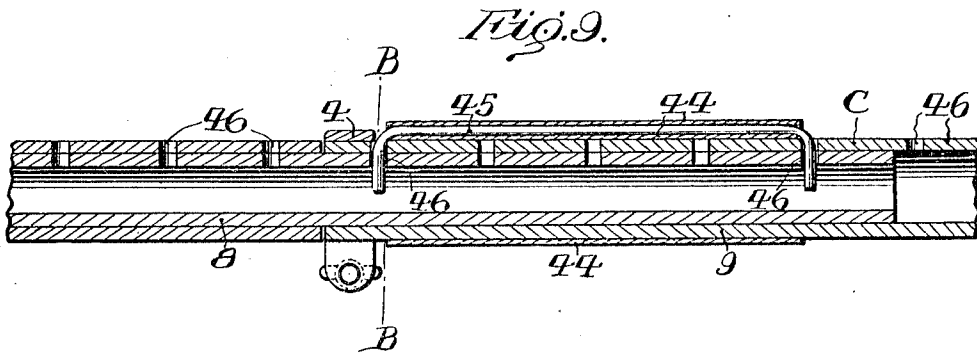
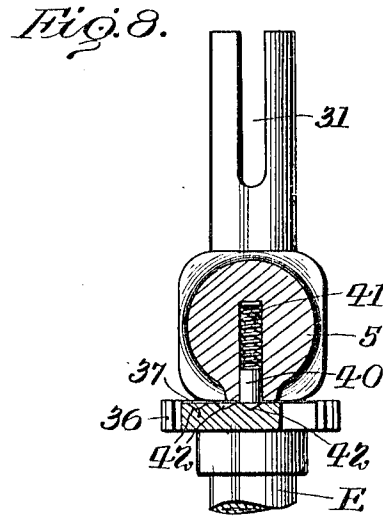
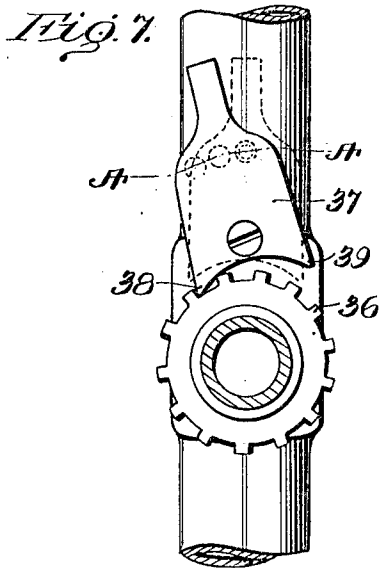
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UNITED STATES PATENT OFFICE.

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MECHANISM FOR LIFTING AND TURNING INVALIDS.

1,273,600.

Specification of Letters Patent.

Patented July 23, 1918.

Application filed November 23, 1914. Serial No. 873,493.

To all whom it may concern:

Be it known that I, ROBERT L. FLOYD, a citizen of the United States, and a resident of the city of Staunton, in the county of Augusta, State of Virginia, have invented certain new and useful Improvements in Mechanisms for Lifting and Turning Invalids, of which the following is a specification.

The present invention relates broadly to lifts and more particularly to invalids' lifts of the "knockdown" type.

The principal object of this invention is to improve the construction disclosed in my Patent #936,107, granted October 5, 1909.

More specifically the present invention resides in improved operating mechanism, and in features of construction for strengthening the frame and rendering the device more easily and securely assembled.

Another specific object of this invention is an improved angle brace constructed to carry the bearing for the lifting shafts and provided with a lock which prevents any possibility of the lifting shafts being accidentally removed from the open bearing.

Another and more specific object of the invention is the provision of a double acting ratchet for holding either section of a sectional driving shaft, wherein the sections may be operatively joined by a clutch, to enable either section of the driving shaft to be driven and held in any desired rotative position.

Still other and further objects of this invention will in part be obvious and will in part be pointed out in the specification hereinafter following by reference to the accompanying drawings wherein like characters are used to represent like parts throughout the several views thereof.

Referring now to the drawings—Figure 1 is a perspective detail view illustrating the operative parts in assembled relation, and showing the connections from one arch to bed rails. Fig. 2 is a detail perspective view illustrating one of the corner braces carrying integral therewith a supporting bearing. Fig. 3 is a detail view illustrating the preferred form of clamp bracket for attaching the device to a bed rail. Fig. 4 is a detail perspective view illustrating one view of one group of operating gears. Fig. 5 is a detail perspective view illustrating a dif-

ferent view of one group of operating gears and showing a portion of the driving shaft together with the thumb clutch and the adjustable stop carried on the shaft. Fig. 6 is a detail view illustrating the thumb clutch and adjustable stop in section. Fig. 7 is a detail view illustrating the relationship of the double acting ratchet and double acting pawl. Fig. 8 is a detail view on section A—A of Fig. 7. Fig. 9 is a detail view illustrating the relation between the openings in the lifting shaft and the cloth holding staple, and showing one form of telescoping connection used in the lifting shafts. Fig. 10 is a sectional view taken on line B—B of Fig. 9 looking in the direction of the arrows.

The usual custom of lifting or handling invalids has been the manual lifting of the patient by attendants without the aid of mechanisms. My Patent #936,107, granted October 5, 1909, discloses a mechanism for performing this work through the aid of a machine, and more particularly discloses a device of the "knockdown" type adapted to be taken to pieces and folded in small compass whereby it may be conveniently transported.

My present invention relates to improvements whereby my device is more easily assembled and manipulated, and furthermore, is more positive and secure when it is assembled. Referring to the drawings and more particularly to Fig. 1, the clamp brackets 1 are adapted to be secured to the rail of a bed, and carry the vertical posts 2, which are provided at each end with thumb clamps 4. Corner braces 5 are adjustably secured within the vertical posts 2 at the upper end thereof, and carry tubular telescoping members 6 and 7 respectively. These members are likewise secured in adjusted position by means of the thumb clamps 4. The telescoping members 6 and 7 enable the arch A, (composed of the vertical posts 2, corner braces 5 and telescoping members 6 and 7,) to be extended laterally to accommodate the device to various widths of beds or cots. Lifting shafts C and D are composed of sections 8 and 9 which have shouldered telescoping joints likewise provided with thumb clamps 4, thereby providing shafts of predetermined lengths when assembled, but which may be demounted

and disconnected to be transported in relatively small compass. The sections 9 of the shafts C and D are provided with bevel gears 10 which constitute a part of a driving mechanism for operating the lifting shafts, which will be more fully described in the explanation of details hereinafter following.

In order that my improvements may be more fully understood, I will now explain several specific parts of my device in detail. Referring to Fig. 2, it will be noted that the corner brace 5 comprises an integral metallic member, preferably cast, provided with a lower shouldered shank 11 which is integral with the body portion, and which is adapted to be seated within the vertical post 2, and to be securely clamped therein by means of a thumb clamp 4 carried by said posts. A bearing 12 is formed integral with the body portion and includes an enlarged U-shaped recess 14 provided with a smaller U-shaped opening 15. The ends of the lifting shafts C and D are provided with cylindrical heads 16, which are adapted to be seated within the bearing cup 12. In practice there is a liability of an attendant stooping under one of the lifting shafts C or D and in rising to come up beneath the lifting shaft, thereby carrying it out of its bearing, and possibly releasing the shaft and injuring the bearing at the other end, and dropping the patient who may have been raised. To obviate this possibility I have provided a positive lock for securing the cylindrical head 16 within the bearings. This positive lock comprises a member 17 threaded into and through the corner brace 5. This threaded member 17 is provided on its inner end with an enlarged cylinder 18 which is seated in a socket in the corner brace 5. The opposite end of the threaded member carries a knurled head 19 which may be secured to the threaded member by means of a stub screw 20. By this construction it will be noted that when the thumb screw is operated in one direction the cylindrical head is carried over the recess 14 in the bearing 12 and effectively locks the cylindrical head 16 in position. When the member 17 is turned in the opposite direction the cylindrical head is withdrawn until the shoulder thereon engages the base of the socket, at which time further movement is stopped. Thus it will be seen that the lock member 17 is provided with stops in each direction rendering it impossible to be removed and lost.

Referring now more particularly to Figs. 1 and 3, the clamp bracket 1 is provided with a body member 21 which carries integral therewith a V-shaped shelf 22. Also extending from the body member 21 and at substantially right angles thereto, is a bifurcated member 24 with which the head 65 of the bolt 25 is adapted to cooperate. A

link member 26 is carried by and slidable upon a thumb screw 27, which is tapped into the body member 21. By this construction it will be noted that the link member 26 comprises a second class lever, which, in connection with the other parts when assembled, will effectively secure the clamp bracket 1 upon either a channel iron or round bed rail when the thumb screw 27 is operated to clamp the parts in position. In hospital practice it is usual to mount a set of clamps upon the rails of a cot, and when the device is removed by loosening the thumb clamps 4, to leave the clamps in position, thereby obviating adjustments and enabling the attendants to use one lifting mechanism in connection with a number of cots, the only extra requirement being extra sets of clamp brackets.

Referring now more particularly to Figs. 4, 5, 6, 7 and 8, the driving mechanism for the lifting shafts C and D consists of relatively large bevel gears 10 which are engaged by beveled pinions 28 that are secured to the ends of the sections 29 and 30 of the driving shaft E. The ends of the sections 29 and 30 pass through openings in the corner braces 5 of the arch B, and are adapted to be withdrawn therefrom when the device is disassembled. Each outer end of the driving shaft is bifurcated as at 31 to form an interlock to receive the cross rivet 32 of the driving handle 34. The supporting arch B, like the supporting arch A, is constructed to be adjustable laterally to accommodate the device to beds of varying widths, and consequently it is necessary that the driving shaft likewise be extensible.

Referring now particularly to Figs. 1, 5 and 6, it will be noted that the section 29 of the driving shaft is reduced and telescopes within the section 30, which section carries a thumb clamp clutch 33 for securing the sections together in such manner that both sections rotate as substantially one shaft. It is sometimes desirable that each section of the driving shaft be rotated independently, and when such rotation is desired, it is necessary to provide a shoulder to prevent the sections from telescoping which would result in a disengagement of the bevel pinions 28 with the bevel gears 10. The adjustable stop 35, which is longitudinally movable upon the reduced portion of the section 29, effectively overcomes this difficulty and maintains the gear members in proper and operative relation.

Referring more especially to Figs. 5, 7 and 8, it will be noted that the double acting ratchet wheels 36 are carried by the driving shaft E adjacent the bevel pinions 28. Double acting pawls 37 are adapted to cooperate with the teeth of the double acting ratchet wheels 36 to hold either section 29 or 30 of the driving shaft in definite

rotative relation from either direction. The double acting pawls are adjustable to three positions; one wherein the dog face 38 is active, the second neutral, or inactive, and the third when the dog face 39 is the active element. This adjustment is accomplished by means of the conical headed plunger 40 which is mounted in a socket in the corner brace 5 of the arch B and is urged outwardly by the coiled spring 41. The conical head of the plunger 40 is normally seated in one of the conical recesses 42 provided on the inner face of the double acting pawl 37. As the pawl rides over the ratchet teeth the conical headed plunger is forced backwardly, but not sufficiently to be entirely displaced from the particular recess in which it is seated, and as the active dog rides over the ratchet tooth, the plunger returns the pawl to engage the on-coming ratchet tooth. Thus it will be seen that the plunger performs a double function of retaining the pawl in different operative positions and effectively maintaining the pawl in such positions, while it is performing its operation.

Referring now more specifically to Figs. 9 and 10, it will be noted that the supporting bands 44 are preferably secured to the lifting shafts C and D by means of long wire staples 45, which coöperate with the openings 46 in the lifting shafts. The openings 46 are longitudinally alined, and are relatively close together, while the wire staples are of a length equivalent to the sum of several spaces between the openings 46. This construction enables a wide band to be secured to the lifting shafts and at the same time be adjusted within relatively small limits to any required position in the length of the lifting shafts.

By referring to Fig. 9 it will be noted that the openings within the telescoping part of the section 8, are alined with the openings in the receiving part of the section 9. This construction permits a staple when passed through the openings to effectively and securely lock the sections together against any possible longitudinal or rotative movement which might occur if the thumb screw 4 were not sufficiently tightened.

It will be noted that the foregoing description has fully and clearly set forth an invalid lift of great strength and simplicity which may be assembled without the use of any tools whatever, and which when assembled will occupy a relatively small compass so that it may be easily and effectively transported from place to place.

Having thus described my invention what I desire to claim is:—

1. An invalid lift comprising in combination a pair of vertical supporting arches, lifting shafts carried by said supporting arches, means for operating said lifting shafts, each of said lifting shafts being provided with a series of equally spaced longitudinally alined openings, and an elongated staple having ends spaced to fit said openings, said staple having a length greater than the distance between an adjacent pair of openings to enable said staple to carry a wide supporting band and to be adjusted at relatively small distances longitudinally of the said lifting shafts.

2. In an invalid lift in combination, supporting arches, lifting shafts carried by said supporting arches, gear mechanism for operating said lifting shafts, and clamp brackets for carrying said vertical arches and securing the same to the rails of a bedstead, said clamp brackets comprising a substantially cylindrical vertical member, a V-shaped supporting shelf extending from said cylindrical member at substantially right angles thereto, a bifurcated arm extending from the side of said supporting shelf at substantially right angles to said cylindrical member, a flat link, a bolt carried by said link and adapted to engage said bifurcated member, and a thumb screw threaded axially alined with said cylindrical member and carrying said link.

3. In an invalid lift in combination, a pair of supporting arches, a pair of lifting shafts carried by said arches, the upper members of said lifting shafts comprising telescoping tubular members adapted to be adjustable longitudinally, means for operating said lifting shafts, said means including a driving shaft formed in two sections, one section telescoping within the other, a relatively large beveled gear carried by each lifting shaft, a beveled pinion carried by each section of the driving shaft, the ends of the driving shaft extending through openings in the vertical members of one of said arches, and an adjustable stop carried by one section of said driving shaft and adapted to be abutted against the end of the other section of the driving shaft to retain said pinions in mesh with said beveled gears when the said arch has been adjusted in an extended position.

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