Dec. 31, 1935. P. WRIGHT ET AL 2,026,153

ADJUSTABLE RECLINING BED, COUCH AND THE LIKE

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Fig. 1.

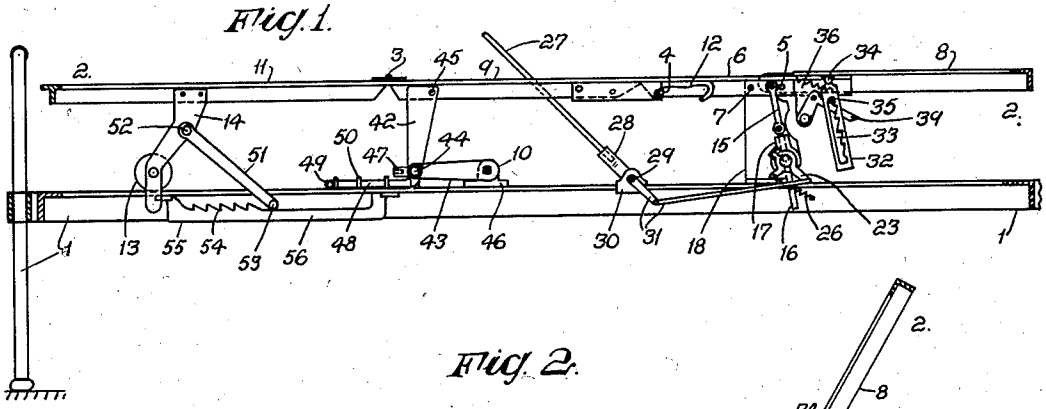


Fig. 2.

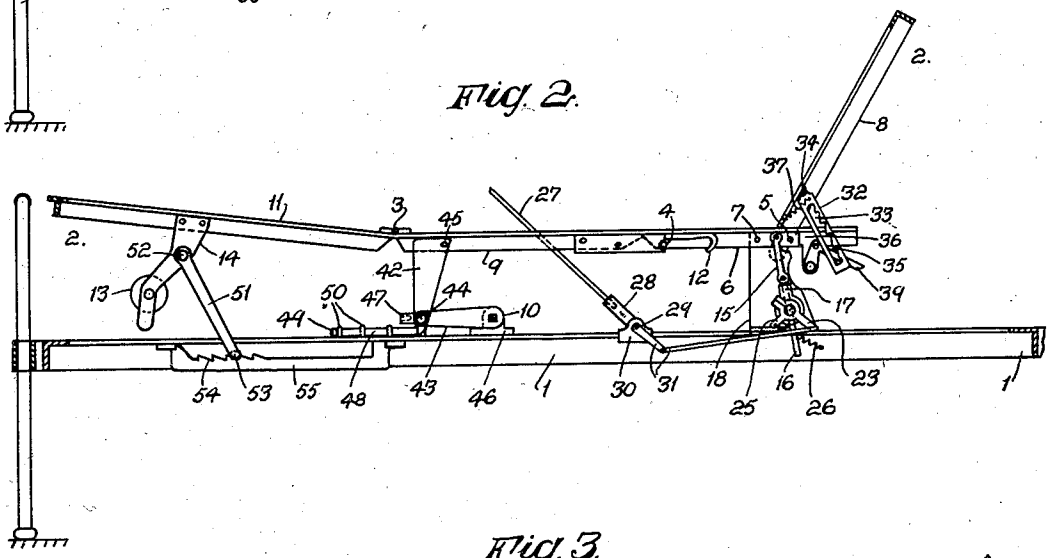
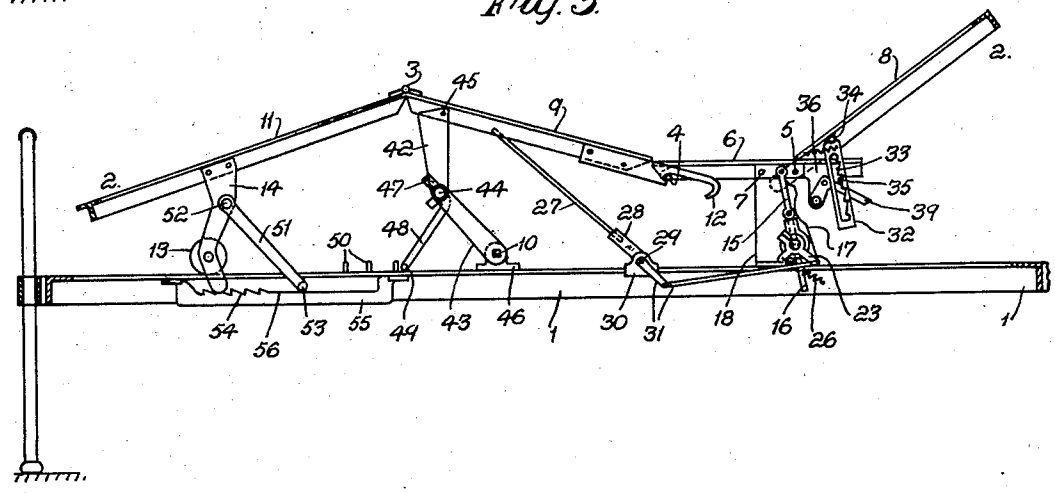


Fig. 3.



WITNESSES.

Archer Swift.
John H. Warren

INVENTORS

P. Wright.
John Garland Lafe

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Fig. 4.

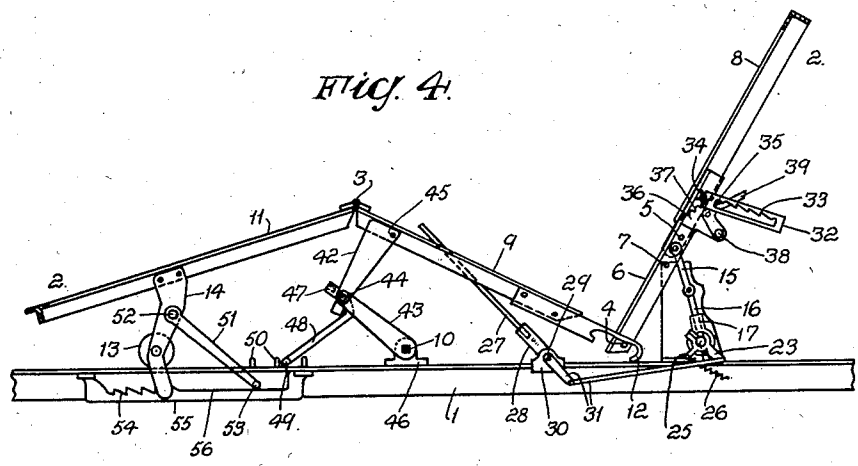


Fig. 5.

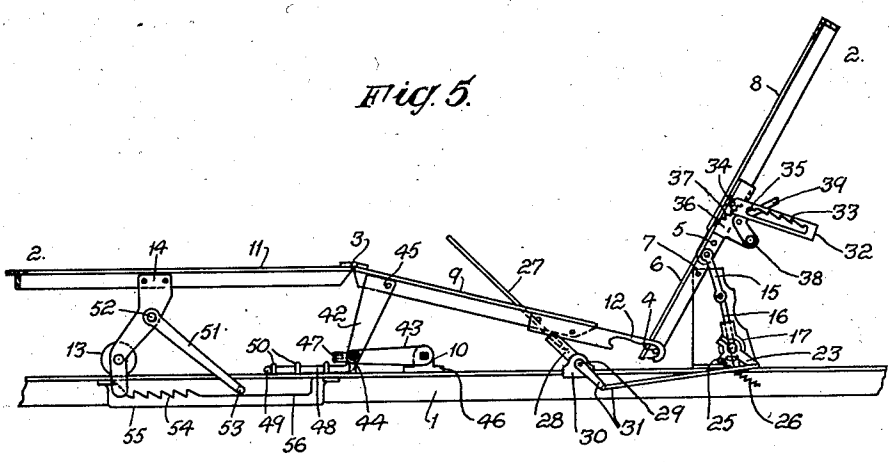


Fig. 6.

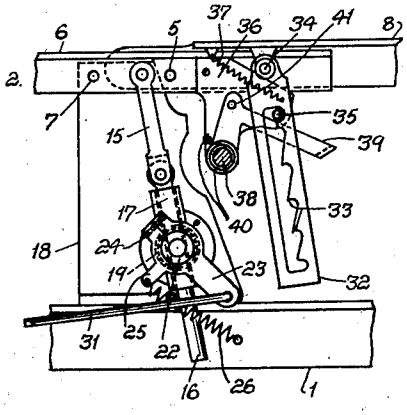


Fig. 7.

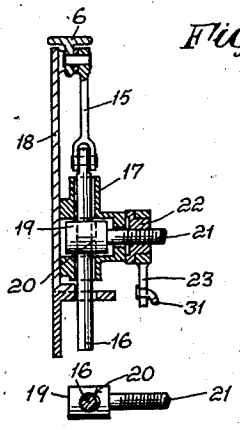


Fig. 8.

WITNESSES.

Arthur Swift
John H Hooker

INVENTORS.

Percy Wright.
John Garland Logan

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UNITED STATES PATENT OFFICE

2,026,153

ADJUSTABLE RECLINING BED, COUCH, AND THE LIKE

Percy Wright, Murragh, Mess Holt, Neston, and John Garland Logan, Birkenhead, England, assignors, by mesne assignments, to Davidson Hospital Bed Company Limited, London, England, a British company

Application May 6, 1933, Serial No. 669,728
In Great Britain May 23, 1932

2 Claims. (Cl. 5—72)

This invention relates to adjustable beds, couches, and the like, of the kind having a transversely divided reclining surface which is capable of being rocked into and locked in required position of adjustment by the occupant at will, and foot and head sections which may be adjusted independently of such rocking motion of said surface.

The object of the present invention is to provide an improved construction of adjustable bed, or the like, of this kind, which possesses capacity for fine and accurate rocking adjustment, in that its surface is capable of an infinitely variable range of adjustments within predetermined limits, and may be definitely locked and maintained in any desired position of adjustment within its range of movement without danger of subsequent distortion or inadvertent displacement due to incorrect positioning of parts, even in the event of the stationary supporting frame of the bed being distorted somewhat due to unevenness of the floor or other cause. Moreover, accurate rocking adjustment of the divided surface may be easily carried out by an occupant without additional aid, and the head and foot sections may also be readily adjusted by an attendant to suit individual requirements without disturbance of the occupant and the customary bed coverings.

According to our invention, we provide an adjustable bed, couch, or the like, which is characterized in that the transversely divided surface thereof includes a back-rest section which is mounted to pivot on stationary bearings of the supporting frame and is adapted to be positively maintained in any desired position within the limits of its pivotal adjustment by a frictional clutching or braking device situated at each side of the bed, or the like, and operatively connected with the back-rest section and the supporting frame and also with an actuating handle or equivalent member; each clutching or braking device preferably consisting of a rod or plunger linked to the back-rest section and extending through a passage in a locking member accommodated in a suitable housing attached to the supporting frame, a handle or equivalent member mounted in a position convenient for actuation by an occupant of the bed, or the like, and operatively associated with a retaining element mounted on an externally screw-threaded stem portion of said locking member, being provided to hold said rod or plunger against slidable movement within the passage of said locking member until such time as the retaining element is turned against spring resistance by appropriate actuation of the handle or equivalent member.

According to another feature of our invention, the transversely divided reclining surface includes a head-rest section which is mounted to pivot on said back-rest section and is adapted to be positively maintained in different positions of adjustment relatively to the latter by the provision at each of its sides of a longitudinally slotted arm pivotally attached to the head-rest section and provided with inwardly extending teeth adapted to engage a pin or pawl associated with the back-rest section and an arm or lever pivotally attached to the back-rest section and provided with a pin or projection adapted, upon pivotal displacement of said carrier arm or lever against spring resistance, to effect disengagement of the teeth of said slotted arm of the head-rest section from said pin or pawl of the back-rest section.

According to a further feature of our invention, the transversely divided reclining surface includes an intermediate leg-rest section which is associated at its forward end with the adjacent rear end of said back-rest section and is adapted to be positively maintained in different positions of adjustment relatively to said back-rest section by the provision at each of its sides of a strut pivotally attached at its upper end to a pair of links or levers connecting the leg-rest section to the supporting frame and adapted—upon appropriate pivotal actuation of said connecting links or levers by means of a handle or equivalent member—to engage at its lower end by gravity horizontally spaced projections or teeth on the supporting frame.

According to another feature of our invention, the transversely divided reclining surface includes a leg and foot-rest section which is associated at its forward end with the adjacent rear end of said intermediate leg-rest section and is adapted to be positively maintained in different positions of adjustment relatively to said intermediate section by the provision at each of its sides of a depending arm pivotally attached at its upper end to the section and provided at its lower end with a lateral pin or projection adapted—when the section is lifted by hand—to engage by gravity horizontally spaced teeth of a rack secured to the supporting frame, a roller or wheel being also mounted on a bearing member fixed to or forming part of each side of said foot-rest section in order to operate on the supporting frame and so carry the section at or near its rear

end when said lateral pins or projections of the pivotal elevating arms are disengaged from their co-operating teeth of the horizontal racks.

We will further describe our invention with the aid of the accompanying sheets of explanatory drawings which illustrate, by way of example only, one mode of carrying the same into effect.

In said drawings:—

Fig. 1 is an elevation of an adjustable bed constructed in accordance with the invention and showing the parts in their normal positions of use.

Figs. 2 to 5 are similar views of the bed illustrating the parts in various positions of adjustment.

Figs. 6 to 8, inclusive, are detail views, drawn to an enlarged scale as compared with the preceding views, and showing in side elevation, transverse section, and fragmentary plan, respectively, one of the frictional clutching or braking devices associated with the back-rest section for controlling the rocking adjustment of the parts; Fig. 6 further illustrates one of the rack and pawl devices for controlling the independent adjustment of the head-rest section.

In the several views like characters of reference denote like or equivalent parts wherever they occur.

1 represents a rigid bed frame of customary pattern, and 2 a suitably braced rectangular frame to which chains or springs or a combination of both are attached in any convenient manner to provide a mattress or mattress-supporting surface. Said surface 2 is transversely divided or separated at three points designated 3, 4, 5 and reconnected in hinged or pivotal fashion and also connected with the rigid supporting frame 1 of the bed structure in such manner as to provide a back-rest section 6 which is capable of oscillation about its points of pivotal connection 7 with the supporting frame and is associated with a head-rest section 8 which is adapted to move conjointly with the back-rest section 6 and is also capable of being separately raised about its points of pivotal connection 5 with the back-rest section, and an intermediate leg-rest section 9 which is capable both of oscillation and longitudinal displacement about its points of pivotal connection 4, 10 with the back-rest section 6 and supporting frame 2, respectively, and is associated with an end leg or foot-rest section 11 which is adapted to move longitudinally in conjunction with said intermediate leg-rest section 9 and is also capable of being separately raised about its points of connection 3 with the latter section. Thus it is merely necessary for an occupant to rock the back and intermediate leg sections 6, 9 of the bed surface 2 in order to assume the required reclining position, whilst independent adjustment of the head and leg sections 8, 11 may be readily effected by an attendant in order to support the occupant of the bed in any other required position, examples of the various adjustment positions that may be obtained being illustrated in Figs. 1 to 5, inclusive.

Such rocking motion of the divided surface 2 is accomplished by an occupant of the bed inclining forward and so exerting pressure on that part of the back-rest section 6 between its fulcrum 7 and the adjacent end of intermediate section 9, with the result that the back and head-rest sections 6, 8 move together to any desired inclination, and simultaneously with this movement of the head and back-rest sections, the intermediate leg section 9 is caused to incline somewhat and travel forward but only slightly due to its connection by means of forked members 12 with the back-rest section 6, and, at the same time, the second leg or foot section 11 hinged to the inner leg section 9, in moving towards the head of the bed, is maintained in a horizontal plane by the aid of a pair of rollers or wheels 13 mounted at the lower ends of bearing members or brackets 14 fixed to the respective sides of the foot section 11 and extending downwardly towards the supporting frame 1 whereon said rollers or wheels operate. Thus the parts are brought into the positions shown in Fig. 5.

In order to lock the sections of the divided surface 2 in their respective positions after such displacement, there is provided at each side of the back-rest section 6 a frictional clutching or braking device consisting of a link 15 pivotally attached at its upper end to the back-rest section at a suitable point behind the fulcrum 7 of the combined head and back-rest sections 6, 8 and connected at its lower end to a rod or plunger 16 which extends through and due to the rocking motion of said combined sections is moved upward substantially in a vertical plane within a housing or casing 17 fixed to the fulcrum bracket 18 mounted on the supporting frame 1. Accommodated within said housing 17 is a locking member 19 formed with a passage 20 wherethrough said rod or plunger 16 projects, the diameter of said passage being somewhat greater than that of the plunger to permit free longitudinal movement of the latter therein when the divided surface is being rocked, and provided also at a side of said locking member 19 is an integral screw-threaded stem portion 21 which extends laterally through an aperture formed in the housing 17 and is fitted at its outer end with a tapped retaining collar or like element 22 screwed into engagement with the adjacent face of housing 17. Attached to said retaining collar 22 is a lever 23 having provision by means of a binding screw 24 for adjustment in a rotary direction on said collar and a lateral projection 25 to which one end of a coiled spring 26 is attached, the opposite end of said spring being anchored to the rigid supporting frame 1. This spring tends to rotate the retaining collar 22 upon its screwed stem 21 in such a direction as to tighten against the housing 17 and so force laterally into frictional contact with the positioning rod or plunger 16 the passaged portion of the locking member 19, thereby forming a clutching or braking device which acts to definitely lock the back-rest section 6 together with its associated parts of the divided surface 2 in the desired position of adjustment. It will be obvious that the locking devices fitted to opposite sides of the bed are unaffected in their clutching action by base frame distortion, such as is usually caused by standing the bed on an uneven floor, a fault which is common to many beds employing as means for controlling the rocking motion of the divided surface two pawls fixed on a common shaft failing to register with notches in a pair of racks, and, furthermore, the divided surface is capable of infinitely variable adjustment within the range of its movements and not restricted to a number of set adjustment positions as must necessarily be the case when rack-and-pawl devices as is customary are employed to control the rocking motion of the divided surface.

The clutching or braking devices before described are adapted to be operated by means of a handle 27 fixed at a side of the bed in a posi-

tion convenient for an occupant to reach and pull, such handle being inserted into one, 28, of a pair of socket members which are themselves secured to the respective ends of a transverse rod 29 mounted to pivot in stationary bearings 30 on the supporting frame 1 and are connected by links 31 to lower end portions of the levers 23 so that, by pulling the handle in the direction of the arrow Fig. 5, the retaining collars 22 will be simultaneously revolved and thereby release the locking members 19 from frictional contact with the positioning rods or plungers 16.

To control the independent pivotal adjustment of the head-rest section 8—which is hinged at 5 to the back-rest section 6 behind the common fulcrum 7 for the rocking motion—a longitudinally slotted arm 32 with inwardly extending teeth 33 of such construction as to resist positively any downward movement of the arms and offer no resistance to its upward displacement is freely suspended from a pivot 34 at each side of the head-rest section 8, and a pin or pawl 35 fixed to a stationary bearing 36 of the back-rest section 6 adjacent to the nearby ends of the head-rest section is provided to engage with the teeth of said arm 32 in order to hold the head-rest section at any desired inclination relatively to the back-rest section when raised by hand as illustrated for example in Figs. 2 and 3, a coiled spring 37 coupling the slotted arm to the head-section being also employed to normally maintain the teeth 33 in engagement with the locating pin 35 of the back-rest section. To each end of a transverse rod 38 mounted to pivot in the stationary bearings 36 of the back-rest section is secured a bell-crank lever 39 which is held in engagement with the locating pin 35 by a coiled spring 40 surrounding the connecting rod 38 and also carries a pin or projection 41 in such a position that, upon one or other of the connecting levers 39 being depressed by hand as indicated by the arrow Fig. 6, it comes into contact with the slotted arm 32 and so acts to disengage against spring resistance the teeth 33 from the locating pin 35 and allow the head-rest section 8 to return to its normal position with respect to the back-rest section. The construction of these adjusting units is such that distortion of the base frame 1 does not affect safe engagement of the arms with the locating pins at opposite sides of the divided bed surface 2.

The knee-raising operation is carried out by means, at each side of the bed, of a pair of links or levers 42, 43 anchored at their adjacent ends to a transverse connecting rod 44, the upper links 42 being pivotally attached at 45 to the intermediate leg-rest section 9, whilst the lower link 43 is attached to the end of a connecting rod 10 mounted to pivot in stationary bearings 46 on the supporting frame 1 and is formed with a socket portion 47 for the insertion of a suitable operating handle. Also provided at each side of the divided surface 2 is a strut 48 which is attached at its upper end to the connecting rod 44 of the levers and is provided at its lower end with a lateral projection 49 adapted to rest upon the supporting frame 1 and co-operate by gravity with horizontally spaced stops or projections 50 on the frame. In order to support the knees of an occupant of the bed. a handle is inserted into the socket portion 47 of the lever 43 and raised by hand, and by such action the positioning strut 48 is caused to travel in a direction towards the head of the bed and engage the desired stop 50 to maintain the intermediate leg section 9 at the required inclination, the foot or leg section 11 being also automatically adjusted in this movement as indicated for example in Figs. 3 and 4. The sections are subsequently returned to their normal horizontal positions by lifting the lever 43 and so allowing the strut 48 to be moved by hand to its original position in which it rests upon frame 1 and constitutes a support for the rear end of the intermediate section 9.

The rearmost foot and leg section 11 of the divided surface 2 is adapted to be adjusted independently of said intermediate leg-rest section by means of a depending arm 51 attached at each side of the bed to a transverse connecting rod 52 mounted to pivot in the bearing members 14 of the supporting rollers or wheels 13, said arm having at its lower end a lateral pin or projection 53 which is provided to engage the horizontally spaced teeth 54 of a rack 55 secured to the supporting frame 1; said teeth 54 are of such construction as to allow free pivotal movement of the depending arm 51 in a direction towards the foot of the bed but positively resist reverse movement of the same. Thus by raising the section 11 from its extreme foot end by hand it inclines from the hinge 3 coupling it to the intermediate leg-rest section 9 and such adjustment permits the lateral pin 53 of the depending arm 51 to travel towards the foot of the bed and engage with the desired tooth of the rack 55 on the base frame as indicated for example in Fig. 2; the parts are subsequently returned to their original positions by raising the foot-rest section 11 and moving the pivotal arms 51 over the pair of racks by hand in which position of the arms the lateral pins 53 thereof operate in plane guide portions 56 of the racks so as not to interfere with the automatic and independent adjustments of the respective sections 6, 8, 9 of the divided surface 2. Likewise, no opposition to knee and foot adjustment is offered by the head and back-rest sections 8, 6 and their supporting and operating mechanism since the latter are so coupled as to conform to these movements at any point throughout the range of adjustment. It will also be noted that as all the mechanism is situated between the rigid base frame 1 and the adjustable surface 2 there is no obstruction to free access below the supporting frame 1.

What we claim as our invention and desire to secure by Letters Patent is:—

1. In an invalid bed having a rigid main frame and a transversely divided surface supported above said frame and comprising foot, leg and head sections connected to a back section pivotally mounted in stationary bearings of the main frame; frictional braking means adapted to control the tilting of said back section, said means comprising, at each side of the bed, a housing attached to the main frame, a locking member accommodated in said housing and having a screw stem projecting laterally from the housing, a depending rod linked to the back section and extending through aligned passages in the housing and locking member, said passage of the locking member being enlarged with respect to those of the housing, a retaining element screwed onto said external stem portion of said locking member, spring means connecting said retaining element with the rigid frame to maintain such element normally in clutching position and constantly in engagement with a co-operating face portion of the housing and said locking member

in frictional engagement with the depending rod, and a handle pivotally mounted on the rigid frame and linked to an arm portion of said retaining element whereby said retaining element may be turned about its screw stem against the spring resistance to a declutching position to release the lateral pressure of the locking member against the depending rod linked to the pivotal back section.

2. In an invalid bed having a rigid main frame and a transversely divided surface supported above said frame and comprising a back section pivoted above the main frame, a leg section connected with the back section and means for maintaining it in different adjustment positions relatively to the back section, and a foot section connected with said leg section; means to maintain said foot section in different adjustment positions relatively to the leg section, said means comprising, at each side of the bed, a bearing plate suspended from and fixed to an intermediate part of the foot section, a roller mounted on the lower portion of said depending plate to operate on the surface of the main frame and normally support the foot section, an arm pivoted at its upper end to said depending plate and provided at its lower end with a lateral projection, and a horizontal rack secured to the main frame and having upstanding ratchet teeth wherewith said lateral projection of the pivotal arm is adapted to engage upon manual lifting movement of the base end of the foot section.

PERCY WRIGHT.
JOHN GARLAND LOGAN.