

May 15, 1945.

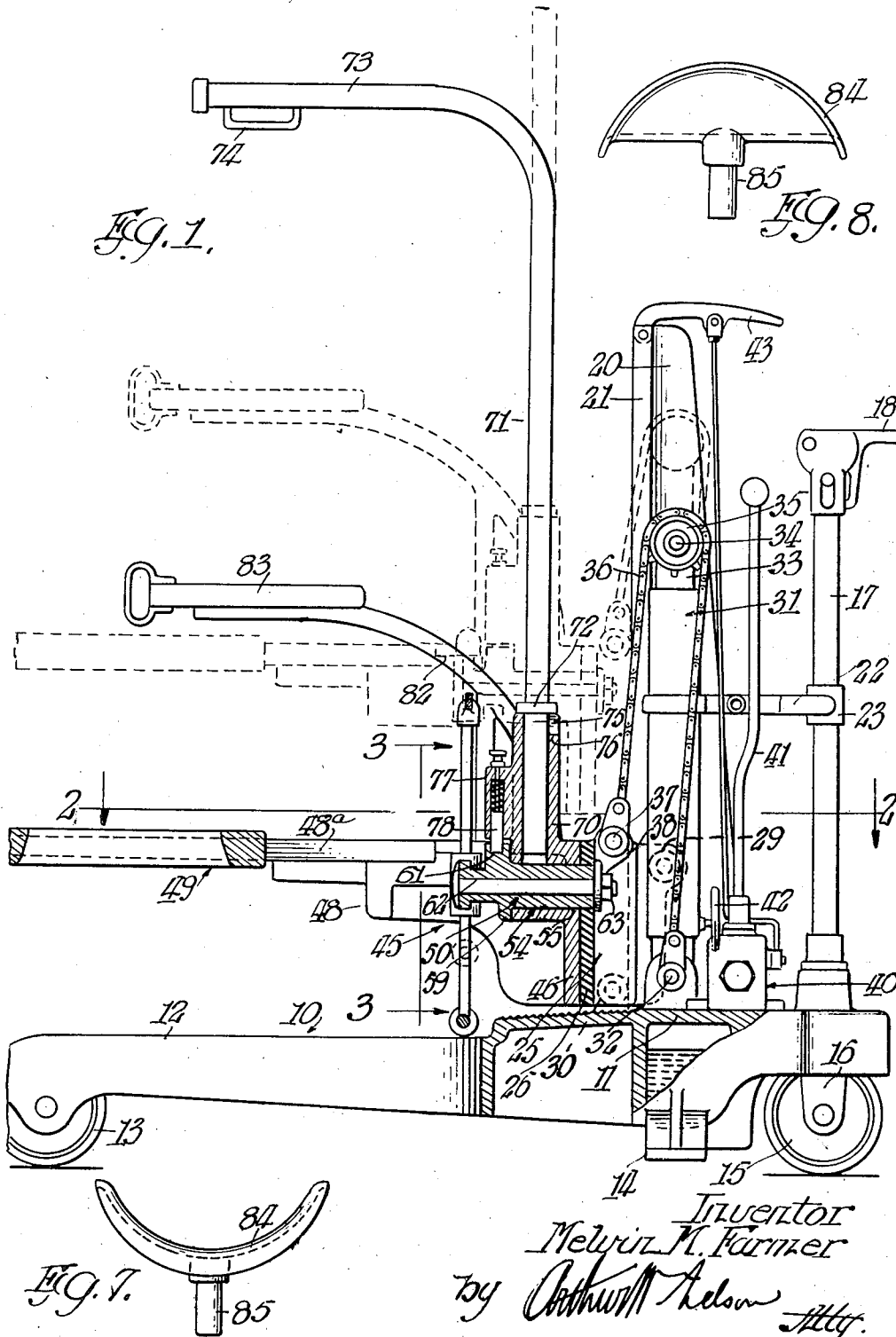
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INVALID TRANSFER DEVICE

Filed April 5, 1944

2 Sheets-Sheet 1



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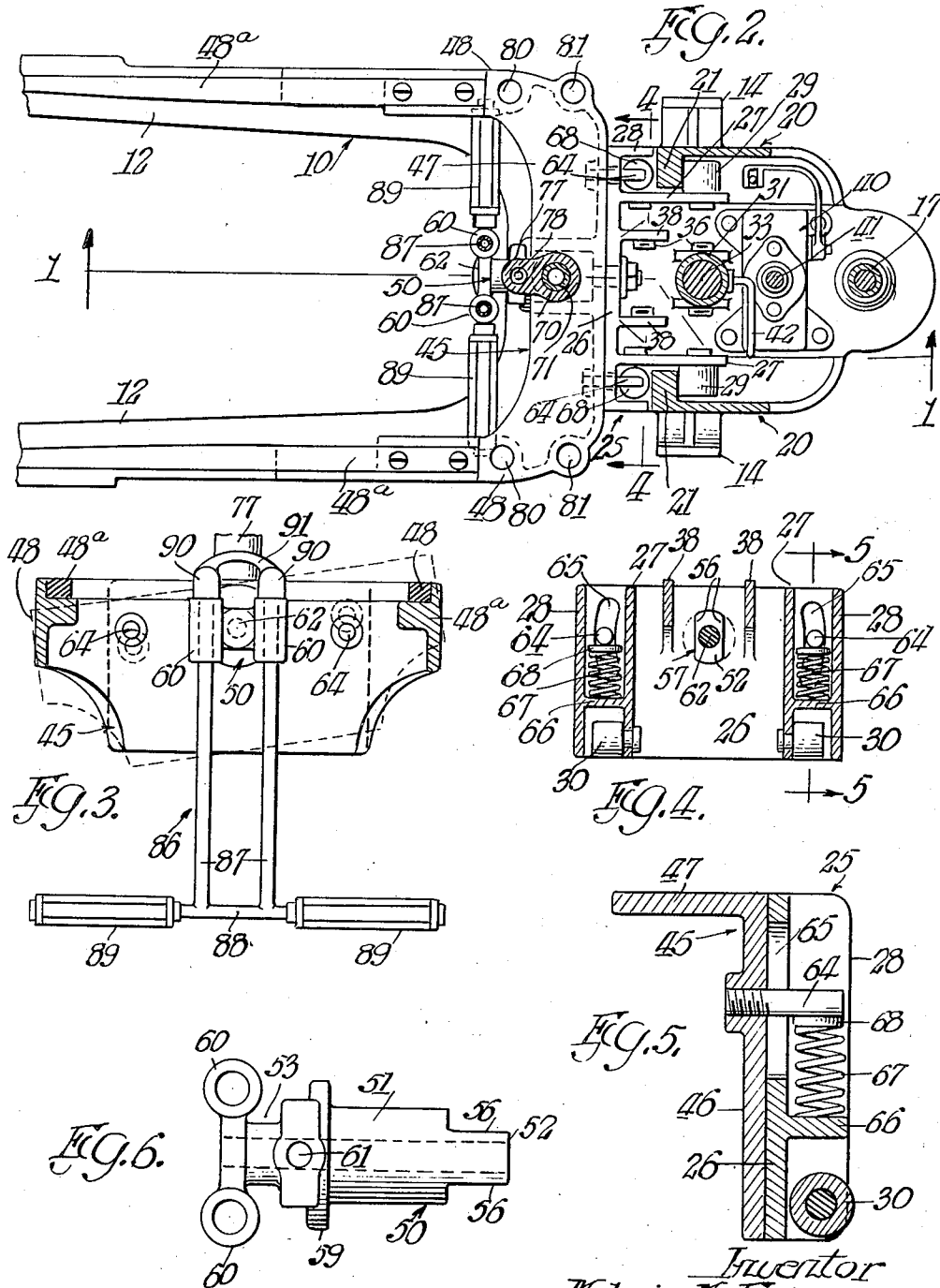
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UNITED STATES PATENT OFFICE

2,375,908

INVALID TRANSFER DEVICE

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Application April 5, 1944, Serial No. 529,608

16 Claims. (Cl. 5—86)

This invention relates to improvements in invalid transfer devices and it consists of the matters hereinafter described and more particularly pointed out in the appended claims.

The invention is more especially concerned with an invalid transfer device that includes a mobile base having a vertically movable carriage thereon to support a foot rest and an associated normally horizontally disposed means for supporting a seat, and which means is movable laterally into position upon an invalid occupied bed, for the transfer of the invalid from the bed, while on said seat, to a chair or the like. For a detailed description of a device of this kind, and its purposes and uses, reference is made to my co-pending application Serial Number 467,070 filed November 26, 1942.

One of the objects of the present invention is to provide an improved mounting for the seat supporting means upon the carriage, whereby said means may be tilted laterally out of its normal horizontal position into a slightly inclined position better to engage the seat, when the latter is disposed under the buttocks of the invalid on a bed, for movement into an elevation above the bed or for a removal and transfer of the invalid therefrom.

Another object of the invention is to provide an improved foot rest for a device of this kind and which is so arranged with respect to the seat as to avoid possible accidental injury to the feet of the invalid occupying the seat when the seat is being moved upwardly or downwardly relative to the mobile base of the device.

The above mentioned objects of the invention, as well as others, together with the advantages thereof will more fully appear as the specification proceeds.

In the drawings:

Fig. 1 is a longitudinal vertical sectional view through the improved invalid transfer device as taken on the line 1—1 of Fig. 2.

Fig. 2 is a horizontal sectional view through the device as taken on the line 2—2 of Fig. 1.

Fig. 3 is a transverse vertical sectional view through the seat supporting means of the device as taken on the line 3—3 of Fig. 1 when the said means is in a position elevated from that appearing in full lines in Fig. 1.

Fig. 4 is another transverse vertical sectional view through a part of the device as taken on the line 4—4 of Fig. 2.

Fig. 5 is a detail vertical sectional view through a part of the device as taken along the line 5—5, and on a scale enlarged over that of Fig. 4.

Fig. 6 is a top plan view of a member whereby the seat supporting means is rockably mounted on and attached to the carriage and which member also constitutes the support for a novel foot rest for the device.

Fig. 7 is a view in end elevation of a certain leg rest which may be advantageously employed as a part of the improved apparatus.

Fig. 8 is a view in side elevation of the leg rest appearing in Fig. 7.

Referring now in detail to that embodiment of the invention illustrated in the drawings, 10 indicates the horizontally disposed mobile base of the device which includes a front end portion or platform 11 and laterally spaced legs 12—12 that extend rearwardly therefrom. Each leg 12 has a wheel 13 journaled therein. At each side of the platform is a foot 14 and at the front central part of said platform is a downwardly opening housing for a wheel 15. This wheel is journaled in the bifurcated lower end 16 of an upright shaft disposed in a supporting tube 17 rising from said housing. The upper end of the shaft in the tube 17 has a hand lever 18 fixed thereto in such a manner that the wheel 15 may be used either as a steering wheel for the device as a whole when mobile or may be used to lower the front end of the base to such a position as to rest upon the feet 14 and in which condition the device is immobile.

Rising from the front portion of the platform 11 is a pair of laterally spaced upright standards 20—20 each provided along its rear inner margin with an upright guide rail 21. Projecting forwardly from about the mid portion of the standards is a yoke 22 which includes a sleeve 23 that surrounds a part of the tube 17 to there give it support.

A carriage 25 is mounted to the rear of the standards 20—20 for a guided movement upwardly and downwardly on the rails 21. This carriage includes an upright flat wall-like body portion 26 that carries pairs of forwardly extending, inner and outer flange-like parts 27 and 28 respectively that best appear in Fig. 4. Each inner flange-like part has journaled thereon upper and lower rollers 29 and 30 respectively, which have rolling engagement with the front and rear faces of the associated rail 21. With the parts arranged as described, it is obvious that the carriage 25 is capable of a raising and lowering guided movement upon the rails of the standards 20—20 into and out of that elevation desired in removing an invalid from a bed. Preferably to raise and lower the carriage, hydraulic means

are employed and such means may be as follows:

31 indicates an hydraulic cylinder which is pivotally mounted upon a transverse pin 32 suitably arranged on the median line of the platform 11 between the standards 20—20. A piston or plunger 33 slides in the upper end of the cylinder 31 and this plunger is provided at its top end with a transverse pin or shaft 34. Journalled on each end of the pin or shaft 34 at each side of the top end of the plunger is a sprocket wheel 35, only one of which appears in Fig. 1. A sprocket chain 36 is trained about each sprocket wheel and one end of each chain is operatively connected to the associated end of the pin 32 before mentioned, while the other end of each chain is operatively connected to a stud 37 carried by an ear 38 on the upper end of the front face of the carriage body 26.

On the platform 11, between the axis of the tube 17 and the axis of the cylinder 31 is located a hydraulic pump 40 which is actuated by a lever 41 mounted on the pump for a rocking movement laterally of the platform. A pipe 42 connects the discharge side of the pump with the bottom end of the hydraulic cylinder 31. The pump 40 is provided with a suitable means actuated by a lever 43 for controlling the passage of hydraulic fluid from the cylinder 31 back to the low pressure side of the pump.

When the lever 41 is rocked back and forth, hydraulic fluid under pressure passes into the bottom end of the cylinder 31 so that the piston or plunger 32 is caused to ascend in said cylinder and through the chains 36—36 will cause an upward movement of the carriage to the desired elevation. When rocking movement of the lever 41 is discontinued, the carriage will remain in that position to which it has been elevated. To lower the carriage, hydraulic fluid is bypassed back through the pump to a reservoir provided therefor under the platform 11 and which reservoir appears in Fig. 1.

Operatively secured to the rear face of the body 26 of the carriage 25 is a seat supporting means indicated as a whole in Figs. 1 and 2 by the numeral 45. This means includes an upright front wall 46 associated directly with the body of the carriage and a flat top wall 47, said two walls cooperating at their ends to provide rearwardly extending arms 48—48 that are disposed so as to overhang front end portions of the legs 12 of the base. A rail 42a is fixed at one end to each arm and extends rearwardly therefrom and which rails are formed to be detachably or removably engaged in grooves (not shown) in the lateral margins of a seat 49, see Fig. 1.

The seat supporting means is so operatively connected to the carriage as to be capable of a limited lateral rocking movement about an axis disposed centrally of said means and said carriage and perpendicular to the vertical movement of the carriage on the rails 21—21. The means for so connecting the seat supporting means to the carriage is as follows: 50 (see Fig. 6) indicates a tubular stud having a central cylindrical body 51 and front and rear ends 52 and 53 respectively. The body portion 51 bears in a recess 54 (see Fig. 1) provided therefor centrally of the seat supporting means 45, near the junction of the front and top walls 46 and 47 thereof. A portion of the body 51 of said stud passes through an opening 55 in the front wall 46 while the end 52 thereof is provided with flat sides 56—56 to nonrotatively engage in a correspond-

ingly shaped opening 57 (see Fig. 4) in the body 26 of the carriage.

The rear end 53 of the stud 50 is made to provide a radial flange-like shoulder 59 and a pair of laterally spaced sleeves 60—60 respectively. The top side of the shoulder is enlarged to provide room for a vertical recess 61. The purposes of said sleeves and said recess will appear later.

A bolt 62 passes axially through the stud and has a head at its rear end that engages that part of the rear end of the stud between the sleeves 60—60. The threaded end of the bolt receives a washer and nut 63 and when the nut is drawn up tight, the stud is fixed to the carriage against turning. The associated parts of the stud, the wall 46 of the seat supporting means and the wall 26 of the carriage are so correlated and proportioned that the adjacent faces of said walls 46 and 26 cannot be so tightly engaged as to prevent the limited lateral rocking movement of the seat supporting means, about the axis of the bolt 62, relative to the carriage.

The wall 46 of the seat supporting means 45 is provided with a pair of forwardly extending studs 64—64, one spaced laterally on each side of the stud 50 and disposed in a horizontal plane passing through the axes of said studs. Each stud passes through an arcuate slot 65 in the body 26 of the carriage and which slots are concentric with the axis of the stud 50 and are so located as to be disposed between the inner and outer flanges 27 and 28 of each pair thereof on the carriage as best appears in Fig. 4. A bridge 66 connects the flanges 27 and 28 of each pair below the slots 65. A helical expansion spring 67 engages at one end upon each bridge 66 and carries a disc 68 at its other end which is adapted to be engaged by the front end portion of an associated stud 64 as best appears in Fig. 5. By this arrangement of parts, the springs 67 which are substantially matched, function to hold the seat supporting means in a substantially horizontal or horizontally balanced position and cushion the lateral rocking action of the seat supporting means in each direction from the horizontal.

The top wall 47 of the seat supporting means is provided on the median line of said means with an upright tubular boss 70 which receives the bottom end of the upright portion of a mast 71. A shoulder 72 carried by said end of the mast limits the position of the bottom end of the mast in the boss. The top end 73 of said mast is bent into a horizontal plane to overhang the seat 49 and is provided with a loop 74 to receive certain slings or straps (not shown) that depend into a position conveniently to be grasped by the occupant of the seat 49 when rising from the seat to a standing position. This mast forms a convenient lever by which the seat supporting means may be rocked in either direction about the stud 50 as before mentioned. The upright part of the mast just below the collar 72 is provided with a lug 75 adapted to engage in a recess 76 in the top end of the boss 70 and whereby the mast is held against turning relative to the boss. If it is desired to turn the mast relative to the boss, the mast is lifted upwardly to release the lug 75 from the recess at which time the mast is free to swing in either direction about its axis in the boss 70.

Under certain circumstances, it may be desired to hold or lock the seat supporting means against rocking on the carriage and therefore the following is provided. At the rear of the boss

70 is an enlargement 77 in which is provided a vertically disposed spring-pressed plunger 78 which, when the seat supporting means is in its normal horizontal position, is adapted to line up with and to enter the recess or socket 61 in the stud 50 as shown in Fig. 1. When said plunger has its bottom end disposed in said recess, it locks the seat supporting means against turning about the stud 50, out of said horizontal position. When a rocking movement of the seat supporting means is desired, the plunger 78 is withdrawn from the recess 61. The mast 71 is then grasped and pulled over to one side or the other, and this causes the seat supporting means to rock to the limits afforded by the compression of one or the other of the springs 67.

The top wall 47 of the seat supporting means 45 is provided at each side with a pair of sockets 80—81 respectively (see Fig. 2) for the reception of the generally upright part 82 of a horizontally disposed arm rest 83, adapted for the use of the occupant of the seat 49. If desired, the arm rests may be removed simply by lifting upwardly thereon to remove the upright parts 82—82 from said sockets.

In certain instances where the occupant of the seat may have an injured leg that requires horizontal support while the occupant is seated on the seat, such support may be provided as follows:

In Figs. 7 and 8 I have shown a leg rest or support that includes a trough shaped leg engageable body member 84 having a centrally disposed stem 85 adapted to be engaged in the socket 80—81 which disposes the leg rest in the position most convenient for the occupant of the seat 49. The stem 85 so fits in the socket 80—81 as to have a turning movement therein to dispose the longitudinal line of the member 84 at that angle most convenient for the injured leg to be supported. It is to be noted from Figs. 7 and 8 that the body member is the highest at its mid portion and curves downwardly toward the ends in a way eliminating all relatively sharp edges.

86 indicates as a whole a means so arranged with respect to the seat 49, when supported by the arms 48, as to form a foot rest for the occupant of the seat. This means, which is of an inverted T shape construction, includes a pair of laterally spaced upright bars 87—87 (see Fig. 3) which slidably engage in the tubular bosses 60—60 on the stud 50. The bottom ends of said bars 87 are connected to the mid portion of a cross bar 88, the end portions 89—89 of said bars being suitably covered with rubber or the like so that the feet when engaged therewith will not readily slip therefrom, and which end portions overhang parts of the legs 12 of the base 10 as appears in Fig. 2.

The upper end of each bar of the foot rest has a nipple 90 secured thereto and both nipples are connected together by yoke 91. The bars 87 are of a length greater than the distance between the top wall of the seat supporting means 45 and the base 19 when said means is in its lowest position on the base as appears in full lines in Fig. 1. Thus, in the lowering movement of the carriage and the seat supporting means, the portions 89—89 of the foot rest will first engage the legs 12 of the base so that as said carriage and means approach their lowest position on the base, the bars 86—86 will slide through the sleeves 60—60 of the boss 50. In the upward movement of the carriage and seat supporting means, when they have ascended to a predetermined elevation, the

nipples 90 will be engaged by the sleeves 60—60 of the stud 50 so that the foot rest will then be picked up and carried by said stud to ascend with the carriage and seat supporting means as appears in dotted lines in Fig. 1. Thus should the occupant of the seat, in the lowering movement thereof, place his or her feet upon the base under the foot rest, the foot rest will move relatively to the seat supporting means and carriage so that the occupant's feet will not be injured even though the foot rest engages thereon.

The operation of the device is substantially as follows: Assume an invalid to be lying on his back in a bed and that it is desired to move the invalid say to a toilet or to a wheel or other chair. The attendant turns the invalid on his side. The seat member 49, having previously been removed from the remainder of the apparatus, is then placed on the bed adjacent one side thereof and with the grooves in its lateral margins facing in such direction that they may be engaged by the rails 48. The invalid is turned over on his back so that his sit bones are disposed on the seat member 49 at which time the patient can be swung around and up in to a sitting position so that his legs hang downwardly over said side of the bed. The device as a whole is then moved into position with respect to the side of the bed, with the rails 48a straddling the patient's legs, it being assumed that said rails are disposed in the horizontal plane.

Due to the fact that the mattress may not present a truly horizontal surface, because the patient may rest upon the seat with pressure so applied that the seat is tilted from the horizontal, or for other reasons, the seat may not be in a truly horizontal plane. For these reasons, the plunger 78 is withdrawn from the recess 61, after which the seat carrying means 46 is swung conveniently through the medium of mast 71 to one side or the other so that the rails 48a are aligned with the grooves in the seat 49 on the bed. The device is then moved inward toward the bed, so that the rails 48a enter the seat grooves for the support of the seat 49.

If desired the patient may hold onto the assist straps (not shown), which depend from the loop 74 of the mast 71. After the patient has thus been positioned, the lever 41 is rocked laterally back and forth and this causes the plunger 33 to elevate the carriage into a position freeing or clearing the seat from supporting engagement with the bed. The device as a whole, with the patient seated thereon, may be moved on its wheels to a chair, toilet or the like. The carriage is then lowered until the seat member 49 rests on the top of the toilet seat.

If the patient is to be placed in a wheel or other chair, the carriage is lowered until the seat member 49 engages upon the seat of the chair, whereupon the transfer device as a whole may be backed away from the chair leaving the seat member in position thereon. It is contemplated that a number of seat members 49 will be provided for each transfer device.

The device may also be used to move a stretcher-borne invalid from one place to another, by supporting the stretcher upon the rails 48a—48a or even upon the seat member 49 when the latter is engaged with or upon said rails.

When it is desired to render the device immobile, it is only necessary to actuate the lever 18 in the proper direction and this will lower the front end of the base so that the feet 14—14 will engage

upon the surface of the floor upon which the device is being used.

While in describing the invention I have referred in detail to the form, arrangement and construction of the parts involved, the same is to be considered only in the illustrative sense so that I do not wish to be limited thereto except as may be specifically set forth in the appended claims.

I claim as my invention:

1. A device of the kind described embodying therein a base, upright means on the base, a carriage having an upward and a downward guided movement on said upright means, seat supporting means, and means operatively mounting the seat supporting means on said carriage for a limited rocking movement about an axis substantially perpendicular to the plane of the guided movement of the carriage.

2. A device of the kind described embodying therein a base, upright means on the base, a carriage having an upward and a downward guided movement on said upright means, a stud extending rearwardly from a central portion of said carriage, and seat supporting means having a part between its sides journaled on said stud for a limited rocking movement in either direction from the horizontal about an axis perpendicular to the plane of the guided movement of the carriage.

3. A device of the kind described embodying therein a base, upright means on the base, a carriage having an upward and a downward guided movement on said upright means, seat supporting means, means operatively mounting the seat supporting means on said carriage for a limited rocking movement about an axis substantially perpendicular to the plane of the guided movement of the carriage, and means for cushioning the rocking movement of the seat supporting means as it approaches the limits of said movement.

4. A device of the kind described embodying therein a base, upright means on the base, a carriage having an upward and a downward guided movement on said upright means, seat supporting means, means operatively mounting the seat supporting means on said carriage for a limited rocking movement about an axis substantially perpendicular to the plane of the guided movement of the carriage, and means for releasably locking said seat supporting means to said carriage against said rocking movement.

5. A device of the kind described embodying therein a base, upright means on the base, a carriage having an upward and a downward guided movement on said upright means, seat supporting means, means operatively mounting the seat supporting means on said carriage for a limited rocking movement about an axis substantially perpendicular to the plane of the guided movement of the carriage, means for releasably locking said seat supporting means to said carriage against said rocking movement, and means operative when said locking means is released for cushioning the rocking movement of the seat supporting means as it approaches the limits of said movement.

6. A device of the kind described embodying therein a base, upright means on the base, a carriage member having an upward and a downward guided movement on said upright means, seat supporting means including a member disposed adjacent said carriage member, means providing a pivotal connection between said members so

that the seat supporting member has a limited rocking movement about said pivotal connection in both directions from the horizontal, and coacting means on said carriage member and on said seat supporting member respectively for cushioning the rocking action of the seat supporting means as it approaches the limits of said movement.

7. A device of the kind described embodying therein a base, upright means on the base, a carriage member having an upward and a downward guided movement on said upright means, seat supporting means including a member disposed adjacent said carriage member, means providing a pivotal connection between said members so that the seat supporting member has a limited rocking movement about said pivotal connection in both directions from the horizontal, there being curved slots in said carriage member concentric with said pivotal connection, studs carried by said seat supporting means and extending through said slots, and resilient means each supported at one end by said carriage and each operatively engaged at the other end by an associated stud for cushioning the rocking movement of the seat supporting member as it approaches the limits of said movement.

8. A device of the kind described embodying therein a base, upright means on the base, a carriage member having an upward and a downward guided movement on said upright means, seat supporting means including a member disposed adjacent said carriage member, means providing a pivotal connection between said members so that the seat supporting member has a limited rocking movement about said pivotal connection in both directions from the horizontal, and coacting means on said seat supporting member and on said carriage member respectively for releasably locking said members against said rocking movement.

9. A device of the kind described embodying therein a base, upright means on the base, a carriage member having an upward and a downward guided movement on said upright means, seat supporting means including a member disposed adjacent said carriage member, means providing a pivotal connection between said members so that the seat supporting member has a limited rocking movement about said pivotal connection in both directions from the horizontal, coacting means on said seat supporting member and on said carriage member respectively for releasably locking said members against said rocking movement, and means operative when said locking means has been released to cushion the rocking movement of said seat supporting member as it approaches the limit of said movement.

10. A device of the kind described embodying therein a base, upright means on the base, a carriage member having an upward and a downward guided movement on said upright means, seat supporting means including a member disposed adjacent said carriage member, means providing a pivotal connection between said members so that the seat supporting member has a limited rocking movement about said pivotal connection in both directions from the horizontal, and means carried by said seat supporting means and adapted to be grasped and used as a lever in rocking said seat supporting means.

11. A device of the kind described embodying therein a base, upright means on the base, a carriage member having an upward and a downward

guided movement on said upright means, seat supporting means including a member disposed adjacent said carriage member, means providing a pivotal connection between said members so that the seat supporting member has a limited rocking movement about said pivotal connection in both directions from the horizontal, coacting means on said carriage member and on said seat supporting member respectively for cushioning the rocking movement of the seat supporting means as it approaches the limit of its movement in either direction, and means carried by the seat supporting means and adapted to be grasped and used as a lever in rocking the seat supporting means.

12. A device of the kind described embodying therein a base, upright means on the base, a carriage having an upward and a downward guided movement on said upright means away from and toward the base, a seat supporting means operatively connected to the carriage to move therewith, a foot rest, and means so connecting the foot rest to the carriage that the foot rest is movable relatively to the carriage as it approaches the limit of its downward guided movement on said upright means.

13. A device of the kind described embodying therein a base, upright means on the base, a carriage having an upward and a downward guided movement on said upright means away from and toward the base, a seat supporting means operatively connected to the carriage to move therewith laterally spaced sleeves on said seat supporting means, a foot rest including upright members and a bottom footrest member, said upright members having a sliding guided engagement in said sleeves, and means at the top of said upright members for connecting them together above said sleeves and which means is adapted to engage said sleeves and limit the downward movement

of said footrest relative to said seat supporting means.

14. A device of the kind described embodying therein a base, upright means on the base, a carriage having an upward and a downward guided movement on said upright means away from and toward the base, a seat supporting means operatively connected to the carriage to move therewith, a foot rest including upright members and a bottom foot rest member, and means movable with the carriage and providing guides in which said upright members of the foot rest have a sliding movement.

15. A device of the kind described embodying therein a base, upright means on the base, a carriage having an upward and a downward movement on said upright means, seat supporting means, means operatively mounting the seat supporting means on the carriage for a limited rocking movement about an axis substantially perpendicular to the plane of the guided movement of the carriage, and a foot rest carried by said operatively connecting means and having a limited relative movement with respect thereto in the direction of the movement of the carriage.

16. A device of the kind described embodying therein a base, upright means on the base, a carriage having an upward and a downward movement on said upright means, seat supporting means, means operatively mounting the seat supporting means on the carriage for a limited rocking movement about an axis substantially perpendicular to the plane of the guided movement of the carriage, a foot rest including an upright portion, and means on said operatively mounting means and through which the upright portion of said foot rest has a limited sliding guided movement with respect thereto in the direction of the movement of the carriage.

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