June 21, 1960 L. W. HEIDEN 2,941,626

PATIENT TRANSPORTING DEVICE AND STABILIZING MECHANISM THEREFOR

Filed March 3, 1959 2 Sheets-Sheet 1

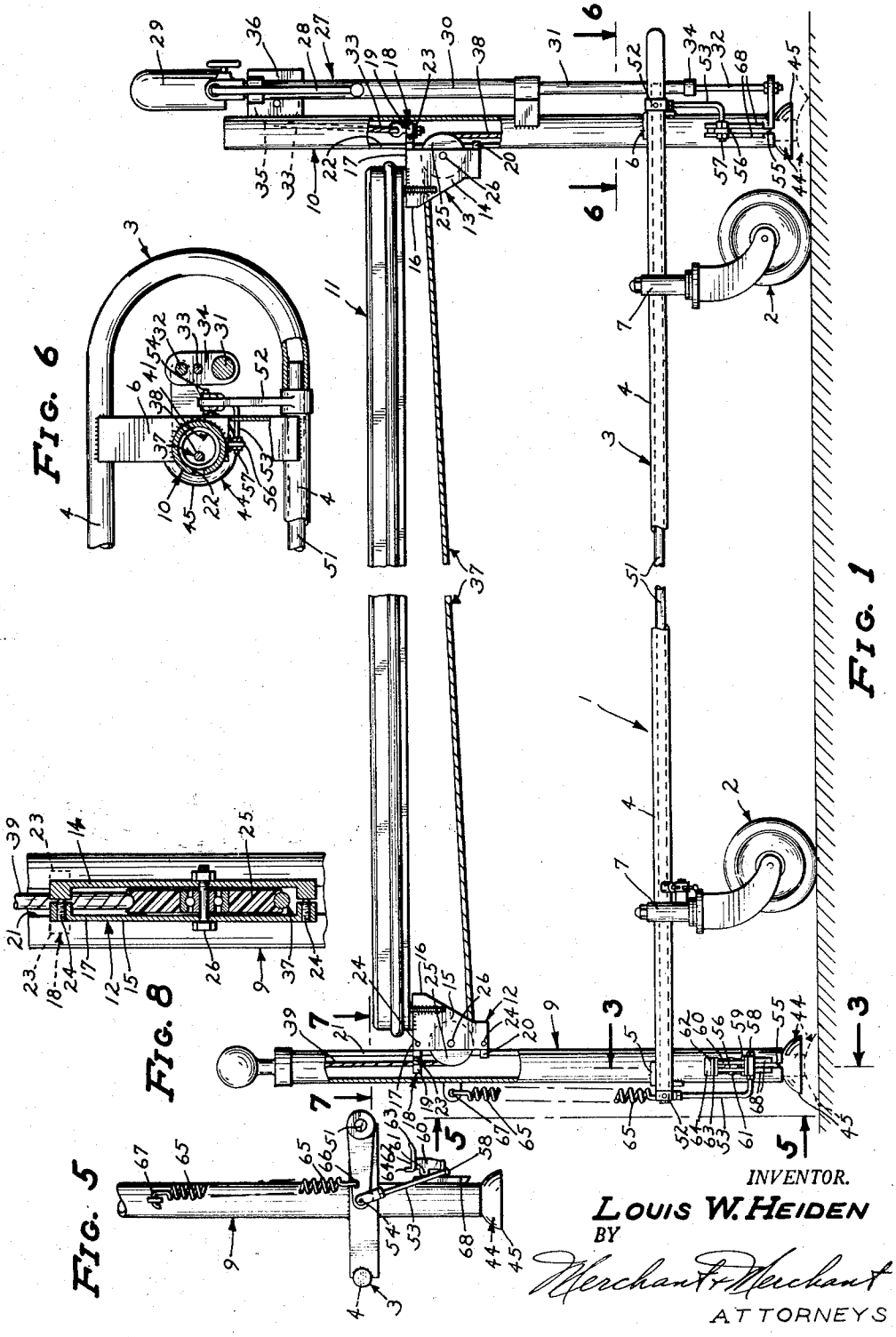


FIG. 1

FIG. 6

FIG. 8

FIG. 5

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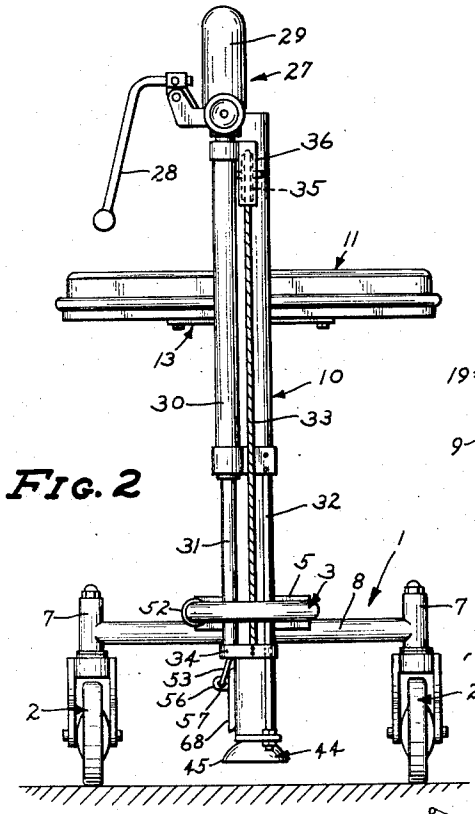


FIG. 2

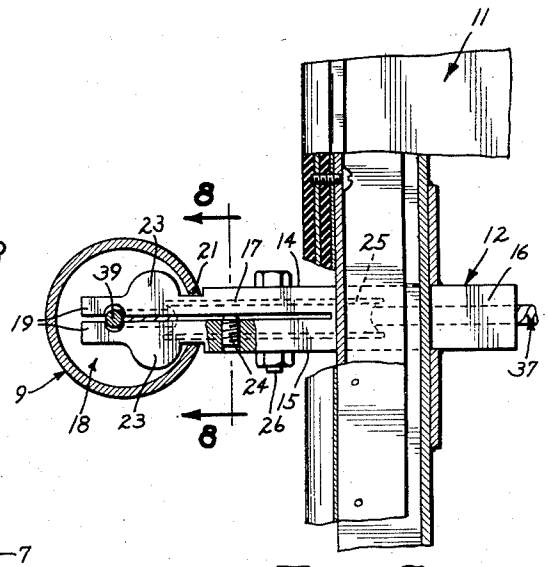


FIG. 7

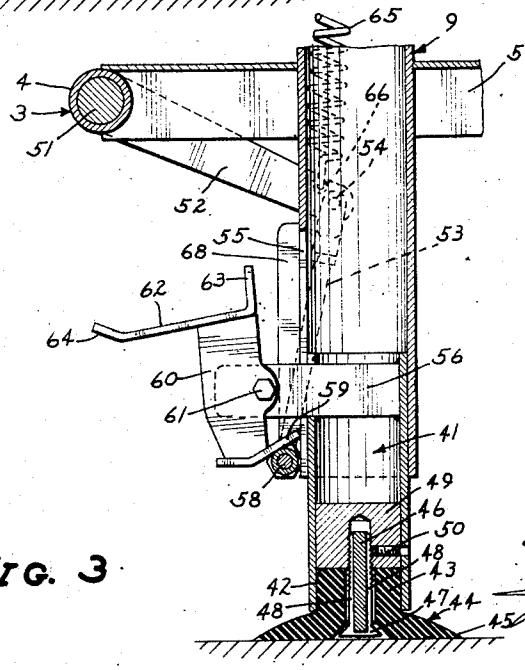


FIG. 3

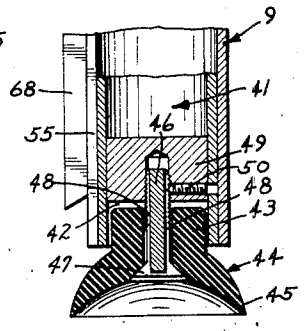


FIG. 4

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PATIENT TRANSPORTING DEVICE AND STABILIZING MECHANISM THEREFOR

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7 Claims. (Cl. 188—5)

My invention relates generally to wheel-equipped patient elevating devices for use in hospitals and the like, and more particularly to novel means for securely stabilizing and immobilizing such devices when patients are being placed thereon and/or removed therefrom.

The primary object of my invention is the provision of a device of the class above described wherein novel manually controlled floor-engaging feet may with a minimum of force be caused to engage the floor surface with sufficient force to securely immobilize the wheel-equipped frame during placement of patients thereon or removal of patients therefrom.

A further object of my invention is the provision of a device of the class immediately above described wherein floor-engaging suction cups are secured to and carried by said feet.

A still further object of my invention is the provision of a device of the class immediately above described wherein the feet and cups carried thereby are mounted for raising and lowering movements, the arrangement of said cups with respect to said feet being such that during lowering, floor-engaging movements thereof air is automatically excluded from the suction cups to encourage sealing engagement thereof with the floor.

A further object of my invention is the provision of a device of the class immediately above described wherein novel means is provided for automatically permitting the introduction of air into the cups upon initial raising movements of the feet, whereby to effectively break the sealing engagement of the base of the suction cups with the floor.

A still further and important object of my invention is the provision of a device of the class described which incorporates a minimum of working parts, which is rugged and durable in construction, easy and completely safe in its operation, and relatively inexpensive to produce.

The above and still further objects of my invention will become apparent from the following detailed specification, appended claims and attached drawings.

Referring to the drawings wherein like characters indicate like parts throughout the several views:

Fig. 1 is a view in side elevation of my novel structure, some parts being broken away and some parts shown in section;

Fig. 2 is a view in end elevation;

Fig. 3 is an enlarged fragmentary view in vertical section as seen substantially from the line 3—3 of Fig. 1;

Fig. 4 is a fragmentary view of the structure of Fig. 3 but showing a different arrangement of some of the parts thereof;

Fig. 5 is a fragmentary view in end elevation as seen substantially from the line 5—5 of Fig. 1;

Fig. 6 is a view in horizontal section as seen substantially from the line 6—6 of Fig. 1;

Fig. 7 is an enlarged fragmentary sectional view as seen substantially from the line 7—7 of Fig. 1;

Fig. 8 is a fragmentary sectional view as seen substantially from the line 8—8 of Fig. 7.

Referring with greater particularity to the drawings, the numeral 1 indicates in its entirety an elongated frame rendered mobile, preferably and as shown through the use of four conventional caster wheels 2. The primary frame member is, as shown particularly in Figs. 1 and 6, made up of a U-shaped tubular pipe 3, the longitudinally extended opposite side portions 4 of which are securely tied together by transverse front and rear frame members 5 and 6 respectively. As shown particularly in Fig. 2, the caster wheels 2 are secured to stub legs 7 on the opposite ends of transverse intermediate frame members 8 underlying and secured to the longitudinal frame members 3, preferably inwardly of the opposite ends of the frame member 1 so as to remove same from the feet of an operator pushing against either of said ends.

Shown as being rigidly secured to and projecting in opposite directions from the intermediate portions of the transverse frame members 5, 6 are front and rear supporting posts 9 and 10 respectively which, preferably and as shown, are tubular in form. A patient supporting pallet 11 is mounted for vertical raising and lowering movements with respect to the mounting posts 9, 10, by means of substantially identical mounting brackets 12 and 13 rigidly secured to the front and rear portions respectively of said pallet 11. The brackets 12, 13, as shown particularly in Fig. 8, comprise a pair of laterally spaced side plate elements 14, 15, which are rigidly secured together at their inner ends 16 where they are secured respectively to the front and rear ends of the pallet 11 and are bifurcated or split at their outer ends 17 to provide expanding jaws 18. As shown particularly in Fig. 1, the bifurcated outer end portions of the mounting brackets 12, 13 are formed to define relatively long upper jaw elements 19 and relatively shorter lower jaw elements 20 each of which is adapted to be snugly slidably received in opposed vertically extended slots 21, 22, respectively in the front and rear mounting posts 9, 10 respectively. In order to securely retain the upper jaw elements 19 within their respective tubular mounting posts 9, 10, while permitting of vertical movements of the former with respect to the latter, said upper jaw elements, as shown particularly in Fig. 7, are provided with laterally projecting lug portions 23. It should be here pointed out that the slots 21, 22 extend to the upper ends of their respective mounting posts so as to facilitate insertion of the enlarged lug-equipped free ends of the upper jaw elements 19 thereinto. For the purpose of expanding the split outer ends 17 to cause relatively snug engagement of the upper and lower jaw elements 19, 20 with opposite sides of their respective slots 21, 22, I provide vertically spaced set screws 24 which extend transversely through the side plate 15 and abut against the side plate 14.

It will be seen that each of the brackets 12, 13 is provided with pulleys 25 which are journaled on horizontal axes 26 between the side plates elements 14, 15, in a manner to project a peripheral portion thereof through the slots 21, 22 into the interior of the tubular mounting posts 9, 10. For the purpose of imparting vertical raising and lowering movements to the pallet 11, I provide a conventional fluid pressure operated pump 27 having an operating handle 28 and secured to and projecting generally rearwardly from the mounting post 10. The pump 27 includes a storage chamber 29, a cylinder 30 and a piston or ram 31 which is guided in its vertical movements by a guide rod identified by the numeral 32. As shown particularly in Fig. 2, a rope, cable or the like 33 is secured at one end to a foot 34 rigidly secured to and carried by the lower end of the ram 31. The cable 33 extends upwardly over a pulley 35 mounted for rotation

on a horizontal axis within a housing 36, in turn rigidly secured to the upper end of mounting post 10. From the pulley 35, the cable 33 projects through an opening, not shown, through the upper end of the mounting post 10 and into the interior thereof, finally being rigidly secured at its opposite end to the inner ends of the upper jaw elements 19 of the bracket 13 within said post 10. In order to assure that the front and rear ends of the pallet 11 are maintained in a horizontal plane during raising and lowering movements thereof, I provide a second flexible tie member or cable 37 which at its rear end 38 is secured within the tubular mounting post 10 adjacent the lower end thereof, by means not shown, and at its front end 39 is secured within the tubular mounting post 9 adjacent its upper end, by means not shown. It will be noted that intermediate its front and rear ends 39, 38, the cable 37 is entrained under the pulley 25 associated with the front mounting bracket 12 and over the pulley 25 associated with the rear mounting bracket 13.

At this point I wish to stress that rocking movements of the pallet 11 during the placement of patients upon and removal of patients therefrom are practically eliminated by the snug engagement of the vertically spaced jaw elements 19, 20 with the opposite sides of the slots 21, 22 in which they are mounted, such adjustments being achieved, as above pointed out, through the set screws 24. Obviously as wear between the jaw elements 19, 20 with opposite sides of the slots 21, 22 causes undesirable slack, same may be eliminated by readjustment of the set screws 24.

Telescopically received within the open lower end portions of the front and rear tubular mounting posts 9, 10 for vertical movements toward and away from engagement with the floor are shoes 41, the lower ends of which define downwardly opening sockets 42 for the loose reception of the upwardly extended reduced stem portions 43 of rubber suction cups 44. The radially outwardly flared annular skirts of the suction cups 44 are identified by the numeral 45. Mounting the suction cups 44 for limited vertical movements of the stem portions 43 thereof within their respective sockets 42 are mounting pins 46 which extend loosely axially through the stem portions 43. At their lower ends, the mounting pins 46 have radially enlarged heads 47 which positively limit downward movement of the suction cups 44 with respect to the shoes 41, the arrangement of the pertinent parts in such position being illustrated by Fig. 4. It will be there noted that free passage of air is permitted between the stem portions 43 and the adjacent sides and top of their cooperating sockets 42 as well as to the interior of the suction skirt 45, circumferentially spaced longitudinally extended slots 48 in the peripheral surface of the mounting pins 46 being provided for this purpose. The precise importance of this feature will be hereinafter explained in detail.

At their upper ends, the mounting pins 46 have screw threaded engagement with the plug 49 forming the upper walls of the sockets 42. Preferably and as shown, set screws 50 are provided to positively lock the mounting pins 46 in a desired set position.

For the purpose of simultaneously imparting raising and lowering movements to the shoes 41, I provide a rock shaft 51 extending through one of the longitudinally extended side portions 4 of the frame 1. Secured to opposite ends of the rock shaft 51 exteriorly of the front and rear ends of the tubular frame member 4 in which it is mounted are crank arms 52 having links 53 pivotally secured to their outer ends, as indicated at 54. Rigidly secured to the shoes 41 and projecting laterally outwardly through vertically extended slots 55 in the mounting posts 9, 10 are mounting tongues 56. The lower end of the link 53 associated with the rear mounting post 10 is pivotally secured on a horizontal axis, as at 57, to the extended end of the adjacent mounting tongue 56. However, the lower end of the link 53 associated with the front mounting post 9 is pivotally secured on a horizontal axis, as at 58, to the undersurface of a latch hook 59 associated with and projecting laterally from the lower end portion of a vertically disposed latch lever 60 which, in turn, is pivotally secured on a horizontal axis to the extended end of the adjacent mounting tongue 56, as indicated at 61. To facilitate imparting of rocking movements to the latch lever 6, I provide a pedal 62 for engagement with the foot of an operator and having raised portions 63 and 64 at its front and rear ends.

Yielding means in the nature of a coil tension spring 65 is interposed between the extended end of one of the crank arms 52, as indicated at 66, and a vertically spaced lug on the supporting post 9, as indicated at 67. The spring 65 tends to simultaneously raise the crank arms 52 and thus exerts yielding bias to simultaneously raise the shoes 41 associated therewith away from engagement with the floor.

Adapted to cooperate with the latch hook 59 is a strike 68, shown as being bifurcated and positioned to be engaged by the latch hook 59 only when the shoes 41 have been caused to engage the floor with sufficient force to flatten out the suction cups 44, as indicated in Fig. 3, to effect a sealing engagement therebetween and the floor. It will be noted that the downward force required to effect such sealing operation of necessity causes engagement of the upper portion of the stem portions 43 of the cups 44 with the upper surfaces of their cooperating sockets 42, annularly of the mounting pins 46 to positively preclude the passage of air from atmosphere to the floor gripping undersurface of the cups 44 through the slots 48 of the mounting pins 46.

After a patient has been safely placed upon the pallet 11 or removed therefrom, and one desires to impart mobility to the frame 1, the operator places his foot in engagement with the pedal 62, pressing same downwardly and forwardly thereon to rock the latch lever 60 and to remove the latch hook 59 carried thereby laterally outwardly of the strike 68. The coil tension spring 65 then simultaneously lifts the crank arms 52 and the links 53 and shoes 41 associated therewith vertically away from engagement with the floor. Initial upward movements of the shoes 41 cause relative vertical movements between the suction cups 44 and their cooperating shoes 41 (see Fig. 4), thereby permitting passage of air into the sockets 42 and downwardly through the slots 48 associated with the mounting pins 46, thereby breaking the sealing engagement of the shoes 41 with the floor, see particularly Figs. 1 and 4.

My invention has been thoroughly tested and found to be completely satisfactory for the accomplishment of the above objects, and while I have shown a preferred embodiment thereof, I wish it to be understood that same may be capable of modification without departure from the scope and spirit of the appended claims.

What I claim is:

1. In a device of the class described, a wheeled frame, a shoe mounted in said frame for vertical movements toward and away from engagement with the floor, the lower end portion of said shoe defining a downwardly opening socket, an elastic suction cup carried by said shoe and having a reduced upper stem portion loosely received in said socket, means mounting said suction cup for limited vertical movements of said stem portion in said socket and guiding same in said movements toward and away from sealing engagement with the upper surface of said socket, said means including a mounting pin extending between said shoe and said cup axially thereof and defining an air passage between the undersurface of said cup and the upper surface of said stem, means for imparting lowering movements to said shoe whereby to force said suction cup into engagement with the floor with sufficient force to cause sealing engagement of said stem portion with the upper surface of the socket, and means for positively locking said shoe in the lowered position.

2. The structure defined in claim 1 in further combination with yielding means for imparting raising movements to said shoe when said locking means is rendered inoperative, initial raising movements of said shoe breaking the sealing engagement of the stem portion of said suction cup with said socket and permitting passage of air to said cup through said passage.

3. The structure defined in claim 2 in which said frame includes a vertical supporting post having a tubular open lower end portion, said shoe being telescopically slidably received in said tubular lower end portion.

4. The structure defined in claim 3 in which said means for positively locking said shoe in said depressed condition comprises a strike on the post and a cooperating latch element carried by said shoe and mounted for swinging movements on a horizontal axis toward and away from engagement with said strike.

5. In a device of the class described, a wheeled frame including a pair of longitudinally spaced supporting posts having tubular lower open end portions, a pair of shoes one each telescopically slidably received in the lower open end portions of said supporting posts for movements toward and away from engagement with the floor, the lower end portions of said shoes defining downwardly opening sockets, elastic suction cups carried by each of said shoes and each thereof having reduced upper stem portions loosely received in said sockets, means mounting said suction cups for limited vertical movements of the stem portions thereof in their respective sockets and guiding same in said movements toward and away from sealing engagement with the upper surfaces of said sockets, said means including mounting pins extending between said shoes and said cups axially thereof and defining air passages between the undersurfaces of said cups and the upper surfaces of said stem portions, means for imparting common lowering

movements to said shoes whereby to force said suction cups into engagement with the floor with sufficient force to cause sealing engagement of said stem portions with the upper surfaces of their cooperating sockets, and means for positively locking said shoes in the lowered positions.

6. The structure defined in claim 5 in further combination with yielding means for imparting common raising movements to said shoes when said locking means is rendered inoperative, initial raising movements of said shoes breaking sealing engagement of said stem portions with said sockets and permitting passage of air to said cups through said passages.

7. The structure defined in claim 6 in which said means for positively locking said shoes in said depressed condition includes a laterally projecting mounting tongue carried by one of said shoes and working in a vertically extended slot in the lower end portion of one of said supporting posts, a strike on said one supporting post, and a vertically disposed latch lever pivotally secured intermediate its ends to the outwardly projected end portion of said tongue, the lower end of said latch lever defining a latch hook movable toward and away from engagement with said strike, the upper end portion of said latch lever defining a pedal for engagement with the foot of an operator.

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