Sept. 10, 1968 H. A. SALLINGER 3,400,410

DIFFERENTIALLY ELEVATABLE BATHTUB DEVICE

Filed Jan. 17, 1966 2 Sheets-Sheet 1

FIG.1

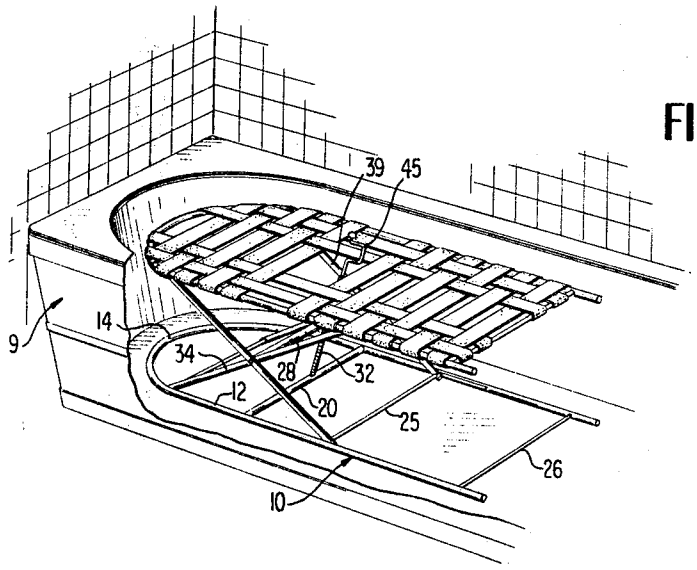
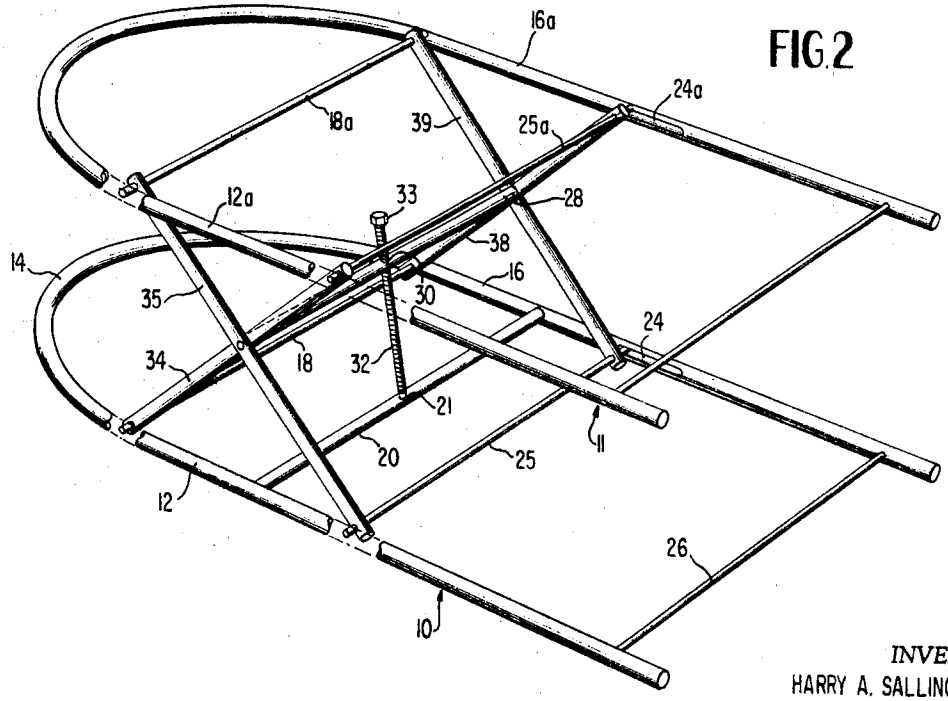


FIG.2



INVENTOR
HARRY A. SALLINGER

BY LeBlanc & Shur

ATTORNEYS

Sept. 10, 1968 H. A. SALLINGER 3,400,410

DIFFERENTIALLY ELEVATABLE BATHTUB DEVICE

Filed Jan. 17, 1966 2 Sheets-Sheet 2

FIG.3

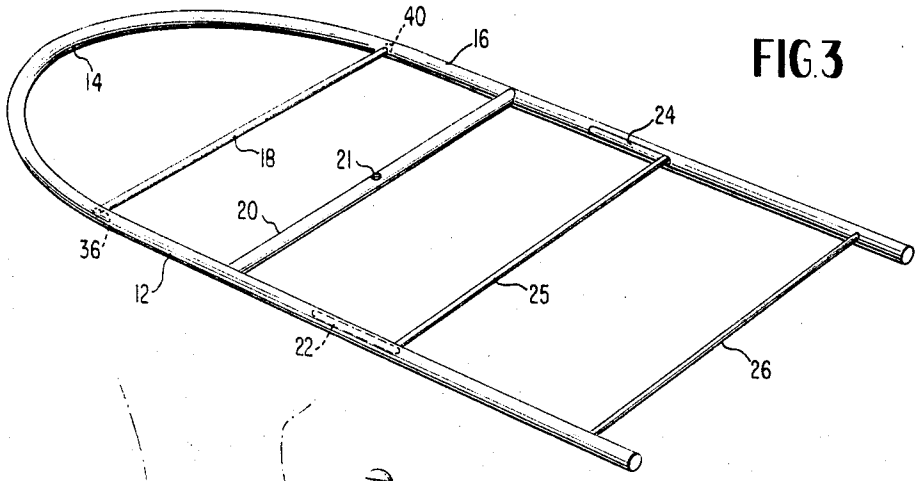


FIG.4

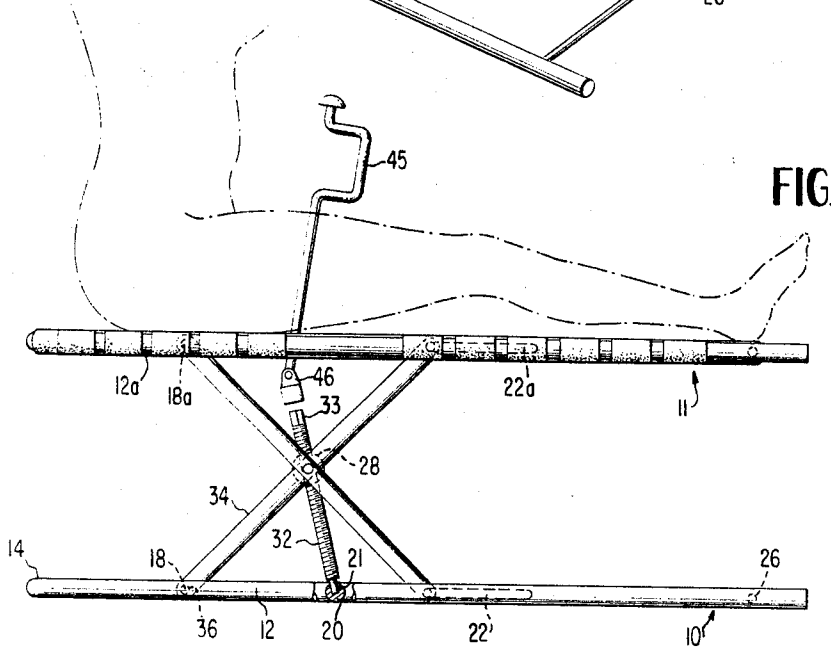


FIG.5

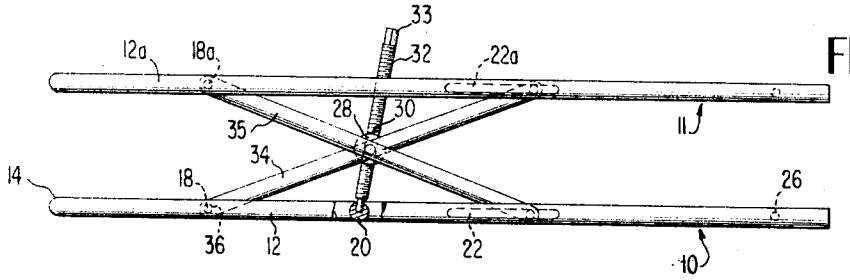
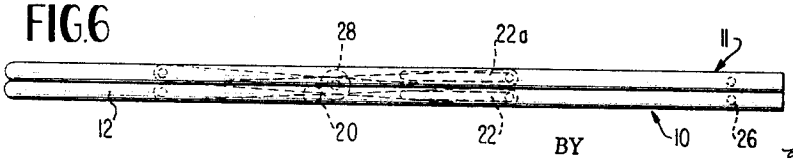


FIG.6



INVENTOR
HARRY A. SALLINGER

BY LeBlanc & Shur

ATTORNEYS

United States Patent Office 3,400,410
Patented Sept. 10, 1968

3,400,410

DIFFERENTIALLY ELEVATABLE BATHTUB DEVICE

Harry Alvin Sallinger, 7904 Sycamore St., New Orleans, La. 70118

Filed Jan. 17, 1966, Ser. No. 521,026
7 Claims. (Cl. 4—185)

ABSTRACT OF THE DISCLOSURE

The removable elevatable bathtub device comprises upper and lower U-shaped platforms connected together by a pantographic linkage having a differential elevating screw connected to the linkages and intermediate the sides and ends of the platforms whereby a convalescent on the upper platform can operate the differential elevating device to raise and lower the upper platform relative to the lower platform and within a bathtub.

This invention relates to bathtubs and more particularly to a differentially elevatable device to be used for ingress and egress therefrom.

The inability of convalescents, or others suffering from physical disabilities, to enter or leave a tub unassisted has presented considerable problems in the past. Also in the instances where assistance is necessary, the physical location and dimensions of the bathtub has generally hampered easy assistance of the convalescent or physically disabled person into or out of the tub. As a result, numerous serious accidents occur in connection with tub use to either the physically disabled person or to the assistant.

While various devices and schemes for assisting convalescents into and out of bathtubs have been tried in the past, they have generally been unsatisfactory for numerous reasons. One of the chief drawbacks of some prior devices is the necessity to alter the bathtub structure proper. Any alteration to the tub structure obviously results in a considerable amount of cost and is economically out of the reach of convalescents generally. Other prior art devices for use with tubs by invalids or convalescents have proved to be unsatisfactory because of the need of an assistant to manipulate the mechanical mechanism for operating the device.

Still other prior art devices have been unsatisfactory since they required the permanent positioning of a device inside the bathtub, and thus makes it inconvenient or awkward for a healthy member of the household to utilize the bathtub. It is to overcome these and various other prior art deficiencies that this invention is directed.

A primary object of this invention is to provide a mechanically simplified, relatively lightweight, safe device for lowering and elevating an incapacitated person in a bathtub.

It is still another object of this invention to provide a device for lowering or elevating an incapacitated person in a bathtub which requires no structural alterations of the bathtub or the use of any fixtures or attachments.

It is yet another object of this invention to provide a differentially elevatable device for use with bathtubs which may be operated by an incapacitated person from a tub position or by an attendant from an out-of-tub position in an effortless and fallproof manner.

Yet another object of the invention is to provide a differentially elevatable device for use with bathtubs which is of sturdy construction, economical to manufacture, reliable in operation, and requires little if any maintenance.

It is still another object of this invention to provide a differentially elevatable device for use in bathtubs which

may be easily positioned inwardly of the tub for use therein, and is easily removable therefrom due to its lightweight construction.

The invention accordingly consists in general of a differentially positonable device for use in the bathtub and includes a lower platform which is formed of pipe, aluminum tubing or the like, and is receivable at the bottom of the bathtub without any alterations being necessary in the tub structure proper. An upper elevatable platform is formed of a suitable waterproof, reasonably permanent material for support of the convalescent or invalid is also provided. Suitable mechanical linkages interconnect the upper and lower platforms. A selectively actuatable mechanism operates the mechanical linking structure interconnecting the upper and lower platforms for differentiatable positioning of the upper platform relative to the lower between an extreme upper position which is substantially flush with the tub rim to a position proximate the tub bottom.

To the accomplishment of the foregoing and related ends, said invention then consists of the means hereinafter further described and particularly pointed out in the claims, the following description setting forth in detail one approved means of carrying out the invention, such disclosed means constituting but one of the various ways in which the principles of the invention may be used.

In the drawings, wherein like reference numerals indicate like parts in the various views:

FIGURE 1 is a perspective view showing a fragmentary bathtub, and the device of the invention in an elevated position therewithin:

FIGURE 2 is a perspective view of the device of this invention with parts broken away and illustrates the structrual mechanism interconnecting the upper and lower platforms for differential elevational positioning of the same;

FIGURE 3 is a perspective view showing the structural make-up of the lower platform which is positioned along the bottom of the bathtub;

FIGURE 4 illustrates a simplified side elevational view of the device of the invention and indicates the position of the various structural elements with the upper platform in its extreme open position;

FIGURE 5 is a side elevational view similar to FIGURE 1 with the lower platform assuming a position intermediate its uppermost and lowermost positions; and

FIGURE 6 is a side elevational view of the device in its collapsed storage position.

Before turning to the drawings for a detailed description thereof, it should be established that the device of this invention is adapted to be formed of lightweight pipe, aluminum tubing or the like. Of course, it is possible for any reasonable substitutes to be used therefor and accordingly equivalent structure is intended to be within the scope of this invention.

Turning now to FIGURE 1, there is disclosed in fragmentary perspective a bathtub **9** having the device of this invention operatively positioned therewithin. The device includes a substantially U-shaped base frame **10** adapted to be formed of pipe, tubing or equivalent materials. The lower platform **10** includes parallel longitudinally extending sides **12** and **16** and a rounded interconnecting tubular head section **14**. It should be appreciated that the platform **10** may be formed by one continuous run of pipe, or, in the alternative, may be made of a plurality of pipes integrally joined in the manner shown. In addition, a plurality of parallel transverse rods are provided at predetermined intervals along the longitudinal dimensions of sides **12** and **16**. More particularly, rods **18** and **26** are provided intermediate the longitudinal extent of the lower platform, proximate the terminal

portions thereof, to stabilize and structurally enhance the rigidity of the lower frame. Transversely parallel members **18** and **26** may be formed of tubular stock or of solid round stock. The transversely parallel members **18** and **26** are fixedly positioned along the longitudinal expanse of the lower platform, intermediate the ends thereof.

Positioned intermediate the fixed rod members **18** and **26** is a hollow tube member **20**. As shown, hollow tube member **20** extends transversely of the longitudinal members **12** and **16** and is parallel to fixed rods **18** and **26**. Intermediate the ends of the transversely extending tube **20** is a bearing aperture for rotational receipt of a screw shaft **32**, see FIGURES 2, 4 and 5. The actual interrelationship of the parts will be discussed in detail hereinbelow.

Slots **22** and **24** are provided in opposed relationship along the inner periphery of longitudinally extending sides **12** and **16** in the manner as shown by the drawings. As further shown by the FIGURES 2 through 5, a rod **25** is received within slots **22** and **24** for slidable longitudinal movement therewithin. Rod **25** extends transversely of the lower platform sides **12** and **16** and is generally parallel with transverse rod members **18**, **26** and tube **20**.

The upper platform **11** is formed substantially in the same configuration and manner as that of platform **10**. Accordingly, the upper platform **11** may be of unitary tubular construction having longitudinal sides **12***a* and **16***a* with an interconnecting rounded head portion **14***a*. In the alternative, as in the case of lower platform **10**, the platform may be formed from a plurality of tubular members which are fixedly interconnected in the substantially U-shaped configuration as shown in FIGURE 3. Furthermore, transversely parallel fixed rods **18***a* and **26***a* are positioned proximate the terminal ends of longitudinal sides **12***a* and **16***a* to substantially enhance the rigidity and structural soundness of the upper platform in a manner as described hereinbelow with reference to the lower platform. Rod **25***a* is received for slidable longitudinal movement within slots **22***a* and **24***a* formed along the inner periphery of longitudinal sides **12***a* and **16***a* which are also provided. As will become evident, a tubular member similar to the fixed transversely parallel rod **20** in the lower platform is not necessary in the upper platform **11**. Also, the upper platform is covered with a suitable water-impervious material which is flexible and able to support the weight of the user. In the alternative, the upper platform may be provided with a plurality of longitudinally and transverse tapes or webs which are permanently secured between the available longitudinal and transversely extending rods, in a conventional manner, to provide body support. The longitudinally and transversely extending tapes or webs may be formed of nylon, or any other suitable waterproof plastic material. As contemplated, the tapes or webs carried by the upper frame will be taut and adequately strong to bear the weight of even the heaviest of users. Furthermore, a plurality of interstices will be formed at the crossing junctions of the longitudinal and transverse webs to permit water flow therethrough. The tapes or webs, or for that matter, any material which is utilized to provide a support surface for the user, will be attached to the platform **11** at a plurality of points along longitudinally extending tubular members **12***a* and **16***a*, and, as well, between fixed transversely extending rods **18***a* and **26***a* by suitable attaching elements made of corrosive resistant material.

FIGURES 2, 4 and 5 illustrate suitable mechanical linking structure which interconnect the upper and lower platforms in the manner shown. More particularly, each of the longitudinally extending sides **12** and **24** of the lower platform are connected to respective opposed longitudinal side **12***a* and **24***a* of the upper platform by means of pantographic-like linkages, whereby the upper platform may be differentially elevatable or vertically shifted, with respect to the lower stationary frame **10**.

The linkage structure or pantographs comprise a pair of crossing diagonally positioned links, rods or bars **34–35** and **38–39**. Each of the rods **34**, **35**, **37** and **38** have one of their ends rotatably connected to fixed rods **18** and **18***a* in a manner as shown in FIGURES 2 and 4–5. The other terminal ends of pantograph forming links **34**, **35**, **37** and **38** are connected to transversely parallel, longitudinally slidable rods **25** and **25***a* for longitudinal movement along recesses or slots **22**, **22***a*, **24** and **24***a*. More particularly diagonally crossing leg **35** is provided with an aperture proximate its upper end for connection to fixed rod **18***a* for rotative movement thereabout. The opposite end of leg **35** is provided with an aperture intermediate its terminal end for rotative movement about sliding rod **25**. In turn, sliding rod **25** is longitudinally movable in recesses or slots **22** and **24**. Leg **34**, which in association with link **35** forms one pantograph linkage, is provided with an aperture **36** intermediate its lower extremity for rotative movement around fixed rod **18**, fixed rod **18** being rotatably mounted between longitudinal sides **12** and **16** of the lower frame. The opposite end of linkage **34** is provided with an aperture intermediate its terminal end for rotation about rod **25***a*. In turn, rod **25***a* is mounted within longitudinal slots or recesses **22***a* and **24***a* for longitudinal movement therealong. In a similar fashion, pantograph forming linkages **38** and **39** interconnect the longitudinally extending sides **16** of the lower platform **10** with side **16***a* of the upper platform **11**. In the above manner, the pantograph-like link structures are diagonally pivotally and slidably interconnected to permit vertical movement of the upper platform **11** relative to the stationary lower platform **10**.

In addition, a translating shaft **28** is provided as shown most clearly in FIGURE 2. The pantograph forming linkages are medially interconnected by suitable pivot means to the ends of translating shaft **28**. A threaded aperture **30** is provided intermediate the terminal ends of translating shaft **28**. A long vertical operating screw shaft **32** is threadedly receivable within threaded aperture **30** of screw shaft **28**, with its terminal or lower end being journalled for rotation within the bearing aperture **21** provided in fixed hollow transverse tube **20**. Screw shaft **22** terminates in a suitable head **33** as shown in FIGURE 2. A handle **45** is provided with an appropriate socket **46** which is universally joined to handle **45** for rotative movement of the screw shaft **32**.

Screw shaft **32** is provided with an external thread of proper pitch which is interrelated to the length of pantograph linkage members **34**, **35**, and **38**, **39**, and, as well, with the longitudinal length of recesses or slots **22**, **22***a*, **24** and **24***a*.

Upon rotative movement of crank handle **45** in a selected direction, the vertical screw shaft **32** will rotate within its bearing **21** and **30** to result in a vertical displacement of translating shaft **28**. Vertical displacement of translating shaft **28** results in rotation of pantograph linkage members **34**, **35**, **38** and **39** about fixed rods **18** and **18***a* to result in longitudinal movement of slidable rods **25** and **25***a* and thus elevate the upper platform **11** relative to the stationary lower platform **10**. Accordingly, the patient who is carried upon the upper platform **11** will be moved in a substantially horizontal plane by the vertical movement of the upper platform. The pantograph linkages operate in substantially vertical planes to translate the patient from an uppermost to a lower position or vice versa in accordance with the direction of rotation of handle **45**. FIGURE 5 illustrates the position of the vertical screw shaft as the upper platform **11** assumes a position intermediate its upper and lower terminal positions. It should, of course, be appreciated that as the upper platform **11** moves in a vertically downward direction, the vertical screw shaft **32** will project through a proper aperture in the webbing carried by the upper

platform, and between the legs of the patient who is sitting or lying on the upper platform. In this manner, the patient will straddle the vertically projecting screw and not experience any discomfort or alarm therefrom.

FIGURE 6 illustrates a fully collapsed view of the device of this invention. It should, of course, be appreciated that as the vertically movable upper platform assumes its lowermost position that screw **32** may be totally removed and the device is now in proper condition for storage.

In operation, the patient will place the device of this invention in the bathtub with the lower platform **11** being positioned upon the bathtub bottom. If the device is in its collapsed position as shown by FIGURE 6, vertical shaft screw **32** will be inserted in an easily manipulative fashion by merely screwing the shaft through translating shaft **28** into the bearing aperture **21** of fixed hollow tubing **20**. Further rotation of the vertical shaft by handle **45** will then position the upper platform to a level which is substantially flush with the tub rim. The user can then be comfortably seated upon the upper platform **11**. After assuming a seated position with his feet overhanging the tub, upon the floor of the bathroom, the user will then swing his body about to assume a position wherein his legs will straddle the shaft projecting aperture provided in the webbing or surface support of the upper platform. The user himself, or an attendant, will then rotate the crank handle in a proper direction to result in a vertically downward movement of the upper platform **11**. Upon the upper platform assuming its desired elevational position, be it the lowermost position of the device, or any position intermediate the lowermost or uppermost positions, the crank handle will be removed and the user will be in a proper bathing position. Upon the user completing his bath, the crank handle **45** is reinserted for engagement between its socket **46** and shaft head **33** to manually reposition the upper platform flush with the tub rim. The patient may then be removed from the device by the performance of steps opposite to those by which he assumed a seated position.

The device may then be repositioned to a fully closed condition as shown by FIGURE 6 for storage.

While it would be apparent that the embodiments of the invention herein disclosed are well calculated to fulfill the objects of the invention, it will be appreciated that the invention is susceptible to modification, variation in change without departing from the proper scope or fair meaning of the appended claims.

I claim:

1. A differentially elevatable bathtub apparatus comprising a lower platform adapted to be removably mountable in a bathtub, an upper patient supporting platform, means interconnecting said upper and lower platforms for vertical differential positionnig of said upper platform relative to said lower platform, said upper and lower platforms each comprising an integrally formed, sugstantially U-shaped tubular structure having longitudinally extending sides and a plurality of transversely parallel rod-like members interconnecting the same, said interconnecting means including transversely opposed longitudinal recesses along the inner periphery of each of said longitudinally extending sides of said upper and lower platforms, a pair of pantograph linkages, each linkage including cooperating diagonally crossed arms, each diagonal arm having a corresponding opposed counterpart in the other of said pair of pantographic linkages to form a pair of cooperating linkages, one of said pair of cooperating linkages each having corresponding ends pivotally connected to said upper longitudinal sides, the opposite ends of said last-mentioned pair being slidably received in said longitudinal recesses of said lower platform for longitudinal sliding movement therewithin, the other linkages of said cooperating pair each having corresponding ends pivotally connected to said lower longitudinal sides at points opposite the said pivotal connections to said upper longitudinal sides, the opposite ends of said other linkages being slidably received in said longitudinal recesses of said upper platform for longitudinal sliding movement therewithin, means operatively connected to said pantograph linkages to differentially position said upper platform to a desired elevational position relative to said lower platform, a transverse lifting shaft pivotally connected between said pair of pantographic linkages at the intersection of said diagonal crossing arms thereof, said shaft being provided with a threaded aperture intermediate the ends thereof, and a vertical screw threadedly engaging said threaded aperture of said lifting shaft and rotatably connected to said lower platform whereby rotation of said screw vertically displaces said pantographs resulting in relative movement between the upper and lower platforms to thereby differentially position said upper frame relative to said lower frame.

2. A differentially elevatable bathtub apparatus comprising a lower platform adapted to be removably mountable in a bathtub, an upper patient supporting platform, said upper and lower platforms each comprising an integrally formed substantially U-shaped tubular structure having longitudinally extending sides and a plurality of transversely parallel rod-like members, and means interconnecting said upper and lower platforms for vertical differential positioning of said upper platform relative to said lower platform, said differential positioning means being located within the vertical confines of said upper U-shaped tubular structure intermediate the ends thereof.

3. The device of claim **2** wherein a plurality of webs are longitudinally and transversely connected between the longitudinally extending sides and transversely parallel rod-like members of said upper platform to form a suitable patient supporting surface.

4. The device of claim **2** wherein said interconnecting means include a pantographic mechanism interconnecting the upper and lower platforms for vertical differential movement relative to each other.

5. The device of claim **2** wherein a pantographic mechanism interconnects longitudinal sides of said upper platform to longitudinally opposed sides of said lower platform and vertically displaceable translating means connected to said pantographic mechanism for selective vertical differential movement relative to each other.

6. The device of claim **2** wherein said interconnecting means include transversely opposed longitudinal recesses provided along the inner periphery of each of said longitudinally extending sides of said upper and lower platforms, a first vertically movable pantographic link mechanism, a second vertically movable pantographic link mechanism, said first and second pantographic link mechanisms operatively connected in opposed relationship between said upper and lower platforms, corresponding links of said first and second pantographic link mechanisms having their ends pivotally connected to said upper and lower platforms, the other ends of corresponding links mounted for sliding movement within said longitudinal recesses of said upper and lower platforms, and means operatively connected to said pantographic link mechanism to differentially position said upper platform to a desired elevational position relative to said lower platform.

7. The device of claim **2** wherein said interconnecting means include transversely opposed longitudinal recesses along the inner periphery of each of said longitudinally extending sides of said upper and lower platforms, a pair of pantograph linkages, each linkage including cooperating diagonally crossed arms, each diagonal arm having a corresponding opposed counterpart in the other of said pair of pantographic linkages to form a pair of cooperating linkages, one of said pair of cooperating linkages each having corresponding ends pivotally connected to said upper longitudinal sides, the opposite ends of said last-mentioned pair being slidably received in said longitudinal

recesses of said lower platform for longitudinal sliding movement therewithin, the other linkages of said cooperating pair each having corresponding ends pivotally connected to said lower longitudinal sides at points opposite the said pivotal connections to said upper longitudinal sides, the opposite ends of said other linkages being slidably received in said longitudinal recesses of said upper platform for longitudinal sliding movement therewithin, and means operatively connected to said pantograph linkages to differentially position said upper platform to a desired elevational position relative to said lower platform.

References Cited

UNITED STATES PATENTS

2,870,460	1/1959	Sanford	5—63
2,968,814	1/1961	Ashby	4—185
2,968,817	1/1961	Jacobs et al.	5—63
3,106,723	10/1963	Carpenter	4—185

HAROLD J. GROSS, *Primary Examiner.*