Oct. 25, 1966 J. C. COTNER 3,280,409

LIFT FOR A SITZ BATH

Filed Jan. 6, 1964 5 Sheets-Sheet 1

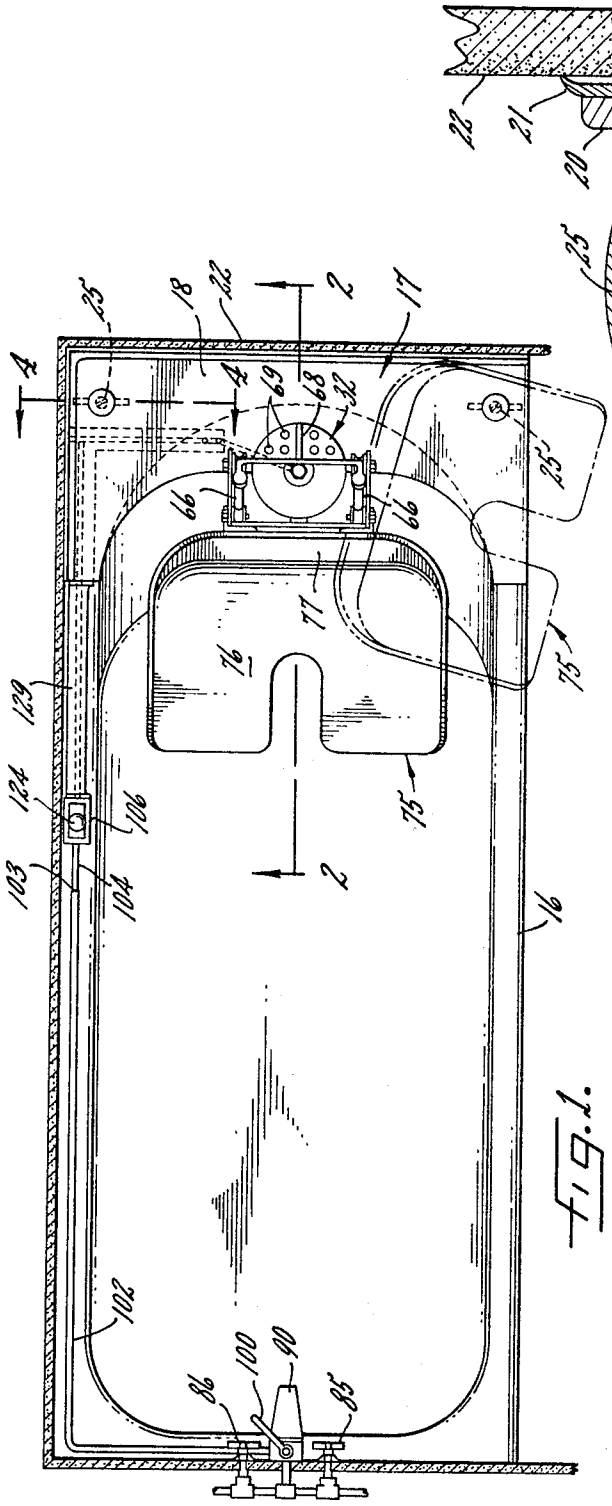


FIG. 1.

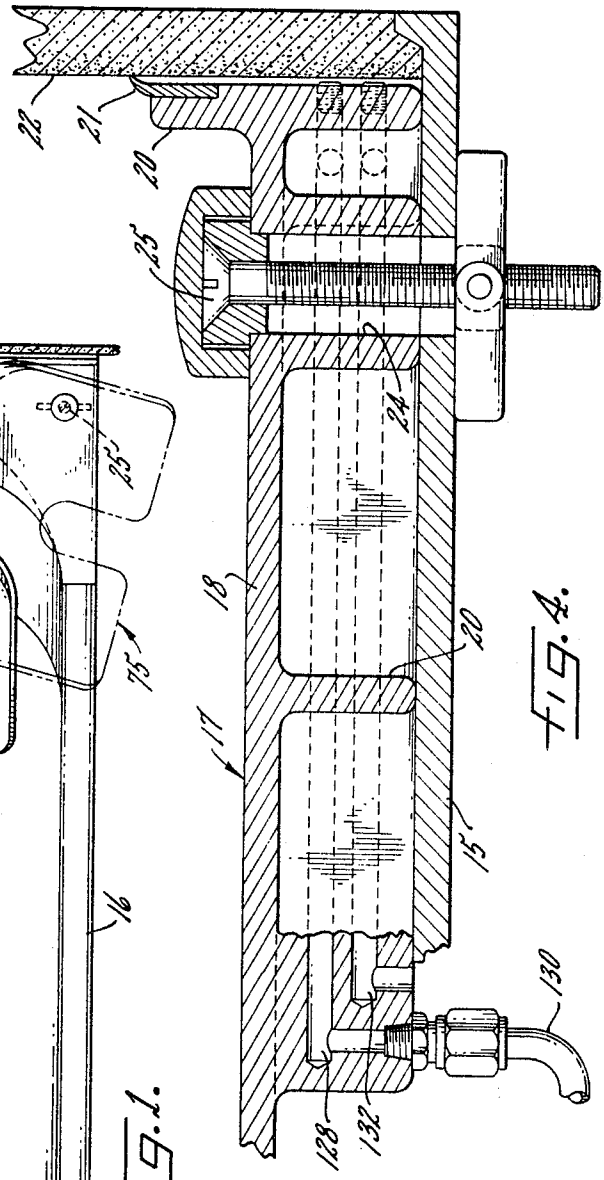


FIG. 4.

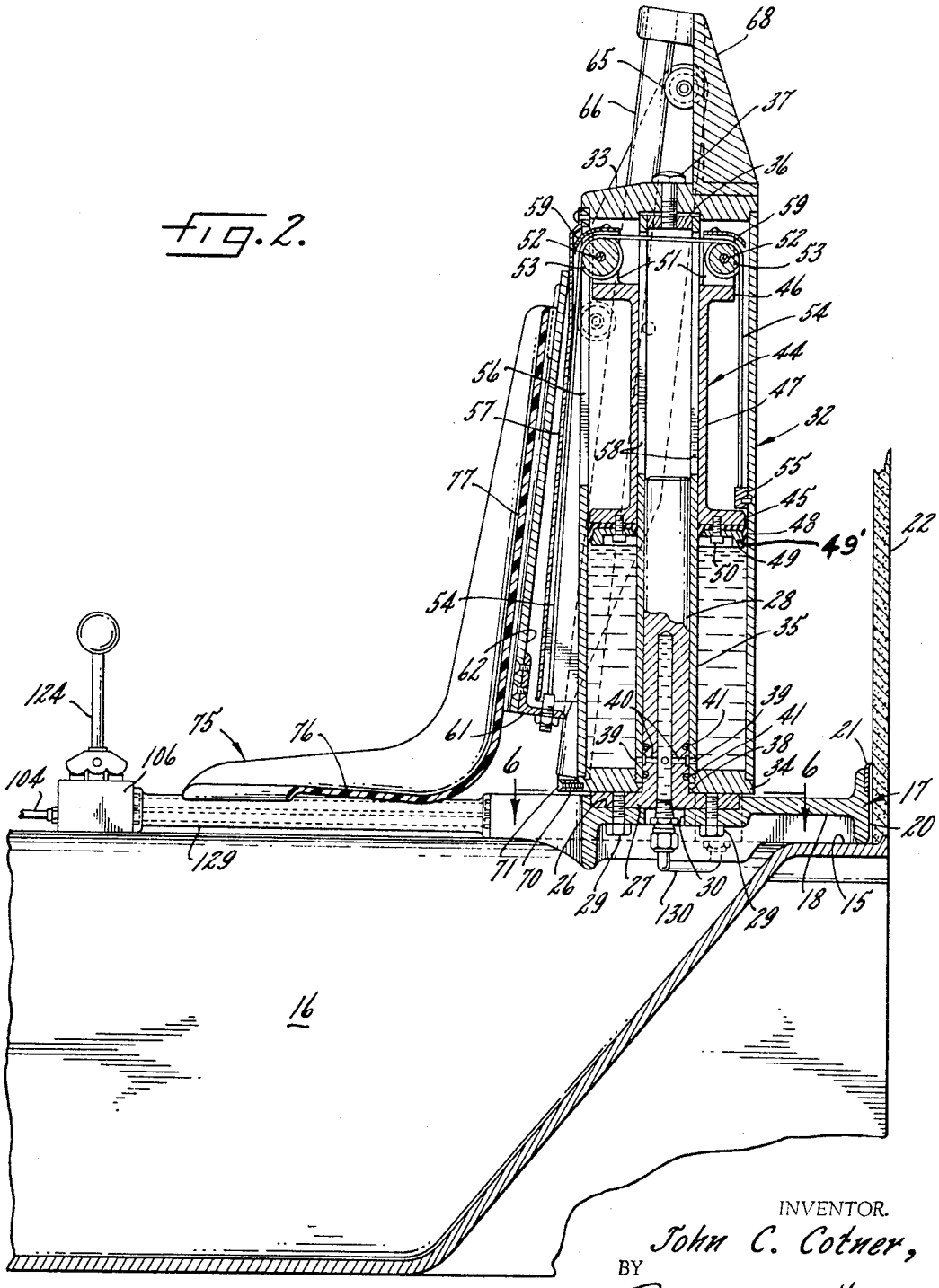
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Fig. 2.



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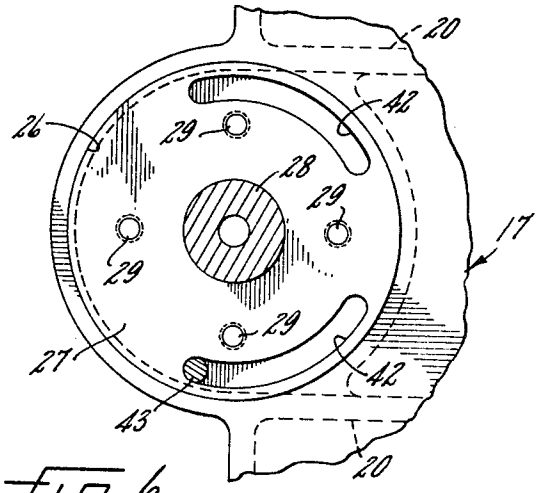


Fig. 6.

Fig. 3.

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LIFT FOR A SITZ BATH

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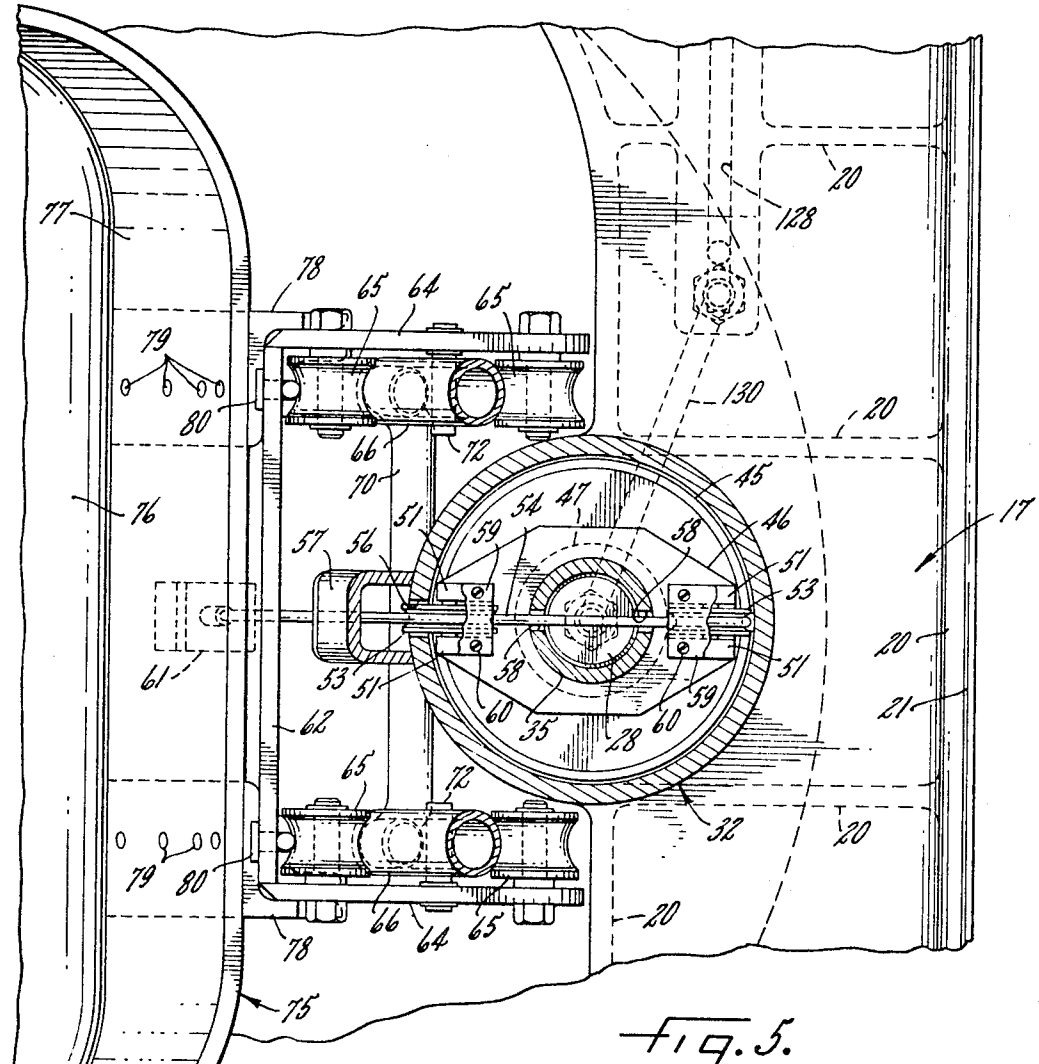


Fig. 5.

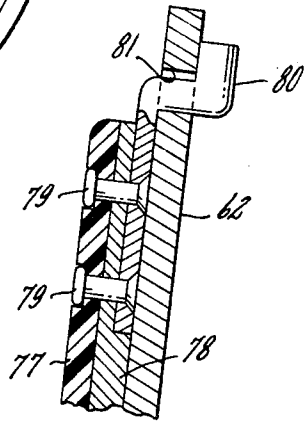


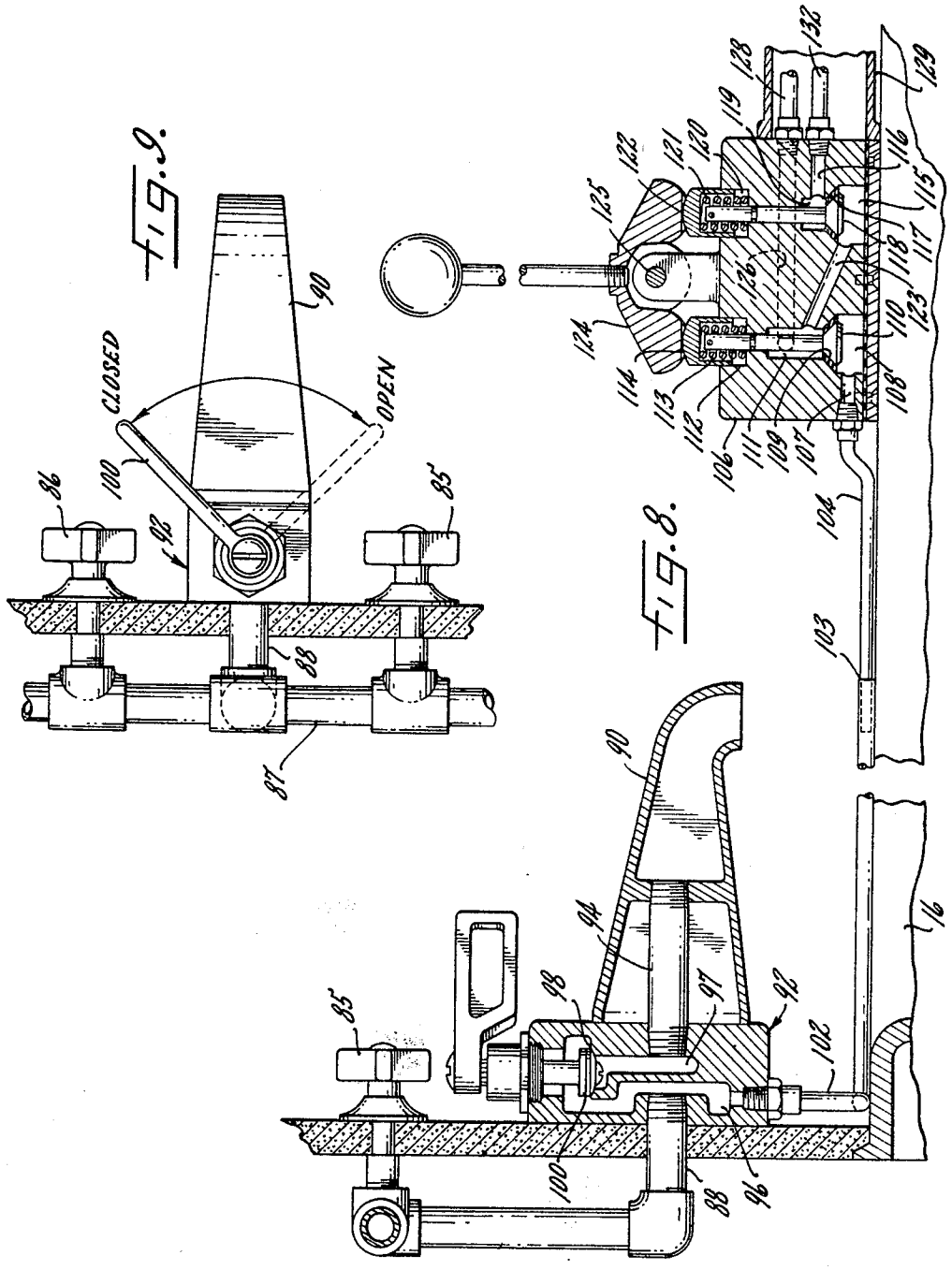
Fig. 7.

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LIFT FOR A SITZ BATH

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LIFT FOR A SITZ BATH

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11 Claims. (Cl. 4—185)

This invention relates to a lift for a sitz bath, and more particularly to a lift for assisting invalids, the aged, etc. in getting into and out of a bathtub.

It is an object of this invention to provide a lift for a sitz bath which can be simply and easily installed on a conventional bathtub without disturbing the permanent tub plumbing, which will permit said tub to be easily cleaned, which will be accessible to the used from a point outside the tub, which will safely transport the user vertically into and out of the tub, which can be simply and easily operated, which can be hydraulically operated by the water source at the tub, which will be compact and of attractive appearance, and which will prove sturdy and durable in use.

According to one form of the invention, there is provided a base mountable on the tub rim. A guide post is fixedly mounted on the base and projects upwardly therefrom. The guide post rotatably supports a housing carrying a guide tube extending the length of said housing. A vertically movable piston slidable on the guide tube is carried within the housing and is rotatable with said housing. Pulley means are mounted on the upper end of the piston for movement therewith and support a cable having one of its ends connected to the housing and its opposite end projecting outwardly through a slot in the housing for connection to a chair support.

Said chair support is provided with a plurality of rollers engaging a pair of obliquely extending guide members mounted on the housing. A chair is removably mounted on the chair support and is vertically movable therewith on vertical reciprocation of the piston between a raised position in which it is disposed in the general horizontal plane of the housing above the tub rim and a lowered position in which it is disposed below a plane of said housing and tub rim. In its raised position, the chair is rotatable with the housing about the axis of the guide post between a loading and unloading position generally normal to the longitudinal axis of the tub and a raising and lowering position generally parallel with the longitudinal tub axis.

The piston is provided with a head slidably engaging the inner wall of the housing, and the guide post and guide tube are provided with fluid passages in open communication with the housing between said piston head and the lower housing end. Said fluid passages communicate with one end of a manifold having an inlet and outlet passage, with the opposite end of said manifold being connected to a three-way valve. A pair of ports of said valve are connected to the inlet and outlet passages of the manifold, and a third port of said valve is connected to an adapter valve connected to the tub nozzle. In this manner, the three-way valve may be manipulated to cause water to flow from the tub nozzle through the inlet passage of the manifold to the housing wherein said fluid will cause the piston to raise to effect a raising of the chair. Conversely, movement of the three-way valve to dispose the exhaust passage of the manifold and the housing in open communication with each other will permit the fluid within the housing to exit said housing to effect a lowering of the chair.

Other objects and features of the invention will become apparent from the more detailed description which follows and from the accompanying drawings, in which:

FIG. 1 is a plan view of a tub having a lift embodying the invention mounted thereon;

FIG. 2 is a vertical section taken on the line 2—2 of FIG. 1 showing the lift in a chair-raised position;

FIG. 3 is a vertical section similar to FIG. 2, but showing the lift in a chair-lowered position;

FIG. 4 is an enlarged vertical section taken on the line 4—4 of FIG. 1;

FIG. 5 is a horizontal section taken on the line 5—5 of FIG. 3;

FIG. 6 is a horizontal section taken on the line 6—6 of FIG. 2;

FIG. 7 is an enlarged vertical section showing the chair-support interconnection;

FIG. 8 is a sectional view through the fluid control apparatus for actuating the lift shown in FIG. 1; and

FIG. 9 is a plan view of the water inlet for the tub shown in FIG. 8.

As shown in FIG. 1, the lift is mounted on the rim 15 of a conventional bathtub 16 at the rear of said tub. The lift is mounted on the tub by generally U-shaped platform 17 having a horizontal web 18 interconnecting a plurality of ribs 20 resting upon the upper surface of the rim 15. As shown in FIG. 2, the outermost rib 20 may project above the web 18 and be recessed for the reception of a seal 21 adapted to abut an adjacent wall surface 22 for sealing the base 17 against said wall. The base 17 is provided with a plurality of openings 24 for the reception of toggle bolts 25 projecting through openings in the tub rim 15 for thus rigidly mounting said base on the tub.

The base 17 is provided with a recess 26 in which an annular flange 27 mounted on the lower end of the guide post 28 is seated, said flange being connected to the base by a plurality of screws 29. For reasons that will become more apparent hereinafter, the guide post 28 has a centrally disposed opening in its lower portion in open communication with an opening 30 formed in the base 17. Disposed around the guide post 28 in annularly spaced relation thereto is a cylindrical lift housing 32 having its upper and lower ends enclosed by end caps 33 and 34. A hollow guide tube is rotatable carried in the guide post 28 and fixedly connected to the end cap 34 with its lower end seated against the end cap shoulder 38. The upper end of the tube 35 carries a plug 36 in which a screw 37 extending downwardly through the upper end cap 33 is received so that upon tightening of the screw 37, the end caps 33 and 34 will be retained in position closing the ends of the housing 32. As shown, the guide tube 35 is provided with a plurality of openings 39 adjacent its lower end in open communication with openings 40 in the guide post 28. Conveniently, a pair of O-ring seals 41 are interposed between the guide post 28 and guide tube 35 above and below the openings 39 and 40.

The housing end cap 34 is rotatably supported on the guide post flange 27 for rotational movement of said housing about said guide post. As shown in FIG. 6, said flange has a pair of arcuately spaced arcuate recesses 42 in which a downwardly projecting pin 43 mounted in the end cap 34 is selectively received. Said pin is slidable in said recesses for limiting the rotational movement of the housing. By disposing said pin in the proper recess, the housing can be mounted on either a right hand or left hand tub to permit the chair used with the device to be swung into a position of access from a point outside the tub.

A piston 44 is carried within the housing 32 and comprises a pair of heads 45 and 46 interconnected by an annular web 47 slidably supported on the guide tube 35. In this manner, the piston 44 is slidably supported within the housing by the outer walls of the tube 35 and the inner walls of the housing 32. As shown, a packing 48 is carried on the lower face of the head 45 by a follower 49 connected to the head 45 by a plurality of screws 50.

The follower 49 has a depending circumferential skirt 49' to retain the packing 48 and head 45 above the plane of the openings 39 and 40 when the piston is in lowered position. Pairs of diametrically opposed fingers 51 project upwardly from the head 46 to support the axles 52 upon which a pair of pulleys 53 are mounted. Said pulleys support a cable 54 having one of its ends connected to a mounting block 55 fixedly mounted on the inner face of the housing 32 and having its opposite end projecting through a vertically extending slot 56 formed in said housing and enclosed by a channeled guard 57 mounted on the outer housing face. The pulleys 53 are disposed on opposite sides of the guide tube 35, and said tube is provided with a pair of aligned slots 58 adjacent its upper end through which a cable stretch intermediate the pulleys 53 extends during vertical reciprocation of the piston 44. Conveniently, cover plates 59 for retaining the cable 54 in the pulleys are mounted on the fingers 51 by screws 60.

The end of the cable 54 remote from the block 55 is connected to a bracket 61 mounted on the rear face of an apron 62 of a U-shaped seat support. Said seat support has a pair of laterally spaced legs 64 projecting rearwardly from the apron 62 and provided with a pair of vertically spaced inwardly projecting rollers 65 adjacent their upper ends. The axes of the lower rollers 65 are offset forwardly from the axes of the upper rollers 65 so that said rollers bear against the opposed front and rear faces of the pair of laterally spaced guide tubes 66 on opposite sides of the housing 32. The upper ends of the tubes 66 which project above the housing 32 are connected to said housing by a mounting bracket 68 fixedly mounted on the end cap 33 by screws 69. The lower ends of the guide tubes 66 are received over the upturned ends of a tubular U-shaped bracket 70 connected by screws 71 to the end cap 34. The guide tubes 66 thus extend obliquely forwardly from their upper ends to their lower ends. A retainer pin 72 projects inwardly from the seat support legs 64 to ride against the rear faces of the guide tubes 66 and to act in combination with the rollers 65 for guiding the seat support along the guide tubes.

A chair 75 having a seat 76 and back rest 77 is removably mounted on the chair support. To this end, a pair of opposed vertically extending, L-shaped braces 78 are mounted on the rear face of the back rest 77, as by rivets 79, with the legs on each of said braces embracing the support apron 62 and one of the legs 64. A pair of generally Z-shaped hooks 80 mounted on the back rest 77 and braces 78 adjacent the upper ends thereof project outwardly from the chair for reception in openings 81 formed in the chair support apron 62. As is apparent from FIG. 7, the hooks 80 are removably inserted in the openings 81 for thus removably mounting the chair 75 on the chair support. With said chair mounted on the support, it will be vertically moved upon vertical movement of the piston 44 between a raised and lowered position and will be rotatably movable with the housing 32 about the axis of the guide post 28.

Actuation of the piston 44 for effecting vertical movement of the chair 75 is effected by the water already available at the tub. A conventional faucet normally comprises a hot water valve 85 and a cold water valve 86 for controlling the flow of water into a mixing manifold 87. A nipple 88 is connected to the manifold 87 and extends outwardly therefrom for connection to a nozzle 90. To adapt my device for use in combination with such a water source, it is merely necessary to connect an adapter 92 to the nipple 88 and to the nipple connection 94 on the nozzle 90. As shown in FIG. 8, the adapter 92 is provided with a pair of chambers 96 and 97 disposed in open communication with the nipple 88 and nozzle 90, respectively. One end of the chamber 97 defines a valve seat 98 against which the valve 100 mounted on the adapter is receivable. Thus, by adjustment of the valves 85 and 86, the desired water temperature can be achieved, and by opening the valve 100, the water may flow from the manifold 87 through the nipple 88 and chambers 96 and 97 for discharge out the nozzle 90 for filling the tub. Upon closing of the valve 100 against the valve seat 98, the flow of water out of the nozzle 90 will be stopped. A conduit 102 is connected to the chamber 96 and through a slip joint 103 to the inlet conduit 104 of a housing 106 on a three-way valve. The inlet conduit 104 is in open communication with an inlet port 107 communicating with an inlet chamber 108. The chamber 108 provides a valve seat 109 against which a valve 110 is received. The stem of the valve 110 projects through a passage 111 and is carried in an opening 112 formed in the housing 106. The upper end of the valve stem is received in a spring 113 acting between the base of the opening 112 and a cam follower 114 extending over the valve 110 and projecting above the top of the housing 106, said spring retaining the valve 110 in a normally closed position against the seat 109.

A discharge chamber 115 is in open communication with a discharge port 116 and provides a second valve seat 117 for a valve 118. The stem of the valve 118 projects upwardly through a passage 119 and is carried in an opening 120 formed in the housing 106. The upper valve stem end is received in a spring 121 acting between the base of the opening 119 and a cam follower 122 extending over the valve 118 and projecting above the top of the housing 106, said spring retaining the valve 118 in a normally closed position against the seat 117. A valve actuator 124 is swingably mounted on the valve housing 106 by a bolt 125. Said valve actuator is provided with cam faces engageable with the cam followers 114 and 122 upon movement of said actuator for thus selectively opening the valves 110 and 118.

The passage 111 is disposed in open communication with the discharge chamber 115 by a passage 123. It is also connected by passage 126 to the inlet passage 128 of a fluid manifold 129 extending from the valve housing 106 to the lift housing. A pipe 130 interconnects the end of the passage 128 remote from the valve housing 106 to the bottom of the opening 30 in the base 17 for thus admitting fluid to said guide post to actuate the cylinder 44. The discharge port 116 is in communication with the exhaust passage 132 carried in the manifold 129, said exhaust passage terminating in a discharge opening at the end of the manifold adjacent the lift housing.

With the valves 85 and 86 in their open positions, and the valve 100 in its closed position, the water will be free to flow from the manifold 87 to the nipple 88 through the chamber 96 to the conduit 104 where it is carried into the inlet chamber 108 in the housing 106. To raise the chair 75, it is merely necessary to move the valve actuator 124 to cause it to bear against the cam follower 114 for opening the valve 110 to thus permit water to flow through the valve passages 111 and 126 to the manifold passage 128 where it is carried to the bottom of the guide post 28. The water will then flow through the passages 39 and 40 to act against the piston head 45 to thus raise the piston to effect a raising of the chair 75. As the piston is raised, the cable 54 will ride over the pulleys 53 to cause the chair to raise with respect to the piston. During this raising movement of the chair 75, the rollers 65 will ride on and be supported by the guide tubes 66. With the chair in its raised position, the valve actuator 124 is moved to its neutral position to thus close the valve 110 to maintain the fluid pressure against the piston 44 for retaining the chair in its raised position. With the chair in such raised position, it may be rotated with the housing 32 about the axis of the guide post 28 to a loading and unloading position normal to the longitudinal tub axis as shown in chain link lines in FIG. 1, the recess 42 and pin 43 limiting such rotational movement.

To lower the chair, the chair and housing are rotated about the axis of the guide post 28 to position the chair

in alignment with the longitudinal axis of the tub. The valve actuator **124** is moved to engage the cam follower **122** to open the valve **118**. With said valve in its open position, the weight of the chair and the person sitting upon it will cause the piston **44** to lower forcing the fluid out of the housing through the openings **39** and **40** and back through the passage **128**. Since the valve **118** is open, said water will flow through the valve passages **126**, **111**, and **123**, chamber **115**, passage **119**, discharge port **116** and finally into the exhaust passage **132** for discharge into the tub. During the lowering of the chair, the rollers **65** will again ride on the guide tubes **66** and said guide tubes will support the chair in a cantilevered position adjacent the bottom of the tub. As with the raising of the chair, the cable **54** will move relative to the piston **44** during chair lowering to permit the chair seat to be disposed substantially below the plane of the lift adjacent the tub floor.

As will be apparent, the chair **75** can be removed from the support apron **62** when the lift is not in use to provide additional tub space. If it is desired to remove the entire device, however, it is merely necessary to remove the toggle bolts **25** and disconnect the conduit **102** from the adapter **92**. Then the entire device can be removed, and the openings in the tub rim **15** can again be closed by the toggle bolts **25**.

I claim:

1. A lift for a sitz bath, comprising

(a) a base mountable on a bathtub rim,

(b) guide means fixedly mounted on said base and projecting upwardly therefrom,

(c) a housing disposed around said guide means and rotatably supported thereon,

(d) a piston slidably supported on said guide means within said housing, said piston being rotatable with and vertically movable with respect to said housing,

(e) a pair of laterally spaced, obliquely extending guide members mounted on said housing,

(f) a chair operatively supported on said guide members and interconnected to said piston for vertical movement along said guide members upon vertical movement of said piston and for rotational movement with said housing between a loading and unloading position generally normal to the longitudinal tub axis and a raising and lowering position parallel with the tub axis, and

(g) means for connecting said housing to a power source for effecting vertical movement of said piston.

2. A lift for a sitz bath as set forth in claim **1** in which

(a) said housing comprises an elongated tubular element closed at its ends by a pair of end caps, and

(b) said guide means comprises a guide post fixedly interconnected to said base and a guide tube rotatably carried therearound, said guide tube operatively interconnecting said pair of end caps.

3. A lift for a sitz bath as set forth in claim **2** in which

(a) said guide post and guide tube have aligned openings operatively connected to a source of fluid power and in open communication with the interior of the housing below said piston.

4. A lift for a sitz bath as set forth in claim **2** in which

(a) said guide post has a radially projecting flange at its lower end fixedly connected to said base and provided with a pair of arcuately spaced arcuate recesses, and

(b) a pin on one of said housing end caps is selectively received in one of said recesses for limiting the rotational movement of said housing.

5. A lift for a sitz bath, comprising

(a) a base mountable on a bathtub rim,

(b) guide means fixedly mounted on said base and projecting upwardly therefrom,

(c) a tubular housing having its ends closed by a pair of end caps and rotatably supported on said guide means,

(d) a piston slidably supported on said guide means within said housing, said piston being rotatable with and vertically movable with respect to said housing,

(e) bracket means mounted on said end caps and projecting outwardly therefrom,

(f) a pair of laterally spaced guide members connected to said bracket means and extending obliquely forwardly from top to bottom along the opposed sides of said housing,

(g) a chair support slidably carried on said guide members and operatively interconnected to said piston for vertical movement along said guide members upon vertical movement of the piston and for rotational movement with said housing,

(h) a chair removably mounted on said chair support for movement therewith, and

(i) means for connecting said housing to a power source for effecting vertical movement of said piston.

6. A lift for a sitz bath as set forth in claim **5** in which

(a) said chair support has a pair of laterally spaced legs each provided with a pair of vertically spaced rollers riding against a pair of opposed faces on said guide members, the axes of the lower rollers of said pairs of rollers being disposed outwardly from said housing relative to the axes of the upper rollers.

7. A lift for a sitz bath as set forth in claim **6** in which

(a) at least one of said legs has a pin mounted thereon between its pair of rollers and slidably engaging the same guide member face as the upper roller.

8. A lift for a sitz bath as set forth in claim **6** in which

(a) said legs are interconnected by an elongated apron, and

(b) said chair comprises a seat and back rest, said back rest being supported against said apron and having a pair of hooks adjacent its upper end removably mounted in a pair of openings in said apron for removably mounting said chair on said support.

9. A lift for a sitz bath, comprising

(a) a base mountable on a bathtub rim,

(b) a guide post fixedly mounted on said base and projecting upwardly therefrom,

(c) a guide tube rotatably carried on said guide post and projecting thereabove, said guide tube having a pair of opposed vertically extending slots formed therein above said guide post.

(d) a housing interconnected to said guide tube and rotatably supported on said guide post,

(e) a piston slidably supported on said guide tube within said housing and having pulley means fixedly mounted thereon,

(f) cable means extending through said guide tube slots and over said pulley means, said cable means being fixedly interconnected at one of its ends to said housing and having its opposite end projecting outwardly through a slot formed in said housing,

(g) a chair operatively connected to said opposite cable end for vertical movement of said chair with and with respect to said piston,

(h) means on said housing guiding the vertical movements of said chair and operatively interconnecting said chair to said housing for rotation therewith, and

(i) means for connecting said housing to a power source for effecting vertical movement of said piston.

10. A lift for a sitz bath as set forth in claim **9** in which

(a) said piston has a pair of vertically spaced heads interconnected by an elongated hollow web carried on said guide tube, and

(b) said pulley means is mounted on the upper of said pair of heads.

11. A lift for a sitz bath, comprising

(a) a base mountable on a bathtub rim,

(b) a guide post fixedly mounted on said base and projecting upwardly therefrom,

(c) a guide tube rotatably carried on said guide post and projecting thereabove, said guide tube having a pair of opposed vertically extending slots from therein above said guide post,

(d) a housing interconnected to said guide tube and rotatably supported on said guide post,

(e) a piston slidably supported on said guide tube within said housing and having pulley means fixedly mounted thereon,

(f) cable means extending through said guide tube slots and over said pulley means, said cable means being fixedly interconnected at one of its end to said housing and having its opposite end projecting outwardly through a slot formed in said housing,

(g) a pair of laterally spaced, obliquely extending guide members mounted on said housing,

(h) a chair support having a plurality of rollers adjacent its upper end riding on said guide members and haiving its lower end interconnected to said opposite cable end for rotational movement with said housing and vertical movement with and with respect to said piston,

(i) a chair mounted on said chair support for movement therewith, and

(j) means for connecting said housing to a power source for effecting vertical movement of said piston.

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