

Jan. 6, 1953

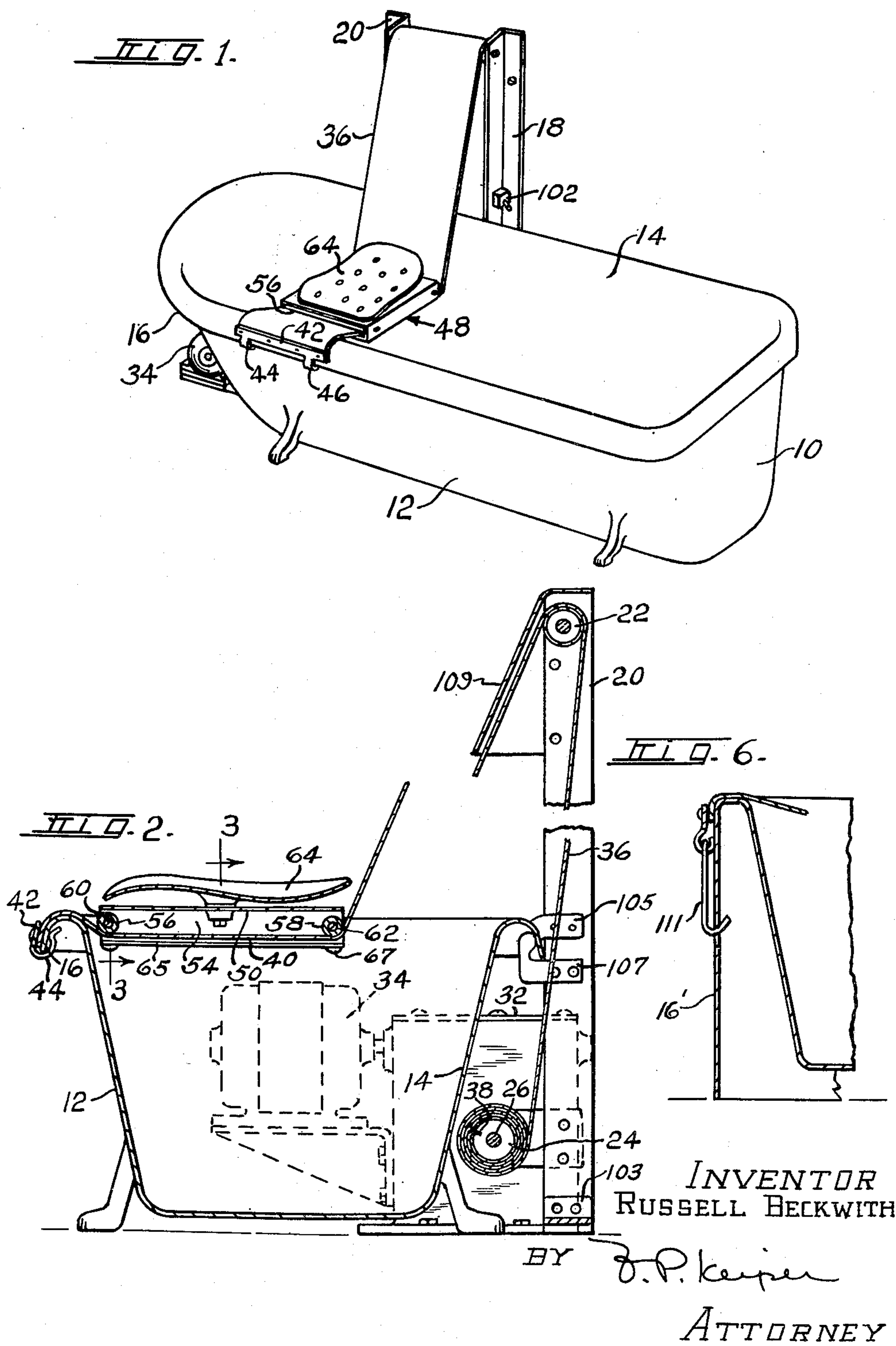
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BATH SEAT LIFTING APPLIANCE

Filed Aug. 28, 1951

2 SHEETS—SHEET 1



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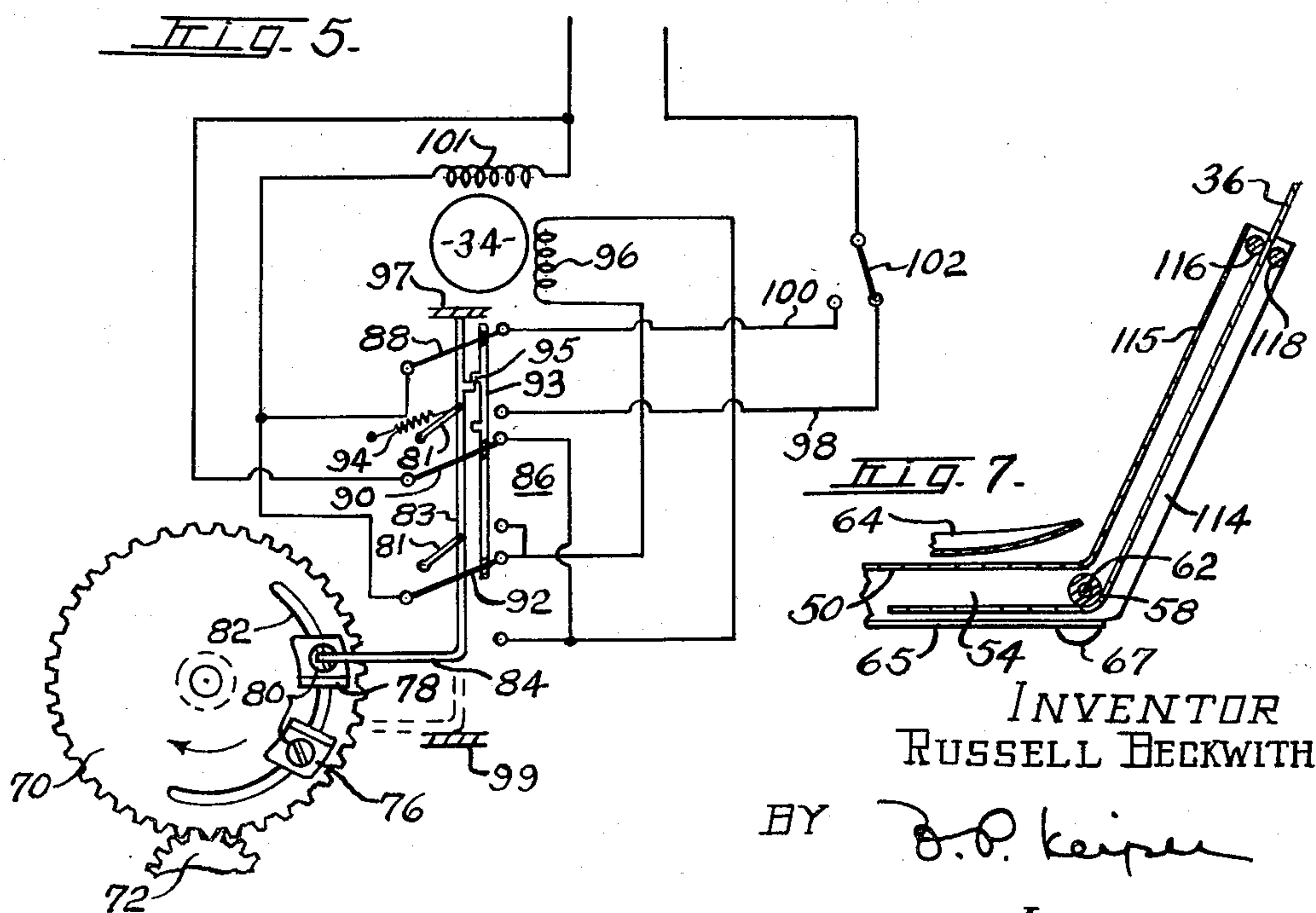
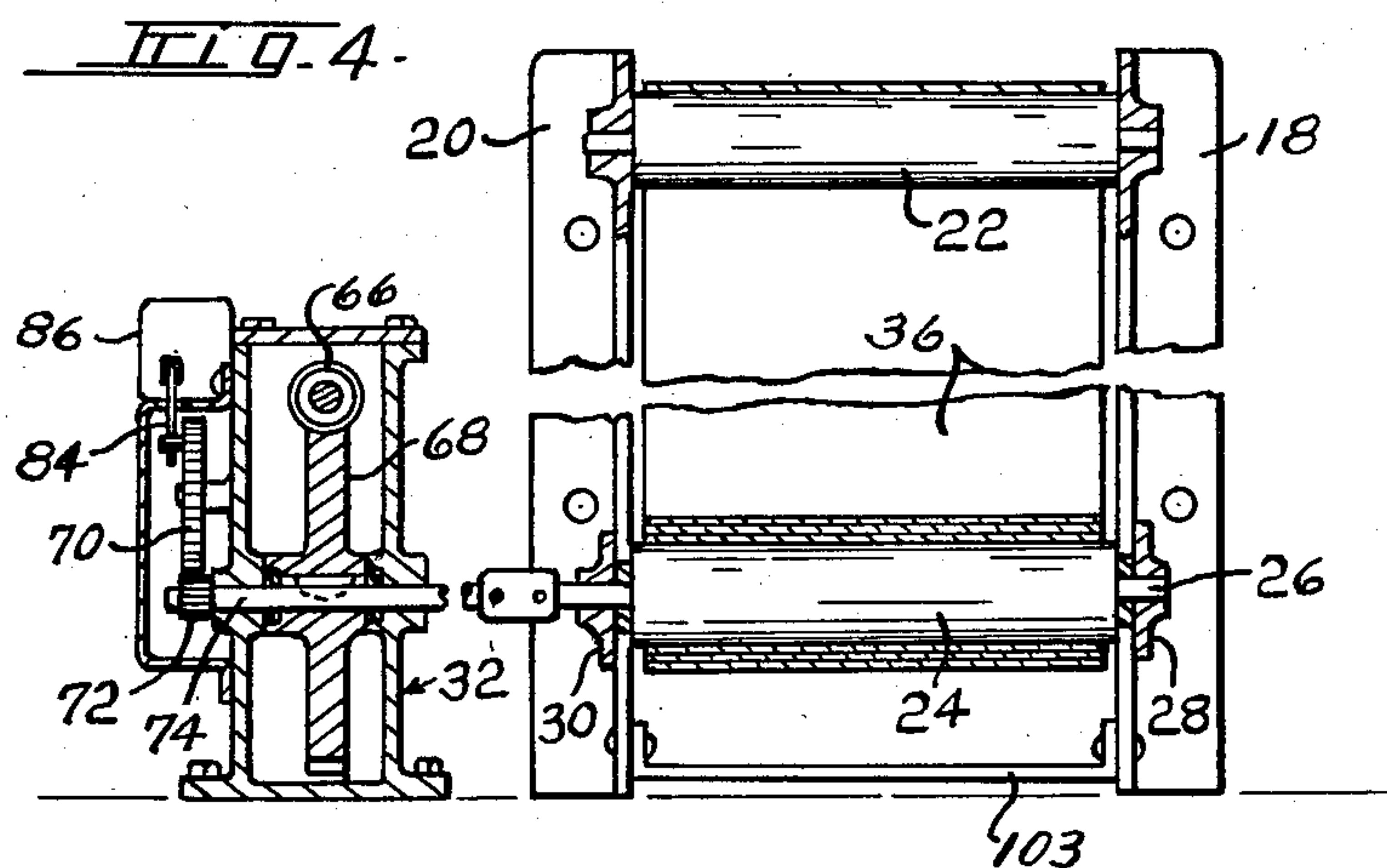
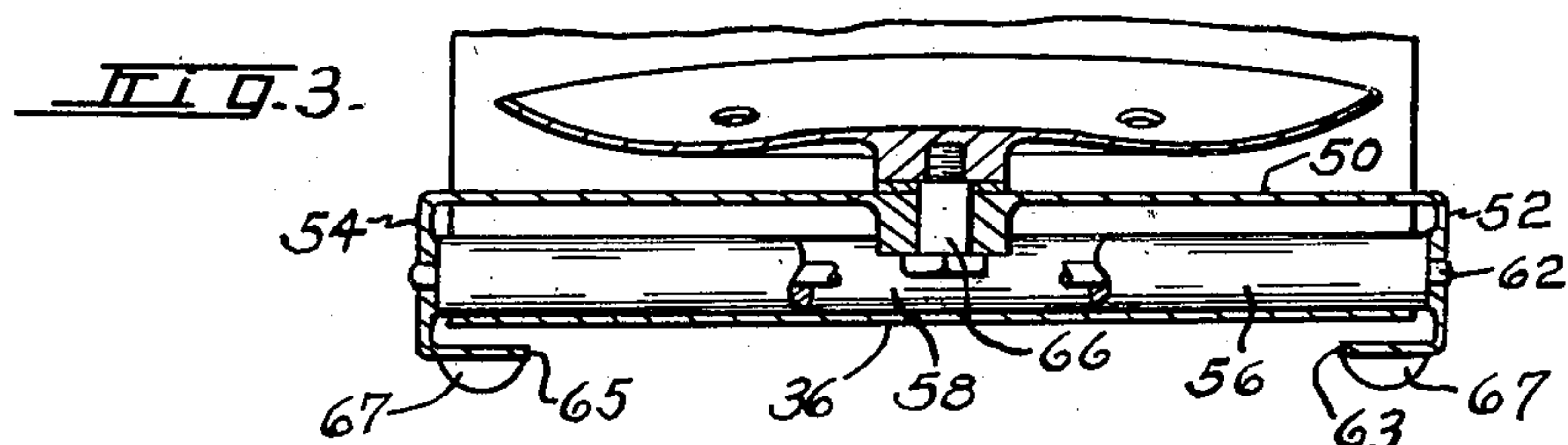
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2 SHEETS--SHEET 2



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## UNITED STATES PATENT OFFICE

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## BATH SEAT LIFTING APPLIANCE

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6 Claims. (Cl. 4—185)

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This invention relates to bath tub seats, and particularly mechanism for elevating and lowering such seats.

Persons suffering from physical disabilities, and others likely to slip in getting into or out of a bath tub find the operation of bathing a strenuous and dangerous undertaking. The present invention is directed to apparatus adapted to alleviate the danger, and effort required in entering or leaving a bath tub.

An object of the invention is to provide a seat movable from a position level with the rim of a tub and adjacent thereto, to a lower position resting on and central of the bottom thereof.

A further object of the invention is to provide apparatus of the type described which is readily installed in conjunction with a bath tub, and in which the seat assembly is adapted to be removed out of the way when not needed.

Another object of the invention is to provide a seat assembly supported upon a wide flexible web, in such a manner as to cause such seat to move from an upper edge of a tub to a central position in the tub on the tub bottom.

Still a further object of the invention is to provide mechanism for automatically elevating such seat between determined upper and lower limits.

The above and other novel features of the invention will appear more fully hereinafter from the following detailed description when taken in conjunction with the accompanying drawings. It is expressly understood that the drawings are employed for purposes of illustration only and are not designed as a definition of the limits of the invention, reference being had for this purpose to the appended claims.

In the drawings, wherein like reference characters indicate like parts:

Figure 1 is a perspective view illustrating a tub with the bath lift seat in elevated position;

Figure 2 is a transverse sectional view taken through the tub and apparatus, in the position shown in Figure 1;

Figure 3 is a sectional view with parts broken away, taken substantially on the line 3—3 of Figure 2;

Figure 4 is an elevational view with parts in section, of the elevating apparatus;

Figure 5 is a circuit diagram showing the electrical control system for the lift seat;

Figure 6 is a fragmentary sectional view showing a modified adaptation of the invention; and

Figure 7 illustrates a feature which may be utilized to stabilize the seat in a level position.

Referring to Figures 1 and 2, there will be seen

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a bath tub 10 having side walls 12 and 14, to which the apparatus is adapted. The side walls have a continuous rolled edge as at 16. Behind the tub wall 14, and mounted on the adjacent wall, are spaced angle members 18 and 20, extending substantially to the floor as indicated in Figures 2 and 4. Such members extend to a height well above the edge of the tub, as indicated, to afford spaced supports for a wide roll 22.

Behind the tub wall 14 is mounted a drum 24 on a shaft 26 journaled in spaced brackets 28 and 30 securely mounted upon the respective angle members 18 and 20. The shaft 26 is coupled to a speed reducer generally indicated at 32 in Figure 2, which, in turn, is driven by a small reversible motor 34. The drum 24 serves as a reel for a relatively wide flexible web 36, one end of which is firmly secured to the drum as at 38, and the other end of which passes upward over roll 22 and downward over the tub to form in effect a seat-supporting loop portion 40. The extreme end of the web is provided with a stiff binding member 42 having spaced hooks 44 and 46 adapted to resiliently engage the under side of the rolled edge of the wall 12 of the tub.

Mounted upon the web, and adapted to traverse the web, is a seat assembly generally indicated as at 48. Such seat comprises a bed plate 50 having side flanges 52 and 54, between which extend spaced rolls 56 and 58, the rolls being freely rotatable on shafts 60 and 62, extending between and supported by the flanges 52 and 54. Such rolls engage the web 36 and are adapted to permit the seat assembly to traverse the web, as the drum 24 unreels or reels the drum-carried end of the web 36. The flanges 52 and 54 may be channeled, if desired, to form inturned guide elements 63 and 65, adapted to embrace the edge of the web and retain the bed plate upon the web.

A swivel seat 64, suitably contoured if desired, is pivotally mounted on the bed plate 50 as at 66. Such seat permits the bather or other person to naturally sit upon the seat, with legs extended over the edge of the tub, and thereafter swivel the seat while bringing the legs over the wall 12 of the tub. The guide elements 63 and 65 are provided with shallow corner pads 67 of rubber or other suitable material, and the entire seat assembly is constructed to afford a minimum of height whereby the occupant will be seated as near the bottom of the tub as possible when the seat assembly is lowered within the tub.

From the structure thus described, it will be seen that upon counterclockwise rotation of the drum 24, as seen in Figure 2, the web 36 will be



unrolled and the seat assembly allowed to lower into the tub. As the seat is lowered, its level position is maintained by the occupant thereof, and the seat gradually travels along the web, finally resting centrally of the tub, on the tub bottom.

In order to provide for slow steady rotation of the drum 24, the motor 34 is adapted to drive the drum through a worm and worm wheel drive 66 and 68. Such arrangement provides a slow steady lifting or lowering movement, and requires but little power, and at the same time acts to hold the seat assembly at any selected position when the motor is disengaged.

Suitable means are provided for limiting the unreeling movement of the web when the seat is lowered to a position at rest on the tub bottom, and the reeling movement is limited when the seat is lifted to a position substantially that shown in Figure 2. For this purpose, a reduction gear 70 driven by a pinion 72 keyed to the worm wheel shaft 74 is provided, the reduction gear having adjustable switch arm actuating lugs 76 and 78. Each of such lugs is clamped to the gear by screws 80 and is shiftable within the limits of the arcuate slot 82 for providing accurate adjustment. The ratio of the gear and pinion 70 and 72 is so chosen that the gear 70 will be required to make less than a full revolution while the seat is moved from the lower limit position to the upper limit position.

The lugs are adapted to engage an actuating arm 84 of a reversing switch 86 on the end of a switch actuating bar 83, mounted on pivoted links 81. An over-center spring 94 operates to move said bar to one end or the other of its movement as established by stops 97 and 99, whenever the lugs move the arms beyond the center point. Such reversing switch 86 is mounted adjacent the reduction gear, as shown in Figure 4. The switch comprises multiple switch arms 88, 90, and 92, ganged together by an insulating bar 93 for simultaneous movement and provided with a lost motion connection 95 with the actuating bar 83, so that over-center movement of the bar 83 kicks the reversing switch from one position to the other, as will be well understood in the art. The switch arms 90 and 92 are adapted to reverse the connections to a starting winding 98, in the case of an induction motor, or armature, while the switch arm 88 acts through parallel circuits 98 and 100 in conjunction with manual single pole double throw switch 102 to establish a circuit until broken by movement to the end position and actuation of the switch 86 to a reverse position. The switch 102 is conveniently located as on angle member 18 for manual actuation.

It will be seen that when the switch 102 is moved from the position shown, current flow is established through conductor 100 to the motor field 101, and also through the starting winding 98, connected in parallel therewith. When the limit position is reached (for example, the seat lowered to its lowermost position), the reversing switch 86 is snapped to the opposite position by lug 76, and the circuit through conductor 100 is broken. The connections to the starting winding are thereby reversed, so that when switch 102 is again actuated to establish a circuit through the field through conductor 98, the motor operates in the opposite direction, lifting the seat to the position shown in Figure 2, at which point lug 78 trips the switch 86.

At any time during lifting or lowering movement, actuation of the switch 102 stops the movement instantly.

The frame angles 18 and 20 may be tied together as at 103, and provision is made as at 105 and 107 for clamping the angle irons to the rolled edge of the tub, whereby the stresses resulting from tension on the web are suitably resisted, and the parts held in rigid relation. The web may be approximately a foot wide to afford sufficient strength and may be of rubberized flexible fabric to resist action of the water. The swivel seat may have one or more small apertures to permit drainage. A suitable shroud such as 109 may be provided over the upper end of the angle irons 18 and 20.

While the apparatus is shown in connection with a tub of the non-built-in type, it will be readily apparent that the angle iron frame may be recessed in a wall behind a built-in tub, and the free end of the web hooked to the skirt 16' by an adapter hook member 111, as shown in Figure 6.

In practice, the reduction gear 32 will be chosen to slowly lift or lower the seat, requiring a relatively small motor, which in connection with a non-built-in tub may be conveniently arranged behind the sloping end of the tub. However, by extending the shaft 26, such motor and reduction gear may be located at any convenient point, more or less remote from the apparatus.

If desired, the seat may have a stabilizing extension as illustrated in Figure 7. In this form, the platform 50 is provided with an integral arm 115 extending upward, inclined substantially parallel with the web extending to the roll 22. Such arm may have flange extensions 116 on either side of the flanges 52 and 54, and at the outer end thereof, spaced rollers 118 and 119 on opposite sides of the belt are provided. Such rollers are journaled in the flanges 114. The extension is such as to nicely telescope within the shroud 109, if desired, and acts to stabilize the seat against possible tilting from a substantially level position.

It will be seen that the apparatus is readily attached for use by merely fastening the end 44-46 of the web 36 to the outer side of the tub, and that when use of the apparatus is not desired, such web may be quickly detached and hung on the frame, out of the way. It will also be seen that by the arrangement shown, the seat is caused to move toward the edge of the tub when lifted, a position most convenient for seating oneself thereupon. During lowering, the seat automatically tends to move to the center of the tub. The apparatus is such as to be readily installed for use in conjunction with a tub of the type shown, without more than merely securing the parts to the wall and anchoring the angle members to the tub.

Although a single embodiment of the invention has been illustrated and described, it is to be understood that the invention is not limited thereto. As various changes in the construction and arrangement may be made without departing from the spirit of the invention, as will be apparent to those skilled in the art, reference will be had to the appended claims for a definition of the limits of the invention.

What is claimed is:

1. A bath seat lifting appliance, comprising a tub, a frame extending a substantial distance above said tub on one side thereof, a web attached at one end to the other side of said tub, and adapted to span the tub, means mounted on said frame a substantial distance above said tub for lifting the other end of said web, and



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a seat mounted on said web and movable lengthwise therealong, whereby on lifting the other end, said seat will move from a balanced lower position central of said tub to a balanced upper position located adjacent the end attached to the tub.

2. A bath seat lifting appliance comprising, a tub, a frame extending a substantial distance above said tub on one side thereof, means for rigidly connecting said tub to said frame, a web attached at one end to the other side of said tub, and adapted to span the tub, means mounted on said frame a substantial distance above said tub for lifting the other end of said web, and a seat mounted on said web and movable lengthwise therealong, said seat comprising a platform having spaced rollers engaging said web, and a swivel seat member mounted on said platform, whereby on lifting the other end, said seat will move from a balanced lower position central of said tub to a balanced upper position located adjacent the end attached to the tub.

3. A bath seat lifting appliance comprising, a tub, a roller mounted a substantial distance above and on one side of said tub, a power-driven drum mounted behind said tub, a web having one end secured to said drum and adapted to be reeled thereon, and extending over said roller, and having the remaining portion spanning said tub, transversely thereof, said web having the other end secured to the other side of said tub, and a seat mounted on said web and movable therealong as said web is reeled and unreeled from said drum, whereby said seat moves from a position level with the edge of said tub and adjacent thereto, to a position centrally and adjacent the bottom thereof.

4. A bath seat lifting appliance comprising, a tub, a roller mounted a substantial distance above and on one side of said tub, a power-driven drum mounted behind said tub, means for maintaining said parts in rigid relationship, a web having one end secured to said drum and adapted to be reeled thereon, and extending over said roller, and having the remaining portion spanning said tub, transversely thereof, said web having the other end secured to the other side of said tub, and a seat mounted on said web and movable therealong, as said web is reeled and unreeled from said drum, whereby said seat moves from a position level with the edge of said tub and adjacent thereto, to a position centrally and adjacent the bottom thereof.

5. A bath seat lifting appliance comprising, a tub, a vertical frame extending to a point a substantial distance above said tub and located adjacent on one side thereof, a roller mounted

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in the upper end of said frame, a drum mounted at the lower end of the frame, a wide web secured at one end to said drum and adapted to be reeled thereon and having the other end extend over said roll, and span the tub, means for securing the other end of said web to the other edge of said tub, a seat mounted on said web having rollers riding on said web, whereby said seat may roll from a position adjacent and level with the said other edge of the tub to a level with the bottom of the tub and central thereof, a reversible motor and reduction gear coupled to said drum, a motor, a reversing switch connected thereto, including a circuit interrupting switch, limit means for actuating said switch to stop motor operation and reverse connections thereto, and a manual switch in circuit with said circuit interrupting switch for re-establishing a circuit to said motor.

6. A bath seat lifting appliance comprising, a tub, a vertical frame extending to a point a substantial distance above said tub and located adjacent on one side thereof, a roller mounted in the upper end of said frame, a drum mounted at the lower end of the frame, a wide web secured at one end to said drum and adapted to be reeled thereon and having the other end extend over said roll, and span the tub, means for securing the other end of said web to the other edge of said tub, a seat mounted on said web having a platform member and spaced rollers riding on said web, whereby said seat may roll from a position adjacent and level with the said other edge of the tub to a level with the bottom of the tub and central thereof, said seat comprising a swivel seat member, a reversible motor and reduction gear coupled to said drum, a motor, a reversing switch connected thereto, including a circuit interrupting switch, limit means for actuating said switch to stop motor operation and reverse connections thereto, and a manual switch in circuit with said circuit interrupting switch for re-establishing a circuit to said motor.

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