

Bath aid unit

The present invention relates to a bath aid unit, which for example is intended to enable disabled and elderly persons to bath more easily.

Various forms of bath aid units have been proposed, to make
5 it easier for disabled or elderly persons to take a bath in a conventional kind of domestic bath, without requiring the assistance of another person and without making excessive physical demands on the person taking the bath.

One such bath aid unit comprises a chair-like arrangement
10 which is positioned in the bath, being supported by an inflatable air cushion operated by a low-pressure air pump. Thus, the cushion is inflated so that the chair is disposed substantially level with the top of the side of the bath, where the user can slide on to the chair, and the air cushion can then be
15 slowly deflated to permit the chair to be lowered gently and slowly into the bathwater. The operating procedure is reversed, by inflating the air cushion, to lift the user out of the water and back up to the level of the top of the bath, so that the person can then slide off the chair sideways and thus easily
20 leave the bath. It will be appreciated however that such an arrangement is relatively complicated, in that it requires a source of low-pressure air such as a pump, while also requiring a guide arrangement to guide the chair unit in its upward and downward movements, for clearly an inflatable air cushion would
25 not provide adequate lateral location and guidance for the chair unit, on its own.

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According to the present invention, there is provided a bath aid unit comprising a seat member on which a user can sit, a support frame structure pivotally connected to the seat member and arranged to rest on the bottom of a bath, the support frame structure being displaceable between a first operating position in which the seat member is raised from the bottom of the bath and a second operating position in which the seat member is lowered at least substantially to the bottom of the bath, spring means urging the support frame structure and therewith the seat member towards the first position, and a fluid-operated control assembly for control of the movement of the seat member between its first and second positions, the control assembly comprising a fluid circuit including a throttle and metering means to throttle the flow of fluid in the circuit, thereby to permit the seat member to move from its second position towards its first position only at a restricted rate under the force of the spring loading.

The control assembly may have a hydraulic control circuit including a control valve which can be operated to permit a flow of fluid through the circuit whereby the seat member is moved from its first or raised position towards its second or lowered position at a rate controllable by operation of the control valve, while the fluid circuit with its throttle and metering means may be part of the hydraulic control circuit, the throttle and metering means thus restricting or throttling the flow of hydraulic fluid in the circuit when the seat member is to be displaced from its second or lowered position towards its first or raised position to permit the seat member to move towards its first position only at a reduced and controlled rate, under the force of the spring loading.

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The throttle means preferably includes a check valve means to prevent a flow of fluid in the direction corresponding to downward movement of the seat member, in order thereby to block the seat member against inadvertent downward movement when the user is trying to get out of the bath.

With such an arrangement, in order for the person using the bath aid unit to get out of the bath without the assistance of another person, the user simply closes the control valve and, for example by grasping the sides of the bath, applies a slight downward force which, in conjunction with the force supplied by the spring loading, permits the seat member to move upwardly in the bath, with the rate of movement thereof being controlled by the above-mentioned throttle means. The spring loading will thus provide an upward force for the seat member, which corresponds to the weight of the person using the bath aid unit, but less a force of for example around 6.4 to 9 kilograms. The user therefore only presses downwardly by such a force to permit the unit to lift him or her upwardly in the bath, to a position at which the seat member is level with the top of the bath so that the user can easily slide sideways and thus get out of the bath.

Embodiments of a bath aid unit according to the present invention will now be described by way of example with reference to the accompanying drawing in which:

Figure 1 shows a diagrammatic side view of the bath aid unit in the raised position,

Figure 2 shows a plan view of the unit of Figure 1, partly cut away to show the details of the support frame structure and fluid circuit, and

Figure 3 shows a modified form of the unit.

Referring firstly to Figure 1, the bath aid unit shown therein comprises a support frame structure as indicated generally

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by reference numeral 1. The structure 1 comprises first and second frame units, each frame unit comprising a pair of at least substantially parallel legs 2. The legs 2 of each frame unit are connected together at their upper ends by a transverse bar member or the like, while a similar transverse bar member or the like also interconnects the legs 2 of the respective frame unit, at or adjacent to the lower end thereof. The bar members at the upper ends of the respective frame units are indicated at 3 and 4 respectively in Figure 2.

10 As will be appreciated from viewing Figure 1, one of the frame units is narrower than the other frame unit whereby the narrower frame unit is disposed within the legs 2 of the wider frame unit, with the legs being joined together by suitable means such as a pivot pin diagrammatically indicated
15 at 5, at the location at which the frame units cross each other. It will be seen therefore that the structure 1 comprises a pivotal leg arrangement generally similar to that used for example in a folding stool.

Disposed at the lower ends of the legs 2 of one of the
20 frame units are soft rubber buffer members or caps 6, while rotatably mounted at the lower ends of the legs 2 of the other frame unit are rollers or wheels 7.

It will be noted that the wheels 7 have soft tyres which will therefore not damage the surface of the bath in which the
25 bath aid unit is placed, and similarly in regard to the non-slip end caps 6 on the bottom ends of the legs 2 of the other frame unit. The wheels 7 are mounted on the respective legs 2 in the manner of a rocking bogey so as to permit the wheels to adapt to the angle of the surface of the bath in
30 which the bath aid unit is placed.

The unit illustrated further comprises a seat member 8 which is made of a suitable material such as moulded plastics, wood, metal or formed in some other suitable manner. Provided on the underside of the seat member 8 are guide and mounting means for
5 connecting the structure 1 to the seat member 8. Thus, as shown in Figure 2, the seat member 8 may carry pivot mounting members of which one is indicated at 9, in which the bar member 3 of one of the frame units is rotatably carried, with a corresponding mounting member at the other end of the
10 member 3. The bar member 4 of the other frame unit is carried by the seat member 8 in such a way as to be displaceable in the lengthwise direction thereof, that is to say, from right to left or left to right in Figures 1 and 2, for example in wear-resistant guides, in order to permit the structure 1 to be
15 displaced between the raised position shown in Figure 1, and a collapsed position in which the seat member 8 is moved downwardly towards the end caps 6 and support wheels 7, in a manner to be described hereinafter.

Reference numeral 10 denotes a tension spring which is
20 connected at each end to respective ones of the frame units by suitable mounting lugs diagrammatically indicated at 11. The spring 10 will thus apply a spring loading to the frame units, urging them towards the raised position shown in Figure 1. The force of the spring 10 is such that, when a person
25 sits on the seat member 8, the seat member 8 will move downwardly under the full weight of the user, by a margin of for example about 6.4 to 9 kg, in other words, the force of the spring 10 fails to counterbalance the weight of the user by from 6.4 to 9 kg. The force of the spring loading produced
30 by the spring 10 may be adjustable in any suitable manner, to adapt the bath aid unit to the specific weight of the user.

It will be appreciated also that in the bath aid unit illustrated just one spring 10 is shown, but a further spring will usually be disposed for example in a symmetrical arrangement on the other side of the seat member 8, to cause a balanced force to be applied to the frame units of the support frame structure 1.

The bath aid unit further comprises a fluid-operated control cylinder 12 which is preferably for example a hydraulic piston-cylinder unit. One end of the unit 12, for example the end of the cylinder member, is pivotally connected for example to the bar member 3 of the respective frame unit while the other end of the unit 12, being therefore the outward end of the piston rod thereof, is similarly connected to the bar member 4 of the other frame unit.

The unit 12 forms part of a fluid circuit such as a hydraulic circuit, comprising a first conduit 13 which communicates with the cylinder member on one side of the piston (not visible) which is displaceable therein, a second conduit 14 which similarly communicates with the cylinder member on the other side of the piston thereof, and a control valve 15 which, in the embodiment illustrated, is disposed in a conduit 16 interconnecting the conduits 13 and 14.

It will be appreciated that other forms of the hydraulic circuit may be employed, which do not therefore use the specific conduit portions 13, 14 and 16.

The control valve 15 is a flow control valve with operating lever 17, which is operable to control the flow of operating fluid from one side of the piston to the other side thereof, as the piston moves in the cylinder member of the unit 12.

The circuit further comprises a one-way restrictor or throttle and metering unit as diagrammatically indicated

at 18, which is connected in parallel with the control valve 15 and the unit 12, between the conduits 13 and 14. The unit 18 is of such a construction that it totally prevents any flow of operating fluid therethrough in a given direction, while
5 permitting a restricted or throttled flow of fluid therethrough in the other direction. The unit 18 thus provides a metering action to control the flow of fluid therethrough under given operating conditions.

The mode of use of the above-described construction is as
10 follows:

The unit, in the condition illustrated in Figure 1, is first placed in the bath. Then, the person wishing to take a bath transfers sideways from the adjacent side of the bath on to the seat member 8. The user then operates the lever
15 17 so as to permit a controlled flow of fluid through the circuit 13, 14, 15, 16, whereby the piston of the unit 12 is able to slide within the cylinder member thereof. As the weight of the user is about 6.4 to 9 kg greater than the set spring loading applied by the springs 10 urging the seat member
20 8 upwardly, the seat member 8 will move downwardly under that difference in weight. Such downward movement can be suitably controlled by the user operating the valve 15 to permit the appropriate flow of fluid from one side of the piston of the unit 12, to the other side. The user thus has total control over
25 the rate of downward movement into the bathwater. Furthermore, that downward movement can be stopped at any time, by simply closing the control valve 15.

When the user of the unit wishes to leave the bath, he simply leaves the control valve 15 in the closed position,
30 and applies an upward force corresponding to the difference in weight between his bodyweight and the upward spring loading

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- applied to the seat member 8 by the springs 10, for example by grasping the sides of the bath and applying a slight downward force. It will be appreciated that the buoyancy of the body of the user in the water in the bath will further facilitate
- 5 generating the upward force required. As therefore the user pushes downwardly on the bath, but applying only a very slight physical force, he will rise, with the seat member rising underneath and with him by virtue of the force of the springs 10 supporting the major part of his bodyweight. Such
- 10 movement of the seat member in an upward direction towards the position of the unit shown in Figure 1 is possible by virtue of the unit 18 permitting fluid to flow therethrough, from the appropriate side of the piston of the unit 12 to the other side. The unit 18 thus provides a metering action for the
- 15 flow of fluid, while also providing a stop action in that it totally prevents a flow of fluid therethrough in the opposite direction to the direction in which the fluid flows as the seat member 8 moves upwardly. With the valve 15 also closed, that is a safety measure insofar as the bath aid unit is
- 20 locked in any given position in the course of its movement in an upward direction, if for example the person sitting on the seat member should suffer from fatigue in the course of lifting himself out of the bath, and should wish to rest his full bodyweight on the seat member again.
- 25 It will be seen therefore that the above-described bath aid unit requires only simple components, and in particular has a closed fluid circuit which does not require any form of pump or power fluid source. The fluid used may be in particular water.
- 30 In a modified embodiment however, it would also be possible to provide a secondary fluid-operated cylinder and a hand pump

to supply a flow of power fluid to the secondary piston-cylinder unit in order to provide for powered upward movement of the bath aid unit. Such a construction, which may be considered to be fully automatic in that it does not require physical assistance from the person using the unit to produce the upward movement, may be desirable for use by persons who suffer from very severe disablement.

Particularly when using a fully powered arrangement of the kind just referred to, it may be desirable to adopt a modified form of the support frame structure, as illustrated in highly diagrammatic form in Figure 3. As shown therein, the unit comprises a stationary frame arrangement 100 which is fitted into the bath and which rests on the bottom of the bath itself. Pivotally connected to the frame arrangement 100 are a pair of leg units 101, each of which comprises a pair of leg portions 102 pivotally connected to the frame arrangement and interconnected by links 102', a pair of support portions 103 extending substantially at right angles to the respective leg portions 102, and a transverse member 104 interconnecting the support portions of the respective leg unit. The seat member 105, shown in dotted line, is carried on the transverse members 104 of the two leg units 101. Suitable springs are connected between the frame arrangement 100 and for example the links 102', as diagrammatically indicated at 106 in Figure 3, urging the leg units from the lowered position shown towards the raised position, by pivotal movement of the units 101 in an anti-clockwise direction. Control cylinders as at 107 are suitably connected between the frame arrangement and the links or the respective leg units, the cylinders being connected by suitable circuit means to a source 108 of power fluid, for example a hydraulic fluid. The source 108 is illustrated at the position shown, only for convenience and by way of example, and may be for example a hand pump.

This form of the bath aid unit may further comprise a fluid control circuit of the same general configuration as that described above with reference to Figures 1 and 2.

Thus, in use of this embodiment, the user sits on the
 5 seat member 105 and moves downwardly into the water in the same manner as described above. To produce the upward movement however, the user simply provides for operation of the power fluid source 108 to cause the power cylinders 107 connected thereto to be extended so as to raise the leg units
 10 102 by pivotal movement relative to the frame arrangement, therewith also lifting the seat member 105 and the person sitting thereon.

Referring again to Figures 1 and 2, it may be found that, when the support frame structure 1 is in the fully collapsed
 15 position in which the frame units are almost parallel to each other and the seat member 8 is thus almost on the bottom of the bath, the springs 10 do not really have adequate force to produce the initial upward movement of the seat member 8, in spite of the lifting assistance applied by the
 20 user pressing against the tops of the sides of the bath. In that case, a further spring may be incorporated in the frame structure, comprising for example a torsion-type spring as shown at 19 in broken lines in Figure 1. The spring which comprises first and second legs 20 which are urged
 25 rotationally away from each other by a coil portion 21 will thus tend to urge the legs 2 of the frame unit towards the raised position shown in Figure 1. The spring 19 may be suitably encased in association with the adjacent parts of the
 30 the bath aid unit, due to breakage of the spring 19.

In addition, it will be noted that the legs 2 in Figures 1 and 2 are fairly closely adjacent to the edges of the seat member 8, as can best be seen from Figure 2. It may be desirable however for the legs 2 to be displaced inwardly of the seat member, and thus moved closer towards each other, so that they are not readily accessible from the sides of the seat member 8. That would provide a safeguard against the user of the seat accidentally having fingers trapped between the legs 2 and other components of the unit in the course of the upward movement thereof.

It will be appreciated that other modifications and variations may be made in the above-described embodiments of the bath aid unit in accordance with this invention, without thereby departing from the scope of this invention. For example, different forms of spring may be used, such as one or more compression springs, while the number and arrangement of the springs may of course vary from that illustrated. Similarly, other forms of fluid circuit and control arrangements may be employed. Likewise, the illustrated support frame structure of the crossed-leg configuration has the advantage of simplicity, but other forms of support frame structure may equally be well be employed, for example of a parallelogram-type arrangement, similar for example to that shown in Figure 3.

CLAIMS

1. A bath aid unit comprising a seat member on which a user can sit, a support frame structure pivotally connected to the seat member and arranged to rest on the bottom of a bath, the support frame structure being displaceable between a first operating position in which the seat member is raised from the bottom of the bath and a second operating position in which the seat member is lowered at least substantially to the bottom of the bath, spring means urging the support frame structure and therewith the seat member towards the first position, and a fluid-operated control assembly for control of the movement of the seat member between its first and second positions, the control assembly comprising a fluid circuit including a throttle and metering means to throttle the flow of fluid in the circuit, thereby to permit the seat member to move from its second position towards its first position only at a restricted rate under the force of the spring loading.

2. A unit according to claim 1 wherein said control assembly includes a hydraulic control circuit comprising a control valve operable to permit a flow of hydraulic fluid in the hydraulic control circuit whereby the seat member is movable from its first position towards its second position at a rate controllable by operation of the control valve.

3. A unit according to claim 2 wherein said fluid circuit with said throttle and metering means is part of said hydraulic control circuit.

4. A unit according to claim 1, claim 2 or claim 3 wherein said throttle and metering means includes a check valve means operable to prevent a flow of fluid in the direction corresponding to downward



movement of the seat member.

5. A unit according to any one of the preceding claims wherein said support frame structure comprises first and second leg units which are pivotally connected together in a scissor-like arrangement, pivotal scissor movement of the leg units relative to each other displacing the seat member between said first and second positions.

6. A unit according to claim 5 wherein said spring means includes at least one coil spring operatively connected between said first and second leg units.

7. A unit according to claim 6 wherein said coil spring is a tension spring disposed adjacent the underside of said seat member.

8. A unit according to claim 5, claim 6 or claim 7 and including an auxiliary spring means operable to assist initial movement of said leg units from said second position of said seat member.

9. A unit according to any one of claims 5 to 8 wherein the lower end of one said leg unit carries support wheels capable of rolling over the bottom of a bath while the lower end of the other leg unit provides non-rolling support means.

10. A unit according to any one of claims 5 to 9 wherein the upper end of a said leg unit is pivotally connected to said seat member and the upper end of the other leg unit is slidable relative to said seat member as said seat member is displaced between said first and second positions.

11. A unit according to any one of claims 1 to 4 wherein said support frame structure comprises a fixed structure for resting on the bottom



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of a bath, and a pair of interconnected leg units connected to the fixed structure pivotally between said first and second positions of said support frame structure.

12. A bath aid unit substantially as hereinbefore described with reference to Figures 1 and 2 of the accompanying drawings.

13. A bath aid unit substantially as hereinbefore described with reference to Figure 3 of the accompanying drawings.

