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(12) # EUROPEAN PATENT APPLICATION

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(54) **Conveying apparatus.**

(57) The present invention provides a conveying apparatus comprising a pair of spaced-apart, first and second, rails 7,8 disposable generally horizontally in use of the apparatus and a movable cantilevered load support means 5 having spaced-apart first and second rail engagement means 18, 17 at greater and lesser horizontal separations, respectively, from a main load supporting portion 11 of said load support means 5 and formed and arranged for load bearing and guided engagement with downwardly and upwardly disposed portions 21, 20 of said first and second rails, respectively 18, 17 whilst resisting rotation about a vertical axis and for substantially free guided movement along said rails 18, 17. Preferably the main load supporting portion is in the form of a seat 11.

Desirably the load support means 5 has main load supporting portion guide means 28 formed and arranged for engagement by engagement portions 27 of the main load supporting portion 11 so that the latter is vertically movable relative to the rails 7, 8.

With an apparatus or aid of the invention the load to be conveyed can be supported more or less remotely from the rails and substantially to one side thereof so that the rails can be mounted so as to minimise any intrusion thereby into the space within which conveying is required.

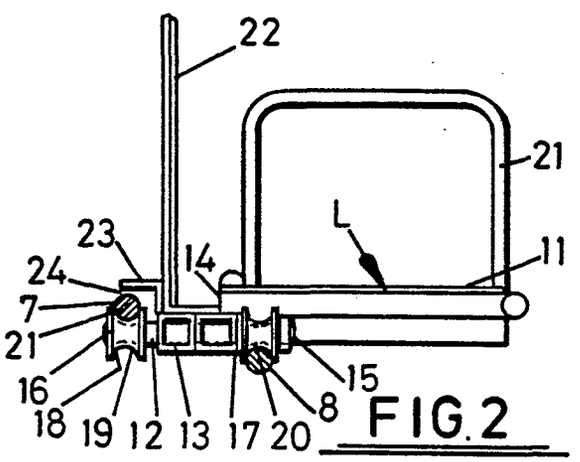

FIG.2

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CONVEYING APPARATUS

The present invention relates to conveying apparatus.

There is a need for conveying apparatus of simple and economic construction in various situations where there are significant constraints on available space and/or the disposition of the load to be conveyed relative to the conveyor support. Thus, for example, many disabled and partly disabled people have difficulty in entering and/or leaving the bath. The available space around a bath is however often very restricted and it is important to avoid intrusion into the bath itself during bathing.

It is an object of the present invention to avoid or minimise one or more of the above problems and disadvantages.

In one aspect the present invention provides a conveying apparatus comprising a pair of spaced-apart, first and second, rails and a movable cantilevered load support means having spaced-apart first and second rail engagement means at greater and lesser horizontal separations, respectively, from a main load supporting portion of said load support means and formed and arranged for load bearing and guided engagement with downwardly and upwardly disposed portions of said first and second rails, respectively whilst resisting rotation about a vertical axis and for substantially free guided movement along said first and second rails.

The present invention provides in a preferred aspect a seated entry/exit aid comprising a pair of spaced-apart, first and second, rails and a movable seat means comprising a seat having a rearwardly extending support means provided with spaced-apart first and second rail engagement means at greater and lesser separations, respectively, from the front of said seat and formed and arranged for load bearing guided engagement with downwardly and upwardly disposed portions of said first and second rails, respectively whilst resisting rotation about a vertical axis and for substantially free guided movement along said first and second rails whereby in use of said aid a person seated on said seat may be readily translated from a first position along said rails to a second position along said rails.

With an apparatus or aid of the invention the load to be conveyed can be supported more or less remotely from the rails and substantially to one side thereof so that the rails can be mounted so as to minimise any intrusion thereby into the space within which conveying is required. Moreover whilst in use the load support is held substantially positively on the rails by its own weight and the weight of any load thereon, the rail engagement means may be readily formed and arranged so as to permit easy disengagement from the rails by simply tilting the load support in the opposite direction to that in which its weight tends to rotate it.

Further preferred features and advantages of the invention will appear from the following detailed description given by way of example of a preferred embodiment illustrated with reference to the accompanying drawings in which:

Fig. 1 is a plan view of a first bath entry/exit aid of the invention;

Fig. 2 is a side elevation of the aid of Fig. 1;

Figs. 3 and 4 are corresponding views of a second embodiment;

Fig. 5 is a schematic front elevation illustrating the mode of operation of the aid of Figs. 3 and 4;

Fig. 6 is a view generally similar to that of Fig. 2 of a further embodiment; and

Fig. 7 is a general perspective view of another embodiment in use at a swimming pool.

Fig. 5 shows schematically a bath 1 into and from which it is desired to facilitate entry and exit, respectively. In accordance with the present invention there is provided an aid comprising a rail means 2 mounted on a wall 3 immediately behind one end 4 of the bath 1 and a seat means 5 movably mounted on said rail means 2.

In the first embodiment shown in Figs. 1 and 2 the rail means 2 comprises a generally rectangular narrow elongate tubular frame member 6 having first and second longer sides constituting respectively first and second rails 7, 8. The first rail 7 is secured by suitable brackets 9 adjacent its ends 10 to the wall 3 behind the bath end 4 so that the frame 6 is inclined downwardly away from the wall 3 in the direction towards the second rail 8 whereby the latter is held at a slightly lower level than the first rail 7.

The seat means 5 comprises a seat 11 having a rearwardly extending support means in the form of two laterally spaced apart axles 12 mounted on tubular members 13 running along the rear 14 of the seat 11. At the forward and rearward ends 15, 16 of each axle 12 are mounted second and first pulley wheels 17, 18 having a generally semi-circular section circumferential groove 19 for receiving therein the upper half 20 and the lower half 21 of the second and first rails 7, 8 respectivley. By this means a load L comprising the weight of the seat means 5 and any body supported thereon is supported in cantilever fashion between the second rail 8 and the first rail 7, the load being borne by the second rail 8 with the first rail resisting rotation of the seat means 5 about said second rail 8.

In order to provide additional security to a user's body two inverted 'U' -shape side rests 21 and a back rest panel 22 are provided on the seat 11 whilst a rear-wardly projecting flange 23 extends in closely spaced relation above the first pulley wheels 17 so as to captively retain the first rail 7 between it and the pulley wheels 17 against rotation about the second rail 8 counter to the direction of the normally applied force on the seat means 5 whilst still permitting the seat means 5 to be disengaged from the rails 7, 8 by tilting upwards at the front to clear the second rail 8 and then disengaging from the first rail by forward and downward movement at the rear so that the first rail 7 is passed through the narrow opening 24 between the flange 23 and pulley wheel 17.

In use of the abovedescribed aid, the seat means 5 is positioned towards one end 25 of the rail means 2 outside the bath 1. The user seats him/herself thereon and then pulls himself and the seat means 5 along the rail means 2 over towards the other end 26 into a position above the bath 1 whereupon the user can then gently lower himself off the seat means 5 into the bath 1. The seat means 5 may now be pushed back into its original position and/or disengaged from the rail means 2 in order to avoid interference with the normal use of the bath. As may be seen from the drawings the rail means projects only a limited amount from the wall 3 so that the aid is relatively unobtrusive when not in use, conveniently in fact the abovedescribed rail means can be used as a towel rail when not being used for entry and exit assistance.

The second embodiment of Figs. 3 to 5 is generally similar to the first, like parts being identified by like reference numerals. In this case though the seat back 22 has tubular uprights 27 at either side which are disposed within respective guide channels 28 for generally vertical sliding guided movement up and down said channels 28 which are secured, with suitable stays 29 for greater rigidity, to a chassis comprised by the horizontal tubular members 13 on which the axles 12 are mounted so that the seat 11 can move vertically up and down as well as along the length of the rail means 2. The seat 11 is held in any desired position and moved up and down the guide channels with the aid of any suitable drive means such as for example a hydraulic drive system with a double acting piston-and-cylinder. Desirably any drive system that is used for a bathroom application should be non-electrical though this would not apply in other applications such as for example in aiding entry to and exit from a seating position at a breakfast bar or the like.

As shown in Fig. 5 the seat is movable from a partly lowered starting position in which the user sits down onto it, to a raised position high enough to clear the bath rim, across to a position above the bath, and then down into a fully lowered position inside the bath which allows the user to move off the seat onto the floor of the bath very easily.

Fig. 6 shows a further embodiment in which is shown a suitable hydraulic operating system 30. In the drawing like parts corresponding to those of the abovedescribed embodiments are indicated by like reference numbers.

The system 30 includes a hydraulic pump 31 having a pump handle 32 extending forwardly alongside one side of the seat 11 so that it can be readily swung up and down by a user seated on the seat 11 for pressurising the system 30. As pressure is built up pressurized fluid is forced into the cylinder 33 of a piston and cylinder unit 34 to drive upwardly the piston means 35 thereof. At the distal end 36 of the piston rod 37 is mounted an enclosed 38 pulley wheel arrangement 39 over which is led a cable 40. One end 41 of the cable 40 is fixed to the cylinder 33 whilst the other 42 is connected to the back 22 of the seat so that as the piston 35 is driven upwardly through a predetermined distance the seat 11 is raised through approximately double that distance. If required a suitable multiple pulley arrangement may be used to provide an even smaller velocity ratio - (corresponding to a greater relative displacement of the seat) where it is desired to raise a user through a relatively large distance for example in use of an apparatus of the invention for assisting entry and exit of a disabled person to and from a swimming pool. Lowering of the seat 11 is effected by relieving pressure from the cylinder 33 via a suitable valve provided with an operating lever 43 extending generally alongside the pumphandle 32. In the case of a hydraulic system the fluid would be returned via said valve to the hydraulic fluid reservoir 44 which is conveniently housed adjacent the pump 31.

As an alternative there could be used a motor driven pump or instead of a pump a compressed gas cylinder for pressurizing the cylinder 33.

Naturally various additional support means may be provided on the seat including for example a lap belt or a leg support sling 45 suspended from an optionally detachable overhead gantry arm 46 mounted on the back 22 of the seat 11.

Fig. 7 shows yet another embodiment which is particularly adapted for swimming pool use. Again like parts corresponding to those of previous embodiments have been identified by like reference numerals.

The aid of Fig. 7 is generally similar to the previously described aids except that the seat means construction 5 is formed and arranged to provide a substantially greater vertical travel due to the greater operating height differential, and the rails 7, 8 are mounted on an extended 'foot-print' base 50 to serve the greater horizontal travel range and support required.

As shown in Fig. 7, the base 50 is disposed across one corner 51 of a swimming pool 52 so that one end 53 is disposed generally above the water 54 whilst the other end 55 is disposed generally above an adjacent section of the pool side 56. In more detail, the base 50 is in the form of a generally box shaped frame 57 provided at either end with outrigger means 58 which engage the pool side 56 forwardly and rearwardly as well as outwardly of the main box frame 57 thereby protecting the aid from toppling into the pool under the weight of the seat means 5 and the user 59.

As may be seen the pumphandle 32 and other controls (not shown for purposes of clarity) are disposed at the rear of the aid so that they can be readily operated by a bath attendant or other assistant (not shown) who would normally be present in a swimming pool situation. It will also be noted that there is a considerable overall height differential between the users position in the water and the mounting position on the pool side and this necessitates the use of relatively long guides 28 and vertical seat supports 27 which are slidable within the guides 28. Nevertheless the ready demountability of the seat unit 5 from the base 50 which itself can be of relatively light weight allows the aid to be readily moved to and from the pool side as and when it is required so that the very considerable advantages of ease and convenience of use and security for the user, can be made full use of.

In order still further to protect the user, the seat means 5 may conveniently be provided with a brake means 60 (shown in broken outline is Fig. 6) which selectively engages one of the rails 7 in the two entry and exit positions of the seat means 5 along the rails 7, 8 to hold the seat 11 steady while the user is mounting and dismounting.

Claims

1. A conveying apparatus comprising a pair of spaced-apart, first and second, rails (7, 8) disposable generally horizontally in use of the apparatus and a movable cantilevered load support means (5) having spaced-apart first and second rail engagement means (18, 17) at greater and lesser horizontal separations, respectively, from a main load supporting portion (11) of said load support means (5) and formed and arranged for load bearing and guided engagement with downwardly and upwardly disposed portions (21, 20) of said first and second rails, respectively (7, 8) whilst resisting rotation about a vertical axis and for substantially free guided movement along said first and second rails (7, 8).

2. A seated entry/exit aid apparatus comprising a pair of spaced-apart, first and second, rails (7,8) and a load support means in the form of a movable seat means (5) comprising a main load supporting portion in the form of a seat (11) having a rearwardly extending support means (12,13) provided with spaced-apart first and second rail engagement means (18, 17) at greater and lesser separations, respectively, from the front of said seat (11) and formed and arranged for load bearing guided engagement with downwardly and upwardly disposed portions (21, 20) of said first and second rails (7, 8) respectively whilst resisting rotation about a vertical axis and for substantially free guided movement along said first and second rails (7,8) whereby in use of said aid a person seated on said seat may be readily transported from a first position along said rails to a second position along said rails.

3. An apparatus according to claim 1 or claim 2 wherein the load support means (5) has main load supporting portion guide means (28) formed and arranged for engagement by engagement portions (27) of the main load supporting portion (11) so that the main load supporting portion (11) is vertically movable between raised and lowered positions relative to the rails (7, 8).

4. An apparatus according to claim 3 wherein is provided a drive means (30, 40) formed and arranged for raising the main load supporting portion (11) from its lowered position to its raised position.

5. An apparatus according to claim 4 wherein is provided a drive control means (32, 43) for controlling the rate of raising and lowering of the main load supporting portion (11).

6. An apparatus according to claim 4 or claim 5 wherein is used a pressurized fluid operated drive means (30).

7. An apparatus according to any one of claims 1 to 6 wherein said first and second rails (7, 8) are provided on a base support means (50) having a substantial lateral extent beyond either side of the main load supporting portion (11).

8. A method of entering or exiting a body of water comprising the steps of: providing an apparatus (2, 5) according to claim 2 adjacent said body of water (1) with the rails (7, 8) thereof extending above said body of water so that the movable seat means (5) is movable between a first position to one side of said body of water (1) and a second position directly above said body of water; position-

ing said seat means (5) in one of said first and second positions; sitting on said seat means (5); moving said seat means to the other of said first and second positions; and dismounting from said seat means (5).

9. A method according to claim 8 wherein is used an apparatus according to claim 3 which method includes the steps of raising and/or lowering said seat means (5) between the steps of sitting on and dismounting from the seat means (5).

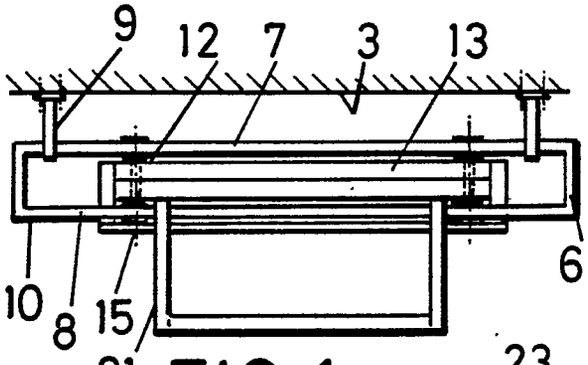

FIG.1

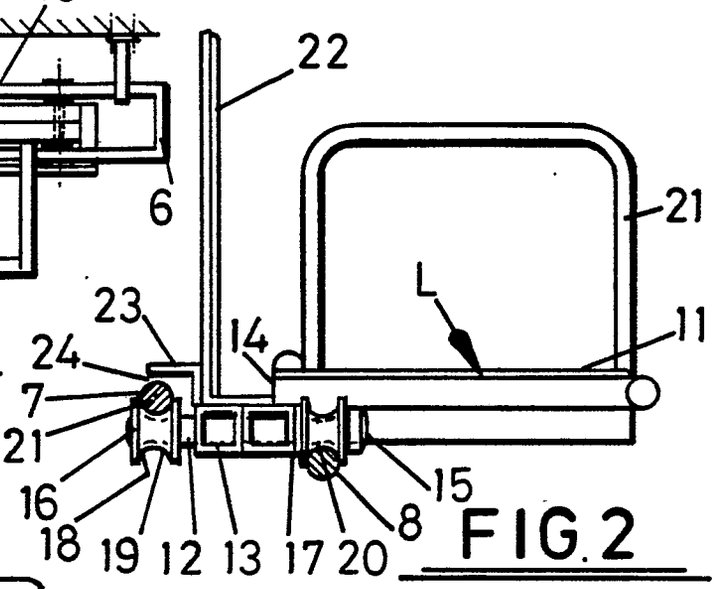

FIG.2

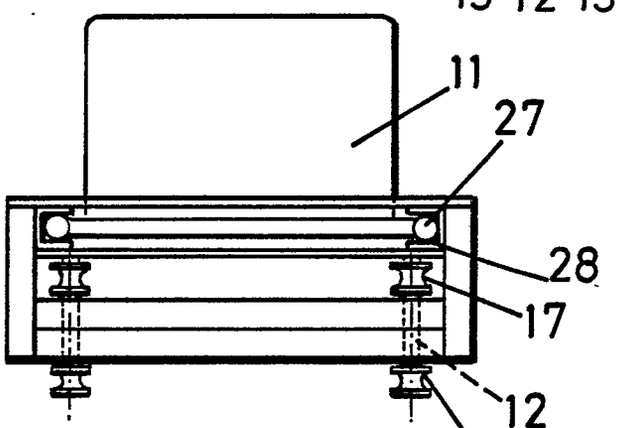

FIG.3

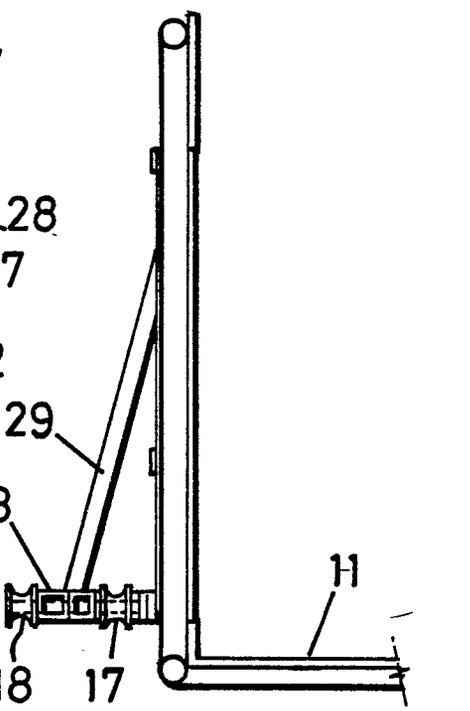

FIG.4

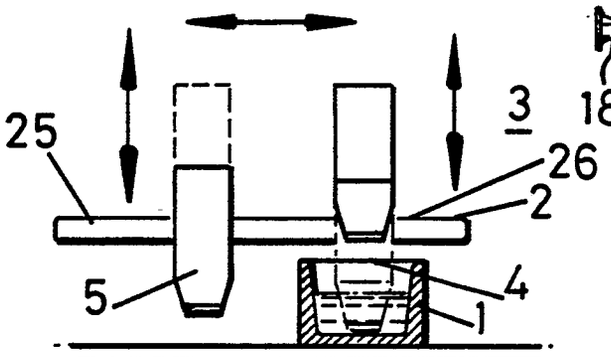

FIG.5

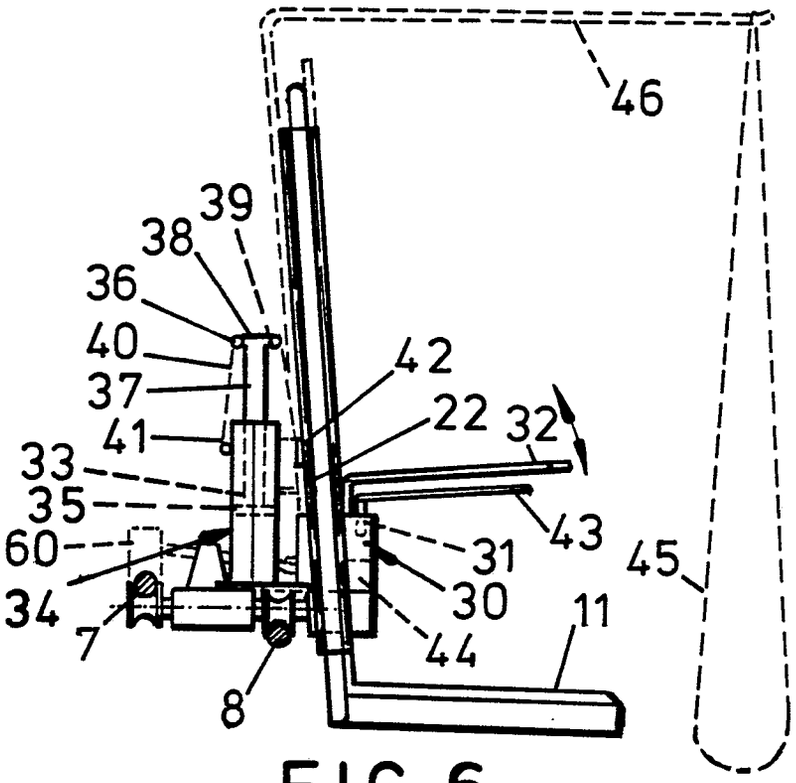
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FIG.6

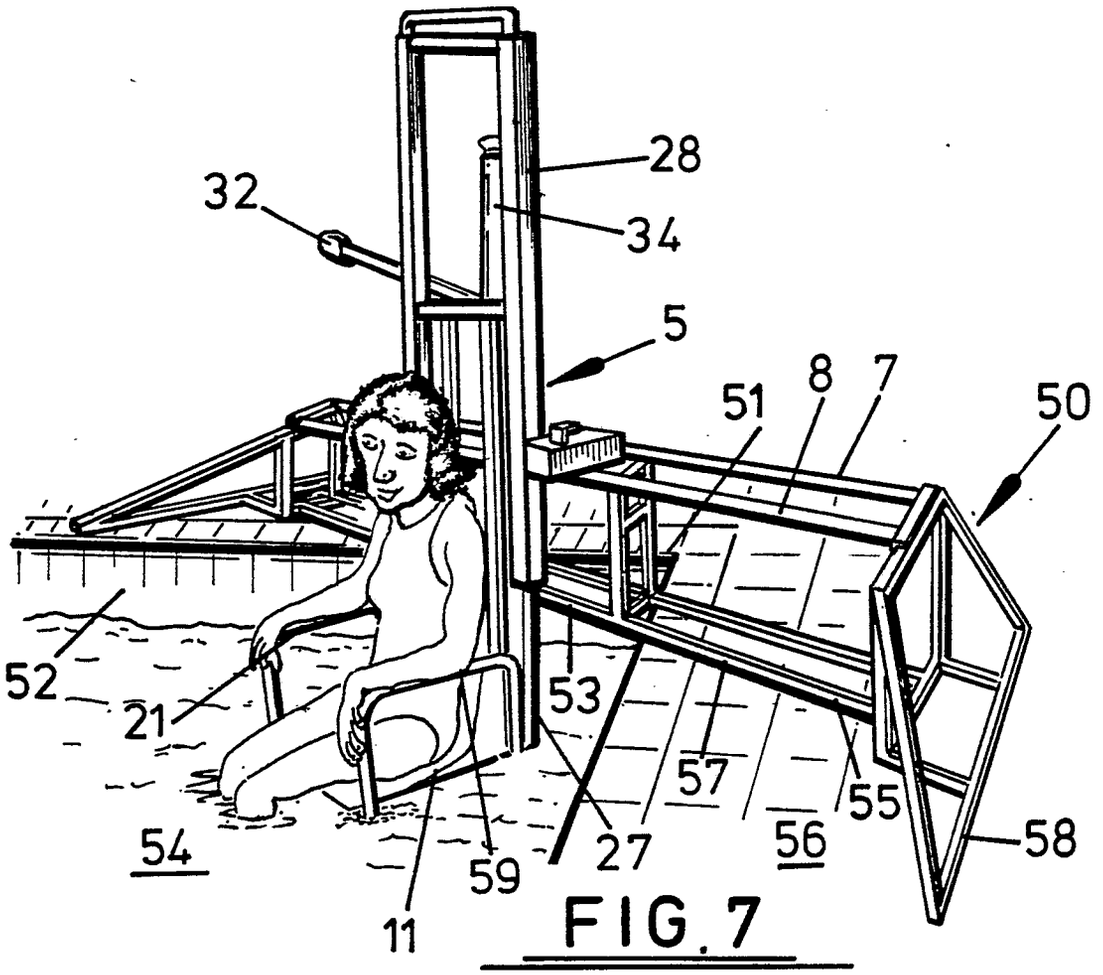
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FIG.7