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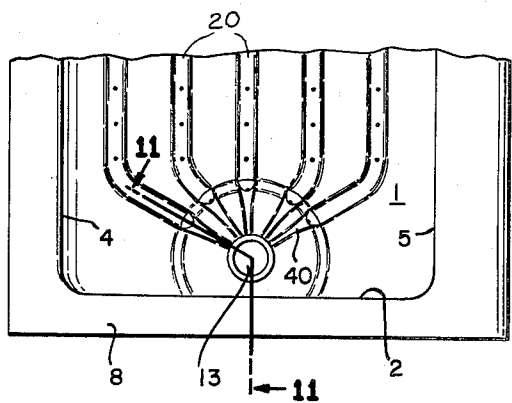
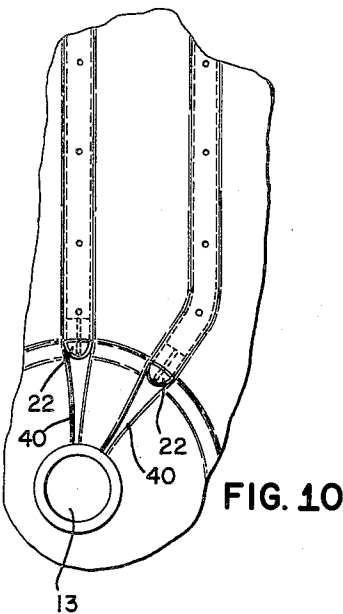
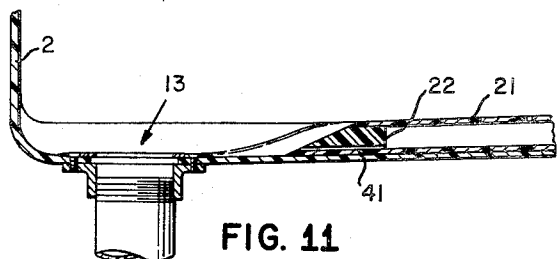
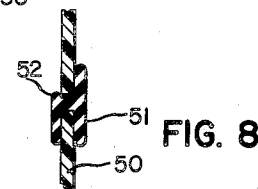
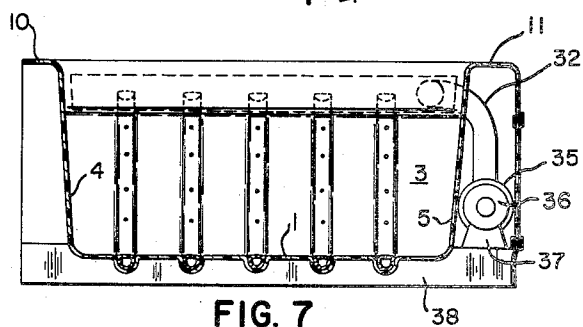
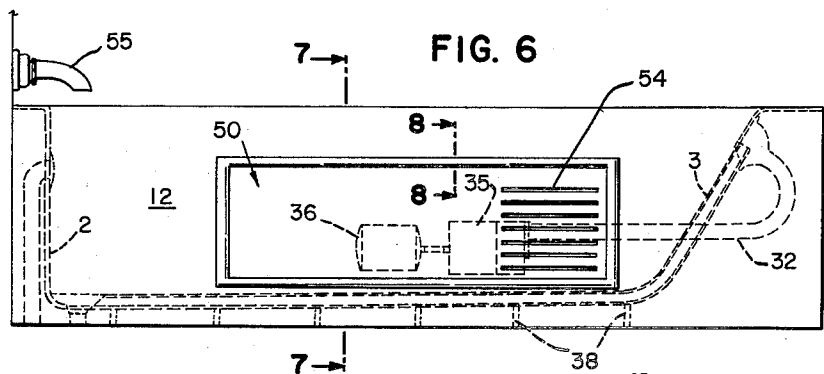
G. WOOD

3,251,071

THERAPEUTIC BATHTUB

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2 Sheets-Sheet 2



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1

3,251,071

THERAPEUTIC BATHTUB

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16 Claims. (Cl. 4-180)

This invention relates to bathing apparatus and more particularly to a therapeutic bathtub wherein means is provided for agitating the water in the bathtub for producing a massaging action. More particularly the invention is directed to that type of bathtub wherein numerous jets of air are provided for the purpose of agitating the water in the tub.

Numerous attempts in the past have been made to provide therapeutic bathtubs wherein the means for providing jets of air takes the form of a portable conduit which is inserted in the tub and connected to a source of air under pressure. Examples of such devices are Gregory Patents Nos. 3,043,296 and 3,065,746; Baumann Patent No. 3,031,685 and Sparks Patent No. 3,075,520.

It has also been suggested that the air injecting means take the form of a removable mat which may be placed on the bottom of the tub and which is provided with a plurality of upwardly directed apertures through which the air is injected into the interior of the tub. In such a case the mat is formed with a plurality of conduits which are connected to a source of air under pressure. An example of this type of structure is shown in Bogar Patent No. 3,076,976.

An obvious disadvantage of the above noted prior art devices is that they are cumbersome and are required to be removed from and inserted into the tub in the normal course of usage. In addition, it is necessary to provide some portable type of air blower adding to the nuisance involved in using such equipment.

It has also been proposed that a bathtub of generally conventional form be employed having a perforated upper bottom for supporting the weight of the bather and an imperforate lower bottom defining a chamber for air between said upper and lower bottoms and to which chamber air may be supplied under pressure from a blower. An example of this type of apparatus is disclosed in Velonis Patent No. 2,856,611. The Velonis type structure is extremely desirable in that it does not require any portable material and the tub may be designed to provide an extremely satisfactory appearance from an aesthetic point of view. However, the Velonis type structure is undesirable from a sanitary point of view since the air chamber formed by the upper and lower bottoms of this type of structure constitutes an inaccessible space into which fouled water may flow and which space is impossible to clean. This objection may be satisfied and the tub will pass most plumbing codes if a removable plate constituting a portion of the upper bottom is provided. However, such a removable plate impairs the appearance of the tub, and the removal and attachment of the plate constitutes a nuisance to the user. Furthermore, such removable plate adds to the expense of the tub since more accurate manufacturing procedures must be followed.

By the present invention all the advantages of prior art therapeutic bathtubs are retained with none of the disadvantages. In addition, an extremely satisfactory design is permitted from an appearance standpoint, and, although certain removable elements are provided, such elements are, in effect, a permanent portion of the tub so that only infrequent removal of such elements is required.

One of the most important advantages of the present invention is that the construction of the tub lends itself to relatively inexpensive methods of fabrication so that the total cost of the tub is not much greater than that of a conventional bathtub.

2

The main object of the present invention is therefore the provision of a therapeutic bathtub providing for agitation of the water by means of jets of air and which tub gives all of the advantages of prior art tubs and none of the disadvantages.

Other objects and advantages of the invention will be apparent from the following specification and drawings wherein:

FIG. 1 is a longitudinal section of a bathtub incorporating the present invention.

FIG. 2 is a perspective of the bathtub of FIG. 1 with portions broken away and in section to show internal structure.

FIG. 3 is an enlarged sectional view through the air header showing the air supply hose and also showing the manner in which the air conduits are connected to the header.

FIG. 4 is a greatly enlarged sectional view through the bottom wall of the tub showing one of the grooves and the preferred form of air conduit received therein.

FIG. 5 is a view similar to view 4 showing a plain air conduit of circular cross section.

FIG. 6 is a side elevation of the bathtub.

FIG. 7 is a transverse cross sectional view of the tub taken in a plane indicated by lines 7-7 of FIG. 6.

FIG. 8 is a greatly enlarged fragmentary cross section through the outer front side of the tub showing the means for connecting the removable plate, and as taken in a plane indicated by lines 8-8 in FIG. 6.

FIG. 9 is a fragmentary top plan view of the tub at the front end thereof showing the manner in which the conduit receiving grooves are disposed relative to drain.

FIG. 10 is a greatly enlarged fragmentary plan view showing a pair of adjacent conduits and the associate drain of the tub.

FIG. 11 is an enlarged cross section of the tub adjacent the drain showing the manner in which the tub is faired into the drain area.

The general form of the tub body may be very similar to that of a conventional bathtub including a bottom wall 1, a front end wall 2 facing the bather, a rear end wall 3 and opposed sidewalls 4, 5 (FIG. 9). The endwalls 2, 3 may be provided with integral horizontally projecting extensions 8, 9 respectively which may be suitably connected in any desired manner (not shown) to the adjacent wall structure of the bathroom. Similarly, the sidewall 4 is provided with a horizontally extending ledge 10 for the same purpose.

The sidewall 5 of the bathtub that is closest to the bathroom area has connected thereto an integral horizontally extending front surface 11 to which is connected a downwardly extending vertical front wall 12 (FIG. 2). It will be noted that the sidewall 5, the horizontally extending flat portion 11, and the front side 12 cooperate to form a generally downwardly opening U-shaped space for a purpose to be described. At this point it will be noted that the general construction of the main portions of the bathtub is very close to conventional and the usual plumbing fittings are also provided including supply faucet 55. As best seen in FIGS. 1 and 11 a drain generally designated 13 is formed at the front end of the bottom wall adjacent the front end wall 2 for draining the waste water from the tub. Connected to the main drain is a vertically extending drain pipe 14 which terminates at its upper end in an overflow opening 15 (FIG. 1). These plumbing connections are conventional and no claim is made to the same except in combination with the invention to be described.

By the present invention the bottom wall 1 is provided with a plurality of longitudinally extending grooves 20 which extend from points adjacent the drain 13 rearwardly to the rear endwall 3 and continue up the endwall 3

to a point above the maximum level of the water indicated by line 19 (FIG. 1). Said maximum level is of course defined by the position of the overflow opening 15. As best seen in FIG. 4 grooves 20 are generally U-shaped in cross section having an upper open side through which the air conduits 21 may be inserted. At this point it may be noted that the tub is preferably formed from a fiber reinforced plastic such as fiberglass which, as is well known, may be formed to very intricate designs with a minimum of molding complications.

As best seen in FIG. 11 the forward ends of the tubes 21 are provided with plugs 22 which may be adherently secured within the ends of the tubes as best seen in FIG. 11. Between the plugs 22 and the ends of the tubes at the rear endwall 3 said tubes are provided with a plurality of relatively closely spaced orifices 23 through which air may escape from the tubes in the form of jets.

The rear endwall 3 is formed with a transverse horizontally extending joggle 27 (FIGS. 2, 3) at which the material of the endwall is offset an amount about equal to the thickness of the material, which may be in the order of $\frac{1}{8}$ to $\frac{3}{16}$ inch. At said joggle junctures between the main portion of the endwall 3 and the grooves 20 are formed which includes apertures 28 complementary to the cross section of the tubes 21. By this structure the tubes 21 may be press fitted with a slight amount of effort through said apertures 28 so as to form a relatively good water-tight and air-tight connection between the endwall 3 and the tubes 21.

Communicating with the upper ends of the tubes 21 is a horizontally extending air chamber or header 30 which may be molded during the bathtub forming operation to provide an integral connection with the outer side of the endwall 3 and the adjacent ends of the grooves 20. Said header 30 is provided with a tubular inlet portion 31 to which may be connected a flexible air supply hose 32 for supplying air to the chamber 30 from which it flows to the tubes 21. The manner in which the air is forced into the air supply tubes and header is not critical and may take the form of a blower 35 driven by an electric motor 36 (FIG. 6). Said motor and blower may be suitably mounted by means of brackets 37 (FIG. 7) which in turn may be connected to transverse stiffeners 38 integrally secured to the bottom of the tub for supporting the weight thereof.

The lower ends of the tubes 21 may terminate along a line extending transversely of the tub but, as best seen in FIG. 9, it is preferable that they extend radially toward the drain 15 in order to achieve the maximum amount of aeration and also to insure as complete drainage as possible from the tubes in the event water enters the tubes.

It will be understood that the particular number of grooves and tubes is not critical, but it has been found that five tubes having an aperture spacing of about two inches provides sufficient agitation of the water. In the event five tubes are used as indicated in FIG. 9, the central tube and its associated groove extends straight toward the drain 13 and the tubes on opposite sides of said central tube are curved as are their associated grooves so that said grooves and tubes terminate at a generally shallow frustoconical portion of the bottom 1 concentric with the drain 13. At said frustoconical portion the upper level of the bottom 1 drops sharply to the level at the drain 13. Between the ends of the tubes and the drain 13 the associated grooves are preferably reduced in lateral extent as indicated in FIGS. 9, 10 so as to provide narrow drainage troughs 40 communicating between the grooves and the drain 13. It will be noted in this connection that due to the reduction in width of the grooves, a well defined stop is provided at the juncture between the troughs 40 and the associated grooves 20 so that the tubes are positioned against the stops formed by said junctures, thereby providing means for insuring that the

upper ends of the tubes extend slightly into the air chamber 30.

In order to insure that any water accumulating in tubes 21 is drained away, a relatively small downwardly opening groove 41 is formed on the lower side of each plug 22 as best seen in FIG. 11. By this structure it will be apparent that even though tubes 21 may become filled with water, such water will ultimately drain away through drain hole 41 without permitting an inordinate amount of air to escape through said drain hole 41 during normal operation of the tub.

The tubes 21 are preferably formed of a fairly flexible plastic such as polyethylene. Referring to FIG. 4 it will be noted that the groove 20 may provide a substantially cylindrical inner surface along its lower portion and preferably terminates in upper portions of a slightly reduced spacing so as to provide a slight press fit for the tube 21. By this structure the tubes may be readily inserted in their corresponding grooves by first placing the tubes so that the plug ends are received at the junctures between the restricted trough portions 40 and the main grooves and then pressing the tubes downwardly progressively toward the endwall 3. Before the endwall portions of the tubes are inserted, the terminating ends of the tubes may be inserted through the openings 28 so as to communicate with the air chamber 30. The tubes are then pressed inwardly into the grooves on endwall 3 to provide a semi-permanent assembly. When it is desired to remove the tubes they may be merely lifted upwardly beginning from either end as indicated by the dotted line position in FIG. 2. Such removal of the tubes may become necessary for thorough cleaning of the tub and the tubes although in most instances it is necessary to remove the tubes after each use of the bathtub. It will also be apparent that the above described structure permits ready replacement of old tubes with new tubes should this become necessary.

Although the form of the tube shown in FIG. 4 is preferred in that it provides an upper flat surface 44 that is substantially coplanar with the inner surface of the bottom wall 1, it will be apparent that other forms of the tubes are contemplated by the present invention. For example, in FIG. 5 there is shown a simple circular tube 45 press fitted within a generally U-shaped groove 46 having a restricted open side 47.

In order to provide for servicing of the electric motor 36 and the blower 35 a relatively large rectangular removable plate is provided on the outer front side 12 of the bathtub. Said plate, generally indicated at 50, may be fitted with a peripherally extending strip 51 received over the edges of the plate 50 and having a rounded protuberance 52 arranged so that the rectangle defined by the protuberances 52 is very slightly greater than the size of the rectangular opening in the front outer wall 12. By this structure the removable plate 50 may simply be press fitted into place and removed by pulling outwardly on the marginal strip 51 against its own resiliency.

In order to provide air to the blower 35 a plurality of louvers 54 (FIG. 6) may be provided in the removable plate 50.

The invention also contemplates the provision of a heater in the air supply line but such an addition is not essential. It will also be apparent that provision of means for heating the ambient air which passes through the louvers 54 may also be resorted to if it is desired to heat the air supply to the bathtub.

It will be apparent that the above described structure presents a neat appearance and the tub may be used without the handling of fixtures or without involving any complications except the closing of a switch (not shown) which may be located in a convenient place to govern the operation of motor 36. By starting the blower 35 before the tub is filled from the supply faucet 55 it will be apparent that water will not be permitted to enter the tubes and if said air is continued to be supplied until after the tub has been completely drained, no water ever enters the

5

tubes 21. However, it will be apparent that even if water does enter said tubes it is readily drained therefrom through the drain holes 41 (FIG. 11).

The above described tub structure does not in any way violate any of the plumbing codes presently in existence because there are no inaccessible spaces required to be cleaned. If the tub becomes soiled at the junctures between the tubes 21 and their associated grooves, it is a simple matter, as described above, to remove the tubes to permit the cleaning of both the tubes and the tub and to reinsert the tubes.

Referring again to FIG. 4 it will be noted that the tubes 21 are preferably provided with an upper surface that is slightly crowned relative to the remainder of the bottom 1. By this structure there is no discomfort experienced by the bather since the tubes provide a smooth supporting surface for the bather's body. Also it will be noted that by forming the tubes 21 of a material having a fairly high coefficient of friction said tubes effect an antiskid surface preventing accidents caused by slipping.

Although the above description of the preferred embodiment of the invention assumes that the tub is molded of fiberglass it will be apparent that other materials may be employed. For example, the tub may be cast of metal with grooves formed therein and, in keeping with the normal procedure for conventional bathtubs, the inner surfaces may be covered with a layer of porcelain or any other suitable surface covering. In such a case, since the sides of the grooves are formed with a draft angle, it may be necessary to fit rivets or other projections on the sides of the grooves before the step of applying the porcelain is carried out. In this manner a slight interference fit may be effected. On the other hand, such interference fit may readily be obtained simply by building up the thickness of the porcelain, or whatever covering is employed, at the open ends of the grooves. Since the tubes engage the grooves along their entire length the interference fit need only be very slight and is readily obtainable through thickening of the tub covering.

The above specific description of preferred forms of the invention should not be taken as restrictive of the invention since various modifications in design will occur to those skilled in the art without departing from the following claims.

I claim:

1. In a bathing device adapted to contain a body of water and provided with a wall having an inner surface that is in engagement with such water,

a conduit adapted to conduct air therethrough, means on said wall forming a receptacle having an open side for receiving said conduit therethrough, said receptacle supporting said conduit in a position substantially outwardly of said inner surface, whereby a portion of said conduit is in engagement with such water,

said conduit being formed with apertures at said portion for conducting air from said conduit into said body, and

means for pumping air under pressure through said conduit.

2. A structure according to claim 1 wherein said portion at said apertures is substantially coplanar with the adjacent inner surface of said wall.

3. A structure according to claim 1 wherein said wall is formed with an elongated undulation forming said receptacle.

4. In a bathtub having a bottom wall provided with an inner surface adapted to support a bather thereon and having an endwall extending upwardly from said bottom wall,

means on said bottom wall forming a groove, a conduit for air removably received in said groove and extending outwardly through said end wall, means outwardly of said tub for conducting air into said conduit, and

said conduit being provided with a plurality of aper-

6

tures for conducting air from said conduit into the interior of said tub.

5. A structure according to claim 4 wherein the portion of said conduit containing said apertures is substantially coplanar with the adjacent inner surface of said bottom wall.

6. A structure according to claim 4 wherein said endwall is provided with a second groove in continuation of said first mentioned groove, said conduit extending along both of said grooves.

7. A structure according to claim 6 wherein said second groove extends to a point spaced a substantial distance upwardly from said bottom wall, and said conduit extends outwardly through said endwall at said point.

8. In an elongated bathtub having a bottom wall provided with an inner surface adapted to support a bather thereon, front and rear endwalls extending upwardly from said bottom wall, a drain opening in said bottom wall and an overflow opening in said front end wall spaced upwardly from said bottom wall, the improvement that comprises:

said bottom wall and said rear endwall being provided with generally longitudinally extending grooves opening inwardly of said bathtub and extending from a point adjacent said drain opening rearwardly along said bottom wall and continuing up said rear endwall to a point above the level of said overflow opening, conduits for air received in said grooves and extending along the length thereof,

said rear end wall being provided with openings through which the upper ends of said conduits extend, means outwardly of said rear endwall and in communication with said upper ends for conducting air into said conduits,

said conduits being provided with apertures for directing air into the interior of said tub.

9. A structure according to claim 8 wherein said means includes a header outwardly of said rear end wall communicating with said upper ends of said conduits.

10. A structure according to claim 8 wherein said grooves are formed relative to said conduits to provide an interference fit whereby said conduits may be press fitted within said grooves.

11. A structure according to claim 10 wherein said conduits are made of resilient material whereby said conduits are held in said grooves by their own resiliency.

12. A bathtub comprising:

a body formed of glass reinforced plastic and including a bottom wall, front and rear endwalls and a pair of opposed sidewalls,

said bottom wall being provided with a drain opening adjacent said front endwall,

said bottom wall and said rear endwall being formed to provide a plurality of elongated grooves extending generally longitudinally of said bottom wall and upwardly along said rear endwall,

elongated conduits of resilient material received within said grooves,

said conduits being provided with apertures for directing air from said conduits into the interior of said tub,

means outwardly of said body for supplying air to said conduits,

said last mentioned means including a header on the outer side of said rear endwall and openings in said rear endwalls for connecting said conduits with said header,

said grooves being formed to provide a light press fit with said conduits whereby said conduits are retained within said grooves by the inherent resiliency of said conduits.

13. A structure according to claim 12 wherein said grooves are formed by undulations of the plastic forming said body and said undulations being generally U-shaped in cross-section.

7

14. A structure according to claim 13 wherein the cross section of said conduits is generally complementary to the cross section of said grooves and the outer faces of said conduits are substantially coplanar with the adjacent surfaces of said bottom wall and said rear endwall.

15. A structure according to claim 12 wherein said grooves on said bottom wall extend to points closely adjacent said drain opening and the lower ends of said conduits are provided with drain openings for draining water from said tubes.

16. A structure according to claim 15 wherein said grooves are directed generally radially of said drain at their lower ends.

8

References Cited by the Examiner

UNITED STATES PATENTS

1,715,043	5/1929	Oye	128—66
2,856,611	10/1958	Velonis	4—180
2,956,565	10/1960	Anderson	128—369

FOREIGN PATENTS

1,298,722	6/1962	France.	
10	LAVERNE D. GEIGER, <i>Primary Examiner</i> .		
	H. GROSS, <i>Assistant Examiner</i> .		