Dec. 8, 1942. H. B. WATSON 2,304,616

HYDROTHERAPY APPARATUS

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FIG. 4.

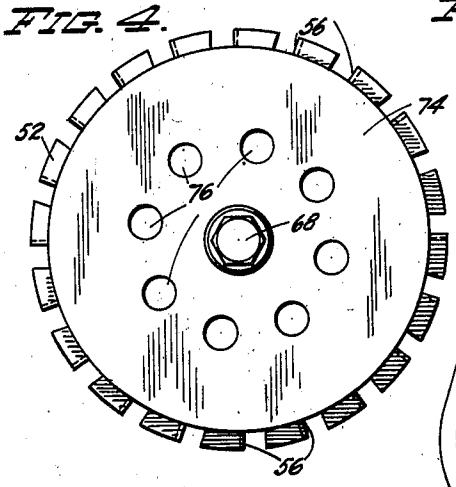


FIG. 1.

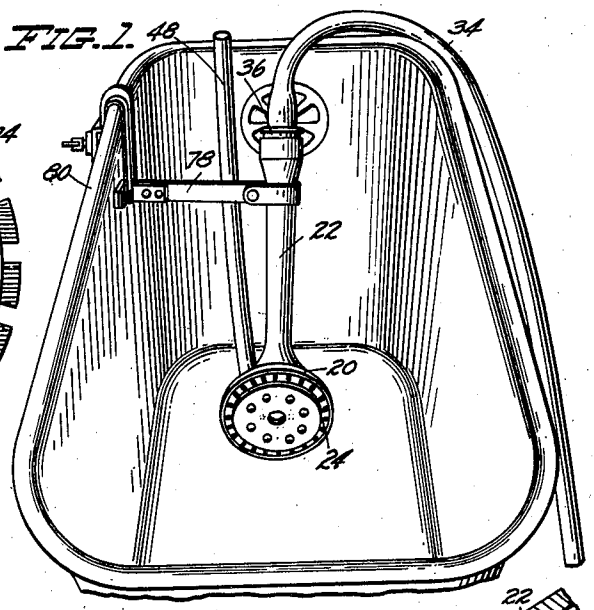


FIG. 5.

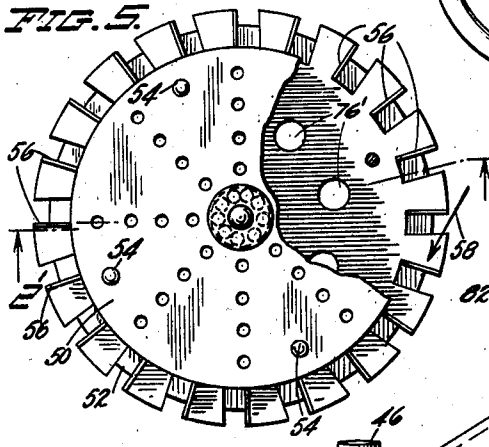


FIG. 2.

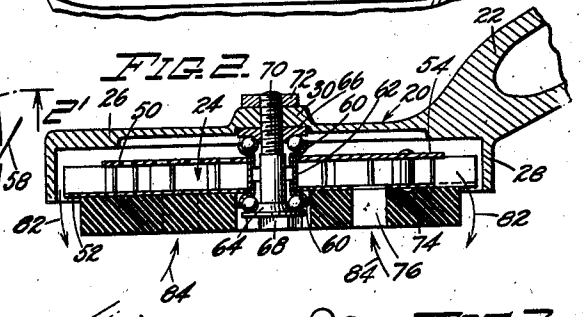


FIG. 6.

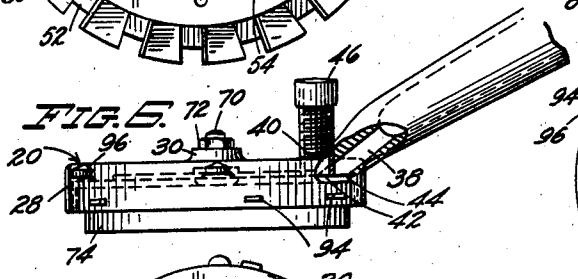


FIG. 7.

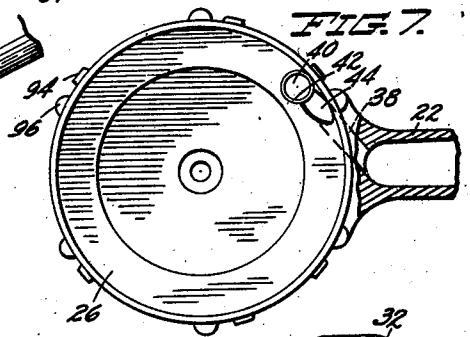
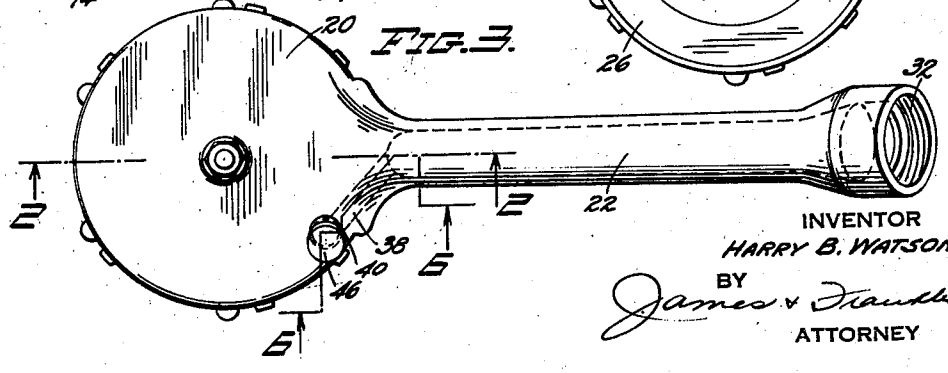


FIG. 3.



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FIG. 8.

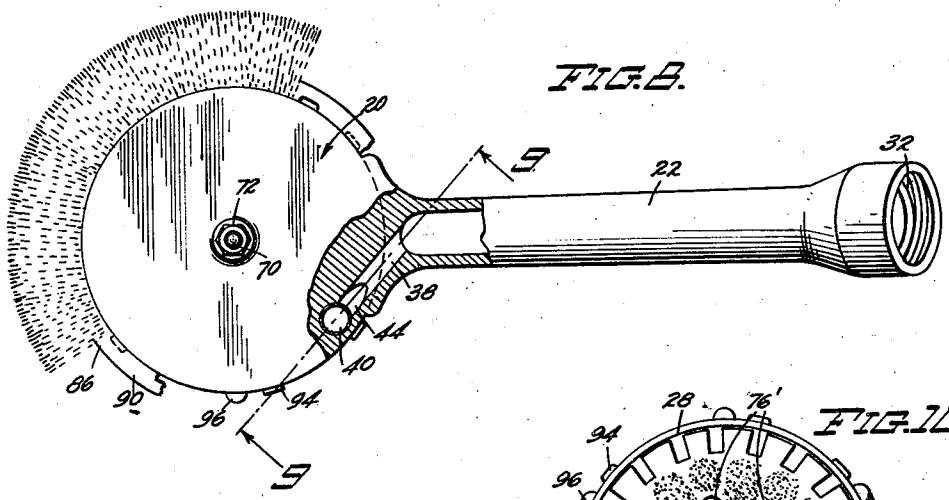


FIG. 10.

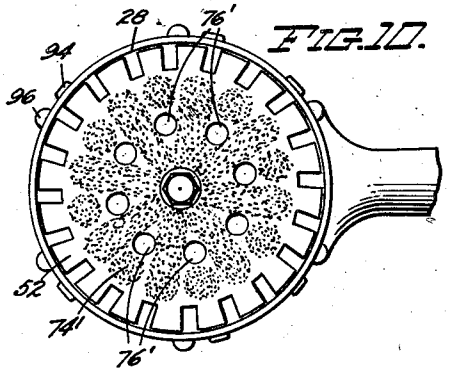


FIG. 9.

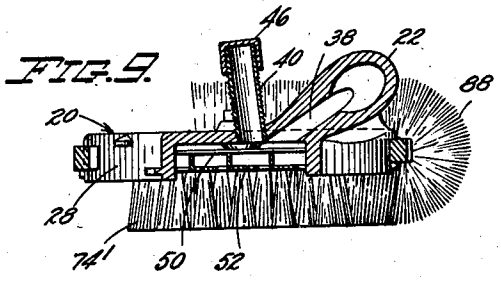


FIG. 13.

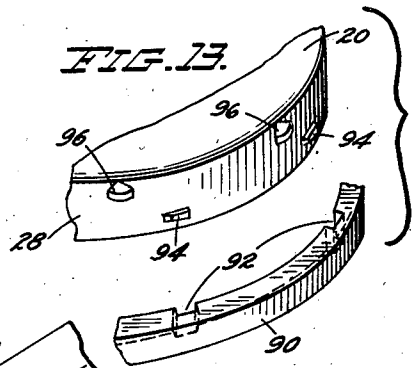


FIG. 11.

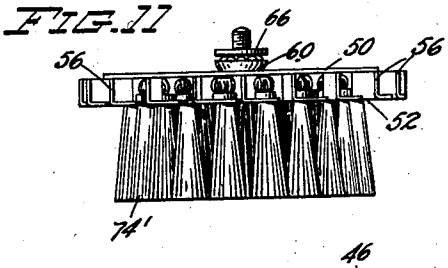
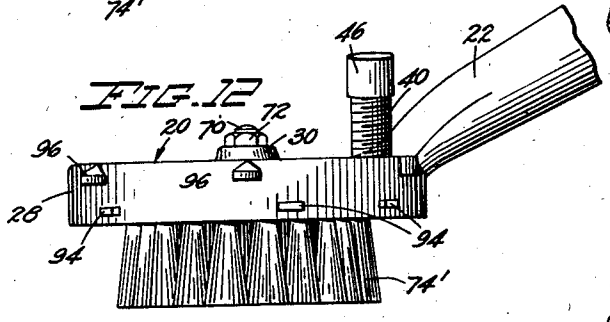


FIG. 12.



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UNITED STATES PATENT OFFICE

2,304,616

HYDROTHERAPY APPARATUS

Harry Bates Watson, East Orange, N. J., assignor to Gyro Brush Co., East Orange, N. J., a corporation of New Jersey

Application May 9, 1939, Serial No. 272,566

2 Claims. (Cl. 128—66)

This invention relates to a hydrotherapy apparatus and more particularly to a hydrotherapy apparatus which may be used either as a whirlpool bath device or as a massaging device.

Under-water therapy has been developed for the treatment of a number of physical conditions. The whirlpool bath has come into use extensively for the treatment of such ailments and conditions as arthritis, infections of the extremities, fractures, frost and dog bites and burns, and this has also been considered for the treatment of peripheral vascular diseases, chronic muscle and joint disturbances, and the like. The whirlpool bath affords relief of pain, accelerates the repair process, and improves the local circulation, and in properly selected cases constitutes a definite addition to therapeutic armamentarium.

A factor which has mitigated against the more general adoption of the whirlpool bath has been the cost of an installation. The results obtained by the use of whirlpool aerated water are pronouncedly good, but the cost of an installation has thus far prevented its general adoption for the smaller institutions and for individual use.

A prime object of the present invention centers about the provision of a hydrotherapy apparatus which is operable to produce a whirlpool bath on the whirling aerated water principle and which comprises a low cost unit, within the economic reach of the individual requiring its use.

A further object of the present invention relates to the provision of such a low cost whirlpool bath device which may readily be employed as a massaging instrument particularly for underwater massaging.

To the accomplishment of the foregoing and such other objects as may hereinafter appear, the invention consists in the hydrotherapy apparatus, the combined whirlpool bath and massaging device, and the elements thereof, all as hereinafter described and as sought to be defined in the appended claims.

The invention is illustrated in the accompanying drawings, in which:

Figure 1 is a perspective view of the hydrotherapy apparatus of the present invention, showing the same mounted for use as a whirlpool bath;

Figure 2 is a view thereof on an enlarged scale with the handle thereof broken away, with the casing thereof shown in cross-section in the plane of the line 2—2 of Figure 3, and the rotor thereof shown in cross-section in the planes of the line 2', 2' of Figure 5;

Figure 3 is a top plan view thereof;

Figure 4 is a bottom plan view of the rotor thereof;

Figure 5 is a top plan view of the rotor thereof with a part broken away;

Figure 6 is a vertical elevational view thereof with a part broken away along the lines 6—6 of Figure 3;

Figure 7 is a bottom plan view showing the casing thereof;

Figure 8 is a top plan view of a modified form of the apparatus with parts shown in section and showing a guard brush applied, serviceable when the device is used as a massaging apparatus;

Figure 9 is a view of the modification taken in cross-section in the plane of the line 9—9 of Figure 8;

Figure 10 is a bottom plan view of this modification;

Figure 11 is a vertical elevational view of the rotor of this modification;

Figure 12 is a vertical elevational view thereof with the handle broken away and with the guard brush detached; and

Figure 13 is a perspective view of details showing the manner of detachably attaching the guard brush element.

Referring now more in detail to the drawings and having reference first to Figures 1 to 3 thereof, the hydrotherapy apparatus of the invention comprises a portable unit consisting of a casing 20 provided with a handle 22 and a water wheel rotor generally designated as 24 mounted for rotation in the casing 20. The casing and rotor are so constructed that when the apparatus is connected to a source of water supply and is submerged in a body of water, the water flowing through the apparatus will cause the water wheel to rotate and the rotation of the water wheel rotor together with the water issuing from the apparatus serve to impart a whirling action to the body of water or bath in which the apparatus is submerged. The construction is furthermore such that the flow of water through the apparatus will induce air to be sucked into the apparatus for the purpose of aerating the water, whereby there is produced a whirling of aerated water. The air functions to keep the water in a state of local agitation; and the greater the subdivision and distribution of the air bubbles in the water, the more efficient is this local agitation and the consequent therapeutic effects. The water wheel rotor functions to produce a very thorough intermixing of air and water to accomplish these results. The water wheel rotor 24 is furthermore so designed and constructed as

to provide an under-water massaging element which also is serviceable to aid in producing the desired whirling action when the apparatus is used as a whirlpool bath device.

To accomplish these objects, the casing 20 comprises an open-sided housing defined by a top wall 26 and a depending flange side wall 28, the said casing being provided with a central thickened portion or boss 30 for supporting the rotor unit 24. The handle 22 is preferably made integral with the casing 20 as by being cast in one piece therewith, and is made in the form of a pipe, the top end of which is threaded as at 32 for connection to a suitable source of water supply which, in Figure 1, is illustrated as a hose 34 having a terminal coupling element 36. The casing is provided with a water duct 38 arranged tangentially therein, which duct communicates with the handle pipe 22. The casing is further provided with an air duct 40, the exit end 42 of which lies adjacent the exit end 44 of the water duct 38 so that a flow of water through the water duct will produce a suction of air through the air duct to aerate the water entering the casing 20. The air duct 40 may be in the form of a threaded pipe section provided with a removable cap 46, which, when the cap is removed, is connectable to a pipe or hose such as 48 (see Figure 1), the top end of which protrudes above the water level of a body of water into which the apparatus is submerged when used as a whirl producing device.

The water wheel rotor 24 comprises a ball bearing mounting unit constructed to be set into rotation by the flow of water issuing through the water duct 38 into the casing 20. This preferably is made up of the two spaced discs 50 and 52 held together and in spaced relation by means of the pins 54, the disc 52 being provided with a series of peripherally arranged vanes 56, 56 preferably struck up from the material of the disc 52, which vanes are arranged so as to be struck or impinged by the flow of water streaming from the water duct 38 in the direction indicated by the arrow 58 in Figure 5 of the drawings. This water wheel is mounted in a ball bearing support, which comprises races 60, 60 fitted centrally to a collar 62 forming part of the rotor, and complementary races 64 and 66 fitted on to a central stub shaft 68 with suitable balls arranged in these races (see Figure 2). The complementary race 64 is a cone piece fitted against the bottom head of the stub shaft 68 and the complementary race 66 is a cone element which is threaded on to the upper end 70 of the stub shaft 68, which upper end is also threadedly received by the boss 30 of the casing 20 and is adapted to threadedly receive a lock nut 72.

The rotor unit 24 is also constructed to function as a massaging element, serviceable when the apparatus is to be used for massaging purposes. This is accomplished by attaching to the outer or exposed face of the rotor disc 52, a flexible pad (or a brush as shown in the modification hereinafter to be described), such as a rubber pad 74 which may be secured by some suitable water-resistant adhesive or in any other manner to the rotor disc 52. This rubber pad is provided with a plurality of induction openings 76 arranged in the body thereof and preferably circularly towards the center thereof, and the rotor disc 52 is also provided with openings 76' registering with these induction openings. These induction openings 76 and 76' function when the apparatus is used as a whirlpool bath to assist in producing a whirling action of the water and function when the apparatus is used as a massaging device to create a suction at the applied surface and thus assist in the massaging action.

The operation of the apparatus of Figures 1 to 7, both as a whirlpool bath and as a massaging device, may now be described. For use as a whirlpool bath, it may be mounted as shown in Figure 1 of the drawings, the pipe handle 22 being mounted by means of a suitable clamping device 78 to the side wall of a suitable water receptacle such as a bath tub 80, the top of the handle being connected to the water supply hose 34, the air inlet pipe section 40 (with the cap 46 removed) being attached to the air hose 48. When the casing 20 is submerged in a body of water in the bath tub 80 and the water supply faucet is opened, the flow of water into the casing through the water duct will impart rotation to the water wheel 24, the water being aerated by air drawn or inducted through the air hose 48. The rotation of the water wheel, the water issuing from the water wheel at the open side of the casing as indicated by the arrows 82, 82 in Figure 2 of the drawings, together with the circulation induced through the induct openings 76 as indicated by the arrows 84, 84 in Figure 2, all serve to impart a whirling action to the body of water admixed with the inducted air, whereby there is produced a most efficient whirling of aerated water. The action of the water wheel on the body of water and air effects a thorough intermixing of the air and the water and a consequent thorough subdivision and distribution of the air bubbles in the water, thus producing a most efficient local agitation. When the device is to be used for under-water massaging, it is removed from the clamping device 78, the air hose 48 is detached, and the air pipe 40 closed by the cap 46. When the rotor is operated, application of the rubber pad 74 to the body serves for massaging purposes. The induction openings 76 act to produce a definite suction action which draws the skin towards the massaging element and assists in the massaging action.

It will be noted that the apparatus provides a simple instrument which offers advantages not embodied in known whirlpool baths. The outstanding advantage is that of low cost of the unit, placing the same within the economic reach of the individual requiring its use. Most of the standard whirlpool baths are very expensive in comparison. The device of the present invention is portable and may be attached to most hot and cold plumbing fixtures, either in the office or in the home. The bath tub or large wash basin serve as excellent overflow receptacles. In the whirlpool of the present invention, the water is always clean, and the debris is washed through the drain pipe. Consequently, the affected extremity never is permitted to soak in its own slough, which occurs in standard whirlpool baths. The instrument of the present invention may be readily sterilized by alcohol or any of the other non-corrosive germicides. The entire unit is small and light. The only power necessary for operation is water which is an inexpensive power source. The apparatus is used for massage either out of or under water. Very light under-water massage is possible by gently stroking the skin with the massaging element. A definite suction action is produced

which draws the skin toward the massaging element, giving a more vigorous massage. These types of massage combined with active and passive motion are very efficacious in the early phases of soft tissue reconstruction. The instrument is easily manipulated and requires very little effort; the stimulating and refreshing effects are found most gratifying. The apparatus has been found efficacious in use for the treatment of the various physical conditions hereinbefore referred to.

In Figures 8 to 13, I show a modification of the invention wherein the massaging pad **74** is replaced by a brush element **74'**. Otherwise the structure is the same as that shown in Figures 1 to 7 of the drawings, and similar parts are indicated by similar reference characters. The brush element **74'** comprises groups of bristles held in suitable orifices formed in the bottom disc **52** of the water wheel, as most clearly shown in Figure 11 of the drawings. In this form of the invention this disc **52** is provided with the induct openings **76** corresponding to the induct openings in the pad **74** of the Figures 1 to 7 form of invention.

In the form of the invention shown in Figures 8 to 13, there is shown a removable guard brush **86** which is used when the apparatus is employed as a massaging device and which functions in that event for preventing the whirling water from spraying the patient when out-of-water massaging is practiced. This removable guard brush may be made to comprise an annular shaped brush, the bristles **88** of which are attached to a ring **90**, the said ring being provided with spaced vertical slots **92, 92** which are adapted to receive the similarly spaced lugs **94, 94** arranged exteriorly on the side wall **28** of the casing **20** when the ring **90** is slipped or slid on to the casing side wall **28**. By reference to Figure 13 of the drawings, it will be seen that after the ring **90** (and the bristles **88** attached thereto) is slid into position on to the casing wall **28**, it may then be locked in position by imparting a partial rotation to the same, the same being then locked between the series of lugs **94, 94** and a second series of lugs **96, 96** spaced from the lugs **94, 94** the thickness of the ring **90**. It will be observed that in the form of apparatus shown in Figures 1 to 7 of the drawings, the casing is similarly constructed by being provided with the two sets of lugs **94** and **96** for detachably receiving the guard brush when this form of device is to be used for out-of-water massaging purposes.

The construction and operation as well as the many resulting advantages of the hydrotherapy apparatus of my present invention will, in the main, be fully apparent from the above-detailed description thereof. The apparatus of the invention may be readily used either to produce a whirlpool bath or as a massaging instrument, the instrument provided being simple, inexpensive, and effective in the treatment of the various physical conditions referred to. It is found that when the instrument is to be used entirely under water, the guard brush should be removed, since it is unnecessary for the massaging action, and inasmuch as the whirling effect is increased when the guard brush is removed. For out-of-water massaging, the guard brush is replaced by simply slipping the same on to the casing of the apparatus and turning the same into locked position. The massaging may be gentle or vigorous, depending upon the use of the instrument. The ball bearing mounting of the light-weight rotor enables high speeds to be obtained, and the power developed in the rotor is sufficient to overcome the resistance applied to the rotor when the instrument is used for massaging purposes, the suction created through the induction openings **76** of the massaging element assisting sufficiently in the massaging action to render it unnecessary to apply too much pressure on the part of the body which is being massaged. Other of the many advantages have been set forth above in connection with the detailed description.

It will be apparent that while I have shown the invention in its preferred forms, many changes may be made in the structure and in the relation of the parts without departing from the spirit of the invention defined in the following claims.

What I claim is:

1. A hydrotherapy apparatus comprising an open-sided casing, a water wheel rotor mounted in said casing, said casing and water wheel rotor being adapted to be submerged in a body of water, said water wheel rotor having vanes arranged circumferentially thereof and induct openings arranged at the open side thereof inwardly of said vanes, a water duct in said casing disposed to cause water flowing therethrough to impinge against the vanes of said water wheel rotor to rotate the same, the rotation of the rotor and the water issuing from the water wheel at the open side of said casing together with the circulation induced through said induct openings serving to impart a whirling action to the said body of water, and an air duct in said casing positioned with relation to said water duct so that the flow of water through the water duct will produce a suction of air through the air duct to aerate the water, whereby there is produced a whirling of aerated water.

2. A hydrotherapy apparatus comprising an open-sided casing, a water wheel rotor mounted in said casing, said water wheel rotor having vanes arranged circumferentially thereof, a water duct in said casing disposed to cause water flowing therethrough to impinge against the vanes of said water wheel rotor to rotate the same, an air duct in said casing positioned with relation to said water duct so that the flow of water through the water duct will produce a suction of air through the air duct to aerate the water, a closure element for said air duct, a massaging element fixed to said rotor at the open side of said casing, and induct openings in said massaging element leading into the water wheel.

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