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HYDROTHERAPY APPARATUS WITH MEANS FOR MOUNTING IN BATHTUB DRAIN

Filed June 15, 1964

2 Sheets-Sheet 1

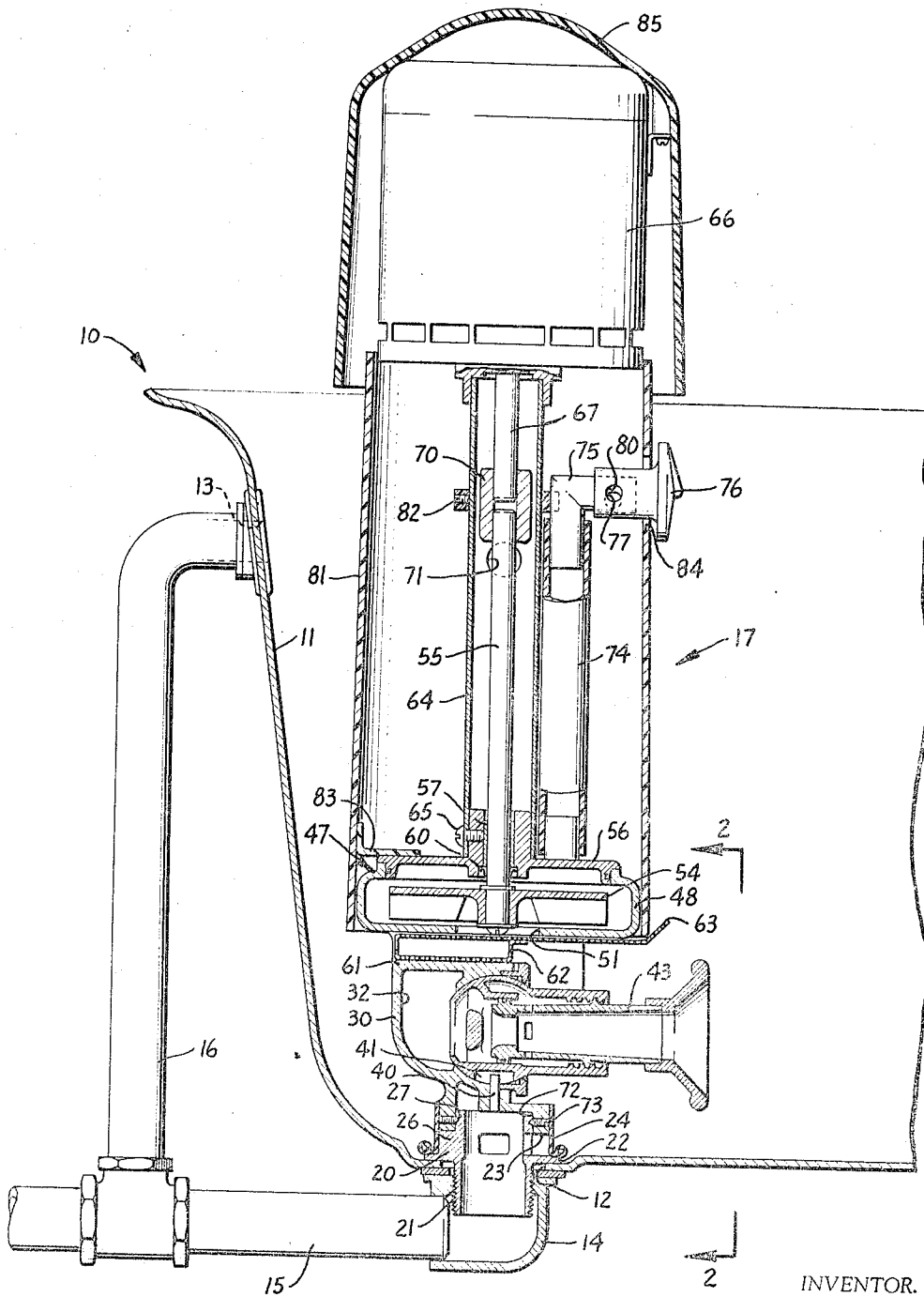


FIG. 1.

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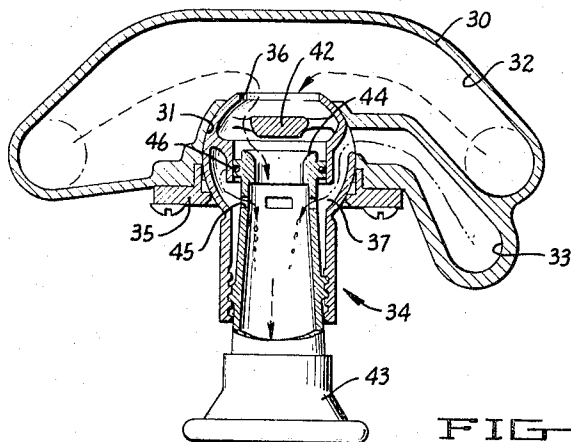


FIG. 4

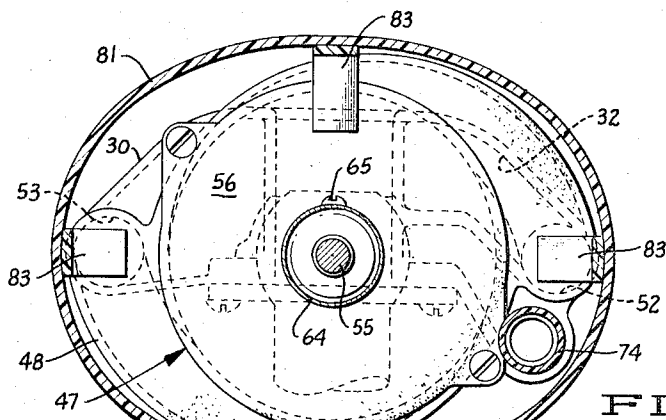


FIG. 3

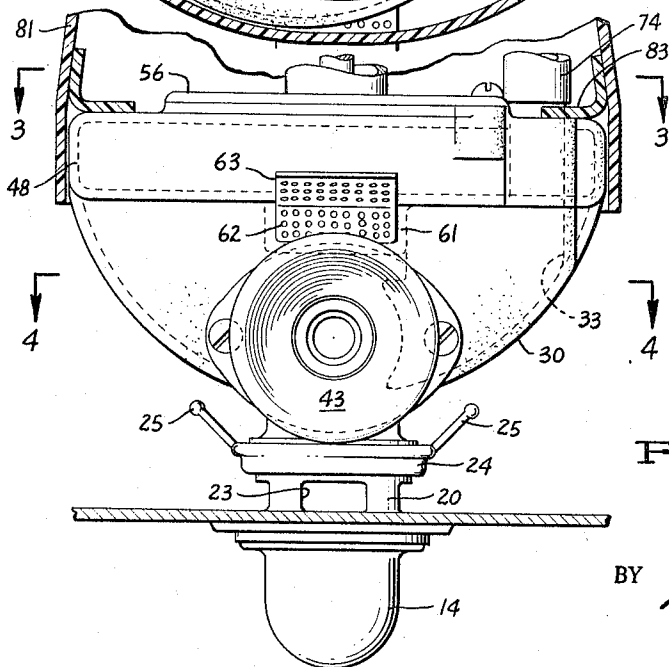


FIG. 2

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HYDROTHERAPY APPARATUS WITH MEANS FOR MOUNTING IN BATHTUB DRAIN

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13 Claims. (Cl. 128-66)

This invention relates to hydrotherapy apparatus and more particularly to an improved hydrotherapy unit adapted to be mounted in a bathtub of conventional character and electrically grounded to the plumbing of the bathtub.

In the past, various forms of hydrotherapy apparatus have been provided either as permanent or temporary installations in bathtubs and the like. The permanent installations had the disadvantage that they were relatively expensive and frequently required a bathtub specifically fabricated to be used in combination therewith. The temporary installations had the disadvantage that they either required particular structure to hold the electrical drive units thereof out of the water and grounding means for these units, or submersible electric drive units with auxiliary grounding means. In the latter respect, it is noted that submersible electric drive units are relatively expensive as compared to nonsubmersible units and that even though safe, many users are reluctant to submerge such a unit in a bathtub in which they are bathing.

It is, accordingly, a principal object of this invention to provide a hydrotherapy apparatus overcoming the afore discussed disadvantages of previous hydrotherapy devices of both the permanent and temporary installation types.

It is a particular object of the invention to provide a hydrotherapy apparatus which is adapted to be securely locked to the plumbing of a conventional bathtub in electrically grounded relationship therewith while still being readily removable from the bathtub.

Another object of the invention is to provide a hydrotherapy apparatus having a pump which is self-priming.

A further object of the invention is to provide a hydrotherapy apparatus wherein shaft seals between the pump and driving motor therefor are not required, thus alleviating the necessity of switching provisions to assure that the pump will not be operated dry.

Yet another object of the invention is to provide a novel fixture for locking a hydrotherapy apparatus to the drain opening of a conventional bathtub, which fixture is adapted to selectively open said opening to fluid communication with the interior of the bathtub.

Broadly, the apparatus of the present invention comprises a hydrotherapy unit adapted to be mounted in a bathtub or the like in engagement with the drain conduit thereof. Included as a primary element of the unit is a housing adapted to be positioned in the bathtub below the normal water level. The housing has therein a nozzle with a water inlet and open discharge end and a pump with a pressure outlet port in fluid communication with said water inlet and an open vacuum inlet port. Mounting of the housing in a bathtub is facilitated by a mounting fixture secured thereto and adapted to be locked to the drain opening of the bathtub. The unit further includes a mounting pedestal secured to the housing and extending to a level which will be above the normal water level of a bathtub in which the housing is positioned and a motor secured to the mounting pedestal so as to be supported above said normal water level. The basic structure of the unit is completed by a drive transmission means, such as a shaft, operatively connecting the motor and pump.

In one of its more specific aspects, the invention comprises a mounting fixture for locking a hydrotherapy unit to the drain opening of a conventional bathtub. The

fixture includes a tube having an open lower end and a port therethrough in spaced relationship to said lower end. Securing means, such as screw threads, are provided on said tube to sealingly lock said open lower end in the drain opening of a bathtub while maintaining said port above the opening. A closure element is provided to selectively open and close said port and the fixture is completed by a mounting provision thereon adapted to be secured to a hydrotherapy unit.

The detailed structure of the invention and the foregoing and other objects will become more apparent when viewed in the light of the accompanying drawings, wherein:

FIG. 1 is a sectional side elevational view of the improved hydrotherapy apparatus installed in a bathtub;

FIG. 2 is a front elevational view of the apparatus, partly in section, taken on line 2-2 of FIG. 1; and

FIGS. 3 and 4 are sectional views taken on lines 3-3 and 4-4, respectively, of FIG. 2.

Referring now to FIG. 1, therein is illustrated a bathtub 10 having a dish-shaped wall 11 with a drain opening 12 through the lower extremity thereof and an overflow opening 13 therethrough adjacent its upper edge. A drain conduit comprising a fitting 14 and drain pipe 15 extends from the opening 12 to a connection with an overflow pipe 16 communicating with the opening 13. The pipe 15 extends downstream from its connection with the pipe 16 to a suitable disposal means (not illustrated) such as a main sewage line.

The hydrotherapy unit of the invention is designated in its entirety by the numeral 17 and is shown locked in the drain opening 12 by a mounting fixture 20. The fixture 20 basically comprises a tube having an open lower end with threads 21 formed thereon and adapted to engage the fitting 14, as illustrated in FIG. 1. A collar 22 is formed on and extends radially outward from the fixture above the threads 21 at a position where it abuts against the upper periphery of the drain opening to which the fixture is locked, thus limiting the degree to which the fixture passes through the opening. A plurality of ports 23 are formed through the fixture 20 above the collar 22 and a resilient sleeve 24 of rubber or the like is received around the fixture in a position where it is adapted to selectively open or close said ports. The latter function is accomplished by rolling the sleeve between the closed and open positions illustrated in FIGS. 1 and 2, respectively. Ears 25 extend radially from the sleeve 24 to facilitate the rolling thereof. The structure of the fixture 20 is completed by a stepped section 26 and annular groove 27 providing means for the securing of a housing 30 of the hydrotherapy unit thereto.

As can best be seen in FIG. 4, the housing 30 comprises a nozzle receiving socket 31 having water and air passageways 32 and 33, respectively, opening thereinto. A nozzle 34 having a spherical rearward end is pivotally retained in the socket 31 by a ring 35 and has the water inlet 36 and air inlet 37 in fluid communication with the respective water and air passageways 32 and 33. Pivotal movement of the nozzle 34 about its longitudinal axis is prevented by a pin 40 extending into the socket 31 to slidable engagement with a slot 41 in the nozzle.

In order to provide for control of the flow of water and air into the nozzle 34, a valve mandrel 42 is fixed in the inlet 36 and a spout 43 having a valve seat 44 on the rearward end thereof is threadably received within the open end of the nozzle so as to be movable towards and away from said mandrel. As can be seen from FIGS. 1 and 4, the spout 43 is open throughout its length and water and air, respectively, are communicated thereto through the open valve seat 44 and a plurality of apertures 45 extending through its periphery. Movement of the spout 43 into or out of the nozzle 34 functions to control the

water flow into the spout by varying the degree of fluid communication between the inlet 36 and the open seat 44. This control also functions to control the flow of air through the apertures 45, since air is drawn therethrough by the low pressure area created downstream from the seat 44 when water flows therethrough. It is noted that water flow around the spout 43 is prevented by an O-ring 46 extending therearound in sealing contact with the water inlet 36.

The housing 30 further has therein a pump 47 comprising a manifold 48 with a vacuum inlet port 51 opening to the exterior of the housing and a pair of pressure outlet ports 52 and 53 extending into fluid communication with the water passageway 32 (see FIG. 3). The pump 47 is of a centrifugal type and further includes an impeller 54 rotatably suspended within the manifold 48 by a drive shaft 55 which, in turn, is rotatably received in a cap member 56 sealingly secured to the housing so as to form the upper wall of the manifold 48. A sleeve bearing 57 within the cap member 56 rotatably supports the shaft 55 therein and a lip type seal 60 below said bearing impedes leakage thereto from the manifold 48. For reasons which will become apparent subsequently, it is not necessary that the seal 60 completely prevent leakage from the manifold 58 and to the bearing 57.

The housing 30 also has formed therein a box shaped screen receptacle 61 having the upper portion thereof open and in fluid communication with the inlet port 51 of the pump and the end portions thereof open to the exterior of the housing. A screen having a box shaped section 62 with exterior dimensions corresponding to the interior dimensions of the receptacle 61 and a laterally extending tongue section 63 is slidably received within the receptacle in a position wherein all water entering the inlet port 51 must be draw therethrough. The function of the screen is to prevent foreign objects, such as hairpins, from being drawn into and fouling the pump 47. The construction of the screen is particularly desirable, since it provides a large surface area and it may be readily slid out of the receptacle 61 for cleaning purposes by pulling on the tongue 63.

The housing 30 has secured thereto in concentric relationship with the drive shaft 55 a tubular metal pedestal 64. The pedestal 64 is secured to the housing 30 by a screw 65 threadedly engaged in the cap member 56 and extends upwardly therefrom to a level above the normal water level in the bathtub and preferably, as illustrated, above the upper edge of the bathtub. The upper end of the pedestal 64 has secured thereto an electric motor 66 with the rotor shaft 67 thereof in axial alignment with the drive shaft 55. The shafts 55 and 67 are drivingly engaged through means of a coupling 70 and an overflow port 71 extending through the pedestal 64 below the upper edge thereof assures that water cannot accumulate therein to the level of the motor 66. Thus it can be seen that the pedestal 64 functions to support the motor 66 at a position isolated from the water within the bathtub 10. Furthermore, since the casing of the motor 66, the pedestal 64, the housing 30 and the fixture 20 are all connected together and fabricated of electrically conductive material, an electrically conductive path is formed between the motor and fixture, thus grounding the motor to the drainpipe 15 to which the fixture is locked. As an alternative to forming the electrically conductive path through the actual components of the unit, the path could be formed by a wire connected between the casing of the motor 66 and the fixture 20. At this point it is noted that the housing 30 is secured in electrical communication with the fixture 20 through means of a socket 72 therein received on stepped section 26 and set screws 73 threadably extending through said socket into engagement with the annular groove 27.

The fluid system of the therapeutic unit is completed by an air pipe 74 mounted on the housing 30 in fluid

communication with the air passageway 33 (see FIG. 2). In order to assure that only air will be drawn therethrough, the pipe 74 extends to a level above the normal water level in the bathtub 10. It is noted that the highest water level in the bathtub 10 is defined by the overflow opening 13. Air flow control through the pipe 74 is effected by a valve comprising a conduit 75 connected to and extending laterally from the upper end of the pipe and a closure sleeve sealingly and rotatably received on said conduit. The conduit 75 and sleeve 76 have formed therethrough apertures 77 and 80, respectively, which may be varied in alignment by turning the sleeve 76, thus controlling the amount of air flowing therethrough and into the pipe 74.

In operation energizing the motor 66 functions to activate the pump 66, thus drawing water into the port 51 and forcing it through the nozzle 34. At the same time, air is also drawn into the nozzle through the pipe 74 and exhausted through the nozzle along with the water. Flow through the nozzle is controlled by turning the spout 43 about its axis and flow direction control is effected by moving the spout laterally, thus pivoting the nozzle 34 within the socket 31.

In order to enhance the safety characteristics of the unit 17, the pipe 74 is preferably fabricated of an electrical insulator material and a tubular cowl 81 of such material is extended around the pipe and the mounting pedestal 64 between the housing 30 and motor 66. The cowl 81 also functions to quiet the operation of the unit, since it insulates the components therein, such as the air pipe, from the exterior of the unit. It is noted that the pedestal 64 and pipe 74 are located sufficiently close to each other that the cowl may take a substantially smooth form, thus also enhancing the appearance of the unit. The pipe 74 is maintained in fixed spaced relationship with respect to the pedestal 64 by a mounting bracket 82 extending therebetween. The cowl 81 is supported loosely on the housing 30 so as to be substantially open at its lower end by a plurality of inwardly extending flange elements 83. The closure sleeve 76 extends loosely through an opening 84 in the cowl to a position wherein it may be readily turned by users of the bathtub 10.

The safety and aesthetic characteristics of the unit 17 are further enhanced by a canopy 85 of insulating material extending loosely over the motor 66. The loose fit of the canopy and the open lower end thereof around the cowl 81 insure adequate ventilation for the motor. Because of the elevated and protected position of the motor 66, it is not necessary that this motor be of submersible type, but it is sufficient that it merely be splash proof. Thus, the hydrotherapy unit of the present invention derives one of its many advantages, namely, that of being relatively inexpensive to fabricate.

To conclude, from the foregoing detailed description it is believed apparent that the present invention enables the accomplishment of the objects initially set forth herein. In particular, an improvement hydrotherapy unit having its driving motor positioned above the normal water level in a bathtub and its pumping and injection components located below this level is provided. The latter characteristic is especially desirable since it assures that the pump will be self-priming and that fluid will be injected into the bathtub at a level which will assure optimum therapeutic benefits. It is to be understood, however, that the invention is not intended to be limited to the specific embodiment illustrated and described, but rather is defined by the following claims.

What is claimed is:

1. In a bathtub having a drain opening therethrough, an improved hydrotherapy unit comprising:
 - (A) a housing positioned in the bathtub below the normal water level, said housing having therein:
 - (1) a nozzle with water and air inlets and an open discharge end; and

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- (2) a pump with a pressure outlet port in fluid communication with said nozzle water inlet and an open vacuum inlet port;
- (B) a fixture secured to the housing and locked to the drain opening of the bathtub;
- (C) an air conduit having one end in fluid communication with said air inlet and another end open at a level above the normal water level of the bathtub;
- (D) a mounting pedestal secured to the housing and extending to a level above the normal water level of the bathtub;
- (E) an electric motor secured to the mounting pedestal so as to be supported above said normal water level;
- (F) an electrically conductive path connecting the motor and fixture so as to ground the motor to the drain opening; and,
- (G) drive transmission means operatively connecting the motor and pump.
2. An improved hydrotherapy unit adapted to be used in a bathtub having a drain opening therethrough, said unit comprising:
- (A) a housing adapted to be positioned in the bathtub below the normal water level, said housing having therein:
- (1) a nozzle with water and air inlets and an open discharge end; and,
 - (2) a pump with a pressure outlet port in fluid communication with said water inlet, and an open vacuum inlet port;
- (B) a fixture secured to the housing and adapted to be locked to the drain opening of a bathtub in which the housing is positioned;
- (C) an air conduit having one end in fluid communication with said air inlet and another end open at a level which will be above the normal water of a bathtub in which the housing is positioned;
- (D) a mounting pedestal secured to the housing and extending to a level which will be above the normal water level of a bathtub in which the housing is positioned;
- (E) an electric motor secured to the mounting pedestal so as to be supported above said normal water level;
- (F) an electrically conductive path connecting the motor and fixture so as to ground the motor to a drain opening to which the fixture is locked; and,
- (G) drive transmission means operatively connecting the motor and pump.
3. A unit according to claim 2 including:
- (A) an open screen receptacle in said housing in juxtaposition to the vacuum inlet port; and
- (B) a screen received within said receptacle in a position wherein all water entering said inlet port must be drawn therethrough, said screen being readily slidable out of said receptacle from the exterior of the housing.
4. A unit according to claim 2 wherein the mounting fixture comprises a tube having an open lower end and including:
- (A) means adapted to lock said lower end in sealed fluid communication with the drain opening of a bathtub; and,
- (B) means to selectively open said tube above said lower end.
5. A unit according to claim 2 wherein the air conduit, mounting pedestal and drive transmission means extend upwardly from the housing in close relationship and including a tubular cowling of electrical insulating material extending around said conduit, pedestal, and the transmission means between the housing and motor.
6. A unit according to claim 5 wherein:
- (A) the mounting pedestal comprises a rigid tube secured at the upper and lower ends thereof to the housing and motor, respectively; and,

- (B) the drive transmission means comprises a shaft extending rotatably through said tube.
7. A unit according to claim 6 wherein:
- (A) the lower end of said cowling is open; and,
- (B) the mounting pedestal tube has an overflow port therethrough at a level below the upper end thereof.
8. A unit according to claim 5 including a canopy of electrical insulating material covering said motor, said canopy comprising:
- (A) a closed top extending over the motor; and,
- (B) a contiguous side wall depending from said top and extending downwardly therefrom loosely around said motor and cowling to an open lower end spaced laterally from said cowling.
9. A unit according to claim 5 including:
- (A) a valve on said air conduit to selectively limit the flow of air therethrough; and,
- (B) control means for said valve extending through said cowling.
10. A fixture for locking a hydrotherapy unit to the drain opening of a bathtub, said fixture comprising:
- (A) a tube having an open lower end and a port therethrough in spaced relationship to said lower end;
- (B) securing means on said tube adapted to sealingly lock said open lower end in the drain of a bathtub while maintaining said port above the opening;
- (C) closure means to selectively open and close said port; and,
- (D) mounting means formed on the tube above said port including an annular seat adapted to be complementally interfitted with and support a hydrotherapy unit.
11. A fixture according to claim 10 wherein said securing means comprises:
- (A) a collar fixed to and extending radially outward from said tube between said port and open lower end, said collar being adapted to abut against the periphery of a drain opening in which the tube is locked; and,
- (B) a threaded section on said tube between said collar and the open lower end thereof, said section being adapted to threadably engage a drain conduit fitting communicating with the drain opening.
12. An improved hydrotherapy unit adapted to be used in a bathtub having a drain opening therethrough, said unit comprising:
- (A) a housing adapted to be positioned in a bathtub below the normal water level, said housing having therein:
- (1) a nozzle with a water inlet and an open discharge end;
 - (2) a pump with a pressure outlet port in fluid communication with said water inlet and an open vacuum inlet port;
- (B) a fixture secured to the housing and having means adapted to be locked to the drain opening of a bathtub in which the housing is positioned;
- (C) a mounting pedestal secured to the housing and extending to a level which will be above the normal water level of a bathtub in which the housing is positioned;
- (D) a motor secured to the mounting pedestal so as to be supported above said normal water level; and
- (E) drive transmission means operatively connecting the motor and pump.
13. A fixture for locking a hydrotherapy unit to the drain opening of a bathtub, said fixture comprising:
- (A) a tube having an open lower end and a port therethrough in spaced relationship to said lower end;
- (B) securing means on said tube adapted to sealingly lock said open lower end in the drain of a bathtub while maintaining said port above the opening;
- (C) closure means to selectively open and close said

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port, said closure means comprising:

- (1) a resilient sleeve extending around said tube, said sleeve being adapted to be rolled between positions sealingly covering and adjacent to said port;
 - (2) a pair of ears fixed to and extending radially from said sleeve to facilitate the rolling thereof; and
- (D) mounting means on the tube adapted to be secured to a hydrotherapy unit.

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