

[54] **ADJUSTABLE HYDROTHERAPY JET PRODUCING DEVICE**

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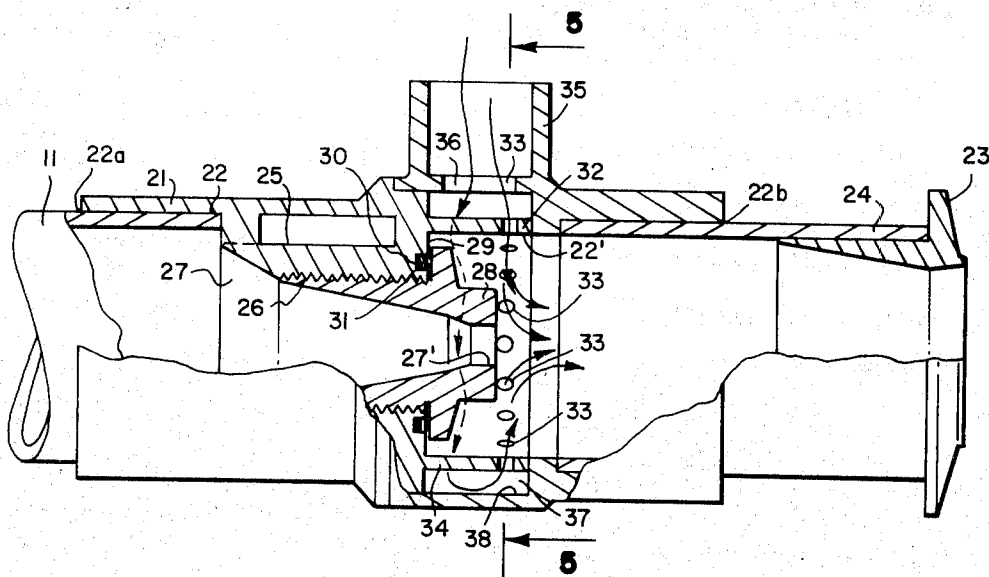
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[57] **ABSTRACT**

A pool mountable hydrotherapy jet producing device which embodies an adjustable dial for air and water mixing providing full control of a plurality of jets of water from an off condition through a range of from gentle to forceful stimulating hydro-massage jet effects.

6 Claims, 6 Drawing Figures



ADJUSTABLE HYDROTHERAPY JET PRODUCING DEVICE

BACKGROUND OF THE INVENTION

This invention is directed to the mixing of air and water in a jet stream and more particularly to a hydrotherapy jet producing water and air mixing means which completely aerates a homogeneous stream of water and adjustably controls the jet stream of water from a fully off to a stimulating hydro-massaging condition while muffling the objectionable sounds associated with hydrotherapy.

FIELD OF THE INVENTION

This invention relates to hydrotherapy water jet producing means for swimming pools and more particularly to one designed to be installed in one of the circulating water inlets thereby avoiding the additional expense of added piping, valves, circulating pump and motor.

DESCRIPTION OF THE PRIOR ART

Heretofore hydrotherapy has been recognized for its stimulating muscle massage and blood circulating characteristics. Aeration has always been a problem since an improperly aerated water stream provides an uneven flow of water; resulting in an unpleasant massaging effect.

To provide a hydrotherapy jet of aerated water in a pool heretofore required an expensive installation in the pool, usually installable only at the time the pool was built. Further, the aerating of the water resulted in a noisy condition which distracted from the soothing effect of the water massaging action of the hydrotherapy jet producing device.

SUMMARY OF THE INVENTION

In accordance with the invention claimed a new and improved dial actuated air mixing hydrotherapy jet producing device is provided which may be placed in one of the regular circulating inlets of a pool or in any water ejecting outlet for completely aerating a homogeneous stream of water for hydromassaging or other useful purposes.

It is, therefore, one object of this invention to provide a new and improved air-water mixing device.

Another object of this invention is to provide an improved water aerating jet producing device which is dial controllable from an off condition to a fully on position.

A further object of this invention is to provide an improved hydrotherapy jet producing device for pools which directs a flow of air in such a manner that it causes the air to aerate a homogeneous stream of water travelling at a high speed.

A still further object of this invention is to provide an aerating hydrotherapy jet producing device which may be installed in a pool water control system without the expense of additional piping, valves, circulating pump and motor.

A still further object of this invention is to provide an adjustable air control aerator for therapeutic use which has a built-in silencer that muffles the objectionable sounds associated with water aeration.

Further objects and advantages of the invention will become apparent as the following description proceeds and the features of novelty which characterize this in-

vention will be pointed out with particularity in the claims annexed to and forming part of this specification.

BRIEF DESCRIPTION OF THE DRAWING

The present invention may be more readily described by reference to the accompanying drawing in which:

FIG. 1 is a partial perspective view of the invention installed in the side of a pool substantially flush with the tile and plaster of the pool;

FIG. 2 is a partial perspective view of a modification of the inventive subject matter shown in FIG. 1 wherein the hydrotherapy jet producing device shown is mounted to extend outwardly from the tile and plaster of the pool;

FIG. 3 is an enlarged partial view partly broken away of the adjustably controlled air inlet to the hydrotherapy jet producing device shown in FIGS. 1 and 2;

FIG. 4 is a view partly in cross section of the water aerating structure of the hydrotherapy jet producing device shown in FIGS. 1 and 2;

FIG. 5 is a cross sectional view of FIG. 4 taken along the lines 5 — 5; and

FIG. 6 is a cross sectional view of a further hydrotherapy jet producing valving arrangement.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring more particularly to the drawing by characters of reference, FIG. 1 discloses a partial perspective view of a typical swimming pool 10 which may be of the well known width, length and depth dimensions.

A main drain is normally provided at its deepest point in the pool and together with a skimmer drain at or near the water level of the pool 10 are connected by suitable pipes and valves to the suction side of a pool circulating pump, all not shown since they are well known in the art.

The pool circulating pump returns the water after proper treatment to the pool through suitable circulating inlet pipes 11 and outlets 12, which may be provided at one or more places in the pool. The inlet pipe 11 shown in FIG. 1 may be in the shallow end of the pool. As shown in FIG. 1 the pool may be provided with generally vertical side walls 13, the top edges of which are lined with a strip of tile 14, in the usual manner, all covered by a suitable coping 15.

Pool 10 is formed in an excavation which is lined with reinforcing steel bars (not shown) and covered with gunite 16 or other suitable material or may be lined with prefabricated metal or plastic panels up to the normal water level of the pool.

A suitable coating of cement or plaster 17 is placed over the gunite 16 and extends to the top of the sides of the pool. A sufficient indentation is formed in the gunite and the plaster coating all around the inside surface of the sides of the pool to receive a plurality of tiles 14, each tile cooperating with the others to form a surface around the pool covering the water line of the pool.

The excavation for the pool is enlarged around the top circumference of the pool so that gunite may form a substantial collar or ground supporting ridge 18 for supporting the coping 15 or walk around the pool.

In accordance with the invention claimed the outlet pipes 11 are installed in the pool to be located about ten inches below its operating water level with an outlet

T-fitting 20 on the outlet pipe 11 installed plumb with tile 14 at the water line. Since the outlet pipes 11 may be and are usually formed of plastic the fitting may be of ABS or PVC material fitted or glued on by suitable well known weld-on solvents.

As shown in FIG. 4 the T-fitting 20 on the end of inlet pipe 11 comprises a body member 21 having a bore 22 which is suitably fixed at its fluid inlet end 22a to the outside surface of inlet pipe 11. The fluid exit end 22b of body member 21 is provided with an inwardly extending coaxially aligned trim flange 23. Trim flange 23 is positioned from the end of body member 21 by a pipe section 24 which snugly fits into bore 22 of body member 21 with flange 23 then fitting into the free end of pipe section 24.

Body member 21 defines a collar 25 extending inwardly from its center section toward its fluid inlet end 22a and defining a cylindrical bore which is provided with internal threads 26. The fluid entrance to collar 25 is tapered inwardly at 27 to form an entrance to a nozzle 27'. As shown in FIG. 4 the collar 25 is spaced from the inside of bore 22 of body member 21 so as to form a seat for the engaging inlet pipe 11.

Threadedly mounted into collar 25 is a nozzle insert 28 which seats against the face 29 of collar 25 and more particularly against an O-ring 30 which is seated in an opening 31 in face 29. Nozzle insert 28 may be replaced by a nozzle of a different bore size to change nozzle capacity.

FIGS. 4 and 5 illustrate that a cylindrical shield 34 is mounted to extend downstream from face 29 of collar 25 surrounding nozzle insert 28 which is provided around its periphery near its outer end 32 with a plurality of spaced apertures 33.

Air entering from the upwardly extending leg 35 of body member 21 of T-fitting 20 passes through an orifice 36 into the space around the cylindrical passage 37 formed between cylindrical shield 34 and the surface 38 of body member 21. From this space the air passes through apertures 33 into bore 22' formed by body member 21 at its outlet through which the inlet pipe 11 discharges water under pressure.

The stream of water under pressure in inlet pipe 11 passing through body member 21 may be travelling at 30 miles per hour and the air in space 37 between shield 34 and the surface 38 of body member 21 provides a ring of air around this fast moving stream of water. This air is injected into the stream of water through a plurality of apertures 33 which may be, for example, sixteen or more in number equally spaced around the circumference of shield 34. These apertures direct the jet flow of air into the stream of water in a penetrating manner. The result of this air penetrating action is to completely aerate the stream of incoming water to produce millions of therapeutic bubbles that gently massage tired aching muscles, stimulate blood circulation and ease daily tension.

In order to control the amount of air flowing around shield 34 and through apertures 33 into the stream of water passing through inlet pipes 11, an adjustable control air inlet valve 40 is attached to the upwardly extending leg 35 of body member 21.

Since the air inlet valve 40 must be mounted above the water level in the pool an extension pipe 41 is tightly fitted into leg 35 to reach above the water level in the pool. At the upper end of pipe 41 an elbow 42 is attached which has fitted into it at right angles to pipe

41 a pipe 43 which has attached to its open end the adjustable air inlet valve 40 shown in FIGS. 1 and 3.

This air inlet valve comprises a body member 45 having a bore 46 at one end which is suitably fitted to the outside diameter of pipe 43. The other end 47 of body member 45 is provided with a threaded outside annular flange 48 which is adaptable for receiving over that end a cap 49. Extending coaxially with annular flange 48 is a second annular flange 50 defining therebetween a bore 51. This annular flange is provided with an annular groove 52 in its end 53 for receiving an O-ring 54. Thus, when cap 49 is threadedly attached to flange 48 and tightened thereon an inside surface 55 of the cap will seat against O-ring 54 to close the end of annular flange 50.

As shown in FIG. 3, surface 55 of cap 49 is formed by an annular collar 56 which extends around only a part of the inside surface of cap 49 and defines with the radially disposed flange 57 of cap 49 an annular space. This space is directly connected with an annular space 59 formed between the annular flange 48 and annular flange 50.

Air enters space 59 through a plurality of apertures 60 spacedly arranged around the periphery of cap 49 as shown in FIGS. 1 and 3. Thus, the amount of air entering into T-shaped fitting 20 may be adjustably controlled by spacedly positioning cap 59 on body member 45 of the air inlet valve 40. The adjustment ranges from a valve closed position when the cap is seated against O-ring 54 to a fully opened position when cap 49 is backed off of O-ring 54 sufficiently to allow unlimited flow of air into body member 21.

If desired, a filter or porous insert 61 comprising, for example, a piece of foam rubber may be inserted in bore 51 for acting as a muffler. This foam muffler which may be polyurethane in addition to acting as a muffler also cleans the air entering the system.

FIG. 2 illustrates a modification of the structure shown in FIGS. 1, 3, 4 and 5 wherein a T-shaped fitting 65 is similar to the T-shaped fitting 20 except that the fitting is adapted to extend outwardly from the pool sidewalls 13, while in FIG. 1 the housing is embodied in the gunite 16 of the pool. The fitting may be of any suitable outside configuration with the inside configuration being substantially identical to that shown in FIG. 4. The adjustable control air inlet valve 40 is identical to that shown in FIGS. 1 and 3.

A suitable snap-on fitting may be attached to the T-shaped fitting 65 for detachably connecting to inlet pipe 11.

FIG. 6 illustrates a further modification of the structure shown in FIGS. 1-5 wherein the T-shaped fitting 67 defines a bore 68 for fitting onto the end of inlet pipe 11 and defines a funnel shaped nozzle 69 for discharging into the outlet end 70 of the fitting. A leg 71 of the T-shaped fitting 65 is connected to adjustably controlled air inlet valve 40 in the manner described in FIGS. 1-5. The difference between T-shaped fitting 67 and T-shaped fittings 20 and 65 is that the inlet air taken in through inlet valves 40 is directed into an annular space 72, which space is funnel shaped and directs the air stream into the water flowing through the fitting from inlet pipe 11. In FIG. 6 the water is directly applied to the full circumference of the stream of water while in FIGS. 1-5 the air is directed into the stream of water by a plurality of jets ejected through apertures 33.

Although only one fluid aerating device is shown in the drawings it should be recognized that more than one device may be installed in the pool side wall or floor to act in combination with each other to provide a plurality of different aerated streams directed to a given zone so that the user may be treated in more than one direction or on more than one area of his body.

Although but a few embodiments of the present invention have been illustrated and described, it will be apparent to those skilled in the art that various changes and modifications may be made therein without departing from the spirit of the invention or from the scope of the appended claims.

I claim:

1. In a fluid aerating device comprising:
 - an open ended cylindrical member defining an annular inlet passage having a nozzle at its fluid discharge end for transmitting unobstructively said fluid under pressure,
 - walls spaced from the outer circumferential surface of said passage and forming therebetween a second coaxial annular passageway,
 - air inlet means for directing air into said second coaxial annular passageway,
 - said walls being formed to direct air from said second coaxial annular passageway into said passage for aerating fluid passing through said passage; and
 - valve means connected to said air inlet means for controlling the amount of air flowing into said passage.
2. The fluid aerating device set forth in claim 1 wherein:
 - said walls being provided with a plurality of apertures extending therethrough, and
 - each of said apertures providing a passageway for directing air into said passage from said second coaxial annular passageway for aerating fluid passing through said passage at a plurality of spaced positions without effecting the velocity of the flow of

fluid through said passage.

3. The fluid aerating device set forth in claim 2 wherein said apertures are equally spaced in said wall around the periphery of said inlet passage.

4. The fluid aerating device set forth in claim 1 wherein said valve means comprises a housing for receiving atmospheric air, said housing having an annular air inlet structure, said structure upon rotation controlling the volume of air into said valve means and a porous insert inserted in said housing for muffling the sound of the air flowing into said air inlet means.

5. The fluid aerating device set forth in claim 1 wherein:

said member comprises a T-shaped housing having said annular inlet passage passing in a straight line through a tapered portion leading up to said nozzle in the crossarm of said T-shaped housing, and said air inlet means directing air into the leg of said T-shaped housing, and said valve means being adjustable for manually controlling the amount of air flowing into said air inlet passage.

6. The fluid aerating device set forth in claim 6 wherein:

said member comprises a T-shaped housing having said annular inlet passage passing in a straight line horizontally through said member when installed in a pool, said air inlet means being connected to a leg of said T-shaped housing which extends substantially vertically upward from said T-shaped housing when installed in a pool, said valve means being connected to said air inlet means so as to extend substantially horizontally with said inlet passage, and said valve means and the discharge end of said inlet passage in said member lying within the same plane.

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