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Schneider

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[54] **NOZZLE ASSEMBLY FOR A HYDROTHERAPEUTIC UNIT**

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[51] **Int. Cl.** **A61h 9/00**

[58] **Field of Search** 128/66; 4/182, 180, 4/178

[56] **References Cited**

UNITED STATES PATENTS

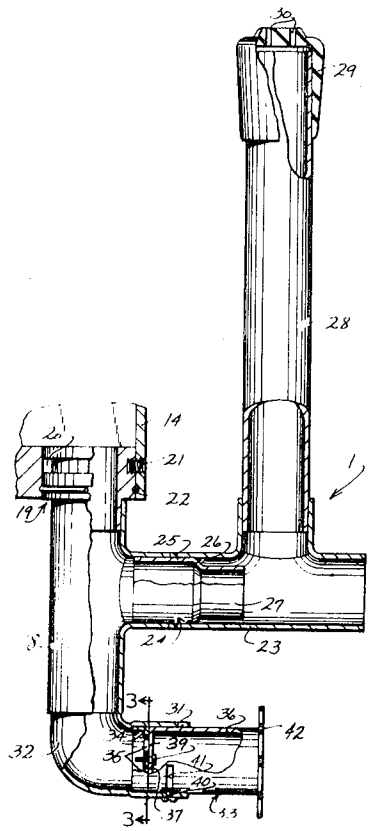
3,340,870	9/1967	Steltz et al.	128/66
2,938,517	5/1960	Friend	128/66
3,067,435	12/1962	Nash	4/180

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[57] **ABSTRACT**

A dual nozzle assembly for a hydrotherapeutic unit. The nozzle assembly includes a primary nozzle having a fixed orifice and combined with a secondary nozzle having a variable orifice. Both of the nozzles are located beneath the level of water in a tub or tank, and water under pressure is introduced into the inlet of the nozzle assembly. The water passing through the primary nozzle provides an aspirating action to draw air into the primary nozzle through a standpipe which extends above the water level. Air is mixed with the water and the aerated high pressure stream is discharged beneath the water level. By adjusting the variable orifice of the secondary nozzle, the amount of water directed through the primary nozzle can be varied to thereby vary the velocity of the water being discharged.

9 Claims, 4 Drawing Figures



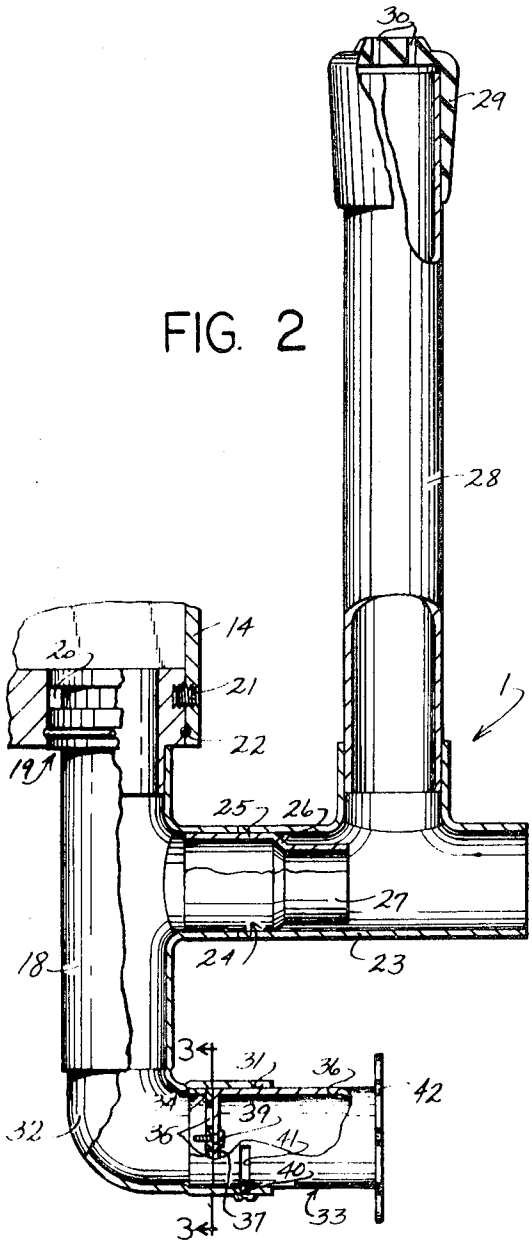


FIG. 2

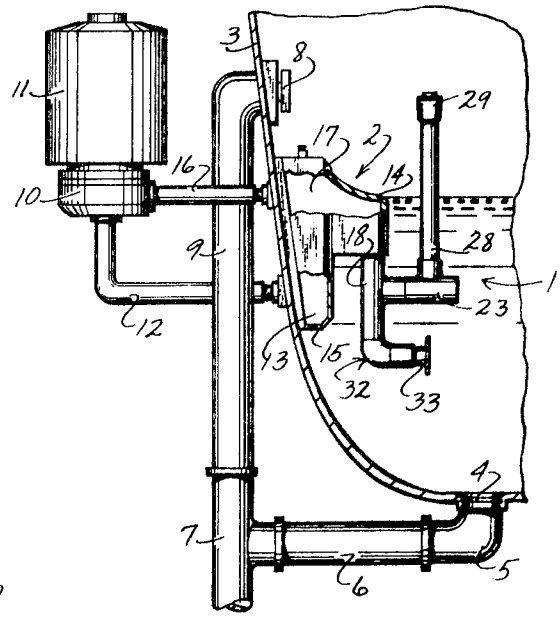


FIG. 1

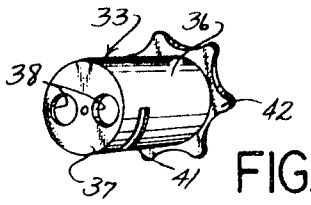


FIG. 4

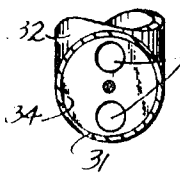


FIG. 3

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NOZZLE ASSEMBLY FOR A HYDROTHERAPEUTIC UNIT

BACKGROUND OF THE INVENTION

Hydrotherapeutic units are employed in a tub or tank to create an aerated high pressure stream of water which can be directed against various portions of the body undergoing hydrotherapeutic treatment. The conventional hydrotherapeutic unit includes a pump and motor unit which is located outside of the tub and water from the tub is conducted through either the tub drain or another outlet opening in the tub to the suction side of the pump. Water discharged from the pump is conducted to a nozzle assembly which is located within the tub. The nozzle assembly generally includes a nozzle which is located beneath the water level in the tank, and as the water passes through the nozzle the velocity of the water is increased, thereby creating an aspirating effect which draws air to the nozzle through a standpipe. The air is mixed with the stream of water and the aerated high pressure stream of water is discharged beneath the water level and directed against the body.

It is often desirable to be able to adjust the velocity of the stream being discharged from the nozzle to thereby provide a strong or mild therapeutic action against the portion of the body undergoing treatment. To vary the velocity of the water being discharged it has generally been necessary with hydrotherapeutic units of the past to remove the nozzle and substitute a nozzle of different dimensions in order to change or vary the velocity of discharge.

SUMMARY OF THE INVENTION

This invention is directed to an improved nozzle assembly for a hydrotherapeutic unit in which the velocity of the water being discharged from the nozzle can be readily adjusted without disassembly or replacement of parts. According to the invention, the nozzle assembly includes a primary nozzle located beneath water level and having a fixed outlet orifice. Water passing through the primary nozzle creates an aspirating effect to draw air into the nozzle through a standpipe which extends above the water level. The air is mixed with water and the aerated high pressure stream is discharged against the portion of the body undergoing therapeutic treatment.

To vary the velocity of the water being discharged from the primary nozzle, a variable orifice valve is incorporated into a secondary nozzle which is connected to the inlet of the nozzle assembly and is located beneath and parallel to the primary nozzle. By adjusting the valve, the amount of water directed through the fixed primary nozzle can be varied to thereby vary the velocity of the discharge. With the variable valve in an open position, part of the flow of water is diverted through the secondary nozzle to provide an additional zone of therapeutic action.

The nozzle assembly of the invention enables the velocity of the discharge of the primary nozzle to be conveniently varied by adjustment of the variable orifice valve, thereby enabling the unit to provide either a more mild or strong therapeutic action, as desired. This adjustment can be made without disassembly or replacement of parts or components.

The nozzle assembly is attached to the water supply manifold by a swivel connection which enables the stream of aerated water being discharged from the nozzle to be directed to any portion of the tub or tank. Furthermore, the swivel connection enables the nozzle assembly to be pivoted against the end wall of the tub in an out-of-the-way location when not in use. The swivel connection can be readily removed from the supply manifold so that the entire nozzle assembly can be withdrawn or removed from the tub.

Other objects and avantages will appear in the course of the following description.

The drawings illustrate the best mode presently contemplated of carrying out the invention.

In the drawings:

FIG. 1 is a vertical section of a conventional bathtub with the hydrotherapeutic unit of the invention associated with the tub;

FIG. 2 is an enlarged side elevation with parts broken away showing the nozzle assembly;

FIG. 3 is a transverse section taken along line 3—3 of FIG. 2; and

FIG. 4 is a perspective view of the variable flow valve member.

FIG. 1 illustrates a nozzle assembly 1 associated with a hydrotherapeutic unit 2 that is mounted within a bathtub 3. As shown in the drawings, the tub is a conventional bathtub although the hydrotherapeutic unit can be associated with any type of hydrotherapeutic tank.

A drain 4 is provided in the bottom of tub 3 and an elbow 5 connects the drain 4 with a horizontal drain conduit 6. The opposite end of the conduit 6 is connected to a waste valve fitting 7 which contains a standard waste valve, not shown. The waste valve within the fitting 7 is controlled by a waste valve lever 8 located on the end wall of the tub 3, and the lever 8 is connected to the waste valve through a control rod which extends within a vertical conduit 9 connected to the fitting 7.

The hydrotherapeutic unit 2 includes a pump 10 which is located outside of the tub 3 and is driven by a motor 11. To supply water from the tub 3 to the pump 10, an inlet pipe 12 is connected to the suction side of the pump and extends through an opening in the end wall of the tub. The pipe 12 communicates with a lower chamber 13 of a housing 14 which is attached to the end wall of the tub. An opening 15 is provided in the lower wall of the housing 14 and provides communication between the chamber 13 and the tub. With this construction, water is drawn from the tub 3 through the opening 15 to the chamber 13 and then through the pipe 12 to the suction side of the pump 10.

Water under pressure is discharged from the pump 10 through an outlet conduit 16 which extends through the end wall of the tub and communicates with an upper chamber 17 of the housing 14. As shown in FIG. 1, the conduits 12 and 16 are located on opposite sides of the waste control conduit 9, and the housing 14 is located in alignment with the longitudinal center line of the tub.

The nozzle assembly 1 of the invention is connected to the housing 14 and water is discharged from the chamber 17 through the nozzle assembly. As best illustrated in FIG. 2, the nozzle assembly includes a vertical conduit 18 having an enlarged upper end or head 19 which is secured within an opening in the housing 14. To mount the nozzle assembly 1 for swiveling movement with respect to the housing 14, the upper head 19 is provided with a circumferential groove 20 and a set

screw 21 extends through an opening in the housing 14 and is received within the groove 20. Engagement of the set screw 21 with the groove 20 prevents axial displacement of the conduit 18 from the housing, but permits the conduit 18 to be rotated about its axis,

To seal the head 19 with respect to the housing, the periphery of the head 19 is provided with a groove which receives an 0-ring seal 22.

Connected to the central portion of the vertical conduit 18 of the nozzle assembly is a horizontal conduit 23 which contains primary nozzle 24. The nozzle includes a tubular inlet section 25, an inwardly tapered central section 26 and a cylindrical outlet section 27, which has a lesser diameter than the inlet section 25.

Water entering the conduit 18 passes through the nozzle 24, and due to the restricted size of the outlet 27 the velocity of the water will be increased and the pressure will be correspondingly reduced, thereby providing an aspirating effect which will draw air into the conduit 23 through a stand pipe 28. The upper end of the stand pipe 28 extends above the water level in tub 3 and receives a cap 29 having a series of air entry holes 30. Air being drawn through the standpipe is mixed with the water being discharge from the primary nozzle 24 to provide a high pressure aerated stream of water which is discharged from the conduit 23 beneath the water level in the tub.

In accordance with the invention, the lower end of the vertical conduit 18 is connected to a horizontal tube 31 through an elbow 32, and a secondary nozzle or valve 33 is mounted within the end of the tube 31. As best illustrated in FIGS. 2 and 3, a fixed disc 34 is secured within the tube 31 and is provided with a pair of outlet ports 35 which are located in vertical alignment.

The valve 33 is mounted for rotation within the end of the tube 31 and includes a cylindrical body section 36 and an inner end wall 37 having a pair of ports 38. Ports 38 are located diametrically of the end wall 37 and have a diameter similar to the diameter of the outlet ports 35 of disc 34.

To secure the valve 33 within the tube 31, a screw 39 extends through the end wall 37 and is threaded within a central hole in the disc 34.

The valve 33 is adapted to be rotated with respect to tube 31 to provide a full open to a full closed position. For example, when the ports 38 are in full registry with the ports 35, maximum flow through the valve 33 is achieved, while if the ports 38 are disposed horizontally they will be entirely out of registry with the ports 35 to prevent flow through the valve 33. The flow between the maximum and minimum positions is controlled by means of a set screw 40 which extends through an opening in tube 31 and is received within a circumferential slot 41 formed in the body 36. The outer end of the body is provided with a knurled knob 42 which facilitates rotation of the valve within the tube 31. When the set screw 40 seats against one end of the slot 41, the ports 38 and 35 will be in full registry so that the water will be discharged through the secondary nozzle or valve 33 as well as through nozzle 24. When the set screw 40 seats against the opposite end of the groove 41, the ports will be out of registry so that all of the water will be directed through nozzle 24.

By use of the variable flow secondary nozzle 33 the velocity of the discharge of water through the nozzle 24 can be conveniently varied, thereby enabling the unit to provide either a mild or strong therapeutic action, as desired. This adjustment can be made by merely rotating the knob 42 and does not require the disassembly of the nozzle and replacement of components as has been necessary with nozzles used in the past. As a further advantage, the emission of water through secondary nozzle 33 provides a lower level of water discharge to thereby increase the zone of therapeutic action.

As the conduit 18 of the nozzle assembly is attached to the water supply manifold through a swivel connection, the stream of aerated water being discharged through the nozzle 24 can be directed to any portion of the tube. Moreover, the swivel connection enables the nozzle assembly to be pivoted against the end wall of the tub when not in use, and if desired, the nozzle assembly can be removed from the manifold by merely threading out the set screw 21.

Various modes of carrying out the invention are contemplated as being within the scope of the following claims, particularly pointing out and distinctly claiming the subject matter which is regarded as the invention.

I claim:

1. A nozzle assembly for a hydrotherapeutic unit, comprising a supply conduit disposed in a tank containing water, one end of the supply conduit being connected to a source of water under pressure, a first outlet conduit connected to said supply conduit, a nozzle disposed within said first outlet conduit and having an inlet communicating with supply conduit and having an outlet of reduced diameter communicating with said tank whereby water is discharged from said nozzle into the tank, air supply means for supplying means to said first outlet conduit at a location adjacent the outlet of the nozzle whereby air is mixed with the water being discharged from the nozzle to provide a high pressure aerated stream of water, a second outlet conduit connected to said supply conduit and spaced from said first outlet conduit and communicating with said tank, valve means connected in said second outlet conduit, and manually adjustable means for varying the flow of water through said valve means to selectively vary the velocity of discharge of the water through the valve means and provide a secondary zone of water discharge through said valve means.

2. The nozzle assembly of claim 1, wherein said valve means includes a fixed valve member having a first port and a movable valve member having a second port disposed to be moved into and out of registry with said first port to thereby control the flow through said valve member.

3. The nozzle assembly of claim 1, and including swivel means connected to the supply conduit means for mounting the supply conduit means for swivel movement with respect to the tank.

4. The nozzle assembly of claim 2, wherein said adjusting means includes a hand knob connected to said second valve member.

5. The nozzle assembly of claim 2, wherein said fixed valve member includes a pair of first ports disposed diametrically opposite each other and said movable valve member includes a pair of second ports disposed diametrically opposite each other.

6. The nozzle assembly of claim 5, wherein the diameter of the first ports is substantially equal to the diameter of the second ports.

7. A nozzle assembly for a hydrotherapeutic unit, comprising a vertical conduit adapted to be disposed in

a tank containing water, the upper end of said vertical conduit being connected to a source of water under pressure, a first generally horizontal conduit connected to said vertical conduit, a first nozzle having an inlet connected to said first horizontal conduit and having an outlet communicating with said tank whereby water is discharged from said nozzle into the tank, air supply means for supplying air to said first horizontal conduit at a location adjacent the outlet of the first nozzle whereby air is mixed with the water being discharged from the nozzle to provide a high pressure aerated stream of water, a second generally horizontal conduit connected to said vertical conduit and spaced vertically from said first horizontal conduit, a second nozzle located in said second horizontal conduit, and adjusting means operably connected to said second nozzle for varying the flow of water through said second nozzle to selectively vary the velocity of discharge of the water through the nozzles and provide a secondary zone of water discharge.

8. The nozzle assembly of claim **7,** wherein the axes of said first and second horizontal conduits are substantially parallel.

9. The nozzle construction of claim **8,** wherein the second horizontal conduit is located beneath the first horizontal conduit.

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