Oct. 18, 1966 D. C. STELTZ ETAL 3,279,703

HYDRO THERAPEUTIC FLUID NOZZLE

Filed Aug. 3, 1964

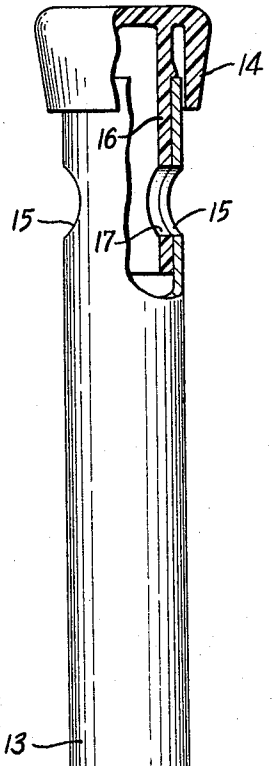


Fig. 1.

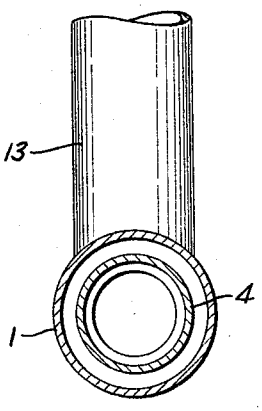
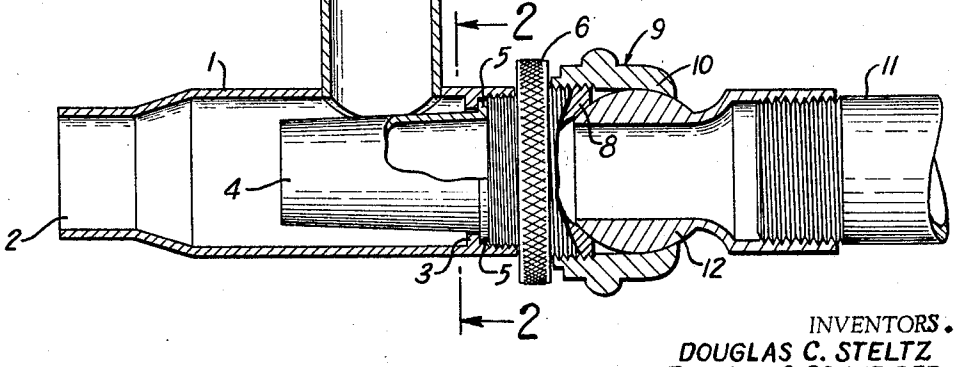


Fig. 2.



INVENTORS.
DOUGLAS C. STELTZ
RICHARD C. SCHNEIDER
BY
Andrus & Starke
ATTORNEYS

United States Patent Office 3,279,703 Patented Oct. 18, 1966

3,279,703

HYDRO THERAPEUTIC FLUID NOZZLE

Douglas C. Steltz, 13385 Kenmar Court, Brookfield, Wis., and Richard C. Schneider, Alta Loma Circle, Thiensville, Wis.

Filed Aug. 3, 1964, Ser. No. 386,921
3 Claims. (Cl. 239—433)

This invention relates to a liquid aerating and pressurizing device and more particularly to a nozzle assembly for use in a hydrotherapeutic device. This application is a continuation-in-part of application Serial No. 307,645, filed September 9, 1963, now abandoned.

A hydrotherapeutic device is designed to apply a pressurized and aerated stream of water externally against a disabled or injured portion of the body. In a typical hydrotherapeutic device, a nozzle assembly is located beneath the water level in a tank, and liquid under pressure is introduced into one end of the assembly and passes through a nozzle or venturi of restricted cross sectional area. Passing through the nozzle increases the velocity of the water stream, creating an aspirating effect which draws air through a stand pipe. The air is mixed with the stream of water and the aerated high pressure stream of water is discharged beneath water level and directed against the portion of the body undergoing the hydrotherapeutic treatment.

The present invention is directed to a new and improved nozzle assembly for a hydrotherapeutic device. More specifically, the nozzle assembly includes a tubular body having an internal ridge or shoulder. A discharge nozzle is freely located within the body and includes an outwardly extending flange. An adapter is threaded into the inlet end of the body and bears against the end of the discharge nozzle to force the flange of the nozzle into engagement with the shoulder of the body and firmly position the nozzle within the tubular body.

The water being discharged through the nozzle is aerated by means of an air inlet pipe which is connected to the tubular body and extends above the water level. Air is drawn through the pipe and mixed with the water to provide a high pressure aerated water stream.

To provide universal movement for the nozzle assembly, the inlet end of the adapter is connected by means of a ball and socket joint to the water supply pipe.

The nozzle assembly of the invention is a simple and inexpensive device having a minimum number of parts. The discharge nozzle can be readily removed from the body and replaced with a nozzle of different diameter to thereby conveniently regulate the discharge pressure of the water. Furthermore, by use of the ball and socket type of connection, the entire nozzle assembly can be moved in all directions within the tank to thereby direct the stream of water against the desired portion of the body undergoing treatment.

Other objects and advantages 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 side elevational of the nozzle assembly of the invention with parts broken away in section; and

FIG. 2 is a transverse section taken along line 2—2 of FIG. 1.

The drawings illustrate a nozzle assembly for use in a hydrotherapeutic device which includes a tubular body 1 having a discharge outlet 2 of reduced diameter. An internal ridge or shoulder 3 is formed in the tubular body adjacent the inlet end, and a tapered discharge nozzle 4 or jet is located within the body and is provided with an outwardly extending flange 5 which bears against the shoulder 3.

The flange 5 of nozzle 4 is maintained in engagement with the shoulder 3 by an adapter 6 having an end 7 which is threaded within the inlet end of the body 1. The outlet end 7 of the adapter bears against the flange and firmly holds the flange against the shoulder 3.

The opposite or inlet end 8 of the adapter 6 is threadedly engaged with a socket member 9 having a portion 10 which defines a portion of a sphere or socket. An inlet pipe 11 is provided with a ball end 12 which is engaged with the socket 10 and permits the tubular body to be moved universally with regard to the inlet pipe 11.

Water, or other liquid, is introduced through the inlet pipe 11 and passes through the adapter 6 and is discharged in the form of a high pressure stream through the nozzle 4. The discharge of liquid from the nozzle 4 provides an aspirating effect which draws air into the tubular body through a stand pipe 13, which extends upwardly to a level above the water in the tank or tub in which the therapeutic device is located. The upper end of the stand pipe 13 is closed off by a cap 14 and the pipe is provided with a series of holes 15 through which air enters. The air passes downwardly through the stand pipe 13 around the nozzle 4 and is mixed with the stream of water to provide an aerated, high pressure stream which is discharged through the outlet 2 in the tubular body. The reduced diameter of outlet 2, which is slightly greater than the outlet diameter of nozzle 4, also aids in producing a sharp, small diameter stream of aerated water.

As the tubular body is connected to the inlet pipe through the ball and socket connection, the tubular body can be moved in all directions within the tank so that the aerated stream of high pressure liquid being discharged through outlet 2 can be directed against the portion of the body undergoing treatment.

As an additional feature, the pressure of the liquid stream being discharged can be conveniently varied by removing the nozzle 4 and substituting a nozzle of different diameter. It is contemplated that the device may include a series of nozzles, and the user can insert the nozzle into the body which will give him the desired pressurized stream. The nozzle 4 can be readily removed by merely unthreading the adapter from the end of the tubular body, removing the nozzle, and replacing the nozzle with a second nozzle of desired diameter.

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 device, comprising a tubular body to be positioned beneath the liquid level and having an inlet end, a central portion and a discharge end, said discharge end having a smaller cross sectional area than the cross sectional area of the central portion, a tapered discharge nozzle freely disposed within the central portion and spaced from the wall of said body to provide an annular clearance therebetween, said nozzle having an outwardly extending flange disposed in bearing engagement with a shoulder on said tubular body, tubular means disposed within the inlet end of said body and engaged with said nozzle for forcing said flange against said shoulder, means for introducing liquid to the inlet end of said tubular body with the liquid being discharged in the form of a high pressure stream through said nozzle and through the discharge end of said body, and an air inlet pipe extending upwardly a substantial distance above the body to a position above the liquid level and communicating directly with said annular clearance, air being drawn in through said pipe due to the aspirating effect of the discharge of liquid through said nozzle to thereby provide an aerated stream of high pressure liquid.

2. A nozzle assembly for a hydrotherapeutic device, comprising a tubular body to be positioned beneath the liquid level and having an inlet end and a discharge end, a first nozzle disposed within said body and having a discharge end spaced radially inward of said body to provide a clearance therebetween, means for introducing liquid into the inlet end of said body, an air inlet pipe extending upwardly a substantial distance above said body to a position above the liquid level and communicating with said clearance, air being drawn in through said pipe due to the aspirating effect of the discharge of liquid through said nozzle to thereby provide an aerated stream of high pressure liquid, and a second nozzle associated with the discharge end of said body, the discharge end of said second nozzle having a smaller cross-sectional area than the cross-sectional area of said body and having a cross-sectional area substantially similar to the cross-sectional area of the discharge end of the first nozzle, said second nozzle serving to receive the stream of liquid from the first nozzle and produce a sharp stream of the aerated liquid.

3. A nozzle assembly for a hydrotherapeutic device, comprising a tubular body to be positioned beneath the liquid level and having an inlet end and a discharge end, a first nozzle disposed within said body, and having a discharge end spaced radially inward of said body to provide a clearance therebetween, means for introducing

liquid into the inlet end of said body, an air inlet pipe extending upwardly a substantial distance above said body to a position above the liquid level and communicating with said annular clearance, air being drawn in through said pipe due to the aspirating effect of the discharge of liquid through said nozzle to thereby provide an aerated stream of high pressure liquid, the upper end of said air inlet pipe being open and the wall of the pipe adjacent said upper end being provided with an air inlet hole, and a cap enclosing said upper end of the inlet pipe and rotatably mounted on the pipe, said cap having a downwardly extending flange, with said flange having an opening disposed to be selectively aligned with said hole on rotation of the cap to thereby vary the amount of air being drawn into said pipe.

References Cited by the Examiner

UNITED STATES PATENTS

1,058,330	4/1913	Page	239—433
2,447,123	8/1948	Jones	239—430
2,518,709	8/1950	Mosby	239—318
2,738,962	3/1956	Goodrie	239—430

M. HENSON WOOD, JR., *Primary Examiner.*

R. S. STROBEL, *Assistant Examiner.*