

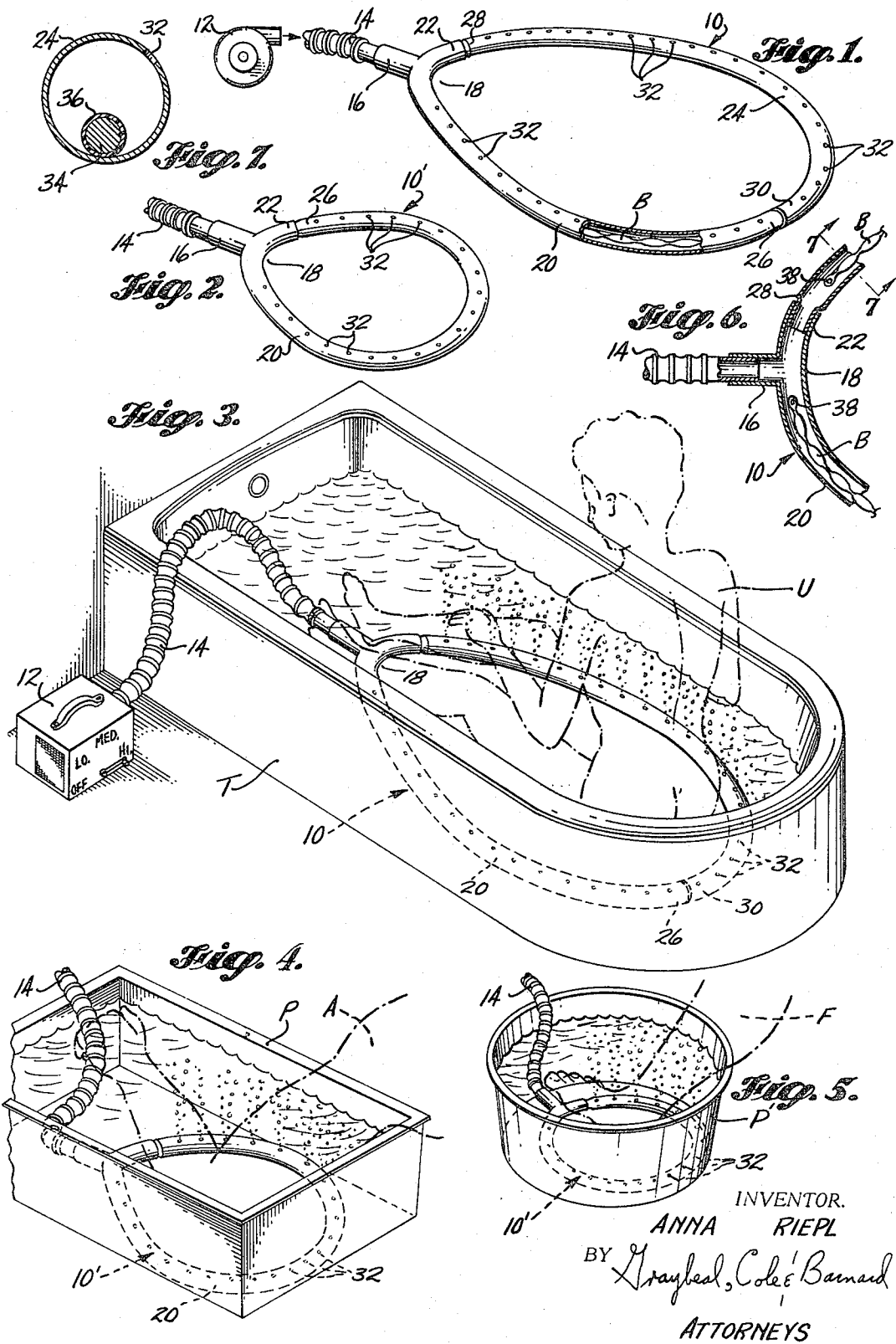
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A. RIEPL

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HYDROKINETIC BATH APPARATUS

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INVENTOR.

ANNA RIEPL

BY *Graybeal, Cole & Barnard*
ATTORNEYS

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HYDROKINETIC BATH APPARATUS
 Anna Riepl, 2102 Lake Washington Blvd. SE.,
 Bellevue, Wash. 98004
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ABSTRACT OF THE DISCLOSURE

Hydrokinetic bath apparatus comprising a submersible aerator of branched conduit form, the conduits being made from a soft elastomeric material rendering them soft and flexible. Ballast means in said conduit. A closed loop form of such aerator including a removable section rendering it changeable in size from a large loop including such section to a small loop minus such section.

The present invention relates to apparatus for use with a conventional bathtub or other vessel, containing heated water, to provide a hydrokinetic or whirlpool bath.

A hydrokinetic or whirlpool bath is a bath in which heated water (at a temperature between about 95° to 115° F., for example) is kept in constant agitation. The immersed part of the body is subjected to the combined action of heat and the gentle mechanical and softening effect of the whirling water, and such action causes a marked response in circulation. The hydrokinetic bath is a most valuable measure in a large number of traumatic and chronic inflammatory conditions. It is excellent for early treatment of stiffness, pain and sluggish skin circulation following fractures and constitutes the best treatment which can be given as soon as a fractured limb can be taken out from its immobilization. In painful scars, adhesions, peripheral nerve injuries and some forms of neuritis, joint stiffness and suitable cases of arthritis, tenosynovitis, indolent and chronic suppurating wounds, painful stumps, weak and painful feet, it is employed with benefit.

The hydrokinetic bath apparatus of the present invention is characterized essentially by an immersible aerator of flexible tubular form, fabricated from a resilient, elastomeric (i.e. rubber-like) material, such as vinyl plastic, for example. Such aerator has a relatively short inlet portion, a two-way flow-divider portion leading from said inlet portion, and a pair of branch portions curving first laterally outwardly in generally opposite directions from said flow-divider portion, and then generally together, and forming between them an open area in which the part of the user's body to be bathed is received. The branch portions each include a plurality of air jet forming nozzle openings. Pressurized air is provided by a variable delivery air pump, or the like, which at all times is located outside of the bath vessel. A flexible conduit interconnects between the outlet of the air pump and the inlet of the aerator, and delivers the pressurized air into the vessel to said aerator. In use a large number of high velocity jet-like streams of air are injected from the aerator. The air stream displace and hence agitate the water, and a large number of air bubbles are formed which add to the mechanical stimulation. Preferably, the nozzle openings are formed in upper, inside side wall portions of the tubing, so that the air streams are directed inwardly toward the portion of the body being bathed, as well as upwardly, so that water movement is generally toward the immersed portion of the body.

In its preferred form, the tubular aerator of the present invention has an elongated first branch of tubing extending laterally outwardly from the two-way flow-divider portion, to one side thereof, a relatively short stub section extending laterally outwardly from said flow-divider por-

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tion, on the opposite side thereof, and a selectively usable makeup section of tubing. The air jet forming nozzles are provided in both the elongated branch and the makeup section. The makeup section has a joint component at each of its ends, one of which is preferably the internal component of a friction-grip slip joint, and the other the external component of such a joint. The elongated branch has a joint component at its free end that is essentially identical to the joint component at a first end of the makeup section, and the stub section has a joint component at its free end that is essentially identical to the joint component at the second end of the makeup section. The joint component at the free end of said first branch, and its identical counterpart at the first end of the makeup section, both complement and are connectable to the joint component at the free end of said stub section. The joint component at the free end of the first branch also complements and is connected to the joint component at the second end of the makeup section. This construction and arrangement makes it possible for the makeup section to be interconnected between the free end of the elongated branch and the free end of the stub section to form a relatively large, closed loop aerator for use in a relatively large vessel, such as a conventional bathtub, for example. Alternatively, the make-up section may be set aside, and the free end of said elongated branch may be brought around and joined to the free end of the stub section to form a smaller closed loop aerator for use in a relatively smaller vessel.

As a further characteristic feature of the invention an elongated, flexible ballast member is disposed in the first branch, and a similar ballast member is disposed in the removable makeup section. The ballast members may comprise a plurality of spaced apart ballast weights (e.g. pieces of lead) encased in an elongated sheath that is constricted in the spaces between the weights, so as to maintain the weights apart and form a continuous but segmented article. The ballast members may be secured in place in the tubing by riveting them at their ends only to the adjacent wall portions of the tubing.

According to the present invention, all parts which in use contact the bathtub, or other vessel in which the aerator is placed, are made of vinyl plastic or some other type of soft surfaced elastomeric material incapable of scratching or marring the finish of the vessel. None of the immersible parts are made of a material that will rust, and no electric wires lead into the water.

An object of the invention is to provide a portable, lightweight, easy to handle hydrokinetic bath apparatus that includes a flexible tubular aerator of closed loop form, especially constructed to be quickly and easily converted from a large loop form, for use in a large vessel, such as a conventional bathtub, for example, to a small loop form, for use in a smaller vessel, and then back again to the large loop form.

Another object of the present invention is to provide hydrokinetic bath apparatus of the character described which is simple in construction, and hence relatively inexpensive to manufacture, is durable throughout a long life of repetitious use, and is attractive in appearance.

These and other features, advantages, objects and capabilities of hydrokinetic bath apparatus constructed according to the present invention will be apparent from the following description of a typical form thereof, taken together with the accompanying illustrations, wherein like letters and numerals refer to like parts, and wherein:

FIG. 1 is a perspective view of the preferred form of aerator unit, with the makeup section of tubing in place, so as to form a relatively large loop capable of substantially encircling the bottom of a conventional bathtub;

FIG. 2 is a perspective view of the aerator unit of FIG. 1, but with one of the makeup sections of tubing removed,

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and with the elongated branch brought around and coupled to the two-way flow-divider portion to form a smaller loop;

FIG. 3 is a perspective view of the aerator unit in its large loop form and in use in a conventional bathtub, such view also showing the out-of-tub air supply unit and the flexible air supply hose leading therefrom into the tub and connecting to the aerator;

FIG. 4 is a perspective view of the aerator in its small loop form, as it is being used for treating an arm in a rectangular vessel substantially smaller than a bathtub;

FIG. 5 is a perspective view of the aerator unit in its small loop form, as it is being used for treating a foot in a circular pan;

FIG. 6 is a fragmentary view, partly in section, taken near the inlet of the aerator, and showing the details of the slip joint connections, the somewhat arcuate T form of the two-way flow-divider whereat the inlet portion of the aerator branches into a pair of oppositely curving branches which eventually meet to form a closed loop, and the manner in which the segmented ballast members are secured to the tubing; and

FIG. 7 is a transverse view taken through the tubing substantially along line 7—7 of FIG. 6, such view showing one of the ballast weights of the ballast member in section, showing the relatively thick wall nature of the tubing, and showing a preferred location for at least some of the air jet forming openings.

Turning to a specific consideration of the several figures of the drawing, the illustrated form of hydrokinetic bath apparatus is shown to include an aerator 10, 10', a source of pressurized air 12, and an air supply hose 14 for delivering pressurized air from the source 12 to the aerator 10.

The aerator 10, 10' comprises an inlet portion 16 that branches or divides at 18 into a pair of oppositely curving branches 20 and 22, 24, respectively. Branch 20 is relatively long, and its terminal or free end is preferably shaped to form the internal component 26 of a friction grip slip joint. Branch 22, 24 includes a stub section 22, 24, the terminal of which is preferably formed to constitute the external or socket portion of such a slip joint. The branch 22, 24 also includes a removable, makeup section of tubing 24 having a joint component 28 at one of its ends, identical to the joint component 26 at the free end of the elongated branch 20, and a joint component 30 at its other end, identical to the joint component at the end of stub section 22.

Referring now to FIGS. 1 and 3, the small end 28 of makeup section 24 is shown to be joined to the free end of stub section 22, and the free end 26 of branch 20 is shown to be joined to the large or socket end 30 of section 24. The loop of tubing thus formed is oval or substantially elliptical in form and of a size to substantially encircle the bottom of a conventional bathtub.

A plurality of air jet stream producing openings 32 are formed in the tubing 20, 24 on about 1½–2½ inch centers, preferably in the upper inside quadrant of the tubing (FIG. 7) so that the air jets are directly inwardly and upwardly. FIG. 3 shows the closed loop of tubing 10 generally encircling the bottom of a conventional bathtub T, and shows a user U sitting in the tub T generally within the open interior of such loop 10.

As shown by FIGS. 2, 4 and 5, section 24 may be removed and end portion 26 of branch 20 brought around and joined to the free end of stub branch 22, so as to still form a closed loop figure 10', but substantially smaller in circumference than the loop formed when section 24 is used. When this is done, the base half of tubing member 20 in effect becomes one of the branches, and the free end half becomes the other branch.

This smaller size of loop 10' is used when a limb or extremity (e.g. arm or a foot) is to be bathed. FIG. 4 shows the small sized loop aerator 10' squeezed into a generally rectangular vessel or pan P, and also shows the arm of the

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user lying in the vessel generally in the open interior of the loop. FIG. 5 shows the small loop aerator 10' lying on the bottom of a circular vessel or pan P', with the user's foot F being situated in the open interior of the loop of tubing.

It is necessary to weight the tubing 20, 24 for the purpose of counteracting the inherent buoyant nature of such tubing when filled with air. According to the present invention, the means for weighting the tubing may comprise two elongated, flexible members or chains B of ballast material, one associated with branch 20 and the other with section 24. Preferably the ballast members B each comprise a series of weights (e.g. nonferrous lead or the like) 34 contained in a plastic sheath or jacket 36. The plastic sheath 36 is restricted in size between the weights 34 so as to maintain the desired spacing of the weights 34 and form a segmented member with much flexibility.

The ballast member B in branch 20 may be simply secured in place by riveting each of its ends to the adjacent wall portion of the tubing 20. In like fashion, the ballast member B in section 24 may be secured in place by riveting each of its ends to an adjacent wall portion of section 24.

By way of typical and therefore nonlimitive example, arm or branch 20 may be about 40–50 inches in length, measuring from the center of junction 18 out to its end. Stub section 22 may be about 2–6 inches in length, and makeup section 24 may measure about 35–48 inches in length. In the preferred form of the invention, branch 20 is about 45 inches in length, section 22 is about 5 inches in length, and section 24 is about 40 inches in length. Preferably, tubing with an inside diameter of about 1¼ inches is used.

The tubing from which the aerator components are made is formed from vinyl plastic, nylon, neoprene, rubber or some other suitable type of elastomeric (i.e. rubber-like) material. The tubing is sufficiently thick walled, and the material used is sufficiently stiff, so that the tubing assumes and normally holds a generally circular cross-sectional shape. When squeezed the tubing will collapse, but it is sufficiently resilient to substantially return to its original shape when the load on it is released.

Preferably the two-way flow-divider portion 18 of the aerator 10, 10' is substantially in the form of a T (as opposed to a Y), with the two arms of the T each curving outwardly somewhat and together forming a rounded arch inlet end section of the loop. The curvature of such section is substantially circular when the aerator is in small loop form (FIG. 2, for example), and indeed such curvature of this section is partially responsible for the branch 20 assuming a generally circular shape when it is brought around and coupled to the end of stub section 22.

The pressurized air source 12 preferably consists of a variable speed (or delivery) air pump. In the illustrated embodiment a three speed air pump is employed. The lower speeds may be used when the aerator is in its small loop form 10', or when the user desires a relatively gentle water massage. The higher speeds are used when the aerator is in its large loop form 10, or when the user desires a more pronounced agitation of the water and hence a more stimulating massage.

Although it is preferred that the hydrokinetic bath apparatus include its own air pump unit 12, it is within the contemplation of this invention that a home vacuum cleaner of a type convertible to a blower be used for supplying the pressurized air.

The air supply hose 14 may also be made from vinyl plastic or another type of elastomeric material. Preferably a corrugated or accordion type of hose is used, so as to provide maximum flexibility.

As illustrated, the air pump unit is situated outside of the vessel. No electric wires lead into the water. All parts which in use contact the bathtub or other vessel

are relatively soft materials and hence will not scratch or mar the finish of the vessel.

Alternative forms of hydrokinetic bath apparatus constructed according to the present invention include a form similar to that illustrated and described above, but wherein the end of section 24 distal stub section 22 is sealed, and the free end of branch 20 is provided with a removable cap. Thus, when this modified aerator is used in a bathtub, for example, it still comprises a pair of branch portions curving first laterally outwardly in generally opposite directions from the flow-divider portion 18, and then generally together, but rather than being joined at their ends such ends remain free. This gives the aerator a generally U-shape, with branch 20 being one arm of the U and section 24 being the other. As before, an open area is formed between branch 20 and section 24 in which the part of the user's body to be bathed is received.

In another alternative form branch 20 may be constructed in sections like branch 22, 24. In other words, branch 20 may be divided into a stub section and a longer section (like section 24), with a slip joint or the like being used to connect the two together.

Also according to the present invention, different types of joints from those illustrated may be used for joining or coupling the tubular components together.

From the foregoing consideration of various aspects of the invention, other arrangements, adaptations and modifications of the invention will occur to those skilled in the art to which the invention is addressed, and are to be considered within the scope of the invention as defined by the following claims.

What is claimed is:

1. Apparatus for submerged use in a vessel of water to form a hydrokinetic bath, said apparatus comprising:

(a) a tubular fluid distributor which in use is substantially entirely submerged in the water, said distributor being fabricated substantially in its entirety from a soft, flexible and resilient elastomeric material, and including

(1) two-way flow-divider of T form having a stem portion, and

(2) a pair of flexible branch portions fabricated in their entireties from a soft, flexible and resilient elastomeric material, and in use each curving first laterally outwardly in generally opposite directions from points of connection with said flow-divider, closely adjacent the stem portion thereof, and then generally together, and forming between them an open central area in the vessel to receive a part of the user's body, submerged in the vessel, with each said branch portion including a plurality of inwardly directed fluid jet forming nozzle openings spaced along its length, and each said branch portion normally having a rounded cross-sectional shape, and being easily deformable when forced so that it will collapse and absorb any blow, and being sufficiently resilient to substantially resume its original shape when any load on it is released, with the soft nature of said branch portions rendering them incapable of hurting the user's body if fallen upon or if struck, with the flexible nature of said branch portions making them easily bendable and/or twistable, permitting the user to move them relative to the body, either individually or both together, in order to regulate the closeness of the nozzle openings to the body, and to roll or fold them up when not in use;

(b) a source of pressurized fluid, with the distributor when in use including means inside it to provide it with sufficient total weight to maintain it substantially completely submerged in the water; and

(c) conduit means interconnectable between said source of pressurized fluid and the stem portion of

said flow-divider, for delivering pressurized fluid to said fluid distributor.

2. Apparatus for use with a vessel of water to form a hydrokinetic bath, said apparatus comprising: an immovable aerator of flexible tubular form having a relatively short inlet portion, a two-way flow-divider portion, and a pair of branch portions fabricated from a soft and resilient elastomeric material, and curving first laterally outwardly in generally opposite directions from said flow-divider portion, and then generally together, and forming therebetween an open area to receive a part of the user's body to be bathed, with said branch portions each including a plurality of air jet forming nozzle openings spaced along its length; an elongated, flexible ballast member extending through each of said branch portions and being of sufficient weight to substantially overcome the inherent buoyancy of said aerator when filled with pressurized air, so as to maintain the aerator substantially submerged in the vessel; a source of pressurized air; and conduit means interconnectable between said source of pressurized air and the inlet of the aerator, for delivering pressurized air to said aerator.

3. Apparatus for use with a vessel of water to form a hydrokinetic bath, said apparatus comprising: an immovable aerator of flexible tubular loop form having an inlet portion, a two-way flow-divider portion, and a pair of branch portions fabricated from a soft and resilient elastomeric material, and curving first laterally outwardly in generally opposite directions from said flow-divider portion, and then generally together, and finally coming together to form a closed loop with an open center area to receive the part of the user's body to be bathed, with said loop including a plurality of air jet forming nozzle openings distributed around same; ballast means inside said tubular loop, said ballast means providing a sufficient amount of weight, substantially evenly distributed about the loop, to substantially overcome the inherent buoyancy of said aerator when filled with pressurized air, so as to maintain the tubular loop aerator substantially submerged in the vessel; an air pump unit to be located alongside of the vessel; and conduit means interconnectable between said air pump and the inlet of the aerator, for delivering pressurized air from the pump to the aerator.

4. Apparatus for use with a vessel of water to form a hydrokinetic bath, said apparatus comprising: a tubular fluid distributor having an inlet portion, a two-way flow-divider portion, and a pair of flexible branch portions fabricated in their entireties from a soft elastomeric material, and in use curving first laterally outwardly in generally opposite directions directly from said flow-divider portion, and then generally together, and forming between them an open area to receive a part of the user's body to be bathed, with said branch portions each including a plurality of fluid jet forming nozzle openings spaced along its length, with the soft nature of said branch portions rendering said distributor incapable of hurting the user's body if fallen upon or if struck, and with the flexible nature of said branch portions making them easily bendable and/or twistable, permitting the user to move them relative to the body, either individually or both together, in order to regulate the closeness of the nozzle openings to the body, and to roll or fold them up when not in use, and flexible ballast means extending lengthwise of each branch portion and being of sufficient weight to substantially overcome the inherent buoyancy of said distributor when filled with pressurized air, so as to maintain the aerator substantially submerged in the vessel; a source of pressurized air; and conduit means interconnectable between said source of pressurized air and the inlet of the fluid distributor, for delivering pressurized air to said fluid distributor.

5. Apparatus for use with a vessel of water to form a hydrokinetic bath, said apparatus comprising: an immovable flexible aerator of tubular loop form, having an inlet

portion, a two-way flow-divider portion, and a pair of branch portions fabricated from a soft and resilient elastomeric material, and curving first laterally outwardly in generally opposite directions from said flow-divider portion, and then generally together, and finally coming together to form a closed loop with an open center area to receive the part of the user's body to be bathed, with said loop including a plurality of air jet forming nozzle openings distributed around same; ballast means comprising a plurality of spaced apart weights encased in said tubular loop and in total providing a sufficient amount of weight, substantially evenly distributed about the loop, to substantially overcome the inherent buoyancy of said aerator when filled with pressurized air, so as to maintain the tubular loop aerator substantially submerged in the vessel; an air pump unit to be located alongside of the vessel; and conduit means interconnectable between said air pump and the inlet of the aerator, for delivering pressurized air from the pump to the aerator.

6. Apparatus for selective use with a conventional bathtub or a substantially smaller vessel, both containing heated water, to form a hydrokinetic bath, said apparatus comprising: an immersible aerator having an inlet portion, a two-way flow-divider portion, and a flexible, tubular loop portion fabricated from a soft and resilient elastomeric material, and comprising an elongated first branch extending laterally outwardly from said flow-divider portion said flow divider including, a relatively short stub section extending laterally outwardly from said flow-divider in the opposite direction from said first branch, and said tubular loop further comprising a selectively usable makeup section, with said first branch and said makeup section each including a plurality of air jet forming nozzle openings spaced along its length, with said makeup section having a joint component at each of its ends, with the first branch having a joint component at its free end that is essentially identical to the joint component at a first end of the makeup section, with the stub section having a joint component at its free end that is essentially identical to the joint component at the sec-

ond end of the makeup section, with the joint component at the free end of said first branch, and its counterpart at the first end of the makeup section, both complementing and being connectable to the joint component at the free end of said stub section, with said joint component at the free end of said first branch also complementing and being connectable to the joint component at the second end of the makeup section, whereby the makeup section may be interconnected between the free end of the first branch and the free end of the stub section to form a relatively large, closed loop air manifold for use in a conventional bathtub, or the free end of said first branch may be brought around and joined to the free end of the stub section to form a smaller, closed loop air manifold for use in the smaller vessel; an air pump unit to be located outside of the bathtub or vessel; and conduit means interconnectable between said air pump and the inlet of said aerator, for delivering pressurized air from the pump to the aerator.

7. Hydrokinetic bath apparatus according to claim 6, wherein each joint is of the friction grip, slip joint type.

8. Hydrokinetic bath apparatus according to claim 6, further including a ballast member inside the first branch, and an independent ballast member inside the makeup section, for countering the inherent buoyancy of the aerator when filled with pressurized air, so as to maintain the same substantially on the bottom of the tube or vessel.

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