



US 20060042689A1

(19) **United States**

(12) **Patent Application Publication**  
**Hinojosa, JR.**

(10) **Pub. No.: US 2006/0042689 A1**

(43) **Pub. Date: Mar. 2, 2006**

(54) **SKIMMER/WATERFALL WITH BACKLIGHT**

(57)

**ABSTRACT**

(76) Inventor: **Francisco Hinojosa JR.**, Santa Paula,  
CA (US)

Correspondence Address:  
**KOPPEL, JACOBS, PATRICK & HEYBL**  
**555 ST. CHARLES DRIVE**  
**SUITE 107**  
**THOUSAND OAKS, CA 91360 (US)**

A skimmer through which water is extracted from a reservoir such as a pool, spa or tub extracts debris from the water and includes a mechanism to return water to the reservoir as a waterfall. Water extracted through the skimmer is distributed between the waterfall and a reservoir return, such as a pool return or hydrotherapy jets in the case of a spa or tub, preferably by a single adjustable valve which controls the distribution. The reach of the waterfall into the reservoir is preferably a function of the water pressure at the waterfall mechanism, with the valve being adjustable to vary the pressure and thereby the waterfall reach. The skimmer/waterfall unit may also include a light source which depends from a removable wall, preferably a lid for the skimmer/waterfall housing, to illuminate the waterfall. The light source is preferably centered behind and disposed to illuminate the waterfall with a balanced backlight.

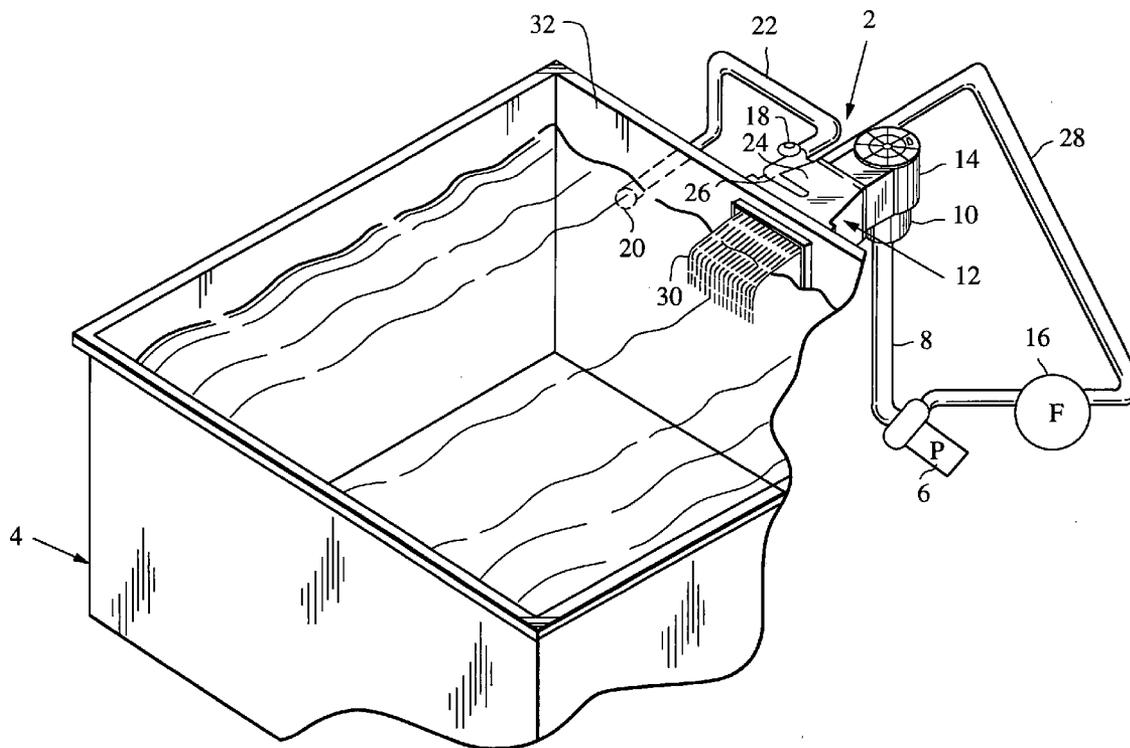
(21) Appl. No.: **10/932,746**

(22) Filed: **Sep. 1, 2004**

**Publication Classification**

(51) **Int. Cl.**  
**F04F 10/00** (2006.01)

(52) **U.S. Cl.** ..... **137/137**



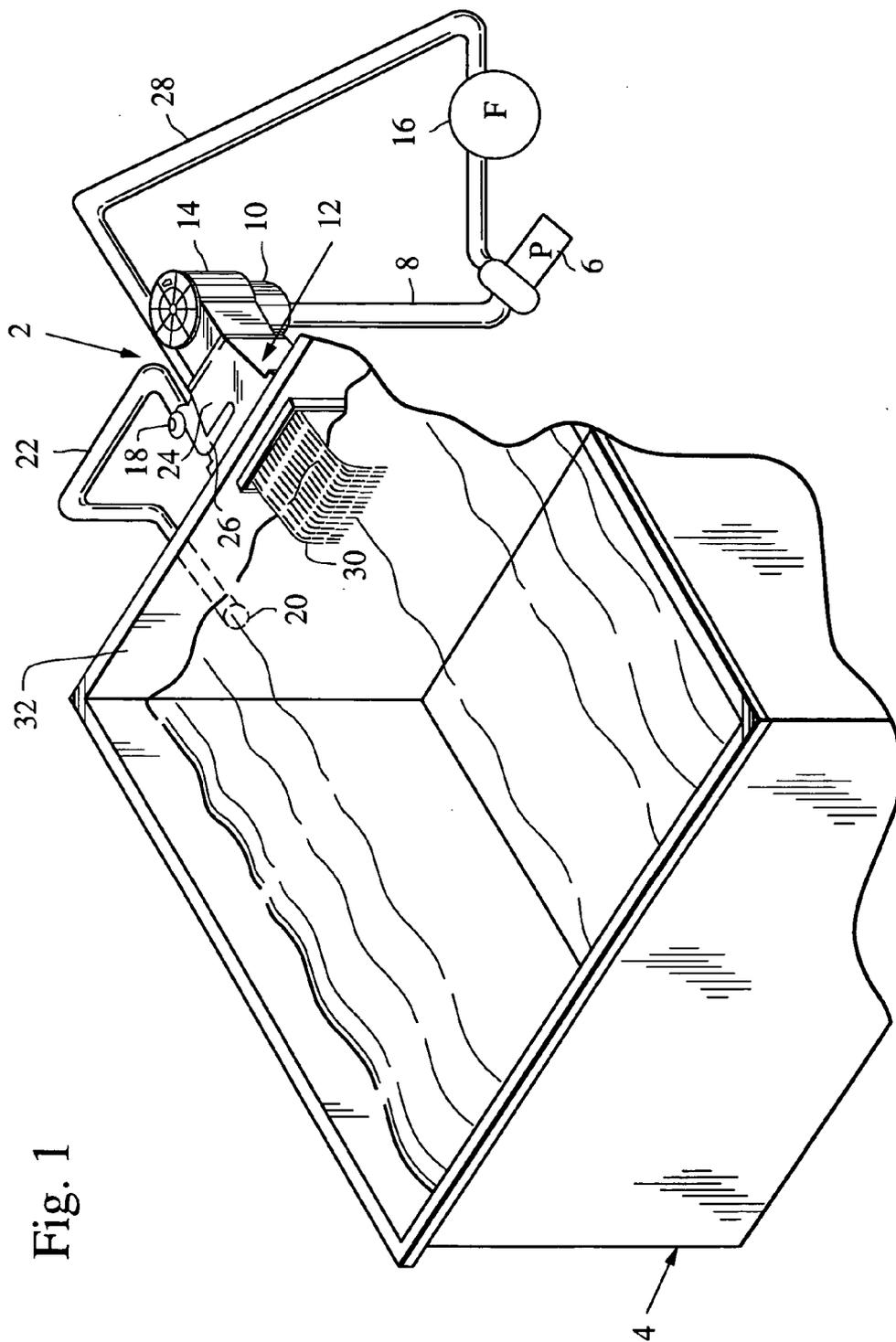
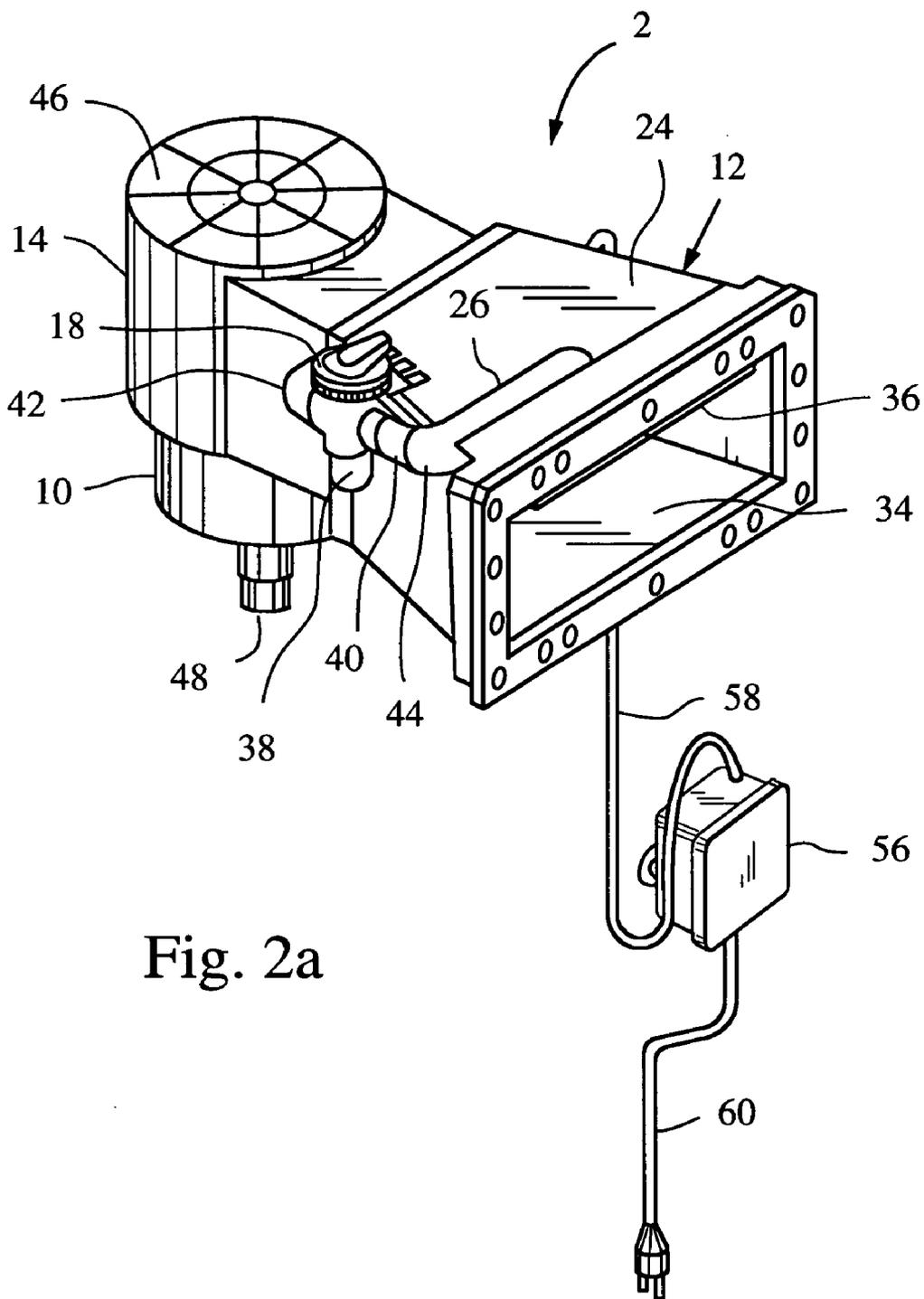


Fig. 1



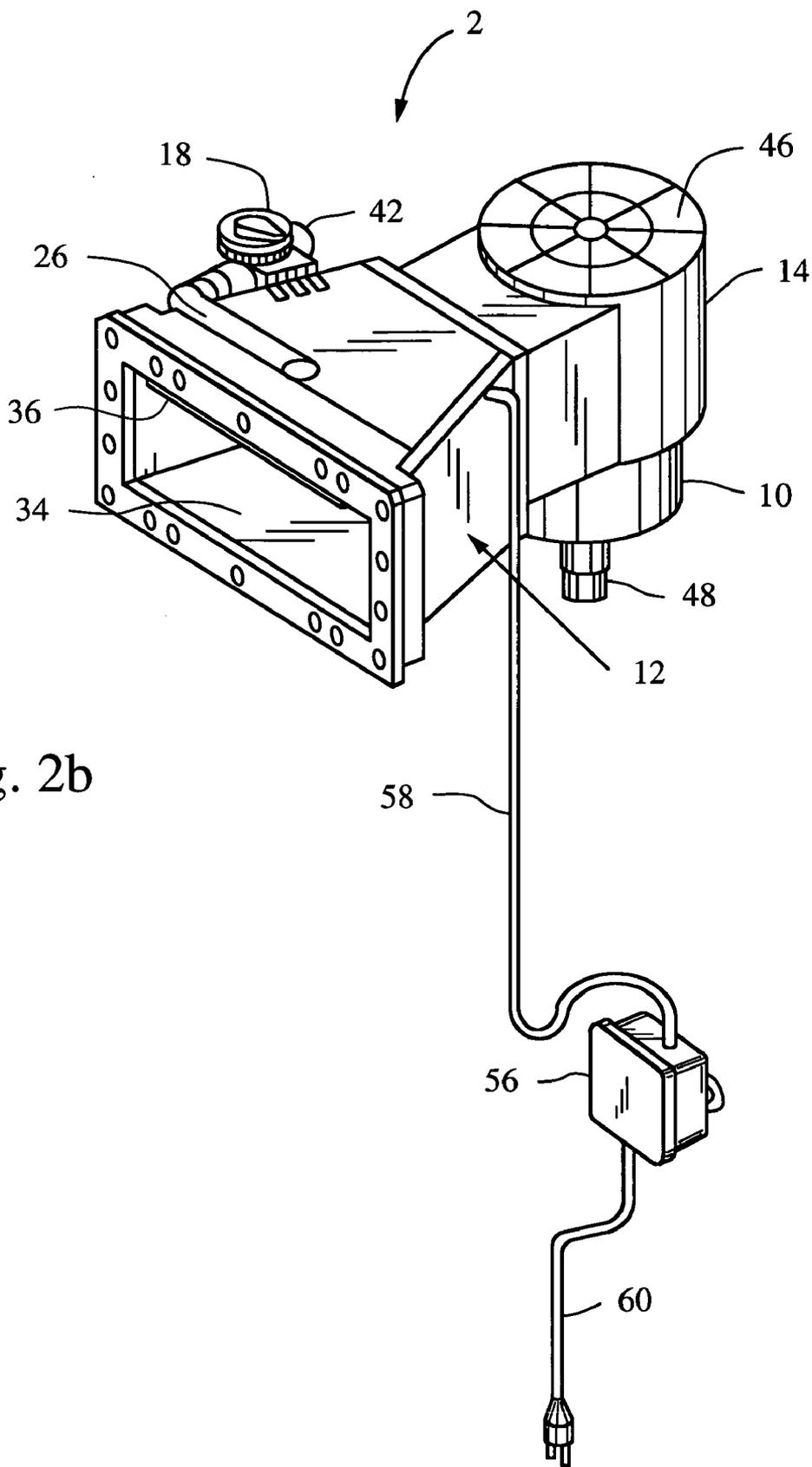


Fig. 2b

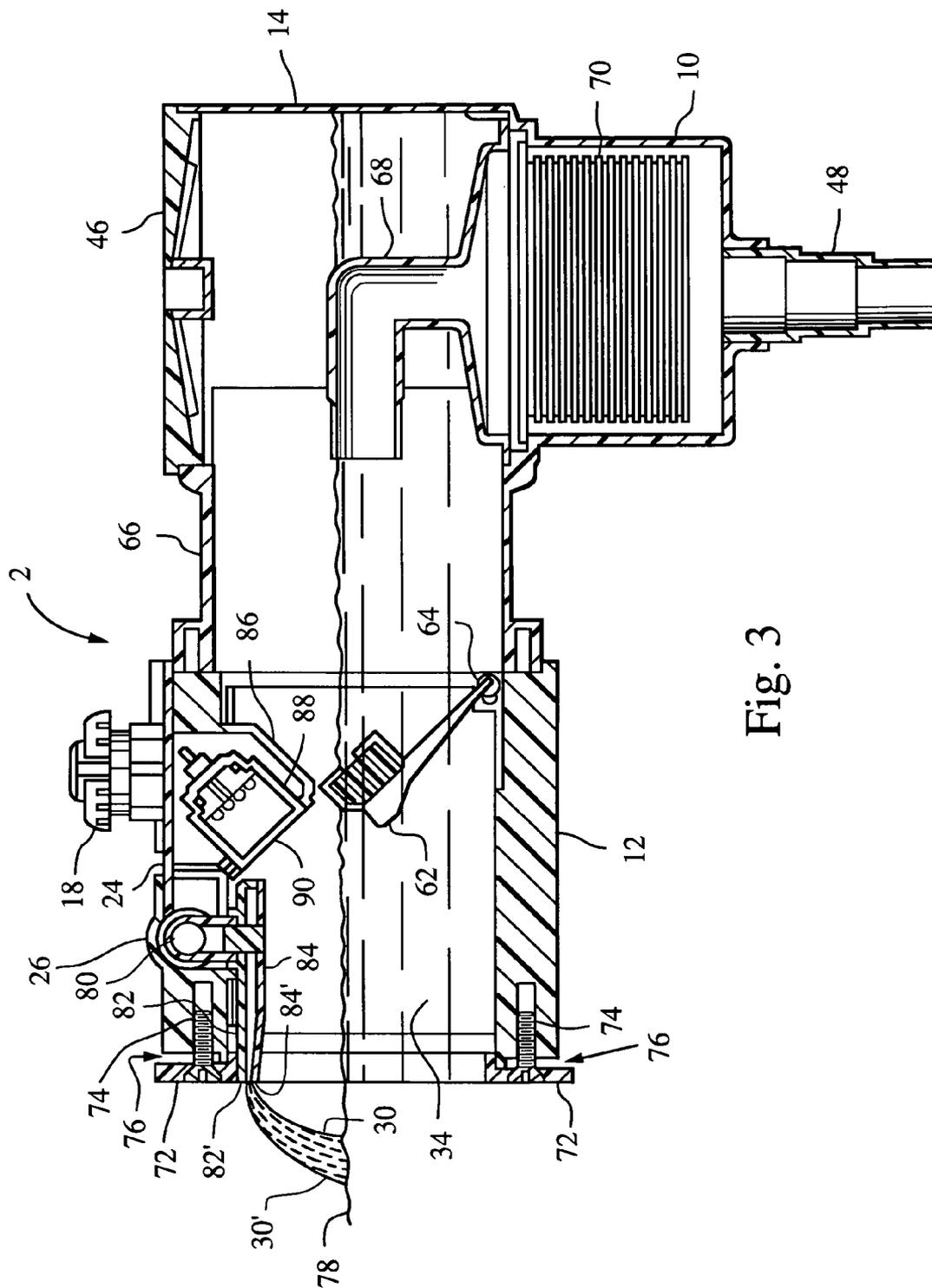


Fig. 3

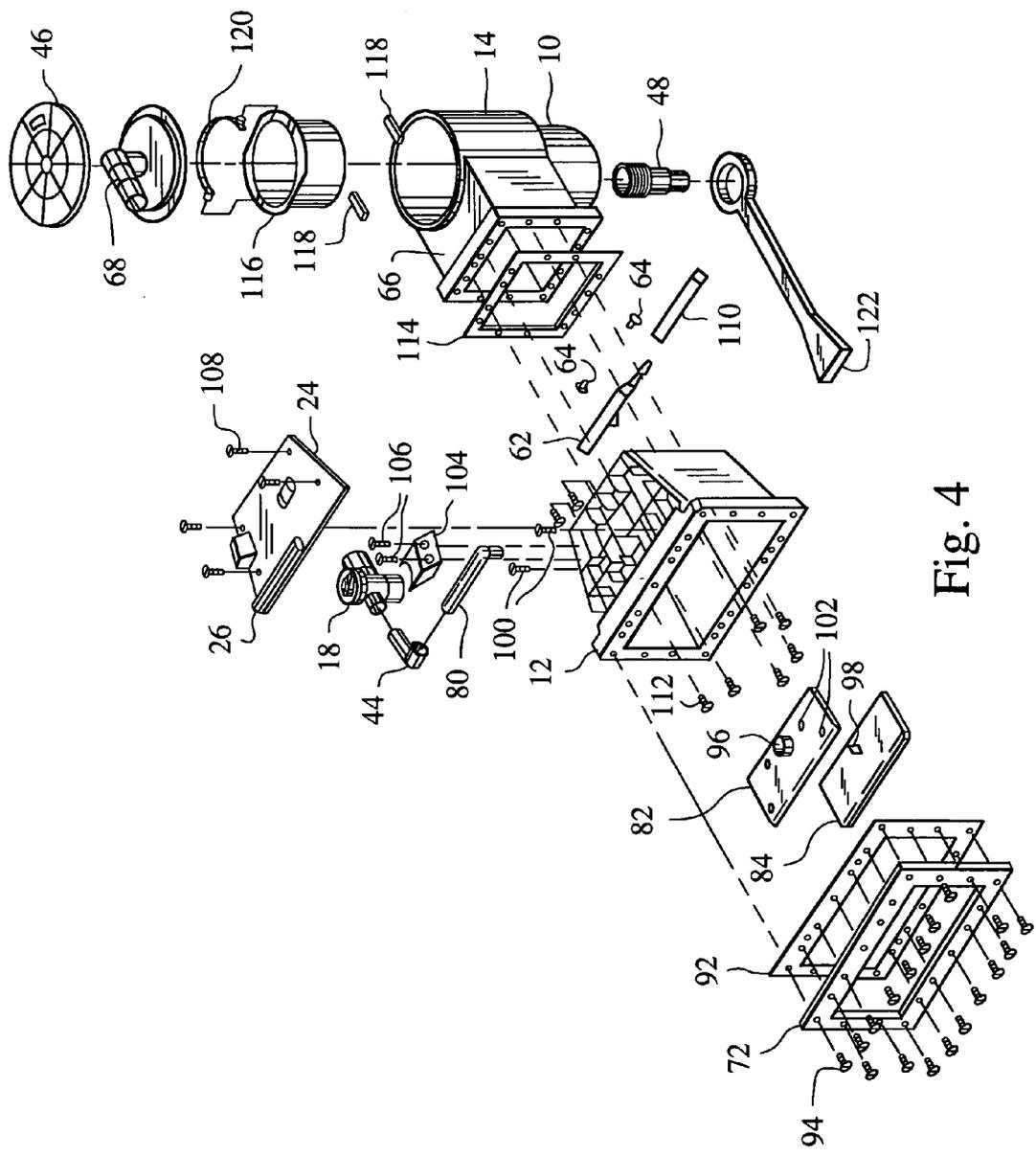


Fig. 4

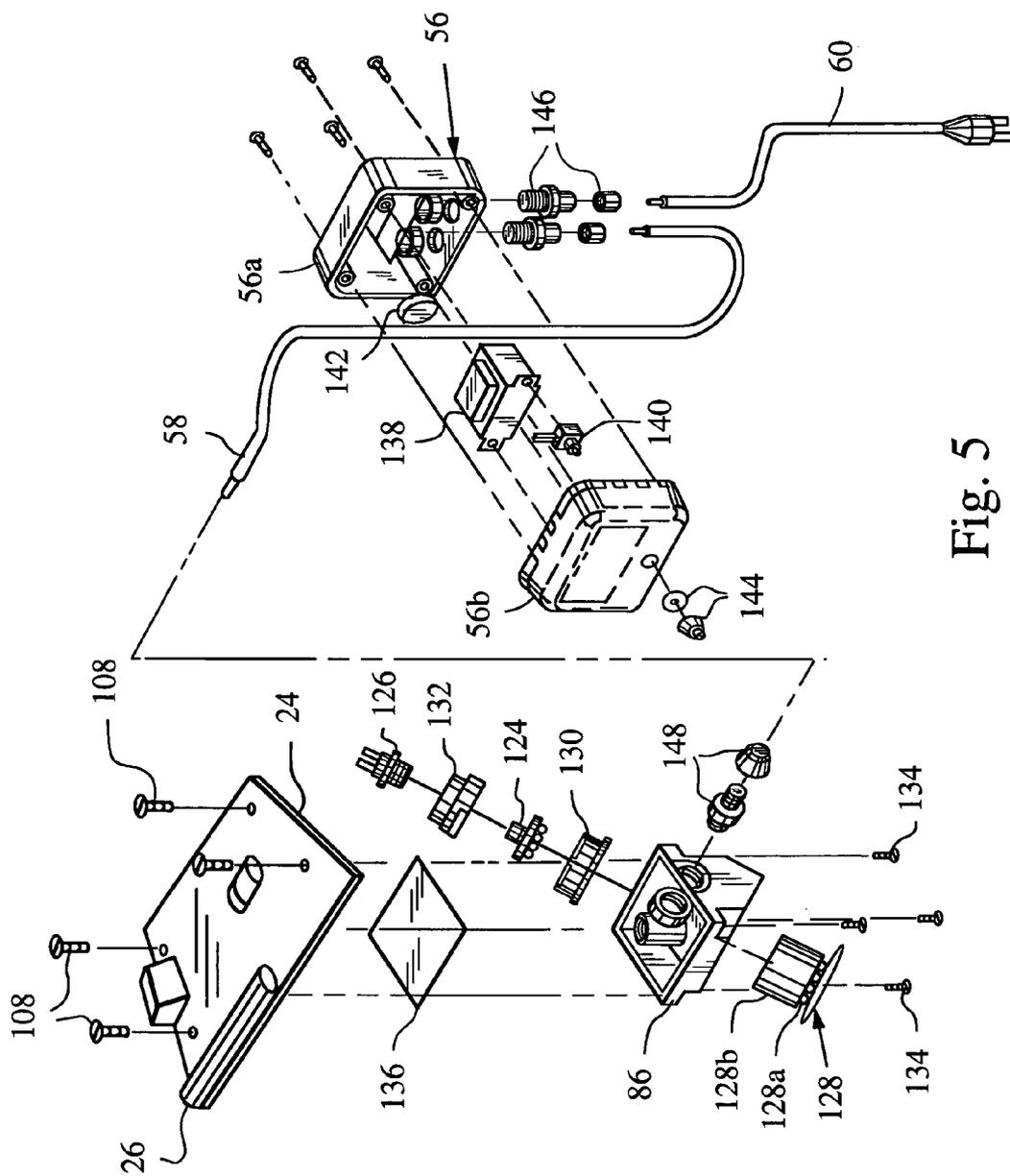


Fig. 5

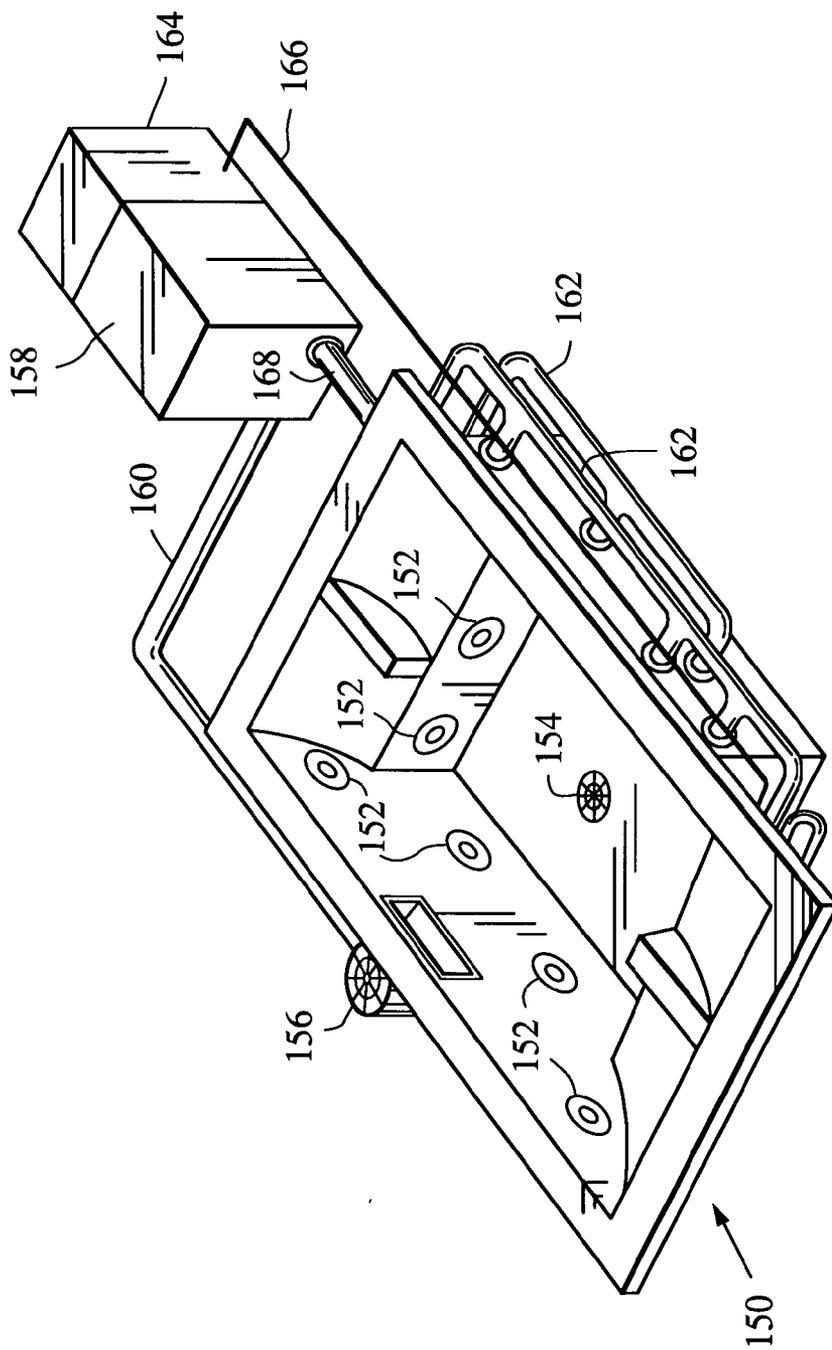


Fig. 6

**SKIMMER/WATERFALL WITH BACKLIGHT****BACKGROUND OF THE INVENTION****[0001]** 1. Field of the Invention

**[0002]** This invention relates to pools and spas with skimmer/waterfall units, and to such units with a capability for waterfall lighting.

**[0003]** 2. Description of the Related Art

**[0004]** Recreational water reservoirs such as pools and spas are well known. Spas include indoor and outdoor units for multiple users, and jetted bathtubs.

**[0005]** Combination skimmers and waterfalls are known, as in U.S. Pat. No. 6,210,568 to Harder. In this device the waterfall is directed vertically downward above and in front of the skimmer intake. This creates turbulence at the skimmer inlet which at least partially disrupts the flow of water into the skimmer. Separate control valves are provided for the return of water withdrawn through the skimmer back to the pool through the normal pool return, and through the waterfall. This requires a proper coordination between the valves to provide a desired waterfall flow, and to avoid over pressures or under pressures within the system.

**[0006]** Stand-alone waterfall units have been provided with an illumination capability for the waterfall, typically by means of optical fibers. Illustrative units are illustrated in U.S. Pat. Nos. 6,595,675 and 6,510,277, both to Dongo, 6,484,952 to Koren and 6,375,342 to Koren et al. However, these patents do not disclose a way to provide a desirable waterfall backlighting in a combination waterfall/skimmer.

**SUMMARY OF THE INVENTION**

**[0007]** In one aspect of the present invention, a skimmer/waterfall unit provides a water extraction path from a reservoir that removes debris from extracted water. A water distributor distributes water between the waterfall and a reservoir return, while a pump extracts water from the reservoir through the skimmer and directs the water to the distributor. The distributor is adjustable to control the distribution of water between the waterfall and the return. It can comprise a single adjustable valve that can vary the water pressure at the waterfall, and thus the reach of the waterfall into the reservoir.

**[0008]** A backlit waterfall illumination can also be provided, with the skimmer housing having a removable wall, preferably a top lid, and a light source that depends from the wall to illuminate the waterfall. The light source is preferably centered behind the waterfall.

**[0009]** In another aspect of the invention, a skimmer/waterfall unit includes a skimmer for removing debris from extracted water, and a waterfall mechanism that is integrated with the skimmer to provide a waterfall return with a reach that is a function of the water pressure at the waterfall mechanism. The unit can be illuminated as described above.

**[0010]** These and other features and advantages of the invention will be apparent to those skilled in the art from the following detail description, taken together with the accompanying drawings, in which:

**BRIEF DESCRIPTION OF THE DRAWINGS**

**[0011]** **FIG. 1** is a cut-away perspective view of a pool with a skimmer/waterfall water control system in accordance with one aspect of the invention;

**[0012]** **FIGS. 2a** and **2b** are respectively left and right side perspective views of a skimmer/waterfall unit in accordance with the invention;

**[0013]** **FIG. 3** is a sectional view of one embodiment of a skimmer/waterfall unit;

**[0014]** **FIG. 4** is an exploded perspective view of the unit shown in **FIG. 3**, except for the waterfall illumination apparatus;

**[0015]** **FIG. 5** is an exploded perspective view of the waterfall illumination apparatus for the unit shown in **FIG. 3**; and

**[0016]** **FIG. 6** is a perspective view illustrating the application of the invention to a spa.

**DETAILED DESCRIPTION OF THE INVENTION**

**[0017]** A pool system in accordance with the invention is illustrated in **FIG. 1**. It provides a combination skimmer/waterfall unit **2** for a pool **4**, although the system could be used with other types of water reservoirs as well. The pool **4** would typically be set in the ground.

**[0018]** Water is drawn into the skimmer by a pump **6**, which is connected through conduit **8** to the outlet of a filter housing **10** included in the skimmer. The water flows into the skimmer body **12**, past a weir gate within the skimmer body and into a well **14** that provides access to the filter housing, which can house a filter basket or similar mechanism to remove debris that has flowed past the weir gate. The water exits the filter housing and is drawn into the pump **6**. The pump may also be connected to draw water from a pool drain (not shown), if desired.

**[0019]** Pump **6** circulates the withdrawn water back through a filter **16** for return to the skimmer/waterfall unit **2** through a lower inlet (not shown) to a valve **18**. This valve distributes the pump water between an inlet to the waterfall section of the skimmer/waterfall unit **2**, and a pool return **20** via conduit **22**. The top wall of the skimmer/waterfall unit body **12** preferably consists of a removable lid **24**, with the waterfall inlet from valve **18** routed under a convex section **26** of the lid. Water drawn through the skimmer is returned to the valve **18** through a conduit **28** from pump **6** and filter **16**.

**[0020]** The skimmer/waterfall unit **2** includes a waterfall section that ejects a cascade of water in a waterfall pattern **30** into the interior of the pool from the upper portion of the housing **12**. This produces a pleasing appearance, makes a water sound that helps to muffle any equipment noises, and tends to conceal the skimmer mechanism from occupants of the pool. The valve **18** distributes water withdrawn from the skimmer between conduit **22** to pool return **20**, and the waterfall cascade **30**. As discussed below, this valve can be adjusted to vary the reach of the waterfall into the pool. The skimmer/waterfall unit **2** is mounted to the pool wall **32**, with the waterfall **30** directed towards the pool side of the wall and the unit's main body positioned outside the wall.

**[0021]** The illustrative skimmer/waterfall unit **2** is shown in left- and right-hand perspective in **FIGS. 2a** and **2b**. The unit housing includes a throat **34** into which water from the pool flows. The waterfall discharge outlet **36** is positioned over the upper portion of the throat. The valve **18** includes

an inlet **38** for receiving water from conduit **28** (shown in **FIG. 1**), a first outlet **40** for supplying water to the waterfall, and a second outlet **42** for directing water to the pool return **20** through conduit **22** (shown in **FIG. 1**). Water is directed to the waterfall from valve outlet **40** through a waterfall feed elbow **44** to a waterfall supply conduit under the convex lid section **26**. A removable lid **46** provides access to the skimmer well **14** for removing and cleaning a filter basket in filter housing **10**. Filter housing outlet **48** provides a coupling to outlet conduit **8** shown in **FIG. 1**.

[0022] The skimmer/waterfall unit preferably includes an internal light source, described below, to provide a backlight for the waterfall. A light controller **56**, which preferably includes a user-accessible on/off switch, is connected to the light by a control cord **58**, and receives an electrical input through power cord **60**.

[0023] The interior of a skimmer/waterfall unit **2** in accordance with the invention is shown in **FIG. 3**. Pool water is drawn into the throat **34** of the skimmer/waterfall unit **2** and flows past an upright self-aligning weir **62** that pivots on hinge **64** to automatically regulate the flow rate of water into the skimmer. Various types of conventional weirs may be used. Water flowing past the weir enters a flue section **66** which opens to well **14**. An interior water flow port **68** within the well has water drawn into it by the action of pump **6** (shown in **FIG. 1**), which is connected by conduit to the filter housing outlet **48**. The water flows through a filter **70**, within the filter housing, that removes debris from the pool water that has flowed into the skimmer. The water is discharged from the unit through filter housing outlet **48**.

[0024] The unit can be affixed to a pool wall by means of a face plate **72** that is connected to the forward end of the skimmer/waterfall housing **12** by screws **74** or other connectors, with the pool wall sandwiched in between in space **76** between the face plate and the remainder of the unit.

[0025] The pool is normally filled so that the surface **78** of the pool water is kept below the upper limit of weir **62**, but above the inlet to water flow port **68** in the filter unit. The filter unit lid **46** is easily removable, as is the water flow port **68** once lid **46** has been lifted, allowing the filter **70** to be easily removed for cleaning.

[0026] A waterfall inlet conduit **80** is supplied with water from the waterfall feed elbow **44** (shown in **FIG. 2a**) under the control of valve **18**. Water flows through the conduit transverse to the skimmer/waterfall unit **2**, and out between upper and lower waterfall guide plates **82** and **84**, respectively. The waterfall guide plates **82**, **84** are glued together and extend forward from the interior of the unit, with their forward ends **82'** and **84'** slanted at an upward angle, preferably on the order of about 15-20°, and their opposed forward edges spaced closely apart to produce a waterfall cascade **30** that is discharges from the unit at an upward angle, and falls to the pool water surface in front of the skimmer/waterfall unit in a generally laminar flow. The two plates are spaced apart rearward of forward ends **82'** and **84'**, while the forward ends progressively converge to produce a narrow discharge slit. This tends to magnify significant changes in the water pressure at the inlet to the plates, which in turn is useful in adjusting the reach of the waterfall into the pool as described below. The plates include side and rear walls that prevent water from escaping except out the discharge slits between the plates.

[0027] The waterfall is normally operated with only a portion of the water flowing through valve **18** with the remainder directed to the pool return. If a significantly greater portion of the water flow through valve **18** is routed to the waterfall, the water pressure behind the waterfall increases and causes the waterfall to reach or extend further into the pool and away from the skimmer/waterfall unit, as indicated by reference number **30'**. Thus, with a single adjustment to valve **18**, the user can divert more or less water from the pool return to the waterfall, and thereby control the reach of the waterfall into the pool.

[0028] The desired reach of the waterfall into the pool will depend upon a number of factors. One is the aesthetic effect, which can vary from user to user. Furthermore, the waterfall tends to create turbulence at the skimmer inlet which at least partially disrupts the flow of water into the skimmer. As the distance of the waterfall out from the skimmer increases, the disruption to the skimmer water intake reduces, but the waterfall becomes somewhat more noisy and less laminar. The degree of laminar flow will also influence the back-lighting effect, although again some users may prefer a greater waterfall reach and others a lesser reach for this purpose. Each individual user can easily adjust the valve **18** to produce a waterfall effect most pleasing to him or her.

[0029] As the water flow varies, the amount of water returned to the pool through the waterfall increases as the flow throughout the pool return is reduced, and vice versa, with the waterfall reach into the pool also increasing and reducing in response to reductions and increases in the water flow through the pool return.

[0030] A light source housing **86** preferably depends from the removable skimmer/waterfall upper lid **24** into the interior of the unit, centered behind and disposed to illuminate the waterfall with a backlight from light source **88**, which is illustrated in **FIG. 3** as an array of light emitting diodes (LEDs) with a front lens **90**. Other types of light sources, such as incandescent bulbs, fiber optics or neon lighting, could be used as desired. A centered light provides a desirable uniform backlight effect across the waterfall. The light source housing **86** is preferably watertight. The light source is easily accessible and replaceable by simply removing the skimmer/waterfall lid **24**.

[0031] Further details of the exemplary unit are illustrated in **FIG. 4**. The mounting plate **72** is secured through a gasket **92** to the skimmer body **12** by a series of screws **94**. The upper waterfall guide plate **82** includes an inlet **96** which receives an inflow of water from waterfall inlet conduit **80**, passing the water to the space between the upper and lower waterfall plates **82**, **84**. An upstanding fin **98** on the lower waterfall guide plate **84** helps to maintain the spacing between the two plates. A set of screws **100** extend through openings in the upper portion of the body **12** and fasten into corresponding threaded receivers **102** on the upper surface of waterfall guide plate **82** to hold the guide plates in place.

[0032] A bracket **104** for valve **18** is fastened to the upper portion of the body **12** by a pair of screws **106**, while the exposed rearward portion of the body is covered by lid **24**, which can be easily fastened and detached by a set of retainer screws **108**. This allows the lid, along with an attached light assembly if provided, to be easily removed to access the light assembly and interior of the unit.

[0033] The weir **62**, which can include a foam pad **110**, is pivotally attached to the bottom rear interior of body **12** by

the weir hinges **64**. Body **12** is affixed to flue **66** by a set of screws **112**, with an intervening water tight gasket **114**.

[0034] A filter basket **116** fits within the filter housing **10**, with a lip around the basket resting on basket stops **118**. The basket and filter cartridge **70** which it carries (not shown in FIG. 4) can be easily removed by unscrewing lid **46**, lifting up water flow port **68**, and removing the basket by grasping the basket handle **120**. A support bracket **122** is provided for the unit around the filter housing outlet **48**.

[0035] FIG. 5 presents an exploded perspective view of an optional lighting unit for the skimmer/waterfall. A multiple LED lamp **124** is held in a socket **126**. A lens **128** extends through an opening in light housing **86**, with a flange **128a** that abuts the outer housing wall around the opening, and a threaded cylinder **128b** that extends from the lens into the housing. A threaded cap **130** screws onto the lens cylinder **128b** and abuts the periphery of the housing opening from inside the housing to hold the lens in place. Lamp **124** and socket **126** are held in place by a threaded back cap **132** that screws into cylinder **128b** from the rear, behind cap **130**.

[0036] Housing **86** and the lamp assembly which it supports are held to the underside of skimmer lid **24** by screws **134** that extend upward through screw openings in the housing and screw into receivers (not shown) on the underside of skimmer lid **24**. A gasket **136** provides a seal between the upper surface of housing **86** and underside of lid **24**.

[0037] The light controller **56** is illustrated as a housing **56a** with a front cover **56b**, enclosing a transformer **138** and power switch **140**, with a cap **142** covering a mounting hole for the transformer. The power switch **140** is operated by a switch actuator **144** that is carried outside the front cover **56b**, where it can be conveniently accessed by the user.

[0038] Power cord **60** enters the housing **56**, and control cord **58** exits the housing, through a set of watertight cord grips **146**. Within the housing, electrical connections (not shown) are made from power cord **60** to transformer **138**, and then through power switch **140** to control cord **58**.

[0039] The opposite end of control cord **58** is brought into lamp housing **86** through another set of liquid tight cord grips **148**. Inside the housing the control cord is connected to supply electrical power, at a low voltage established by transformer **138**, to socket **126** and thus to lamp **124**. The unit is easily accessed by simply unscrewing the skimmer/waterfall lid **24**. If desired, a light source could be provided within controller housing **56**, and one or more optical fibers substituted for control cord **58** to direct light from the source into the lamp housing **86** to be directed on to the back of the waterfall.

[0040] FIG. 6 illustrates the application of the invention to a spa jetted tub **150**, as opposed to the swimming pool discussed above. The spa or tub **150** includes a series of hydrotherapy jets **152** and a drain **154** in its floor. A skimmer/waterfall unit **156** in accordance with the invention is shown mounted in one wall. A water pump **158** supplies water through a conduit **160** through a valve (not shown) which can be either mounted to or separate from the skimmer/waterfall unit **156**, with the valve distributing the incoming water between the waterfall and a network of conduits **162** that feed the jets. Whether the valve is mounted on the skimmer/waterfall unit or placed at another location within the system, it is preferably a single unit that distrib-

utes water between the waterfall and jets with a single valve control. If desired, an air pump **164** can also be provided to deliver air to the jets through air line **166** to aerate the water flowing through the jets, rather than providing an air pump to increase the pressure of the air entering the jets. The vacuum created by the jet venturis can also be used to draw air into the jets and the water streams flowing through them in a well known manner.

[0041] In this spa/tub embodiment, water can be drawn into the water pump **158** through the drain **154** via a drain conduit **168**, with the pump also drawing water through the skimmer via a branch of the same drain conduit, through a dedicated skimmer conduit. Rather than returning the water back to the reservoir through a waterfall and pool return, with a user controllable distribution between the waterfall and pool return as in the pool embodiment described previously, in the spa/tub embodiment water is distributed between the waterfall and spa jets, again preferably by means of a single user controlled valve.

[0042] The water drawn by the pump through the skimmer can be in addition to, or in lieu of, water drawn through drain **154**. A spa/tub skimmer will normally have a different design from a pool skimmer, but the general principles of the invention apply to each, with water returned to the reservoir though the combination of the waterfall and a water return that is implemented with a pool return in the case of a pool, and hydrotherapy jets in the case of a spa or tub.

[0043] Numerous variations and alternate embodiments can be envisioned within the scope of the invention. For example, multiple skimmer/waterfall units could be provided for a single reservoir of water, and various available skimmer designs could be used. Numerous valve mechanisms are also known that can be used to distribute water between the waterfall and water return with a single control. The valve could also be electromechanically controlled rather than manually. Accordingly, it is intended that the invention been limited only in terms of the appended claims.

I claim:

1. A reservoir water control system, comprising:

- a water reservoir,
  - a skimmer coupled to said reservoir to provide a water extraction path from said reservoir and to remove debris from extracted water, said skimmer including a waterfall mechanism to provide water to the reservoir in a waterfall,
  - a water return coupled to return water to the reservoir,
  - a water distributor coupled to distribute water between said waterfall mechanism and said return, and
  - a pump coupled to extract water from said reservoir through said skimmer and to direct said water to said distributor,
- said distributor being adjustable to control the distribution of said water between said waterfall mechanism and said return.
2. The system of claim 1, said reservoir comprising a pool, and said return comprising a pool return.

3. The system of claim 1, said reservoir comprising a spa or tub, and said return comprising at least one jet coupled to direct returned water into said spa or tub in at least one jet flow.

4. The system of claim 1, said distributor comprising a single adjustable valve.

5. The system of claim 4, wherein the reach of said waterfall into said reservoir is a function of the pressure of said water at said waterfall mechanism, and said valve is adjustable to vary said pressure.

6. The system of claim 1, said skimmer including a housing with a removable housing wall, and further comprising a light source which depends from said removable wall to illuminate said waterfall.

7. The system of claim 6, said removable wall comprising a lid for said housing.

8. The system of claim 1, further comprising a light source mounted within said skimmer, centered behind and disposed to illuminate said waterfall.

9. The system of claim 8, said skimmer including a housing with a removable housing wall, said light source depending from said removable wall.

10. A reservoir water control system, comprising:

a water reservoir,

a skimmer coupled to said reservoir to provide a water extraction path from said reservoir and to remove debris from extracted water, said skimmer including a waterfall mechanism to provide water to the reservoir in a waterfall, said waterfall mechanism establishing a waterfall reach into said reservoir which is a function of the water pressure at said waterfall mechanism,

an adjustable valve coupled to control a flow of water to said waterfall mechanism, and

a pump coupled to extract water from said reservoir through said skimmer and to direct at least a portion of said extracted water to said valve,

said valve controlling the water pressure at said waterfall mechanism, and thus the reach of said waterfall into said reservoir.

11. The system of claim 10, said skimmer including a housing with a removable housing wall, and further comprising a light source which depends from said removable wall to illuminate said waterfall.

12. The system of claim 11, said removable wall comprising a lid for said housing.

13. The system of claim 10, further comprising a light source mounted within said skimmer, centered behind and disposed to illuminate said waterfall.

14. The system of claim 13, said skimmer including a housing with a removable housing wall, said light source depending from said removable wall.

15. A skimmer/waterfall unit, comprising:

a skimmer for removing debris from water extracted from a reservoir, and

a waterfall mechanism integrated with said skimmer to provide a waterfall return with a reach that is a function of the water pressure at said mechanism.

16. The skimmer/waterfall unit of claim 15, said skimmer including a housing with a removable housing wall, and further comprising a light source which depends from said removable wall to illuminate said waterfall.

17. The skimmer/waterfall unit of claim 16, said removable wall comprising a lid for said housing.

18. The skimmer/waterfall unit of claim 15, further comprising a light source mounted within said skimmer, centered behind and disposed to illuminate said waterfall.

19. The skimmer/waterfall unit of claim 18, said skimmer including a housing with a removable housing wall, said light source depending from said removable wall.

20. A skimmer/waterfall unit, comprising:

a skimmer for removing debris from water, said skimmer including a housing with a removable housing wall,

a waterfall mechanism integrated with said skimmer to provide a waterfall return, and

a light source which depends from said removable wall to illuminate said waterfall.

21. The skimmer/waterfall unit of claim 20, said removable wall comprising a lid for said housing.

22. The skimmer/waterfall unit of claim 20, wherein said light source is centered behind said waterfall.

23. A skimmer/waterfall unit, comprising:

a skimmer for removing debris from water,

a waterfall mechanism integrated with said skimmer to provide a waterfall return, and

a light source mounted within said skimmer, centered behind and disposed to illuminate said waterfall.

24. The skimmer/waterfall unit of claims 23, said skimmer including a housing with a removable housing wall, said light source depending from said removable wall.

25. A method of controlling the flow of water to a reservoir having a water return and a waterfall, comprising:

varying a flow of water into said reservoir through said return,

increasing a flow of water into said reservoir through said waterfall in response to a reduction in water flow through said return, and

reducing said flow of water into said reservoir through said waterfall in response to an increase in water flow through said return.

26. The method of claim 25, further comprising increasing the reach of said waterfall into said reservoir in response to a reduction in water flow through said return, and reducing the reach of said waterfall into said reservoir in response to an increase in water flow through said return.

\* \* \* \* \*