A vacuum apparatus (20) includes an intermediate chamber (30) interposed between inlet and outlet sections (28, 32). A fluid supply pipe (46) resides inside the intermediate chamber (30) and supplies fluid (62) under pressure toward the outlet section (32). An inner diameter (96) of the outlet section (32) is smaller than an inner diameter (94) of the intermediate chamber (30). The introduction of the high pressure fluid (62) and the inner diameter of the outlet section (32) relative to the inner diameter of the intermediate chamber (30) creates a partial vacuum to induce a flow of water (98) and contaminants (22) from a submerged surface (24) of a reservoir (26) through the vacuum apparatus (20). The water (98) and contaminants (22) are subsequently discharged from the reservoir (26) through a discharge hose (44) coupled to the outlet section (32).
SWIMMING POOL VACUUM APPARATUS

TECHNICAL FIELD OF THE INVENTION

[0001] The present invention relates to the field of fluid reservoirs, such as swimming pools. More specifically, the present invention relates to an apparatus for cleaning contaminants from the bottom of such reservoirs.

BACKGROUND OF THE INVENTION

[0002] In swimming pools, a leaf skimmer is typically utilized to skim off leaves and other such contaminants that float on the surface and that are pulled into the skimmer by the currents of the recirculating water in the pool. Unfortunately, some debris often sinks to the bottom before it has an opportunity to be caught in the skimmer. In reservoirs, such as ponds, decorative pools, fountains, and so forth that do not have a skimmer in them, contaminants blown in or dropped in the reservoirs ultimately sink to the bottom of the reservoir. Contaminants that accumulate on the bottom of a pool are unsightly. Moreover, such contaminants also accelerate the formation and growth of algae, and as the contaminants decompose, the water can become cloudy.

[0003] Various devices are available for removing sediment, leaves, grass, rocks, and other contaminants from reservoirs, such as swimming pools, ponds, decorative pools, fountains, and so forth. Many devices are removable connected to the water intake of a pool recirculating system. The devices then vacuum the contaminants from the bottom of the pool and deliver the contaminants to the pool filter from which contaminants may be removed or backwashed.

[0004] While removal of contaminants from the bottom of the pool in this manner may be effective, such an apparatus often necessitates the disassembly of part of the skimmer in order to connect the vacuum hose to the water return for the pool circulation system. In addition, since such devices only function when the reservoir includes a recirculating water supply, these vacuum devices cannot be utilized in reservoirs that do not have a recirculating water supply. Yet another problem is that the contaminants sucked up by the vacuum device can clog the pool filter, decrease filter effectiveness, and eventually damage filtration and pump system components, especially when backwashing is not performed on a regular basis.

[0005] To circumvent the problems of the aforementioned vacuum devices, some prior art pool vacuum systems have been developed that do not couple to the swimming pool recirculating water supply. These pool vacuum systems are referred to herein as filter system bypass vacuums to differentiate them from the pool vacuums, discussed above, that are coupled to the water intake of a recirculating water supply for a pool. These filter system bypass vacuums use the addition of water into the pool to effect their operation. More specifically, water under pressure is supplied to the pool through a hose to force a stream of water through nozzles in the filter system bypass vacuum that are directed toward a debris pickup bag. The high pressure water creates a vacuum to suck up debris from the bottom of a pool. This debris passes through the filter system bypass vacuum and into a basket, filter, or other such debris pickup bag through the exit end of the vacuum. The filtered water then returns to the pool. In pools of all types, it is typically necessary to add additional water to replace water that has evaporated from the pool and/or has been splashed out of the pool. Thus, systems like this can serve the purpose of concurrently supplying the needed water to the pool while functioning to pick up debris from the bottom of the pool.

[0006] Reservoirs, such as swimming pools, ponds, decorative pools, fountains, and so forth, can collect large amounts of leaves, rocks, dirt, and other contaminants through severe intentional or unintentional neglect. Additionally, large quantities of contaminants can rapidly collect in the bottom of a reservoir during a severe rainstorm and/or dust storm.

[0007] Pool vacuums that are coupled to the water intake of a recirculating water supply for a pool may be able to pick up some of the debris. However, contaminants from a very dirty pool can rapidly clog the filter of a recirculating water supply system. Thus, an individual may have to stop frequently during the cleanup process to backwash the pool when the pool has large quantities of contaminants. Frequent backwashing during a single cleaning process is highly undesirable in terms of inconvenience, as well as wear and tear on the pump and filter system components.

[0008] While a filter system bypass vacuum may satisfactorily suck up small amounts of debris, or lightweight debris, such as leaves, grass, and so forth, such a vacuum cannot effectively pick up the large quantities of contaminants found in a neglected or storm ravaged pool. That is, the filter system bypass vacuums tend to generate insufficient suction to pick up large quantities of contaminants and/or heavy contaminants, such as rocks. In addition, tiny particulates, such as dust, may be sucked up by the filter system bypass vacuum only to be released back into the pool through the filter bag of the vacuum. If the filter system bypass vacuum is able to pick up the contaminants, the filter bag of a filter system bypass vacuum rapidly fills with debris, thus necessitating frequent and inconvenient cleaning.

[0009] Both filter system vacuums and filter system bypass vacuums tend to cause significant “kick” in very dirty pools. The term “kick” is referred to herein as the action in which dirt and dust is stirred up from the bottom in a cloud about the vacuum as the vacuum travels across the bottom of the pool. The kick results from the contact of the vacuum head with the bottom of the pool combined with insufficient suction of the vacuum. Contact occurs from the wheels of the vacuum head rolling on the bottom of the pool, as well as, from the conventional stiff bristles of the vacuum head rubbing across the bottom of the pool. Unfortunately, if the dirt and dust floats up from the bottom of the pool, it is less likely that the vacuum will be able to effectively suck up the dirt.

[0010] Due to the problems incurred with both the pool vacuums that are coupled to the water intake and the filter system bypass vacuums, an individual may be compelled to drain their pool to clean the bottom of their severely soiled pool. The individual may then be required to shovel out the accumulated contaminants from the bottom of the empty pool. Such action is highly undesirable because such extreme action is time consuming, labor intensive, and wastes significant quantities of water. Thus, what is needed is a pool vacuum apparatus that is effective for removing large quantities of contaminants found in a neglected or storm ravaged pool.
SUMMARY OF THE INVENTION

Accordingly, it is an advantage of the present invention that an improved vacuum apparatus for cleaning a submerged surface of a reservoir is provided.

It is another advantage of the present invention that a vacuum apparatus is provided that cleans the pool using an external water source to generate suction.

Another advantage of the present invention is that a vacuum apparatus is provided that effectively removes contaminants in a severely soiled pool.

Another advantage of the present invention is that a vacuum apparatus is provided that removes contaminants from the submerged surface of a reservoir while producing minimal kick.

Yet another advantage of the present invention is that a vacuum apparatus is provided that is of simple construction and is easy to use.

The above and other advantages of the present invention are carried out in one form by a vacuum apparatus for removing contaminants from a submerged surface of a reservoir. The vacuum apparatus includes an inlet section having a first inlet end and a second inlet end. An intermediate chamber has a first chamber end and a second chamber end, the first chamber end being in fluid communication with the second inlet end. The intermediate chamber exhibits a first inner diameter. An outlet section has a first outlet end in fluid communication with the second chamber end. The outlet section exhibits a second inner diameter that is less than the first inner diameter. A fluid supply pipe resides inside the intermediate chamber and has a fluid port directed toward the outlet section. The fluid supply pipe supplies fresh fluid under pressure from the fluid port toward the outlet section to induce a flow of fluid and the contaminants from the reservoir into the first inlet end of the inlet section and through the intermediate chamber and the outlet section.

BRIEF DESCRIPTION OF THE DRAWINGS

A more complete understanding of the present invention may be derived by referring to the detailed description and claims when considered in connection with the Figures, wherein like reference numbers refer to similar items throughout the Figures, and:

FIG. 1 shows a perspective view of a vacuum apparatus in accordance with a preferred embodiment of the present invention;

FIG. 2 shows an exploded perspective view of the vacuum apparatus of FIG. 1;

FIG. 3 shows sectional view along a longitudinal dimension of the vacuum apparatus of FIG. 1;

FIG. 4 shows an exploded perspective view of a vacuum apparatus in accordance with an alternative embodiment of the present invention; and

FIG. 5 shows a perspective view of the vacuum apparatus of FIG. 4.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to FIGS. 1-2, FIG. 1 shows a perspective view of a vacuum apparatus 20 in accordance with a preferred embodiment of the present invention, and FIG. 2 shows an exploded perspective view of vacuum apparatus 20. Vacuum apparatus 20 effectively removes contaminants 22 from a submerged surface 24 of a reservoir 26. Reservoir 26 may be a swimming pool, spa, pond, decorative pool, fountain, and so forth. Contaminants 22 include leaves, grass, dirt, rocks, and other undesired debris in reservoir 26.

Vacuum apparatus 20 functions independent from a recirculating water supply (not shown). Thus, vacuum apparatus 20 may be utilized in reservoirs that do not have such a recirculating water supply. In addition, vacuum apparatus 20 is advantageously utilized for cleaning reservoirs that have become severely contaminated from intentional or unintentional neglect, or from severe weather phenomena.

Vacuum apparatus 20 includes an inlet section 28, an intermediate chamber 30, and an outlet section 32. Inlet section 28 has a first inlet end 34 and a second inlet end 36. A first chamber end 38 of intermediate chamber 30 is in fluid communication with second inlet end 36 of inlet section 28. In addition, a second chamber end 40 of intermediate chamber 30 is in fluid communication with a first outlet end 42 of outlet section 32. A flexible discharge hose 44 is coupled to a second outlet end 46 of outlet section 32.

Vacuum apparatus 20 further includes a fluid supply pipe 46 having an interior portion 48 (shown in ghost form) residing inside of intermediate chamber 30 and an exterior portion 50 located outside of intermediate chamber 30. A first end 52 of fluid supply pipe 46 at interior portion 48 includes a fluid port 54 (best seen in FIG. 3), and a second end 56 of intermediate chamber 30 at exterior portion 50 includes a coupling 58. Coupling 58 is a standard threaded coupling configured for connection to a fluid supply hose 60, such as a conventional garden hose, for supplying fresh water 62 to fluid supply pipe 46.

A conventional quick change handle 64 is coupled to vacuum apparatus 20. Quick change handle 64 includes detents 66 that interconnect with corresponding holes on a pole 68, such as that commonly used for a pool skimming net.

Intermediate chamber 30 is desirably formed from a rigid plastic material and serves as a support structure for inlet section 28, outlet section 32, fluid supply pipe 46, and quick change handle 64. However, inlet section 28 is configured for direct contact with submerged surface 24. Thus, in a preferred embodiment, inlet section 28 is formed from a flexible plastic material for enabling vacuum apparatus 20 to accommodate non-uniformities in the smoothness of submerged surface 24.

Inlet section 28 includes a head 70 that forms first inlet end 34, and a flexible tubular member 72 that terminates at second inlet end 36. Second inlet end 36 connects with first chamber end 38 of intermediate chamber 30 via a flanged coupling 74. By way of example, flanged coupling 74 includes a first segment 76 that extends into second inlet end 36 and a second segment 78 that extends into first chamber end 38. Flanged coupling 74 may be press-fit, glued, bolted or otherwise secured to each of flexible tubular member 72 and intermediate chamber 30 per conventional techniques.

In a preferred embodiment, flexible tubular member 72 is formed from flexible polyvinylchloride (PVC)
tubing. Alternatively, flexible tubular member 72 may be formed from polyethylene, polypropylene, polyurethane, nylon, and so forth. In addition, head 70 may be formed from a flexible material, such as PVC, polyethylene, polypropylene, polyurethane, nylon, and so forth, so that head 70 will also flex to accommodate non-uniformities of submerged surface 24.

[0031] Head 70 includes an extension member 80 formed at first inlet end 36 that is oriented transverse to inlet section 28. In use, extension member 80 is brushed against submerged surface 24. Extension member 80 may be approximately ten inches in length, so as to sweep an approximate ten inch swath along submerged surface 24. A flexible rubber member 79 is coupled to a rear edge 81 of head 70 along the length of extension member 80, and a pile material 82 is secured to flexible rubber member 79. Pile material 82 may be a synthetic felt that is durable, odor resistant, mildew resistant, and will not break down from moisture. Alternatively, pile material 82 may be another fabric, such as chenille, having a fiber of wool, cotton, nylon, and the like, that stands up from the weave. Pile material 82 may be optionally removably coupled to flexible rubber member 79. Pile material 82 is made removable by use, for example, of hook and loop fasteners so that pile material 82 can be replaced as it wears out. Flexible rubber member 79 and pile material 82 serve to sweep or direct contaminants 22 toward an opening 84 (see FIG. 3) in inlet section 28. The use of flexible rubber member 79 and pile material 82 combined with the suction created using vacuum apparatus 20 (discussed below) results in a system that is effective at removing a thick coating of dust from submerged surface 24 with minimal kick, i.e. minimal generation of a cloud of dust in the water. In addition, the flexibility of member 79 enables effective cleaning of the vertical walls of the sides and, if present, stairs, of reservoir 26.

[0032] Head 70 and flexible tubular member 72 are described as separate parts of inlet section 28. However, the present invention is not limited to such a configuration. Rather, head 70 and flexible tubular member 72 may be formed as a single, integral unit utilizing fabrication and molding techniques known to those skilled in the art.

[0033] FIG. 3 shows a sectional view of vacuum apparatus 20 along a longitudinal dimension. FIG. 3 draws attention to the variances of the inner diameters of inlet section 28, intermediate chamber 30, and outlet section 32. These changes in inner diameter generate a Venturi effect that results in a high level of suction at first inlet end 34. This high level of suction is particularly advantageous for removing contaminants from a severely soiled reservoir 26 (FIG. 1). Discharge hose 44, handle 64, and extension member 80, shown in FIGS. 1-2, are not shown in FIG. 3 for simplicity of illustration.

[0034] As mentioned briefly above, interior portion 48 of fluid supply pipe 46 resides within intermediate chamber 30 with fluid port 54 of interior portion 48 being located proximate second chamber end 40 of intermediate chamber 30. More specifically, interior portion 48 is approximately axially aligned with intermediate chamber 30. In addition, interior portion 48 of fluid supply pipe 45 is radially positioned toward a center, longitudinal axis 88 of intermediate chamber 30. In a preferred embodiment, fluid supply pipe 46 is formed from one quarter inch copper tube with the length of pipe 46 from an elbow 90 to fluid port 54 being approximately two and one half inches.

[0035] Inlet section 28 exhibits a first inner diameter 92. Intermediate chamber 30 exhibits a second inner diameter 94, and outlet section 32 exhibits a third inner diameter 96. First and second inner diameters 92 and 94, respectively, are roughly equivalent, and third inner diameter 96 is smaller than second inner diameter 94. In addition, discharge hose 44 (FIGS. 1-2) has a diameter that is smaller than second inner diameter 94. With particular regard to third inner diameter 96, third inner diameter 96 of outlet section 32 is in a range of twenty-five to fifty percent smaller than second inner diameter 94 of outlet section 32.

[0036] In an exemplary embodiment, first and second inner diameters 92 and 94, respectively, are approximately one and one half inches, and third inner diameter 96 is approximately one inch. Discharge hose 44 friction fits onto outlet section 32. Thus, in the exemplary embodiment, discharge hose 44 (FIG. 2) may have an inner diameter of approximately one and a quarter inches. This configuration, combined with the one quarter inch fluid supply pipe 46 supplying fresh water 62, generates suction at first inlet end 34 of inlet section 28.

[0037] The suction results from a Venturi effect. That is, as fluid flows past a constricted opening or through a constricted pipe, the velocity of the fluid increases, and the pressure in the system decreases. Accordingly, a Venturi effect occurs when fresh water 62 enters intermediate chamber 30 at second chamber end 40 and immediately flows into the constricted outlet section 32. The Venturi effect occurring at outlet section 32 results in a corresponding pressure decrease in inlet section 28 relative to the pressure outside of vacuum apparatus 20. Consequently, this pressure decrease results in suction which induces a flow of water 98 mixed with contaminants 22 from reservoir 26 into first inlet end 34 of inlet section 28. The relatively large size of first and second diameters 92 and 94, respectively, allow large profile contaminants, such as leaves, to be drawing into vacuum apparatus 20. Accordingly, water 98 and contaminants 22 are effectively drawn through intermediate chamber 30 and outlet section 32. Water 98 and contaminants 22 are subsequently discharged from reservoir 26 through discharge hose 44.

[0038] To use vacuum apparatus 20, a user attaches fluid supply hose 60 (FIG. 1) to coupling 58 and attaches pole 68 to quick change handle 64. Vacuum apparatus 20 is submerged into reservoir 26, with a distal end of discharge hose 44 remaining outside of reservoir 26. A water source coupled to fluid supply hose 60 is turned on to supply fresh water 62 from fluid port 54 to into intermediate chamber 30 and out of outlet section 32. When pressure drops sufficiently, vacuum apparatus 20 will begin to draw water 98 combined with contaminants 22 from intermediate chamber 30 and out of outlet section 32. When pressure drops sufficiently, vacuum apparatus 20 will begin to draw water 98 combined with contaminants 22 from reservoir 26 through submerged surface 24. The user then sweeps head 70 across submerged surface 24 (FIG. 2) with tubular member 72 and rubber member 79 flexing to accommodate non-uniformities in submerged surface 24, changes in depth of reservoir 26, and distance from the edge of reservoir 26. Once submerged surface 24 is clean, the suction can be stopped merely by turning off the water source supplying fresh water 62. Although some of water 98 is removed from reservoir 26 through vacuum apparatus 20 (roughly nine gallons per minute), reservoir 26 need not be
completely drained in order to clean a very soiled pool. Thus, significant savings in terms of time, labor, and water is achieved using vacuum apparatus 20.

0039) Referring to FIGS. 4-5, FIG. 4 shows an exploded perspective view of a vacuum apparatus 100 in accordance with an alternative embodiment of the present invention, and FIG. 5 shows a perspective view of vacuum apparatus 100. Vacuum apparatus 100 operates on the same principle as vacuum apparatus 20 (FIG. 1) to remove contaminants 22 from submerged surface 24 of reservoir 26.

0040) Vacuum apparatus 100 includes an inlet section 102, an intermediate chamber 104 in fluid communication with inlet section 102, and an outlet section 106 in fluid communication with intermediate chamber 104. A fluid supply pipe 108 resides in intermediate chamber 104, and includes a coupling 110 configured for connection to fluid supply hose 60. Discharge hose 44 is coupled to an outlet end 112 of outlet section 106, and quick change handle 64 is coupled to vacuum apparatus 100 for interconnection with pole 68.

0041) Inlet section 102 of vacuum apparatus 100 includes a head 114 and a tubular member 116. Tubular member 116, intermediate chamber 104, and outlet section 106 are manufactured as an integral unit, and a sleeve portion 118 of head 114 slides over tubular member 116. Head 114 readily friction fits onto tubular member 116 for engagement with or removal from tubular member 116. In a preferred embodiment, head 114 includes extension member 80 and pile material 82. However, pile material 82 surrounds inlet section 102 at an inlet end 119 of head 114. More specifically, pile material 82 is coupled about extension member 80 and an opening (not seen) into inlet section 102. Due to the friction fit of head 114 onto tubular member 116, head 114 may be easily replaced as pile material 82 wears out, or as enhancements to the shape and/or size of head 114 evolve.

0042) Tubular member 116 and head 114 may be fabricated from a rigid plastic material. Alternatively, tubular member 116 may not be integral with intermediate chamber 104, but may instead be fastened to intermediate chamber 104 through standard manufacturing methods. As such, tubular member 116 and head 114 can be produced from flexible material for enabling vacuum apparatus 100 to accommodate non-uniformities in the smoothness of submerged surface 24.

0043) The inner diameters intermediate chamber 104 and outlet section 106 correspond respectively to second inner diameter 94 and third inner diameter 96, discussed in connection with FIG. 3. However, tubular member 116 exhibits a first inner diameter 122 that is smaller than the inner diameter of intermediate chamber 104. Although, suction is achieved due to the reduction of diameter from the larger second inner diameter 94 (FIG. 3) of intermediate chamber 30 (FIG. 3) to the smaller third inner diameter 96 (FIG. 3) of outlet section 32 (FIG. 3), it has been discovered that the smaller inner diameter 122 of tubular member 116 relative to the inner diameter of intermediate chamber 104 further enhances this suction. Such enhanced suction is particularly advantageous when removing fine particulate contaminants 22, such as, dust, from submerged surface 24 while producing minimal kick.

0044) Tubular member 116 forms an elongated neck through which water 120 and contaminants 22 travel as they are drawn through vacuum apparatus 100. Vacuum apparatus 100 generates suction in a similar manner to vacuum apparatus 100. However, the elongated neck of tubular member 116 with the smaller inner diameter relative to the inner diameter of intermediate chamber 104 may serve to further enhance the suction capability of vacuum apparatus 100.

0045) In summary, the present invention teaches an improved vacuum apparatus for cleaning a submerged surface of a reservoir, such as a swimming pool. The vacuum apparatus utilizes an external water source that generates suction through a Venturi effect to draw water and contaminants from the reservoir. The construction of the inlet and outlet sections of the vacuum apparatus relative to the intermediate chamber, and the positioning of a fluid supply pipe within the intermediate chamber proximate the outlet section generates significant suction to effectively remove contaminants from a severely soiled pool. Moreover, unlike conventional apparatuses, the enhanced suction capability of the vacuum apparatus readily removes contaminants from deep reservoirs, such as, eight to ten foot driving pools. In addition, the shape of the vacuum head and the inclusion of the flexible rubber member and the pile material on the vacuum head serve to sweep, or draw in, contaminants from the submerged surface of the reservoir while producing minimal kick. The operation of the vacuum apparatus using an external water source is simpler than connection to the recirculating water supply of a pool, and enables the vacuum apparatus to be used in reservoirs that do not include a recirculating water supply system.

0046) Although the preferred embodiments of the invention have been illustrated and described in detail, it will be readily apparent to those skilled in the art that various modifications may be made therein without departing from the spirit of the invention or from the scope of the appended claims. For example, the principles of the present invention may be adapted for use to remove particulate contaminants from the submerged surface of a reservoir containing a fluid other than water. In addition, the discharge hose of the vacuum apparatus can be adapted to couple to a water intake of a recirculating water supply for a pool, so that the water introduced into the vacuum apparatus can be returned to the reservoir.

What is claimed is:

1. A vacuum apparatus for removing contaminants from a submerged surface of a reservoir comprising:
   - an inlet section having a first inlet end and a second inlet end;
   - an intermediate chamber having a first chamber end and a second chamber end, said first chamber end being in fluid communication with said second inlet end, and said intermediate chamber exhibiting a first inner diameter;
   - an outlet section having a first outlet end in fluid communication with said second chamber end, said outlet section exhibiting a second inner diameter that is less than said first inner diameter; and
   - a fluid supply pipe residing inside said intermediate chamber and having a fluid port directed toward said outlet section, said fluid supply pipe supplying fresh fluid under pressure from said fluid port toward said
outlet section to induce a flow of fluid and said contaminants from said reservoir into said first inlet end of said inlet section and through said intermediate chamber and said outlet section.

2. A vacuum apparatus as claimed in claim 1 wherein said inlet section exhibits a third inner diameter, said third inner diameter being approximately equivalent to said first inner diameter of said intermediate chamber.

3. A vacuum apparatus as claimed in claim 1 wherein said inlet section exhibits a third inner diameter, said third inner diameter being less than said first inner diameter of said intermediate chamber.

4. A vacuum apparatus as claimed in claim 1 further comprising an extension member formed at said first inlet end and oriented transverse to said inlet section.

5. A vacuum apparatus as claimed in claim 1 further comprising a flexible rubber member coupled to a rear edge of said inlet section at said first inlet end.

6. A vacuum apparatus as claimed in claim 1 further comprising a pile material at said first inlet end of said inlet section.

7. A vacuum apparatus as claimed in claim 6 wherein said pile material is removably coupled to said inlet section at said first inlet end.

8. A vacuum apparatus as claimed in claim 1 wherein said inlet section is formed from a flexible plastic, and said inlet section flexes to accommodate non-uniformities in said surface.

9. A vacuum apparatus as claimed in claim 1 wherein said second inner diameter of said outlet section is in a range of twenty-five to fifty percent smaller than said first inner diameter.

10. A vacuum apparatus as claimed in claim 1 wherein said outlet section has a second outlet end, and said apparatus further comprises a discharge hose coupled to said second outlet end for discharging said fluid and said contaminants from said reservoir.

11. A vacuum apparatus as claimed in claim 1 wherein said fluid supply pipe residing inside said intermediate chamber is approximately axially aligned with said intermediate chamber.

12. A vacuum apparatus as claimed in claim 1 wherein said fluid supply pipe is radially positioned toward a center of said intermediate chamber.

13. A vacuum apparatus as claimed in claim 1 wherein said fluid port of said fluid supply pipe is located proximate said second chamber end of said intermediate chamber.

14. A vacuum apparatus as claimed in claim 1 wherein said fluid supply pipe comprises:

- an interior portion located inside of said intermediate chamber, said fluid port being located at a first end of said interior portion;
- an exterior portion located outside of said intermediate chamber having a second end; and
- a coupling located at said second end for connection to a fluid supply hose for supplying said fluid to said fluid supply pipe.

15. A vacuum apparatus for removing contaminants from a submerged surface of a reservoir comprising:

- an inlet section having a first inlet end and a second inlet end;
- an extension member formed at said first inlet end and oriented transverse to said inlet section;
- a flexible rubber member coupled along a rear edge of said extension member;
- a pile material coupled to said flexible rubber member;
- an intermediate chamber having a first chamber end and a second chamber end, said first chamber end being in fluid communication with said second inlet end, and said intermediate chamber exhibiting a first inner diameter;
- an outlet section having a first outlet end in fluid communication with said second chamber end, said outlet section exhibiting a second inner diameter that is less than said first inner diameter; and
- a fluid supply pipe residing inside said intermediate chamber and having a fluid port directed toward said outlet section, said fluid supply pipe supplying fresh fluid under pressure from said fluid port toward said outlet section to induce a flow of fluid and said contaminants from said reservoir into said first inlet end of said inlet section and through said intermediate chamber and said outlet section.

16. A vacuum apparatus as claimed in claim 15 wherein said inlet section is formed from a flexible plastic, and said inlet section flexes to accommodate non-uniformities in said surface.

17. A vacuum apparatus for removing contaminants from a submerged surface of a reservoir comprising:

- an inlet section having a first inlet end and a second inlet end, said inlet section exhibiting a first inner diameter;
- an intermediate chamber having a first chamber end and a second chamber end, said first chamber end being coupled to said second inlet end, and said intermediate chamber exhibiting a second inner diameter;
- an outlet section having a first outlet end and a second outlet end, said first outlet end being in fluid communication with said second chamber end, and said outlet section exhibiting a third inner diameter, said first and third inner diameters being less than said second inner diameter;
- a fluid supply pipe residing inside said intermediate chamber and having a fluid port directed toward said outlet section, said fluid supply pipe being radially positioned toward a center of said intermediate chamber, and said fluid supply pipe supplying fresh fluid under pressure from said fluid port toward said outlet section to induce a flow of fluid and said contaminants from said reservoir into said first inlet end of said inlet section and through said intermediate chamber and said outlet section; and
- a discharge hose coupled to said second outlet end for discharging said fluid and said contaminants from said reservoir.

18. A vacuum apparatus as claimed in claim 17 wherein said fluid supply pipe comprises:
an interior portion located inside of said intermediate chamber, said fluid port being located at a first end of said interior portion;
an exterior portion located outside of said intermediate chamber and having a second end; and
a coupling located at said second end for connection to a fluid supply hose for supplying said fresh fluid to said fluid supply pipe.

19. A vacuum apparatus as claimed in claim 17 wherein said fluid supply pipe is approximately axially aligned with said intermediate chamber.

20. A vacuum apparatus as claimed in claim 17 wherein said fluid port of said fluid supply pipe is located proximate said second chamber end of said intermediate chamber.