May 20, 1969 H. C. MARTIN 3,444,575

POOL CLEANER

Filed May 2, 1967 Sheet 1 of 2

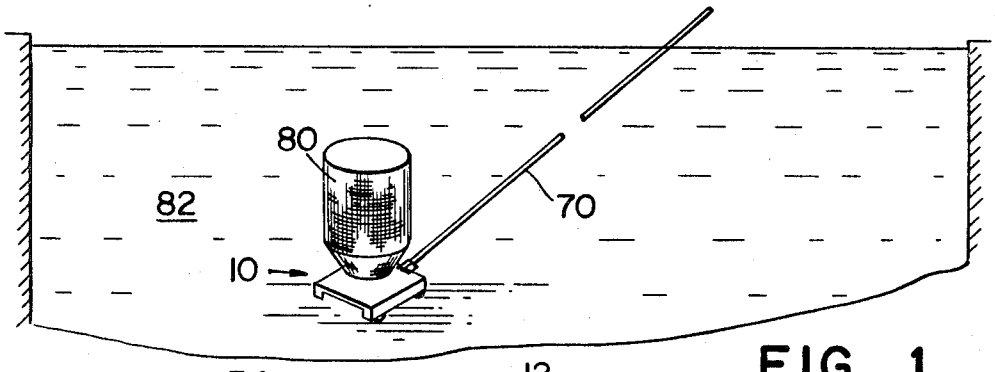


FIG_1

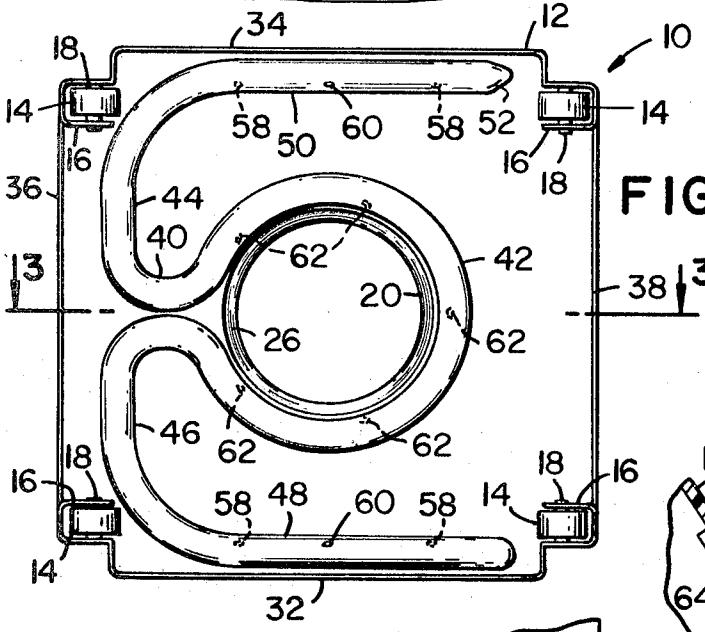


FIG_2

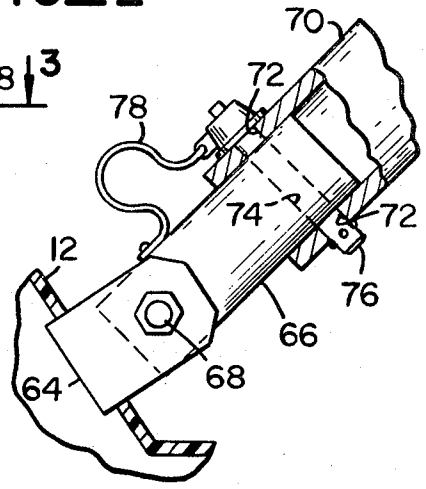


FIG_4

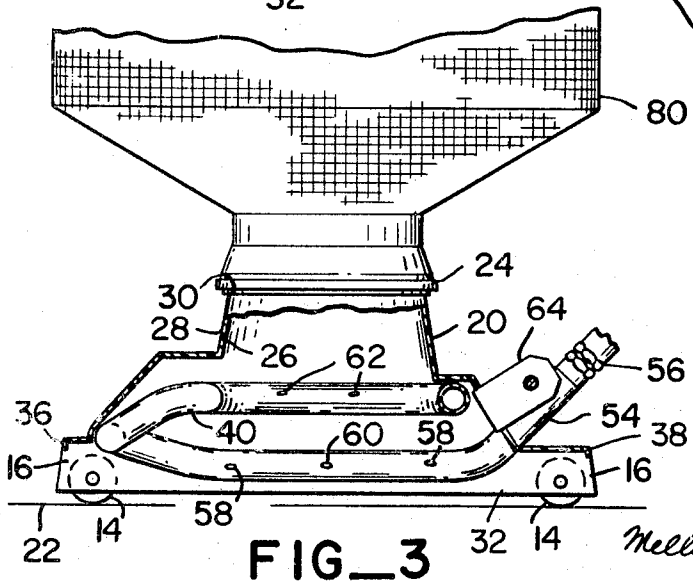


FIG_3

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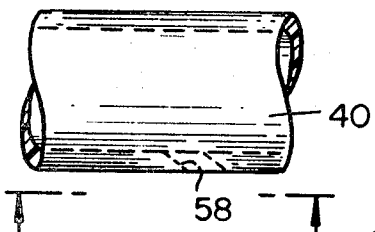


FIG_8

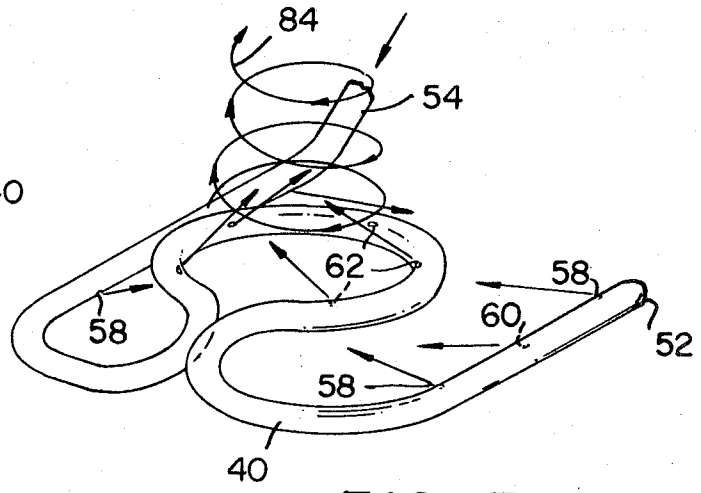


FIG_7

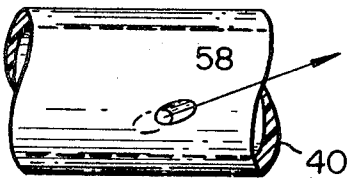


FIG_9

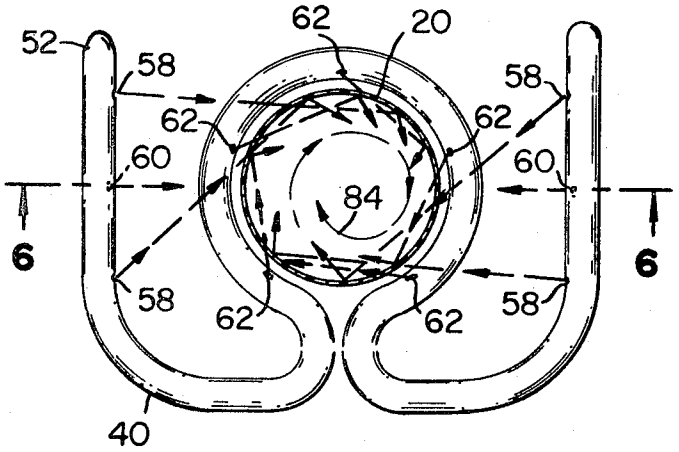


FIG_5

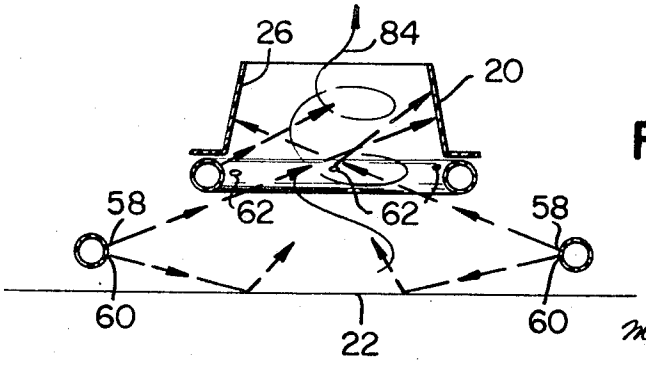


FIG_6

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3,444,575

POOL CLEANER

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Int. Cl. E04h 3/20
U.S. Cl. 15—1.7 7 Claims

ABSTRACT OF THE DISCLOSURE

A pool cleaner of the type having a water-pervious debris collection bag mounted on an open-bottomed housing, which can be guided along the bottom of a swimming pool, is equipped with water jets supplied with water from a hose. The arrangement of the jets is such that a vortex similar to an inverted tornado is created which sucks up debris dislodged from the pool bottom by washing jets and, due to its centrifugal momentum, conveys even relatively heavy objects into the bag while preventing dispersion of light debris dislodged by the washing jets.

This invention relates to a device for cleaning a water-filled pool, and more particularly, to a device for removing foreign matter from the pool bottom by inducing a vortex in the device which acts to carry the foreign matter into a water-pervious trap.

BACKGROUND OF THE INVENTION

In the past, various attempts have been made to provide a device which is capable of effectively cleaning a water-filled pool. A number of these devices utilize a water jet to carry foreign matter from the pool into a water-pervious bag, the water jet being created by passing water under pressure through a hose which runs from a water source to the device (for example, Blumenfeld 2,919,027, Pansini 3,287,755, Lombardi 2,725,356, and Pansini 3,063,077). While each of these devices may be effective under certain circumstances, a study of them reveals that each one fails to provide certain requisites which may be considered essential to an effective device.

It will be noted, initially that the Pansini 3,287,755, device is relatively complicated, requiring pipes extending from the base and a pair of deflectors to guide debris into a bag. The Blumenfeld device is also relatively complicated, requiring a device to be mounted on the side bank of a pool. It will further be noted that the water jets of Pansini 2,287,755 and Lombardi 2,725,356 induce water flow which is parallel to the wall to be cleaned and thus these devices are only adapted to picking up leaves, loose dirt, and the like, and are not effective in picking up foreign matter which is adhered to the wall, since water merely sweeps over the wall. A study of Pansini 3,063,077 reveals that the device therein is also only adapted to pick up leaves, it being designed for that purpose, and is not effective in dislodging debris which is adhered to a pool wall.

A device is known which merely uses its own motion across the pool wall to be cleaned to induce debris into the device (Eistrup 2,902,705). But this device is clearly not as effective as one which uses water jets to draw debris into the device, nor is it effective in picking up debris adhered to the pool wall.

Devices are known which use downwardly directed water jets to dislodge shellfish from a water bed and additional water jets to urge the shellfish into the device itself. But these devices, of course, are quite complicated and bulky, and are not adaptable for use as a pool cleaner.

The device of this invention has the additional advantage that the dirt and debris dislodged by the downwardly directed cleaning jets provided in the device are not stirred up and redeposited adjacent the device, but are immediately sucked into the vortex due to the strong current created by it. Consequently, the device of this invention leaves a very clean path when moved along the bottom of a pool.

It is an object of this invention to overcome the above problems by providing a device which is extremely simple in both construction and operation.

It is a further object of the invention to provide a device which effectively dislodges debris which is adhered to a pool wall and carries it therefrom.

It is a further object of this invention to provide a device which is effective in picking up debris which lies in a pool and is not adhered to the walls.

It is a further object of this invention to provide a device which is capable of effectively removing from the pool foreign objects of various sizes, shapes and weights.

SUMMARY OF THE INVENTION

Briefly stated, the device for cleaning foreign matter from a water-filled pool comprises an open-bottomed base and a conduit leading from the base to a water-pervious bag. Means are included for directing at least one water stream into the inlet end of the conduit and against the inner surface thereof at an acute angle thereto, the stream being positioned to induce a vortex in the conduit. The foreign matter drawn into the vortex is carried thereby into the inlet end of, through, and to the outlet end of the conduit, where it enters the water-pervious bag or trap connected to the outlet end of the conduit and is centrifugally distributed over the filtering surface of the trap.

BRIEF DESCRIPTION OF THE DRAWINGS

Each of the above objects is fulfilled by the specific embodiment shown in the drawings, wherein:

FIG. 1 shows the device being used to clean foreign matter from a pool;

FIG. 2 is a bottom view of the device;

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

FIG. 4 is a side elevation, partially broken away, of the means used for coupling the device to a handle;

FIG. 5 is a plan view of the pipe and conduit utilized in the device;

FIG. 6 is a section taken along the line 6—6 of FIG. 5;

FIG. 7 is a perspective view of the pipe utilized in the device;

FIG. 8 is a view of a portion of the pipe showing an aperture therein;

FIG. 9 is a view taken along the line 9—9 of FIG. 8.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring initially to FIGS. 1, 2 and 3, a pool cleaning device **10** is shown. The device **10** has a base **12** which has a substantially square outer periphery and wheels **14** mounted on its underside at each corner thereof. As best shown in FIGS. 2 and 3, a flange portion **16** of the base **12** adjacent each corner thereof is bent around each wheel **14** and a pin **18** is passed through the base **12**, wheel **14**, and flange portion **16** to provide a stable and strong wheel connection. The base **12** has as an integral part thereof a conduit **20** which is substantially in the center of the base **12**. When the wheels **14** are placed against a flat surface **22**, the axis of the conduit **20** is substantially perpendicular to that surface **22**. Fixed to the outer end of the conduit **20** is a ring **24**, the inner periphery of which is flush with the inner surface **26** of the conduit **20**, and the outer periphery of which extends past the outer surface **28** of the conduit **20** to form a peripheral lip **30**.

The slides **32**, **34** of the base **12**, which are opposite each other and are parallel to the direction in which the

base 12 moves on its wheels 14, extend so that they are in close proximity to the surface 22. The other opposite sides 36, 38 are formed so that they are relatively remote from the surface 22.

The base 12, conduit 20, and ring 24 are preferably of a tough, light plastic material.

Held within the base 12, and also preferably of light, tough plastic, is a pipe 40, which may with advantage be fused to the base 12. The shape of pipe 40 is best shown in FIGS. 2, 3 and 7. The pipe 40 has a substantially circular inner portion 42, portions 44, 46 which run along the side 36, and portion 48, 50 which runs along sides 32, 34, respectively. An end 52 of the pipe 40 is fused closed, while the opposite end 54 extends through the base 12 to the upper end thereof, and is adapted to receive a water hose by means of coupling 56. The substantially circular inner portion 42 is coaxial with the conduit 20 and fits against the first end thereof. The pipe 40 has therein a plurality of apertures 58, 60, 62, the operation of which will later be discussed in detail.

Fixed to the base 12 is a U-shaped strap 64, preferably made of the same plastic material as the base 12. The strap 64 pivotally holds a shaft 66 by means of a fastener 68. The shaft 66 is adapted to receive over it the end of a long, hollow handle which has aperture 72 positioned to align with an aperture 74 in the shaft 66 so that a pin 76 may be passed therethrough. This serves to connect the handle 70 to the shaft 66, whereby the device 10 may be moved by means of handle 70. The pin 76 may be attached to the shaft 66 by wire 78, as shown in FIG. 4, to insure that it will not be misplaced.

Attached to the end of the conduit 20 is a water-pervious bag or trap 80 of close mesh. The end of the bag 80 fits over the lip 30 about the conduit 20 and may be held thereon by a rubber band or any other well-known means.

In FIGS. 8 and 9, a small section of pipe 40 with an aperture 58 therein is shown. It is to be noted that water passing through the aperture 58 will travel in the direction shown in FIGS. 8 and 9, that direction being substantially along the axis of the aperture 58. Thus the direction of the water stream from the aperture 58 in the pipe 40 may be chosen by forming the aperture (as by drilling) at a certain angle relative to the pipe 40.

Referring now to FIGS. 5, 6 and 7, only the pipe 40 and conduit 20 are shown for clarity. As best shown in FIG. 6, apertures 60 are formed to direct cleaning water jet streams downward and against the surface 22. Apertures 58 are formed to direct water streams into what may be called the first end of the conduit 20 and against the inner surface 26 thereof. As best shown in FIG. 6, the water streams from apertures 58 strike the inner surface 26 of the conduit 20 at an acute angle thereto, the streams being positioned to induce a vortex in the conduit 20. The inner portion 42 of the pipe 40 contains a series of apertures 62 which are also directed into the first end of the conduit 20 and against the inner surface 26 thereof at an acute angle thereto. These water streams are also positioned to induce a vortex in the conduit 20.

In the operation of the device, the handle 70 is connected to the shaft 66 by means of pin 76, and a source of water under pressure is connected through a hose to coupling 56 attached to pipe 40. The device 10, with water-pervious bag or trap 80 attached thereto as discussed above, may then be lowered by means of handle 70 into a water-filled pool 82, as shown in FIG. 1. Water under pressure is then supplied to pipe 40. This water flows through pipe 40 and exits from apertures 58, 60, and 62, thus forming water streams from these apertures.

As described above, the streams from aperture 60 are directed downward. The stream from apertures 58, 62 are directed into the first end of the conduit 20 and induce a vortex 84 in the conduit 20. Foreign matter in the pool 82 adjacent the vortex 84 is strongly drawn into the vortex and carried thereby into the first end of the conduit 20. The foreign matter passes through the conduit 20 and from what may be called the second end thereof and into the trap 80, where it is collected. The centrifugal momentum of the vortex causes an even distribution of the debris over the bag surface, so as to utilize the full capacity of the bag with maximum effectiveness.

The device 10 may, of course, be moved on its wheels 14 over the submerged walls of the pool 82, by means of handle 70. When this is done, the water streams from apertures 58, being directed against a submerged wall, dislodge foreign matter which may be adhered to the wall. The vortex then acts on the dislodged foreign matter to carry it into, through, and from the conduit 20 and into the trap 80, where it is collected. When the trap 80 is sufficiently filled with debris, the device 10 may be tilted on its side to insure that collected foreign matter remains in the trap 80, and removed from the pool 82 by means of handle 70. When the device 10 is so removed, the trap 80 may be disattached from the conduit 20 and emptied of foreign matter.

It is to be noted that the sides 32, 34 of the base 12, being in close proximity to the wall 22, act to keep foreign matter, which has been dislodged, within the base 12, so that the vortex 84 may act on it and carry it into the trap 80. This results in the cleaning of a strip of wall 22 and insures that foreign matter which is dislodged does not settle back to the wall 22 on a portion that has already been cleaned.

It is also to be noted that the sides 36, 38 of the base 12, being relatively remote from the surface 22 that they pass over, allow objects such as leaves into the base 12 as it rolls on its wheels 14. The vortex 84 may thus be brought adjacent these objects, whereby they may be picked up and carried into the bag 80.

The inventive device is extremely effective, as compared to the prior art devices, because of the vortex 84 which is induced in the conduit 20. It has been found that a device incorporating a vortex of this type in combination with a relatively large diameter conduit, has much greater carrying power than a device in which water streams merely pass through the conduit without forming such a vortex. This device, because of the vortex and relatively large diameter conduit, has been found effective for picking up leaves, and even odd-shaped and relatively heavy objects, and has also been found effective in dislodging and picking up heavy muck which has become adhered to a pool wall.

Applicant has thus disclosed a pool cleaner which is extremely simple in both construction and operation, requiring a minimum of components. Furthermore, the invention device is extremely effective in cleaning debris, either loose or adhered to the pool walls, from the pool, and is extremely effective in picking up objects of various sizes, shapes and weights.

I claim:

1. A device for cleaning foreign matter from a water-filled pool comprising:

(a) a base;

(b) a conduit held relative to the base and open at both ends;

(c) means for projecting at least one water stream into the first end of the conduit and against the inner surface thereof upwardly and at an acute angle thereto, said stream being positioned to induce a vortex in the conduit, the foreign matter adjacent the vortex being carried thereby into the first end of, through, and from the second end of the conduit; and

(d) a water-pervious trap connected to the second end of the conduit for collecting foreign material carried from the second end of the conduit.

2. A device according to claim 1 wherein is included means for directing at least a second water stream against a submerged wall of the pool when the base is properly

positioned relative to said submerged wall, whereby foreign matter is dislodged from the submerged wall and carried by the vortex into the first end of, through, and from the second end of the conduit and into the water-pervious trap.

3. A device for cleaning foreign matter from a pool comprising:

(a) a base adapted to be moved over the submerged walls of the pool;

(b) a conduit held relative to the base and open at both ends;

(c) a pipe held within the base and adjacent the first end of the conduit and having a plurality of apertures therein;

(d) a hose connected at one end thereof to the pipe and at the other end thereof to a source of water under pressure, the water thereby passing through the hose into and through the pipe, and from the apertures therein, the apertures being positioned so that a plurality of water streams therefrom are projected into the first end of the conduit and against the inner surface thereof upwardly and at an acute angle thereto, said streams being positioned to induce a vortex in the conduit, the foreign matter adjacent the vortex being carried thereby into the first end of, through, and from the second end of the conduit, and

(d) a water-pervious trap connected to the second end of the conduit for collecting foreign material carried from the second end of the conduit.

4. A device according to claim 3 wherein said pipe

includes an additional plurality of apertures adapted to direct a plurality of water streams therefrom against a submerged wall of the pool when the base is moved over said submerged wall, whereby foreign matter is dislodged from the submerged wall and carried by the vortex into the first end of, through, and from the second end of the conduit and into the water-pervious trap.

5. A device according to claim 4 wherein the axis of the conduit is perpendicular to the submerged wall as the base is moved over the submerged wall, and wherein a portion of the pipe is shaped to substantially surround the axis of the conduit.

6. A device according to claim 5 wherein the outer periphery of the base is substantially of square configuration, and wherein two opposite sides of the base are adapted to be in close proximity to the submerged wall as the base is moved over the submerged wall.

7. A device according to claim 6 wherein the base and conduit are integral, and the base, conduit, and pipe are of plastic material.

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