

[54] WALL-MOUNT AIR PUMP

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[22] Filed: June 25, 1971

[21] Appl. No.: 156,861

[52] U.S. Cl. 417/413, 248/358

[51] Int. Cl. F04b 45/04, F16f 15/04

[58] Field of Search. 417/413, 416, 417, 417/410; 310/36, 1, 39; 248/358

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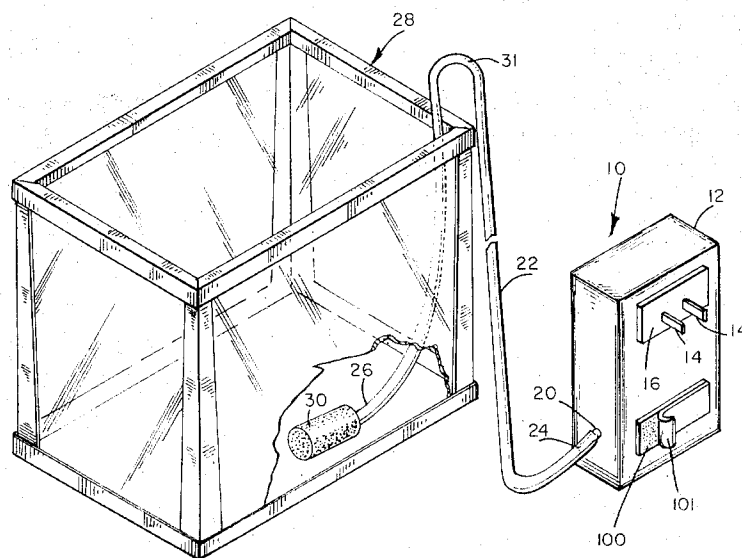
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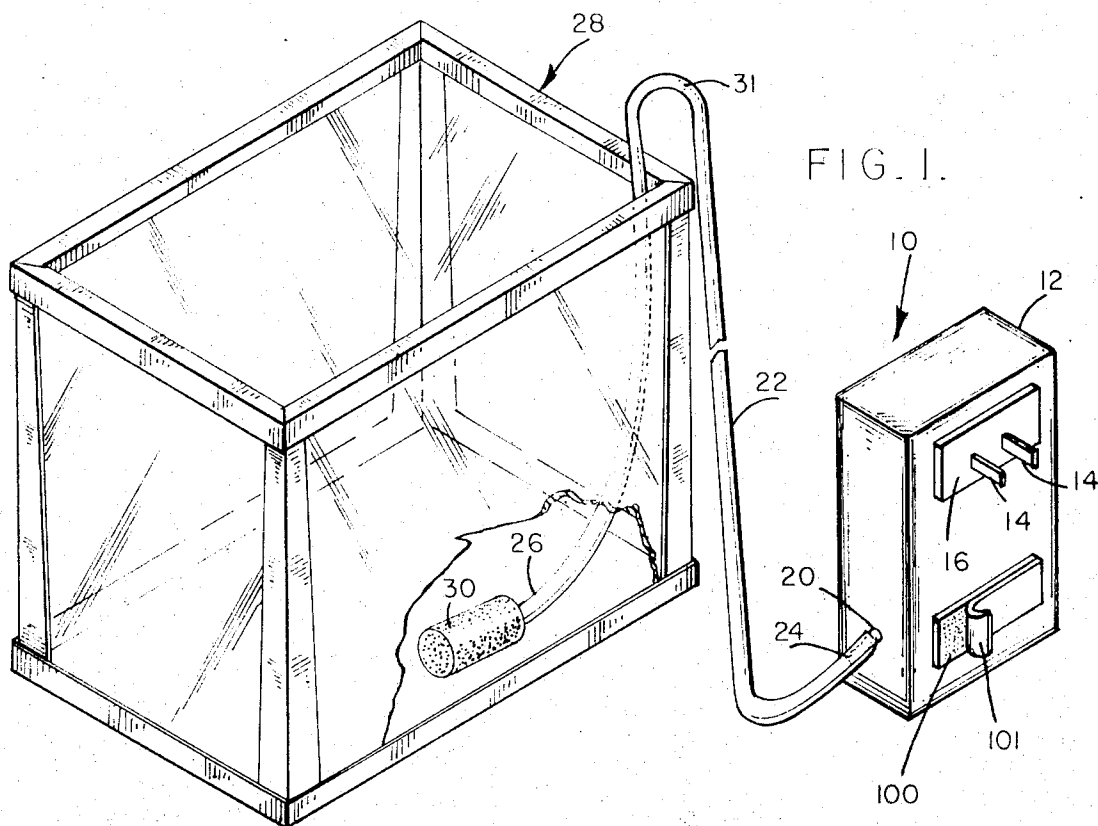
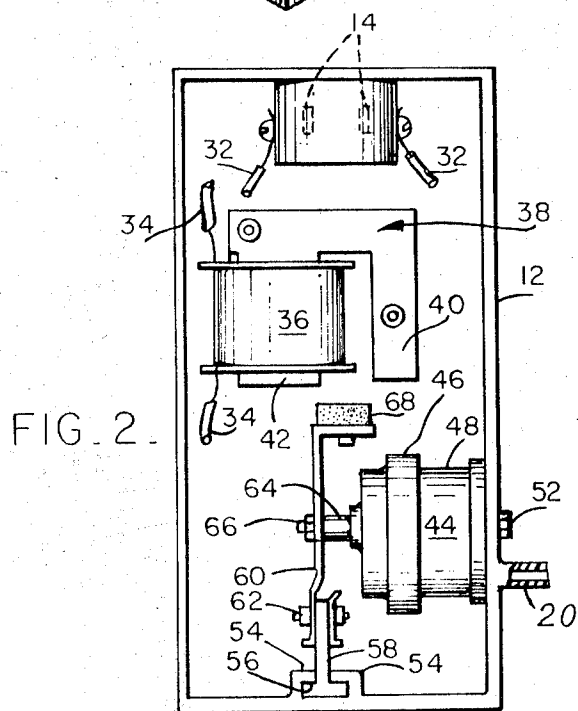
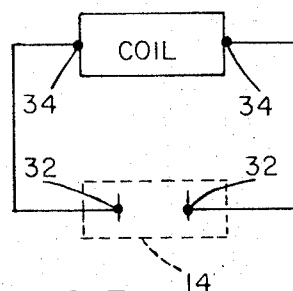
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[57] ABSTRACT

An air pump comprising a housing in which is mounted a pump for emitting air and an electric-circuit for generating a magnetic field, the latter which actuates the pump. A pair of electric-terminal prongs extend from the housing and are electrically coupled with the electric-circuit. The prongs may be directly inserted into a wall-mounted electric power receptacle and, thereby, in the absence of any auxiliary members, act to support the air pump housing. Tubing is provided for communicating the wall-mounted air pump with a water-filled aquarium, which tubing acts to direct air expelled from the air pump into the aquarium.

2 Claims, 3 Drawing Figures





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WALL-MOUNT AIR PUMP

BACKGROUND OF THE INVENTION

The present invention relates generally to tropical aquarium accessories, and more particularly to an air pump for being directly connected to a wall-mounted electric power receptacle.

Conventional pump accessories for tropical aquariums and especially that of the air pump generally require auxiliary support members, the latter which are connected to the tropical aquarium for supporting the pump. Thus, the conventional air pump is provided with an electric cord which extends for substantially 6 feet and terminates in a plug which is insertable into a wall-mounted electric power receptacle, which electric cord is relatively expensive.

There are a number of disadvantages associated with this particular arrangement in that auxiliary support members upon which the air pump may be supported are generally unsightly when connected to an aquarium. Moreover, the proximity of the air pump and its electrical components therein relative to the aquarium is such that there is the inherent danger that the air pump may be inadvertently cast into the water-filled aquarium, thereby, resulting in damage to the electrical components and, moreover, and more importantly, should the air pump be electrically coupled with an external wall-mounted electric power receptacle, it is obvious that not only will the fish be electricuted, but the hobbyist himself may be seriously harmed should he place his hand into the aquarium for the purpose of removing the submerged air pump.

Clearly, therefore, these disadvantages such as the requirement for auxiliary support members, unsightliness, potential danger associated with the conventional air pump and expensiveness of the electric cord are such that there is indeed a void in the art.

SUMMARY OF THE INVENTION

Accordingly, it is an object of the present invention to provide an improved air pump assembly.

It is another object of the present invention to provide an air pump for association with a tropical aquarium and having structure such that the pump need not be mounted directly upon the aquarium.

It is still a further object of the present invention to provide an air pump for association with a tropical aquarium such that absolutely no electric cords or the like need be provided in the vicinity of the aquarium.

It is still another object of the present invention to provide an air pump with self-supporting structure for operative association with a wall-mounted electric power receptacle.

It is another object of the present invention to provide an air pump and means for supporting the latter such that there is obviated, in large measure, excessive noise and vibration.

Other objects of the present invention are to provide an air pump which is economical to manufacture, simple to use, simple to attach in operative association with a tropical aquarium and one that does not have loose electrical cords, the latter which are a great deal more expensive than that of the air-conducting plastic tubular hose of the present invention.

To this end, the present invention relates generally to an air pump comprising a housing in which is mounted a pump for emitting air and an electric-circuit for gen-

erating a magnetic field, the latter which actuates the pump. A pair of electric-terminal prongs extend from the housing and are electrically coupled with the electric-circuit. The prongs may be directly inserted into a wall-mounted electric power receptacle and, thereby, in the absence of any auxiliary members, act to support the air pump housing. Tubing is provided for communicating the wall-mounted air pump with a water-filled aquarium, which tubing acts to direct air expelled from the air pump into the aquarium.

BRIEF DESCRIPTION OF THE DRAWINGS

With the above and additional objects and advantages in view as will hereinafter appear, this invention comprises the devices, combinations and arrangements of parts hereinafter described and illustrated in the accompanying drawings of a preferred embodiment in which:

FIG. 1 is a perspective view illustrating the air pump pursuant to the present invention as operatively associated with a tropical aquarium;

FIG. 2 illustrates an elevational view of the internal portion of the air pump pursuant to the present invention and the electrical, magnetic and pumping structure in operative association with one another; and

FIG. 3 illustrates a schematic representation of the electrical circuitry as arranged in the air pump pursuant to the present invention.

DETAILED DESCRIPTION OF THE INVENTION

Referring now to the drawing, and more particularly to FIG. 1 thereof, the present invention comprises an air pump generally denoted by the reference character 10, the latter being provided with a housing 12 from which extends a pair of electric-terminal prongs 14. Interpositioned between the extreme free end portions of the prongs 14 and the housing 12 is a vibration damper 16 generally constituted of resilient material such as rubber or the like, the purpose of the latter being clarified below. Extending from the side of the housing 12 is an air expulsion conduit 20, the purpose of which will also be clarified below.

A tubular member 22 constituted of resilient material such as plastic or the like is utilized for directing air expelled from the air pump 10. In this respect, the tubular member 22 is provided with one end 24 which is connected to the air expulsion conduit 20 of the air pump 10 and terminates in a free end 26 which is disposed in a tropical aquarium 28, the free end 26 being connected to an air permeable diffuser stone 30 for dispersing air expelled from the air pump 10.

Referring now to FIGS. 2 and 3 of the drawing, mounted internally of the housing 12 of the air pump 10, is an electric-circuit for inducing a magnetic field having fluxes alternating in polarity. In this respect, a pair of leads 32 are electrically coupled in a conventional manner to the prongs 14, in parallel therewith, and in turn to a pair of leads 34, the latter which are electrically coupled in a conventional manner with a coil enwrapped spool 36 for inducing a magnetic field. The coil enwrapped spool 36 is mounted upon and insulated from a U-shaped magnetic core 38, the latter having a first limb 40 and a second limb 42, the limb 42 having a greater cross-sectional extent than that of the limb 40 and supporting the coil enwrapped spool 36.

Also mounted internally of the housing 12, as illustrated in FIG. 2, is a pump 44 having a resilient diaphragm 46, the latter being mounted upon a pump housing 48, the housing 48 communicating with the air expulsion conduit 20 and being connected to the housing 12 in a conventional manner such as by a bolt 52.

The lower portion of the housing 12 is provided with a pair of spaced L-shaped lugs 54 which cooperatively define a generally inverted T-shaped recess 56 into which may be press-fit a resilient T-shaped support member 58, the latter constituted of rubber or the like. Connected to the resilient support member 58 is a generally L-shaped lever 60 such as by means of a bolt 62.

Extending transversely of and connected to the lever 60 is a plunger 64, which plunger 64 is connected to the lever 60 such as by means of a bolt 66 and to the diaphragm 46 in a conventional manner. Extending along the upper free end surface of the lever 60 and connected to the latter is a permanent magnet 68 for operative association with the magnetic field generated by the coil enwrapped spool 36.

The primary concept of the present invention will be recognized readily immediately upon its use. In this respect, the hobbyist need simply connect the air pump 10 to a suitable wall-mounted electric power receptacle, such as that found in the usual household, in a manner as one would ordinarily do when one wishes to connect the plug of an electrical load such as that of a lamp or the like to the wall-mounted electric power receptacle. Thus, in that manner by which the plug of an electrical power cord, such as that of a lamp or the like, is supported by the wall-mounted electric power receptacle, the air pump 10 will be supported likewise.

Expanding upon this concept, somewhat, all the hobbyist need do is insert the prongs 14 of the housing 12 appropriately within a wall-mounted electric power receptacle and immediately upon doing so, the pump 44 mounted internally of the housing 12 will be immediately activated for causing the expulsion of air through the conduit 20 of the housing 12. Obviously, whenever a tubular member such as that of the tubular member 22 is connected to the air expulsion conduit 20, air will be directed through the tubular member 22 and into the confines of a water-filled aquarium such as that of the aquarium 28 for aerating the water therein.

The pumping structure mounted internally of the housing 12 is operated immediately upon insertion of the prongs 14 into the wall-mounted electric power receptacle. In this respect, electric power is directed to the leads 32 and 34 which are electrically coupled with one another and into the coil enwrapped spool 36. Indeed, since the electric power supplied by the conventional household is generally 60 C.P.S.—alternating current, the magnetic field generated by the coil enwrapped spool 36 is such that the magnetic fluxes at the limbs 40 and 42 respectively of the U-shaped magnetic core 38 alternate in polarity. The permanent magnet 68 which is fixed to the lever 60 is, thus, alternately attracted toward each of the limbs 40 and 42 as the polarity of the latter alternates, and this alternate attraction effects a general pivotal displacement or oscillation of the lever 60, the latter being substantially characterized as pivotally supported by the resilient support member 58.

The pivotal displacement or oscillation of the lever 60 results in actuation or rapid deformation of the resilient diaphragm 46 through the intermediary of the

plunger 64, the latter being interpositioned between the diaphragm 46 and the lever 60. As those skilled in the art readily appreciate, as the diaphragm 46 is rapidly deformed, inwardly and outwardly of the pump housing 48, axially of the latter, in a conventional manner aided by valve means (not shown), there is effected the expulsion of air through the conduit 20 extending from the housing 12. Air will, thus, be directed through the tubular member 22 and into the air permeable diffuser 30, the latter dispersing air universally throughout the water-filled aquarium 28.

In the instance of the preferred embodiments, herein disclosed, there is not shown a manually operable switch for rendering the pump selectively operative and inoperative while the prongs 14 remain inserted in the wall-mounted electric power receptacle. However, as those skilled in the art readily appreciate, a switching arrangement may be readily incorporated herein so that the air pump 10 may be selectively rendered inoperative while connected to the wall-mounted electric power receptacle. Obviously, in the instance of the preferred embodiment wherein there is absent a switching arrangement, air will be continuously expelled by the air pump 10 for so long as the latter remains connected to the wall-mounted electric power receptacle.

It is significant to note that the air pump 10 is provided with a vibration damper 16 for being interpositioned between the wall-mounted electric power receptacle and the housing 12 to thereby diminish to a great extent excessive noise due to vibration that would otherwise occur in the absence of the vibration damper 16.

It should be clear from the above, that the present invention is extremely beneficial in that there is obviated any necessity for supporting the air pump 10 pursuant to the present invention adjacent a fish tank, this enhancing the esthetics of the aquarium and obviating potential danger whenever an electrical appliance is in proximity with water. Furthermore, the air pump 10, pursuant to the present invention, will support itself when associated with a wall-mounted electric power receptacle in a manner as does an electrical plug of conventional nature.

It is noteworthy that the housing 12, on that surface of the latter from which extend the prongs 14 and the vibration damper 16, there may be provided an adhesive-carrying member 100, constituted of rubber foam or the like, which member 100 includes adhesive-protective strips 101. As those skilled in the art will readily understand, the strip 101 may be peeled from the member 100 to expose a layer of adhesive interposed therebetween thereby permitting the direct contact of the adhesive with portions of the wall surrounding the wall-mounted electric receptacle for further enhancing support of the pump 10. Obviously, the thickness of the member 100 should be at least equal to, and preferably greater than, the thickness of the vibration damper 16. Moreover, the member 100 may be arranged as either one or a plurality of elements and extend either horizontally or vertically along the housing 12.

Furthermore, the member 100 may be provided as an accessory to the pump 10 such that on opposed faces the member 100 there is provided adhesive-protecting strips which may be peeled therefrom so as to expose adhesive on opposite faces of the member 100. This of course permits the hobbyist to choose the most appropriate place on the housing 12 to position the member

100, the appropriate place accounting for the vertical extent of the housing 12 and the portion of the wall, in which is provided the electrical receptacle, which is most suitable.

Numerous alterations of the structure herein disclosed will suggest themselves to those skilled in the art. However, it is to be understood that the present disclosure relates to a preferred embodiment of the invention which is for purposes of illustration only and not to be construed as a limitation of the invention.

What is claimed is:

1. An air pump comprising a housing, pump means for emitting air, said pump means being enclosed within said housing, first means securing said pump to an inner side of one wall of said housing, conduit means extending outwardly from an outer side of said one wall of said housing, said conduit means communicating with said pump means for expelling air from said pump means, a pair of electric-terminal prongs secured within said housing and extending outwardly from a rear wall of said housing for operative association with an external wall-mounted electric power receptacle, said prongs being electrically connected to a coil mem-

ber enclosed within said housing for inducing a magnetic field, said coil member being mounted upon a core member, second means securing said core member within said housing, magnetic-responsive means associated with said core member and connected to said pump for actuating said pump when said prongs are operatively associated with the power receptacle, third means pivotally securing said magnetic responsive means within said housing, and vibration damping means disposed on said rear wall of said housing for interposition between said rear wall and the wall-mounted electric power receptacle, said pair of prongs extending through and outwardly from said vibration damping means, whereby said air pump is a self-supporting structure for direct connection to the wall-mounted receptacle without any external electrical power cords.

2. An air pump as claimed in claim 1 wherein said housing includes adhesive means proximate said vibration damping means for operative association adhesively with a wall in which is provided said wall-mounted electric power receptacle.

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