March 26, 1963 H. M. ARAK 3,082,935

AQUARIUM PUMP

Filed March 1, 1961

FIG. 1

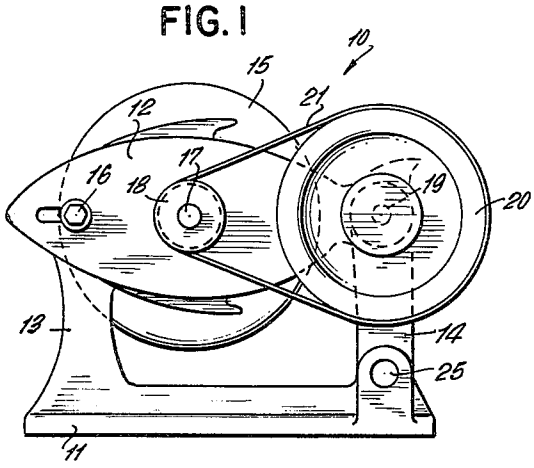


FIG. 2

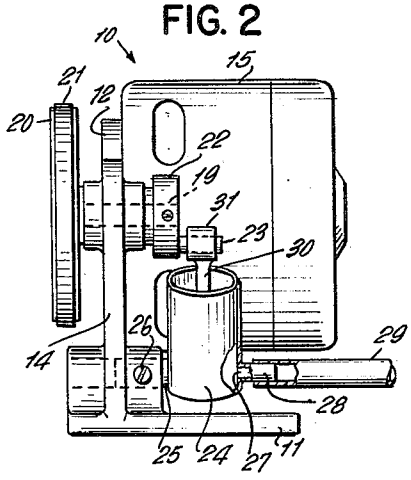


FIG. 3

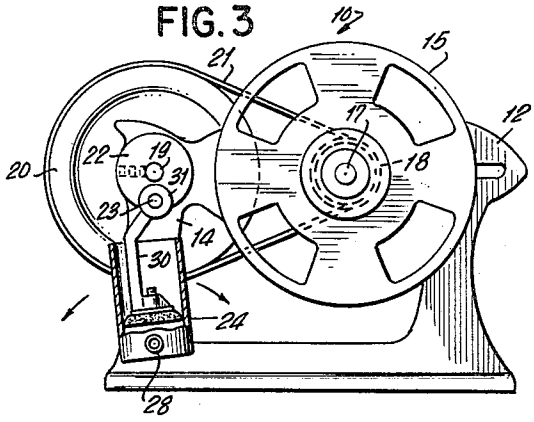


FIG. 4

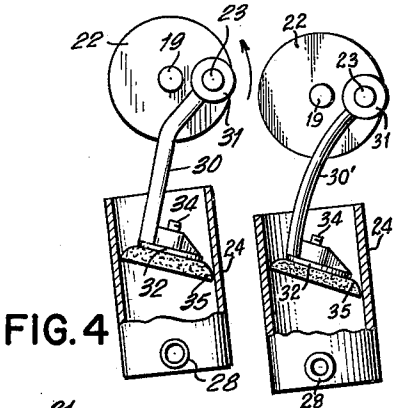


FIG. 9

FIG. 5

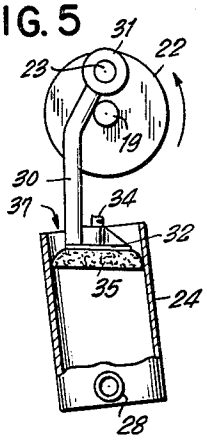


FIG. 6

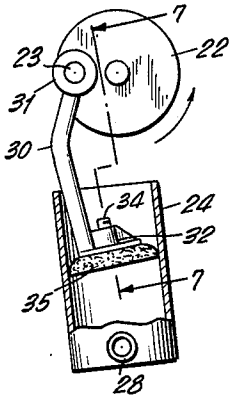


FIG. 7

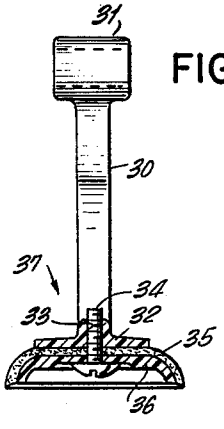
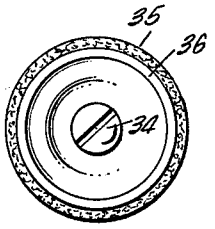


FIG. 8



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AQUARIUM PUMP

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2 Claims. (Cl. 230—172)

This invention relates to air pumps, particularly for aquariums and the like, and has for its objective the creation of an air pump, to aerate an aquarium, which operates with a maximum of efficiency with each stroke of the piston arm.

In present types of aquarium pumps of this type the piston arm is straight, so that, with each stroke of the piston arm, air is forced through the pump into the air-line only during a small portion of the downward drive, and much of the downward stroke is wasted because the piston becomes angled and not air-tight. With my invention of an angled piston arm, however, the piston is air-tight substantially the entire distance of the downward stroke, with the result that twice the amount of air is pumped with each stroke.

It is therefore the principal object of my invention to create an air pump having a particularly angled piston arm capable of forcing a greater amount of air through the pump with each downward stroke of the piston arm.

Another important object of my invention lies in the provision of an air pump provided with a particular type of piston arm which eliminates the need for a separate bearing in its engagement with the drive pin.

Still another important object of my invention lies in the creation of an air pump provided with a more efficient and durable type of piston.

Other objects, advantages and functional features will become more readily apparent from an examination of the following specification, taken with the accompanying drawings, wherein:

FIG. 1 is a rear view of the aquarium pump made according to my invention;

FIG. 2 is a side view of the embodiment of FIG. 1, partly broken away to show air line connection;

FIG. 3 is a front view, partly in cross-section, to show construction of the pump barrel;

FIG. 4 is an enlarged, front view, partly in cross-section, showing the piston arm on the upward stroke within the barrel;

FIG. 5 is a view, similar to FIG. 4, showing the beginning of the downward stroke of the piston arm;

FIG. 6 is a view similar to FIG. 5, but showing the downward stroke in intermediate position;

FIG. 7 is an enlarged, cross-sectional view, taken on lines 7—7 of FIG. 6;

FIG. 8 is an enlarged, bottom view of the piston; and

FIG. 9 is a view similar to FIG. 4, but showing a modified embodiment of the piston arm.

Similar reference characters designate similar parts throughout the different views.

Illustrative of the embodiment shown, my aquarium pump 10 comprises a base 11 provided with a vertical support 12 integral with the base 11 by means of uprights 13 and 14. A motor 15 is rivetted to the support 12 by means of rivets 16, with its shaft 17 extending through an opening in the support 12. A drive wheel 18 is provided upon the shaft 17 and adapted to rotate with the shaft 17. Secured through the upright 14 there is provided a rotatable shaft 19, around one end of which is secured a fly wheel 20 aligned with the drive wheel 18. An endless belt 21 engages the drive wheel 18 with the fly wheel 20, so that rotation of the drive wheel 18 rotates the shaft 19. A disc 22 is secured around the opposite end of the shaft 19 and is provided with an eccentric pin 23. Below the disc 22 and open barrel 24

is secured to the base 11 by means of an integral shaft 25 journalled in a bearing in the base 11, rotative therein and secured in any desired angle by engagement of the shaft 25 with the screw 26. The barrel 24 is provided with an opening 27 adjacent its base, with an extending nozzle 28, to which an air tube 29 is attached, as shown.

Coming now to the particular features of my invention there is provided a piston arm 30, angled as shown. This arm 30 is preferably made of a suitable plastic material. The upper end of the arm 30 is enlarged to define a bearing 31 adapted to fit upon the eccentric pin 23. The lower end of the arm 30 is enlarged to define a circular base 32 provided with a central threaded bore adapted to receive a screw 34. A spreader 35, capping a cup washer 36 is secured to the piston base 32 by means of the screw 34 to form the piston 37, the piston 37 being of a diameter to frictionally abut the wall of the barrel 24 in air-tight engagement.

In the operation of the aquarium pump, the activation of the motor 15 causes rotation of the disc 22 to drive the piston arm 30 within the barrel 24. On the downward stroke the piston arm 30 turns near the top of the stroke so that the piston 37 is in air-tight engagement with the barrel 24 and forces the air within the barrel 24 through the nozzle 28 and into the air line 29. At the begining of the upward stroke the piston arm 30 turns near the base of the barrel 24, causing the piston 37 to break the air-tight engagement which continues throughout the balance of the upward stroke, permitting air to enter the barrel 24 from the atmosphere, to be forced through the barrel 24 at the next downward stroke and into the air line 29. It is to be particularly noted that because of the angulation of the piston arm 30 the piston 37 continues an air-tight engagement with the wall of the barrel 24 through a longer area of the barrel 24 than is possible with a straight piston arm, since, with the latter, the rotation of the disc 22 forces the piston from an air-tight position in the barrel 24 until a point much lower in the barrel 24. As a consequence, a much greater amount of air is pumped through the barrel 24 with my invention than is possible with a straight piston pump, in each stroke, and a greater degree of efficiency is achieved.

While the embodiment shown and described discloses a piston arm of which the upper portion is at an angle to the lower portion, it is to be understood that my invention is not limited to such type of piston arm, but includes various degrees of angle as well as the use of a curved piston arm capable of achieving the same result.

In FIG. 9 there is shown a modified embodiment of my pump. This modification is to be found in the piston arm 30′, which is curved instead of angled as in FIG. 4. As is well apparent, my pump functions equally well with a curved piston arm 30′ as with an angled piston arm 30.

It is also to be noted that my improvement of the piston arm includes as well the elimination of a separate bearing, as well as the particular features of construction of the piston attachment.

Various changes may be made in the construction, composition and arrangement of parts of my invention, and substitution of equivalent elements, without departure from the spirit and scope of my invention, or sacrificing any of the advantages thereof inherent therein, all of which are claimed.

Having described my invention, I claim:

1. An aquarium pump comprising a stand provided with vertical supports, a motor having a drive shaft provided with a drive wheel mounted upon one of the supports, a rotatable shaft mounted in the other support, a fly wheel secured to one end of the rotatable shaft in

alignment with the drive wheel, means for engagement of the drive wheel with the fly wheel to rotate the rotatable shaft, a disc mounted on the other end of the rotatable shaft and provided with an eccentric pin, a barrel mounted in the stand below the disc, means to secure the barrel to the stand at pre-selected angles from the perpendicular, an air vent in the barrel near its base, an air line connected to the air vent and a combination piston rod and piston disposed within the barrel, the piston rod being angular and in engagement at its upper end with the eccentric pin for reciprocating movement of the piston within the barrel to force air from the barrel through its air vent and through the air line.

2. An aquarium pump comprising a stand provided with vertical supports, a motor having a drive shaft provided with a drive wheel mounted upon one of the supports, a rotatable shaft mounted in the other support, a fly wheel secured to one end of the rotatable shaft in alignment with the drive wheel, means for engagement

of the drive wheel with the fly wheel to rotate the rotatable shaft, a disc mounted on the other end of the rotatable shaft and provided with an eccentric pin, a barrel mounted in the stand below the disc, means to secure the barrel to the stand at pre-selected angles from the perpendicular, an air vent in the barrel near its base, an air line connected to the air vent and a combination piston rod and piston disposed within the barrel, the piston rod being curved and in engagement at its upper end with the eccentric pin for reciprocating movement of the piston within the barrel to force air from the barrel through its air vent and through the air line.

References Cited in the file of this patent

UNITED STATES PATENTS

2,023,466	Crowley	Dec. 10, 1935
2,284,645	Duffy	June 2, 1942
2,968,963	Hazlett	Jan. 24, 1961
2,985,358	Lee et al.	May 23, 1961