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AIR PUMP TO AERATE FISH CONTAINERS

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FIG. 1.

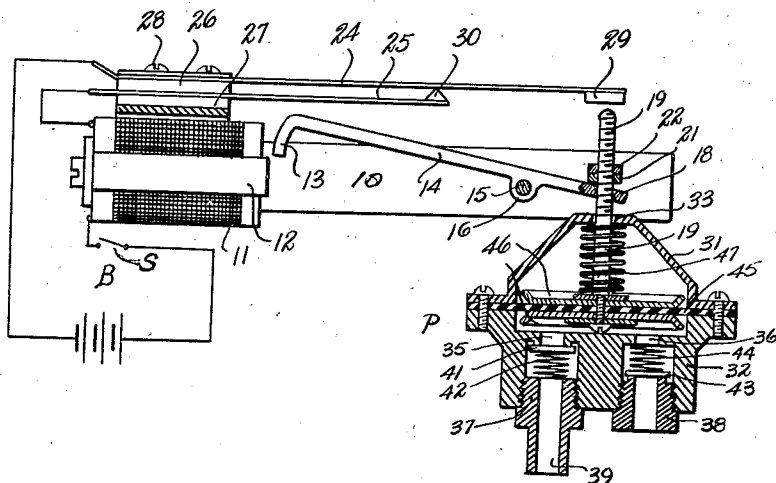


FIG. 2.

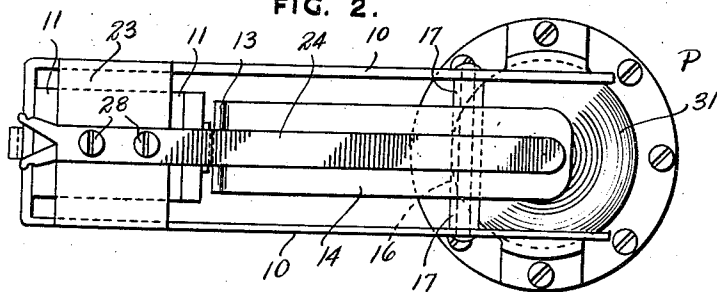
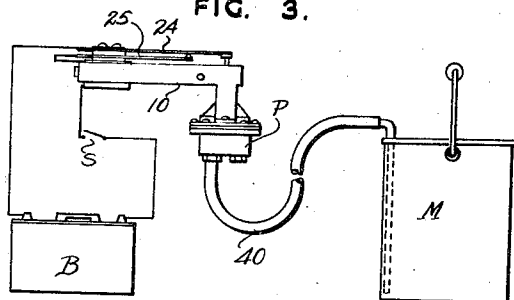


FIG. 3.



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AIR PUMP TO AERATE FISH CONTAINERS

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1 Claim. (Cl. 230—55)

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The present invention relates to air pumps to aerate water and is more particularly concerned with an electrically operated air pump to aerate minnow containers.

The primary object of the invention is to provide a device of the character referred to which can be readily connected to a source of electric supply, such as the battery of an automobile or the like.

Another object of the invention is to provide an aerating pump which in operation interrupts the electric current intermittently to alternately take in fresh air and then emit it into a water container, thus feeding fresh oxygen thereto as desired.

A further object of the invention is to provide an electrically operated aerating pump of simpler and more compact construction than prior devices.

Still another object of the invention is to provide a current interrupter of simple and inexpensive construction for use in association with an air pump of the character referred to.

With the foregoing and other objects and advantages in view the invention consists of the novel construction, arrangement and combination of parts hereinafter described and claimed.

In the accompanying drawings illustrating the preferred embodiment of the invention,

Figure 1 is a vertical longitudinal section of the air pump and current interrupter wired for use.

Figure 2 is a top plan view of the current interrupter in operative position on the air pump.

Figure 3 is a schematic view showing the several units in circuit with a source of electric current.

Like reference characters, as used in the description and drawings, designate the same structural parts.

10 is a U-shaped frame in the closed end of which is mounted a spool magnet 11, the core 12 of which is secured to the frame by means of a screw threaded into its end. An arcuate armature 13 of soft iron with an elongated arm 14 is fulcrumed between the two sides of frame 10, adjacent to the ends thereof and the armature and magnet core are contiguous, as shown in Figure 1, but having suitable clearance. The fulcrum is a shaft 15 disposed transversely. An integral sleeve 16 on the underside of arm 14 is mounted to oscillate on said shaft and spacer washers 17 are interposed between sleeve 16 and the walls of frame 10.

Forwardly of the said fulcrum point the arm

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14 is provided with a vertically disposed aperture 18 for reception of the plunger 19 of a pump P which depends from a truss bar 20 spanning the space between the ends of frame 10. The upper portion of said plunger is threaded for an adjusting nut 21 and lock nut 22 positioned on the upper side of arm 14.

Mounted on a truss plate 23 connected to the frame 10 above the magnet 11 is a jack comprising two spaced conductor arms 24 and 25 of unequal length with the longer one above. Interposed between said strips at said place of mounting is an insulation block 26 and another insulation block 27 is interposed between both of said arms and the said truss. The arms of the jack and the said insulation blocks are secured together and to the said truss by metal screws 28 which thread into the truss.

The arms of the jack extend longitudinally of frame 10 and in parallelism, with the forward extremity of the upper one, 24, in proximity to the upper end of the pump plunger 19 but suitably spaced therefrom. On the underside of said arm is a fiber block 29 positioned for the pump plunger to strike. The shorter or under jack arm 25 is designed to be stationary while the upper arm 24 is designed for spring action when impinged by said plunger. On the upper side of arm 25 adjacent its end is a contact point 30 which normally impinges the upper jack arm.

The opposite or rearward ends of said arms are suitably fashioned for wiring connections with an electric circuit to a source of supply, here shown as a storage battery B. In the circuit is a toggle switch S to turn the current on and off, as desired. Where this device is set up in an automobile one of said wires can be connected to the ignition switch, the cigar lighter, trouble lamp socket, or elsewhere that connection can be had with the battery, while the other wire would be grounded on some part of the car.

Pump P consists of a case in two sections, an upper 31 and a lower one 32 with annular flanges designed to be secured together by screws. The upper section is in the form of a conical shell with a central aperture 33 in the top for reciprocation therein of the plunger 19.

The lower section of the casing is provided in its top with a circular recess 34 having two round apertures 35 and 36, serving respectively as the outlet and intake ports of the air pump.

Below both ports are annular plug sockets for reception of centrally bored plugs 37 and 38 designed to thread part of the way into said sockets. An extension 39 depending from plug 37

serves as a coupling for a length of hose 40 to induct fresh air into a minnow bucket M or other container as illustrated in Figure 3. A Micarta disc 41 normally engages the valve seat surrounding outlet port 35 and serves as a valve. Interposed between said disc and the top of plug 37 is a coiled spring 42 to normally seat the disc and close the port.

The intake valve assembly consists of a valve disc 43 seating on top of plug 38 and a superimposed coiled spring 44 which impinges the upper wall of the plug socket and normally closes the intake port 36.

Interposed between the flanges of the casing sections is a vibratory diaphragm 45 of rubberized cloth or other suitable material which is reinforced interiorly of the casing by upper and lower cupped discs 46. Mounted on the upper disc and concentrically therewith, by means of a screw through the diaphragm assembly which threads into its lower end, is the plunger 19. Washers are employed on top and bottom reinforcing discs where the screw passes through and the lower end of the plunger impinges the upper washer.

Interposed between the said washer and the top wall of casing section 31 is a coiled spring 47 which surrounds plunger 19 and serves to return the diaphragm to lowered position when the jack is opened and the circuit broken, as hereinafter explained more at length.

The aforesaid pump and circuit breaker may be readily contained in a portable case of metal or plastic, and approximately five inches long, 3½ inches wide inside and 2¼ inches high inside, with a top, either hinged or removable. Easily carried, it will be convenient for a fisherman. When so encased the frame 10 of the circuit breaker will be suitably affixed to the bottom of the case and the circuit wires arranged for ready connection with a battery circuit and ground.

In operation, when the jack arms are in contact and switch S is turned to "on" position the circuit is closed through the coil of the magnet thus energizing same and attracting armature 13 to core 12. As the armature swings toward the core the arm thereon pulls the plunger upward. This operates the diaphragm of the pump and sucks air in through the air intake plug 38 and the intake port. When the plunger reaches the top of its upward stroke, approximately, the upper jack arm 24 of the current interrupter lifts it off the contact point on jack arm 25 and thereby breaks the circuit and de-energizes the coil of the magnet. When this occurs, the coiled spring 47 pulls the plunger 19 down and carries the diaphragm with it, thereby forcing the air entrapped in the pump case out through outlet port 35 and the outlet valve plug 39 whence it flows into hose 40 and thence to the water in the minnow bucket M. Upon completion of said down stroke of plunger and diaphragm the jack arms

resume contact and open the circuit, thus completing a cycle which is repeated and oxygen supplied to the water in the container as long as switch S is left on.

By use of the aforesaid apparatus oxygen can be supplied to a container up to 200 gallons capacity provided the depth of water is not in excess of approximately 30 inches and minnows may be transported in large numbers for long distances with negligible loss. In the case of a small container it will not be necessary to run the pump continuously, but if allowed to run all the time, no injury to the fish will result therefrom. It will be understood that the device need not be attached to the car permanently. When not in use it can be stowed away in the car or can be removed from one car to another.

As different embodiments may be made of this inventive concept and modifications may be made in the embodiment hereinbefore shown and described, it will be understood that the matter herein is to be interpreted, as illustrative merely, and not in a limiting sense.

What I claim is:

Electromagnetic means for actuating a liquid aerating pump, comprising a substantially U-shaped frame, an electromagnet fixed on the inside of the bight of said frame with the core of said magnet extending longitudinally of the legs of said frame, a cross-shaft connecting said legs intermediate the ends thereof, an elongated arm pivoted intermediate its ends on said shaft, one end of said arm being contiguous to said magnet core and being arcuately bent to provide an armature, an aerating pump mounted on the free ends of the legs of said frame and including a reciprocable plunger extending through said legs at right angles thereto, a free end of said plunger extending beyond said legs, means operatively and readily detachably connecting the second end of said arm to said plunger inwardly of the free end thereof, a make-and-break device mounted on said frame and including a spring-actuating arm extending over said plunger in actuating proximity to the free end thereof, and a suitable source of electric power operatively connected to said magnet and to said make-and-break device to reciprocate said plunger.

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