

Sept. 10, 1968

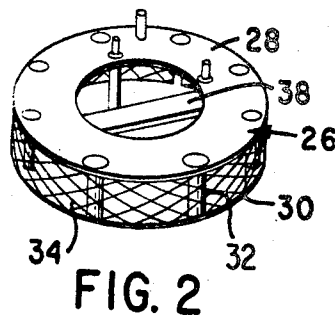
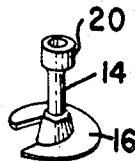
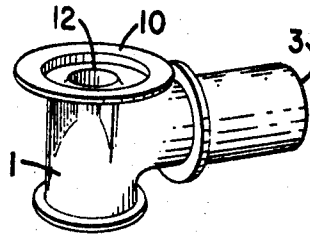
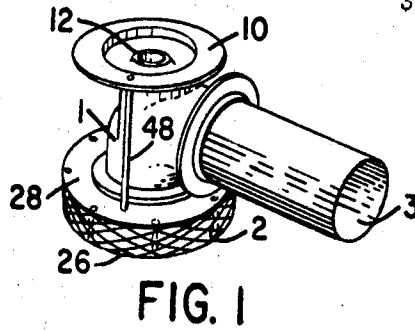
N. J. KINGSEP

3,400,664

FLOATING PUMP

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3 Sheets-Sheet 1



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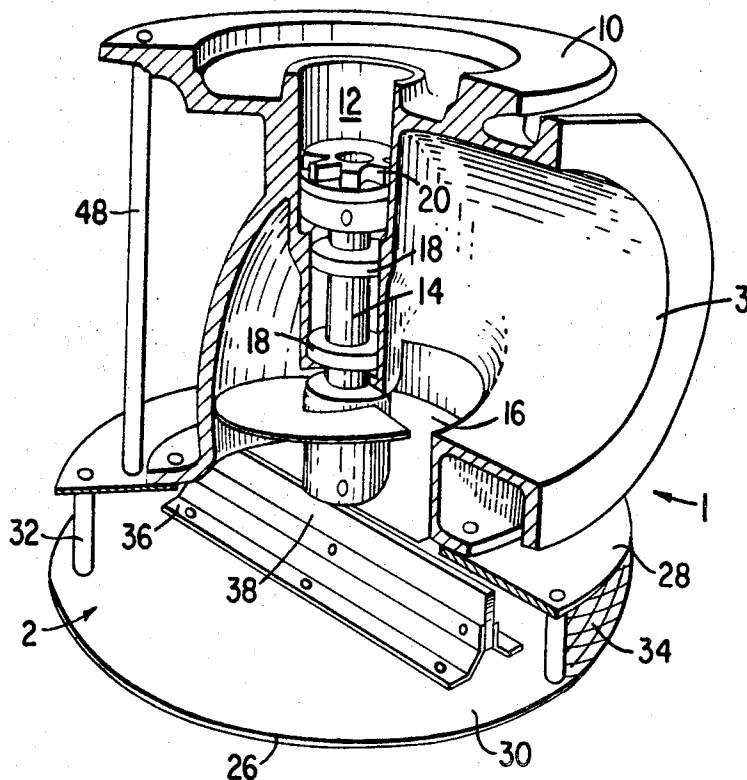


FIG. 3

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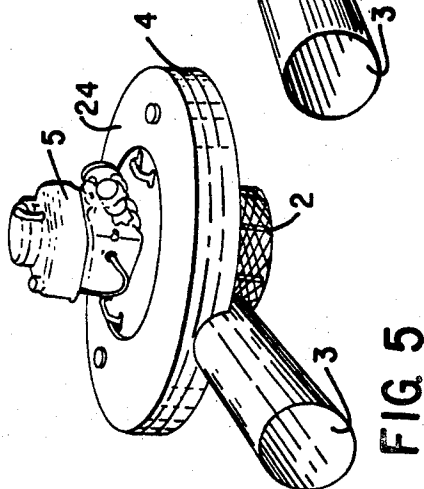
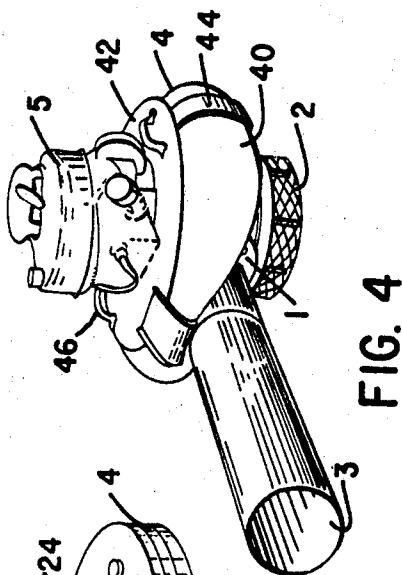
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FLOATING PUMP

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4 Claims. (Cl. 103—87)

ABSTRACT OF THE DISCLOSURE

A self-containing floating pump unit having a flotation ring such as an inflatable tube. An elbow shaped housing provides an inlet below the liquid level and an outlet above and an auger shaped impeller is mounted in the housing to pump liquid therethrough. A manifold is provided on the inlet end and a stationary vane of resilient material is positioned in the manifold in close proximity to the lower or leading edge of the impeller and radially across the housing inlet. Both reduce swirl in the liquid and prevent solid particles from wedging between the impeller and the vane.

This invention relates to pumps and in particular to a floating pump for removing water or sludge materials from pools, ditches, well sumps or pits etc.

Floatable pumps are known but, for various reasons, have not proven their worth in a variety of pumping operations. The floating pump of the present invention is adapted to overcome the deficiencies of prior art floating pumps in providing a unit that is self-priming with an open type of impeller which can successfully pump heavy sludge materials such as liquid manure, cesspools, ditches, oil field sumps or pits or light materials such as water etc. Moreover, the pump of the present invention is portable enough that one man can operate the same and it is extremely flexible in operation in that, aside from being used for the above-mentioned pumping operations, it can also be interconnected to irrigation systems where such things as collapsible irrigation tubing are being used.

Accordingly, a floatable irrigation pump comprises an angularly shaped conduit housing having an inlet and an outlet; impeller means mounted for rotation in said housing and communicating with said inlet and outlet; a manifold on said intake; a flexible vane disposed in said manifold and positioned radially across said inlet; means on said housing for supporting motor means to rotate said impeller within said housing; a flotation ring mounted on said housing for maintaining said motor means above the level of the material being pumped and with the outlet below the level of the material being pumped, so the flowing material has no weight bearing on the pump; and an alternate intake pipe extending from above the material level into said manifold to prevent vacuum occurring in said inlet.

The invention is described, by way of example, in the accompanying drawings in which:

FIGURE 1 is a perspective view of the pump but without the flotation unit and motor means;

FIGURE 2 is an exploded view of the main parts of the pump shown in FIGURE 1;

FIGURE 3 is a perspective view in section showing the manner in which the impeller is mounted within the housing and illustrates the relationship between the flexible vane and the inlet end of the housing;

FIGURE 4 is a perspective view of the complete pump unit; and

FIGURE 5 is a view similar to FIGURE 4 but showing an alternate form of flotation ring.

Referring firstly to FIGURE 4, the pump in its entirety

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comprises a housing 1 having an inlet 2 and an outlet 3, a flotation ring 4 and a motor means 5, both of which are secured to the housing in any known manner. It will be seen from FIGURE 1 and FIGURE 3 that the housing is angularly or elbow shaped and includes a flange 10 that supports the motor means shown in FIGURE 4. Concentrically positioned in this flange is a sleeve 12 shown in FIGURE 3 which positions and retains the shaft 14 of the impeller 16, for example by means of ball races 18. The upper end of the impeller shaft 14 is provided with a coupling insert 20 that is adapted to receive a corresponding coupling member provided on the lower end of the drive shaft of the motor, not shown.

Referring to FIGURES 2 and 3 the inlet 2 of the housing is provided with an intake manifold 26 which consists of top and bottom plates 28 and 30 respectively spaced apart by shoulder bolts 32. Covering this space which extends circumferentially of the manifold is a screen 34 which is adapted to keep out larger pieces of foreign materials, i.e. large stones, chunks of ice etc. Extending radially across the floor of the intake manifold is an intake vane 36 having an upper flexible portion 38. In the assembled position, the lowermost end of the impeller 16 acts against this flexible vane 38 which, when the impeller 16 is rotating, creates a slicing of the liquid entering the housing 1. In the absence of such a vane, there would be a whirlpool effect rotating with the speed of the impeller with the result that water output would be extremely low. Due to the flexibility of the member 38, small foreign materials will not be jammed between the impeller and the vane.

As shown in FIGURE 4, the flotation ring 4 consists of an inflatable inner tube 40 secured to a flotation plate 42 by means of straps 44. Flotation pipe 42 is provided with handles 46 for carrying the complete unit and the pipe 42 is detachably secured to the flange 10 on the housing 1. In place of the inflatable flotation ring 4, the latter can be replaced, for example, by a Styrofoam ring 24 (FIG. 5) which is metal clad for protection. The latter would have advantages from the standpoint of being punctured by foreign objects although the inflatable type of tube has advantages from the standpoint that it can be deflated to take less room.

It will be seen from FIGURE 1 that a vacuum break tube 48 extends from the upper plate 28 of the intake manifold 26 to a position above the level of the material to be pumped, for example, to the flange 10 on the housing 1. The pump is adapted to work under extreme conditions such as irrigation channels which include a lot of foreign materials, for example straw, grass etc. In sloughs with icy conditions in the water these materials and sometimes ice itself is set up against the outside of the screen 34 causing a restricted water flow. This normally would create a vacuum inside the pump which could, under certain circumstances, put extreme stress on the engine and possibly damage the latter. However, the vacuum break tube 48 provides an alternate intake pipe leading from the atmosphere into the intake 2 so that the pump will draw in air and eliminate the pressure. In most cases the pump will then clear the foreign materials itself but in no case will it cause damage to the engine or the impeller.

In operation, the outlet 3 is connected to a drainage hose or the like, the pump is placed on the pool of material to be pumped, and the engine is started. The pump will then pump the material in which it is floating until such time as the bottom of the pool is reached or until the device is shut off.

It will be appreciated that the pump of the present invention having an open auger type impeller is non-clogging in nature and does not require priming prior to

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operation. Moreover, it is extremely light in weight, approximately 50 pounds, and easily portable so that it may be transported and operated in the most inaccessible location. Further, it has a high capacity of delivery, in the region of 30,000 gallons per hour, and a low fuel consumption rendering it economical. Furthermore, the pump may be altered for variable pumping capacities by exchanging the impeller for one of greater or lesser pitch.

I claim:

1. A floatable irrigation pump comprising an angularly shaped conduit housing having an inlet end and an outlet end; an auger impeller mounted for rotation in said housing and communicating with said inlet and outlet ends; a manifold on said inlet end; a stationary flexible vane disposed in said manifold to reduce swirl in said housing; said vane being in close proximity to one end of the impeller and being disposed radially across the housing inlet; means on said housing for supporting motor means for rotating said impeller; a floatation ring mounted on said housing for maintaining said outlet above the level of material to be pumped; and an alternate intake pipe extending from above said material level into said manifold to limit the amount of vacuum in said housing inlet.

2. A floatable pump according to claim 1 wherein said floatation ring is an inflatable tube.

3. A floatable irrigation pump comprising an elbow-shaped conduit housing having an inlet end and an outlet end positioned approximately 90° from said inlet; a sleeve concentrically positioned in said inlet end extending to an opposite side of the elbow; an auger impeller mounted for rotation in the inlet end of said housing and

including a shaft rotatably mounted in said sleeve; a screened manifold on said inlet end including a stationary flexible vane radially disposed with respect to said inlet and being in close proximity to said impeller; an inflatable floatation ring detachably secured to said housing for maintaining said outlet above material to be pumped; an intake pipe extending from above said outlet to said intake manifold to limit vacuum therein when said screen is blocked; and a coupling member on one end of said impeller shaft for receiving engagement of motor means.

4. In a floatable irrigation pump of the type including a housing and impeller therein, an inflatable floatation ring and motor means for rotating said impeller and a screened manifold on the inlet end of the housing, the improvement comprising a stationary resilient vane in said manifold positioned radially across said inlet and being in close proximity to said impeller to reduce swirl of liquid in said housing; and an air conduit extending from said manifold to a position on said housing above the material to be pumped whereby, if said manifold becomes clogged, air may be drawn into said inlet to limit vacuum in the inlet of said pump.

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