March 31, 1964 H. L. DILLINER 3,126,830

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Filed March 11, 1960 4 Sheets-Sheet 1

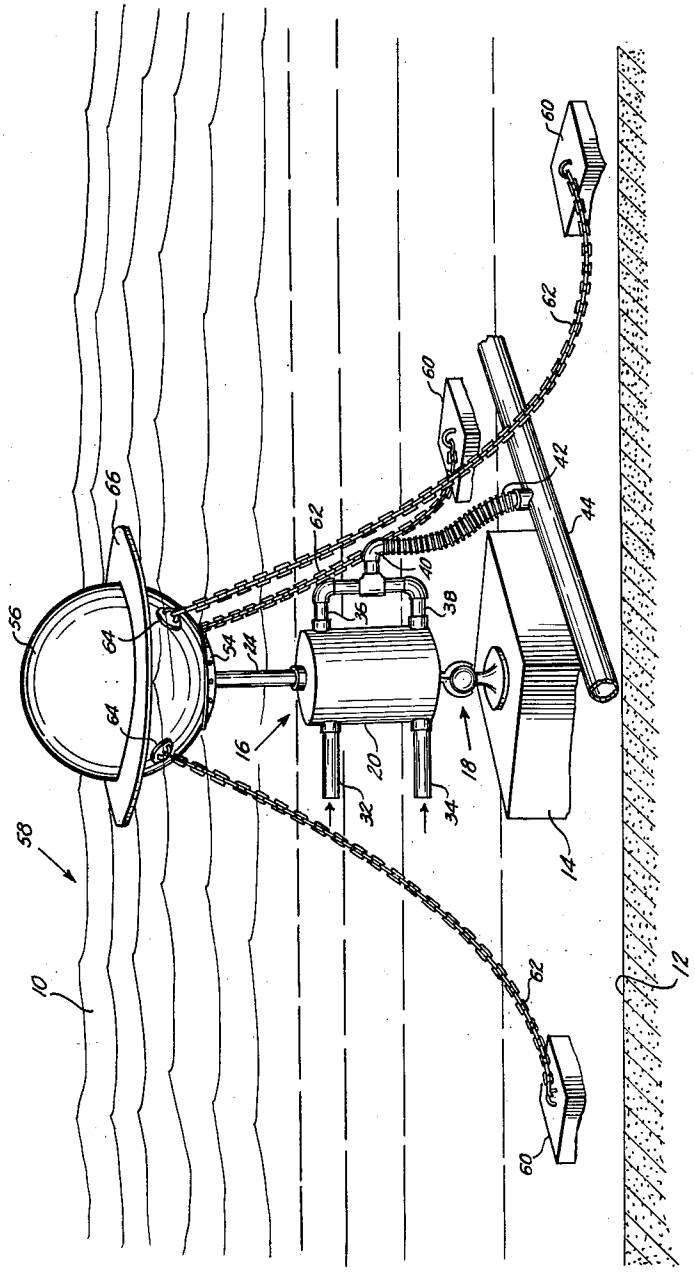

FIG. 1

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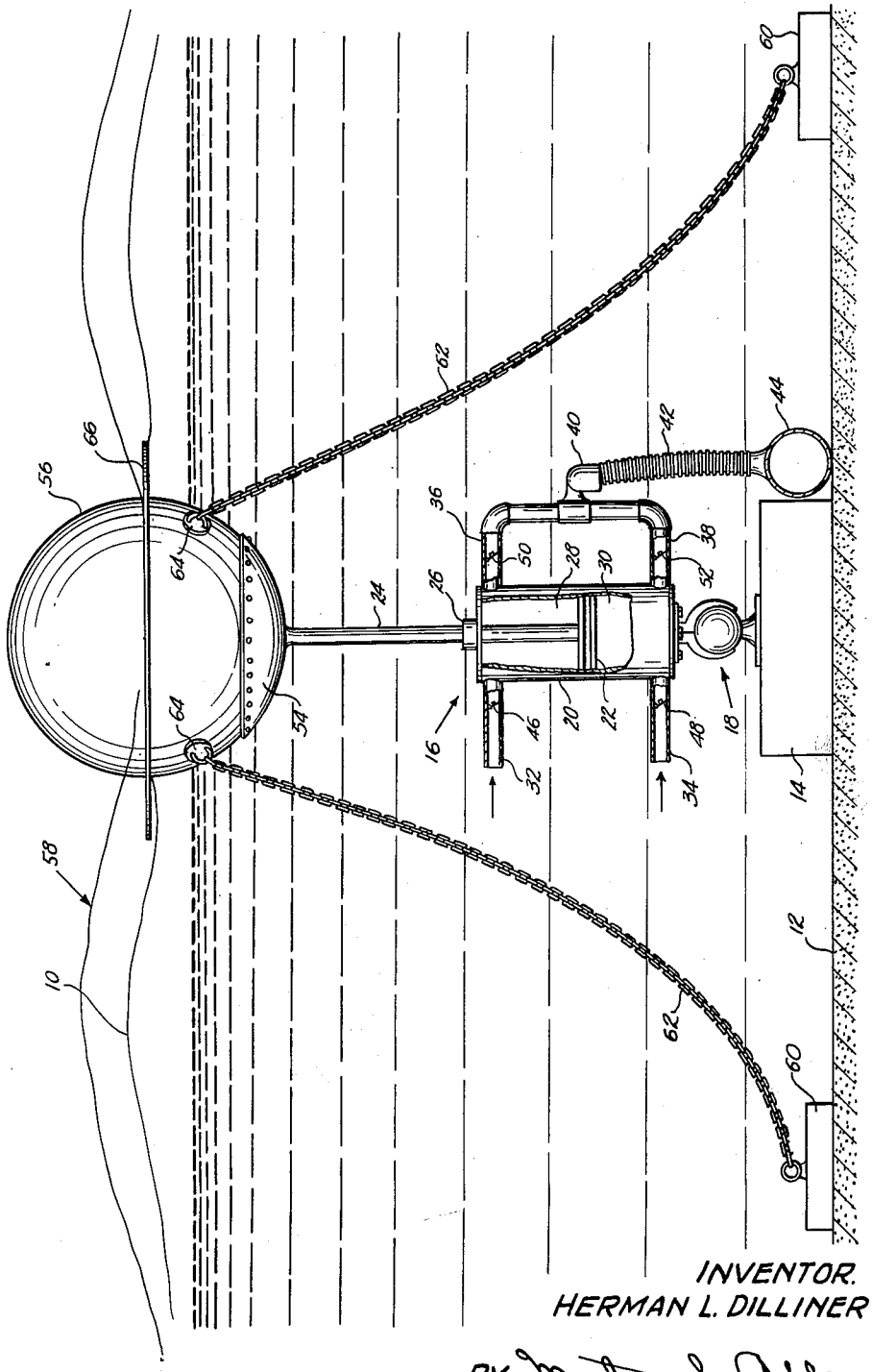

FIG. 2

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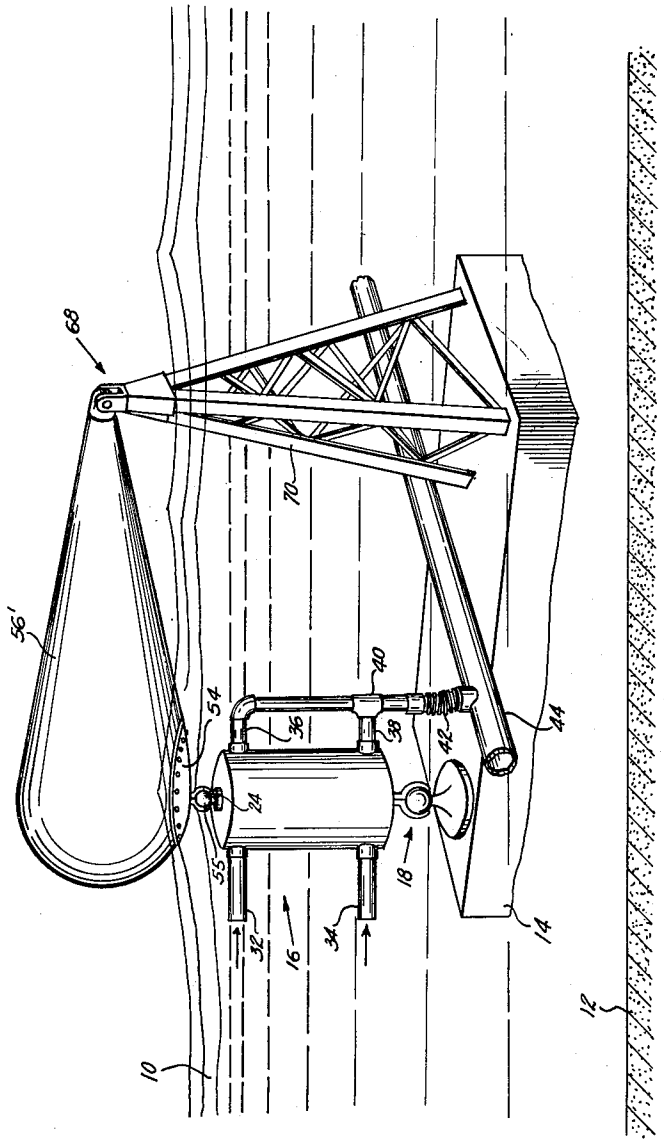

FIG. 3

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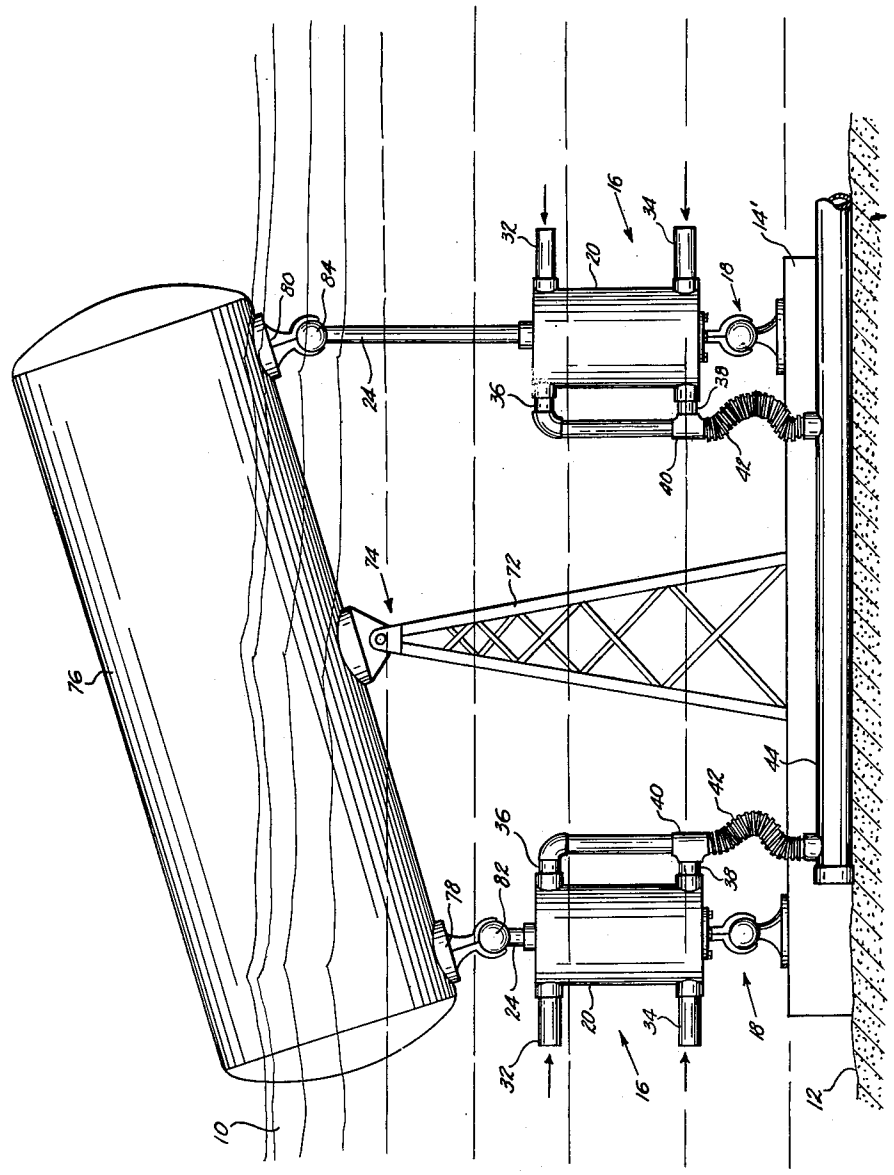

FIG. 4

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2 Claims. (Cl. 103—68)

This invention relates to pumps and more particularly to a novel means for operating the same.

The primary object contemplated herein is the provision of a pump assembly wherein the power for operating the same is freely available from forces in nature.

More specifically, it is one of my objects to provide a pump assembly designed to be submerged in a body of water such as the ocean, a lake, pond or the like where some undulation or turbulence is present at the surface in the form of waves, ground swells, or tides and to utilize the force created by such undulations or turbulence to operate the pump.

A further object is to provide an anchored, but relatively freely movable float susceptible of rising and falling with the waves on a body of water and connected to a piston to be reciprocated within a submerged pump assembly.

Further objects and the more obvious advantages of the invention will be mentioned or else appear plainly from the description which follows.

This invention consists of novel parts and combination of parts to be hereinafter described whereby the objects set forth are attained, as pointed out in the claims, and illustrated in the accompanying drawings, in which:

FIG. 1 is a perspective view showing a submerged pump assembly mounted for operation according to my invention,

FIG. 2 is a side elevational view of the device shown in FIG. 1 with portions of the pump housing broken away and portions in section,

FIG. 3 is a perspective view illustrating a modified float structure used with this pump, and

FIG. 4 is an elevational view showing a double pump assembly operated according to this invention.

Referring to the drawings a body of water is designated by the numeral **10** and the bottom thereof by the numeral **12**. Such body of water may be the ocean, a lake, pond or the like where any turbulence or undulations are present. A block or base **14** is suitably anchored on bottom **12** and need be only at sufficient depth so that the pump assembly **16** is submerged. Thus it will be appreciated that the installation to be described herein may be close to the shoreline, if desired, although this is not required. Pump assembly **16** is mounted to base **14** by means of any suitable pivot or swivel arrangement **18**.

No invention is claimed in the pump assembly **16** per se as any suitable type of many commercially available pumps may be used—my invention relating to the means for operating the pump and not the pump structure. However, for purposes of illustration, I have shown assembly **16** as including the housing **20** in which a piston **22** is mounted for reciprocation and is connected to the piston rod **24** which projects axially and upwardly through suitable packing **26**. The piston **22** is shown (FIG. 2) as dividing the interior of housing **20** into an upper and lower chamber **28** and **30** respectively. Inlet ports **32** and **34** connect to the respective chambers **28** and **30** as do the respective outlet ports **36** and **38**. Ports **36** and **38** also connect to a common outlet **40** which in turn is connected by a flexible flow line or conduit **42** to the manifold **44** that will transmit water to the point of use. Inlet ports **32** and **34** are provided with the respective check valves **46** and **48** and similar valves **50** and **52** are in the respective outlet ports **36** and **38**. It will thus

be appreciated that I have used a double action pump for illustration and as shown, when the pump is primed, as piston moves up, water enters chamber **30** from inlet **34** so that valve **48** is open and valve **52** is closed and at the same time water in chamber **28** is discharged through outlet **36** where valve **50** is open and with valve **46** in inlet **32** closed. On the downward stroke of piston **22** the relationship of valves and water intake and discharge is of course reversed and at all times water discharged from housing **20** moves through conduit **42** to the manifold **44** for transmission to the point of use.

With reference now more particularly to FIGS. 1 and 2, piston rod **24** terminates in a suitable fitting **54** to which there is secured a float member **56**. The form and shape of float **56** and its means of attachment to rod **24** are not material, the important point being that member **56** is a suitable float or vessel susceptible of floating on the surface **58** of the water **10** so as to rise and fall with the undulations or turbulence thereat. Float **56** is anchored to the bottom **12** and for this purpose, I show a plurality of anchors **60** concentrically arranged relative to base **14** and chains or the like **62** extending from each respective anchor **60** to a spaced fitting **64** on float **56**. The means for anchoring float **56** is not critical—the important purpose being accomplished by any suitable means calculated to maintain a relative position relationship between the float and the pump assembly. As shown in FIG. 1, float **56** shown in the form of sphere is provided with a circumferential vane, rib or fin **66** which extends horizontally from sphere **56** relative to its position in the water for the purpose of increasing the bearing surface against which the water can act and thereby increases the efficiency of the pump by minimizing any tendency for the sphere **56** to become awash in turbulent water.

Thus far described it will be appreciated that float **56** will continually be rising and falling with natural undulations of the water **10** and as this occurs, piston **22** will be reciprocated whereby pump **16** is operated in its normal manner and since the pump is submerged the problems of air lock, loss of prime and leaks are completely eliminated. The arrangement of pivot **18** and flexible line **42** are designed to permit assembly **16** to tilt as float **56** moves within its anchored limits to permit proper action of piston **22** and assure a pump stroke of sufficient capacity to allow for maximum and minimum tides or waves. It should also be mentioned that the intensity of the undulations is important only in regard to the amount of pressure that may be developed and that a relatively quiet appearing pond has sufficient undulation to operate a small pump as has been demonstrated by actual successful use of this method of operating a pump in a small body of water to irrigate adjacent farm land. It can be mentioned here that an inch of movement of the float will produce an inch of displacement in the pump cylinder since water is not compressible and this will take place regardless of the position of the piston in the housing, providing the pump has sufficient over travel.

With reference to FIGS. 3 and 4, the construction and operation of the pump **16** is the same as described so that like parts are given like numerals. In FIG. 3, float **56'** is shown formed in an enlarged and elongated tear drop shape attached at its large end portion to fitting **54** having a pivot or swivel means **55** for attachment to rod **24** and at its smaller end is pivotally attached to the upper end **68** of a derrick or tower-like support or standard **70** mounted to the base **14** in spaced relationship to pivot **18**. The effect of float **56'** on pump **16** is of course the same as previously described with the difference being chiefly in the means for anchoring the float.

FIG. 4 illustrates an arrangement of two spaced pump assemblies 16 on an enlarged base anchor 14'. A tower or support standard 72 is mounted to base 14' intermediate the pumps 16 and to the top 74 of standard 72 an elongated float 76 is pivotally attached intermediate its ends. At each respective end, float 76 carries a pivot or swivel fitting 78 and 80 respectively for suitable attachment to the respective fittings 82 and 84 on the respective piston rods 24 of the two pump units 16. Thus arranged, float 76 will be rocked on standard 72 by the undulating water to simultaneously operate the two pump assemblies 16.

It is submitted that the invention shown and described is aptly suited to achieve the purposes intended and is characterized by a combination of highly useful and mutually cooperation elements that combine their respective and proportionate functions in accomplishing the objects sought to be obtained.

It will be understood that the phraseology employed herein is for the purpose of description and not for limitation and that modifications and changes in the construction and arrangement of this invention can be made within the scope of what is claimed, without departing from the spirit and purpose thereof. It is thus intended to cover by the claims, any modified forms of structure or mechanical equivalents which may be reasonably included within their scope.

I claim:

1. In a pump of the class having a reciprocating piston and a piston rod secured thereto, said pump adapted to be submerged in an undulating body of water, a float member on the surface of said body of water, means for anchoring said float so as to maintain it in a predetermined position relative to said pump, and means operably connecting said float member to said piston rod whereby the rise and fall of said float member with the undulations on the surface of said body of water will effect a reciprocation of said piston, and means carried by said float

member solely to materially supplement the normal buoyancy thereof and to minimize the possibility of its becoming awash in turbulent water.

2. In a pump of the class having a reciprocating piston, a piston rod secured thereto and respective inlet and outlet ports, said pump adapted to be submerged in an undulating body of water, a flexible flow line connected at one end to said outlet port and at its other end to a manifold, a float member on the surface of said body of water, means for anchoring said float so as to maintain it in a predetermined position relative to said pump, and means operably connecting said float member to said piston rod whereby the rise and fall of said float member with the undulations on the surface of said body of water will effect a reciprocation of said piston, a circumferential vane carried by said float member and extending horizontally therefrom relative to its position in the water, said vane constructed solely to materially increase the normal bearing surface of said float member against which the water will act and thereby materially increase the efficiency of the pump by minimizing the possibility of its becoming awash in turbulent water.

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