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1,594,050

A. CONNOR

WAVE PUMP

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Fig. 1.

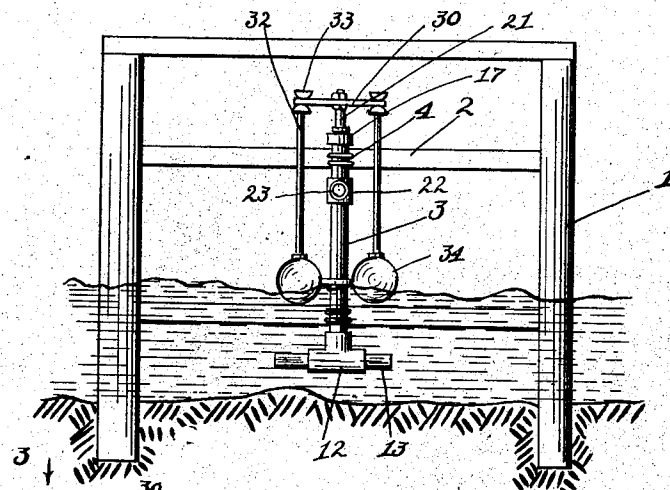


Fig. 2.

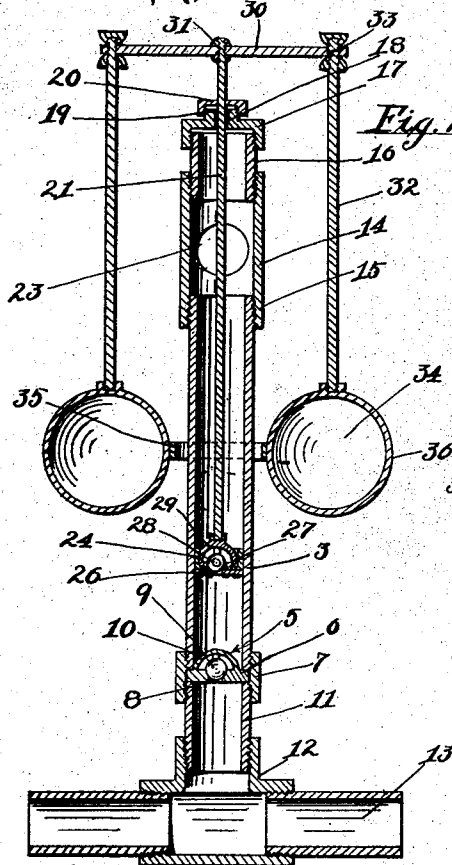
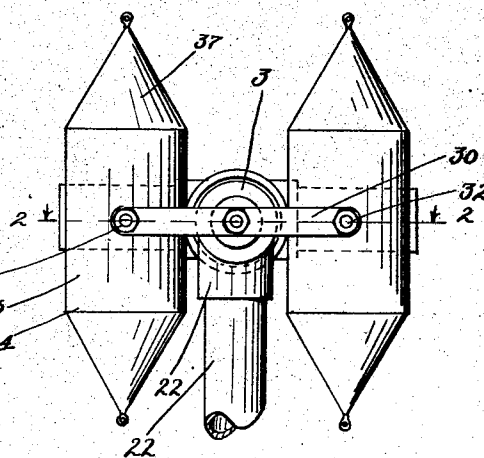


Fig. 3.



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WAVE PUMP.

Application filed January 19, 1926. Serial No. 82,202.

My invention is a wave pump adapted to pump water by wave action and preferably installed so as to pump the water substantially directly from the location of the pump, the pump being placed in a seaway or the like where it may be subjected to considerable wave action.

An object of my invention is to mount a pump in a seaway preferably incorporated in a pier or the like and to have the pump actuated by the waves in passing the pump.

A further object of my invention is to utilize floats or buoys to actuate the pump plunger and thereby elevate the water in the pump to an elevated discharge pipe.

A specific object of my invention is in the construction of a pump having a plunger reciprocal vertically, the upper end of the plunger being connected to a cross head and having a plurality of buoys mounted on the plunger and of such shape that they will always head into an oncoming sea, the buoys being guided in their vertical movement by the pump barrel.

In my construction I secure the pump barrel to a pier or the like in such a position so that the waves may have a free action on the pump. The intake is positioned well below the low water level and the plunger is of sufficient length to accommodate the rise and fall of the tides in tidal waters, the plunger being such as to swivel and allow the buoys to keep head on to the sea.

The pump plunger is provided with a lifting valve, a check valve installed in the base of the pump so that the water elevated will not be forced backwardly again. A pipe connects the upper end of the pump and leads shoreward or to a suitable place of discharge thereof.

My invention will be more readily understood from the following description and drawings, in which:—

Figure 1 is a cross sectional view of a pier or staging having my pump installed therein.

Fig. 2 is a vertical section through the center of the pump and the buoys, on the line 2—2 of Fig. 3, in the direction of the arrows.

Fig. 3 is a plan view of the pump as if taken in the direction of the arrow 3 of Fig. 2.

In order to support the pump I utilize a pier or staging which is designated gener-

ally by the numeral 1, having a cross rail 2 for supporting the pump barrel 3. This barrel is illustrated as being secured to the rail by band bolts 4 or other suitable fastening. The pump barrel will be of such length as to accommodate the rise and fall of tides in tidal waters.

The details of the pump are illustrated particularly in Fig. 2. The barrel 3 is preferably a simple section pipe having a check valve 5 adjacent the lower end; this check valve being formed of a disc 6 having a sleeve 7 secured to the edges thereof, the sleeve being threaded to the pump barrel. A port 8 forms the valve seat on which rests a ball valve 9 being retained in position by a cage 10. A pipe section is screw threaded on the lower end of the sleeve and preferably has a T 12 secured at its lower end, this T having intake pipes 13 threaded on its free ends.

The upper part of the pump is provided with a coupling 14 which may be in the form of a T, one branch being screw threaded on the pump barrel as indicated by the numeral 15 and the opposite branch being screw threaded to a pipe section 16, this section having a cap 17 with a plunger aperture 18 therethrough. A packing gland 19 of the usual type and a packing nut 20 are utilized to form a water-tight connection with the pump plunger 21. The discharge of the pump is through the third branch 22 of the T to a discharge water duct 23 which will preferably lead to a shore station or the like and suitably supported on a pier or by trestles.

The pump plunger has a lifting valve 24 at its lower end, this valve being formed of a disc 25 having a port 26 therethrough. A flexible cup 27, a ball 28 seated in the port forming a valve and a cage 29, the cage being threaded or otherwise secured on the lower end of the plunger.

A cross head 30 is secured to the upper end of the plunger being held in rigid relation thereto by lock nuts 31. A plurality of stems 32 are secured to the cross head and extend downwardly therefrom, this connection being by ball shaped nuts 33 to allow a slight rocking action of the stems on the cross head. A plurality of buoys 34 are fastened to the lower end of the stems, these buoys being held together by a collar 35, the collar being adapted to contact with the

pump barrel due to the wave action on the buoys and forming a guide for their upward and downward movement.

The buoys are preferably formed with a cylindrical central section 36 and with conical ends 37; this construction being sufficient to cause the buoys to always present one of the conical ends to the oncoming waves.

The manner of operation of my wave pump is substantially as follows:

In the position illustrated in Fig. 1, the waves are presumed to be traveling from beyond the pump inward, the buoys being aligned in the direction of movement of the waves and the intakes 13 being positioned as above described in a fixed manner.

Due to the wave action the floats are given a rising and falling motion and hence operate the cross head which in turn reciprocates the pump plunger. On the upstroke water is sucked in through the intakes and through the check valves and on the downstroke is forced through the pump valve, being lifted on the next stroke, thereby after the pump has been properly primed, continuously pumping water as long as the wave action is sufficient to lift the floats in relation to the pump barrel.

In the manner of mounting the pump as shown it is presumed that the waves will travel in substantially the same direction, that is, lengthwise of the pier or staging illustrated in Fig. 1 and hence the buoys will not be required to swivel laterally to a great extent as in many localities the direction of the waves is substantially constant within a few degrees one way or the other; however, if the pump were mounted in a place in which the direction of the waves had considerable change the supporting structure should be such as to allow the buoys to swivel or turn to a considerable extent before the stems 32 would contact with the supporting structure.

Although my invention is of a simple construction and as illustrated shows only one pump delivering water, nevertheless, it is apparent that a battery comprising a number of pumps could be installed and discharged through a common discharge pipe. Moreover, the construction of my pump may be considerably changed in general construction and in specific details to adapt it to different types of installations. Such changes would be within the spirit of my

invention as set forth in the description, drawings and claims.

Having described by invention, what I claim is:—

1. A wave pump comprising in combination a pump barrel having an intake in a seaway, the upper end of the barrel being positioned above the water level, a cap for the upper end of the barrel, a pump plunger operating through the cap, a cross head rigidly secured to the upper end of the plunger, a pair of stems depending from the opposite sides of the cross head, the said connection allowing slight rocking movement, a buoy secured to each stem, a collar connecting the buoys, the collar being adapted to slide on the pump barrel, a lift valve on the lower end of the plunger and a check valve in the pump barrel adjacent the inlet, there being a discharge outlet from the pump barrel above the water level.

2. A wave pump as claimed in claim 1, in which the stems are secured to the cross head by ball-shaped nuts to allow the rocking movement and the floats are constructed with a cylindrical body and tapering ends adapted to maintain the floats head on to a sea.

3. A wave pump comprising in combination a pump barrel formed of a tube, a disc having a sleeve threaded on the lower end thereof, the said disc having a port there-through, a ball seated in the port and a cage to retain the ball, thereby forming a check valve, means to secure an inlet to the lower end of the sleeve, a T secured to the upper end of the pump barrel, a discharging water duct connected to one branch of the T, a pipe section connected to the branch of the T opposite the pump barrel, a cap having an opening therethrough secured to the pipe section, a pump plunger operating through the cap having a lift valve at the lower end, a cross head rigidly secured to the upper end of the plunger, a plurality of stems connected to the outer ends of the cross head, such connection allowing slight rocking movement, a plurality of buoys connected to the lower ends of the stems and a collar connecting the buoys, the collar being adapted to slide on the pump barrel.

In testimony whereof I have signed my name to this specification.

ALBERT CONNOR.