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O. C. HUFNAGLE

PUMP OR THE LIKE

Filed April 16, 1926

2 Sheets-Sheet 1

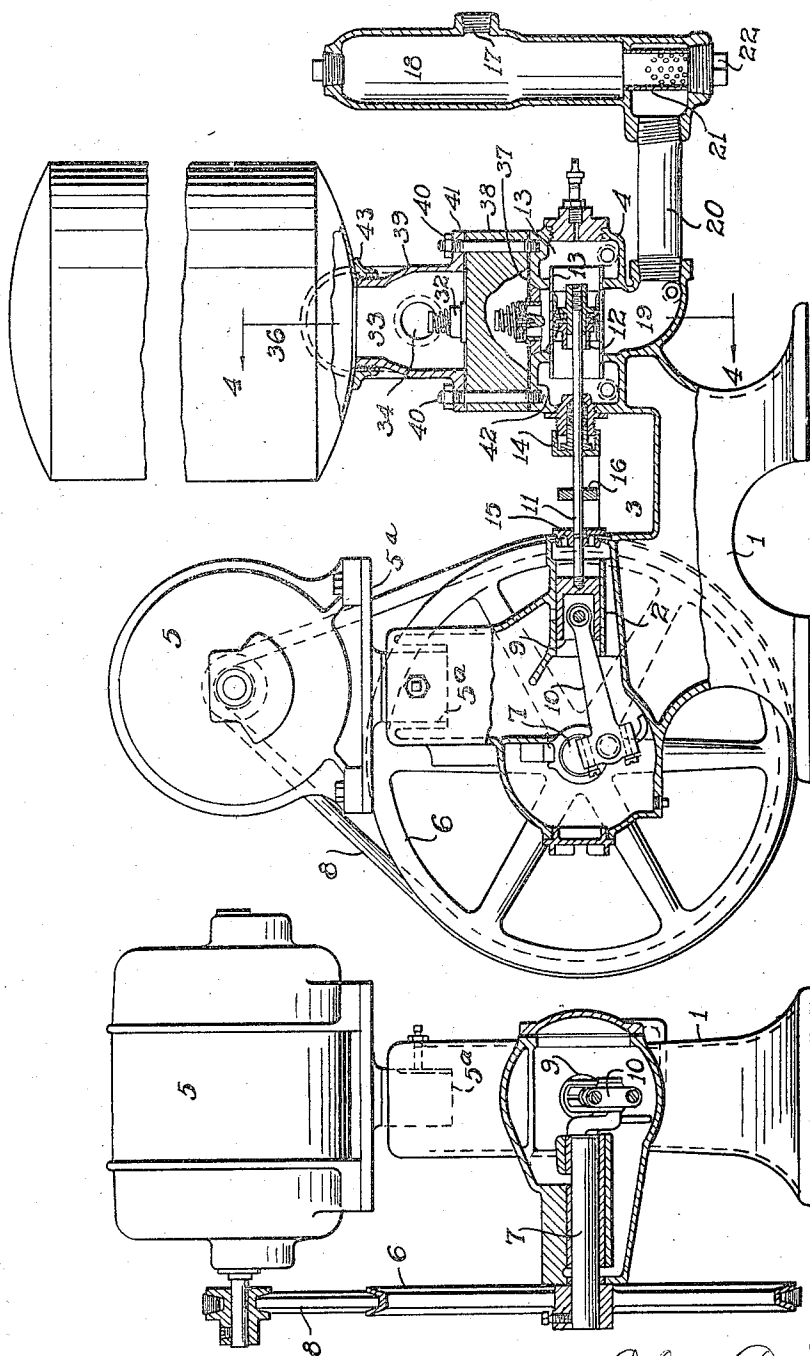


Fig. 1.

Fig. 2.

INVENTOR
O. C. HUFNAGLE
BY *[Signature]*
ATTORNEY

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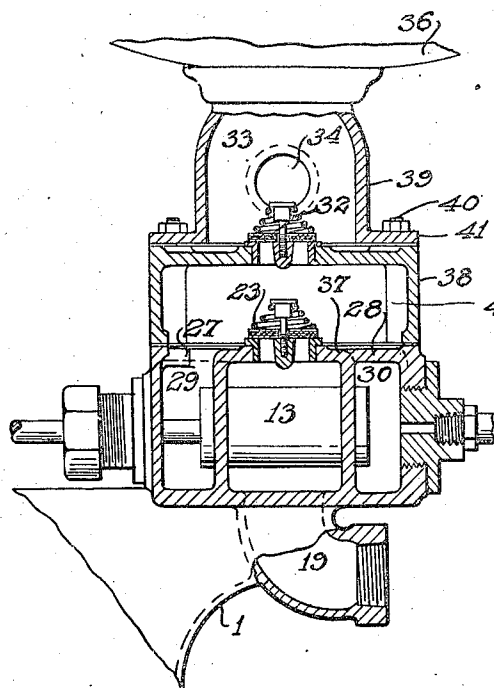


Fig. 5.

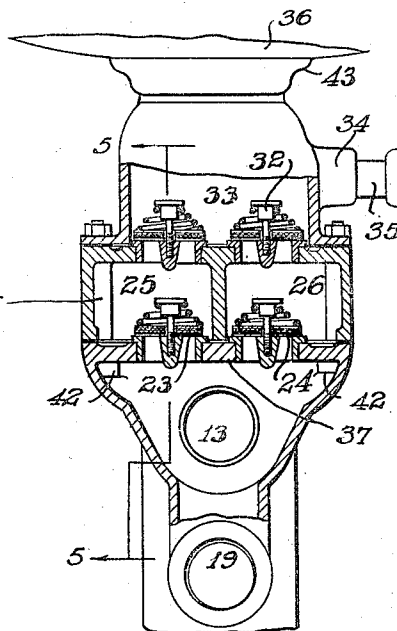


Fig. 4.

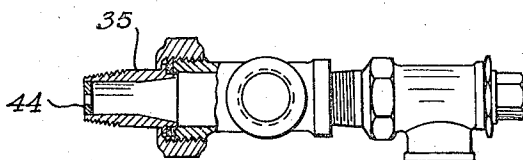


Fig. 3.

INVENTOR
O. C. Hufnagle
BY [Signature]
ATTORNEY

UNITED STATES PATENT OFFICE.

OLIVER C. HUFNAGLE, OF DAYTON, OHIO, ASSIGNOR TO THE DAYTON PUMP & MANUFACTURING COMPANY, OF DAYTON, OHIO.

PUMP OR THE LIKE.

Application filed April 16, 1926. Serial No. 102,574.

This invention relates to pumps, having particular reference to improvements in suction pumps for domestic water systems.

The objects attained in the improvements consist in structural features which tend to simplify the construction and reduce manufacturing costs, improve the operation of the pump, making it more effective with lower maintenance costs, the assembled units of the mechanism being designed for ready accessibility of the parts for adjusting the interior mechanism and replacing parts that become worn, etc.

An outstanding feature of the pump consists in its symmetrical design and grouping of the different units of the mechanism which serve to effect a well balanced compact structure which has relatively large capacity, the size of the pump being considered.

The pump in its general features is of well known construction, the invention relating to refinements of the mechanism which result in substantial structural and functional improvements.

In the accompanying drawings:

Fig. 1 is a view of the pump in side elevation, partly in section;

Fig. 2 is a view in rear elevation partly in section;

Fig. 3 is a detail view of the discharge connections;

Figs. 4 and 5 are sectional views through the pump suction chambers and the discharge or flow chamber.

As here shown the pump comprises an integral frame structure 1 including the crank case cylinder 2, drain sump 3 and suction housing 4.

Power for operating the pump is supplied from a motor 5 connected to a drive pulley 6 on the crank shaft 7 by a belt 8. By mounting the motor on a vertically adjustable base 5^a simple and highly effective means are provided for keeping the motor belt properly taut. The piston rod cross-head 9 is connected to the crank shaft by a pitman arm 10. The opposite end of the piston rod 11 has a piston 12 secured thereto coacting with the suction cylinder 13. The piston rod opening to cylinder 13 is closed with a combination packing nut 14 of well known construction and the opening to the cross head cylinder 2 with a common nut 15. An important refinement of the piston

rod connection between cylinders 2 and 13 consists in a baffle disc 16 arranged telescopically on the rod and movable with the rod between nuts 14—15, the baffle acting to prevent moisture from the water chamber following the rod by seepage and capillary action into the crank casing. Any water following the piston rod will be caused to drip from the baffle into the drain sump 3, this simple arrangement being effective to maintain lubrication and operation of the mechanism in the crank casing in normal condition indefinitely by excluding the moisture.

The movement of the water through the pump is as follows: The supply line (not shown) is connected as at 17 to an intake vacuum chamber 18 passing to the suction chamber 19 through a pipe 20, a screen 21 being interposed in the bottom of chamber 18 to exclude foreign matter in the water, a drain plug 22 adjacent the screen serving to afford convenient access to the screen.

The movement of the water from the suction chamber is alternately through oppositely disposed valves 23—24, as best shown in Fig. 4, into opposite alternately acting suction and pressure chambers 25—26, each of the chambers 25—26 communicating by means of a constantly open port 27—28 with cylinder head suction and pressure chambers 29—30 arranged at the opposite ends of cylinder 13. On the forward stroke of the piston, away from the crank case, the intake of water will be through suction chamber 19, valve 23 into chamber 25, through port 27 into chamber 29, the discharge from the pump on the forward stroke of the piston being through chamber 30, port 28, chamber 26, valve 32 into a flow chamber 33 and thence through a port 34 into a pipe connection 35 (see detail Fig. 3) to the service line (not shown). The movement of the water through the suction and pressure chambers and valves coacting with the opposite ends of the cylinder is the same being alternated one with the other—when water is being drawn in by suction at one end of the cylinder water is being discharged by pressure at the other end of the cylinder. An air pressure tank 36 supported on the flow chamber 33, as here shown, acts in a well known manner to maintain uniformity of flow of the water discharged.

An important improvement comprised in

the invention relates to the details of construction and manner of assembling the parts which make up the discharge unit of the pump as a whole. As illustrated in the drawings the integral cylinder housing 4 is arranged at the top to form a cover for the cylinder chamber and a base 37 for the suction and pressure chambers 25—26, the same being an integral housing 38, open at top and bottom, and adapted to rest with its lower face flush on base 37, the valves 23—24 being seated in and rising above base 37 as shown in the several figures.

The housing 38 together with the flow chamber housing 39 is secured to base 37 by means of bolts 40, housing 39 being flanged as at 41 at its base to receive the bolts, the lower ends of the bolts being threaded into blind apertures 42 in base 37. By this arrangement only a minimum of parts are required for the assembly, the bolts 40 except the bolt heads, being enclosed in internal raised portions 45 of the housing 38 and an excellent construction obtained, a particular point of advantage consisting in the convenient and full accessibility afforded to all the valves in the housing.

A further substantial improvement in the refined construction consists in the manner of supporting the pressure tank on the flow chamber. The connection as shown in Fig. 1 consists of a threaded ring flange 43 surrounding the opening in the tank to the chamber, the flange being direct connected to the threaded end of the housing, thus serving to eliminate the usual and less desirable pipe connection to the tank.

The entire unit of assembly comprised in the discharge end of the pump is designed for low cost production, convenient accessibility of parts, low maintenance and, with all, excellent design for appearance.

A further improvement of the pump which has marked influence on the performance of the pump, consists in means provided in the connection 35 for maintaining greater uniformity of pressure in tank 36 and thus to effect a more even discharge of water. The means for accomplishing this highly desirable result consist in an accurately dimensioned choker 44 disposed in the discharge

port which acts to restrict the flow of water through the port to the per minute delivery capacity of the pump. Thus when the pump is operating normal uniform head pressure will be maintained in the pressure tank and the pump will discharge an even flow of water without the objectionable fluctuations which are common in pumps not so highly perfected.

Having described my invention, I claim:

1. A pump including in combination with a suction chamber, a valve base in said chamber, a detachable valve housing comprising a series of vertically extended, apertured portions projecting inwardly from the wall of the housing, a detachable flow chamber housing having an apertured flange supported on the valve housing in register with said apertured portions thereof, and a series of bolts extended through said flange and apertured portions for securing said housings to the valve base.

2. A pump including in combination with a suction chamber, a valve base covering said chamber, having a plurality of blind, threaded apertures suitably arranged therein, a detachable valve housing supported on said base, a detachable flow chamber flanged outwardly at its base and supported on the valve housing, a plurality of bolts extended through the flange of the flow chamber and having their opposite ends threaded into said apertures of the valve base for supporting said parts one relative to another, an air pressure tank supported on the flow chamber, a threaded ring flange fixed to the pressure tank around the opening between the tank and flow chamber coacting with the open threaded end of the flow chamber for sealing the tank with the housing.

3. A pump comprising a flow chamber and a pressure tank arranged to coact one with the other to effect discharge of liquid under pressure from the pump, and a discharge port coacting with the flow chamber including a choker of predetermined dimensions fixed in said port for regulating the pressure in said tank by restricting the flow through said port.

In testimony whereof, I affix my signature.

OLIVER C. HUFNAGLE.