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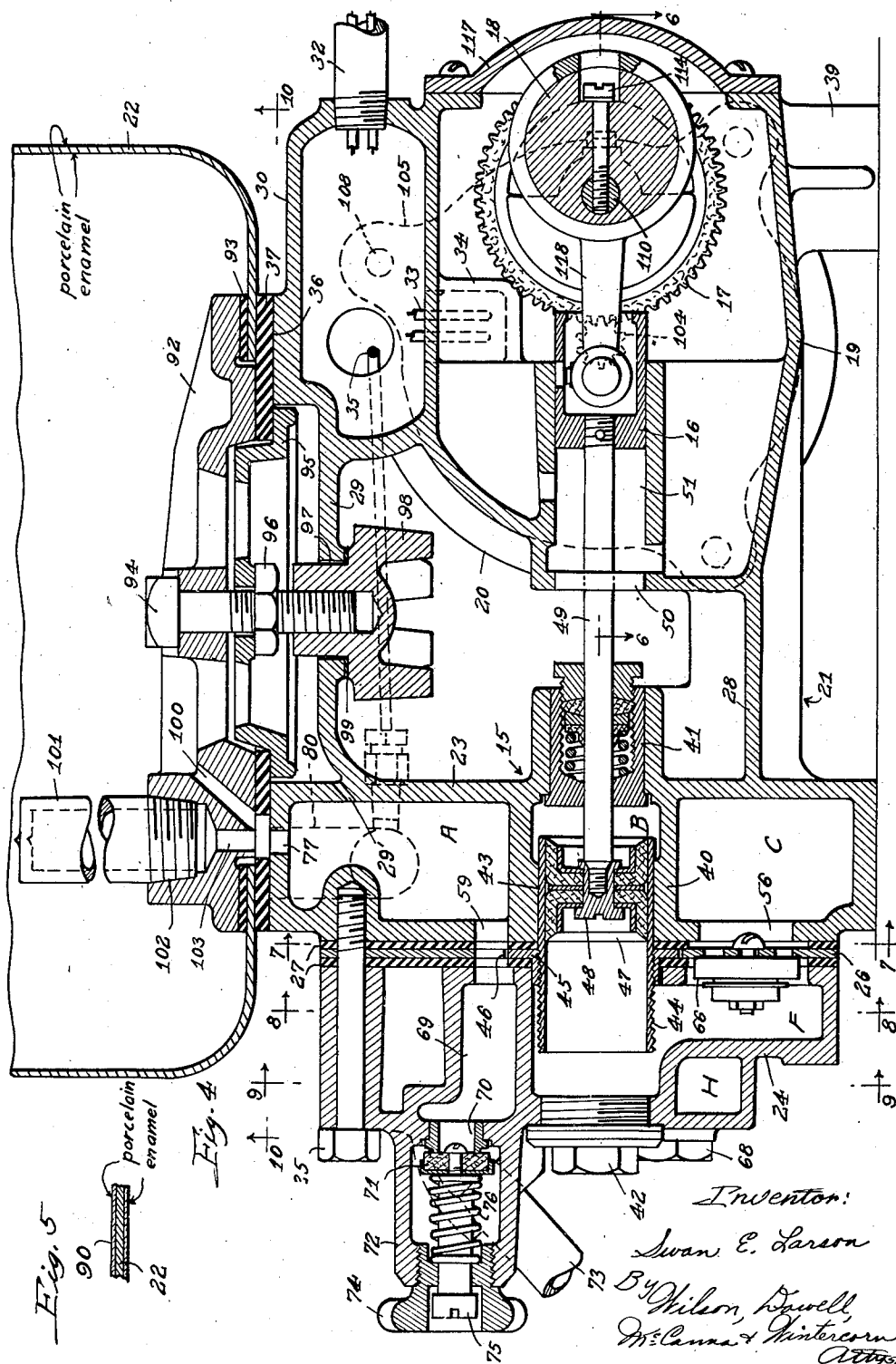
S. E. LARSON

2,133,708

PUMP UNIT

Filed June 8, 1936

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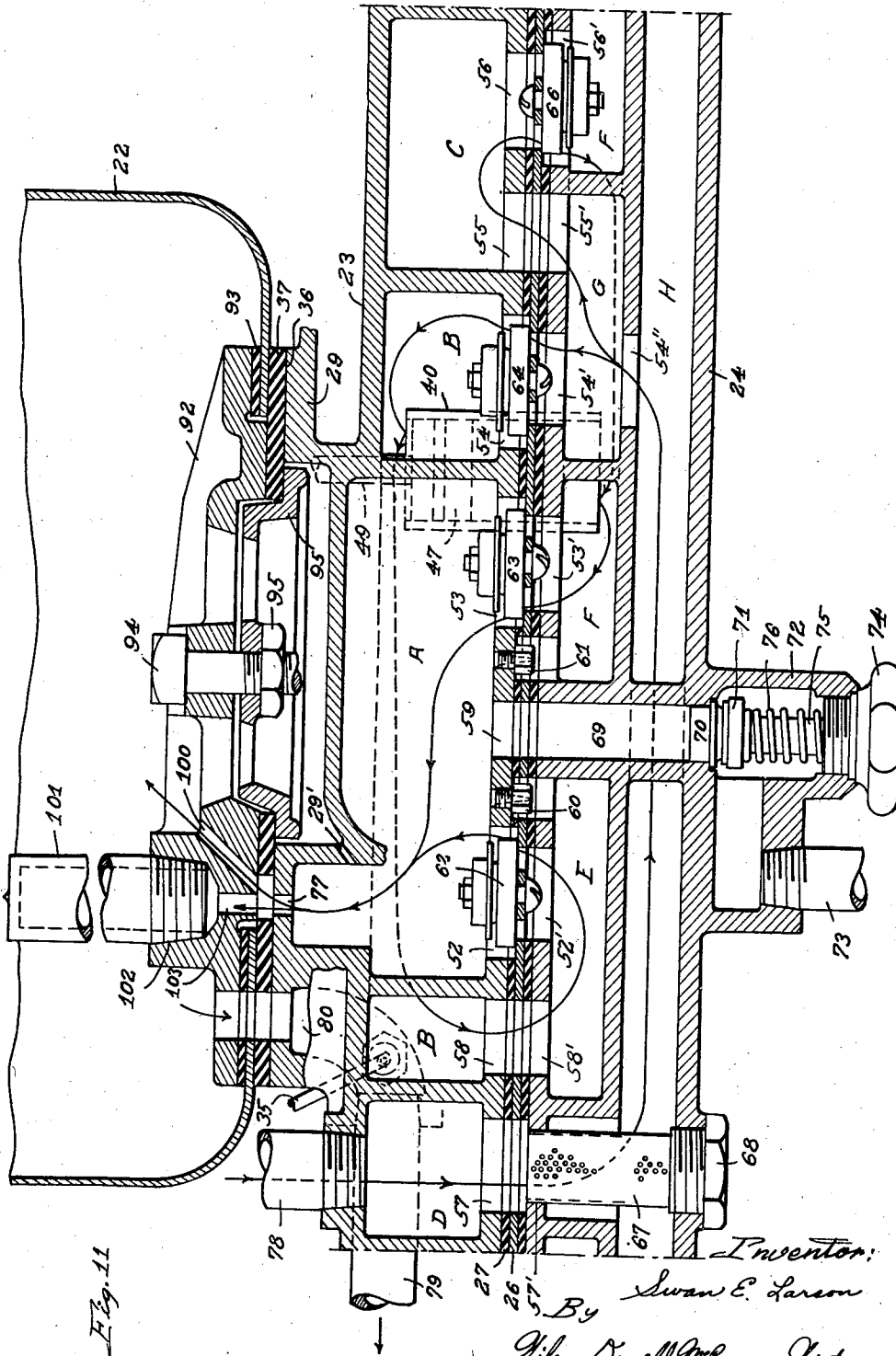


Fig. 11

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UNITED STATES PATENT OFFICE

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PUMP UNIT

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30 Claims. (Cl. 103—218)

This invention relates to a pump unit especially designed for use in domestic water systems.

The principal object of my invention is to provide a self-contained compact pumping unit, that is, one in which the pump, the motor for driving the same, the storage tank, automatic pressure regulator, and the usual other accessories, such as a safety relief valve, strainer, etc., are all assembled together in one compact unit, so that all that there is necessary in the installation thereof is to connect the supply and service pipes thereto, and water systems are thereby standardized and whatever service troubles may arise can be dealt with without much trouble or expense.

The unit of my invention embodies many novel and advantageous features, among which may be mentioned the following:

(1) The storage tank which is porcelain enameled inside and out to resist corrosion and permit easy cleaning is mounted for easy removal from the base, the loosening of a single nut permitting removal of the tank;

(2) The air chamber or air dome is combined with the hold-down plate inside the tank where it is out of the way and out of sight, thus improving the appearance of the unit and at the same time making it more compact;

(3) All of the valves are congregated on one porcelain enameled plate to resist corrosion and avoid sticking, and also permit removal and replacement of the valves all at one time;

(4) All of the working parts are made readily accessible for inspection and replacement, as, for example, the strainer, which is removable from the front plate; the plunger assembly, removable from the front plate; the valve plate and cylinder liner, easily removable after the front plate has been removed; the drive motor, removable without disturbing any other parts, and the driving gear and eccentric, removable from the main drive shaft without disturbing the crosshead and plunger of the pump;

(5) The drive motor is built in for direct drive and is mounted so as to assure perfect alignment and quiet operation, in addition to permitting removal of the motor without disturbing the rest of the unit in any way.

The invention is described in detail hereinafter in connection with the accompanying drawings, in which—

Figure 1 is a front view of a pump unit made in accordance with my invention;

Figs. 2 and 3 are views from opposite sides, the

upper portion of the tank being broken away in Fig. 3;

Fig. 4 is a longitudinal section through the base of the unit on a larger scale, taken on the line 4—4 of Fig. 2;

Fig. 5 is a fragmentary sectional detail of a portion of the tank to indicate how the tank is enameled inside and out;

Fig. 6 is a horizontal section on the line 6—6 of Fig. 4;

Figs. 7, 8, and 9 are transverse vertical sections on the correspondingly numbered lines of Fig. 4;

Fig. 10 is a horizontal section on the line 10—10 of Fig. 4, but on the same scale as Figs. 1 to 3;

Fig. 11 is a developed diagrammatic section to illustrate the water circuits in the pump;

Fig. 12 is an edgewise view of the valve plate showing the valves thereon in side elevation;

Fig. 13 is a section through one of the valves as indicated by the line 13—13 in Fig. 12, and

Fig. 14 is a section through an air bleeder taken on the line 14—14 of Fig. 7.

The same reference numerals are applied to corresponding parts throughout the views.

The pump unit of my invention utilizes a reciprocating pump indicated generally by the reference numeral 15 operated from a crosshead 16 and driving gear 17 and eccentric 18 disposed in the housing 19 and driven by the motor 20. The housing 19 is cast as an integral part of a frame 21 which forms the base for the unit and carries the storage tank 22 thereon. The base 21 has one end thereof cast to provide a multi-chambered manifold 23 forming one-half of a valve chest, the other half being a separate removable multi-chambered front plate 24 fastened to the manifold 23, as by bolts 25, to clamp the valve plate 26 in place therebetween, together with gaskets 27 on the opposite sides thereof. The manifold 23 is spaced from the housing 19 and joined thereto at the bottom and top by integral webs 28 and 29, respectively, the web 29 terminating in a small housing 30 over the housing 19 in which a pressure regulator switch 31 is conveniently mounted so as to be enclosed for neatness in appearance, and also obviate exposed wiring. The wires extending to the pressure switch from the current source extend through a conduit 32, and the other wires 33 going from the pressure switch to the motor 20 are extended inside the unit directly from the housing 30 to the motor through a cored portion of the housing wall 34 between the housings 19 and 30. A flexible tube 35 communicating with the tank 22 through the passage 36, hereinafter described, extends into

the housing 30 to the switch 31, and causes the operation of the switch in response to changes in pressure in the tank. The web 29 is machined flat on top to provide a seat 36 whereon to mount the tank 22 on a gasket 37. The bottom of the manifold 23 is formed to provide a flat bolting pad 38 at one end of the base 21, and another bolting pad is provided at the other end of the base by an integral projection 39 on the bottom of the housing 19, the pads 38 and 39 affording rigid support for the unit. It is clear from the foregoing that the base 21 provides for practically everything in a single casting; it embodies the pump 15 and its valve chest 23—24 in one end and the housing 19 for the drive mechanism 16—18 in the other end, and forms a support on the side thereof for the motor 20 and on the top thereof for the vertically disposed storage tank 22, besides affording a housing therein for the pressure switch 31 in convenient close relationship to the motor 20. The number of parts required in the assembly are manifestly reduced by this construction to a minimum, and the desired lightness and compactness are secured, and, in addition, a neat and attractive appearance. The construction is moreover economical.

The cylinder 40 for the pump 15 is formed integral with the manifold 23 at the center thereof, concentric with a stuffing box 41 provided in the back wall of the manifold, and a removable plug 42 threaded in the front wall of the front plate 24. A sleeve 43 forms a renewable liner for the cylinder 40 and has a slip fit in the cylinder. The liner is externally threaded, as at 44, to receive a flanged threaded collar 45. The latter is received in a central hole 46 in the valve plate 26 and is clamped between the gaskets 27 when the front plate 24 is bolted in place. Thus, the liner 43 can be removed and a new one inserted simply by removing the front plate 24, and, of course, the valve plate 26 is also removable at that time, if desired. In the past, the brass liners were invariably pressed in, and hence it was very difficult to remove the same, and such repair jobs were correspondingly expensive. It was also common practice to have the liners rolled over or belled out at the ends to make them tight, and that, of course, made it so much more difficult to remove the same. A slip-fit cylinder liner clamped in place, as herein disclosed, can be replaced in a small fraction of the time required for the old liners, and a great saving in expense is realized for the user.

47 is the pump piston or plunger which is made up of oppositely facing cup leathers held together by a grommet 48 which is provided with a threaded bore in the rear end and a screw-driver slot in the front end for threadedly securing the piston 47 on the reduced threaded front end of the rod 49. The latter is reciprocable in the stuffing box 41 and extends through a grease retainer 50 for connection with the crosshead 16 reciprocable in the guide 51 in the housing 19. Obviously, when the plug 42 is removed, the piston 47 is accessible and can be removed with the aid of a screw-driver, without removing the front plate 24. Hence, this part which is most subject to wear and most apt to require replacement is most easily accessible.

The valve plate 26, shown removed in Fig. 12, and also appearing in Figs. 4, 11 and 13, is, of course, perforated to receive the bolts 25 for fastening the front plate 24 to the manifold 23. The valve plate 26 is assembled in a vertical plane between the manifold 23 and front plate 24, so that

any sediment that would lodge between the valves and seats if the plate were horizontal, will tend to wash down and leave the valve seats clean. In addition, it has ports therein to register with the ports 52—59 provided in the front wall of the manifold 23, in addition to holes for the projection therethrough of small air bleed nozzles 60 and 61. There are four valves 62, 63, 64, and 66 on the plate 26 to control the flow of water through the ports 52, 53, 54 and 56, respectively. The advantages in having all of the valves on one removable plate is believed to be obvious. The valves 62—64 are on the rear side of the plate and serve as check valves to prevent outward flow through the ports 52—54, respectively, whereas the valve 66 is on the front side and prevents inward flow through the port 56. The back wall of the front plate 24 has ports 52'—58' registering with the ports 52—58, respectively. A strainer 67 is entered in the port 57' and is carried on a screw plug 68 removable from the front plate. A passage 69 in the front plate communicates at its rear end with the port 59 in the manifold 23 and at its front end with a valve seat 70 for a combination relief and drain valve 71 provided in a hollow boss 72 on the front of the plate 24. A drain pipe 73 extends from the boss 72 to the sewer or other drain receptacle. A hand operable plug 74 is screwed into the boss 72 and forms a guide for the stem 75 of the valve 71 and an abutment for its spring 76. The plug is arranged to be threaded in a predetermined distance, as indicated in Fig. 4, to compress the spring 76 a predetermined amount to hold the valve 71 seated under such spring pressure that it will open when a predetermined pressure is exceeded in the passage 69, as, for example, in the event the switch 31 fails to function. Now, of course, one may back up the plug 74 sufficiently to unseat the valve 71 and thus use the valve as a drain cock, as, for example, when the unit is to be drained for inspection, cleaning, or repair, or in the event the unit is to be left standing out of commission for some time, and is accordingly drained to prevent freezing.

The manifold 23 has chambers A, B, C, and D provided therein. The front plate has three chambers E, F, and G in one plane, and a fourth chamber H in a forward plane communicating with the chamber G through the port 54''. The chambers B and F communicate directly with the opposite ends of the working cylinder 40, that is, with the opposite ends of the cylinder sleeve or liner 43. The chamber A communicates through the port 77 with the storage tank 22. 78 is the water supply pipe extending to the well or cistern, and communicates with the chamber D in the manifold 23. 79 is the service pipe extending to the service system, and communicates with the storage tank 22 through a cored passage 80 in the web 29. The circuit for the water can now be traced: The incoming water from pipe 78 enters chamber D, as indicated by the arrow in Fig. 11, and passes through strainer 67 into chamber H and thence through port 54'' into chamber G. Now, assuming the piston 47 is moving outwardly, water is accordingly drawn into the rear end of the cylinder 40 from chamber B and expelled from the front end into chamber F. The water drawn into the rear end of cylinder 40 enters chamber B past check valve 64 from chamber G, as indicated by the arrow. The water expelled from the front end of cylinder 40 into chamber F flows from chamber F past check valve 63 into chamber A, the check valve 66 seat-

ing to prevent back-flow. The water forced into chamber A displaces other water from chamber A into tank 22 through port 77, the check valve 62 seating to prevent outward flow. On the return stroke of the piston 47, the water previously drawn in behind the piston is expelled into chamber B and flows through port 58 into chamber E and past check valve 62 into chamber A, as indicated by the arrow, the check valve 64 in this case seating to prevent outward flow from chamber B to chamber G. The water entering chamber A displaces other water therein, forcing water into tank 22, the check valve 63 in this case seating to prevent leakage from chamber A to chamber F. Water drawn into the front end of cylinder 40 in the return travel of piston 47 is supplied from chamber C past check valve 66 to chamber F, the valve 64 seating to prevent taking water from chamber B, and the valve 63 likewise seating to prevent taking water from chamber A. Obviously, therefore, water is continuously being delivered under pressure from the cylinder 40 into chamber A alternately from opposite ends of the cylinder. It is clear that the strainer 67 catches any solid foreign particles therein, since the water entering chamber H from chamber D has to pass through this strainer. The removal of the strainer by means of the plug 68 for cleaning at intervals keeps the unit operating efficiently at all times. It is also clear how the combination pressure relief and drain valve 71 operates, since it has direct communication with the chamber A, just described, and hence communicates also with the storage tank 22. It should also be clear that the nozzles 60 and 61, being at a high level in the chambers E and F (Fig. 8), will serve to drain the air out of these chambers in the filling of the unit with water, and will thereafter bleed off any air that happens to collect in these chambers during the operation of the unit, so that the piston 47 will at no time be air-bound and fail to pump water properly. In passing, attention is called to the plug 81 on the front plate 24, the removal of which permits priming the pump by filling the chamber H and communicating chambers G and C through the inclined neck 82.

The valve plate 26, in accordance with my invention, and as clearly illustrated in Fig. 13, is porcelain enameled all over, as indicated by the numeral 83, the enameling extending into all of the ports, as shown. This prevents corrosion and also gives the advantage that the rubber disks 84 used in the valves 62, 63, 64, and 66 will not stick thereto. Each valve comprises in addition to the rubber disk 84 a coiled compression spring 85 to hold the disk seated and a washer 86 to enclose the spring and provide not only a backing for the spring, but a limiting abutment for the valve disk to limit movement thereof away from the plate. A screw 87 passing through the plate 26, spacer 88, and washer 86 receives a nut 89 to complete the assembly and permit easy disassembling for replacement of valve disks and springs when necessary. The surfaces of the plate 26 contacted by the gaskets 27, have the porcelain enamel preferably etched with acid to roughen the same to make better joints with the gaskets and lessen the danger of leakage.

The pump per se forms the subject matter of a divisional application, Serial No. 108,236, filed October 29, 1936.

The tank 22, as illustrated in Fig. 5, is porcelain enameled inside and out, as indicated by the numeral 90, whereby to resist corrosion and pro-

vide a sanitary tank which can be washed out thoroughly like a milk can. Here again I prefer to treat the bottom surface where it contacts gasket 37, because a metal to rubber joint is less apt to leak. The porcelain enamel at this point is wiped off, but only so much of the surface as the gasket will cover. The tank has an oblong hole 91 in the bottom thereof, and an oblong plate 92 corresponding in outline to the gasket 37 (Fig. 10) is entered inside the tank together with a marginal gasket 93 to engage the top of the bottom wall. A bolt 94 extends downwardly through the center of the plate 92 through a registering hole in an outer plate 95 and receives a nut 96 which, when tightened, serves to clamp the gasket 37 to the plate 92 so that it lifts off the seat 36 with the tank in the removal of the tank from the base. Now, there is a large hole 97 in the center of the web 29 and a large castellated nut 98 bearing against the bottom of the web, suitably with a lead gasket 99 interposed therebetween, threads on the lower end of the bolt 94 and serves when tightened to draw the tank 22 firmly down upon the seat 36 on the base 21. The gaskets 37 and 93 being concentrically arranged with respect to the clamping bolt and nut, are subjected to uniform compression in the tightening of the nut, and a watertight joint results, which, moreover, shows no evidence of leakage at the pressures commonly employed in domestic water systems. The fact that a single large nut takes care of the fastening of the tank makes it an easy matter to detach the tank and clean it out and then replace it. The user can therefore keep the unit in a wholesome, sanitary condition with minimum trouble and expense. By castellating the nut 98, the user can easily start the nut on the bolt and then, without any special wrenches, but simply by the use of a screw-driver or rod, he can tighten the nut enough to avoid likelihood of water leakage. The small hole, indicated at 29', extending from the lowermost portion of the web 29, is mainly for the purpose of drainage when all of the water is being drained out of the unit. The main communication between the tank 22 and the chamber A in the manifold 23 is by way of the passage 100 in the hold-down plate 92 which communicates with the port 77, previously mentioned, when the tank is assembled on the base.

In accordance with another feature of my invention, an air dome 101 is provided inside the tank 22, in the form of a pipe closed at its upper end and threaded at its lower end in a socket 102 provided therefor in the hold-down plate 92 and communicating with the chamber A in the manifold 23 through the hole 103. This air chamber, as is well known, is to avoid water-hammer action, and by incorporating it inside the tank, as herein disclosed, I obtain not only a more compact unit, but one having a better appearance.

The drive motor 20 carries a spiral pinion 104 on the armature shaft thereof meshing with the drive gear 17, previously mentioned. The motor is carried on a ring 105 which is arranged to be centered accurately on the housing 19 on an annular pilot portion 106, and when thus accurately located is arranged to be clamped in place by means of nuts 107 threaded on studs 108 projecting from the housing 19. Thus, perfect alignment is obtained although the motor is arranged to be detached easily. The drive gear 17 has a composition sheath or rim 109 to make for a smooth, quiet drive. Obviously, the elimi-

nation of belts and pulleys by this direct gear connection makes for greater compactness and a cheaper construction. The gear 17 and eccentric 18 are carried on a main drive shaft 110 received in bearings 111 and 112 in the opposite side walls of the housing 19. Screws 113 and 114 serve to fasten the parts 17 and 18 to the shaft in the correct relationship, and when these screws are removed and a side plate 115 enclosing the projecting end of the shaft 110 is also removed from the hollow boss 116, the main drive shaft can be pulled out. One can therefore replace the main drive gear 17 without disturbing any of the working parts of the pump. The back plate 117 is removable from the housing 19 to afford access to the gear 17 and eccentric 18 and pitman rod 118 provided in connection with the eccentric to connect the latter with the cross-head 16, in the usual way. In short, everything has been designed with a view to facilitating assembling and disassembling, so as to lower the initial cost and decrease maintenance expense.

The device appearing at 119 is an automatic float-operated air inlet valve, which in the event the usual water-level float rises past a certain level, thus indicating the need for additional air, opens the valve and allows air to be delivered through the tube 120 to the chamber F, so as to be entrained with the water that is being forced into the chamber A and thence to the tank 22 in the operation of the pump.

It is believed the foregoing description conveys a good understanding of the objects and advantages of my invention. The appended claims have been drawn with a view to covering all legitimate modifications and adaptations.

I claim:

1. A pump unit comprising a base formed to provide a pump housing and a drive gear housing interconnected in horizontally spaced relation, pump mechanism in the first housing operatively connected with drive mechanism in the second housing, said housings providing spaced supporting feet for said base, a storage tank disposed vertically over said base and demountably supported thereon, means establishing detachable fluid connection between said tank and said pumping mechanism when said tank is supported on said base, and fastening means for detachably securing said tank to the base extending downwardly from beneath the tank and accessible in the space between the two housings.

2. A pump unit comprising a pump housing and a drive gear housing in horizontally spaced relation, said housings being rigidly connected at the top thereof by a cross member, the bottoms of said housings providing spaced supporting feet for said unit, pump mechanism in the first housing operatively connected with drive mechanism in the second housing, a storage tank disposed over and demountably supported on said housings, means establishing detachable fluid connection between said tank and said pump mechanism when said tank is supported on said housings, and fastening means extending between said cross member and tank for detachably securing said tank in the position stated.

3. A pump unit comprising a base casting formed to provide a pump housing and a drive gear housing in spaced relation interconnected at the top by a horizontal web integral with said housings, the web having a seat provided on the top thereof in a substantially horizontal plane, an upright tank arranged to be demountably secured on said base resting on said seat, a hold-

down plate inside said tank in the bottom thereof, a single clamping bolt extending from the center of said plate downwardly through an opening provided in said connecting web and receiving a clamping nut, whereby to secure said tank detachably in engagement with said seat, means establishing detachable fluid connection between said tank and pump housing through said seat when said tank is mounted as set forth, and pumping mechanism in the pump housing operatively connected with drive mechanism in the other housing.

4. A unit as set forth in claim 3, including a gasket arranged to be interposed between said tank and seat, an outer plate engaging said gasket from below to secure it to the tank, and a nut on said clamping bolt engaging said plate from below to draw the latter and the hold-down plate together.

5. A unit as set forth in claim 3, including gaskets abutting the inside and outside of the bottom of said tank, the inner one being disposed beneath the hold-down plate and the outer one being arranged to be interposed between the tank and seat, an outer plate engaging the outer gasket from below to secure it to the tank, and a nut on said clamping bolt engaging said outer plate whereby to force the plates toward each other and clamp the gaskets in place.

6. A pump unit comprising a base casting formed to provide a pump housing and a drive gear housing in spaced relation interconnected at the top by a horizontal web integral with said housings, the web having a seat provided on the top thereof in a substantially horizontal plane, an upright tank arranged to be demountably secured on said base resting on said seat, a hold-down plate inside said tank in the bottom thereof, an air chamber on said plate projecting upwardly inside said tank, means extending between said plate and said transverse top wall to secure said tank detachably in engagement with said seat, means establishing detachable fluid connection between said pump housing and said air chamber and tank through said seat when the latter is mounted on said seat, and pumping mechanism in the pump housing operatively connected with drive mechanism in the other housing.

7. In a pump unit, the combination of a pump housing containing pumping mechanism and having a discharge port, a storage tank communicating through the discharge port with said mechanism, and an air chamber element also communicating with said mechanism directly through the same port and disposed inside said tank.

8. In a pump unit, the combination of a pump housing containing pumping mechanism, a storage tank communicating with said mechanism, a hold-down plate inside said tank and means connected therewith for detachably securing said tank to said housing, and an air chamber carried on said hold-down plate and disposed inside said tank in communication with said mechanism.

9. In a pump unit comprising a storage tank, pumping mechanism arranged to communicate therewith, driving mechanism arranged to operate said pumping mechanism, and a motor arranged to operate the driving mechanism, a base for said unit formed to provide a support on top thereof for said tank, said base also being formed to provide a housing for the pumping mechanism and being formed to provide a housing for the driving mechanism, and being further formed

to provide a support for the motor on one side of the last-mentioned housing.

10. A pump unit comprising in combination, a pump housing containing pumping mechanism, another housing in laterally spaced relation thereto containing driving mechanism operatively connected with said pumping mechanism, a cross-member extending between the tops of said housings, a storage tank vertically disposed on said cross-member and detachably secured thereto, a portion of said tank forming a joint with a portion of said pump housing whereby to provide detachable fluid connection therebetween, and an air chamber disposed inside said tank and arranged also to be placed in detachable fluid communication with said pump housing through said joint.

11. A unit as set forth in claim 10, including a gasket outside said tank between the portions forming said joint, a support for said air chamber inside the tank, and a plate engaging the bottom of said gasket and secured to said support, whereby to fasten said gasket in assembled relation to said tank.

12. A unit as set forth in claim 10, wherein the tank is detachably secured to said cross-member by means of a hold-down plate inside the tank, a clamping bolt depending therefrom through said cross-member, and a clamping nut threading on said bolt against the bottom of said cross-member, the unit including a gasket on the bottom of said tank to seal said joint between the tank and pump housing, and a plate for retaining said gasket fastened in place by means of said bolt.

13. A unit as set forth in claim 10, wherein the tank is detachably secured to said cross-member by means of a hold-down plate inside the tank, a clamping bolt depending therefrom through said cross-member, and a clamping nut threading on said bolt against the bottom of said cross-member, the unit including a gasket between said hold-down plate and the tank bottom, and another gasket between the tank bottom and the pump housing, whereby to effect a seal when the tank is secured on said cross-member, and an outer plate for retaining the outer gasket fastened in place on said bolt so that the hold-down plate and outer plate are drawn toward each other to clamp both gaskets in assembled relation to the tank.

14. In a pump unit the combination with a storage tank, pumping mechanism communicating therewith, drive gearing operatively connected with said pumping mechanism, a motor for driving the gearing, and a pressure switch responsive to pressure in said tank to control the operation of said motor, of a single multi-chambered base casting formed on the bottom to rest on a flat supporting surface and on top to provide a seat for detachably supporting the tank thereon, one of the chambers of said casting receiving said pumping mechanism and communicating with said tank through said seat, another of said chambers receiving said drive gearing and being formed so that one side thereof is open and provides a mounting place for said motor, and still another of said chambers receiving said pressure switch, said switch also communicating with said tank through said seat.

15. A unit as set forth in claim 14, including a hold-down plate inside said tank for fastening the same to said seat, and an air chamber on said plate communicating with said pumping mechanism through said seat.

16. A unit as set forth in claim 14, including an air chamber enclosed in said tank and communicating with the pumping mechanism.

17. A unit as set forth in claim 14, including a gasket interposed between said tank and seat and arranged to be compressed in the fastening of said tank, a hold-down plate inside the tank, bolting means extending therefrom for engagement with said base to draw the tank down onto said seat, and an outside plate engaging the gasket from below and held in place on said tank by said bolting means whereby the gasket is secured to said tank.

18. A pump unit comprising a base, pumping mechanism therein, said base being formed to provide a seat thereon for detachably mounting a storage tank thereon, a storage tank porcelain enameled inside and out and having a hand hole provided in one wall thereof adapted to be engaged on said seat, said hand hole being large enough to provide access therethrough to all portions of the interior of said tank for cleaning, a hold-down plate entered through said hand-hole to engage the inside of said wall, gaskets of compressible resilient material interposed between said plate and wall and between said wall and seat, means whereby said plate may be drawn downwardly toward said seat to mount the tank thereon, and means for establishing communication between said pumping mechanism and said tank.

19. A unit as set forth in claim 18, including an outer plate engaging the outer gasket from the outside thereof and fastened to said hold-down plate, whereby to secure said plates and gaskets in assembled relation on the wall of said tank.

20. In a pump unit, a vertical storage tank, a supporting base therefor including a reciprocating pump housing and an operating crankshaft housing laterally spaced on opposite sides of the vertical axis of said tank, substantially axially located means for securing said tank to the base extending into the space between said housings, pump mechanism in the first housing operatively connected with a crankshaft in the second housing, power operated means for driving said shaft, and means for establishing communication between said pump mechanism and said tank.

21. In a pump unit, a vertical storage tank, a supporting base therefor including a reciprocating pump housing and an operating crankshaft housing laterally spaced on opposite sides of the vertical axis of said tank, means for securing said tank to the base, pump mechanism in the first housing operatively connected with a crankshaft in the second housing, a motor carried on the side of said second housing and having an armature shaft extending into the housing for a direct detachable driving connection with said crankshaft, and means for establishing communication between said pump mechanism and said tank.

22. In a pump unit assembly, the combination of a pump having a discharge port, a tank over said pump and supported thereby, the pump having its discharge port communicating with the tank, and an air chamber over the pump and also communicating directly with the same discharge port.

23. In a pump unit, the combination of a pump adapted to serve as a supporting base for a tank, a storage tank supported thereby, a hold-down plate within said tank, means cooperating with said plate to secure the tank to said pump in

fluid communication with the discharge thereof, and an air chamber carried on and removable from within the tank with said plate and also arranged in fluid communication with the pump discharge when the plate is in operative position within the tank.

24. In a pump unit assembly, a base frame including a pump housing for a reciprocating pump, and another housing for an operating crankshaft in spaced relation thereto, pump mechanism in the first housing including a reciprocable piston, and a crankshaft in the second housing operatively connected through a piston rod with the aforesaid piston, the pump housing having a discharge opening, a water storage tank vertically disposed over said base and resting thereon in communication with said discharge opening, said tank being disposed with its vertical axis between said housings, a fastening bolt extending downwardly from said tank substantially axially to anchor the tank on the base, and a castellated nut operable by leverage means from the side of the base and threading on said bolt and bearing against a surface on the base frame whereby to draw the tank down tightly and with substantially uniform pressure at all points of the bottom thereof onto the base.

25. A pump unit comprising a base including a pump housing and a drive gear housing in rigid laterally spaced relation, pump mechanism in the first housing operatively connected with drive mechanism in the second housing, the housings providing spaced supporting feet for the base, a top wall extending from one housing to the other, a storage tank resting on said top wall and adapted to be demountably supported thereon, means establishing detachable fluid connection between the tank and the pumping mechanism when the tank is supported on said top wall, and means for detachably securing the tank to the top wall.

26. A pump unit comprising a base casting formed to provide a pump housing and a drive gear housing in spaced relation interconnected at the top by a horizontal web integral with said housings, the web having a seat provided on the top thereof in a substantially horizontal plane, a member arranged to be demountably secured on said seat and providing an air chamber, means extending between said air chamber member and the transverse top wall for detachably securing said member on the seat, a storage tank communi-

cating with the pump housing, and means establishing detachable fluid connection between the pump housing and the air chamber when the air chamber member is mounted on the seat, and pumping mechanism in the pump housing operatively connected with drive mechanism in the other housing.

27. A pump unit as set forth in claim 26, including a gasket interposed between the air chamber member and the seat, and a plate engaging the bottom of the gasket and secured to the air chamber member to hold the gasket in assembled relation to said member.

28. In a pump unit comprising a storage tank, pumping mechanism arranged to communicate therewith, driving mechanism arranged to operate the pumping mechanism, and a motor arranged to operate the driving mechanism, a base for the unit formed to provide a housing for the pumping mechanism and also formed to provide a housing for the driving mechanism, said base being further formed to provide a support for the motor on one side of the last-mentioned housing.

29. In a pump unit comprising a storage tank, an air chamber, pumping mechanism arranged to communicate with the storage tank and air chamber, driving mechanism arranged to operate the pumping mechanism, and a motor arranged to operate the driving mechanism, a base for the unit formed to provide a support thereon for the air chamber, said base being also formed to provide a housing for the pumping mechanism and a housing for the driving mechanism, and being further formed to provide a support for the motor on one side of the last-mentioned housing.

30. In a pump unit comprising a storage tank, the combination with a pumping mechanism communicating with said tank, drive gearing operatively connected with the pumping mechanism, a motor for driving the gearing and a pressure switch responsive to pressure in the tank to control the operation of the motor, of a single multi-chambered base casting, one of the chambers of said casting receiving the pumping mechanism, another of said chambers receiving the drive gearing and being formed so that one side thereof is open and provides a mounting place for the motor, and still another of said chambers receiving the pressure switch.

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