

Oct. 27, 1925.

1,559,365

B. J. PEPPER

PUMP

Original Filed April 23, 1921 4 Sheets-Sheet 1

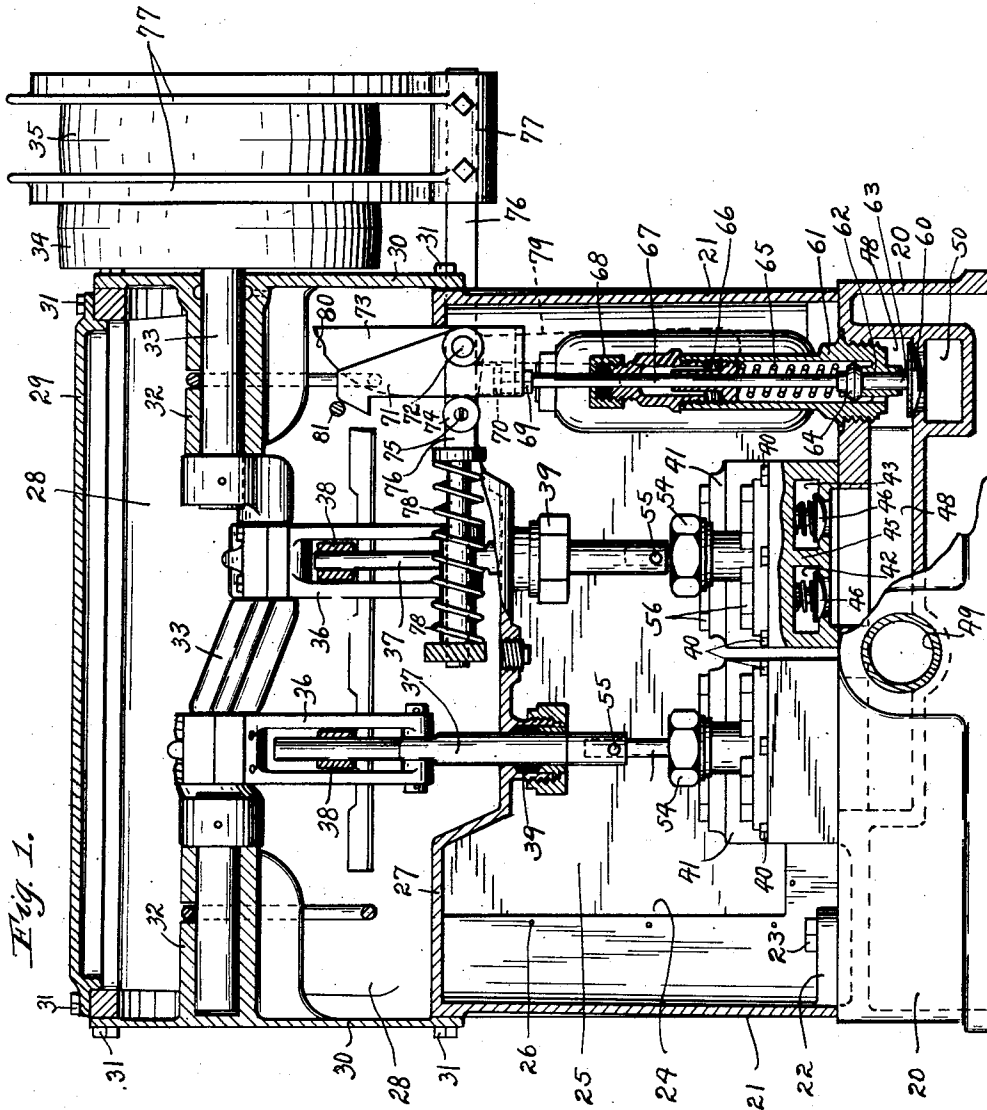


Fig. 1.

Witness:

R. L. Darlington.

Inventor:

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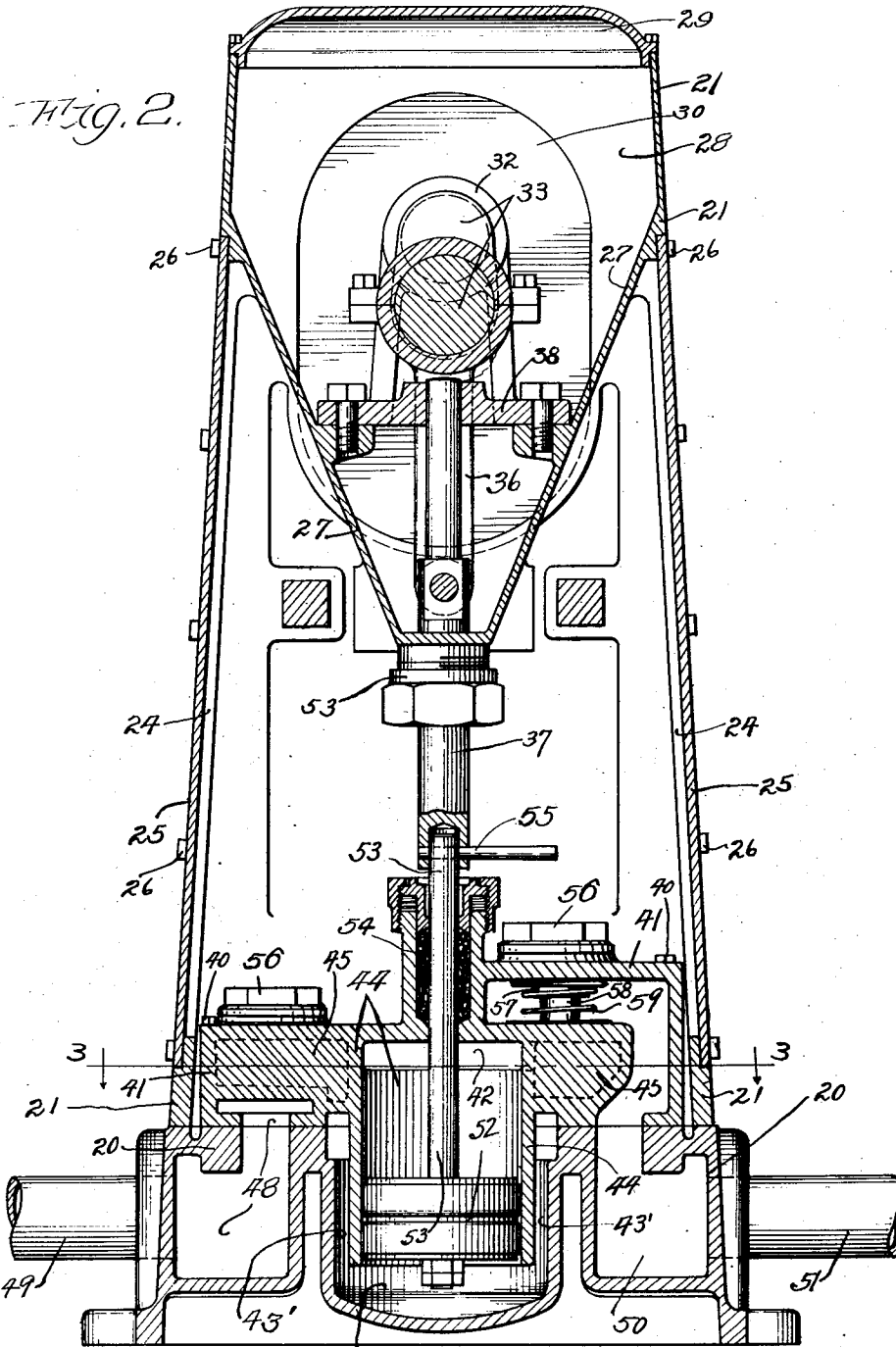
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PUMP

Original Filed April 23, 1921 4 Sheets-Sheet 2



Witness:
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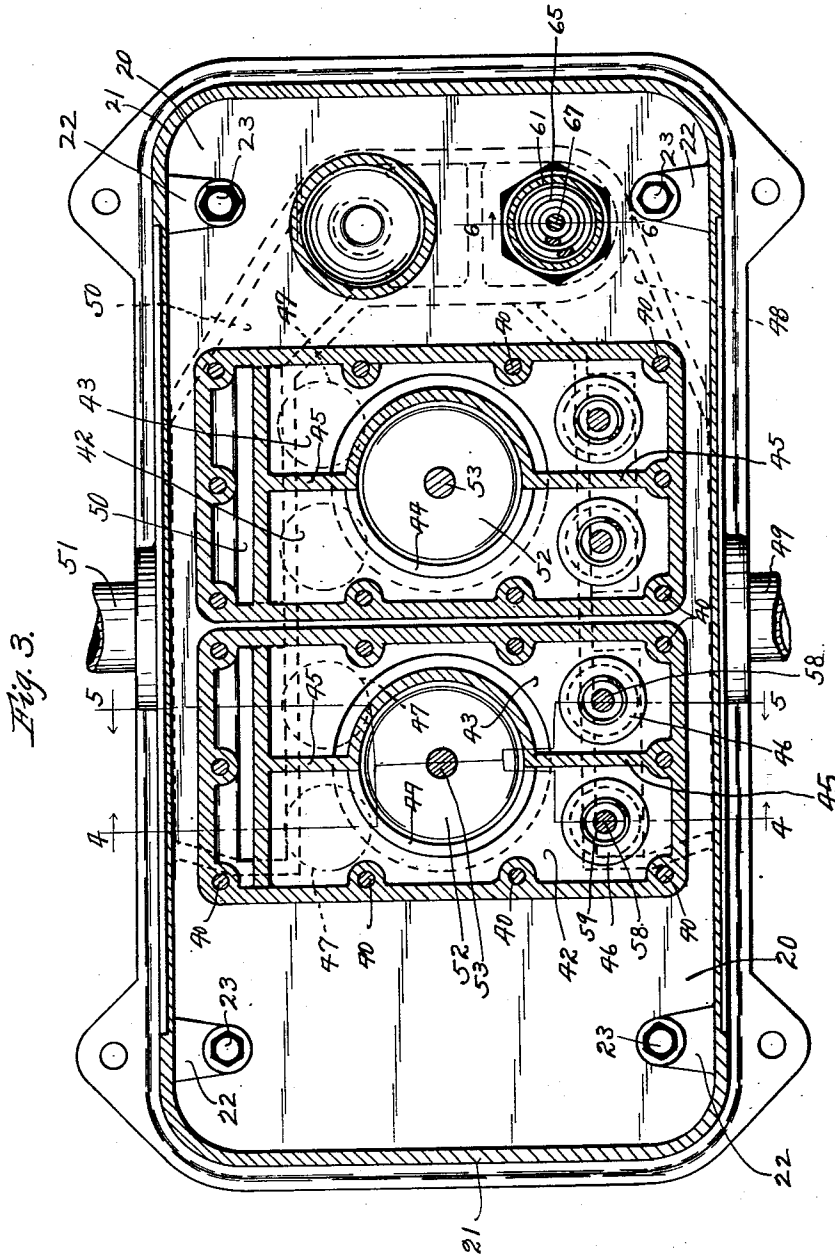
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Original Filed April 23, 1921 4 Sheets-Sheet 3



Witness.
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Oct. 27, 1925.

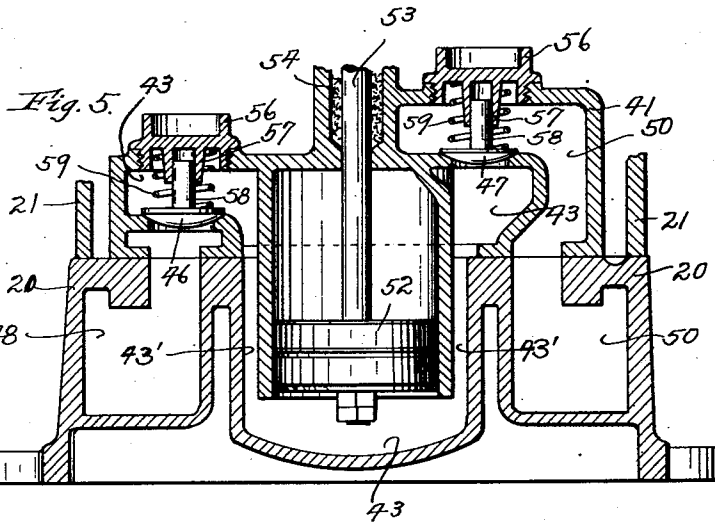
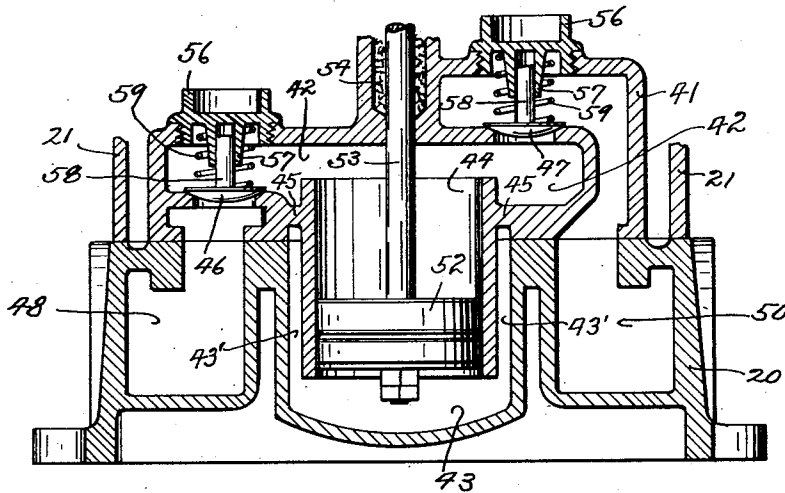
1,559,365

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Original Filed April 23, 1921 4 Sheets-Sheet 4

Fig. 4



Witness:

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Patented Oct. 27, 1925.

1,559,365

UNITED STATES PATENT OFFICE.

BYRON J. PEPPER, OF FORT WAYNE, INDIANA, ASSIGNOR TO S. F. BOWSER & COMPANY INC., OF FORT WAYNE, INDIANA, A CORPORATION OF INDIANA.

PUMP.

Application filed April 23, 1921, Serial No. 463,848. Renewed September 17, 1925.

To all whom it may concern:

Be it known that I, BYRON J. PEPPER, a citizen of the United States, residing at Fort Wayne, in the county of Allen and State of Indiana, have invented certain new and useful Improvements in Pumps, of which the following is a specification.

My invention relates to pumps and has for one of its objects the provision of a pumping mechanism having a housing which encloses all of the rest of the device.

A further object is the provision of a pumping mechanism having a pumping unit with a cylinder, plunger, plunger rod, and valves all detachable as a unit without disturbing the rest of the mechanism.

A further object is the provision of a pumping mechanism in which the valves are quickly and easily accessible for regrinding or repairing.

A further object is the provision of a pumping mechanism arranged for pumping a fluid at substantially a constant pressure.

A further object is the provision of a pumping mechanism in which the pressure in the discharge line will automatically stop the pump when a pressure above a predetermined pressure is obtained in said discharge line.

A further object is the provision of a pumping mechanism in which the operating parts are mounted in an oil chamber so as to run in oil.

A further object is the provision of a pumping device adapted to pump a plurality of separate fluids.

A further object is the provision of means for automatically stopping the device when a predetermined quantity of liquid is pumped.

A still further object is the provision of a pumping mechanism which is applicable for a variety of forms of power driving mechanism.

Other objects will appear hereinafter.

Embodiments of my invention are illustrated in the accompanying drawings, forming a part of this specification, and in which—

Fig. 1 is a central section of a pumping device embodying my invention;

Fig. 2 is an enlarged transverse section of the device;

Fig. 3 is a section taken on line 3—3 of Fig. 2;

Figs. 4 and 5 are fragmental sections taken substantially on lines 4—4 and 5—5, respectively, of Fig. 3.

Referring more particularly to the drawings, I have indicated a base member 20, which in the present instance is a casting, but may be formed in any desirable manner. Resting on the base 20 is a housing 21, and this housing is also indicated as being a casting in the present instance, but may be formed in any desirable manner or number of parts. The housing 21 is indicated as having ears 22 secured to base 20 by cap screws 23, or their equivalent.

I preferably provide the housing 20 with openings 24 on its lateral sides, and these openings 24 are closed by plates 25 secured by screws 26, or their equivalent. By removing the plates 25 the pump cylinder mechanism may be accessible.

Across the upper portion of the housing 21 I provide a partition 27, which in the present instance is somewhat V-shaped in cross-section, as clearly indicated in Fig. 2. The chamber 28 above partition 27 is a receptacle for oil or other lubricant and also is a chamber in which the cranks and connecting rods for operating the pumps are mounted. By mounting the cranks, etc., in oil in this chamber an effective lubricating means is provided which requires practically no attention after once filled with lubricant.

The top of the housing 21 may be open, with a plate 29 closing it when so desired so as to obtain access to the top of chamber 28. I also preferably provide the ends of chamber 28 with openings which are closed by plates 30. These plates 30 may be secured by screws 31, or in any other desirable manner.

Attached to the inner sides of plates 30 are bearings 32 in which a crank shaft 33 is journaled. I have indicated the bearings 32 as being formed integral with the plates 30, but said bearings may be arranged in chamber 28 in any desirable manner.

On one end of crank shaft 33 which extends from the chamber 28 is a fixed pulley 34 and a loose pulley 35. A belt, not shown, may engage said pulleys for transmitting power to the device.

In the device shown in Fig. 1 I have indicated the crank shaft 33 as having two cranks and connected to each is a connecting rod 36 which is pivoted to a sliding rod

37. Each of the rods 37 is mounted for sliding in a bearing 38 adjacent crank shaft 33 and a stuffing box 39 at the partition 27. The lower ends of the rods 37 are attached

5 to the pump piston rods.
Attached to the top of base 20 in any desirable manner, such as by cap screws 40 are housings 41 which enclose two chambers 42 and 43. Chamber 42 is in communication
10 with the upper end of cylinder 44, and chamber 43 is in communication with the lower end of said cylinder. The chamber 42 is divided from chamber 43 by vertical partitions 45. In each of chambers 42 and 43
15 is an intake valve 46 and a discharge valve 47. The intake valves 46 are in communication with an intake chamber 48 in base 20 and chamber 48 connects with a suction pipe 49, and the latter is connected to some source
20 of liquid to be pumped, not shown.

Also, in base 20 is a discharge chamber 50 which communicates with the upper sides of discharge valves 47 and is also connected with
25 a discharge pipe 51 into which the liquid is pumped. Mounted in the cylinder 44 is a piston 52 having a piston rod 53 extending up through a stuffing box 54 and connected with rod 37 by a pin 55. It will be noted
30 that when piston 52 is moved downwardly in cylinder 44 the intake valve 46 in chamber 42 will rise to permit a liquid to enter said cylinder, and upon the upward movement of piston 52 said valve 46 will be closed and the discharge valve 47 in said chamber
35 will be raised by the liquid and the latter pass out into discharge passage 50. In these same movements of the piston the downward stroke of the latter forces liquid out of the lower end of cylinder 44 and up through
40 the narrow passage 43' up through discharge valve 47 into discharge passage 50, and the upward stroke of said piston will draw liquid from chamber 48 through valve 46 in chamber 43 down through the narrow
45 passage 43' to the lower end of the cylinder. Thus, the piston draws in liquid at one side thereof and discharges liquid at the other side thereof at each stroke. The valves 46 and 47 are substantially alike and mounted
50 in similar manners. The housing 41 is provided with threaded openings for said valves and in each opening is a cap 56 which has a guide 57 on its lower side. In the guide 57 is a stem 58 on one of said valves 46 or 47.
55 Said valves are maintained normally closed by compression springs 59. It will be apparent that the mounting and arrangement of the valves 46 and 47 may be varied without departing from my invention.

60 The chamber 48 has a part extending around to the end of base 20 and over a similar extension of chamber 50. A valve 60 controls an opening between said passages, said arrangement being clearly indicated in Fig. 1. Fitted in the base 20 is a

housing 61 which has a guide 62 therein. In the guide 62 is the stem 63 of valve 60 arranged so that the latter may slide vertically to control the opening between chambers 48 and 50. Above guide 62 in housing 61 is an
70 enlargement 64 which slides easily in the bore of housing 61, and pressing on the upper side of enlargement 64 is a compressing spring 65 which normally holds valve 60 closed. An adjustable member 66 is threaded
75 in the housing 61 for varying the tension of spring 65. When it is desired to provide a pump which will pump a liquid, delivering it at a desired pressure, a relieve valve, such as just described and as indicated in
80 Fig. 1, may be arranged to operate valve 60.

When it is desired to have the pump stopped when a pressure exceeding a predetermined pressure is obtained in chamber 50, a control mechanism, such as indicated in Fig.
85 1, is arranged to control valve 60. In this arrangement the enlargement 64 has a rod 67 extending up through the top of housing 61 through a stuffing box 68 and provided with an adjustable nut or bumper 69 at its
90 top. The nut 69 engages an arm 70 on a stirrup 71 which is pivoted on a shaft 72. The shaft 72 is journaled in a suitable part of housing 21 and has fixed thereon a cam 73. The cam operates against a roller 74
95 pivoted as at 75 on a horizontally sliding rod 76. The rod 76 carries a belt shifter 77 adapted to shift the belt back and forth between pulleys 34 and 35. A spring 78 tends to normally hold the belt shifter in a position
100 to hold the belt on loose pulley 35. On the shaft 72 is fixed a lever 79 so that when it is desired to throw the pump into operation, the operator manually moves lever 79 from its position indicated in dotted lines in
105 Fig. 1. This moves cam 73 against roller 74 and the latter moves rod 76 against the influence of spring 78 and carries the belt shifter 77 along to shift the belt from loose pulley 35 to tight pulley 34, thus placing
110 the pump in operative condition. When a pressure exceeding a predetermined pressure is obtained in chamber 50, such pressure raises valve 60 against the influence of spring 65 and swings the stirrup 71 on
115 shaft 72, and this swinging of the stirrup moves cam 73 upwardly a sufficient distance to dislodge roller 74 from a depression 80 in said cam 73. As soon as the roller 74 moves out of depression 80 spring 78 moves
120 rod 76 carrying the belt shifter over to shift the belt back to the loose pulley 35 thereby stopping the pump.

The pumping unit which comprises a pump cylinder, its piston, piston rod and valves mounted in the casing 40 is an integral part and can be removed from the device by removing screws 40 and pin 55. This is an important feature since with this
125 arrangement the pumping unit may be
130

easily removed for repairs or adjustment when so desired. Another important feature is the mounting of the discharge valves 47 at the highest points or in the top walls 5 of the chambers 42 and 43 so that there is no chance for air or gases pocketing in the pump element.

I claim:—

1. A pump comprising a cylinder open at 10 its top; a casing forming an integral closed chamber at the top of said cylinder; a discharge valve in the top wall of said casing at the highest part of said chamber; a piston operatively mounted in said cylinder and 15 a base member having a chamber for receiving the lower end of said cylinder and detachably secured to the lower face of said casing so as to permit removal of said cylinder and casing intact and expose the 20 lower end of said cylinder.

2. A pump comprising a cylinder open at its ends; a casing enclosing a chamber at one end of the cylinder; intake and discharge valves in said casing, the discharge valve being at the highest part of said 25 chamber; a piston mounted in the cylinder and a second casing member for enclosing the opposite end of said cylinder and detachably secured to said first-mentioned casing member to permit access to said cylinder 30 by separation of said casing member while said cylinder and first-mentioned casing member remain intact.

3. A pump comprising a base; a casing 35 mounted on the base and enclosing a chamber; a cylinder extending from the casing down into said base and in open communication with said chamber; an intake valve in the bottom wall of the casing; a removable cap in the casing above said intake valve in position to expose said valve when said cap 40 is removed; a discharge valve in the upper wall of said casing at the side of said cylinder opposite said intake valve and in communication with the same end of said cylinder as said intake valve; and a piston operatively mounted in said cylinder.

4. A pump comprising a housing; a pumping unit having an open-ended cylinder, a piston in the cylinder a casing connected with said cylinder and forming a chamber about one end of said cylinder, intake and discharge valves for said cylinder carried by said casing, and a piston rod connected with the piston; operating means for said piston in said housing; and means for removably securing said pumping unit to said housing and said operating means said housing having a portion forming a chamber about one end of said cylinder when the 60 parts are in assembled relation.

5. A pump comprising a housing; a partition dividing the housing into two compartments; a self-contained pumping unit 65 comprising a cylinder, piston, and inlet and

outlet valves detachably secured in one of said compartments; pump operating mechanism mounted in said other compartment; and a detachable connection between said pumping unit and said pump operating 70 mechanism.

6. A pump comprising a housing; a partition dividing the housing into upper and lower compartments, the upper compartment being closed to provide a lubricating chamber; a pumping unit comprising a cylinder, piston, and inlet and outlet valves detachably secured in said lower compartment and removable as a unit therefrom; and pump operating mechanism mounted in said 80 lubricating chamber and operatively connected with said pumping unit.

7. A pump comprising a housing; a partition dividing the housing into upper and lower compartments; a frame member comprising a cylinder and communicating chamber in the lower compartment; a piston in said cylinder; a piston operating means mounted in said upper compartment; and a piston rod connecting the piston with 90 said piston operating means.

8. A pump comprising a housing; a partition dividing the housing into a closed lubricant reservoir at its top and a pump chamber at its bottom; a pumping unit 95 frame comprising a cylinder, communicating chamber and control valves detachably secured in said pump chamber; a crank shaft mounted in said lubricant reservoir; a connection between said pumping unit and 100 said crank shaft; and packing means on said partition and packing said connection against the loss of lubricant from said lubricant reservoir.

9. A pump comprising a housing; a partition dividing the housing into an upper lubricant reservoir and a lower pump chamber; a pump cylinder in said pump chamber; a plunger in said cylinder; a plunger rod connected with said plunger and extending into said lubricant reservoir; and a connecting rod in said lubricant reservoir connecting the plunger rod with said crank shaft said pump chamber having an opening through the side thereof to afford access 115 to said pump cylinder.

10. A pump comprising a pump cylinder open at its ends; a casing enclosing a chamber at one end of said cylinder and extending beyond the lateral walls of the latter; an intake valve in the bottom wall of said casing at one side of the cylinder and communicating with the same end thereof; a discharge valve in the top wall of said casing at the other side of said cylinder; a plunger 125 in said cylinder; and means for operating said plunger.

11. A pump comprising a pump cylinder; a piston in said cylinder; a casing enclosing a chamber around said cylinder; partitions 130

between the cylinder and casing dividing said chamber into two compartments, one of the compartments being in open communication with one end of the cylinder and the other compartment being in open communication with the other end of the cylinder said casing being separable between the ends of said cylinders and intake and discharge valves for both ends of said cylinder carried all on one part of said casing.

12. A pump comprising a frame member having a pumping cylinder open at both ends; a pair of intake and discharge valves connected with one end of the cylinder and carried by said frame member; a pair of intake and discharge valves connected with the other end of said cylinder and carried by said frame member, a base separably connected with said frame member and providing communication between one end of said cylinder and one of said pairs of valves; and a piston operatively mounted in said cylinder.

13. A pump comprising a pumping cylinder; a piston in said cylinder; a casing disposed around said cylinder and enclosing two chambers at the top of the cylinder, one of the chambers being connected with the top end of the cylinder and the other chamber being connected with the bottom of the cylinder; intake and discharge valves in each chamber and a base member on which said cylinder and casing are separably mounted, said base member connecting one of said chambers with one end of said cylinder.

14. A pump comprising a pumping cylinder; a piston operatively mounted in said cylinder; a casing disposed around said cylinder and enclosing two chambers, one chamber being connected with the top of said cylinder and the other chamber being connected with the bottom of said cylinder; and a discharge valve in the upper wall of each of said chambers leading to a common discharge conduit.

15. A pump comprising a base member having a chamber formed therein and open at the top, a frame member having a cylinder formed therewith and having two chambers formed therein, means for detachably securing said frame member to said base member with said cylinder extending into the chamber in said base member so that the chamber in said base member communicates with one of the chambers in said frame member while the other chamber in said

frame member communicates with the end of said cylinder opposite that extending into said base member, and an inlet and outlet valve for each chamber in said frame member.

16. A pump comprising a cylinder, a frame member having separate chambers communicating with the opposite ends of said cylinders, a supply conduit at one side of said cylinder extending below each of said chambers, an outlet conduit at the opposite side of said cylinder extending above each of said chambers, inlet valves controlling passages between said supply conduit and said chambers, outlet valves controlling passages from each of said chambers to said outlet conduit, there being openings above each of said valves, and closure members for said openings providing abutments and guides for said valves.

17. A pump comprising a housing, a base member, a frame member detachably secured to said base member within said housing and having a cylinder formed integral therewith, said base member and frame member having registering passages forming separate chambers communicating with the opposite ends of said cylinders respectively, and inlet and outlet valves in said frame member for controlling both of said passages, said housing having an opening through the side thereof to permit access to said frame member and removal thereof from said housing.

18. A pump comprising a base, a housing mounted thereon, a frame member detachably mounted on said base within said housing, said frame member comprising a cylinder and having openings registering with openings in said base to provide separate chambers communicating with opposite ends of said cylinder, inlet and outlet valves carried by said frame member for controlling the passage of fluid to and from the opposite ends of said cylinder, a piston in said cylinder, a partition wall in said housing, driving mechanism for said piston at the opposite side of said partition wall from said piston, and a piston rod extending through said partition wall and having a packed joint therewith and connected with said driving mechanism.

In testimony whereof I have signed my name to this specification on this 13th day of April, A. D. 1921.

BYRON J. PEPPER.