No. 722,871. PATENTED MAR. 17, 1903.

A. B. MOORE.

FEED PUMP.

APPLICATION FILED MAY 19, 1902.

NO MODEL.

Fig. 1

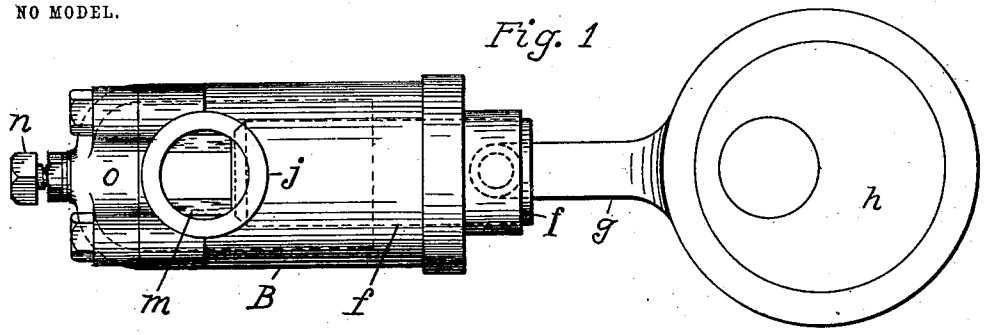


Fig. 2

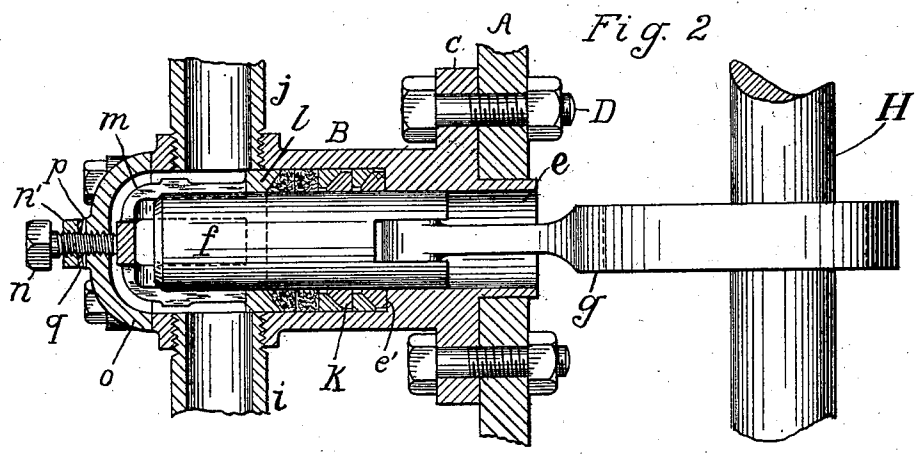


Fig. 3

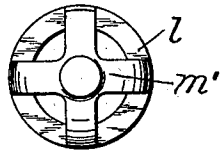


Fig. 4

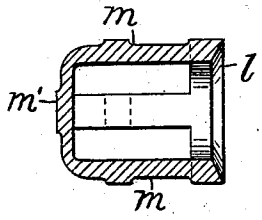


Fig. 5

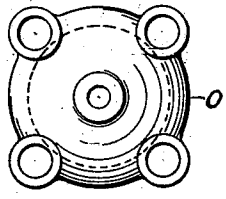


Fig. 6

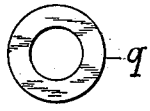




Fig. 7

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FEED-PUMP.

SPECIFICATION forming part of Letters Patent No. 722,871, dated March 17, 1903.

Application filed May 19, 1902. Serial No. 107,950. (No model.)

To all whom it may concern:

Be it known that I, ALBERT B. MOORE, a citizen of the United States, residing at 219 Edgar Place, Elizabeth, county of Union, State of New Jersey, have invented certain new and useful Improvements in Feed-Pumps, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

The present invention relates to plunger-pumps which are used in pumping alcohol, gasolene, and analogous volatile liquids for feeding boilers, tanks, and other receptacles. Such pumps are necessarily single-acting, and heretofore the plunger has always been packed at the front end of the barrel, through which the plunger is extended for a reciprocating connection. The liquid in the pump thus tends to crowd past the packing and escape at the front end of the barrel, and where the packing is placed in such location the plunger is necessarily drawn out of the barrel nearly its entire stroke at each reciprocation.

In the present invention I dispense wholly with any packing or stuffing box at the front end of the barrel and substitute a guide fitted to the plunger, with a counterbore extended from the inner end of such guide to the rear end of the barrel. A packing is fitted to the shoulder where the counterbore joins the guide and is compressed by a follower adjustable from the rear end of the barrel. The pressure generated within the pump thus forces the packing more tightly against the plunger and wholly prevents leakage. As no stuffing-box is required upon the outer end of the barrel, the plunger may be made very much shorter and the whole pump made more compact. As the outer end of the barrel does not need to be accessible for tightening any stuffing-box, it may be attached either directly or indirectly to a vacuum or suction tank or other receptacle in which the mechanism for moving the plunger is located and which may be in turn connected directly or indirectly to said vacuum or suction tank. The plunger is fitted to and sustained by the guide, the packing-rings, and the follower, and the shortening of the plunger at the outer end does not therefore deprive it of the necessary support. The follower for the packing is formed with a cup-shaped skeleton yoke which surrounds the inner end of the plunger and is of sufficient depth to permit the reciprocation of the plunger therein, the skeleton form of the yoke permitting the fluid to pass freely from the plunger to the lateral pipe-openings upon the barrel, which connect the same with the valve-chamber. A single set-screw inserted through the head of the barrel serves by contact with the end of the yoke to adjust the follower against the packing-ring; but it will be understood that the packing needs no follower to merely hold it in place, as the pressure in the pump operates constantly in that direction. To pack the joint of the follower set-screw with the head of the barrel, I insert a dished washer and an annular lead gasket beneath a jam-nut on the set-screw, the concavity of the washer serving to crowd the lead directly into the thread of the set-screw.

In the annexed drawings, Figure 1 is a plan of the pump-barrel with its plunger and connection to an eccentric. Fig. 2 is a section on the center line of Fig. 1. Fig. 3 is an end view, and Fig. 4 a side view, of the follower and its yoke. Fig. 5 shows the detachable head of the pump-barrel. Fig. 6 is a side view, and Fig. 7 a central section, of the dished washer.

A designates the wall of a closed vacuum-chamber, in the center of which the crank-shaft H of the engine is journaled and into which the three cylinders E exhaust. In practice the chamber is in open connection with a condenser by a pipe, (not shown,) in which the alcohol accumulates and from which it is drawn by the pump for delivery to the vaporizer.

The pump-barrel B is shown attached to the wall of the chamber by flange C and bolts D.

The barrel is formed at its inner end with annular guides *e*, fitted to the plunger *f*, and the latter is shown connected by a link *g* with an eccentric *h*. An enlarged counterbore extends from the guide to the rear end of the barrel. A metallic packing *k* is shown fitted to the counterbore and the plunger next the shoulder *e'*, formed by the guide *e*, and the follower *l* is fitted in contact with hemp rings next the packing *k* and is formed

with skeleton yoke consisting of four arms m and a bridge m' at the outer end. A set-screw n is inserted through the head o upon the outer end of the barrel into contact with the yoke, and thus prevents any play of the follower. The follower is fitted to the counterbore of the pump-barrel and the exterior of the plunger, and thus serves as a guide for the plunger, so that when the latter is pushed into the pump, as shown in Fig. 2, the outer end of the plunger may move inward nearly to the packing, as it is then guided partly by the follower and partly by the guide e. The depth of the hollow yoke is made sufficient for the stroke of the plunger, so that the point of the plunger always remains in the follower l, as shown in Fig. 1.

The pump-barrel is provided with lateral valve connections by means of one or more lateral openings for a pipe i or for pipes i and j to connect with inlet and outlet valves, and such openings are formed at the sides of the skeleton yoke, and the form of the yoke thus permits the liquid to pass freely in and out of such openings. It is obvious that all the pressure in the pump tends to force the packing against the guide e and to force the follower against the packing, so as to hold the same firmly in place. Any adjustment required by the packing is effected by turning the single screw n, which sets up the follower more evenly than can be done where several bolts or screws are arranged at different sides of the follower. The construction is no more expensive than an ordinary packing-gland and operates much more effectively in preventing leakage of the liquid around the plunger.

In double-acting plunger-pumps it is common to form the central diaphragm of the pump-cylinder with a packing and to operate a follower upon such packing from the exterior of the barrel; but in such constructions the plunger does not extend through the head of the barrel into the atmosphere, as in single-acting pumps, but is reciprocated between two cylinder-heads by a rod extended through one of such heads.

My construction differs in the following respects from those which use an internal packing: First, it wholly avoids the necessity of any stuffing-box or packing at the end of the pump-barrel; second, it so locates the packing that the pressure generated in the barrel tightens the packing constantly and prevents leakage into the atmosphere; third, it permits a great reduction in the length of the plunger and avoids much projection outside of the barrel, so that the whole pump may be made very compact, and, fourth, it permits the open or front end of the barrel to be attached to a closed receptacle containing the plunger-reciprocating mechanism.

In Fig. 2 a lead gasket p is shown around the set-screw n and the cup-shaped washer q, which would be made of steel, is applied over the gasket, with nut n' upon the set-screw to compress the gasket. The concavity of the washer crowds the lead against the thread of the set-screw and against the head into which it is tapped, thus effectually preventing any leakage or furnishing a means of correcting the same, if any occurs.

The set screw may be packed or constructed in any suitable manner to prevent leakage.

Having thus set forth the nature of the invention, what is claimed herein is—

1. The combination, with the chamber A containing the driving-shaft H having the eccentric h thereon, of the pump-barrel B provided at the front end with a plunger-guide e having the shoulder e' as set forth, the enlarged counterbore extended from the shoulder e' to the rear end of the barrel, the head closing the rear end of the barrel and provided with set-screw n, the plunger f fitted movably to the guide e and connected with the eccentric by link g, packing-rings fitted to the counterbore contiguous to the shoulder, and the follower l fitted to the counterbore and pressed upon the packing by the set-screw, whereby the pressure generated within the pump-barrel operates to tighten the packing and avoids a stuffing-box upon the plunger within the chamber A.

2. The combination, with the chamber A containing the driving-shaft H having the eccentric h thereon, of the pump-barrel B having at the rear end lateral pipe connections i and j, and at the front end the flange C secured to the chamber A and a plunger-guide e extended inwardly therefrom, a head fitted removably to the rear end of the barrel and provided with set-screw n, the plunger f fitted movably to the guide e through the wall of the chamber A and connected with the eccentric h by link g, packing-rings fitted to the shoulder next the guide e, the follower l having skeleton yokes m, m' and fitted to the counterbore and pressed directly upon the packing, and proportioned to form a guide for the rear end of the plunger, whereby the pressure generated in the barrel tightens the packing and the plunger may move into the barrel at the inner end of its stroke.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

ALBERT B. MOORE.

Witnesses:
L. LEE,
THOMAS S. CRANE.