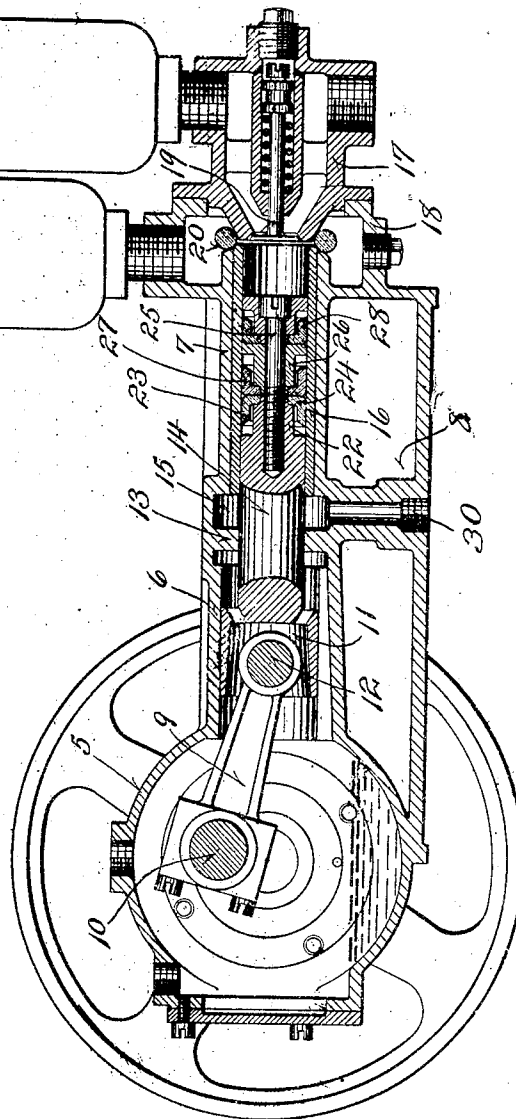


J. ASTROM.
PUMP.
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1,328,474.

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Witness
R. C. Weber

By

Inventor
J. Astrom
Young & Young
Attorneys

UNITED STATES PATENT OFFICE.

JOHN ASTROM, OF FORT WAYNE, INDIANA, ASSIGNOR TO FORT WAYNE ENGINEERING & MANUFACTURING CO., OF FORT WAYNE, INDIANA.

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To all whom it may concern:

Be it known that I, JOHN ASTROM, citizen of the United States, and resident of Fort Wayne, in the county of Allen and State of Indiana, have invented certain new and useful Improvements in Pumps; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention relates to new and useful improvements in pumps, more particularly of that relatively small type shown in my previous Patent No. 1,196,920, issued Sept. 5, 1916, and adapted for use in connection with domestic water distributing systems, or for other uses where it is desirous to provide a compact pump unit.

It is in general the object of my invention to simplify and otherwise improve the structure and to increase the efficiency of pumps of this character and also to increase their durability under the average conditions of use.

Pumps of this character have been heretofore constructed with an open well between the crank casing and engine cylinder, to receive a packing box which surrounds the piston rod. Under the unskilled manipulation of the average user of this type of pump the stuffing boxes have been frequently tightened to an excessive degree, thus setting up adverse conditions of operation.

It is therefore a more specific object of my invention to provide an arrangement wherein the packing structure of the piston plunger is rendered fairly foolproof against careless adjustment and wherein the piston plunger may be completely inclosed to thus prevent the introduction into its bearings of dust and other foreign matter which might otherwise settle thereon.

A further object is to provide an integral body casting for the pump which facilitates the complete inclosure of the piston plunger, while at the same time preventing introduction of fluid from the crank casing into the pump cylinder or vice versa.

With the above and other objects and advantages in view, which will be apparent as the description proceeds, my invention resides in the novel features of construction, combination and arrangement of the parts as hereinafter described and defined by the appended claims.

In the accompanying drawing:

The figure shows a vertical longitudinal sectional view through a pump constructed in accordance with my invention.

Referring now more particularly to the accompanying drawing, it is noted that the crank casing 5, cross head guideway 6, and pump cylinder 7 of the pump structure are formed in a single casting, together with a base frame portion 8. The crank casing 5 is of the usual circular shape and the cross head guideway opens thereinto for the reception of the usual pitman 9 connecting the crank drive shaft 10 with the cross head member 11 which carries the usual crank pin 12. The guideway 6 is in axial alinement with the pump cylinder and is closed at its end adjacent the pump cylinder by a wall 13 through which the piston plunger 14 is slidable for connection with the cross head member. An annular chamber 15, surrounding the piston plunger is provided between the wall 13 and the inner end of the pump cylinder, this chamber being of greater diameter than the pump chamber, which it will be noted is formed by a lining sleeve 16 within the pump cylinder.

A suitable valve arrangement is provided at the outer end of the pump cylinder, preferably of the type shown in my said previous patent and including a head member 17 secured to a casing portion 18 surrounding the outer end of the pump cylinder, said head member being provided with an intake passage for a puppet valve 19, and having its end spaced from the end of the pump cylinder to form a valve seat in cooperation with the end of the pump cylinder for the reception of a contractile valve ring 20. The usual air domes 21 are provided for the casing portion 18, which has a suitable outlet (not shown) and for the inlet head member 17. The piston plunger 14 is provided with a reduced end portion within the pump chamber and this end portion is further reduced at its free extremity to provide a shoulder 23 adapted to seat the base of a cup shaped packing member 24 having its annular wall extended into the space between the reduced plunger portion 22 and the periphery of the pump chamber. A bolt screw 25 is threaded in the plunger end and mounted on the screw bolt is a sleeve 26 having its end portion adjacent the packing

24 reduced for the reception of the base portion of a second cup-shaped packing member 27 which has its annular wall directed forwardly with respect to the effective stroke of the plunger and disposed between the sleeve 26 and the periphery of the pump chamber. The forward end of the sleeve 26 is enlarged to substantially the diameter of the pump chamber and is adapted to seat the base portion of a third cup-shaped packing member 28 which has its annular wall portion also forwardly directed, this packing member being secured against the sleeve 26 by a second follower sleeve 29 which has its rear end portion reduced to form a shoulder and which has its forward end portion increased in diameter to the diameter of the pump chamber to provide a piston end surface, the head of the bolt 25 being counter-sunk in this surface.

I thus provide a pair of packing members expansive against the wall of the piston chamber to resist passage of water along the piston plunger, and a rearward single packing member to prevent leakage of air into the piston chamber in reverse stroke of the plunger, a positive packing action being thus procured without the necessity of providing a packing gland at the end of the pump cylinder. By providing the various recited shoulder reductions of the ends of the packing clamping members, I procure a positive metal to metal mutual contact of said members, upon tightening the screw 25, thus procuring an exceedingly efficient and readily assembled packing structure which does not depend upon any particular degree of adjustment to procure its efficiency, the clamping shoulders being so spaced from the extremities of their respective members as to exert a proper action on the interposed packing when the extremities of the members are in abutting relation.

I thus provide an exceedingly simple and highly efficient structure wherein the tendency to tamper with the working parts of the pump is eliminated by the complete inclosure of said working parts, and inasmuch as the piston plunger 14 is entirely inclosed a considerable element of wear is avoided inasmuch as said plunger is not exposed to external conditions. By forming the entire body structure of the pump in a single casting, I procure a decided economy of structure and also eliminate the occurrence of any joints or seams whatever between the crank casing and the outer end of the piston cylinder. The intermediate chamber 15 is thus inclosed by integrally connected bounding portions. The piston plunger working through this chamber would shed into the chamber any excess oil or any water which might possibly find its way through the packing and the chamber is provided with

a depending drain 30 extending through the base portion 8 of the casting. I thus, despite my entirely inclosed structure, positively avoid the possibility of oil finding its way into the pump chamber, or of water finding its way into the casing.

While I have shown and described a preferred embodiment of my invention, it will be appreciated that various changes and modifications of structure may be employed to meet differing conditions of use and manufacture, without departing in any manner from the spirit of my invention.

What is claimed is:

1. A pump structure comprising a crank casing, an inclosed cross-head guideway and a pump cylinder all formed in a single casting, valve mechanism at the outer end of the cylinder, a cross-head in said guideway, a crank in the crank casing connected with said cross-head, a piston plunger connected with the cross-head and extending into the pump cylinder, packing on said plunger in the pump cylinder, and an annular inclosed chamber surrounding the piston plunger between the cross-head guideway and pump cylinder.

2. In a pump structure of the class described, the combination of a substantially cylindrical cross-head guideway, a pump cylinder formed in a single casting with said guideway, a cross-head in said guideway, a piston plunger connected with said cross-head and extending into the pump cylinder, packing on said plunger in the pump cylinder, and an annular chamber surrounding the piston plunger between the said guideway and the cylinder, said chamber being bounded and completely inclosed by integral connecting portions of the guideway and pump section.

3. In a pump structure of the class described, the combination of a substantially cylindrical cross-head guideway, a pump cylinder formed in a single casting with said guideway, a wall closing the end of the guideway adjacent the pump cylinder and provided with a bearing opening, said wall being spaced from the end of the pump chamber, a piston plunger connected with the cross-head and slidable in the bearing opening of the said wall and extending into the pump cylinder, packing on said plunger in the pump cylinder, integral connecting portions of the pump cylinder and guideway extending between the said wall and the adjacent end of the pump cylinder to define therewith an annular inclosed chamber surrounding the piston plunger.

In testimony that I claim the foregoing I have hereunto set my hand at Fort Wayne, in the county of Allen and State of Indiana.

JOHN ASTROM.