J. S. Barden,

Steam Pump.

No. 18,718. Patented Nov. 24, 1857.

Fig. 3.

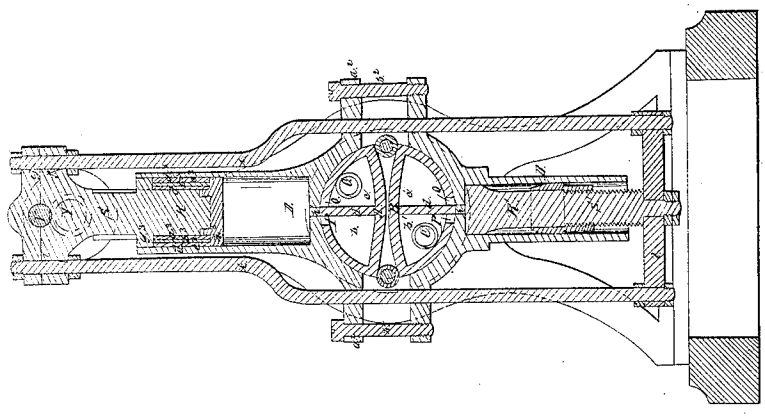


Fig. 6.

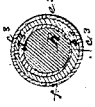


Fig. 2.

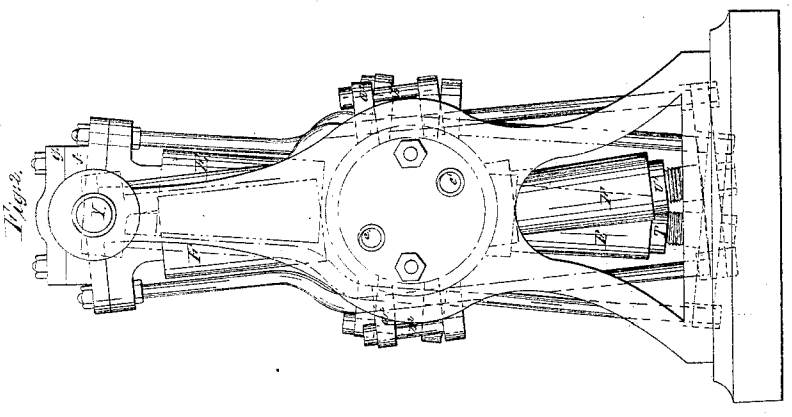


Fig. 5.

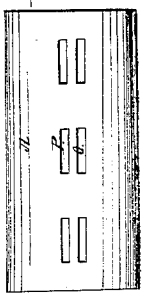


Fig. 1.

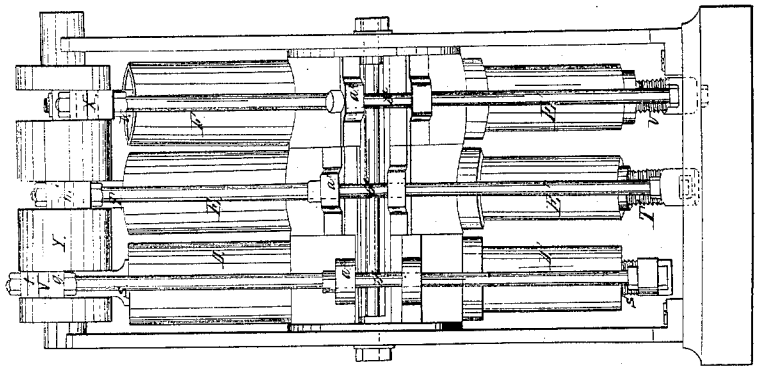
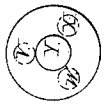


Fig. 4.



UNITED STATES PATENT OFFICE.

JOHN S. BARDEN, OF NEW HAVEN, CONNECTICUT, ASSIGNOR TO HIMSELF, AND AARON W. ROCKWOOD, OF BOSTON, MASSACHUSETTS.

STEAM PUMPING-ENGINE.

Specification of Letters Patent No. 18,718, dated November 24, 1857.

To all whom it may concern:

Be it known that I, JOHN S. BARDEN, of New Haven, in the county of New Haven and State of Connecticut, have invented a new Steam Pumping-Engine; and I do hereby declare that the same is fully described and represented in the following specification and the accompanying drawings, of which—

Figure 1 is a side elevation of the said engine; Fig. 2 is an end view of it; Fig. 3, a transverse section taken through one of its oscillating cylinders and the pump thereof. Fig. 4 is a sketch exhibiting the positions of the three cranks of the shaft to be hereinafter described.

On the 26th day of February, 1856, Letters Patent were granted to me for a hydraulic engine or water meter. My present invention contains the principles or combination so patented and consists mainly in a combination composed of such an engine or apparatus, three or other suitable number of pumps and a divided chamber, as will be hereinafter described, my improved apparatus being for the purpose of raising water or a fluid by the action of steam or other elastic vapor or medium in a manner to be hereinafter described.

In the drawings above mentioned A, and B, are two semicylindrical hollow vessels arranged with respect to one another and each divided vertically into two chambers b, c, and b', c', by partitions d, d', each of which (partitions) extends vertically through its chamber and terminates against the two ends and top and bottom of it. The said vessels A, and B, or steam and water chests, as they may be termed, are each provided with an induction pipe or passage e or e' (see Fig. 2) and an eduction passage C, or C′ leading out of them, as seen in Fig. 3, the induction passage of each vessel or chest being opened into one of its chambers while the eduction passage leads out of the other chamber.

Above the vessel A, as well as below the vessel, B, there is placed a series of pump barrels or cylinders D, E, F, or D′, E′, F′, each cylinder of the upper series being arranged with its axis in line with that of the pump barrel which is directly underneath it. That part of each pump barrel and cylinder which bears against the curved cylindric surface of its chest A, or B, is curved with a seat made to fit closely to the same during the oscillations of the said cylinder or barrel and each steam cylinder D, E, F, is connected with the pump barrel D′, E′, F′, as shown in Fig. 3, that is by ears or projections a^2, a^2, a^2, and also by screw bolts b^2 b^2 extended through said ears or projections. Thus any oscillating movement of one of the steam cylinders will produce a corresponding oscillating movement of that connected with it, but in the opposite direction. Through the bottom of each cylinder or pump barrel there is a passage h' (see Fig. 3), the same operating in conjunction with two passages P, Q, or P′, Q′, made through the steam or water chests A or B, and arranged as shown in Fig. 3. One of each two of the adjacent passages opens into one chamber of its chest, while the other opens into the other chamber thereof. Fig. 5 is an external view of the curved surface of one of the chests and shows the various sets of said passages and their arrangement. There is a piston R or R′, applied within and to each cylinder and pump barrel, the several rods of these pistons being shown at S, T, U, and S′, T′, U′. The upper rods S, T, U, are applied respectively to three bell cranks V, W, X, of a horizontal shaft Y, the respective positions of the cranks being shown in Fig. 4.

Fig. 3, exhibits how by means of a cross head f, and a cap, g, the piston rod of a steam cylinder is applied to its crank. It also represents two rods k, k, extending downward from the cross head and fastened to another cross head l of the piston rod of the pump barrel which is situated directly underneath the said cylinder. The piston of each cylinder should be connected in the same manner with the piston of each pump barrel when the two pistons are in their lowest positions.

In constructing the piston of either of the steam cylinders I make it of two eccentric rings a^3 b^3 arranged with respect to one another as shown in Figs. 3 and 6, the latter being a transverse section of the piston. One of these eccentric rings is arranged within the other and each is split open vertically, as shown at c^3. These rings are surrounded by two rings d^3, e^3, which I term concentric rings, they being made of an equal thickness throughout and arranged one above the other and each split open, as seen

at f^3. One concentric ring is placed on the other and so that it shall break joint or cover the ends of the other while both rings embrace the outer eccentric ring, as shown in Fig. 6. These rings constitute a packing to the piston, they being placed on it as shown in Fig. 3, and between overlapping heads g^3 h^3, arranged as shown in said figure. By means of heat each eccentric ring is expanded laterally. It is found that when only one ring is employed in connection with a concentric ring the cylinder or pump barrel will be worn unequally, but by the use of two eccentric rings arranged with respect to one another as described the cylinder or pump barrel and the surrounding concentric rings will be worn equally and cylindrically.

With an apparatus so constructed if we connect the induction passages of the two vessels A, and B, with a steam generator or boiler and a cistern or reservoir of water, so that the steam may flow from the generator into the upper vessel or chest A and water be raised into the lower chest B, when it (the latter) is exhausted of air, the apparatus will be in a condition to operate so as to elevate water into one of the chambers of the vessel B, and discharge it from the other chamber thereof, the steam by its action in the three cylinders and on their pistons serving to maintain a continuing rotation on their shaft and one cylinder and piston controlling the movement of the other by means of the devices by which it is connected therewith. The movements of the several pistons of the steam cylinder will produce corresponding movements of the pistons of the pump barrel, and such pump barrel will be moved laterally with and by its cylinder as such cylinder is moved on the chest A, by the operations of the pistons and crank shaft. The consequence of this action of the apparatus will be that each pump during its two lateral vibratory motions in opposite directions will draw water into one chamber of the vessel B, and discharge it into the other chamber thereof, such water being finally expelled from the latter chamber through its eduction passage.

I am aware that it is not new to so combine a pump with a steam engine that the piston of the former may be operated by the latter, also that it is not new to arrange the axis of the cylinder of a steam engine in line with that of the barrel of the pump and so connecting the pistons of the two that a reciprocating rectilinear movement of the steam engine cylinder may create a corresponding movement of the pump piston. Therefore I do not claim such.

I do not herein claim—

A partitioned hollow semicylindrical chamber and two series of induction and eduction passages arranged with respect to the partition of said chamber substantially as described in combination with three or any other suitable number of oscillating cylinders and pistons connected together by three connected cranks and applied to the partitioned semicylindric vessel as described, such being the subject of claim in my Letters Patent herein before named.

Nor do I claim the rotary pump for which a patent was granted to Hosea Lindsay Dec. 4th, 1858. Nor do I claim the reciprocating pump represented in Henry L. Russell's application for a patent rejected October 25th, 1854, for in neither of the engines of the said McMurtrie, Lindsay and Russell is there any threefold bell crank, and three pumps operating together and in connection with a semicylindric case. I employ three pumps on one semicylindric case, and with one engine, made as specified, the semicylindric case connecting all the pumps together, so that the fluid which each pump may elevate is drawn into one end of the common case and forced out of the other end of it, while but one threefold crank is used in the construction of any apparatus. Therefore it is this peculiar apparatus as composed of the three pumps arranged on one common case and combined with the peculiar steam engine, in manner as described and so as cause but one threefold crank necessary to the operation of the three pumps during each entire revolution of the crank, that I claim as my invention.

In testimony whereof, I have hereunto set my signature this 10th day of September A. D. 1857.

JOHN S. BARDEN.

Witnesses:
R. H. Eddy,
F. R. Hale, Jr.