

J. A. HAGAN.

Valves for Direct-Acting Steam-Pumps.

No. 149,747.

Patented April 14, 1874.

Fig. 2.

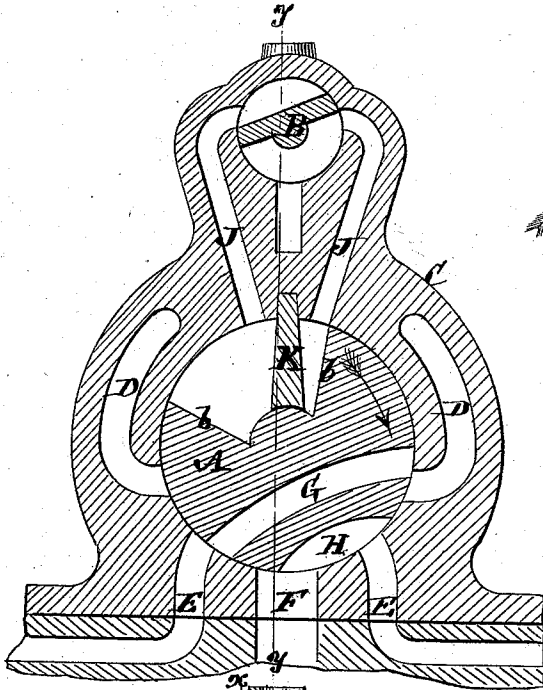


Fig. 1.

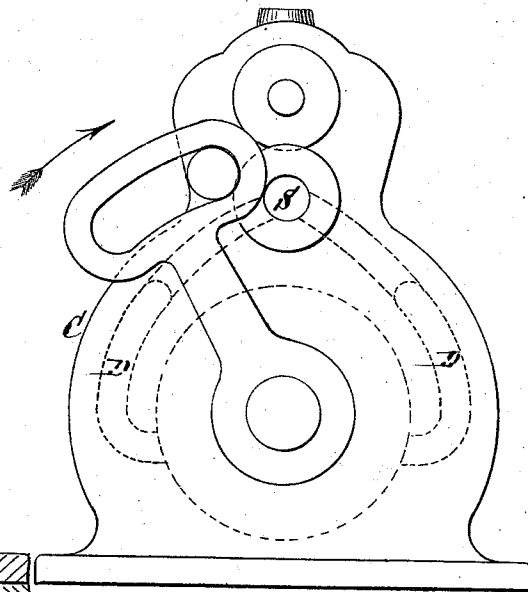


Fig. 3.

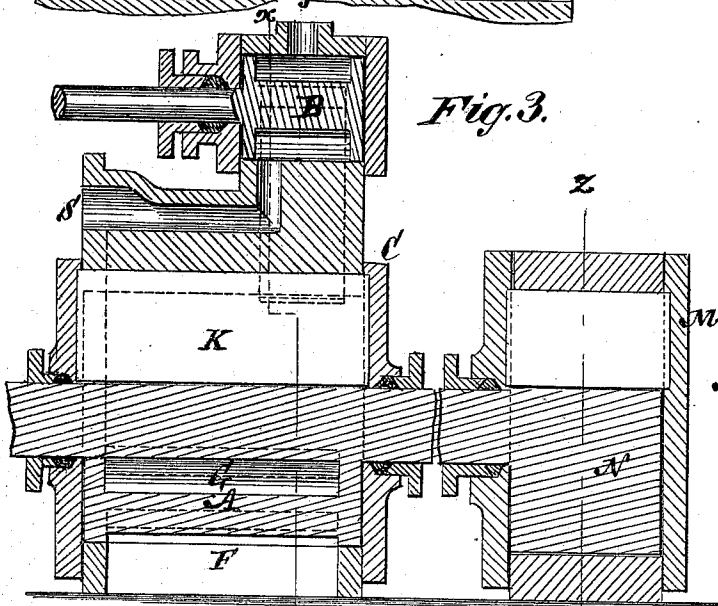
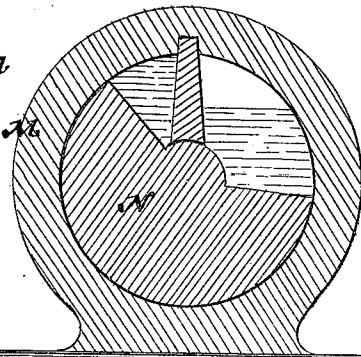


Fig. 4.



Witnesses.

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JOHN A. HAGAN, OF WEATHERLY, PENNSYLVANIA.

IMPROVEMENT IN VALVES FOR DIRECT-ACTING STEAM-PUMPS.

Specification forming part of Letters Patent No. **149,747**, dated April 14, 1874; application filed February 18, 1874.

To all whom it may concern:

Be it known that I, JOHN A. HAGAN, of Weatherly, in the county of Carbon and State of Pennsylvania, have invented certain Improvements in Valves for Direct-Acting Steam-Pumps, and other purposes, of which the following is a specification:

This invention relates to cylindrical valves that have an oscillating motion about their longitudinal axes, and is more particularly intended for direct-acting steam-pumps, but may also be used for steam-engines of various kinds. The same, however, will here be described in connection with direct-acting steam-pumps. The invention generally consists in a novel construction of oscillating circular valve, having a port running through it for operation in connection with opposite induction and eduction ports leading from the steam-supply pipe and to reverse ends of the working-cylinder; also, having an exhaust cavity for operation in connection with a fixed exhaust-passage, and, furthermore, being constructed with an interior cut-away portion, forming steam-spaces on opposite sides of a fixed diaphragm that serves as an abutment for steam admitted by an auxiliary valve to complete the throw of the main valve.

The leading points of advantage in this valve arrangement are that the valve may be made a nearly-balanced one, and is not liable to leak from wear, and the same moved by the action of the steam without the aid of an additional piston and without relieving the main piston of its work. Furthermore, the valve may be operated from or by any suitable moving portion of the pump, and so that it has an accelerated motion near the end of each stroke, for the purpose of regulating the supply of steam to the piston; and the supply of steam to the cylinder of the pump, so regulated that the commencement and termination of each stroke may be made at a diminished rate of piston-speed for the purpose of seating the water-valves without shock. Again, the steam-valve has its throw controlled by a dash-pot having a dasher, which has an oscillating motion, and is of like construction with

the steam-valve, omitting the ports in the latter.

Figure 1 represents an end elevation of the whole structure; Fig. 2, a transverse vertical section on the irregular line *xx*; Fig. 3, a longitudinal vertical section on the line *yy*; and Fig. 4, a transverse vertical section through the dash-pot on the line *zz*.

A is the main steam-valve; B, the auxiliary valve; and C, the valve-case. D D are steam ports or passages freely supplied with steam from the main steam-pipe or inlet S, and arranged on opposite sides of the main-valve portion of the case, and with the valve-space of which they connect at their lower ends, preferably below the center of the valve. E E are the ports leading to either end of the pump-cylinder, and F the exhaust-port. G is a port or passage extending through the lower portion of the valve, and H an exhaust-cavity in the under side thereof. It will be perceived that upon a suitable turning motion being communicated to the valve by a direct connection with the piston-rod of the pump the port G forms a passage for the steam from either one port D to the opposite cylinder-port E. Such mechanical action, however, from the piston-rod of the pump can only open the valve A a trifle at the point of reversing the stroke, as shown in Fig. 2; and to complete the reversing action the auxiliary oscillating valve B is brought into play, which valve is also operated by the piston-rod of the pump. This valve B may be of a double-leaf-like construction for operation within a cylindrical chamber, to which, on the under side of the valve, steam is admitted and exhausted from above said valve as the latter is oscillated to establish reverse communication, as regards its steam and exhaust spaces, with passages J J that connect below with the working space of the valve A on opposite sides of a fixed diaphragm, K, for the purpose of completing the throw of the main valve A. The diaphragm K is fitted within an upper cut-away portion of the valve A, so as to form a steam-joint with it, and is let into both steam-chest heads, the same constituting an abutment for

the steam as the latter is supplied by the auxiliary valve when either passage J is uncovered by the primary action of the main valve to admit steam to act on either side *b* alternately of the cut-away portion of the main valve, for the purpose of completing the throw of the latter.

The starting motion of the main valve, by the mechanical action of the pump, as hereinbefore referred to, may be effected by a stud or roller working within a slotted lever or link, as in Fig. 1, or any other suitable operating means may be employed, and the valve in its action is caused to cut off the steam at a given point in advance of the close of the pump-stroke to complete the action of pump-piston by expansion of the steam.

M is the dash-pot in the same axial line with and of similar construction to the working space or chamber of the valve A, and having a corresponding fixed diaphragm or abutment for operation on opposite sides of it alternately of the oscillating dasher N, which is fast to the shaft of the valve A, and is of like cut-away construction as said valve, omitting the ports.

The space on each side of the diaphragm is partly filled with oil or water, the quantity of which controls the throw of the main valve.

I claim—

1. The combination of the valve A, constructed with the steam-operating surfaces *b b*, through port G and exhaust-cavity H, with the diaphragm K, steam-ports D D, passages E E, and exhaust-passage F, all being constructed and arranged substantially as described, for the object specified.

2. The auxiliary valve B and passages J J, in combination with the fixed diaphragm K and oscillating circular valve A, having propelling surfaces *b* on opposite sides of the diaphragm, essentially as described.

3. The combination of an oscillating dasher and its fixed cylinder or circular dash-pot with the oscillating main valve, having steam-propelling surfaces on opposite sides of a fixed diaphragm, substantially as specified.

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Witnesses:

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