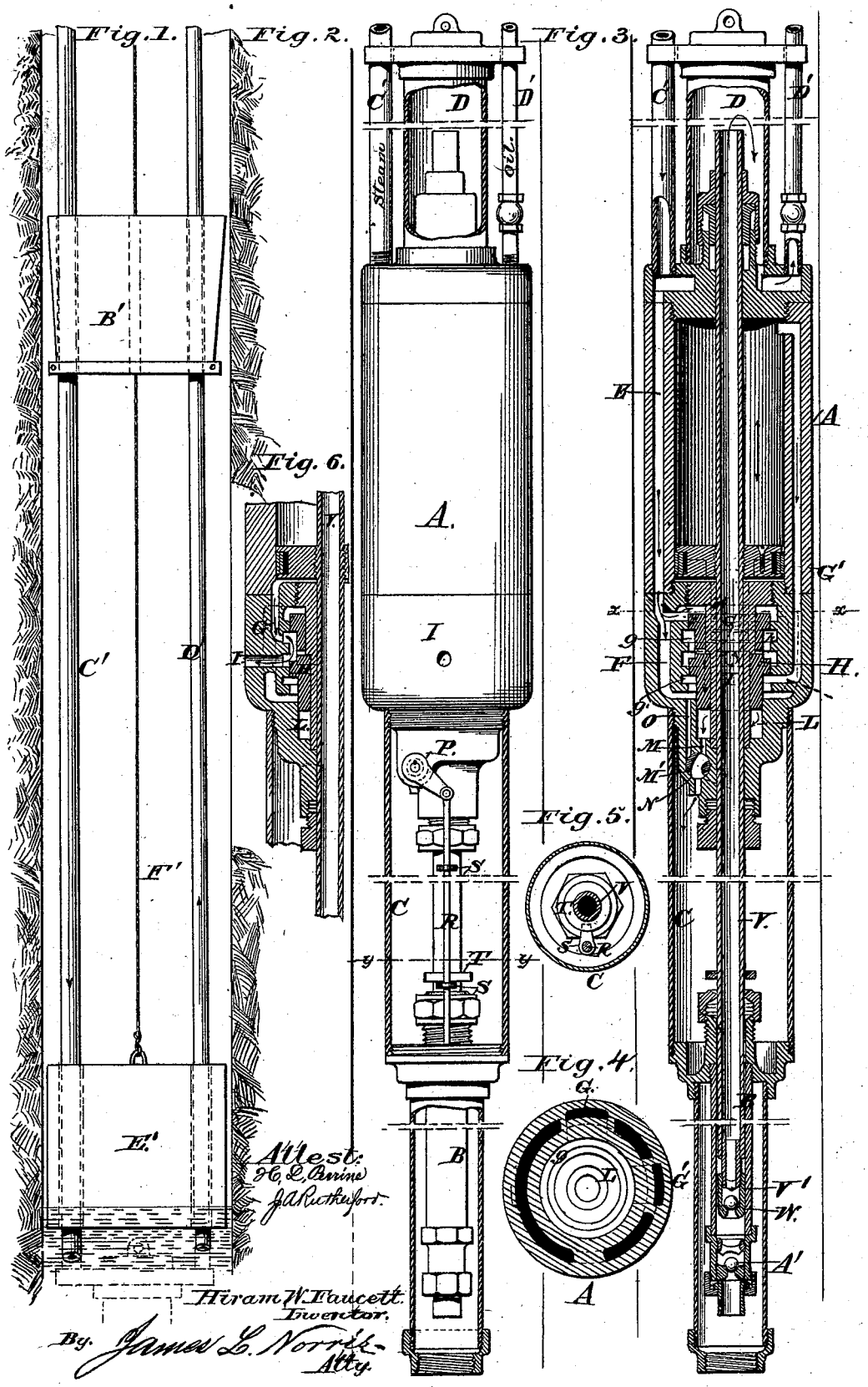
H. W. FAUCETT.

Steam-Pump for Oil-Wells.

No. 204,015. Patented May 21, 1878.



UNITED STATES PATENT OFFICE.

HIRAM W. FAUCETT, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN STEAM-PUMPS FOR OIL-WELLS.

Specification forming part of Letters Patent No. **204,015**, dated May 21, 1878; application filed October 10, 1877.

To all whom it may concern:

Be it known that I, HIRAM W. FAUCETT, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Steam-Pumps for Oil-Wells, of which the following is a specification:

This invention relates to an improved steam-pump for oil-wells; and it has for its object to prevent the accumulation of paraffine and bitumen in the bore of the well.

The invention consists in certain improvements in the construction of the pump, whereby the heat radiated from the same and the exhaust-steam may be employed to prevent the accumulation of paraffine, bitumen, or other solid hydrocarbons in the bore of the well, and of a certain novel combination of parts, all of which will be fully hereinafter described.

In the drawings, Figure 1 represents a sectional view of the bore of the well, showing the bucket located therein and the float for automatically operating the valve to admit and cut off the steam from the cylinder. Fig. 2 represents an elevation of my improved pump, and Fig. 3 represents a sectional view of the pump. Fig. 4 is a cross-section taken on line *x x*, Fig. 3; Fig. 5, a section on line *y y*, Fig. 2; and Fig. 6, a detail vertical section at a right angle to Fig. 3.

The letter A represents the steam-cylinder; B, the pump-cylinder, firmly connected together by means of a cylindrical casing, C; and D, a cylindrical chamber, located above the steam-cylinder, forming a reservoir for the oil as it is pumped from the well.

The letter E represents a steam-port leading through the walls of the steam-cylinder to a valve-chamber, F, located in the lower part of the steam-cylinder, and communicating with the respective ends of said steam-cylinder by means of the ports G G′.

The letter H represents a cylindrical valve, having an annular space, *h*, and capable of a vertical reciprocating movement in the valve-chamber F, so as to throw the space *h* alternately in communication with the annular ports *g g′* in the valve-chamber.

The letter I represents an exhaust-port leading directly through the wall of the valve-chamber, and which is always in communication with the annular space *h*.

The lower part of the valve H sits in a cylindrical steam-chamber, L, from which extends a port, M, leading to a valve-chamber, M′, in which is located an oscillating valve, N. From said valve-chamber extends a small exhaust-port leading to the cylindrical extension, by means of which the steam and pump cylinders are connected together.

O represents a port leading from the valve-chamber F to the valve-chamber M′. The valve-stem of the valve N projects through the walls of its chamber, and is provided with a lever, P, to the end of which is connected a vertically-reciprocating rod, R, provided with tappets S, operated alternately by a tappet, T, on the piston-rod V, to shift the valve N, in order to exhaust the steam from the chamber L and allow the valve H to drop for changing the ports of the steam-cylinder. The piston-rod V is hollow and extends entirely through the steam-cylinder into the chamber D above, passing through suitable stuffing-boxes. To the lower end of said hollow piston-rod is attached the pump-plunger V′, which is of the ordinary construction and provided with a ball or other valve, W. The pump-cylinder is provided with a similar valve, A′, at its lower end.

The letter B′ represents a bucket, located in the well-bore above the pump, and connected to the pipes C′ D′, by means of the first of which steam is conducted to the steam-cylinder, and by the latter the oil discharged from the pump.

The letter E′ represents a float, located in the well at the surface of the oil therein, and connected by a rod, F′, extending to a valve above, by means of which the admission of steam to the engine is controlled.

The steam cylinder and pump are submerged in the well, and their operation is as follows: Steam is admitted to the main valve-chamber by means of the pipe C′ and port E leading to the said chamber. The piston and valve being in the position shown in Fig. 3, the cylinder A will take steam from the port E at its lower end through the port G. (Shown in Figs. 4 and 6.) It will be understood that the valve H, as shown in Fig. 3, is just ready to

fall, and does fall before steam begins to enter the lower end of the cylinder, in order to bring the annular space *h* in connection with port G′, thus forming an exhaust-passage from the latter port outward through the exhaust-port I. (Shown in Fig. 6.) When the piston reaches the top of the cylinder, the tappet T strikes the upper tappet S on the rod R, turning the crank-arm P and the valve in valve-chamber M′, so as to admit steam through passages O and M into the steam-chamber L and below the valve H, at which time steam-pressure will also be exerted upon the under side of the projection of valve H, which closes the lower side of port *g′*, and the pressure at these two points causes the valve H to rise until the space *h* connects port G with exhaust-port I, forming a passage for the escape of steam from the lower side of the piston, and at the same time brings port E in connection with port G′ by means of passage *g′*, for the admission of motive steam to the upper side of the piston.

By means of the float the valve of the steam-induction pipe is operated to admit steam to the cylinder when the oil in the well rises to the proper height and shut off steam when it falls below the proper level, automatically starting and stopping the engine at the proper times. The pump being thoroughly heated by the steam, and the discharge taking place directly in the bore of the well, effectually prevents any accumulation of paraffine, bitumen, or other solid hydrocarbons in the well.

What I claim, and desire to secure by Letters Patent, is—

1. In a steam-pump, the combination, with the steam-cylinder and its piston, of the valve-chamber and ports, the annular-ported main valve, and the supplementary valve and ports, the whole constructed to operate to exhaust the steam directly into the bore of the well, substantially as set forth.

2. The combination of the steam-cylinder and its piston, the hollow piston-rod and pump, and the oil-reservoir provided with a discharge-pipe, the whole constructed and arranged to operate substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand in the presence of the subscribing witnesses.

HIRAM W. FAUCETT.

Witnesses:
ANDREW J. HEWLINGS,
JOHN GOEHRING.