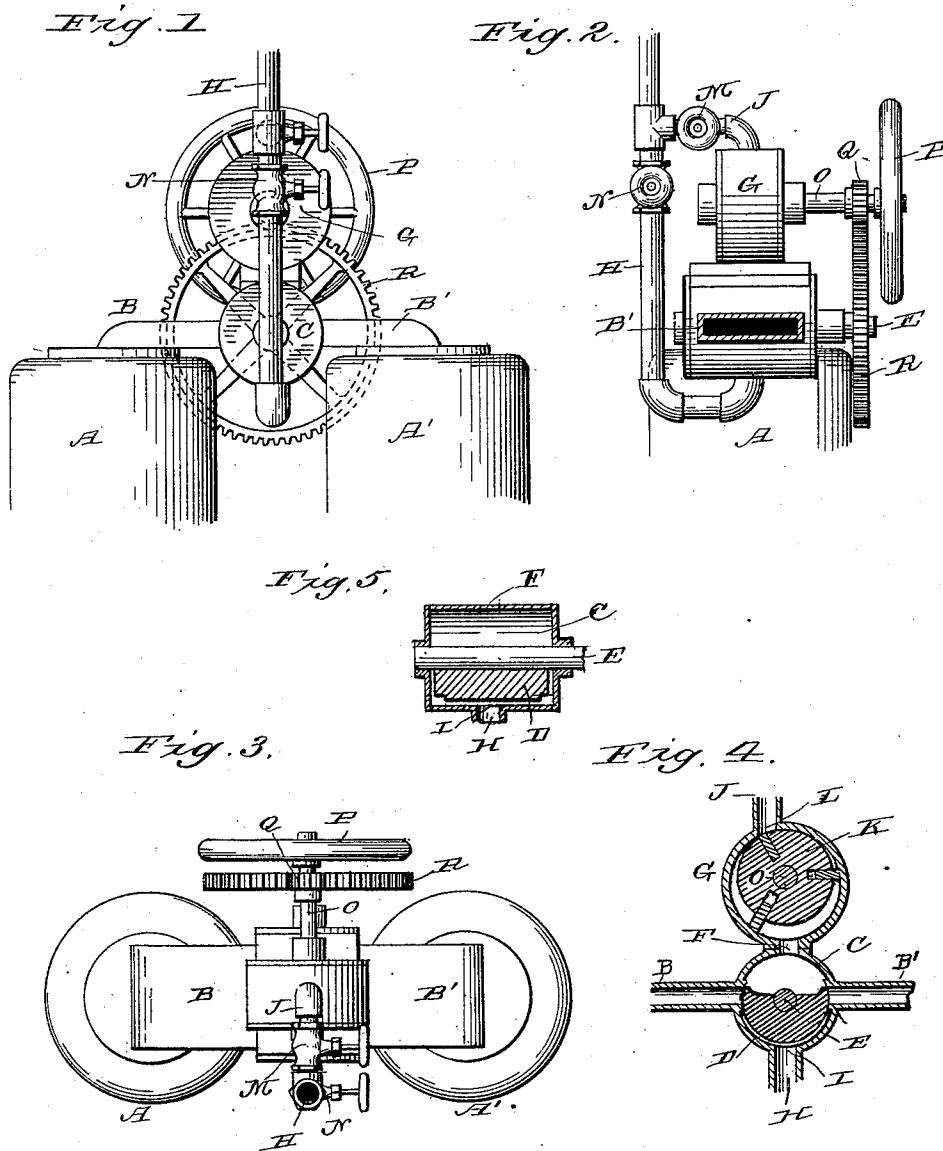


(No Model.)

O. R. DAVIS.
STEAM VACUUM PUMP.

No. 425,024.

Patented Apr. 8, 1890.



Witnesses
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UNITED STATES PATENT OFFICE.

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STEAM VACUUM-PUMP.

SPECIFICATION forming part of Letters Patent No. 425,024, dated April 8, 1890.

Application filed May 3, 1889. Serial No. 309,459. (No model.)

To all whom it may concern:

Be it known that I, OWEN R. DAVIS, a citizen of the United States, residing at York, in the county of York and State of Pennsylvania, have invented certain new and useful Improvements in Steam Vacuum-Pumps; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to steam vacuum-pumps, and has for its object to connect the valve which controls the passage of steam to the vacuum-chambers with an engine, so that said valve will be operated by said engine; also, to admit to the valve-chamber the steam which has been used to work the engine, and also to provide for admitting to the valve-chamber steam direct from the boiler, so that when there is not sufficient steam exhausted from the engine to supply the vacuum-chambers the additional steam required can be taken to the valve-chamber directly from the boiler, there being provided valves for regulating the flow of steam from the boiler to both the engine and valve-chamber.

With the above objects in view I will proceed to describe means by which I carry out my invention, reference being had to the accompanying drawings, forming a part of the same, and in which—

Figure 1 is a side elevation of a steam vacuum-pump having my invention applied thereto. Fig. 2 is an end elevation of the same. Fig. 3 is a plan view, and Fig. 4 a vertical section through the engine and valve-chamber. Fig. 5 is a vertical cross-section through Fig. 4 at right angles thereto, showing the form of the valve and the space between it and its casing at all points except opposite to the channels leading to the vacuum-chambers.

In the drawings, the letters A and A' indicate the two vacuum-chambers connected by the channels B and B', leading from the valve-chamber C. The construction and operation

of the vacuum-chambers are the same as in other vacuum-pumps—for instance, as in my steam vacuum-pump, patented April 6, 1880, No. 226,285—and therefore the same will not be more fully illustrated or described; but I will confine myself to setting forth my present invention.

Within the valve-chamber is the valve D, connected to the shaft E, the valve being shorter than the chamber and larger in circumference at the portion opposite the channels B B' than elsewhere, so that while it will close said channels at the proper times it will leave a space elsewhere entirely around the valve for the steam admitted thereto, as shown in Figs. 4 and 5; and for the better securing of that end the valve-chamber is preferably enlarged to both sides of said channels, as clearly shown in Fig. 4 of the drawings. It will also be understood that the valve will be only the segment of a circle, as shown, so as to form a suitable steam-space and to permit the steam to pass from the chamber through first one channel and then the other as it is alternately cut off from the two channels. The valve-chamber C is supplied with steam from the exhaust-port F of the engine G, (in this illustration a rotary engine,) and when necessary also through the steam-pipe H, which leads from the boiler (not shown) and opens, preferably, into the bottom of the valve-chamber through port I. This pipe H at a point in its length is provided with a branch pipe J, which supplies the piston K of the engine G with steam through the port L, and it is provided with a valve M, to regulate the quantity of steam to be admitted. The pipe H is also provided with a valve N below the branch pipe I, so as to regulate the amount of steam to be admitted through the port J. It will thus be seen that the desired quantity of steam or pressure may be kept up in the pump, although the pressure in the boiler may vary. The shaft O of the piston K is provided with the fly-wheel P and has a pinion Q, which meshes with a gear-wheel R on the shaft E of the valve D. It is obvious that the gear R is made larger than the pinion Q, so that the speed of the valve will be slower than the piston, as less steam is re-

quired to operate the piston than to supply the vacuum-chambers, and an opportunity is thus afforded of accumulating steam for the chambers.

5 It will be observed that under the construction described the valve for regulating the supply of steam to the vacuum-chambers is operated directly by its connection with the engine and not by the pressure of steam on
10 the valve, and that the exhaust-steam of the engine is utilized to help make up the quantity required to supply the vacuum-chambers, the additional quantity required being supplied through pipe H. The valve N may be a
15 reducing-valve, adapted to work automatically, so as to admit only enough steam to the valve-chamber to operate the vacuum-chambers, even though there be a high pressure in the boiler.

20 The parts, besides possessing the advantages already assigned to them, are simple in construction and produce a compact and very efficient steam vacuum-pump.

I lay no claim herein, broadly, to supplying exhaust-steam to the vacuum-chambers
25 through a valve-chamber whose valve is operated from an engine.

Having described my invention and set forth its merits, what I claim is—

30 1. In a steam vacuum-pump, the combination, with the vacuum-chambers and valve-chamber communicating therewith through channels B and B', of the valve lying across the entrance to said channels to open and
35 close the same in alternation, and a space formed between the ends and periphery of the valve, and the valve-casing on opposite sides of said channels B and B', substantially as described, for the purposes set forth.

40 2. In a steam vacuum-pump, the combination, with the vacuum-chambers, valve-chamber, and valve to control the supply of steam to the vacuum-chambers, of a piston-cylin-

der connected with the valve-chamber to supply exhaust-steam to said chamber, and a
45 separate port for admitting steam to the valve-chamber from a boiler-supply, substantially as and for the purposes set forth.

3. In a steam vacuum-pump, the combination, with the vacuum-chambers, valve-chamber, and valve to control the supply of steam
50 to the vacuum-chambers, of a piston-cylinder connected with the valve-chamber to supply exhaust-steam thereto, a pipe for supplying steam to the valve-chamber from a boiler-
55 supply, and a valve in said pipe to control the passage of steam therethrough, substantially as and for the purposes set forth.

4. In a vacuum-steam pump, the combination, with the vacuum-chambers, valve-chamber, and valve to control the supply of steam
60 to the vacuum-chambers, of a piston-cylinder connected with the valve-chamber to supply exhaust-steam thereto, a pipe for supplying steam to the valve-chamber from a boiler-
65 supply, a branch pipe leading from said pipe to the piston-cylinder, and a valve in the pipe between the branch pipe and valve-chamber, substantially as and for the purposes set forth.

5. In a vacuum steam-pump, the combination, with the vacuum-chambers, valve-chamber, and valve to control the supply of steam
70 to the vacuum-chambers, of an engine-piston and gears connecting the shafts of the piston and valve together to operate said valve from
75 the engine, said gears being arranged to reduce the speed of the valve admitting steam from the valve-chamber to the vacuum-chambers below the speed of the engine, substantially as and for the purposes set forth.
80.

In testimony whereof I affix my signature in presence of two witnesses.

OWEN R. DAVIS.

Witnesses:

GEORGE J. SHETTER,
THOMAS H. FULTON.