(No Model.) 2 Sheets—Sheet 1.

G. E. NYE.

STEAM VACUUM PUMP.

No. 454,062. Patented June 16, 1891.

Fig. I.

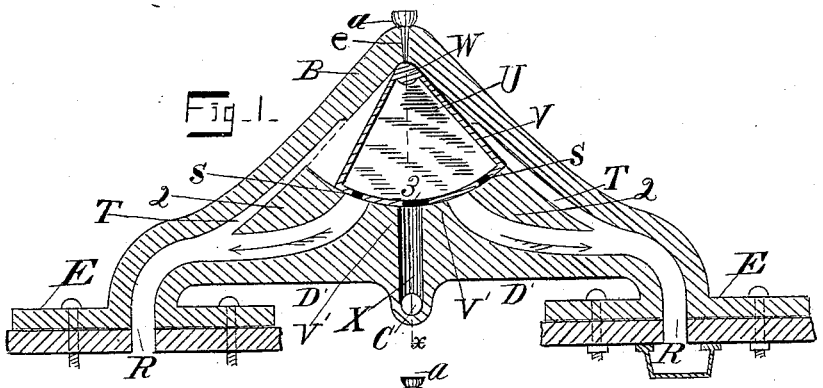
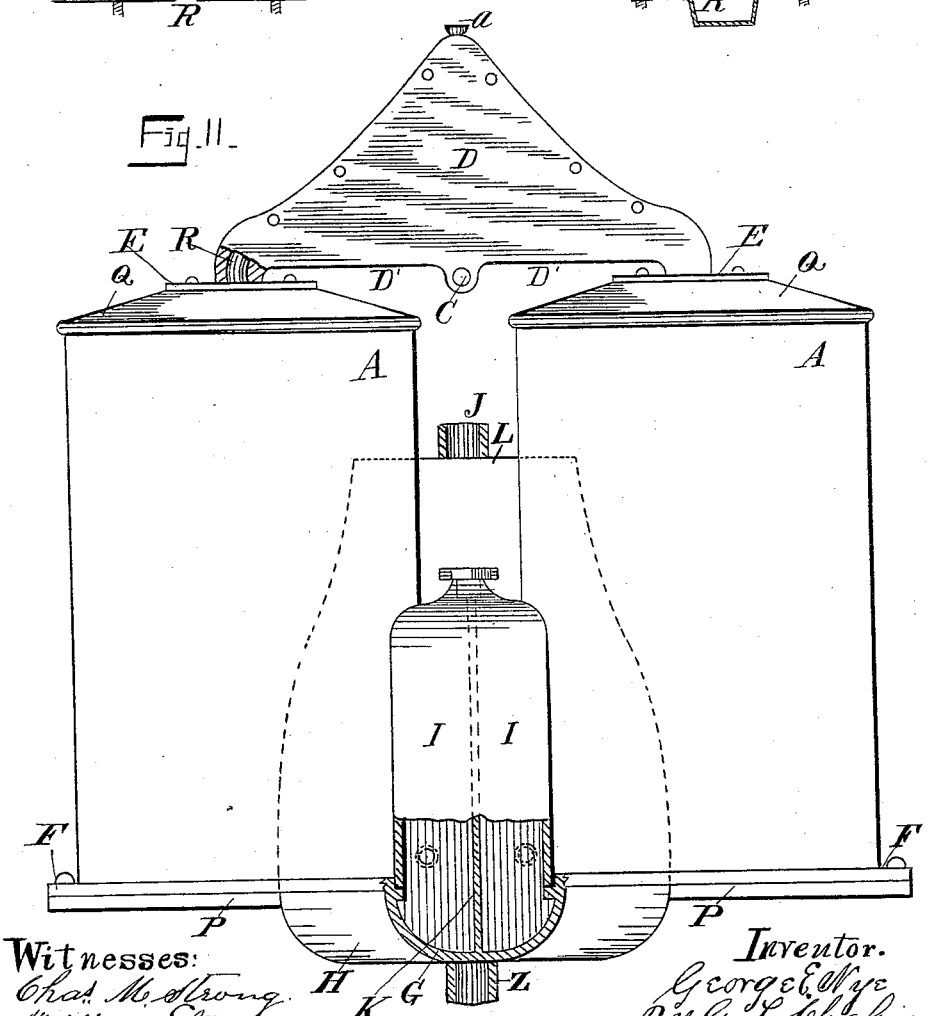


Fig. II.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. III.

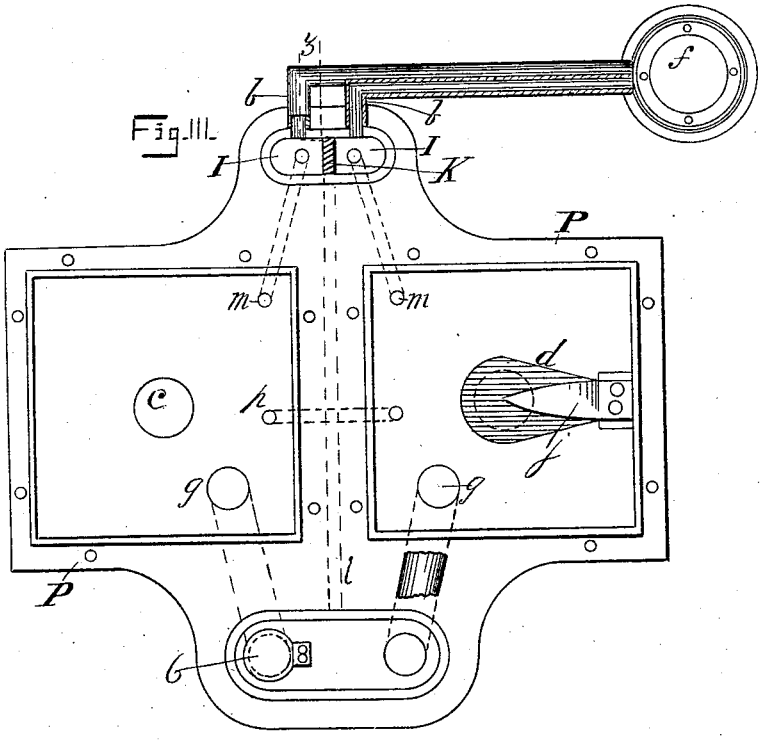


Fig. IV.

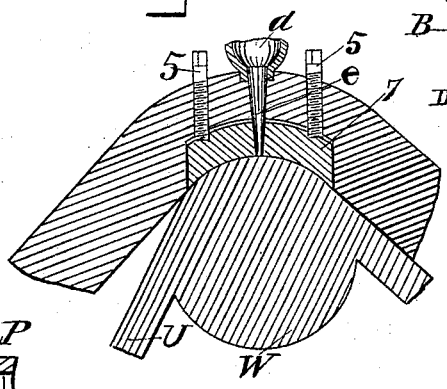


Fig. V.

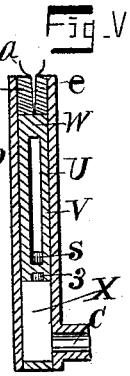
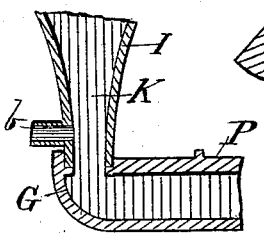


Fig. VI.



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UNITED STATES PATENT OFFICE.

GEORGE E. NYE, OF CHICAGO, ILLINOIS.

STEAM VACUUM-PUMP.

SPECIFICATION forming part of Letters Patent No. 454,062, dated June 16, 1891.

Application filed March 6, 1891. Serial No. 383,962. (No model.)

To all whom it may concern:

Be it known that I, GEORGE E. NYE, a citizen of the United States, residing at Chicago, county of Cook, and State of Illinois, have invented new and useful Improvements in Steam Vacuum-Pumps, of which the following is a specification, reference being had to the annexed drawings, (two sheets,) in which—

Figure 1, Sheet 1, is an enlarged vertical sectional longitudinal elevation of my improvements, particularly in the steam-valve, represented as attached to the heads of the water-chambers; Fig. 2, a longitudinal elevation of the steam vacuum-pump as embodying my improvements; Fig. 3, Sheet 2, a plan of the base of the pump suitable for the connection of my improvements, also a plan of a force-pump and the water-pipes leading therefrom to the air-chambers; Fig. 4, a broken longitudinal vertical elevation of the upper portion of the steam-valve and its case; Fig. 5, a transverse vertical sectional elevation of the steam-valve and its case, taken on line *x*, Fig. 1; Fig. 6, a vertical sectional elevation of the lower portion of the double air-chamber, the chamber in the base below, and a portion of one water-pipe leading to the force-pump, on line *z*.

The purpose of this invention is to construct a steam vacuum-pump which will serve the purpose of elevating water and sand with the water. In steam vacuum-pumps which are employed to elevate sand there is great wear on the pipes and valves in the air-chamber by the constant movement of sand back and forth through the chamber and between the water-chambers at such times as the chambers are alternately taking steam and water. I remedy this difficulty by a double air-chamber, the two compartments of which have no communication, and supply the lower portions of such chambers with separate pipes from a water force-pump to compress the air to produce the reaction required to assist in producing the necessary vacuum. The pressure of water from the force-pump is never to be so great as the force of steam in the water-chambers, whereby condensation does not take place in a chamber till the water is forced out and the cross-pipe between the water-chambers has ejected water into the chamber from which water was last forced out, as is now the case with the single air-chamber pump.

My purpose is, further, to lessen the friction of the steam-valve and to construct it so as to be wholly balanced, except such upward excess of force as to hold its upper rounded apex always to its bearing in the case by the upward pressure of steam. The valve is hollow, and is the same kind of a valve shown in my application filed September 29, 1890, Serial No. 366,602, except that no pivot is employed. By obviating the use of a pivot, as in said application, the rounded apex of the valve can be lubricated directly from the outside of the valve-case, whereby it is more sensitive than when pivoted and oil through the steam is relied on for lubrication.

P P represent the base of the pump, to which the water-chambers A A are secured in the ordinary manner well known to the art. L is the ordinary water-discharge chamber, and J represents the discharge-pipe.

G is the hollow portion of the base below the air-chamber, and H represents the hollow portion below the water-chamber. The air-chamber consists of two compartments I, separated by a partition K, so that each compartment communicates only with one water-chamber A by means of a small pipe *m*. The hollow base portion H is also partitioned beneath (dotted lines *l*) and the two compartments have no communication except by the small cross-pipe *p*, as pumps are now constructed. In addition to the present construction, one pipe *b* is made to communicate with each compartment of the air-chamber and with an ordinary force-pump, (indicated at *f*,) whereby there is constantly projected into said chambers, respectively, a small stream of water under less pressure than the steam-pressure in the water-chambers.

The valve shown at *d j* is one which closes one induction-port *c*, and the valve shown at W U V is hollow, and in face elevation is about one-sixth of a circle. Its induction-port is shown at 3 and the steam-exit ports are shown at S S. The seats are shown at 2 V'. The top portion of the valve is formed on the segment of a circle, and it has a reverse counterpart bearing in the internal upper portion of the case, so as to have an oscillating motion, whereby the ports S S are reversed.

An oil-port *e* is formed through the case above the bearing W of the valve, and a cup *a* may be connected therewith for keeping the said portion constantly lubricated. This construction serves, where pumps are to be considerably employed, to keep the valve in good order; but where the pump is to be kept in constant use an adjustable bearing, of brass or some non-corrosive metal, is to be inserted in a seat formed in the internal portion of the case, as shown at Fig. 4, and set-screws 5 5 are to be tapped through the case to set the bearing 7 down to the valve as the latter shall require by wear.

The case to the valve, as shown at B E 2 D′, takes steam by a pipe C and chamber X and discharges it alternately through pipes R into the water-chambers A, the same as in my said application.

In the operation the force-pump *f* will be ready to force water into the double air-chamber, as stated. One chamber A will be primed with water, the steam let into valve W U V at the same time the pump *f* is put to work. Then presuming the pipe Z to be connected with a suitable sand-induction pipe the sand with the water will be driven out at pipe J or its extension-pipe.

6 is one valve of the water-ports *g g*.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In steam vacuum-pumps, an improvement consisting of a double air-chamber with two separate compartments, each one communicating with its respective water-chamber, in combination with a force-pump having two separate water-pipes communicating with the respective compartments of the air-chamber, as and for the purpose specified.

2. An improvement in steam vacuum-pumps, consisting of the combination of a valve-case with the main chambers and discharge-water chamber, and suitable steam-pipes in the case for taking steam and discharging it alternately into the main water-chambers, and a hollow oscillating valve within the case, and the upper portion of the valve having its bearing directly on the internal portion of the case and held to its bearing by the upper pressure of steam, and the case above the valve-bearing provided with a lubricating-port, substantially as and for the purpose set forth.

3. In a valve and case for steam vacuum-pumps herein described, the case provided with an adjustable bearing within the internal portion of the case, set-screws for adjusting it to the top of the valve, and an oil-port extending through the case and bearing, as specified, and for the purpose set forth.

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