(No Model.)

E. KÖRTING.

STEAM AND VACUUM PUMP.

No. 457,729. Patented Aug. 11, 1891.

Fig. 1.

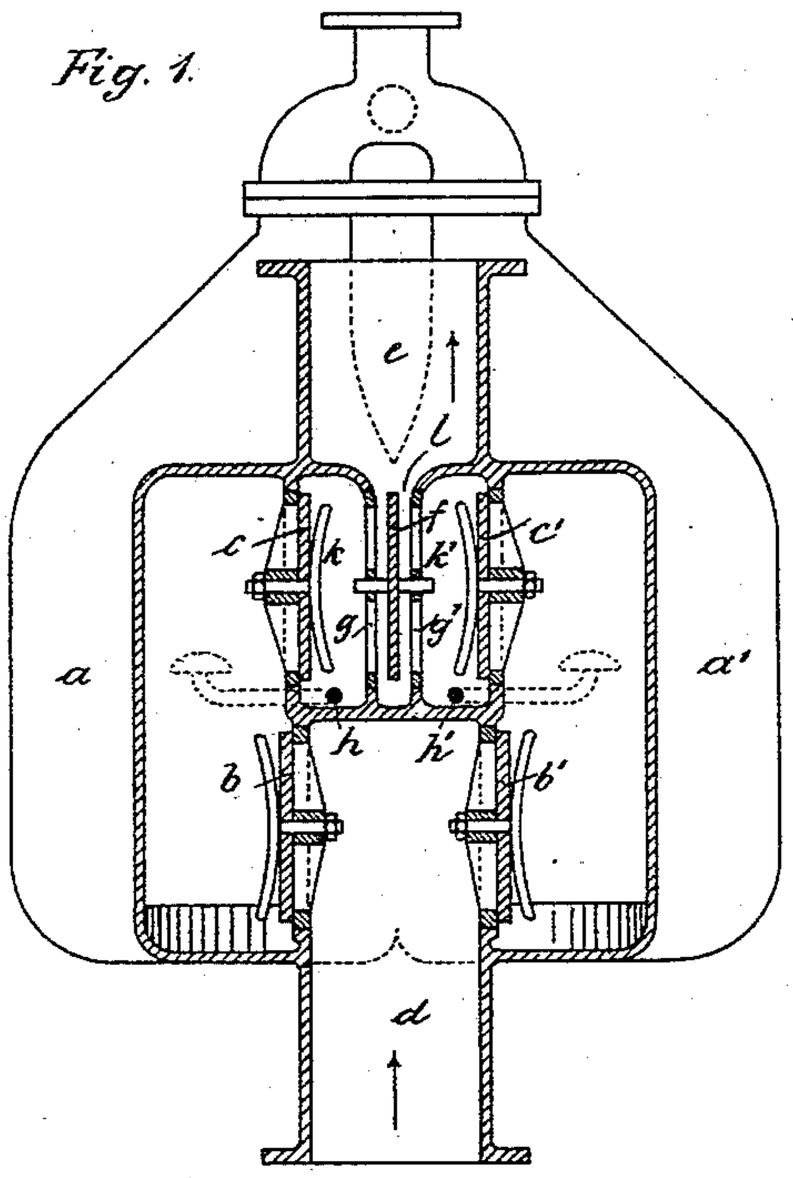


Fig. 2.

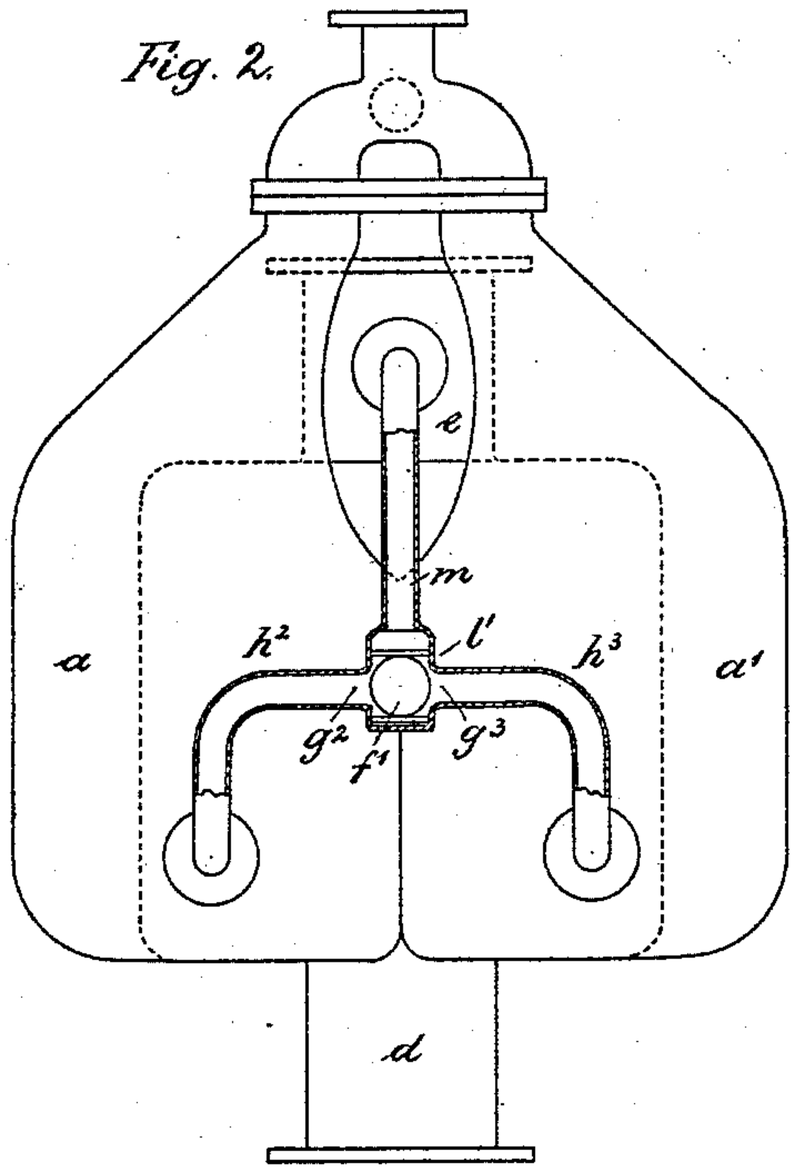


Fig. 3.

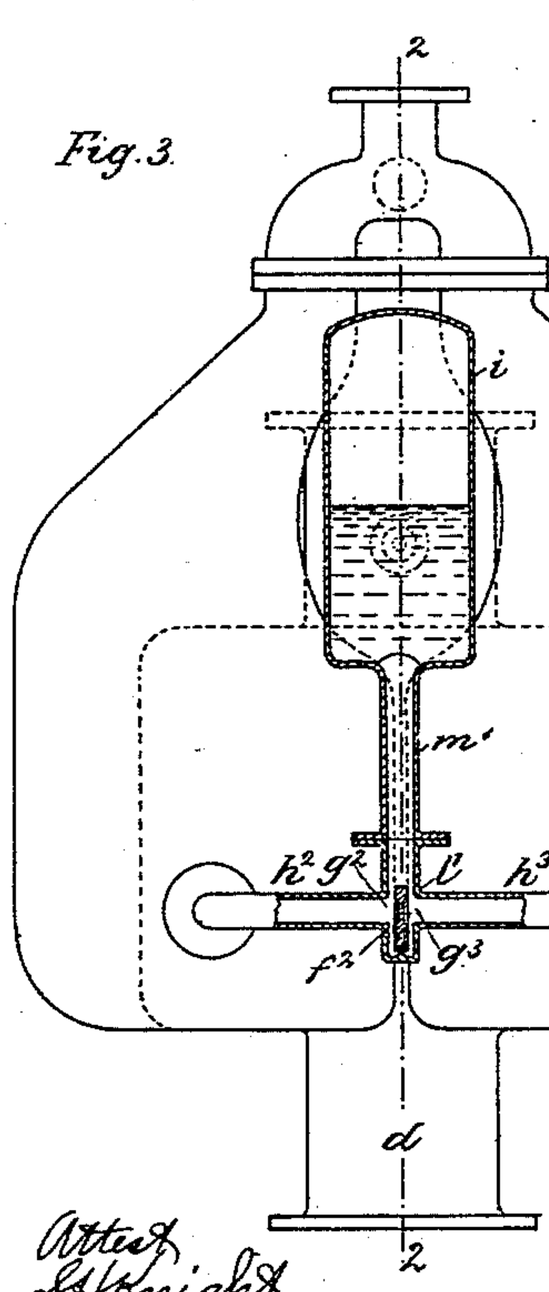
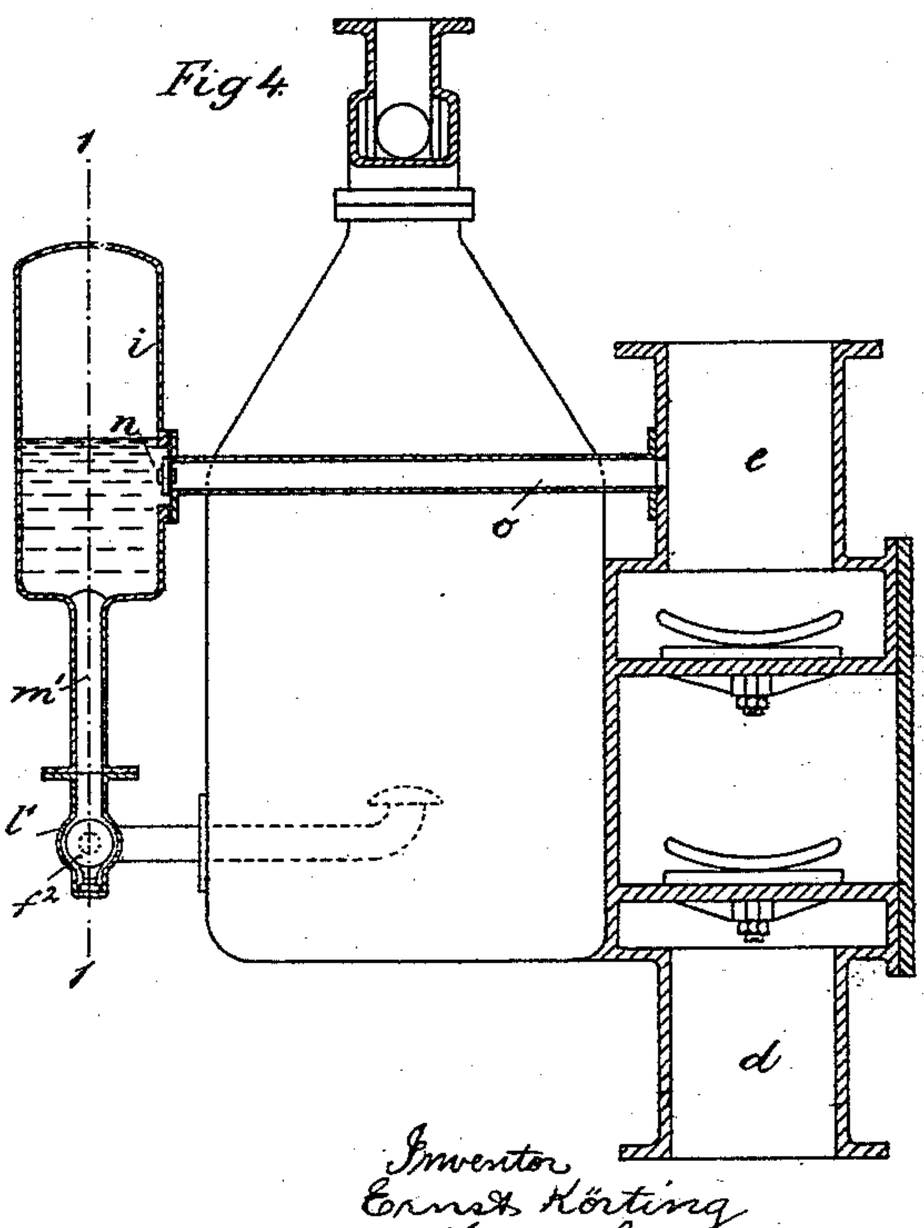


Fig 4.



Attest
S. H. Knight
Harry D. Rohrer.

Inventor
Ernst Körting
By Knight Bros.
Attys

UNITED STATES PATENT OFFICE.

ERNST KÖRTING, OF HANOVER, GERMANY.

STEAM AND VACUUM PUMP.

SPECIFICATION forming part of Letters Patent No. 457,729, dated August 11, 1891.

Application filed February 3, 1891. Serial No. 380,017. (No model.)

To all whom it may concern:

Be it known that I, ERNST KÖRTING, a subject of the King of Prussia, residing at Hanover, Kingdom of Prussia, Germany, have invented new and useful Improvements in Steam and Vacuum Pumps, (Pulsometers,) whereof the following is a specification.

My invention relates to steam and vacuum pumps or pulsometers having two chambers and provided with means for injecting water into the said chambers in view of accelerating the condensation of the steam subsequent to its operation.

The object of the improvements is to prevent a waste of water of injection, even if its supply be very ample, to bring about by means of such ample supply a rapid reversal of the steam-valve after a chamber has been evacuated of water, and to avoid loss of steam without being under the necessity of compensating this advantage by a loss of water. For this purpose I stop the influx of water of injection to the emptied chamber immediately after the reversal of the steam-valve has taken place, the means therefor consisting in a single self-acting distributing-valve—such as a clack-valve, a piston-valve, a disk-valve, a ball-valve, and the like—arranged in the channel through which the water of injection flows and seating toward the injection-pipes, so that, according to its alternating position, the valve will admit water to one chamber and cut it off from the other one, and that there will be injection into one chamber at a time only. The water of injection may be supplied from the discharge-pipe of the pump or from any other source of supply, such as an air-vessel, or from both simultaneously.

In the annexed drawings, Figure 1 is a sectional elevation of a steam and vacuum pump having two chambers and provided with my improvement, the section being taken through the center of the box containing the different valves. Fig. 2 is a sectional elevation showing another arrangement of the distributing-valve. Fig. 3 represents in sectional elevation a third arrangement, the section corresponding to line 1 1, Fig. 4, which is a section on line 2 2, Fig. 3.

In the arrangement shown by Fig. 1, a a' are the two pump-chambers; b b', the two suction-valves, and c c' the discharge-valves, the latter opening out into the respective discharge-chambers k k', from which are branched off the injection-pipes h h', leading into the pump-chambers a a'.

d is the suction-pipe, and e the discharge-pipe. The opposite walls of the discharge-chambers k k' form two walls of a valve-box l, communicating at the top with the pipe e, the said walls having the apertures g g', between which is placed the distributing-valve, the latter consisting in a disk-valve f, seating against the apertures g g' and capable of closing the said apertures alternately. According to the position it occupies the valve f thus stops the communication between the discharge-pipe e and one or the other of the chambers k k', the entire quantity of water raised by the apparatus being in consequence cut off alternately from either discharge-chamber and from the injection-pipe h or h' communicating therewith.

The operation of the apparatus is as follows: If steam acts in the chamber a to convey the contents of the same into the discharge-pipe, the valve f is pressed by the water against the aperture g', the water contained in the discharge-pipe being thereby cut off from the injection-pipe h'. As soon as chamber a has been emptied the pressure of the head of water in pipe e causes a small quantity of water to flow back through the aperture g and injection-pipe h into chamber a, whereby vacuum is produced, which causes the steam-valve to be reversed. Immediately after this the conveyance of the contents of the chamber a' to the discharge-pipe commences, and the pressure of the water pushes the valve f against the aperture g, so that the water in the discharge-pipe is cut off from the injection-pipe h. The purpose aimed at—namely, that of stopping injection into the emptied pump-chamber immediately after the reversal of the steam-valve has taken place—is thus fully attained.

In the arrangement represented by Fig. 2 the distributing-valve consists in a ball-valve f', inclosed in a box l', which is placed outside of the pump and connected to the respective inside injection-pipes (not shown in this figure) by the pipes h^2 h^3, and to the dis-

charge-pipe *e* by the pipe *m*, the said ball-valve being disposed to close the apertures g^2 g^3, corresponding to the aforesaid apertures *g g'*, and which in this case form the mouths of the pipes h^2 h^3.

The operation of the valve *f'* is like that described with reference to the valve *f*, Fig. 1, except that it is not the whole quantity of water raised by the pump which is controlled by the valve, but only the injection water.

The modification shown by Figs. 3 and 4 differs from the foregoing arrangement mainly in this, that the water of injection is supplied through a pipe *m'* from an air-vessel *i*, which may be connected to the discharge-pipe *e* by a pipe *o*. If the pipe *o* is not existing, the water required for injection is forced into the air-vessel from either pump-chamber at every discharge of the same through the alternate injection-pipes and the pipe *m'*.

In view of facilitating the starting of the pump, it is, however, advantageous to establish the connection between the air-vessel and the discharge-pipe by the pipe *o*, and to the latter may be applied a check-valve *n*, opening toward the air-vessel.

The distributing-valve shown in Figs. 3 and 4 consists in an oscillating clack-valve f^2.

I claim as my invention—

1. The combination, with a steam and vacuum pump having two chambers, of two injection-pipes passing into the respective pump-chambers, a valve-box having two apertures communicating each with one of the injection-pipes, a single valve placed in the valve-box and seating toward the injection-pipes and capable of closing the said apertures alternately, and a water-supply source communicating with the valve-box, substantially as described.

2. The combination, with a steam and vacuum pump having two chambers, of two injection-pipes passing into the respective pump-chambers, a valve-box having two apertures communicating each with one of the injection-pipes, a valve placed in the valve-box and adapted to close the said apertures alternately, and a water-supply source consisting in an air-vessel that communicates with the valve-box, substantially as specified.

3. The combination, with a steam and vacuum pump having two chambers and a discharge-pipe, of two injection-pipes passing into the respective pump-chambers, a valve-box having two apertures communicating each with one of the injection-pipes, a valve placed in the valve-box and adapted to close the said apertures alternately, a water-supply source consisting in an air-vessel that communicates with the valve-box, and a pipe by which communication is established between the air-vessel and the discharge-pipe of the pump, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

ERNST KÖRTING.

Witnesses:

JOH. KRACKE,

ALB. PEPPERMÜLLER.