E. KORTING.

Steam-Condensers.

No. 134,900. Patented Jan. 14, 1873.

Fig 1.

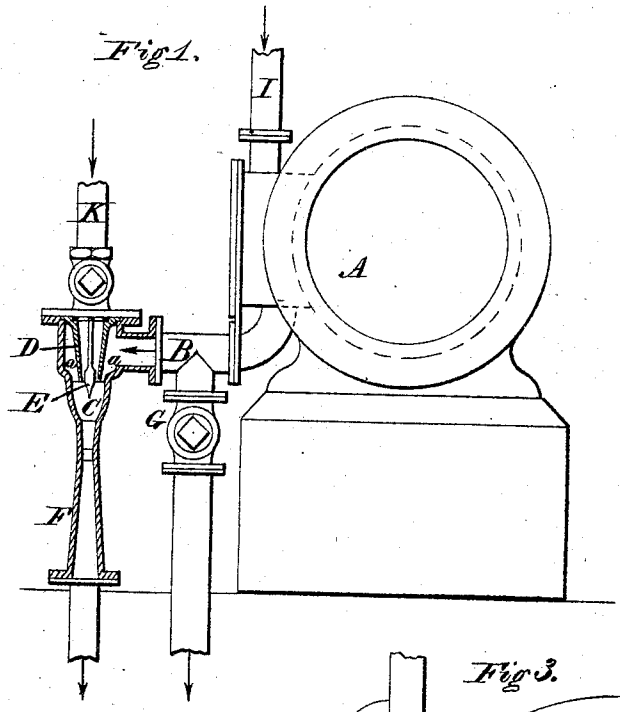


Fig 2.

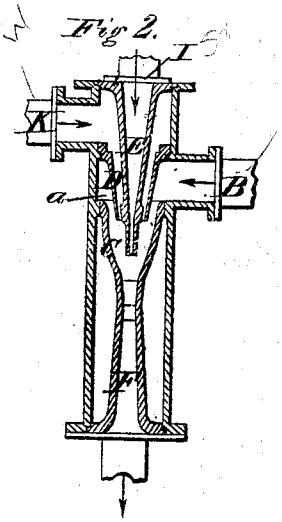
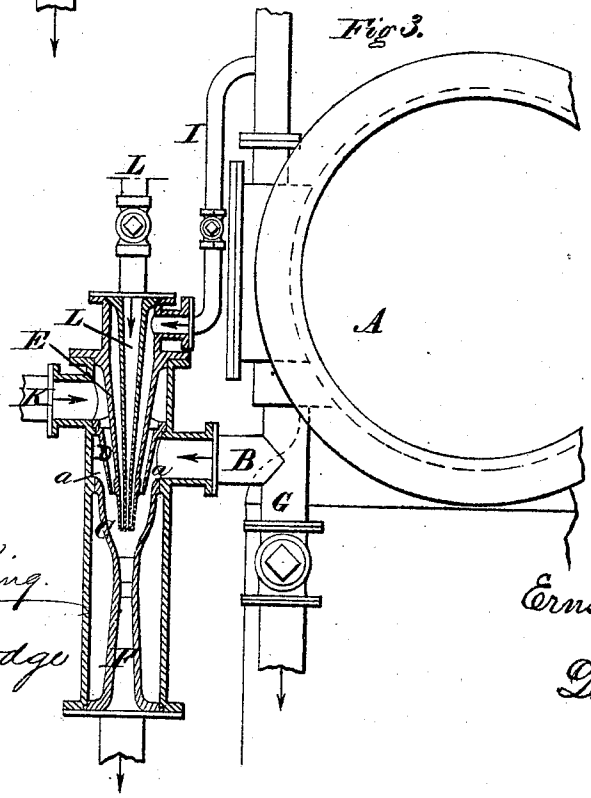


Fig 3.



Witnesses.

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ERNST KORTING, OF VIENNA, AUSTRIA.

IMPROVEMENT IN STEAM-CONDENSERS.

Specification forming part of Letters Patent No. 134,900, dated January 14, 1873.

To all whom it may concern:

Be it known that I, ERNST KORTING, of Vienna, Austria, have invented certain Improvements in Steam-Condensers, of which the following is a specification, reference being had to the accompanying drawing.

My invention relates to a condenser operated by a high-pressure jet of cold water; and consists in certain improvements therein, as hereinafter described.

Figures 1, 2, and 3 are sectional views of different forms in my condenser, the first and last being shown applied to engines.

In Fig. 1, A is the cylinder of an ordinary engine, and B the exhaust-steam pipe leading therefrom. C is the condensing nozzle or cone, into the large end of which the exhaust-steam pipe B discharges from one side. D is the nozzle for the condensing water, entering the large end of the condensing-nozzle C, and extending inward past the mouth of the steam-pipe B, so that an annular space is left around it, in order that the steam may surround it and blow forward past its end. E is a solid spindle, secured in the center of the water-nozzle, so as to cause the water to issue therefrom in a hollow tubular jet. F is the discharge or pressure nozzle, which has its small end connected to the small end of the condensing-nozzle C.

When the condenser is in operation the water issues from the nozzle D in a tubular jet, while the exhaust steam fills the space *a*, and blows forward around the nozzle D, so as to surround the water-jet. The water-jet being thus ejected into the center of the steam-jet condenses the latter, and carries the water resulting from the condensation forward into the discharging or pressure nozzle F. As the water-jet passes into the diverging portion of the nozzle F its velocity enables it to overcome the pressure of the atmosphere, so that it will discharge itself into the open air. As the steam is condensed by the water-jet a vacuum is established in the condensing-nozzle, and extended or communicated, through pipe B, to the cylinder of the engine. In order to produce the required vacuum, and to discharge the water-jet without the aid of live steam, the condensing water is supplied to the condenser under a pressure sufficient to give it a velocity, when discharged from the nozzle D, greater than the velocity corresponding to the counter-pressure of the atmosphere. This pressure may be created by a special pump, a high-level reservoir, a pump or pumps driven by the engine, or in any other suitable manner.

By giving the water-jet the hollow or tubular section I expose a very large surface to act upon the steam; and, as a consequence, condense the steam rapidly and with a smaller amount of water than would otherwise answer.

When the condensing water is supplied direct by a pump operated by the engine it is necessary to provide the exhaust-steam pipe B with a branch, G, opening into the atmosphere, and with a cock to close said branch, so that the exhaust may be discharged into the open air in starting the engine until the pump is fairly in operation.

The condenser, constructed as in Fig. 1, will start and operate without the use of live steam, and with a very small amount of water to produce the required vacuum; but it has not the power to raise any portion of the condensing water.

Fig. 2 represents a condenser very similar in construction and operation to that represented in Fig. 1, the only difference being that the central spindle is made hollow, so as to form a nozzle, and connected with the live-steam pipe I. This arrangement of the spindle, of course, necessitates the introduction of the condensing water from one side, as shown, instead of through the end, as in Fig. 1. Irrespective of the central spindle or nozzle the operation of this condenser is the same as the one represented in Fig. 1.

When the condensing water is supplied by a pump which does not commence operation before the engine is started, live steam may be admitted through the pipe I so as to blow through the central spindle or nozzle E. In this way a suction is produced in the water-nozzle, and the feed-water raised to the condenser, and at the same time a vacuum produced before the pump commences operation. The water, entering through the supply-pipe K, flows through the water-nozzle D, and enters the condensing-nozzle C, where it condenses the exhaust steam, and produces the required vacuum. It then passes the end of the central nozzle E, and receives a fresh impulse from the high-pressure jet issuing there-

from sufficient to carry it out through the discharge-nozzle F.

Fig. 3 represents a condenser of the same construction as that shown in Fig. 2, except that an additional nozzle, L, is inserted through the center of the nozzle or spindle E, the end of both these nozzles being extended inward beyond the end of the water-nozzle. In operating this condenser the nozzle L is connected with a water-supply, and fresh or live steam blown through nozzle E, so as to produce a vacuum in the cylinder before the pumps are working, and also to cause the water to rise and discharge itself through the nozzle L. Both the live and the exhaust steam are condensed by the water-jets, and the condensation water carried forward through the discharge-nozzle F.

Instead of blowing the live steam through the nozzle E it may be blown through nozzle L, so as to draw the water through nozzle E.

The general operation of all three forms of the condenser is the same. The only difference in construction is that in Fig. 1 the spindle E for giving the jet of condensing water the tubular form is solid; while in Fig. 2 it is made hollow, to form a nozzle, and in Fig. 3 has an extra nozzle inserted through it. In each of the three forms of the condenser the high-pressure cold-water jet is forced inward by outside independent means, and serves alone and by itself to cause the operation of the condenser.

The steam-jets used in the two modified forms of the apparatus are unessential features, and may be dispensed with, if desired, without affecting the operation. They are not intended to and do not assist the condenser in its regular course of operation. They are intended to produce a vacuum and raise the water temporarily before the pump or other forcing apparatus commences operation; although in the form of apparatus shown in Fig. 3 the jet of steam may be used continuously for the purpose of raising the extra stream of condensing water to the level of the condenser.

Having thus described my invention, what I claim is—

1. In combination with the condenser, constructed and operating as described, the cock G communicating with the open air, as and for the purpose set forth.

2. The central spindle or nozzle E, when mounted within the water-nozzle D, and extended through into the condensing-nozzle C, as and for the purposes described.

3. The concentric nozzles E and L mounted within the water-nozzle D, one for water, and the other for fresh steam, when arranged substantially as described.

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