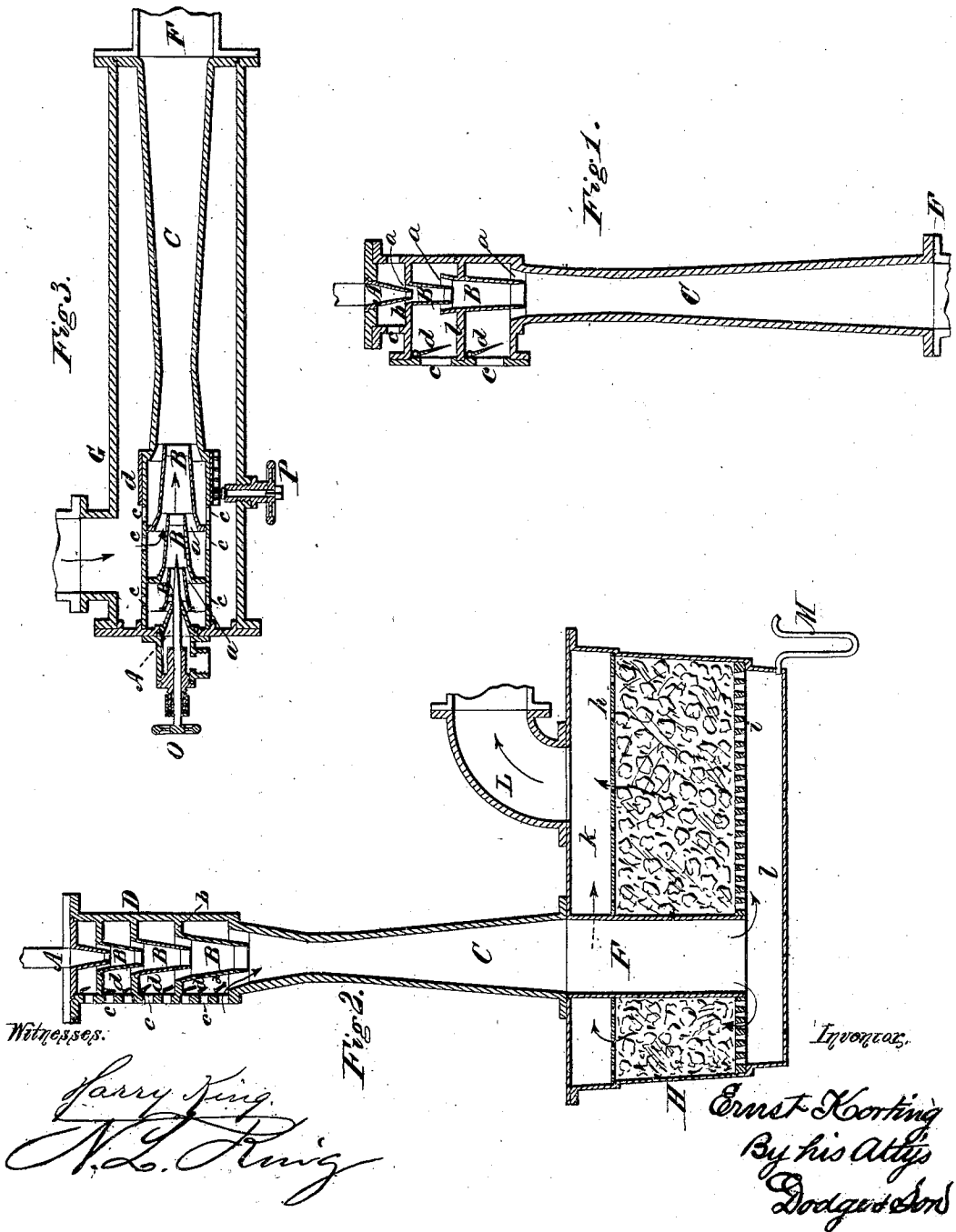


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Steam-Jet Apparatus for Forcing and Exhausting
Air and Condensing Steam.

No. 142,856.

Patented September 16, 1873.

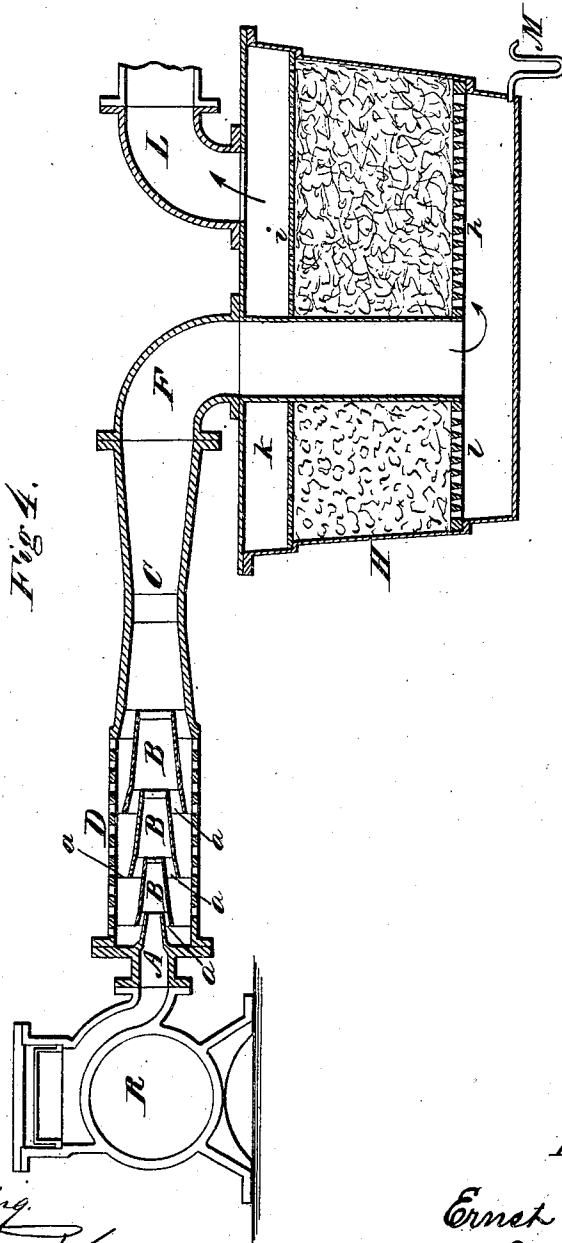


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Witnesses.

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ERNST KÖRTING, OF VIENNA, AUSTRIA.

IMPROVEMENT IN STEAM-JET APPARATUS FOR FORCING AND EXHAUSTING AIR AND CONDENSING STEAM.

Specification forming part of Letters Patent No. **142,856**, dated September 16, 1873; application filed April 14, 1873.

To all whom it may concern:

Be it known that I, ERNST KÖRTING, of Vienna, Austria, have invented certain Improvements in Steam-Jet Apparatus for Forcing and Exhausting Air and Condensing Steam, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to a steam-jet apparatus for forcing and exhausting air and condensing steam, adapted for a variety of uses, but intended more especially for blowing smiths' fires, exhausting gas-retorts, and condensing the exhaust steam from steam-engines. The invention consists in so constructing the apparatus that it may be varied in capacity according to the demands upon it; and in an arrangement for removing all moisture from the air-blast.

Figure 1 is a central section of my apparatus adapted for blowing or forcing air; Fig. 2, a section of the same with the air-drying apparatus connected thereto; Fig. 3, a section of the apparatus adapted for exhausting instead of blowing air; and Fig. 4, a section of the blower and drying apparatus applied to the exhaust-port of an engine.

The apparatus by which the air is set in motion, whether it is to be forced forward or exhausted, consists of a steam-nozzle, A, a number of receiving-nozzles, B, and a large flaring or diverging tube, C, arranged in line with each other, so that the steam-jet passes through them all. The nozzles are mounted in a body, D, and are so arranged that the small end of each one extends slightly into the large end of the next, so that annular spaces *a* are left between them for the admission of air. The nozzles are surrounded and held by partitions *b*, which divide the body into several chambers, each of which is provided with an opening, *c*, to admit air from the outside, so that each nozzle has a separate independent communication with the outside air. Each opening *c* is provided with a hinged valve, *d*, opening inward, so that by means of the valves each nozzle may have its communication with atmosphere closed or shut off without affecting the others. When a full head of steam is

used, and the apparatus is working up to its full capacity, the steam blows forward through all the nozzles, and causes a strong and continuous current of air through the openings *c* and spaces *a* into all the nozzles B, and forward into the tube C. When, however, it is required to have the apparatus move only a small quantity of air, and the supply of steam is therefore reduced, it will be insufficient to cause a suction or current into all the nozzles. There will be a suction into the first one, two, or more of the nozzles, according to the quantity and pressure of steam; but from the others there will be an outward current or pressure, which will close their valves *d*, and thereby shut off their communication with the atmosphere and render them inoperative. By thus closing the communication of one or more of the nozzles with the air the apparatus is reduced to the same capacity it would have without them, and enabled to operate on a small scale; whereas, if the valves were removed, it would be impossible to work the apparatus, except with a jet of steam sufficient to cause a suction into all the nozzles, for the reason that the air and steam, instead of passing forward into the tube C, would escape from the inner nozzles into the air.

Instead of using the automatic hinged valves, the same object may be accomplished by mounting a sliding sleeve or valve, *d*, around the body D, as shown in Fig. 3, so that when moved forward it will cover and close the air-inlets *c*.

As before stated, the arrangement used for moving the air is the same whether the apparatus is to be used for forcing or blowing the air forward or for exhausting or drawing it forward. When used for forcing the air the air-conductor F is connected to the mouth of the tube C to receive the air issuing therefrom, as shown in Figs. 1, 2, and 4; but when used for exhausting air the body D is inclosed in a casing, G, and the exhaust or suction pipe connected to the casing, as shown in Fig. 3, so that the air will be drawn from the casing through into the nozzles, and driven out through the tube C.

The apparatus, whether intended for blowing or exhausting, may be operated by live

steam; or it may be applied to the exhaust-port of an engine and operated by the steam therefrom. In the latter case the steam, while it serves to operate the apparatus, will, in turn, be condensed by the inflowing cold air. The apparatus serves as a cheap and efficient condenser, and may therefore be used for that purpose alone when it is not desired to employ it for either of the other purposes.

When the apparatus is to be used for blowing smiths' fires, or for other purposes which require a dry blast, I pass the blast through a body of coke, charcoal, or like material, which will absorb and retain the moisture. I arrange the material in a body, H, between two perforated plates, *h* and *i*, leaving chambers above and below the material; and I pass the air-pipe down through the material into the bottom chamber, and then apply another pipe, L, to the upper chamber to carry the air off. The air, entering the bottom chamber, passes up through the material and off through pipe L in a dry and pure condition, while the moisture or water is retained by the material, and falls back into the bottom chamber, from whence it passes out through a siphon, M.

When the apparatus is applied to an engine, as in Fig. 4, the air may be used for any suitable purpose, and the water pumped back into the boiler again.

It is obvious that in constructing my apparatus the form and arrangement of the valves

may be varied as desired, and that the body containing the drying or absorbing material may be constructed in any suitable manner without departing from the limits of my invention. When the apparatus is applied to an engine it is not necessary to use the valves, or to give the nozzles separate communications with the air, for the reason that the amount of steam exhausted does not vary, and is always sufficient to operate the apparatus to its full capacity.

Having thus described my invention, what I claim is—

1. An apparatus for forcing or exhausting air and condensing steam, containing a steam-nozzle, a number of receiving-nozzles having separate independent communications with the air, and a valve or valves, by which the communication between one or more of the nozzles and the air may be closed, when constructed and arranged to operate substantially as herein shown and described.

2. In combination with a steam blowing or exhausting apparatus, substantially such as herein described, a body containing coke, charcoal, gravel, or like material, so arranged that the air passes through said material, and is deprived of moisture thereby.

ERNST KÖRTING.

Witnesses:

A. BRANDE,
Wm. PROZELLY.