

(No Model.)

V. D. ANDERSON.
STEAM CONDENSER.

No. 355,291.

Patented Jan. 4, 1887.

Fig. 1.

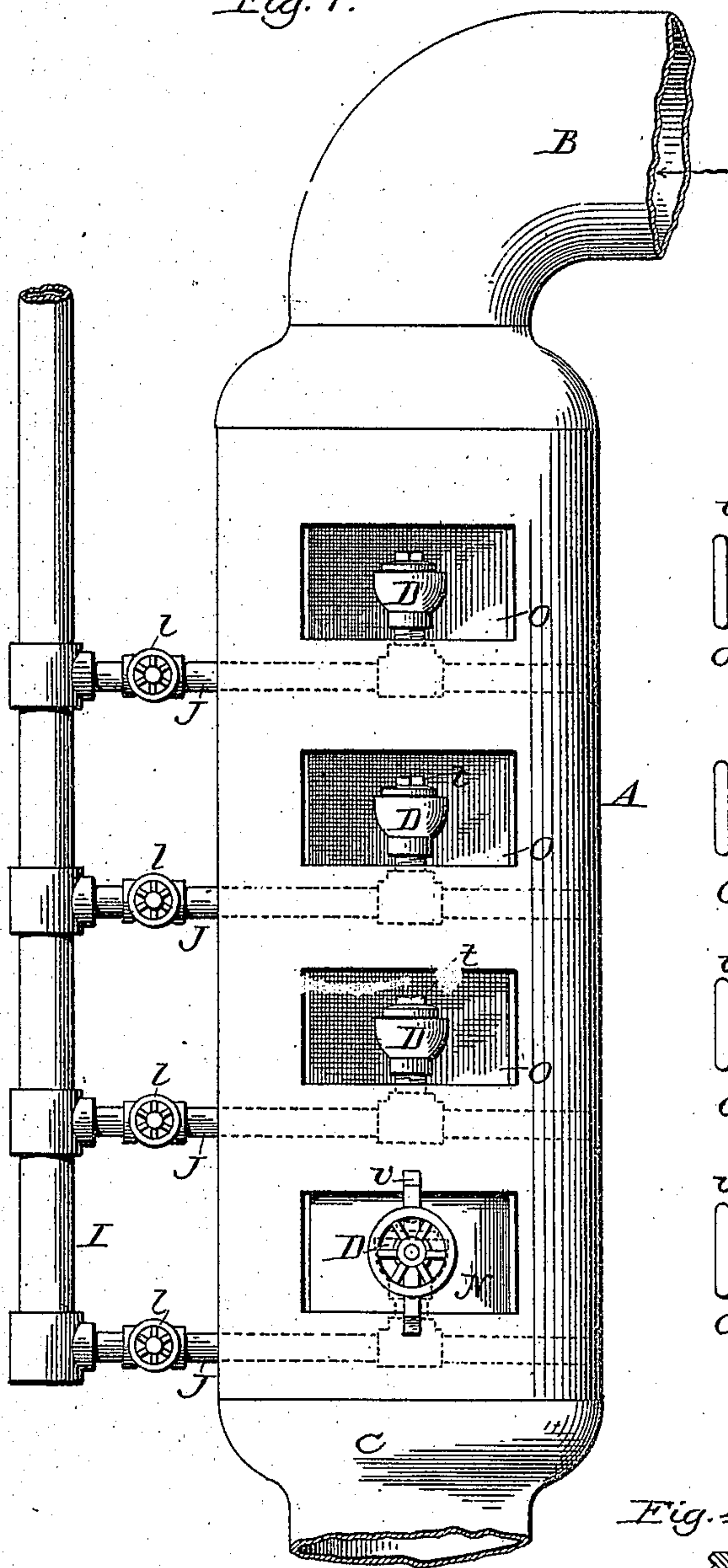


Fig. 2.

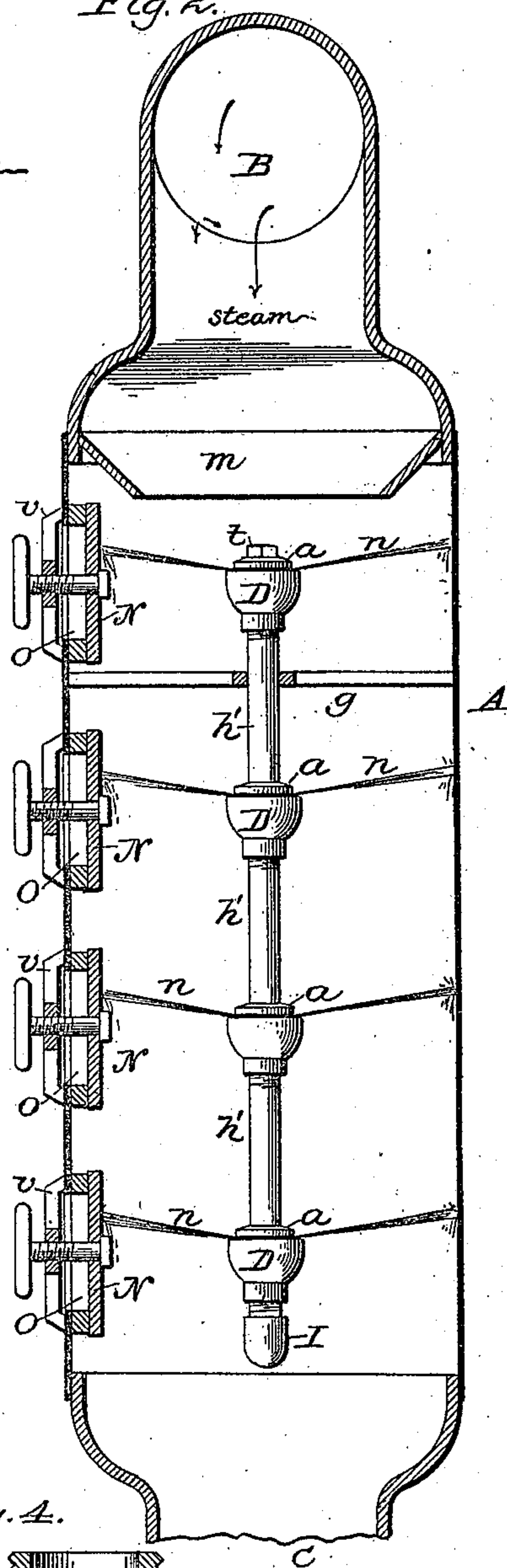


Fig. 4.

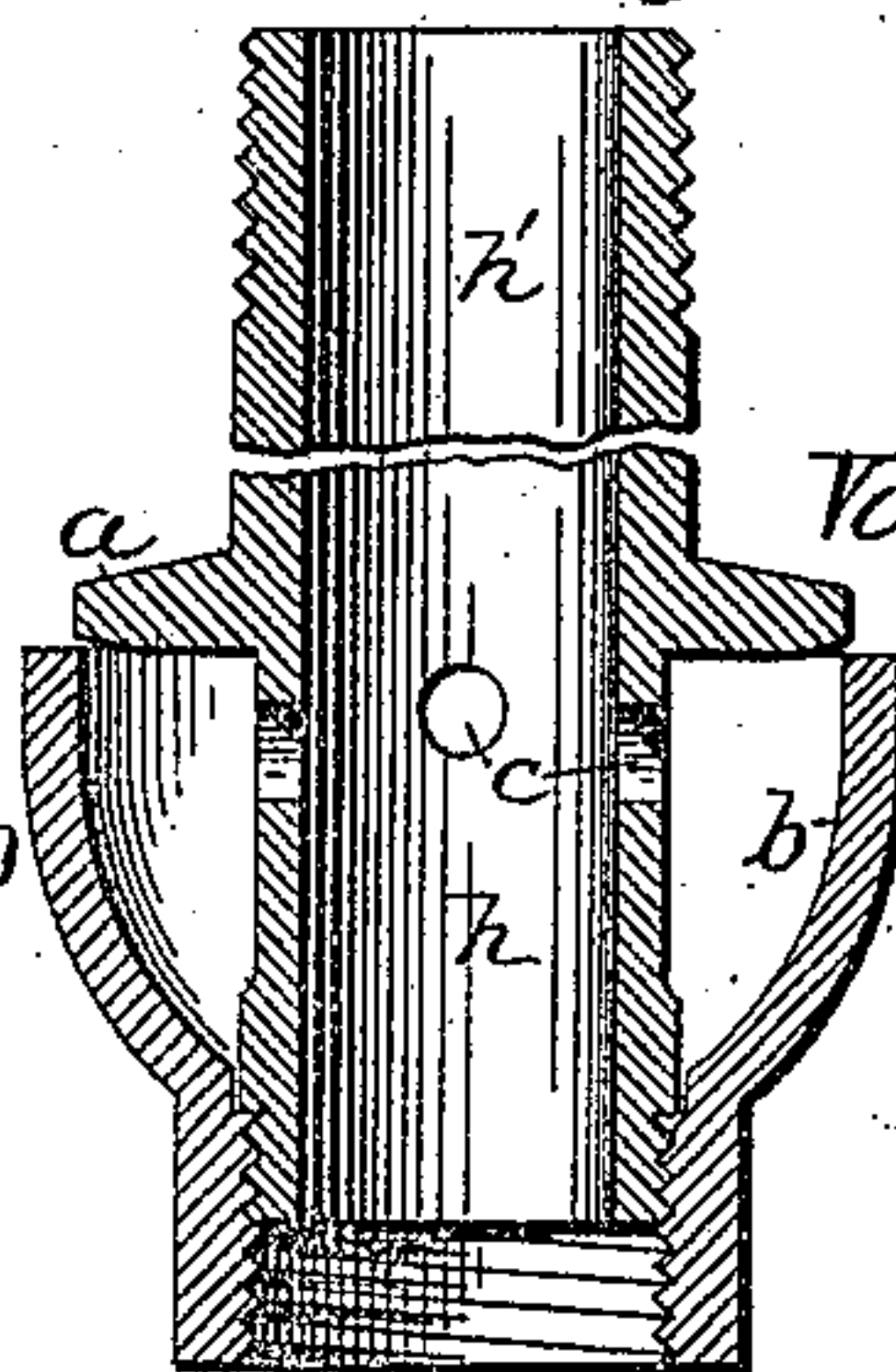
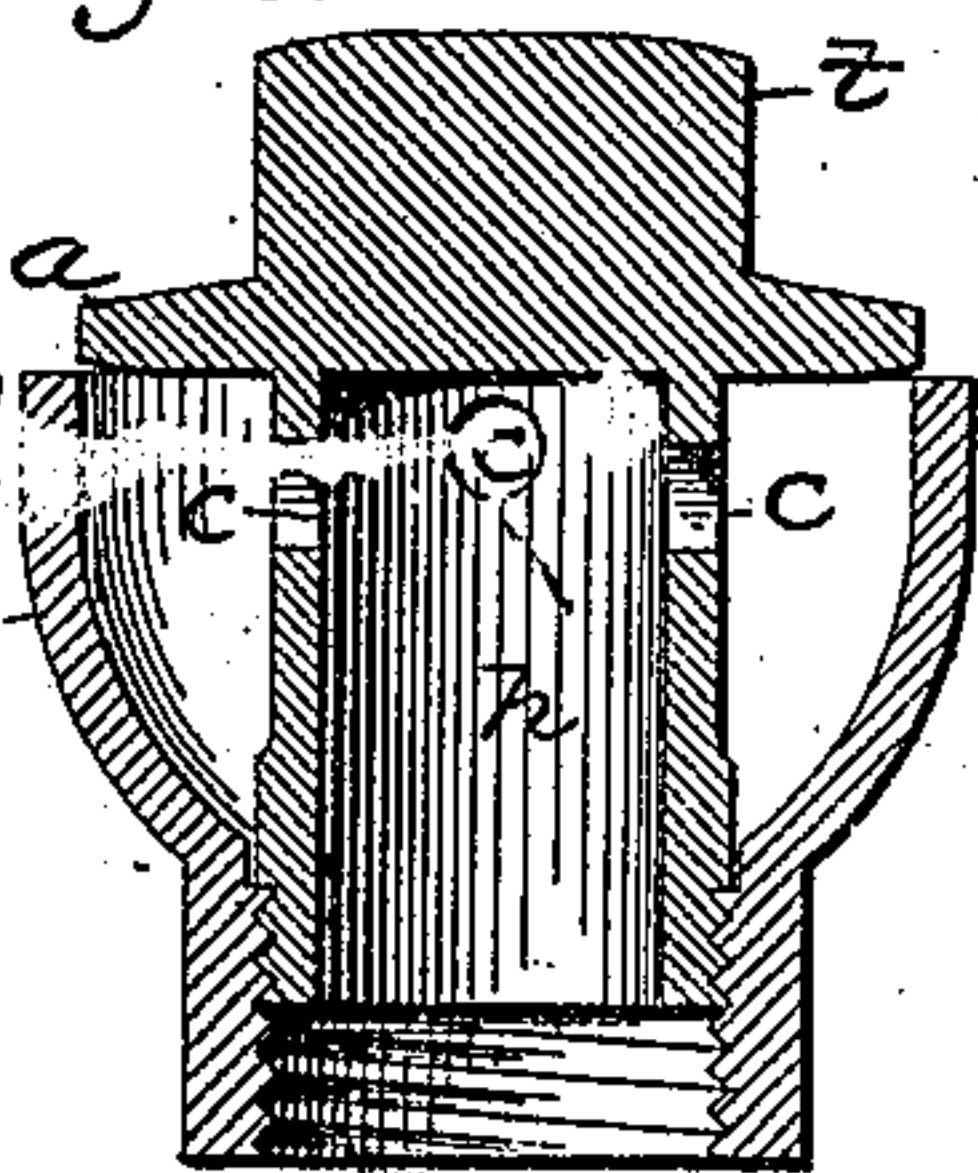


Fig. 3.



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UNITED STATES PATENT OFFICE.

VALERIUS D. ANDERSON, OF CLEVELAND, OHIO.

STEAM-CONDENSER.

SPECIFICATION forming part of Letters Patent No. 355,291, dated January 4, 1887.

Application filed August 23, 1886. Serial No. 211,586. (No model.)

To all whom it may concern:

Be it known that I, VALERIUS D. ANDERSON, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Condensers, of which the following is a specification.

This invention relates to condensers for steam and similar vapors; and the invention consists of a nozzle or device so constructed as to deliver or produce within a suitable case a continuous sheet or diaphragm of water which shall fill the case transversely, and in the arrangement of a series of these devices within the case, together with certain details of construction, all as hereinafter more fully described.

Figure 1 is a side elevation of a condenser constructed on my plan, and Fig. 2 is a transverse vertical section of the same, showing a modification of the water-pipes. Fig. 3 is a transverse vertical section of the nozzle, full size and detached. Fig. 4 is a similar view of a nozzle having its water-supply pipe modified, so as to connect a series of them with a single supply-pipe.

This condenser is designed more especially for use in connection with the apparatus used for drying offal from slaughtering or packing houses, and which is converted into fertilizers. As is well known, great difficulty has been encountered in this and similar operations, because of the foul and noxious odors and gases which are carried off during the drying operation by the escaping steam, so great, indeed, that not unfrequently the work has been stopped by the health officers or authorities on account of the injury to the public health and the nuisance created by the foul odors. Various forms of condensers and apparatus have been devised from time to time to remedy these difficulties, but generally without entire success. After a variety of experiments I have succeeded in producing a condenser which accomplishes the desired result in the most satisfactory manner, and which I will now proceed to describe.

In the drawings, A indicates the case or body of the condenser, made of boiler-iron or heavy sheet metal, by preference, and of a size to correspond with the size of the drier to which it is to be connected or the work it is to perform. For the largest-sized driers the case A is usually about six feet long and about

eighteen inches in diameter, but of course may be made of any size desired. At each end the case is provided with a dome-shaped head, preferably of cast iron, with a central opening of about two-thirds of the diameter of the body A, as shown in Figs. 1 and 2. To the upper head is connected a pipe, B, for conveying the steam, with the foul odors, gases, &c., from the drier into the condenser, the opposite or lower head being connected by a pipe, C, to the sewer or drain into which the water, with the condensed steam, &c., is allowed to escape.

Centrally within the case I arrange a series of nozzles, D, constructed as shown in section in Fig. 3. This nozzle consists of two parts, *a* and *b*, the latter being made in the form of a bowl with a tubular stem or neck at its bottom, having an internal screw-thread cut therein, as shown. The other part consists of tubular stem *h*, provided at its lower end with a corresponding screw-thread, and at or near its upper end with a laterally-projecting flange or disk, *a*, of the same diameter as the interior of the bowl *b*, or practically so, the lower edge of this disk or flange *a* being very slightly beveled, as shown in Figs. 3 and 4. In the tubular stem *h*, just below the flange *a*, are a number of holes, *c*, for the passage of the water. When these nozzles are to be connected to separate supply-pipes J, as shown in Fig. 1, and which is the plan that I prefer, an angular or flat-sided projection, *t*, is formed above the flange *a*, for the application of a wrench, as shown in Figs. 1 and 3. Having provided a number of these nozzles, I arrange them one above another centrally within the case A, as shown in Fig. 1, each being secured to a separate branch pipe, J, which extends from the main supply or water pipe I through the side of the case A, and preferably entirely across the same, so that its closed end can be secured by a boss or collar to the opposite side of the case, as shown by the dotted lines in Fig. 1, and thus hold the nozzles securely in place. Each branch pipe J is provided with a valve, *l*, as represented in Fig. 1, so that the water may be shut off from one or more of the nozzles at will, and thus adapt the condenser to the varying conditions of the work or quantity of steam and vapors to be condensed. The water-supply pipe I may be arranged to bring the water from above or from below, as may be most convenient, and the steam may be intro-

duced at either end. In the side of the case A, opposite each nozzle, a man-hole or opening, O, is made, of such a size as will enable the attendant to insert his hand, with a wrench, to screw or unscrew the parts, these holes being closed by a plate, N, on the inside, held in place by a crab or clamp, v, as shown in Fig. 2, the bolt of which may be provided with a hand-wheel, as shown, for turning the same to tighten or loosen the plate when necessary.

In Fig. 2 I have shown the nozzles D as all being secured to one vertical water-pipe. In that case the tubular stem *h* of the part *a* will be extended through and above the flange or disk *a*, as shown at *h'*, Fig. 4, its upper end being provided with a screw-thread to enable the nozzle next above to be screwed thereon, and so on until the required number are connected, as shown in Fig. 2, they being held against lateral displacement by one or more spiders or sets of braces, *g*, as shown. In such case the supply-pipe I will enter at or near the bottom of the case, and, if desired, the several tubes *h'* may be made of gradually-decreasing diameters from the bottom upward—that is, each successive tube *h'* may be somewhat smaller than the one below it—for the purpose of equalizing the supply of water to the several nozzles, though in practice I have not found this necessary, as I make the tubes *h'* of sufficient capacity to supply all the water required by the several nozzles. This method of connecting and supplying the several nozzles with water will answer the purpose; but I prefer to connect each to a separate branch or supply-pipe, and to provide each branch with a valve, as shown in Fig. 1, for the reason that the supply of water to each nozzle can be adjusted or regulated as may be required, and because, also, the water can then be shut off from one or more of the nozzles at will and the remainder of them be used, as hereinbefore stated.

When the water is turned on with a suitable pressure, the result is that it is projected from the nozzle in a continuous unbroken sheet or film to the sides of the case A, as indicated at *n*, Fig. 2, thus forming a series of sheets or diaphragms of water entirely across the case, instead of the spray usually produced in condensers of this general character, and this solid or unbroken sheet of water I consider of great importance. The steam entering at the top, loaded with the foul odors and gases given off by the offal or similar material in the drier, impinges directly upon the first or upper sheet of water, and the portion not condensed thereby, breaking through this first sheet of water, then impinges upon the second sheet of water, which, with the spray caused by the sheets of water striking the sides of the case, condenses still more of it, and so on through the entire series, or until all has been effectually condensed. In practice I find that from four to six of these nozzles thus arranged and operating are sufficient for the largest driers, and that the foul odors, gases, &c., are so effectually

condensed and absorbed or destroyed as to render the operation and presence of these driers unobjectionable.

It will be observed that the sheet of water *n* is thrown out at a slight upward angle, and which may be increased or decreased by varying the slight bevel or inclination on the under edge of the disks *a*. It will operate without this; but I prefer to give the sheet of water more or less inclination, as it seems to operate better, probably because more force is required on the part of the steam to break through the sheet of water when thus inclined.

In the top of the case I usually secure a funnel-shaped annular flange, *m*, for the purpose of throwing the steam to the center, where the sheet of water offers the greatest resistance to its passage. This may be dispensed with, but I prefer to use it, as I think it somewhat improves the operation.

While I have described the condenser as being more especially designed for use in connection with offal-driers, it is obvious that it is equally applicable for the condensation of the steam and vapors arising from tanks, &c., in which the offal or any similar offensive material is cooked or subjected to any similar process, as in soap-factories and the like. It is also obvious that it is equally applicable for the condensation of steam from engines, or in any case where it is desired to condense steam or similar vapors, and I intend to so apply and use it.

Having thus fully described my invention, what I claim is—

1. A condenser consisting of a case, A, having one or more nozzles, D, arranged therein, with a pipe for supplying water thereto, the said nozzle or nozzles being constructed substantially as described, whereby a solid or unbroken sheet or diaphragm of water is produced within the case, as and for the purpose set forth.

2. In combination with the case A, the supply-pipe I and the branch pipes J, each of the latter being provided with a nozzle, D, constructed as shown, and with a valve or cock, *l*, all arranged to operate substantially as shown and described.

3. The herein-described nozzle for condensers, consisting of the bowl D, having its mouth or open end provided with a flat annular surface at a right angle to its interior wall, and the solid disk *a*, having its lower edges slightly beveled, the said parts being made adjustable in relation to each other, but so as to retain a fixed position when adjusted, substantially as shown and described.

4. The nozzle D, having the tubular stem *h'* extended above the flange *a*, to enable a series of the nozzles to be united, substantially as shown and described.

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Witnesses:

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