

J. CREAGER & A. EVANS.
 Vapor-Condensing and Air-Warming Apparatus.
 No. 231,766. Patented Aug. 31, 1880.

Fig. 1.

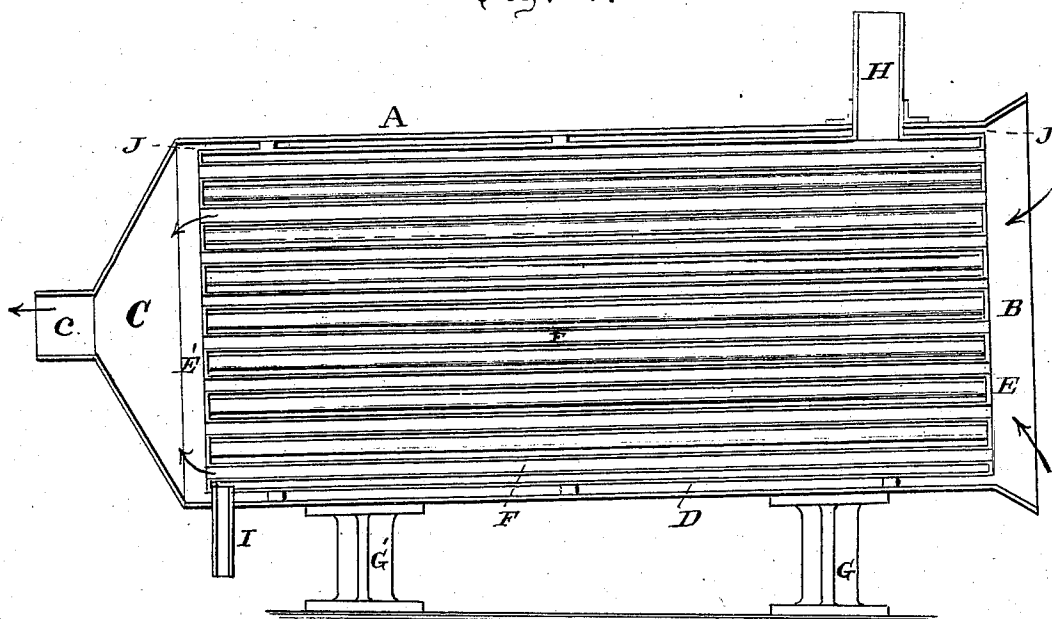
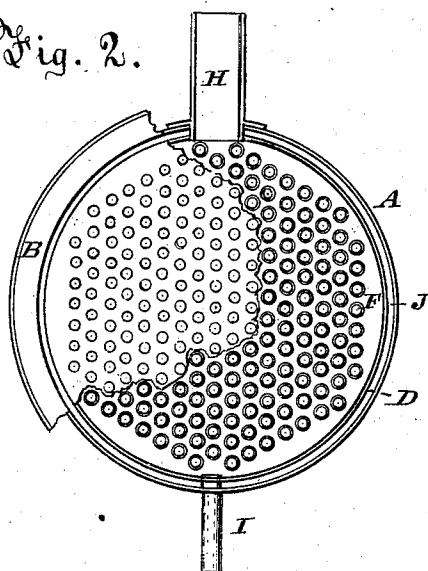


Fig. 2.



Attest
 Walter Knight
 Percy Knight

Inventors
 Jonathan Creager
 Anderson Evans
 By Knight Bros Attys

UNITED STATES PATENT OFFICE.

JONATHAN CREAGER AND ANDERSON EVANS, OF CINCINNATI, OHIO,
ASSIGNORS OF ONE-THIRD OF THEIR RIGHT TO WILHELM PIEPER,
OF SAME PLACE.

VAPOR-CONDENSING AND AIR-WARMING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 231,766, dated August 31, 1880.

Application filed December 19, 1879.

To all whom it may concern:

Be it known that we, JONATHAN CREAGER and ANDERSON EVANS, of Cincinnati, in the county of Hamilton and State of Ohio, have jointly invented certain new and useful Vapor-Condensing and Air-Warming Apparatus, of which the following is a specification.

Our apparatus was designed primarily as an economical and effective means of warming or heating air to be supplied to houses for drying freshly-molded brick as a preparation for the kiln.

Our apparatus consists of two concentric cylinders inclined out of the horizontal and having between them an annular air-space, the outer cylinder being provided at the higher or induction end with an outwardly-flaring or conical mouth, while the lower or eduction end is provided with a conical head or cap leading to a more or less contracted outlet communicating with a suction-blower. The heads of the inner cylinder are perforated to receive the ends of tubes, which, together with the annular space between the two cylinders, afford passage for the air from the induction to the eduction end. Steam is admitted to the top of the inner cylinder at the higher end by means of a tube extending through the outer cylinder, and the water of condensation escapes through an outlet-pipe leading from the bottom of the lower end of the inner cylinder, and extending directly downward therefrom through the outer casing.

In order that our invention may be fully understood, we will proceed to describe it in reference to the accompanying drawings, in which—

Figure 1 is a vertical axial section of our improved apparatus. Fig. 2 shows the same part in end elevation and the rest in transverse section through the steam-pipe.

A represents the outer shell or cylinder, in which is fixed concentrically a slightly-smaller cylinder, D, whose ends are closed by heads E E', that are perforated to receive tubes F. The inner cylinder has at top, near the receiving end, a pipe, H, which, extending through the outer shell, communicates with the exhaust of a steam-engine, and the same cylinder has at

bottom, at the delivering end, a spout or outlet, I, for the escape of the water of condensation.

The apparatus is supported by legs G G' in such a manner as to cause its axis to decline from the receiving toward the delivering end, as shown in Fig. 1, so that the steam enters at the extreme top, traverses the whole length of the apparatus, and finally escapes at the lowest point in the form of warm water, thus making the most economical use of the heat that is possible.

The outer casing, A, has attached to its receiving end an outwardly-flaring or conical mouth, B, that operates to cause the air to converge toward the tubes F in the inner cylinder and annular space J between the inner and outer cylinders.

At the delivery end the outer cylinder is provided with a conical head or cap, C, converging from the periphery of said cylinder to a suction-pipe, c, the conical shape of said head operating to contract the air into the outlet c.

The air-outlet c being connected to the inlet of a suitable suction apparatus, a current of air is caused to flow through the steam-heated tubes F and passage J, so as to insure the condensation of the steam and the heating of the air.

The water of condensation may be carried back to the boiler, while the heated air is forced or drawn through the dry-house for the purpose of drying the bricks, as before referred to.

Practical test has demonstrated that a heater of this plan thirty-six inches in diameter and five feet long, filled with inch tubes, attached to a suitable exhaust-blower and supplied with exhaust-steam from an engine eight inches in diameter and sixteen inches stroke, with all the work in the open air when the atmosphere is at about the freezing-point, will heat fourteen thousand cubic feet of air per minute to 100° Fahrenheit.

Having thus described our invention, the following is what we claim as new therein, and desire to secure by Letters Patent:

The vapor-condensing and air-heating ap-

paratus consisting of the two concentric cylinders A and D, the inner one having heads EE', longitudinal tubes F, steam-inlet H at the air-receiving end, and water-outlet I at the air-delivering end, the outer one having outwardly-flaring mouth B, conical head C, and outlet c, the whole being inclined downward from receiving to delivering end, as and for the purpose set forth.

In testimony of which invention we hereunto set our hands.

JONATHAN CREAGER.
ANDERSON EVANS.

Attest:

GEO. H. KNIGHT,
WILHELM PIESER.