

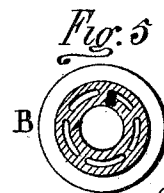
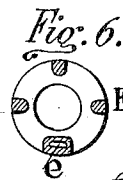
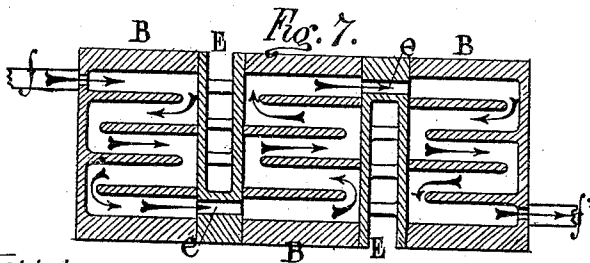
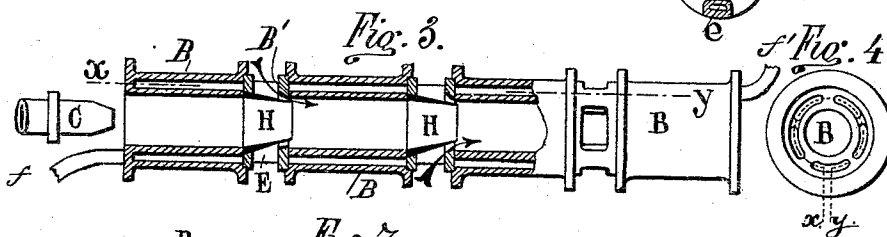
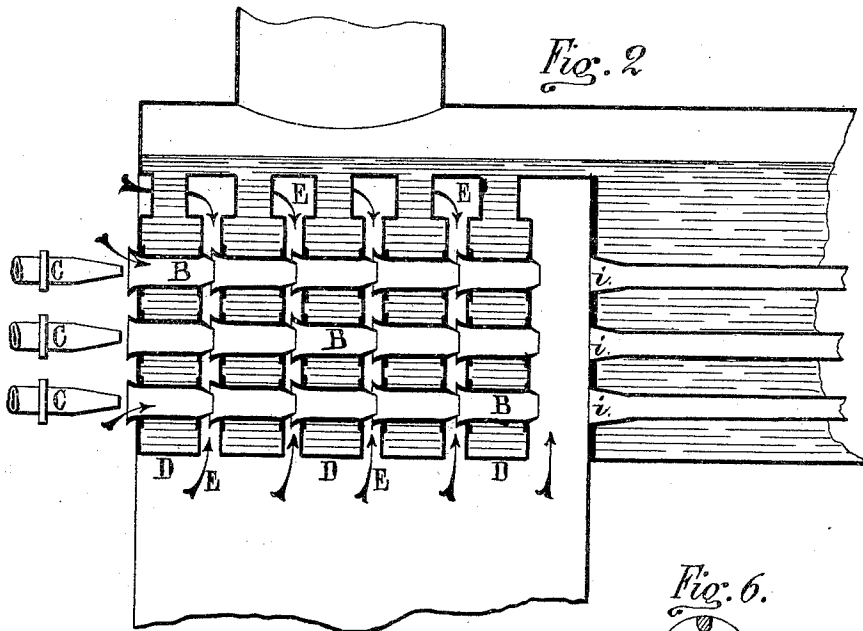
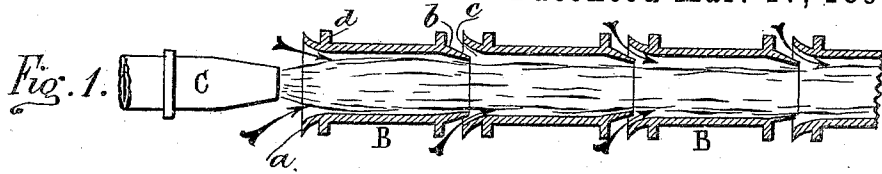
(No Model.)

A. SEIGLE-GOUJON.

DEVICE FOR HEATING BY GAS OR COMBUSTIBLE VAPOR.

No. 448,460.

Patented Mar. 17, 1891.



Witnesses
Harold Serrell
J. Staib

Inventor
Adolphe Seigle-Goujon
Lemuel W. Serrell
att'y

UNITED STATES PATENT OFFICE.

ADOLPHE SEIGLE-GOUJON, OF LYONS, FRANCE.

DEVICE FOR HEATING BY GAS OR COMBUSTIBLE VAPOR.

SPECIFICATION forming part of Letters Patent No. 448,460, dated March 17, 1891.

Application filed March 17, 1890. Serial No. 344,151. (No model.)

To all whom it may concern:

Be it known that I, ADOLPHE SEIGLE-GOUJON, a citizen of the Republic of France, and residing at Lyons, France, have invented a new and useful Improvement in Devices for Heating by Gas or Combustible Vapor, of which the following is a specification.

My improvements relate to apparatus adapted to burn gas or vaporized or atomized hydrocarbon or other combustible liquid at a very high temperature, with a perfect and complete combustion for the purpose of heating water in a boiler or other device for generating steam; also, for heating circulating water or superheating steam for various uses.

In carrying out my invention I employ series of aligned cylinders, which are similar in construction, each having a flaring and a tapering contracted end, the tapering contracted end of one cylinder being adapted to set slightly within the open flaring end of the adjoining cylinder with an annular air-space between the parts. These are combined with a burner for gas or an atomizer or similar device for atomizing or vaporizing any hydrocarbon or other combustible liquid the flame from which is directed into the aforesaid series of cylinders, where the same is consumed, the combustion being perfect and at an intense heat, because air is drawn in at the annular spaces between the aligned cylinders in the direction of movement of the burning-gas.

In the drawings, Figure 1 is a longitudinal section of a series of aligned cylinders. Fig. 2 illustrates their application to a steam-boiler, and Fig. 3 is a longitudinal section of a modified form of aligned cylinders. Fig. 4 is an end view of one cylinder, and Fig. 5 is a cross-section of the same. Fig. 6 is a cross-section of one connecting-ring; and Fig. 7, a section at the line *x y*, as if laid out flat.

B represents the cylinders, and the same are aligned one after the other to any desired length, as shown in Figs. 1 and 2. Each cylinder has an open flaring end *a*, and a tapering contracted end *b*, the main portion being preferably of uniform size throughout. The contracted ends *b* are to be placed slightly within the open ends *a*, so that annular air-openings *c* are left between the parts.

C represents the device for supplying the

flame of burning-gas or other hydrocarbon to the cylinder B. This may consist of any desired or suitable apparatus—such, for instance, as a gas-generator or an injecting or atomizing apparatus—and I prefer to employ an apparatus having a circular jet of flame, the parts B also being circular; but I do not limit myself in this particular, as other shapes may be employed, if desired. These cylinders B may be made with flanges *d*; and in Fig. 2 I have shown the same as connected by said flanges to the case D of the steam-generating boiler and aligned with the boiler-tubes, there being adjacent to the annular spaces *c*, between each cylinder B, air-passage ways E, formed by the case D, which is here made as boxes or chambers, through which the cylinders B pass. These passage-ways E may be open to the air or communicate with a conduit for heated or cold air under pressure, and air passing through the same enters within the cylinders B by the annular spaces *c*, where it combines with the burning-gases to make their combustion more perfect and to increase their temperature to a high degree. The flame of the burned gases passes from the last cylinder B, in Fig. 2, to and through the horizontal tubes *i* of the boiler. The flanges *d* may connect the cylinders B to plates or parts of other forms of apparatus designed to hold liquid to be evaporated by the heat of the flame within the cylinders B.

The number of aligned cylinders B may be varied according to the conditions governing the structure to be made.

The modification illustrated in Figs. 3, 4, 5, 6, and 7 relates to similar cylinders to those heretofore described, except that they are surrounded or formed with cases, having longitudinally-placed partitions, between which there are chambers or passage-ways, connected together at alternate ends, forming tortuous passage-ways, arranged circumferentially of the cylinders, the series around one cylinder being connected to those around the adjacent cylinder by the passage-way *e*, Figs. 6 and 7. In these views Fig. 4 is an end elevation of a cylinder B, detached from one of the pairs of rings B'; Fig. 5, a cross-section through the cylinder and case and across the passage-ways. Fig. 6 is a cross-section through

the air-passage at E in the rings B', and Fig. 7 illustrates the various connected passage-ways, as if laid out flat on the line $x y$ of Fig. 3.

5 B' represents two rings, connected together by cross-pieces, (shown in section at Fig. 6,) one of these cross-pieces being larger than the others and having therein the connecting passage-way e . A conical pipe or end H is secured within the rings and serves as a continuation of one cylinder B when the parts are connected. The cylinders B and rings B' may be secured together in any manner desired, and the same may be of any length.

15 f represents the inlet-opening to the passage-ways of the first cylinder, and f' the exit-opening to the passage-ways of the last cylinder, which may be in the form of pipes, as indicated in Figs. 3 and 7, the passage-ways between these points being continuous, so that the movement of liquid or fluid therein is tortuous and serpentine, but unhindered, the same following the direction of the arrows in Fig. 7.

25 C in Fig. 3 illustrates the device similar to that heretofore described for supplying the flame of burning-gas or other hydrocarbon to the cylinders B, and the combustion of the burning-gas is made perfect and the temperature thereof is increased by the air that is drawn or forced in around the conical pipes H.

30 The heated gases of the cylinders are utilized for heating the fluid or liquid caused to flow through the serpentine or tortuous passage-ways. This fluid or liquid may consist of air or gases to be heated for various purposes, steam to be dried and superheated,

or water to be heated before passing into a boiler or for heating purposes.

I claim as my invention—

40 1. In an apparatus for heating liquids having partitions separating the apparatus into alternate air and liquid spaces, the combination of a range of tubular flue-sections passing through the liquid to be heated and 45 through the partitions, said tubular flue-sections having contracted ends adjoining the ends of the tubes next in front and leaving lateral annular air-inlet openings, and a gas-supplying jet in line with the range of tubes, 50 whereby the flame within the direct-acting heating-tubes is supplied with air progressively to render the combustion perfect, substantially as specified.

2. The combination, with the tube C for 55 supplying burning-gas or similar material to a flame, of a series of aligned tubes or cylinders, through which the flame is caused to pass, each tube having a contracted end passing into the next tube, with a surrounding annular air-space, each of the aligned tubes having a surrounding case and partitions forming tortuous passages, and rings between and connecting the respective aligned tubes with 60 passages through them coinciding with the end portions of the tortuous passages of the aligned tubes, substantially as specified.

The foregoing specification of my improvement in heating by gas or combustible vapor signed by me this 31st day of January, 1890. 70

ADOLPHE SEIGLE-GOUJON.

Witnesses:

JULES LÉPINETTE,
YRIN RABILLOUD.