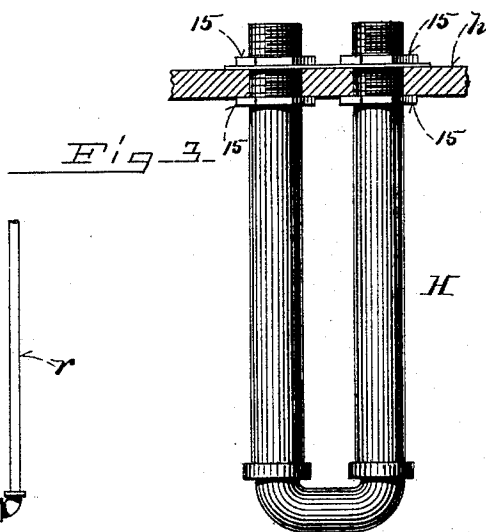
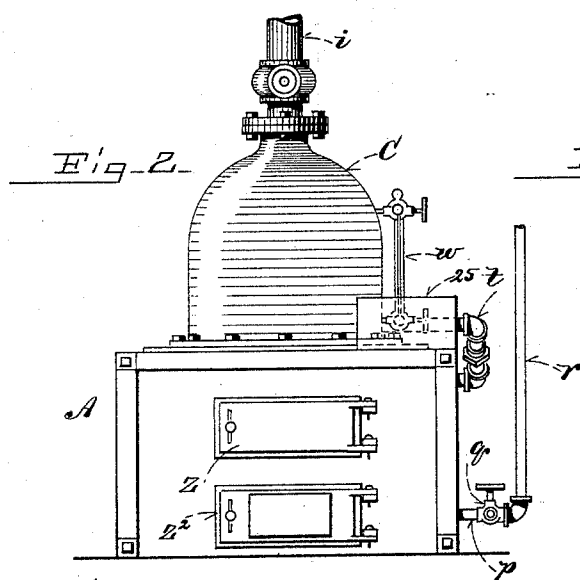
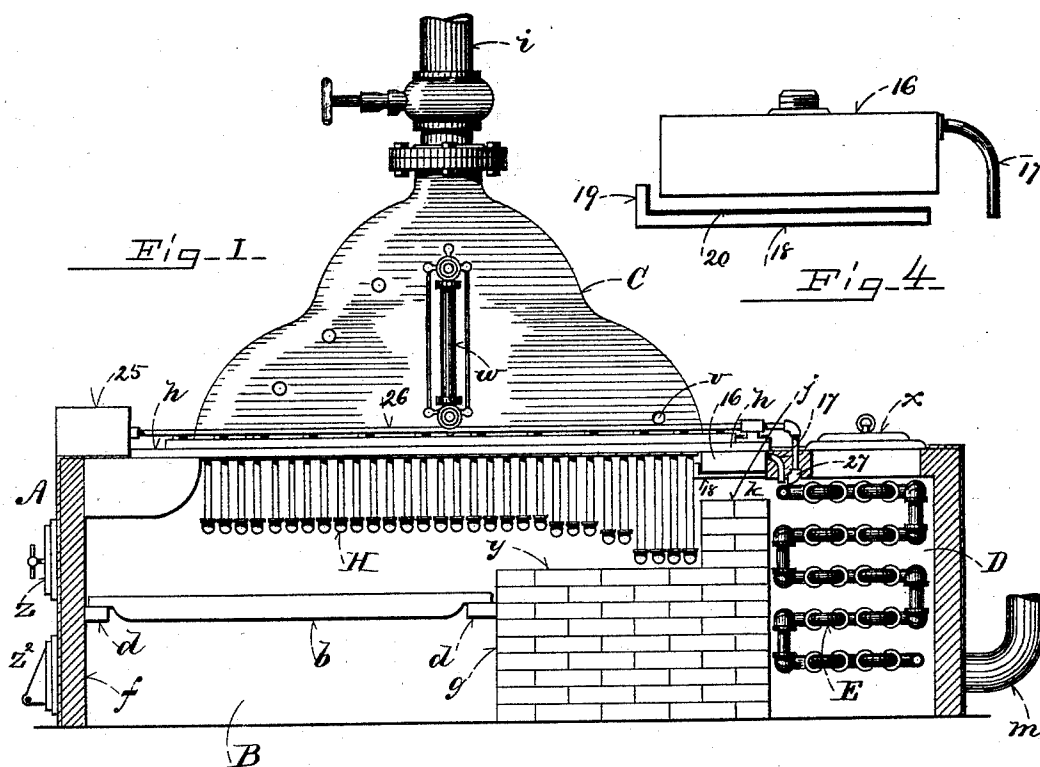


(No Model.)

A. GRAF.
HEATER.

No. 485,190.

Patented Nov. 1, 1892.



WITNESSES:
Amesbury
W. D. Impey

INVENTOR=
Anton Graf,
By *C. A. Shawcross,*
ATTY-S.

UNITED STATES PATENT OFFICE.

ANTON GRAF, OF GEORGETOWN, MASSACHUSETTS, ASSIGNOR OF ONE-HALF
TO STEPHEN OSGOOD, OF SAME PLACE.

HEATER.

SPECIFICATION forming part of Letters Patent No. 485,190, dated November 1, 1892.

Application filed June 6, 1892. Serial No. 435,621. (No model.)

To all whom it may concern:

Be it known that I, ANTON GRAF, of Georgetown, in the county of Essex, State of Massachusetts, have invented certain new and useful Improvements in Heaters, of which the following is a description sufficiently full, clear, and exact to enable any person skilled in the art or science to which said invention appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation, partly in section, of my improved heater; Fig. 2, a front end elevation of the same; Fig. 3, an enlarged elevation of one of the circulation-tubes, and Fig. 4 an elevation of the oxygen box and guard.

Like letters and figures of reference indicate corresponding parts in the different figures of the drawings.

My invention relates especially to a hot-water and steam-heater; and it consists in certain novel features hereinafter fully set forth and claimed, the object being to produce a simpler, cheaper, and more effective device of this character than is now in ordinary use.

The nature and operation of the improvement will be readily understood by all conversant with such matters from the following explanation.

In the drawings, A represents the furnace of the heater considered as a whole, which is provided with a fire-box B, having a grate *b*, supported by lugs *d* on the front *f* and back wall *g* of the furnace. On the top *h* of the furnace there is a dome-shaped chest C, from the apex of which the discharge *i* leads. The back wall *g* is elongated vertically at *j* in its rear portion, leaving a narrow flue *k* between the top and such elongation. Said flue leads into the top of a box D at the rear of the furnace. The stack *m* opens into the bottom of said box. A feed-water-heating-coil of pipe E is disposed in the box D, the supply *p* for said pipe opening through the wall of the box at the bottom. A T-coupling valve *q* is in the supply, and the return *r* leads into said coupling. The coil discharges through a pipe T outside the box leading into the dome at *v*. An ordinary gage-glass *w* is connected with

the dome. A manhole *x* leads into the top of the box D. The furnace-front is provided with the usual doors *z z'*. Above the grate *b* and the top *y* of the wall *g* a series of U-shaped pipes H are secured in the top *h* of the fire-box by check-nuts 15. (Shown in Fig. 3.) Both ends of said pipes open within the dome C. At the mouth of the flue *k* a box 16 is mounted in the furnace, said box having a discharge-nipple 17, opening above the coil E. This box is designed to contain any oxygen-producing compound—as, for example, permanganate of potash, black oxide of manganese, or other similar substance, which may or may not be mixed with an acid. The heat from the fire-box passing through the flue causes the compound to give off oxygen, which is discharged through the nipple 17 into the rear box D. A protecting-slide 18 is arranged under the box, and may be manipulated through the furnace-wall by any desired means. Said slide has an upwardly-turned lip 19 adjacent the fire-box, and is provided on its inner face with protecting-lining 20, (indicated by a black line in Fig. 4.) which is constructed of insulating material. By manipulating this slide laterally of the box the bottom thereof may be protected in a proportionate degree from the flame of the fire-box.

When the fires are dampened in the furnace, so that the flame or sufficient heat to effect the compound in the box will not ignite the discharge of oxygen, I provide an inflammable gas, which is generated from a mineral oil contained in a box 25 at the front of the furnace outside, or where it will be subject to a mild degree of heat. Said oil being of a light volatile nature, I conduct the same by a pipe 26, which opens at 27, adjacent the mouth of the nipple 17, within the box D. As such gas is of a highly-inflammable nature, it readily ignites from the heat from the fire-box. Water being admitted to the supply and fire started in the grate, the full force of the heat is drawn against the U-shaped pipes H, creating an independent circulation in each of said pipes and the dome. The heat passing through the flue *k* and drawn downward to enter the stack *m* superheats the water in the feed-water-heating coil E, delivering it to the dome C in such condition. By

- means of the oxygen and gas, generated as described, this heat may be intensified to any desired degree and maintained when the fire on the grate is low. Moreover, when the device is used for hot-water heating, the water, being discharged from the dome-pipe *i* is returned through the return-pipe *r* directly into the coil and again superheated, maintaining a constant rapid circulation.
- 10 The same device is applicable for steam-heating by reducing the amount of water in the dome to allow for steam-space. The amount of fuel necessary to the proper heating of the water or generating of the steam is greatly reduced by my improved arrangement.

It will be understood that the oxygen-generator and gas apparatus described may be applied to other forms of furnaces for superheating the supply before delivery to the boiler.

Having thus explained my invention, what I claim is—

1. The furnace A, provided with the box D, having the stack *m*, and the wall *g*, in combination with the dome C, the feed-water-heating coil E, disposed behind said wall and opening into said dome, the flue *k* at the top of said wall, and a receptacle for containing an oxygen-generating compound disposed adjacent said flue and opening against said coil, substantially as described.
2. In a heater, a furnace and steam or water dome, in combination with a circulation feed-water-heating coil disposed in said furnace between its fire-box and stack, and a receptacle for containing an oxygen-generating compound disposed adjacent said coil.
3. The furnace A and dome C, in combina-

tion with the supply feed-water-heating coil E, leading into said dome, and an apparatus disposed within the furnace adjacent said coil for generating oxygen and an inflammable gas by the heat from the fire-box, substantially as described.

4. The furnace A, provided with the flue *k* and stack *m*, in combination with the dome C, the feed-water-heating coil E, opening into said dome, the receptacle 16, disposed adjacent said flue and opening against said coil, and the shield or guard 18 for said receptacle, all being arranged to operate substantially as described.

5. The combination, with the furnace A, dome C, and circulation feed-water-heating coil, of the oxygen-generating receptacle 16, having a discharge-opening against said coil, and the oil-tank 25, having the discharge-opening adjacent the oxygen-discharge, substantially as described.

6. The combination, with a furnace and boiler, of a supply-pipe for said boiler, disposed in the furnace in the draft from its fire-box, and an oxygen-generating compound so disposed that the oxygen given off will be ignited by the heat from said box and superheat said supply.

7. The combination, with a furnace and boiler, of a supply-pipe for the boiler, passing through the fire-box draft, an oxygen-generator disposed adjacent such supply-pipe, and an inflammable gas-generator, all being arranged substantially as described.

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Witnesses:

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