

(No Model.)

2 Sheets—Sheet 1.

G. E. BENNINGHOFF & C. F. JEWELL.

HEAT PRODUCING APPARATUS.

No. 344,615.

Fig 1. Patented June 29, 1886.

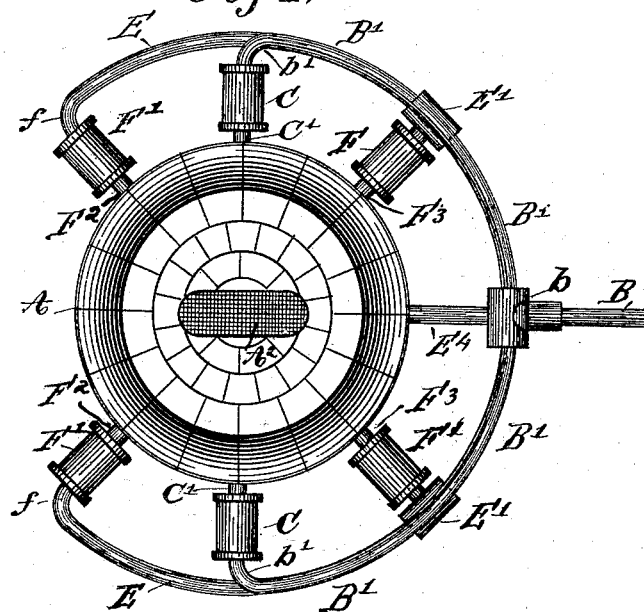
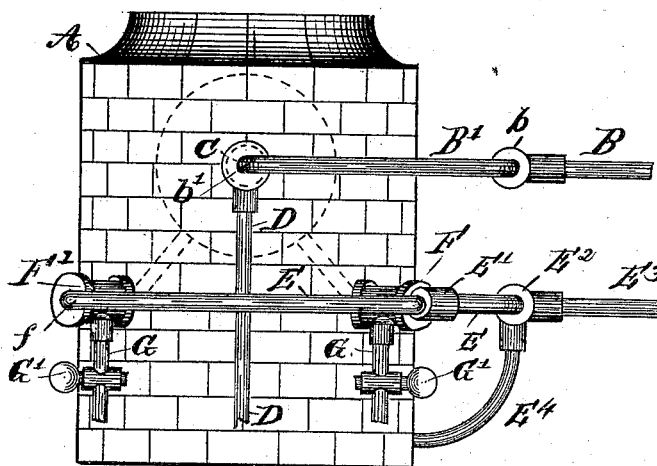


Fig 2



WITNESSES

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Fig. 3.

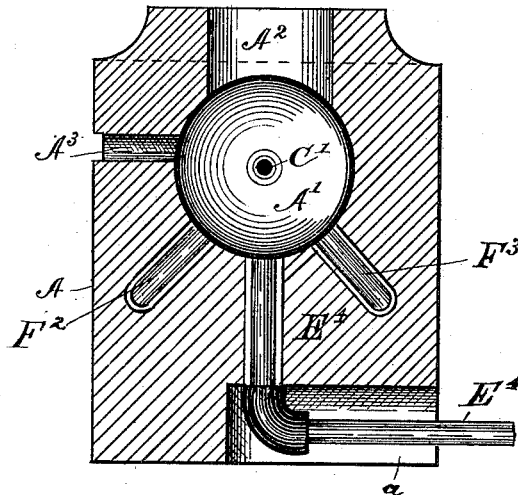


Fig. 4.

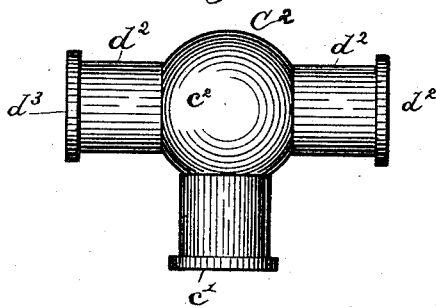
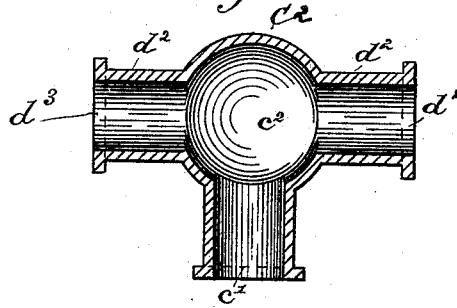


Fig. 5.



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UNITED STATES PATENT OFFICE.

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HEAT-PRODUCING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 344,615, dated June 29, 1886.

Application filed August 25, 1885. Serial No. 175,326. (No model.)

To all whom it may concern:

Be it known that we, GEORGE E. BENNINGHOFF and COLLIN F. JEWELL, citizens of the United States, residing at Kendall Creek, in the county of McKean and State of Pennsylvania, have invented certain new and useful Improvements in Heat-Producing Apparatus; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The object of this improvement is an economical and intense heat-producing fuel, produced by mixing air and gas under pressure, and suitable mechanical means for practically applying the same to blacksmithing, various metal-working, and to heating purposes in general, by introducing the same into the combustion-chamber of a forge or furnace in a thoroughly-blended state. These results are attained by the process hereinafter described, and the mechanism illustrated in the drawings herewith filed as part hereof, in which the same letters of reference denote the same parts in the different views.

Figure 1 is a plan. Fig. 2 is a side elevation. Fig. 3 is a vertical section taken centrally. Fig. 4 is a representation of the gas-oxygenizers on enlarged scale. Fig. 5 is a longitudinal section of same.

A represents brick or stone masonry forming a forge, the inner part of which may be formed of fire-brick, and the whole inclosed in a metal cylinder and cap conforming thereto.

A' is a spherical combustion-chamber provided with an escape, A², and opening A³, of any suitable size for introducing into the combustion-chamber bars to be heated. The combustion-chamber may be oval, cylindrical in form, or otherwise, as may be deemed advisable, and the same may be changed to suit the purposes for which the heat is to be applied.

B is a blast-pipe connected, through a union-piece, b, and blast-conduit B' B', with gas-oxygenizers C C, the interior construction of which is fully illustrated in Fig. 4.

D D are gas-supply pipes connected with oxygenizers C C, and C' C' are conduit-pipes

for introducing oxygenized gas into the combustion-chamber A.

E³ is a blast-pipe connected through a union-piece, E², with blast-conduit E, connected through union-pieces E' with gas-oxygenizers F F, and through curved continuation of pipe E, as shown at f f, with gas-oxygenizers F' F', which are provided with gas-supply pipes G G, having stop-cocks G' G', as fully shown in Fig. 2.

F² F³ are conduit-pipes connected with and having a direction from the gas-oxygenizers F' F' toward the center of the combustion-chamber A', for the purpose of producing a blast concentric with the combustion-chamber A', and thereby attain a thorough blending of the elements of combustion in all the parts of the chamber.

E⁴ is an air-blast conduit-pipe connected through the union-piece E² with the blast-pipe E³, and thence directed through recess a of the forge A and a recess in the vertical center of the latter to the combustion-chamber A', as fully shown in Fig. 3.

Referring to Figs. 4, 5, C² C² represent the gas-oxygenizers on an enlarged scale. c² is the air-and-gas-mixing chamber. To their rectangular extensions c' the gas-supply pipes D and G are suitably connected. The parts d² d³ are provided with screw-threads for connection therewith of blast-pipes B' and E and oxygenized-gas conduits C' F³.

The blast-pipes B and E³ may be connected to and supplied with air through a single blast-conduit connecting with a fan or other suitable mechanism for producing a similar result.

The operation is as follows: Gas will flow into the chambers c² of the oxygenizers C and F F' through the pipes D G, and will be blended in the chambers c² with the air-blast entering the latter through the pipes B' E', and will be forced thence through the conduit-pipes C' and F³ in a thoroughly-mixed state into the combustion-chamber A', where the different currents of air and oxygenized gas will blend with each other, and thus be put in condition for thorough combustion, from which a very intense heat will be produced more economically

than is otherwise practicable. The vertical blast through the pipe E¹ will assist the blending of the different currents introduced into the combustion-chamber and the action of the

5 heat in a vertical direction.

The pipe E¹ may be provided with a stop-cock for stopping entirely or partially reducing the force of the blast through the same, as occasion may require.

10 The stop-cocks G' G' of the supply-pipe connecting with the oxygenizers F F' may be used for partially or entirely cutting off the flow of gas into the oxygenizers, as occasion may require, and the pipes E E used as air-conduits

15 only.

The form of oxygenizer herein described is preferable for producing a suitable mixture of gas and air; but the same may be more or less modified without altering the spirit of our

20 invention or departing substantially from the construction shown. We therefore do not confine ourselves strictly to the form described, but may use any suitable construction for the same that is adapted to produce the result

25 specified.

Having explained the features of our improvement, what we claim as new, and desire to secure by Letters Patent, is—

1. The combination, in a furnace, of the combustion-chamber, the air and gas supply pipes, the oxygenizers or mixing-chambers, and the conduits extending through the furnace-wall,

the area in cross-section of the mixing-chambers being greater than the sum of the similar areas of the pipes, and that of the conduits 35 equal to said sum, substantially as and for the purpose set forth.

2. The combination, in a furnace, of a combustion-chamber, the air and gas supply pipes, the oxygenizers or mixing-chambers, and the conduits extending through the furnace-wall 40 for introducing into the combustion-chamber sub-currents of air or gas, or air and gas, and distributing the combustion to all parts of or locating the heat of the same in any desired part 45 of the combustion-chamber, substantially as specified, for the purpose set forth.

3. The combination, in a furnace, of a combustion-chamber, the air and gas supply pipes, the oxygenizers or mixing-chambers, the conduits extending through the furnace-walls in 50 positions opposite to each other, and the conduit extending into the body of the furnace and vertically through the center of the same to the combustion-chamber, as and for the purpose set forth. 55

In testimony whereof we affix our signatures in presence of two witnesses.

GEORGE E. BENNINGHOFF.
COLLIN F. JEWELL.

Witnesses:

JAMES GEORGE,
N. B. SMILEY.