No. 749,502. PATENTED JAN. 12, 1904.

G. TEICHGRAEBER.

APPARATUS FOR HEATING AIR FOR SUPPLYING BLAST FURNACES.

APPLICATION FILED JAN. 6, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

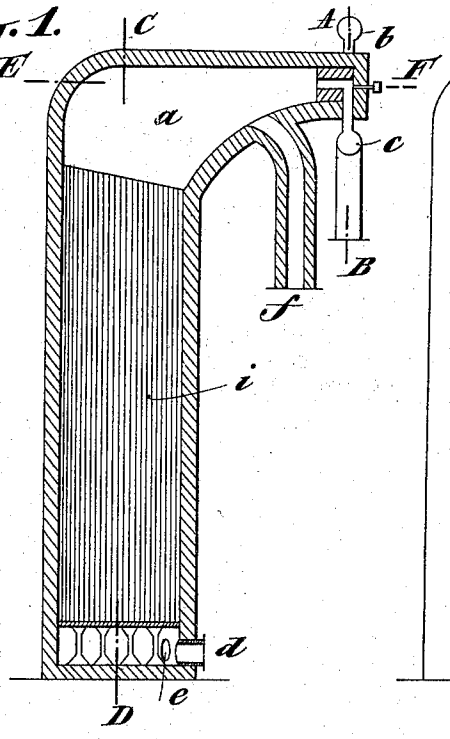



Fig. 2.

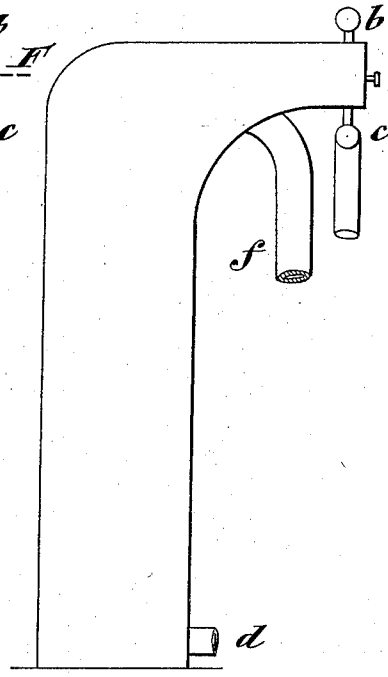



Fig. 3.

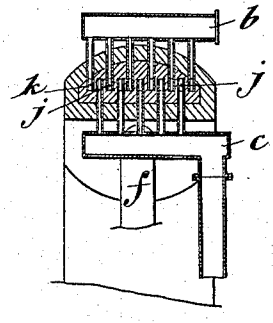



Fig. 4.

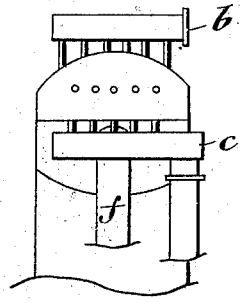
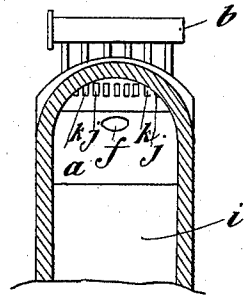



Fig. 5.



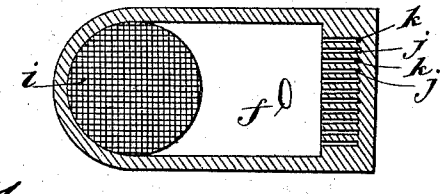




Fig. 6.

Witnesses.
Bruce A. Elliott.
Robert Everett.

Inventor.
George Teichgraeber.
By James L. Norris.
Atty.

No. 749,502. PATENTED JAN. 12, 1904.

G. TEICHGRAEBER.

APPARATUS FOR HEATING AIR FOR SUPPLYING BLAST FURNACES.

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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 7.

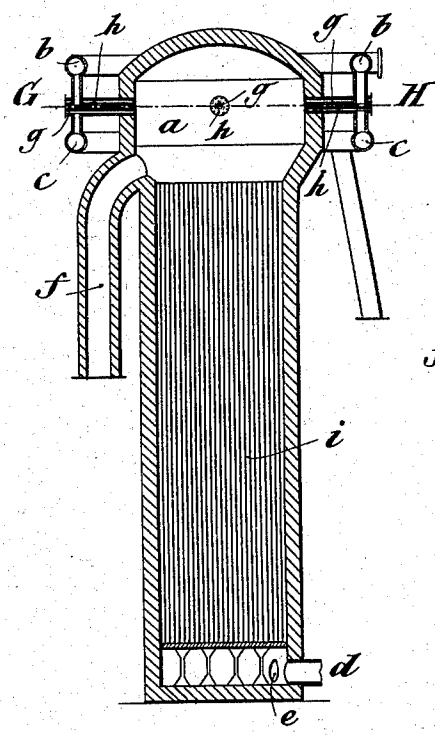



Fig. 8.

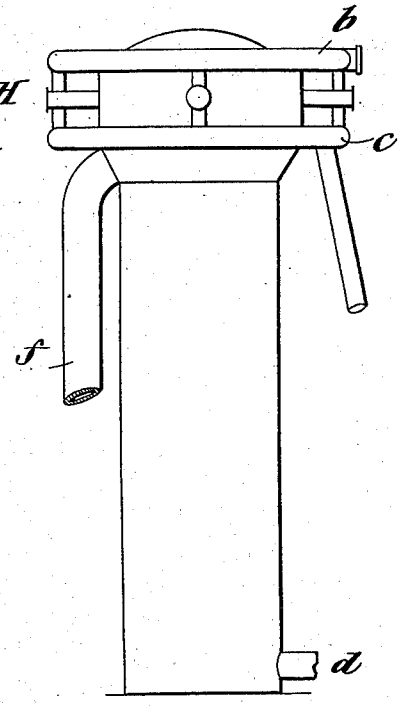
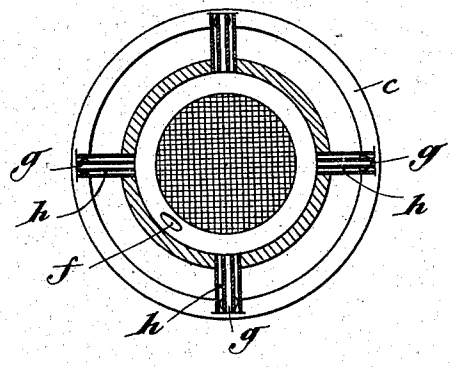



Fig. 9.



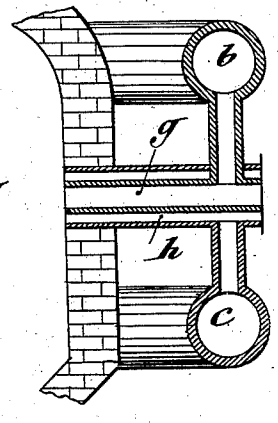




Fig. 10.

Witnesses.
Bruce A. Everett.
Robert Everett.

Inventor.
George Teichgraeber.
By James L. Norris.
Atty.

No. 749,502. Patented January 12, 1904.

# UNITED STATES PATENT OFFICE.

GEORGE TEICHGRAEBER, OF MARCHIENNE AU PONT, BELGIUM.

## APPARATUS FOR HEATING AIR FOR SUPPLYING BLAST-FURNACES.

SPECIFICATION forming part of Letters Patent No. 749,502, dated January 12, 1904.

Application filed January 6, 1902. Serial No. 88,614. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE TEICHGRAEBER, a subject of the Emperor of Germany, and a resident of Marchienne au Pont, Belgium, have invented a certain new and useful Improvement in Apparatus for Heating Air for Supplying Blast-Furnaces, of which the following is a specification.

This invention relates to improvements in apparatus used for heating air for supplying blast-furnaces.

In order to obviate the disadvantages of the Cowper system, various modifications thereof have been proposed. One notable proposal of this kind is to suppress the combustion-pit and to effect the combustion of the heating-gas in the free space above the generator proper, through which the air passing to the blast-furnace is caused to flow when this generator has been sufficiently heated by the passage of the burned gases, which are drawn from the top to the bottom by the chimney; but the apparatus designed to embody this modification have not given the expected result, because their arrangement did not admit of the gas and the air mixing properly in the combustion-chamber. The air conducted above the generator through passages formed in its walls and terminating at the circumference of the combustion-chamber was drawn by the draft of the chimney directly through the external tubes of the generator that are nearest to the orifice of the air-passages, while the gas introduced either down from the center of the top of the combustion-chamber or up through a passage formed in the center of the flues of the generator and extended into the said chamber was drawn directly through the flues of the generator that are nearest to the center. The mixture of air and gas required for combustion was therefore produced not in the chamber at the top of the generator, but principally at the bottom of the said generator in the free space underneath the lower orifice of the flues, and the result was that the generator scarcely became heated, as a very considerable portion of the heat escaped through the chimney without useful effect.

My invention has for its object to obviate this disadvantage by insuring a good mixture of air and gas and causing its combustion to be effected in the chamber above the generator. For this purpose I arrange the air and gas inlet passages in the said chamber so as to cause the air and the gas to enter in or approximately in the same plane at places sufficiently far away from the upper orifices of the flues of the generator that the combustion will take place above the said orifices. Furthermore, I enlarge the chamber above the flues of the generator, so as to form a dome, whose form and dimensions likewise assist in the complete combustion of the gaseous mixture.

The accompanying drawings show two means for carrying out my invention.

Figure 1 is a vertical section of the apparatus. Fig. 2 is an elevation. Fig. 3 is a vertical section on the line A B of Fig. 1 and viewed from the right-hand side. Fig. 4 is an elevation corresponding to Fig. 3. Fig. 5 is a vertical section of the upper part of the apparatus on the line C D of Fig. 1 and viewed from the left-hand side. Fig. 6 is a horizontal section on the line E F of Fig. 1 and viewed from above. Fig. 7 is a vertical section of a modification of the apparatus. Fig. 8 is an elevation thereof. Fig. 9 is a horizontal section on the line G H of Fig. 7 and viewed from above; and Fig. 10 is a sectional detail, hereinafter more particularly described.

In the apparatus shown in Figs. 1 to 6, inclusive, the dome *a*, which surmounts the group of vertical flues *i* of the generator, is formed like a reverberatory furnace. The air introduced through the pipe *b* enters the combustion-chamber *a* by slits or openings *k* in the rear wall of this chamber and the gas introduced through the pipe *c* enters the chamber through slits or openings *j*, located in the same plane as the openings *k*, thereby insuring the mixing of the two elements and the combustion thereof in the dome *a*. After its combustion the gaseous mixture is drawn through the flues of the generator *i* and the tube *d*, leading to the chimney, by the draft of the said chimney. When the generator has been sufficiently heated, the admission of the gas and air through *b* and *c* is stopped, the outlet

to the chimney is closed, and the passages *e* and *f* are opened. The cold air then enters through *e*, passes through the tubes of the generator in which it is heated, and flows into the blast-furnace by the passage *f*.

In the modification of the apparatus shown in Figs. 7, 8, and 9 the dome *a* is formed as a cylindrical chamber of larger diameter than the part of the generator containing the flues, and the air and the gas are introduced into the said dome by pipes *h* and *g*, which are arranged concentrically and of which the orifices are distributed at intervals on the periphery of the dome. The drawings show four of these double tubes; but their number may be varied as desired. The air from the pipe *b* enters the dome through the internal pipes *g*, and the gas from the pipe *c* enters the dome through the external pipes *h*, or vice versa. The apparatus acts in the same manner as in the previous case.

The different forms of inlet-pipe for air and gas hereinbefore described may be used indifferently in one or the other modification of my invention.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

In an apparatus for heating the air for supplying blast-furnaces, the combination of a plurality of regenerator-flues, a dome placed above said flues, a gas-passage, a plurality of gas-inlet passages leading from said gas-passage into said dome, an air-passage, a plurality of air-inlet passages leading from said air-passage into said dome, said gas and air inlet passages being located in the same plane, an inlet for cold air beneath said regenerator-flues, and an outlet for said air after it has been heated by said flues.

In witness whereof I have hereunto set my hand in presence of two witnesses.

GEORGE TEICHGRAEBER.

Witnesses:

C. DONIES,

G. DONIES.