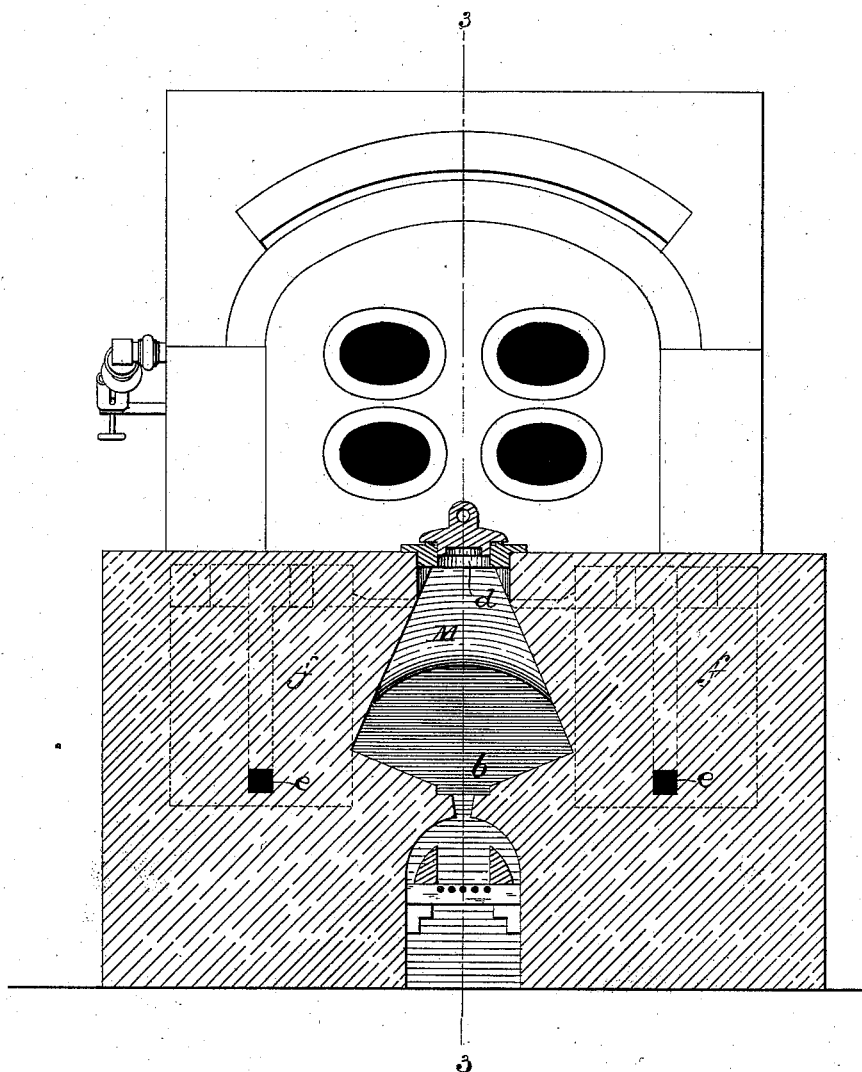


G. LIEGEL.
Furnace for Gas-Retort and other Purposes.
No. 219,165. Patented Sept. 2, 1879.

Fig. 1.



WITNESSES

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Wm F. Kilgore

INVENTOR

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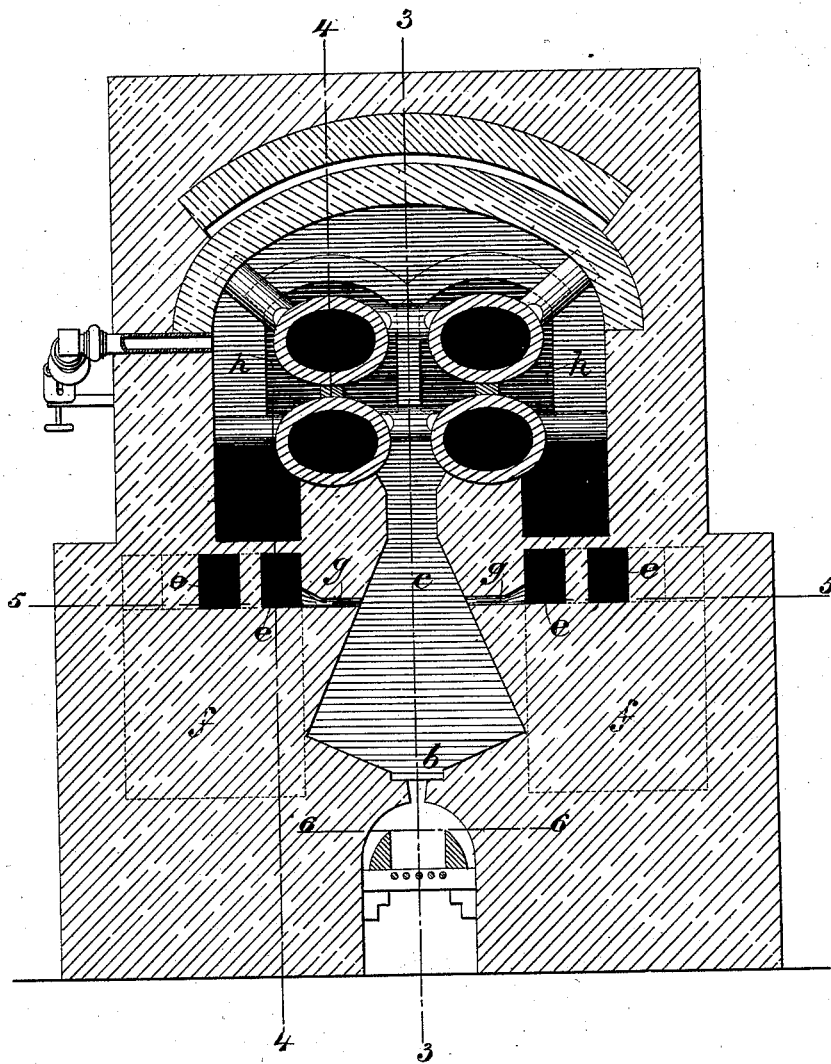
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Fig. 2.



WITNESSES

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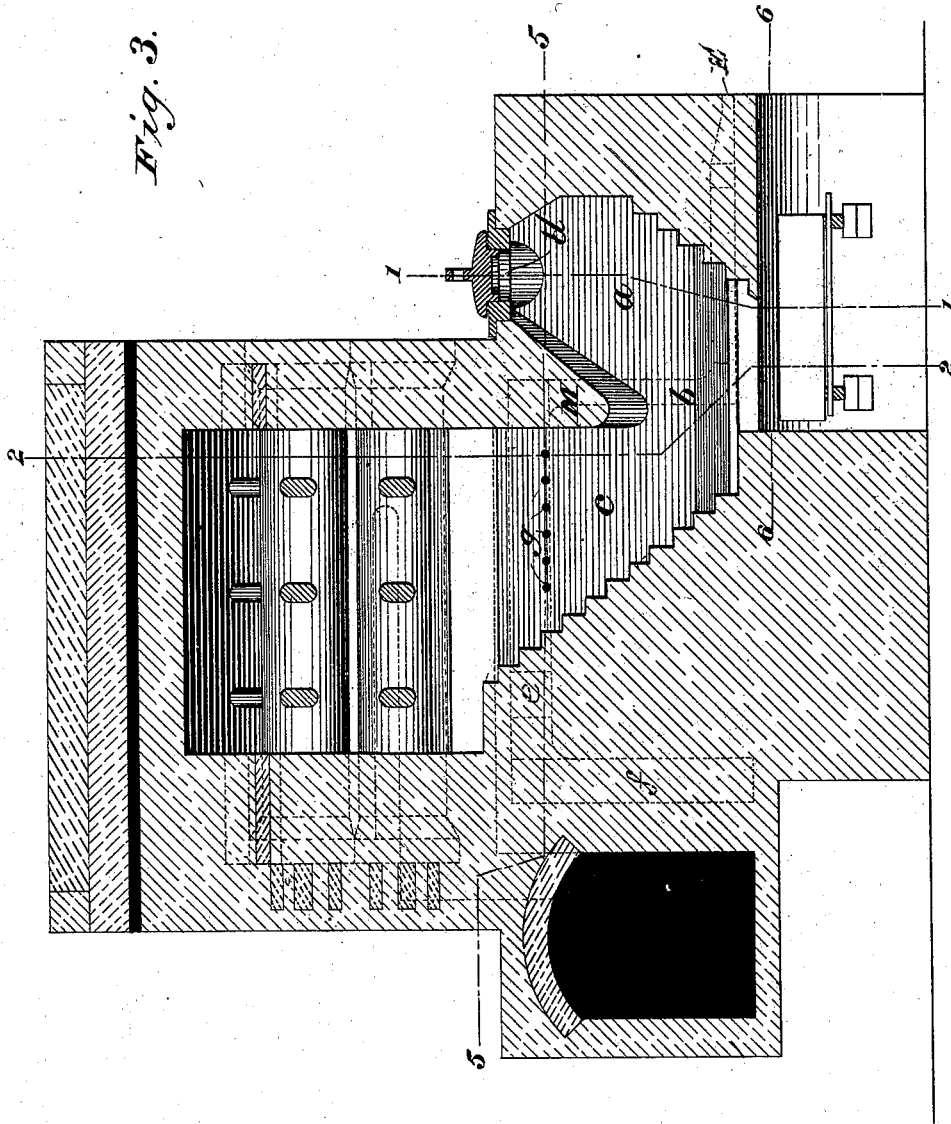
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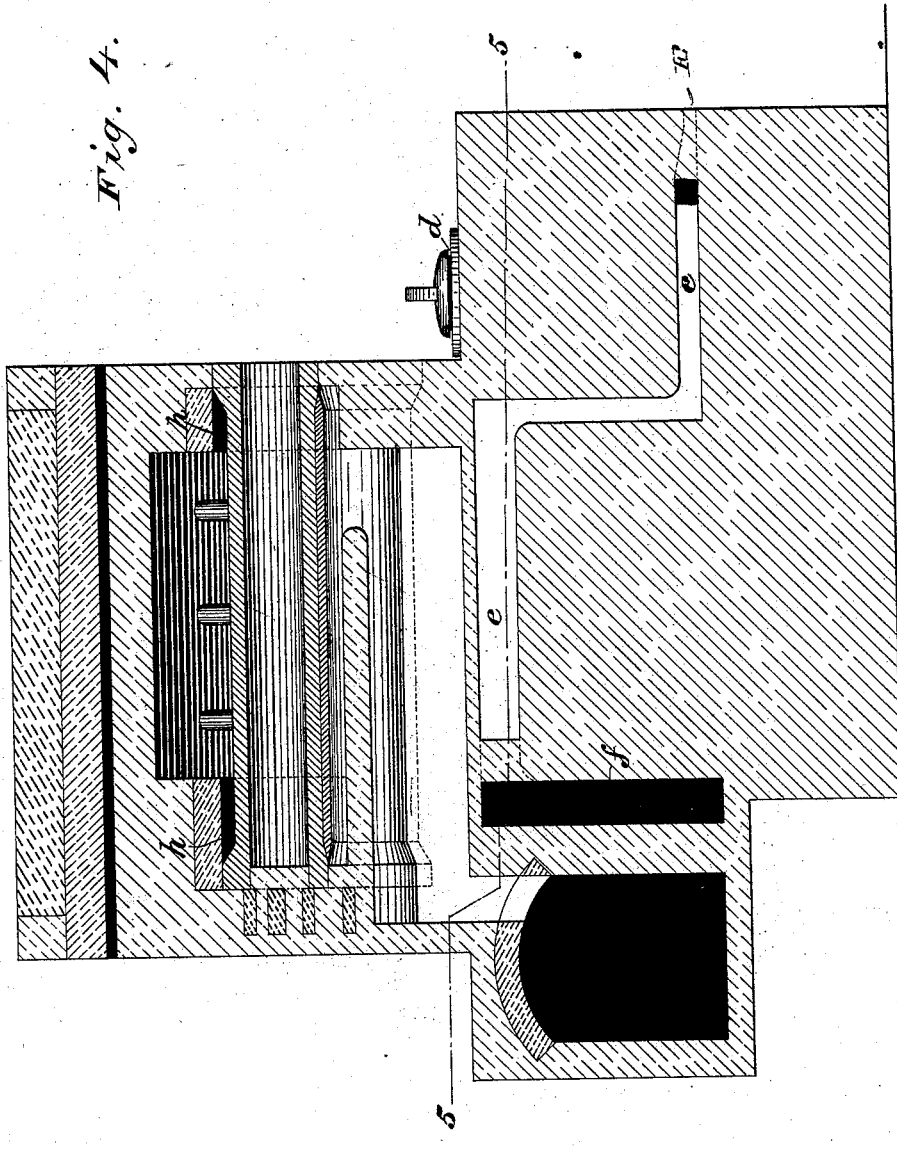
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Fig. 4.



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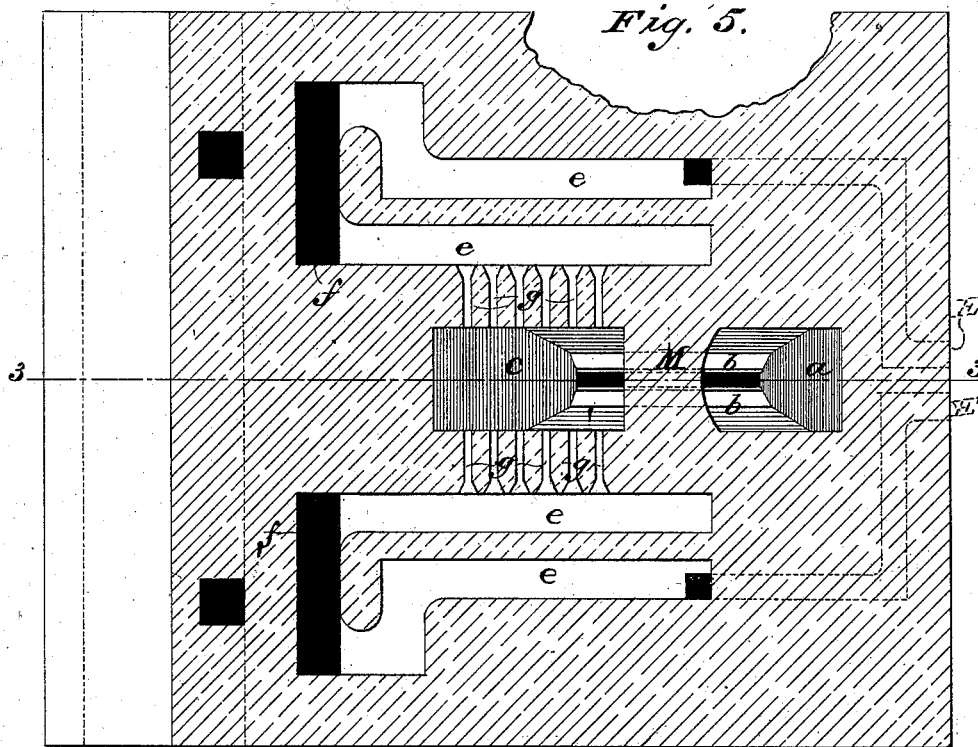
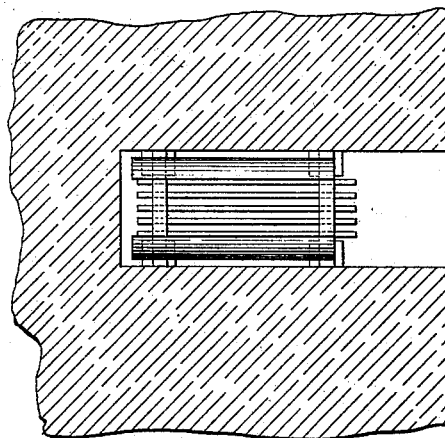


Fig. 6.



WITNESSES

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Fig. 7.

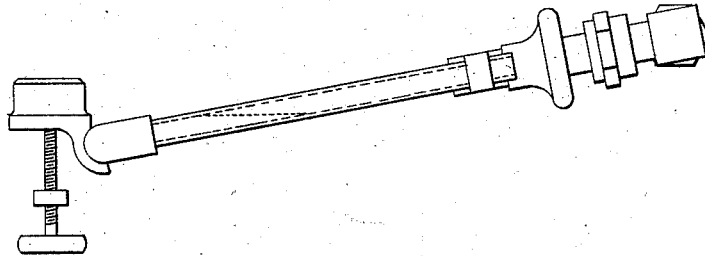
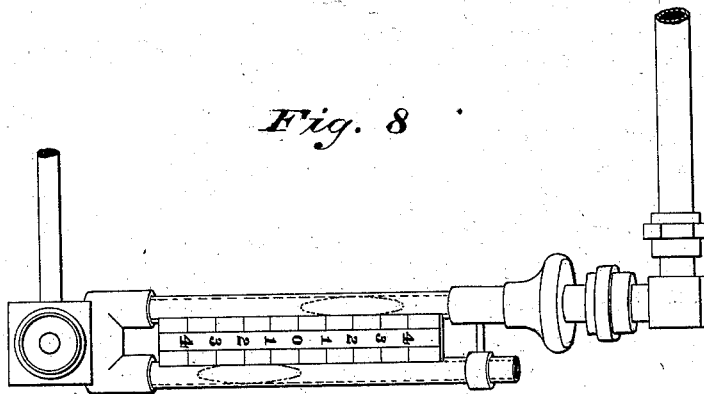


Fig. 8



WITNESSES

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UNITED STATES PATENT OFFICE.

GEORG LIEGEL, OF STRALSUND, PRUSSIA, GERMANY.

IMPROVEMENT IN FURNACES FOR GAS-RETORTS AND OTHER PURPOSES.

Specification forming part of Letters Patent No. **219,165**, dated September 2, 1879; application filed June 4, 1879.

To all whom it may concern:

Be it known that I, GEORG LIEGEL, of the city of Stralsund, Kingdom of Prussia, and German Empire, have invented new and useful Improvements in Furnaces for Gas-Retorts and Other Purposes, of which the following is a specification.

The present invention relates to improvements on the furnace system for which Letters Patent No. 208,106 were granted to me September 17, 1878; and consists in additions and alterations for the better utilization and economy of the heat, and for regulating the draft, which I will now describe, and then designate in my claims.

In the drawings, Figure 1 is a front elevation, partly in section, on line 1 1 of Fig. 3. Fig. 2 is a vertical transverse section on line 2 2 of Fig. 3. Fig. 3 is a vertical longitudinal section on line 3 3 of Figs. 1, 2, and 5. Fig. 4 is a vertical longitudinal section on line 4 4 of Fig. 2. Fig. 5 is a horizontal section on lines 5 5 of Figs. 2, 3, and 4. Fig. 6 is a horizontal section on line 6 6 of Fig. 2; Figs. 7 and 8, details of manometer.

The main features of my system are described in the specification forming part of Letters Patent No. 208,106, and need not be here repeated.

My improvements consist in the manner of supplying air for the combustion of the carbonic oxide arising from the fire-chamber *b*. The air for supplying the oxygen for the formation of carbonic oxide enters through the slit in the bottom of the fire-chamber *b*. The secondary supply of air for the combustion of the carbonic oxide, or for converting it into carbonic acid, enters at the front end, through the openings *E*, into the flue or channel *e*, which, beginning at the opening *E*, runs back on each side of the fire-chamber *b*, then rises and continues back under the last fire-flue to a chamber, *f*, made in the wall forming one side of the main flue leading to the chimney. From the chamber *f* it passes back through a flue or channel, under the last fire-flue, inside of and parallel with the flue or channel through which it enters. At the end of this latter flue, and leading into the combustion-chamber *c*, are a number of small funnel-shaped holes, *g*, through which the secondary supply of air finally

reaches the combustion-chamber *c*. This funnel shape facilitates the passage of the air and causes its more rapid and more equal distribution.

It is an important feature of this improvement that, while the air is supplied at a high temperature, it obtains its temperature from the hot gases on their way to the chimney after they have given out the heat that is generally utilized, and thereby saves heat which would otherwise be lost. The sectional area of the flue or channel *e* is enough larger than the combined sectional areas of all the small holes *g* to insure a uniform exit of air from each and all of them.

My improvements further consist in increasing the heating-surface of the retorts, when this system is employed in a furnace for gas-retorts, by having the end walls provided with niches *h* for the ends of the retorts, the niches *h* being large enough to allow a space to be left around the retorts for the circulation of the hot products of combustion.

The drawings represent my system as applied to a furnace for gas-retorts; but it is evident that it may be applied to smelting, puddling, steam-generating, or other purposes where a high temperature is required.

The position of the fuel-chamber can be changed with respect to the combustion-chamber to suit circumstances.

Instead of having the walls of the fuel-chamber converge toward the top they may diverge, so as to increase the capacity of the chamber when desired.

For the fire-proof stones forming the slit at the bottom of the fuel-chamber and the air-channels below it, as in my said patent, an iron or steel structure may, in some cases, be substituted, the advantages of which are that it is cheaper, and will allow a more ready change of the size of the slit, and for certain classes of fuel it is more durable.

I am aware of the United States Patent of Stanley, No. 180,955, and my improvements are distinguished from the subject-matter of that patent by a different arrangement of flues and in having funnel-shaped distributing-holes in the furnace-walls, as above described, and my invention is limited accordingly.

Having described the improvements in my

furnace, I claim as new and desire to secure by Letters Patent—

1. In a gas-retort furnace, the walls of the combustion-chamber, provided with an air-inlet flue, a hot-air chamber, a return-flue, and funnel-shaped distributing-holes, in combination with the combustion-chamber, substantially as described.

2. The combination, substantially as herein-

before set forth, of a furnace having recesses in the end wall around the ends of the retorts and the retorts, for the purpose specified.

In testimony whereof I have hereunto subscribed my name.

GEORG LIEGEL.

Witnesses:

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HEINR. SANDON.