

G. E. ÖHRN.
CHANNEL KILN.

APPLICATION FILED JUNE 15, 1909.

Patented Feb. 1, 1910.

3 SHEETS—SHEET 1.

948,243.

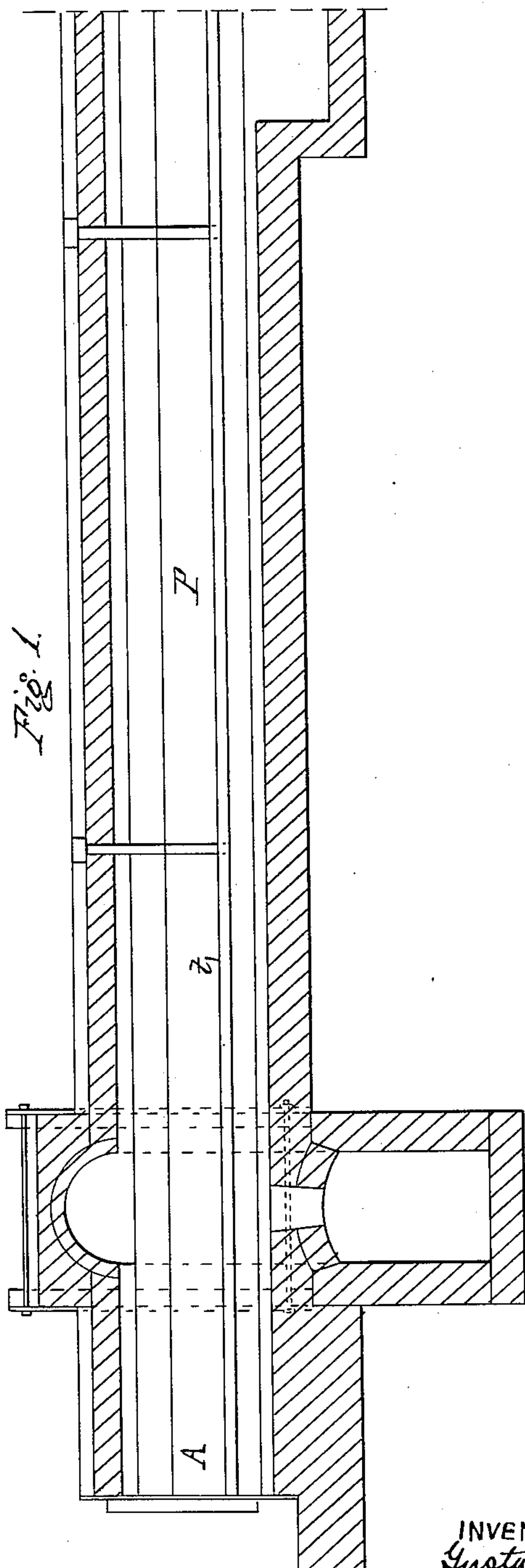


Fig. 1.

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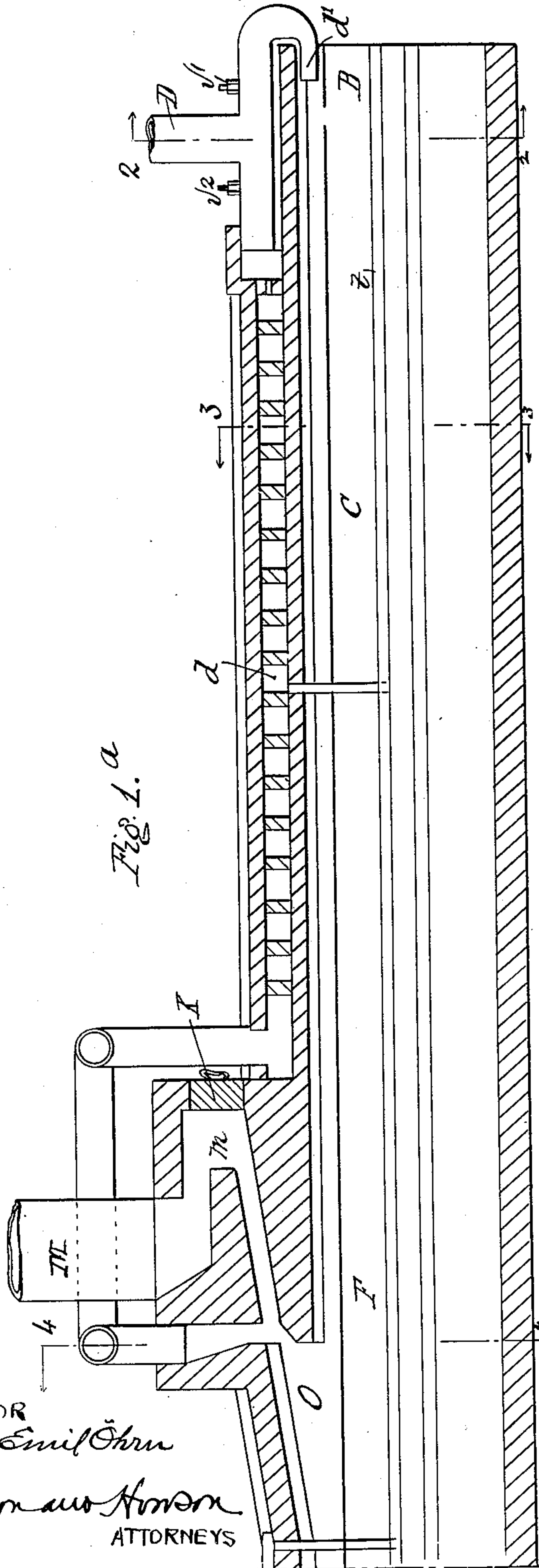
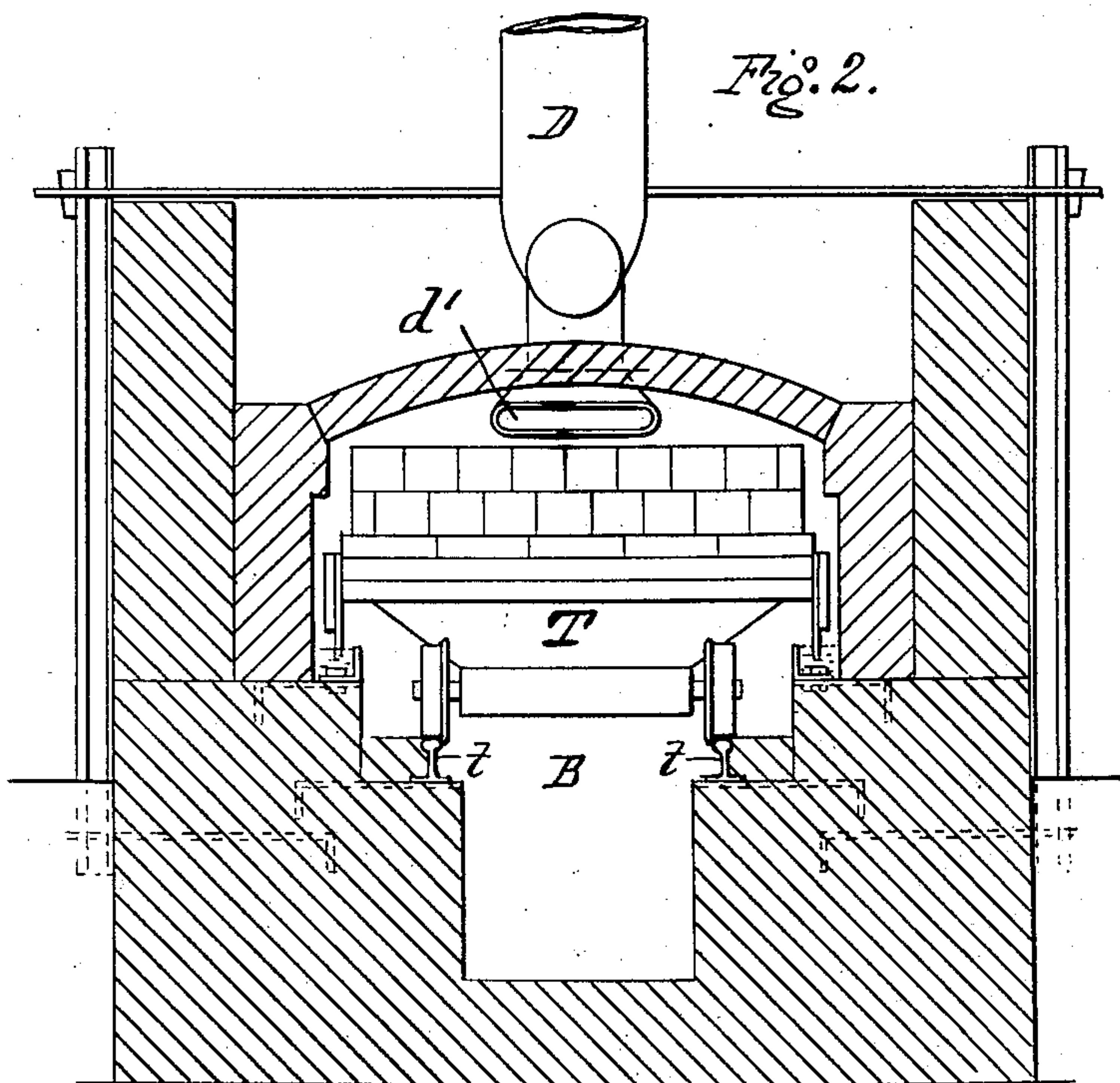
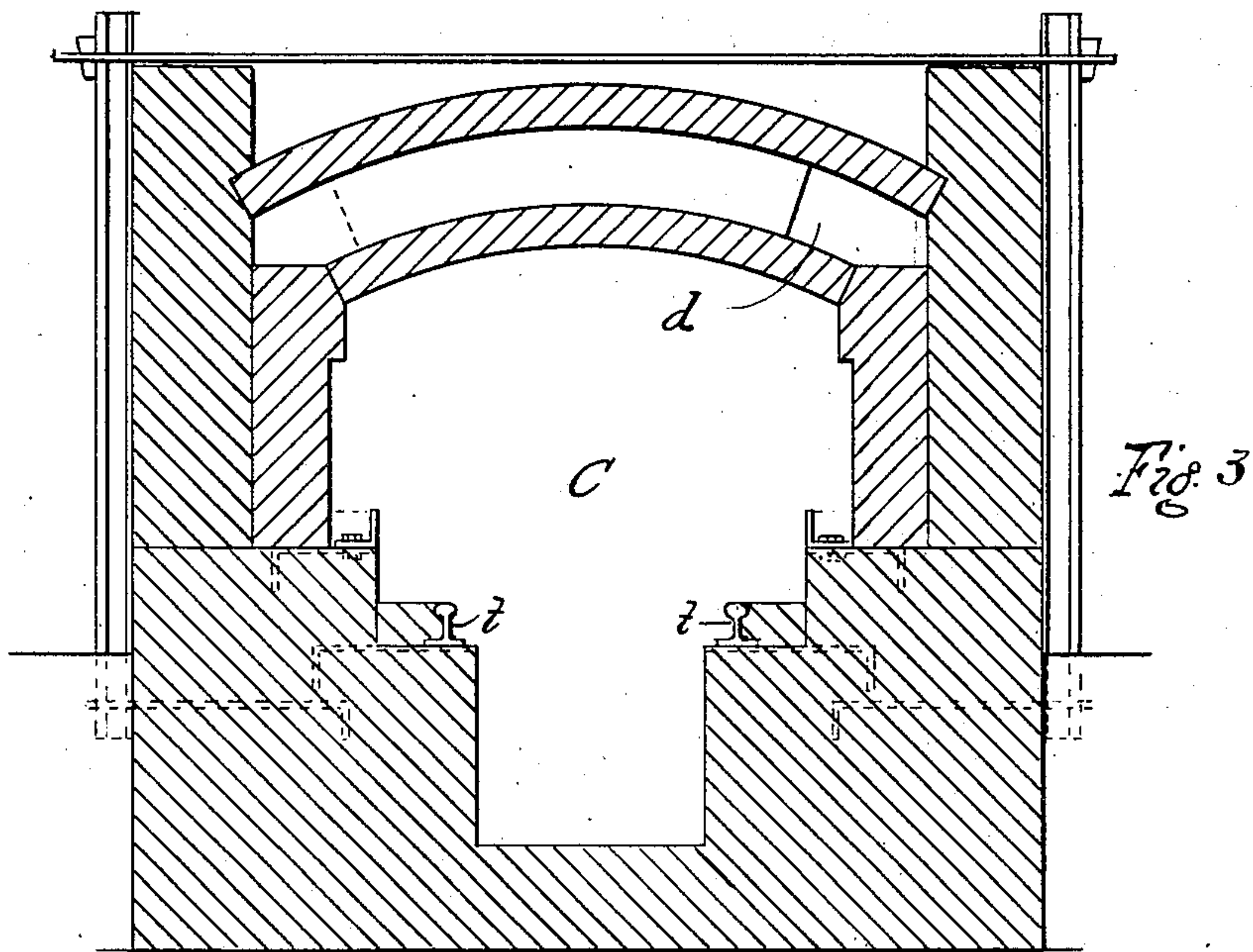


Fig. 1. a.

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3 SHEETS—SHEET 3.

Fig. 5.

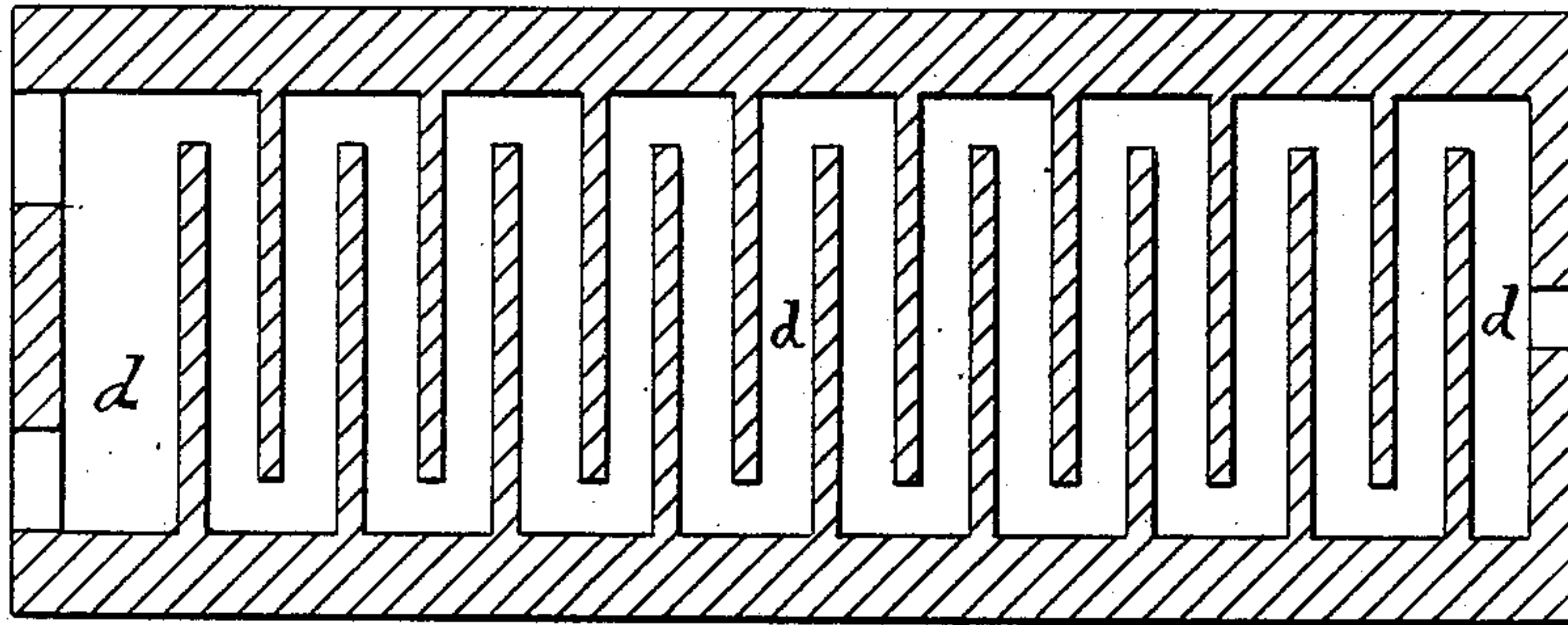
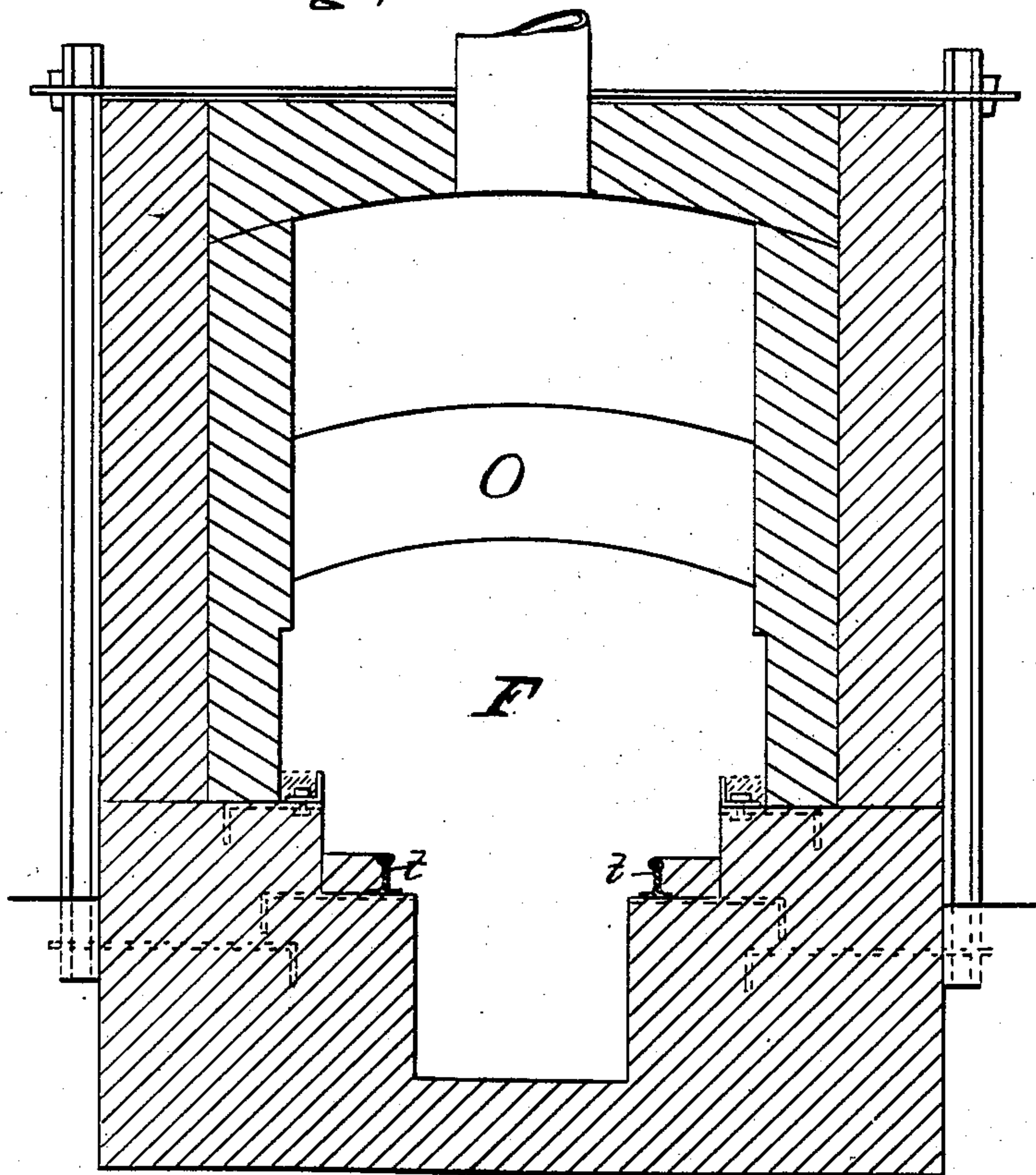


Fig. 4.



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UNITED STATES PATENT OFFICE.

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CHANNEL-KILN.

948,243.

Specification of Letters Patent.

Patented Feb. 1, 1910.

Application filed June 15, 1909. Serial No. 502,400.

To all whom it may concern:

Be it known that I, GUSTAF EMIL ÖHRN, a subject of the King of Sweden, and resident of Herräng, Häfverösund, Sweden, have invented a certain new and useful Improvement in Channel-Furnaces, of which the following is a specification.

My invention relates to channel furnaces and particularly to a furnace of the type described in the U. S. patent to Grondal 876,712, the object of my invention being to improve the same in the particulars hereinafter pointed out.

In the accompanying drawings, Figures 1 and 1^a are broken horizontal vertical sections through the entrance and exit ends respectively of a furnace of the type mentioned, showing my invention applied thereto; Fig. 2 is a transverse vertical section through the furnace on the line 2—2, Fig. 1^a; Fig. 3 is a similar view on the line 3—3, Fig. 1^a; Fig. 4 is a similar view on the line 4—4, Fig. 1^a; and Fig. 5 is a horizontal section through the air passage in the roof of the cooling chamber.

For the purpose of description the invention is shown applied to a furnace of the Grondal channel type mentioned, having an entrance A at one end for the introduction of the material to be treated, which is carried by trucks T running on tracks *t* through the preheating room P to the combustion chamber F where it is subjected to the action of the flame issuing from the burner port O, and passes thence to the cooling room C which it finally leaves through the exit B.

My improvement relates to the burner port O and the conduits which lead the gas and air thereto, my object being to secure a more thorough admixture of the gas and air at the burner port, to present a better directed, better controlled and more effective flame to the material on the trucks T, and to conduct the air to the burner port in better condition to assist in the combustion of the gas. To this end the gas after it leaves the main M is passed through a conduit *m* which is shaped to not only spread the gas into a comparatively thin layer but also to interrupt the direction of its flow and break the current into eddies, both of which features facilitate the mixture of the air therewith. As shown this conduit *m* has a sharp U bend, the lower arm of which leads to the burner port discharging the gas in a thin

whirling stream having a slight downward inclination. A cleanout hole K may be opened into the U bend, as indicated.

The cooperating air blast which is led to the furnace through the pipe D is preferably divided, portion being conducted by one branch through a baffled preheating passage *d*, arranged in the crown of the cooling chamber, to the burner port O. Here it descends in a substantially vertical stream and impinges against the gas current intimately mingling therewith as both gas and air pass through the burner port into the combustion chamber and tending to blow the flame down upon the material on the trucks T. The other portion of the air blast is led by the branch *d*¹ to the exit end of the cooling chamber where it is discharged, and passing over the material on the trucks cools the same. It reaches the burner port O very hot and impinging against the combustible mixture issuing therefrom, supplies any deficiency in the supply of oxygen necessary for the complete combustion of the gas. It will be noted that this arrangement insures a very intimate mixture of the gas and air since the blast in the branch *d* impinges against the stream of gas from one side, while the blast passing through the cooling chamber impinges against the other side of the stream as it issues from the burner port,—the air blast in each case meeting the stream with which it mingles, at substantially right angles. The efficiency of the blast is increased by the preheating of the air in one case as it passes through the baffled branch *d* in the crown of the furnace and in the other case as it passes over the heated material on the trucks. Furthermore by means of the valves *v*¹, *v*², one in each of the branches of the pipe D, a complete control of the quantity of air passing therethrough is afforded, and this together with a regulation of the velocity of the blast, makes it possible to give the flame any desired direction in the combustion chamber. Thus by increasing the strength of the blast through the cooling chamber the flame may be carried forward and spread over the top material on the trucks while by increasing that flowing through the branch *d* the flame is directed downward. These results may be obtained in other ways without departing from the scope of my invention and I do

not limit myself to the details of construction shown, but

I claim as my invention:

1. A channel furnace having a combustion chamber and a burner port in the crown thereof adapted to direct its flame downwardly upon the material in said chamber to be consumed, in combination with a gas conduit for leading a supply of gas to said port, said conduit being shaped to break the current of the flow of gas and thus present an eddy stream of gas to said burner, in combination with means for leading to the said burner downwardly directed and horizontally directed air blasts between which said gas is discharged, whereby an efficient mixture of gas and air is obtained, substantially as described.

2. A channel furnace having a combustion chamber and a burner port in the crown thereof adapted to direct its flame downwardly upon the material in said chamber to be consumed, in combination with a gas conduit for leading a supply of gas to said port, said conduit being shaped to break the current of the flow of gas and thus present an eddy stream of gas to said burner, in combination with means for leading to the said burner downwardly directed and horizontally directed air blasts between which said gas is discharged, whereby an efficient mixture of gas and air is obtained, together with means for independently controlling the said air blasts whereby the direction of the flame issuing from the burner port may be regulated, substantially as described.

3. A channel furnace having a combustion chamber and a cooling chamber communicating therewith, a burner port in the crown of said combustion chamber adapted to direct its flame downwardly upon the material in said chamber to be consumed, in combination with a gas conduit for leading a supply of gas to said port, said conduit being shaped to break the current of the flow of gas and thus present an eddy stream of gas to said burner, in combination with means for leading to the said burner downwardly directed and horizontally directed air blasts between which said gas is discharged, whereby an efficient mixture of gas and air is obtained, together with means in connection with said cooling chamber for preheating said air blasts.

4. A channel furnace having a combustion chamber and a cooling chamber communicating therewith, a burner port in the crown of the combustion chamber adapted to direct its flame downwardly upon the material in said chamber to be consumed, in combination with a conduit for leading a supply of gas to said port, said conduit being shaped to break the current of the flow of gas and thus

present an eddy stream of gas to said burner, in combination with a passage through the crown of the cooling chamber for an air blast and means for presenting the air blast passing therethrough to the burner port in a substantially vertical direction together with means for directing a supplementary air blast through the cooling chamber to said burner port in a substantially horizontal direction, and means for controlling said air blasts independently of each other, whereby the direction of the flame issuing from said port may be controlled, substantially as described.

5. A channel furnace having a combustion chamber and a cooling chamber opening thereto, through which the material treated passes, in combination with means for leading a supply of gas to the combustion chamber and means for leading a divided current of air to the gas inlet to aid in the combustion of said gas, portion of the air being led through the cooling chamber in contact with the material coming from the combustion chamber and serving to cool the same, portion of the air being led above said cooling chamber to the gas inlet, whereby said air is preheated and the combustion of the gas improved.

6. A channel furnace having a combustion chamber and a cooling chamber opening thereto through which the material treated passes, in combination with means for leading a supply of gas to the combustion chamber and means for leading a divided current of air to the gas inlet to aid in the combustion of said gas, portion of the air being led through a baffled passage in the crown of the cooling chamber to the gas inlet, whereby said air is preheated and the combustion of the gas improved.

7. A channel furnace, comprising a combustion chamber and a burner port opening thereto, said burner port being formed in the crown of said furnace and comprising an angled gas passage leading the gas to the port on a slight incline and a substantially vertical air blast passage leading a downwardly directed air blast to said burner port, whereby the flame issuing from said port may be blown down upon the material in said chamber, together with means for leading a supplementary air blast to said burner port in a substantially horizontal direction, and means for independently controlling said blasts for the purpose described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses.

GUSTAF EMIL ÖHRN.

Witnesses:

EDITH D. WRIGHT,
ARCHIE H. STRONG.