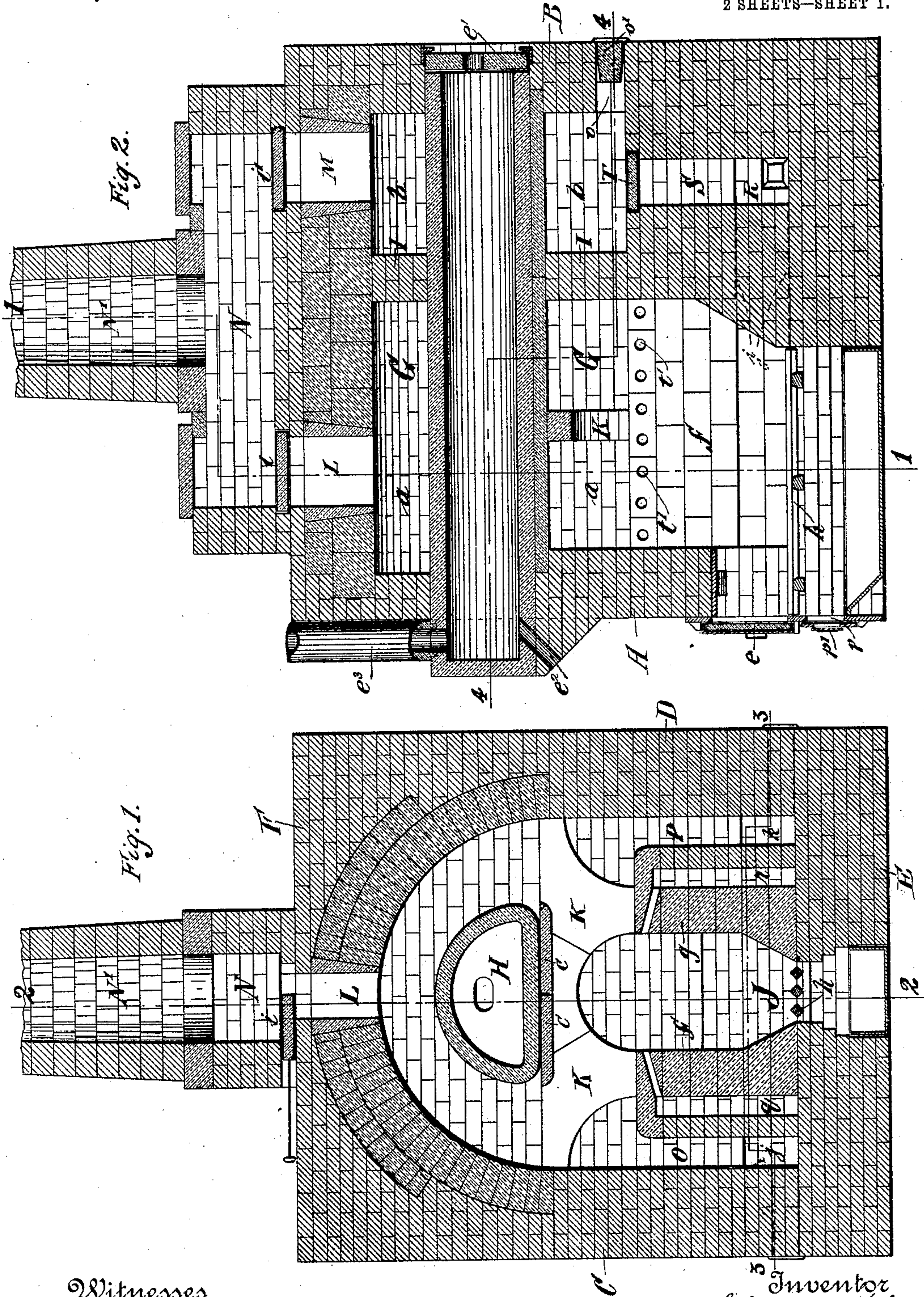


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ROASTING FURNACE.
APPLICATION FILED SEPT. 9, 1905.

945,041.

Patented Jan. 4, 1910.

2 SHEETS—SHEET 1.



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ROASTING-FURNACE.

945,041.

Specification of Letters Patent.

Patented Jan. 4, 1910.

Application filed September 9, 1905. Serial No. 277,741.

To all whom it may concern:

Be it known that I, GLENN H. NILES, a citizen of the United States, residing in Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Roasting-Furnaces, of which the following is a specification.

The object of this invention is to provide a heater for treating substance which it is desired to subject to different temperatures, or to like temperatures, in its several parts; and for this purpose the invention consists of a heater comprising means for producing temperature in a portion of the material being treated, and means for controlling said temperature.

The invention consists further in certain combinations of parts, and in certain details of construction, which will be fully described hereinafter and finally pointed out in the claims.

In the accompanying drawings, Figure 1 is a vertical transverse section on line 1—1 Fig. 2, through a heater embodying my invention, Fig. 2 is a vertical longitudinal section on line 2—2 Fig. 1, Fig. 3 is a horizontal section on line 3—3 Fig. 1, and Fig. 4 is a horizontal section on line 4—4 Fig. 2. Similar letters of reference indicate corresponding parts.

Referring to the drawings, A indicates the front wall of a suitable furnace, B the rear wall of the same, C and D the side walls respectively, E the bottom or base, and F the top. Within the furnace is a heating chamber G, adapted to receive the body or material to be heated, which may be of any state or form. For properly supporting the material within said chamber G a retort H may be arranged therein; any other suitable support may be employed in place of the retort, or in case the body to be treated is capable of self-support supporting means may be omitted.

J indicates the fire-box or heat-generating chamber of the furnace. The front wall of the fire-box is provided with a door or gate *e* of any suitable construction.

f and *g* indicate the side walls of the fire-box and *h* grate-bars at the bottom of the same. A transverse dividing wall I divides the heating-chamber G into portions, a front-portion *a* and a rear-portion *b*, and forms the rear wall of the fire-box. At its top the fire-box is open and communicates

with the front part of the heating chamber. The retort extends continuously through the dividing wall and in each portion of the heating chamber, and is provided, outside of said chamber, with inlet and discharge openings, as shown. It affords thereby a continuous support for the material from the charging end of the retort, through both portions of the heating chamber, to the discharging end. In the structure shown in the drawings, the inlet or charging end of the retort is adjacent the portion *b* of the heating chamber, and the discharging end adjacent the portion *a*. Any desired arrangement of openings may however be made without departing from the invention.

A bridge K extends transversely of and is supported on the side walls *f* and *g* approximately midway between walls I and A and aids in support of the retort. Tiles *c* below the retort protect the same against the action of the fire. The heating medium, comprising the heated products of combustion from the firebox, is conducted to the rear portion *b* of the heating chamber G by means of flues O and P, and rearwardly-extending horizontal flues *j* and *k*, and a connecting flue R, and an inlet-flue S. A damper T controls said inlet-flue and thereby the flow of said heating medium and its admission to the portion *b* of the heating chamber.

The portions of the heating chamber are provided with independent outlets L and M. A discharge flue N connects the same, and with the latter is connected a chimney N¹ or other draft-producing device. Said outlets are controlled by dampers *i* and *i*¹.

Flues *j* and *k* communicate at their front ends with the exterior atmosphere or any suitable air supply, and are controlled by plugs *b*¹ and *b*². From the connecting-flue R extend flues *l* and *m* which serve to admit air thereto and give access for cleaning. An inlet *o*, in the rear wall B, said inlet controlled by a plug *o*¹, connects the rear portion *b* of the heating chamber G with the atmosphere or other suitable air supply. Primary air is admitted to the fire in the fire-box J through an opening *p* controlled by a damper *p*¹ in the front wall of the furnace below the grate-bars *h*. Secondary air is admitted into secondary air flues *q* and *r* located respectively in the firebox walls *f* and *g* and controlled by dampers *s* and *t*. Openings *t*¹ near the upper ends of

the side walls *f* and *g* admit the secondary air into the furnace near the upper portion of the fire-box. An opening *e*¹, a discharge opening *e*², and a riser-pipe *e*³ afford means for the reception of material into and discharge of the same from the retort.

It is obvious that the heating chamber may be divided by walls as *I* into any number of portions, each of said portions beyond the front-portion *a* being connected with flues *j* and *k* by means of a connecting flue as *R* and having its separate inlet and outlet and controlling means therefor.

Fire being provided in the fire-box *J*, then by proper manipulation of the dampers and such if any of the plugs as necessary, any desired relation between the temperature of the front portion of the retort and that of the rear portion of the same may be obtained, and thereby temperatures produced and controlled in the respective portions of the material being treated.

When it is desired to obtain a higher temperature in the front portion than in the rear portion of the heating chamber, dampers *T* and *i*¹ are closed and damper *i* opened. The products of combustion pass then from the generator through the front portion of the heating chamber and heat that portion of the retort therein, thence through outlet *L*, connecting flue *N* and chimney *N*¹. The rear portion of the retort, being cut off from the heating medium, remains at a lower temperature than the front portion of the retort.

When the higher temperature is desired at the rear portion of the retort, damper *i* is closed and dampers *T* and *i*¹ opened. The heating medium emerging from the fire-box is then compelled to pass over walls *f* and *g*, through flues *O*, *P*, *j*, *k*, *R*, and inlet *S*, into the rear portion *b* of the heating chamber. After heating that portion of the retort therein it passes out by outlet *M*, to connecting flue *N* and chimney *N*¹. The front portion of the retort thereby receives a smaller amount of heat from the heating medium than the rear portion of the same. When it is desired to obtain equal temperatures in the several portions of the retort, each of the dampers *i*, *i*¹ and *T* is opened, to such extent as to divide the flow of the heating medium to produce equal temperatures in the portions, a part of said heating medium passing from *J* through *a* and *L* and a part through *O*, *P*, *j*, *k*, *R*, *S*, *b*, *M*, and both thence into connecting flue *N* and chimney *N*¹. By proper adjustment of the dampers *i*, *i*¹, *T*, the quantity of heating medium permitted to pass through either of the courses mentioned may be regulated, to produce such relations between the temperatures of the several portions as may be desired. A further cooling effect may be produced in the rear portion of the heating chamber by admitting a cooling medium, such as atmospheric air, through

inlet *o* into said rear portion. A draft of such cooling medium through said portion may be produced by closing damper *T* and opening dampers *i* and *i*¹, the passage of the heating medium through *a*, *L*, *N* and *N*¹ exerting a suction action drawing the cooling medium through *o*, *b* and *M*, into connecting flue *N*, where it commingles with the heating medium and passes with the same to the discharge. Greater extremes of temperature among the several portions of the heating chamber may thereby be obtained than without the use of such cooling medium. The flow of the cooling medium may be controlled by the plug *o*¹ and the degree of cooling effect thereby regulated.

When a plurality of portions are employed in addition to the front portion *a* of the heating chamber, the inlets of the portions between the front and rear portions are located in the side wall.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. A furnace, comprising a heating chamber, a dividing wall therein, a generating chamber communicating with the portion of the heating chamber at one side of said wall, flues connecting the generating chamber with the portion of the heating chamber at the other side of said wall, dampers controlling said flues, a discharge flue, flues connecting each portion of the heating chamber independently with the discharge flue, and a material support extending in said heating chamber at each side of the dividing wall.

2. A furnace, comprising a heating chamber, a dividing wall therein, a generating chamber communicating with the portion of the heating chamber at one side of said wall, flues connecting the generating chamber with the portion of the heating chamber at the other side of said wall, secondary air flues in the generating chamber located to receive heat from said flues, dampers controlling said first-named flues, a discharge flue, flues connecting each portion of the heating chamber independently with the discharge flue, and a material support extending in said heating chamber at each side of the dividing wall.

3. A furnace, comprising a heating chamber, a dividing wall therein, a generating chamber communicating with the portion of the heating chamber at one side of said wall, flues connecting the generating chamber with the portion of the heating chamber at the other side of said wall, dampers controlling said flues, a discharge flue, flues connecting each portion of the heating chamber independently with the discharge flue, dampers controlling said last-named flues, and a material support extending in said heating chamber at each side of the dividing wall.

4. A furnace, comprising a heating chamber, a dividing wall therein, a generating chamber communicating with the portion of the heating chamber at one side of said wall, 5 flues connecting the generating chamber with the portion of the heating chamber at the other side of said wall, the wall of said last-named portion of the heating chamber being provided with an opening for admis- 10 sion of air to said portion of the heating chamber, means controlling said opening, dampers controlling said flues, a discharge flue, flues connecting each portion of the

heating chamber independently with the discharge flue, dampers controlling said last-named flues, and a material support extending in said heating chamber at each side of the dividing wall.

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In testimony whereof I have signed my name to this specification in the presence of 20 two subscribing witnesses.

GLENN H. NILES.

Witnesses:

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