

J. J. GILL.
Glass-House Furnace.

No. 226,608.

Patented April 20, 1880.

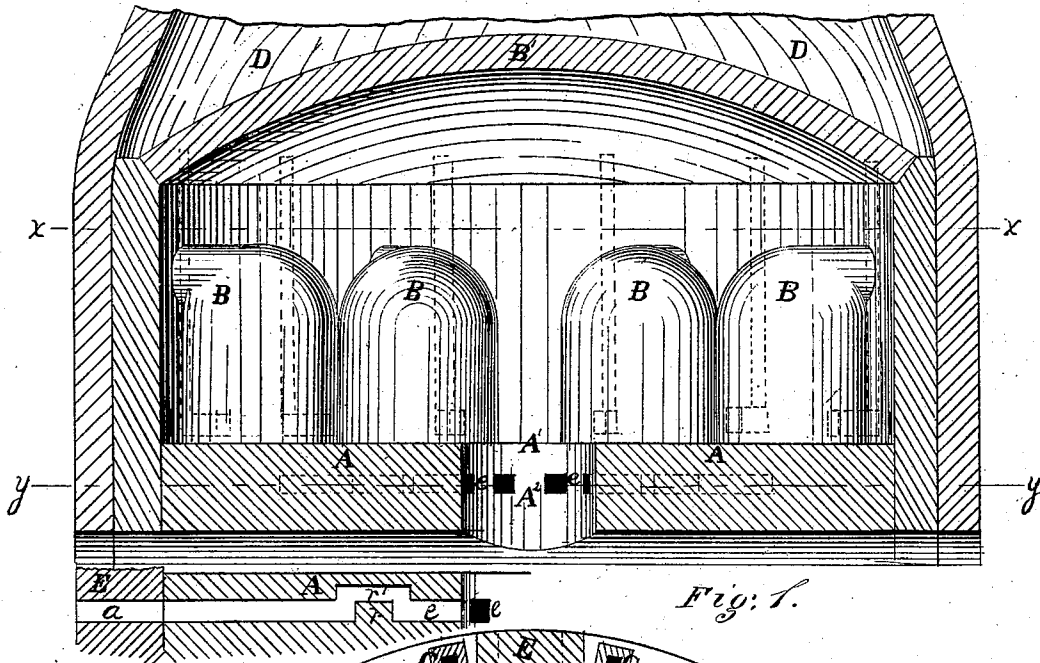


Fig. 1.

Fig. 3.

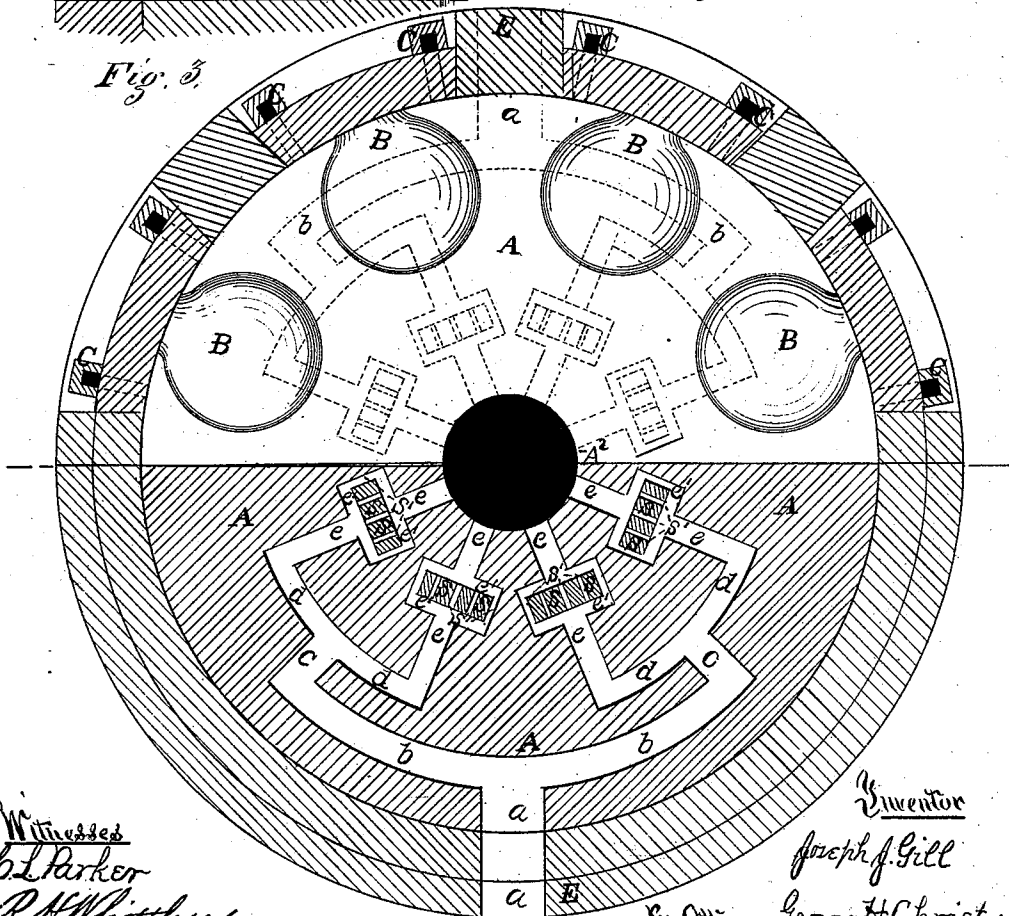


Fig. 2.

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GLASS-HOUSE FURNACE.

SPECIFICATION forming part of Letters Patent No. 226,608, dated April 20, 1880.

Application filed February 27, 1880.

To all whom it may concern:

Be it known that I, JOSEPH J. GILL, of Steubenville, county of Jefferson, State of Ohio, have invented or discovered a new and useful Improvement in Glass-House Furnaces; and I do hereby declare the following to be a full, clear, concise, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—like letters indicating like parts—

Figure 1 is a vertical sectional view of such parts of a glass-melting furnace as are necessary to illustrate my invention. Fig. 2 is a transverse sectional view of the same, one half being taken in the plane of the line *x x*, Fig. 1, and the other half in the plane of the line *y y*; and Fig. 3 is a sectional view of a detached part of the bench, illustrative of certain modifications in the construction of the air-flues, as hereinafter described.

In the construction of glass-melting furnaces attention has heretofore been given to the heating of air for supporting or perfecting combustion by arranging air-flues in the walls of the producer, or in the walls of the gas-conduits from the producer to the combustion-chamber.

My present invention relates to the utilization of the heat which is absorbed by the bench of the furnace on which the glass-melting pots are placed by arranging a system of air-flues in or through such bench a little below its upper surface, in such way as to detain the air in its passage through such flues until it is raised to a high temperature by the intense heat conducted from above; and I also have in view the better protection or preservation of the bench by the uniform distribution of air under the surface of the same, both advantages being practically secured by the same arrangement of the flues.

For the purpose of better illustrating my invention I have shown in the drawings some of the parts of a glass-house furnace as usually built, in which *A* is the bench on which the glass pots *B* rest, any desired number being arranged thereon. An eye, *A'*, opens from a combustion-chamber, *A*², into the chamber under the dome *B'*, in which the pots *B* are placed.

The usual escape-flues are shown at *C*.

These may discharge separately into the open air or into a common discharge, *D*, above the dome *B'*. These several parts may be constructed in any convenient way, and of the usual materials.

In the bench *A*, I arrange my improved air-flues as follows: One or more trunk inlet-flues, *a*, lead from the outer air through the exterior walls, *E*, of the furnace into the body of the bench a little ways, where they open into branch flues *b b*, which lead off from the trunk flues at or nearly at right angles and, by preference, in a curved direction near the periphery of the bench and concentric therewith. The length of these flues *b* may be varied, depending upon the amount of further subdivision desired, and also upon the number of such systems arranged in the bench, the object being to conduct the inflowing air to such points near the periphery of the bench that upon the further subdivision of the flues, as they lead toward the central discharge, they shall be distributed with uniformity through the body of the bench. At their extremities the flues *b* open into short radial flues *c*, or take an abrupt turn in a radial direction, and then again separate into or open into short arc or curved flues *d* concentric, or nearly so, with flues *b*. These flues *d*, in turn, branch into radial flues *e*, which may be further subdivided, or, as shown, may lead to and open into the combustion-chamber *A*².

By this subdivision or branching of the flues I distribute the inflowing air uniformly through the body of the bench, and thus secure the best effect in heating the air by contact with and passage through the bench; also, by giving the flue-passages abrupt turns or zigzag direction I increase their length and retard, in a measure, the flow of air, thus subjecting it a longer time to the action of the heat.

In order to secure still more perfectly these results, and especially to increase the surface of the flues at or near the points of most effective heat, and at the same time to divide up and spread out the air-column so as to be more highly heated, I make enlargements *e'* in the flue-passages *e*, and arrange therein, across the line of the flue, brick-work *s*, leaving passages *s'* around and through the same in any desired number. I prefer to so propor-

tion these passages s' that their combined area shall about equal or slightly exceed that of flues e , and I so shape them that the air passing through is subdivided or spread into comparatively thin sheets.

As a modification of brick-work s , and for the purpose of delaying or retarding the flow of air, obstructions r , Fig. 3, may be built in the direct line of the flues and the flues be carried over or under the same, as at r' , and preferably by abrupt or right angles, thus giving a vertical zigzag course to the flues as well as a horizontal one.

I prefer to arrange the brick-work s or r in or across the flues e , between the inner circle of the pots B and the central chamber, A^2 , as the effective heat is greatest on this exposed or uncovered part of the bench, and not only will the air be more highly heated by such arrangement, but also the protection to the bench afforded by the air in such extended or enlarged places in the flues will be of greatest service at such points; but I do not wish to limit my invention in this particular, as the work s or r may be arranged across any of the flues or at different points in their length, as may be desired, and thus a large heating-surface be secured, and in turn the air will have an extended and uniform effect through the bench in protecting it against the destructive action of the excessive heat above; and to this end I arrange the system of air-flues a sufficient distance below the surface of the bench to cause the air to act with practical uniformity on such surface and not cool the bench too much in the line of the flues.

So far as I am aware, it is new with me to arrange a system of air-flues through the body of the bench below but near its upper surface in such manner that they shall be distributed with uniformity from a line near its periphery to the central combustion-chamber, and while I have described a zigzag arrangement of such flues with transverse obstructions or brick-work across and in the same, yet I do not limit my invention to flues having these special features, as the advantages named may be secured, in part at least, by distributing the flues through the body of the bench without such artificial obstructions.

By making the deflections in the flues from a radial line greatest at or toward the periphery I am enabled to secure a more uniform distribution, and at the same time adapt a zigzag arrangement of flues to the circular form of furnace usually employed.

In the operation of my improved furnace gas for burning may be supplied to the combustion-chamber A^2 from any suitable pro-

ducer and through any suitable conduits. I have not thought it necessary to show such devices, as they are well known to those skilled in the construction of this class of furnaces.

Such gas, being mingled with the highly-heated air supplied through the flues described, will be burned at or near the eye A' , producing intense heat in the chamber above, and this heat, being much greater than that in and around the producer, is more effective in heating the air-supply, since the bench is necessarily much hotter than the walls of the producer.

I claim herein as my invention—

1. A system of air-entrant flues distributed around, below, but near the level of the bench, substantially as set forth, whereby the heat absorbed by the bench shall be utilized in uniformly heating the air, not only at or near the exit-points into the combustion-chamber, but also outwardly to or nearly to the outer periphery of the bench.

2. In the air-heating apparatus of a gas-burning furnace, a flue or flues, a , divided at one or more points at or near the periphery of the bench into two or more separate flues, which diverge and branch to such extent that the air passing through or along the same shall receive heat from different portions of the bench above, and thereby be more highly heated, as well as keep the different portions of the bench at a more uniform temperature, substantially as described.

3. In the air-heating apparatus of a gas-furnace, a series of flues extending in a zigzag or irregular course from the entrant to the exit points of the air; such deflections from a radial line being greatest at or near the outer periphery of the bench, substantially as set forth.

4. A brick-work, s , built transversely across an air-conduit flue, e , and with a series of two or more reduced holes or air-passages, s' , through or past the same, substantially as set forth.

5. In a system of air-flues arranged in the bench of a glass-house furnace, and in combination therewith, brick-work built transversely across such flues between the inner circle of the pots and the eye, with air-passages over or through and around such brick-work, substantially as and for the purposes set forth.

In testimony whereof I have hereunto set my hand.

JOSEPH J. GILL.

Witnesses:

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