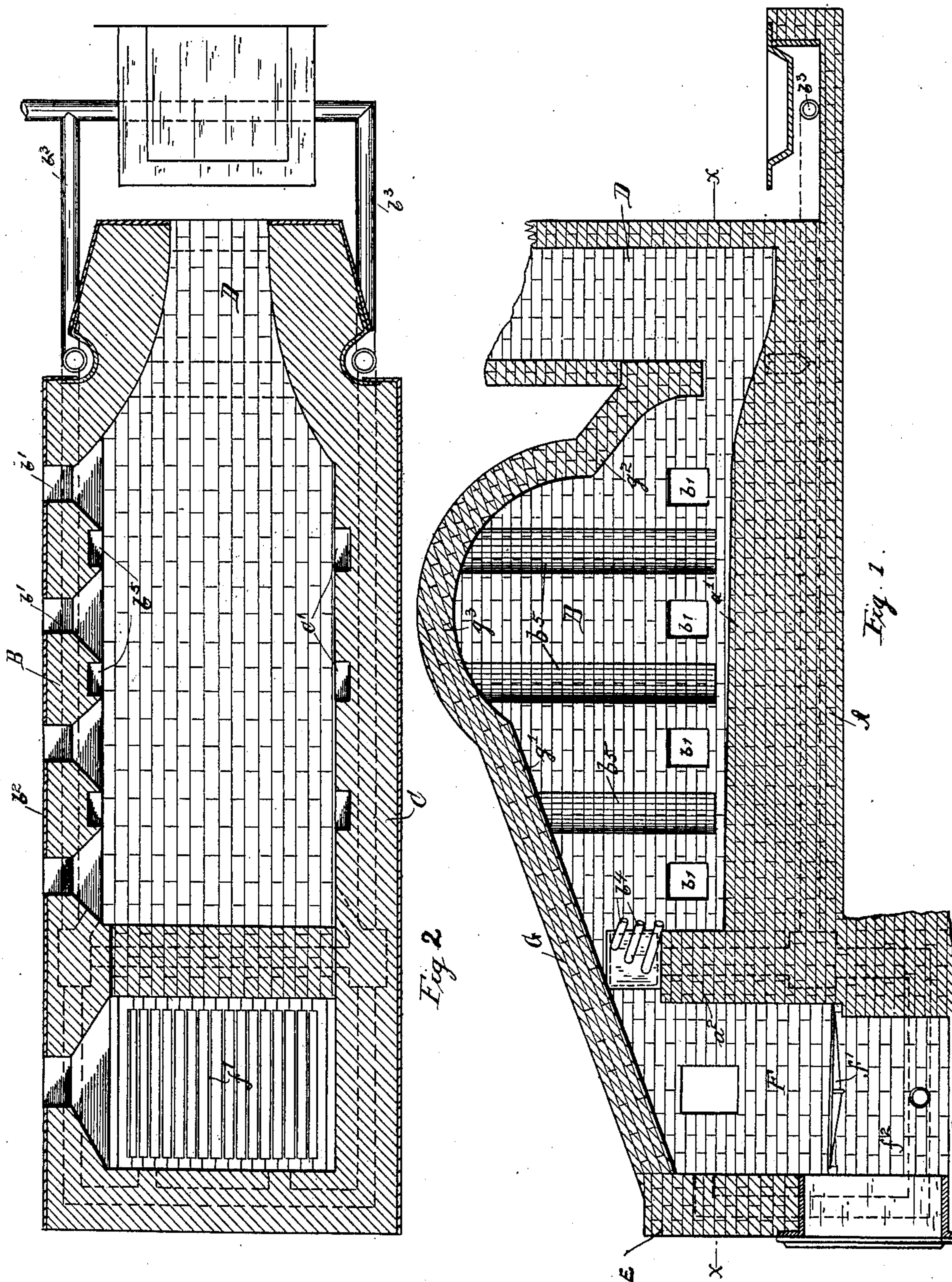


No. 829,676.

PATENTED AUG. 28, 1906.

G. W. SHEAR.
METALLURGICAL FURNACE.
APPLICATION FILED DEC. 12, 1902.



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GEORGE W. SHEAR, OF JOLIET, ILLINOIS.

METALLURGICAL FURNACE.

No. 829,676.

Specification of Letters Patent.

Patented Aug. 28, 1906.

Application filed December 12, 1902. Serial No. 134,894.

To all whom it may concern:

Be it known that I, GEORGE W. SHEAR, a citizen of the United States, residing at Joliet, in the county of Will and State of Illinois, have invented certain new and useful Improvements in Metallurgical Furnaces, of which the following is a specification.

My invention relates to improvements in the construction and arrangement of metallurgical furnaces, and especially those of the reverberatory and reheating types.

The principal objects of my improvements are to provide a furnace of this kind in which the flames and currents of air will not only be deflected to the hearth uniformly, but in which there will be a thorough admixture of the gases of combustion, thus economically and effectively heating the material in the metal-chamber. In carrying into effect these objects I have utilized the well-known condition of the flames hugging the side and roof walls of the furnace until they meet angles which divert their course, thereby giving them a swirling movement, which results in the formation of flame-eddies similar to those formed by water when it meets obstructions in a rapidly-moving stream. In breaking up the shafts of flame and heated-air currents which follow the latter into a number of minor streams having a rotary movement at certain points from which they are projected in various directions intersecting other shafts I effect a thorough commingling of the heated gases. By forming the roof of my improved furnace with a pitch suitable for projecting these mixed gases toward the hearth I attain the results sought for.

In the accompanying drawings, which form a part of this application, I have illustrated one form of furnace in which the principles involved in my invention are applied in a preferred manner; but I do not thereby wish to be understood as limiting my patent rights to the specific form shown and described.

In the drawings, Figure 1 is a vertical longitudinal section through the center of my improved furnace and looking toward the front of same, and Fig. 2 is a horizontal longitudinal section at a point a short distance above the hearth of the furnace.

Referring to the drawings in detail, A represents the base of the furnace, which is constructed of masonry in the usual manner and

is formed with a hearth a' and a bridge-wall a^2 .

B indicates the front wall of the furnace, in which the doorways or stock-holes b' are provided and to the outer face of which is secured the front plate b^2 .

C is the rear wall, which in this instance is shown imperforate. At the right-hand end is the stack or shaft D, and between the end wall E and the bridge-wall is the fire-box F, supplied with the usual grate f' , and below the latter the ash-pit f^2 . In the walls I run blast-pipes b^3 , which with suitable connections or boxes serve to convey air under pressure from any suitable source to the metal-chamber through the nozzles b^4 . Extensions of these pipes communicate with the ash-pit and with the fire-box, as indicated in dotted lines, thus introducing air to said portions of the furnace.

G represents the furnace-roof, which forms an important feature of this invention. From the end walls the roof extends upwardly on straight lines in inclined planes, the line from the fire-box being long and that from the stack being short, as shown in Fig. 2, such portions being indicated by reference-letters g' g^2 . The roof-lines g' g^2 before intersecting are changed from straight to curved lines or planes which form the dome g^3 . This dome may be directly over the center of the hearth or nearer the stack end of the furnace and the dome arch may be a pure arch or rampant, as shown, the latter form being desirable as tending to arrest the flames and hot-air currents on their way toward the stack. Instead of having the dome in the form of a single arch I may subdivide the surface into several arches, as in the form of a trefoil arch, the function in each case being the diversion of the flames from their initial course. As the heated gases rush up the inclined roof they will be caught in the dome and given a downward swirl, which will effect a thorough commingling and mixture of the gases, and thus produce more perfect combustion than is possible with flat or inclined roof furnaces.

In the front wall of the furnace I form between the doorways recesses b^5 , which extend from just above the hearth to the roof and may be rectangular in cross-section, as shown, or curved or of any other suitable contour. Similar recesses c' are formed in the rear wall and cooperate with those in the front wall in

producing swirls and eddies in the shafts of flame, which are conducive to perfect combustion and also serve to arrest the movement of the products of combustion toward
5 the smoke-stack, thereby more effectively securing the benefit of the units of heat therein.

The air for blast purposes introduced through the blast-pipes may be taken from
10 any source, and while they are not essential to the successful operation of the furnace and are *per se* well-known features in furnace construction said pipes peculiarly coöperate with the recessed and chambered wall and
15 roof construction which I employ in my improved furnace.

I am well aware that inclined roofs are not new in furnace construction and that arched or dome roofs are also old in the art; but so

far as I am aware there has been no linking 20 together of these specific forms in a single structure or to constitute a single roof.

I therefore claim and desire to secure by Letters Patent—

A furnace having its roof formed in part 25 with straight oppositely-inclined portions the inclination of one portion being greater than the other, and also formed with a rampant arch, the lines of said arch merging with the lines of the straight portions, and the in- 30 clination of the arch being toward the front of the furnace.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE W. SHEAR.

Witnesses:

JOHN HULSIZER,
F. BENJAMIN.