S. M. FALES.

Refining Iron and Steel.

No. { 1,275, } { 32,279. }

Patented May 14, 1861.

Fig. 1.

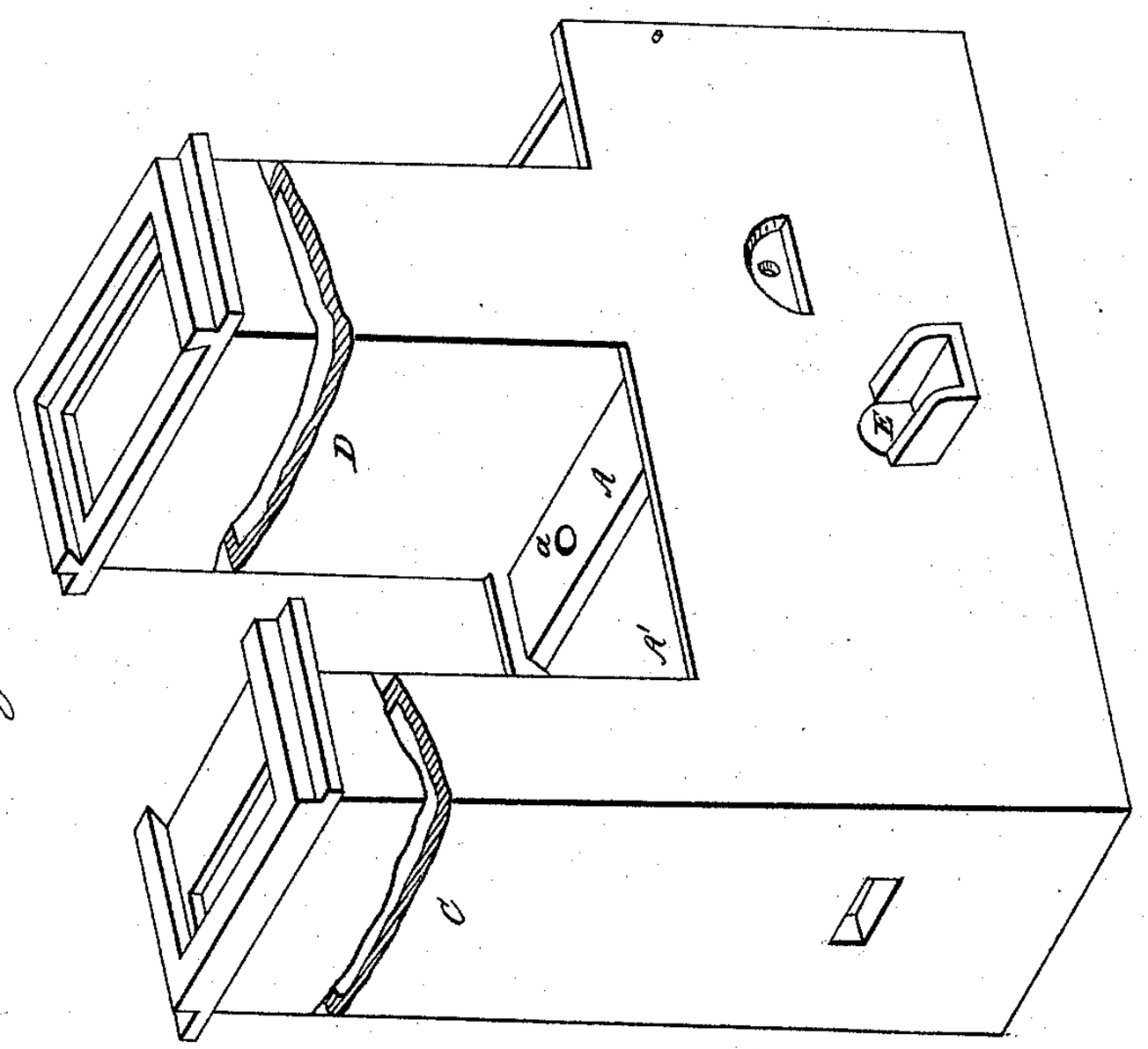
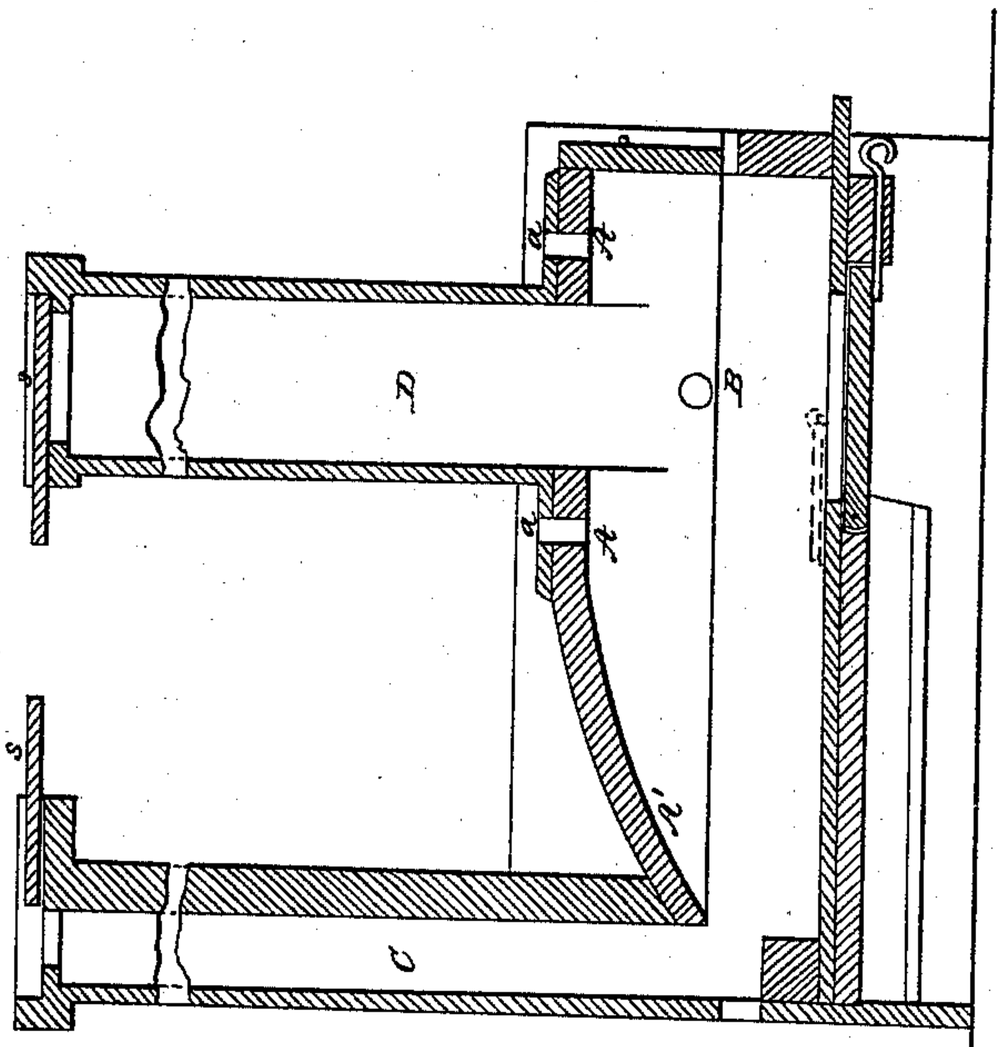


Fig. 2.



Witnesses:

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UNITED STATES PATENT OFFICE.

SQUIRE M. FALES, OF BALTIMORE, MARYLAND.

IMPROVEMENT IN REFINING AND SMELTING FURNACES.

Specification forming part of Letters Patent No. **32,279,** dated May 14, 1861.

To all whom it may concern:

Be it known that I, SQUIRE M. FALES, of the city and county of Baltimore, in the State of Maryland, have invented a new and useful Improvement in Furnaces for Smelting and Refining Iron, and also Ores of Various Kinds; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a perspective view of a smelting-furnace as improved by me, and Fig. 2 is a vertical longitudinal section of the same.

Similar letters of reference in each of the two figures indicate corresponding parts.

My present improvement relates particularly to the furnace patented to me on the 8th day of February, 1859; and the object of the same is to give the said furnace capacity for melting and refining at one operation a large quantity of pig or cast iron, or other metals for large castings, and also to maintain a proper fluidity of the large mass during the operation, and until the furnace is tapped and the metal run off into a mold adapted for a large casting.

The nature of my invention consists in extending one or more of the arches of my said patent furnace, and having the said extended arch or arches communicate by a flue with an auxiliary stack or chimney, or with a series of auxiliary stacks or chimneys, C, substantially as hereinafter described.

To enable others to make and use my invention, I will proceed to describe its construction and operation.

The furnace patented to me at the date above stated consists of a stack or cone, D, a central melting-chamber, B, and side arches, A, with passages *a* through their tops for the introduction of suitable fluxes. By this arrangement, as described in my said patent, the blast is allowed a chance to expand laterally or circulate before it rises in the cone of the furnace, instead of being compelled to pass, as previously, directly upward; and thus having the blast circulate has been found in practice to give greater efficiency to the furnace and insures a superior quality of iron. It also provides for the introduction of the refining-fluxes at points where their effect will be most beneficial.

In operating with my patent furnace, the advantages secured in the melting of small quantities of iron, &c., for small castings have been so great that I have concluded to extend its capacity in order that large quantities of iron for large castings may be melted in it at one operation, and to accomplish this end I have extended the length of one or more of the arches or side chambers, A; but in doing this it becomes necessary that the heated gases be kept constantly circulating over the large mass of molten metal which flows into the enlarged side arch or chamber, A′, in order to maintain the proper fluidity of the mass until the desired quantity for a good-sized casting has been melted; and to effect this result I have provided an auxiliary stack or chimney, C, at the terminus of each arch or chamber, and made a free draft through from the furnace to said chimney. I also have provided a slide-damper, *s*, at the upper end of the cone or stack D, and of the auxiliary chimney or stack C, so that the direction of the draft may be regulated or the same reversed as occasion may require.

By providing an auxiliary draft-chimney the heated gases from the fuel which is employed for smelting the iron are caused to circulate over the mass of melted metal which flows into the extended arch or chamber from the smelting-chamber, and thus all danger of the large mass of metal becoming cool or assuming any other than a fluid state is obviated. Again, if it is desirable to increase or decrease heat in the main stack or cone, or to change the direction of the heated gases, it can be accomplished by entirely or partly closing the damper of the auxiliary chimney and opening fully or partially the damper of the main cone or stack.

The improvement described is an important one when employed in connection with my patented furnace, as it enables me to cast and refine large quantities of metal at one operation and in the same furnace, and to keep the same in a proper fluid state any desirable length of time with a small consumption of fuel.

In smelting with my furnace, the iron or ores and the fuel are piled together in the main stack or cone and in the melting-chamber. The fluxes are introduced through the passages *a a*. As fast as the iron or ores are melted, the purified or refined metal spreads laterally aud runs into the arch or chamber A A′, and at proper periods the arch is tapped at E, and the melted mass run off into the mold or place provided for its reception.

What I claim as my invention, and desire to secure by Letters Patent, is—

Extending one or more of the arches A of the furnace B D, constructed as set forth in my patent dated February 8, 1859, and having the said extended arch or arches communicate by a flue with an auxiliary stack or chimney, or with a series of auxiliary stacks or chimneys, C, substantially as and for the purposes set forth.

SQUIRE M. FALES.

Witnesses:

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