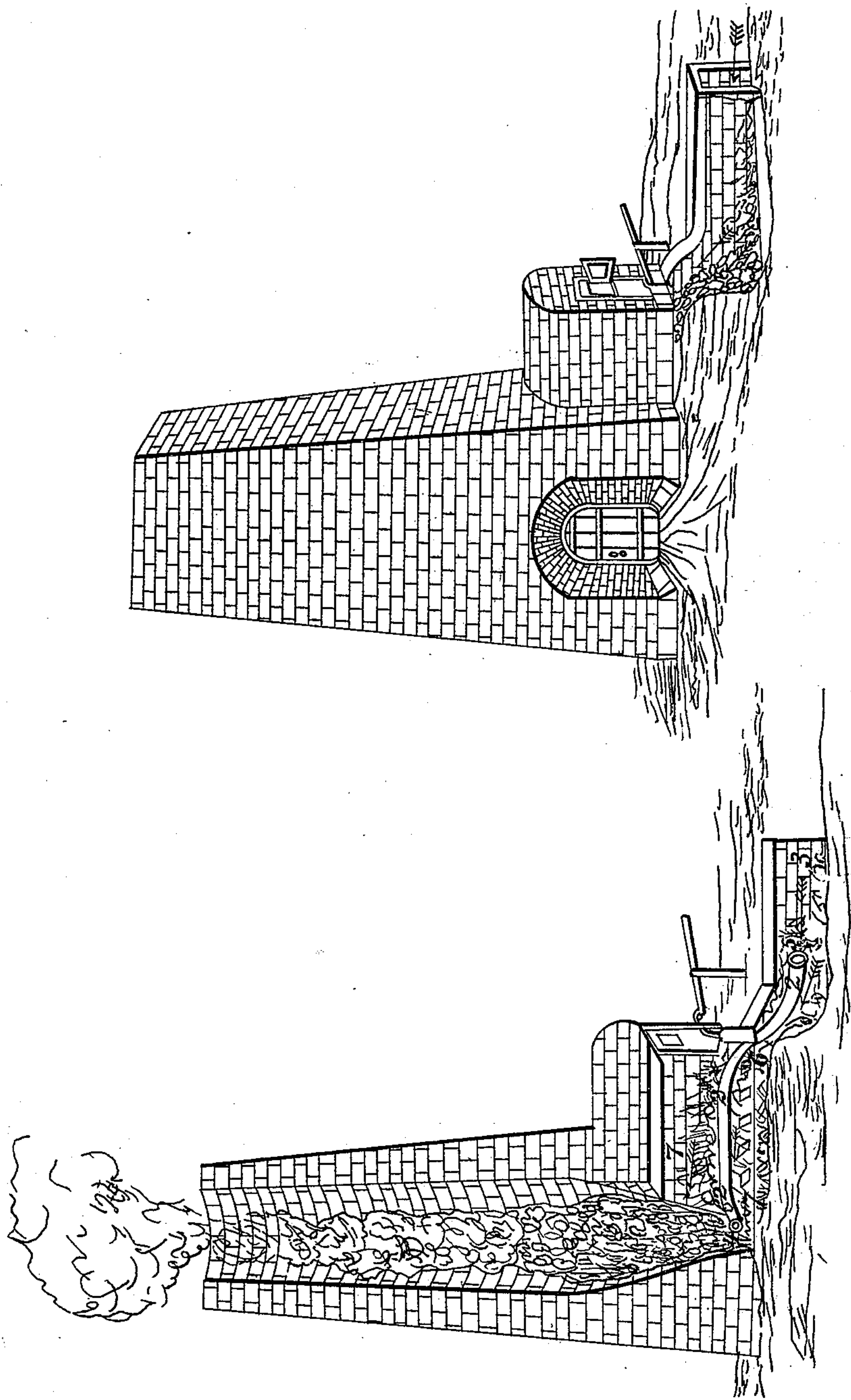


T. H. POWERS.
Blast Furnace.

No. 14,827.

Patented May 6, 1856.



UNITED STATES PATENT OFFICE.

THOMAS H. POWERS, OF WYOCENA, WISCONSIN.

IMPROVEMENT IN FURNACES FOR SMELTING IRON.

Specification forming part of Letters Patent No. 14,827, dated May 6, 1856.

To all whom it may concern:

Be it known that I, THOMAS H. POWERS, of Wyocena, Columbia county, Wisconsin, have invented a new and useful Improvement in Furnaces for Smelting Iron Ores, which can also be adapted to the burning of lime more speedily and economically than by any mode heretofore known; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The nature of my invention consists in and is comprised by the following: The shaft or stack is forty feet high. *m m m m* represent, in Figure 2, Plate 2, its vertical section. *a*, same plate and figure, represents the flue in which are deposited ores, fuel, and flux, if used; *d*, the hearth receiving melted metals; *d'*, the furnace for the combustion of fuel alone; *e*, the passage for heat and flame thence into the stack; *e*, the door for the introduction and replenishment of fuel; *g g g g*, the grates supporting the latter, and forming interstices through which air passes into the furnace from the trench *h h h h*; *f*, the damper by which it is admitted or excluded from *i*, the vault in which atmospheric air is heated with the ashes, live coals, embers, and igneous particles of whatever nature, drawn by a suitable device into the vault from the trench. *k* and *l* represent the foundation and earth, being the site of the superstructure, as shown in perspective on Plate 1. *n* is a door for the withdrawal of lime when the stack is used as a kiln, (colored olive in perspective,) Plate 2, Fig. 1. The air, being heated in the vault to the degree required, passes through the throat *p* into the furnace, mingles with and increases the intensity of its heat, which is communicated to and augments the combustion of substances used in calcining lime or solving substances refractory to the lower degrees of heat.

2 2 2 is a pipe for the hot air or rarefied atmosphere to be conveyed from the vault 3 as far as the molten metals upon the hearth 4. This pipe receives, in the first place, the heated air at 5. It then continues toward the hearth by leaving the vault at or about 6, and entering the flues of the furnace 7 7 7 7. Having passed through them, as shown at 2, it terminates at 4 over the molten metals which have been deposited as the mass of ore,

&c., under process of reduction has yielded to heat. Now, the air, originally hot when it entered the pipe 2 2 2, in its passage to 4, the termination of the pipe, has acquired whatever elevation of temperature the surrounding space possessed, whether in the furnace or in the stack or the neighborhood of the hearth; but the tendency of heated air would be to ascend up the stack or into open air, and not circumfuse the liquid mass with an element capable of either prolonging or augmenting its liquidity. By conducting a volume of hot air in this pipe and constantly discharging it upon and around the mass of fused metal on the hearth, it is prevented sweeping past and rushing upward.

It will be observed that there is no other mode for the production of great and constant heats in immediate contact with the hearth of the edifice, and by which that portion of the metal already melted from the ore above can be kept fluid and prevented from chilling and setting, (solidifying.) This pipe 2 2 2 is to prevent the occurrence just alluded to and avert the expense of similar disasters. As the hot air is poured around the hearth, it simultaneously escapes and adds its auxiliary heat to the combustion it promotes in the stack above, and, as there is no apparatus above or around or under the stream or pond of metal producing heat, this combination of the pipe for hot air produces an economical result, and is not subject to the hazards of machinery.

The flue from the hips upward is cylindrical, and the hot air escapes up it into the atmosphere without mechanical means to expel it.

e, the passage or inlet from the furnace to the flue, is vaulted between the two with such grates as are known to be proof to intense heats, and prevent the entrance of lime, ore, slag, or scoriæ, as well as sustain the column of fuel in the stack at this part.

I claim—

So arranging the pipe 2 2 2 in connection with the combustion-chamber and stack, as described, that the air passing through the pipe shall be heated and discharged in the manner and for the purpose set forth.

THOS. H. POWERS.

In presence of—

B. K. MORSELL,
W. CRAUSER.