Sheet. 1.

Edward Mingay.

Improvement in Furnaces.

Witnesses.
J. H. Mills
Edward Griffith

PATENTED APR 11 1871

Edward Mingay.
by his Attorney.
Frederick Curtis.

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Fig. 1.

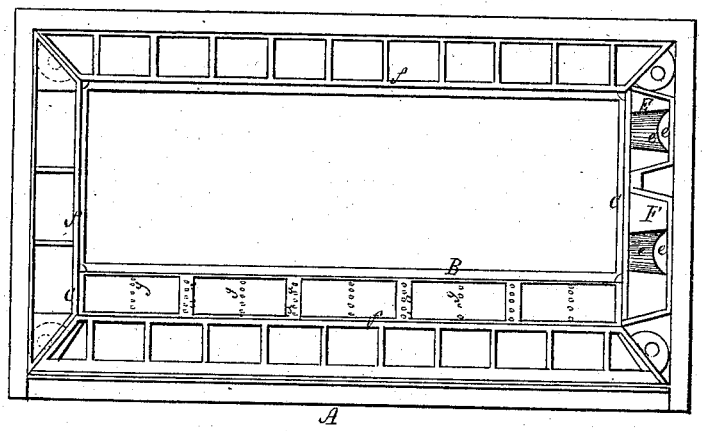

Fig. 4.

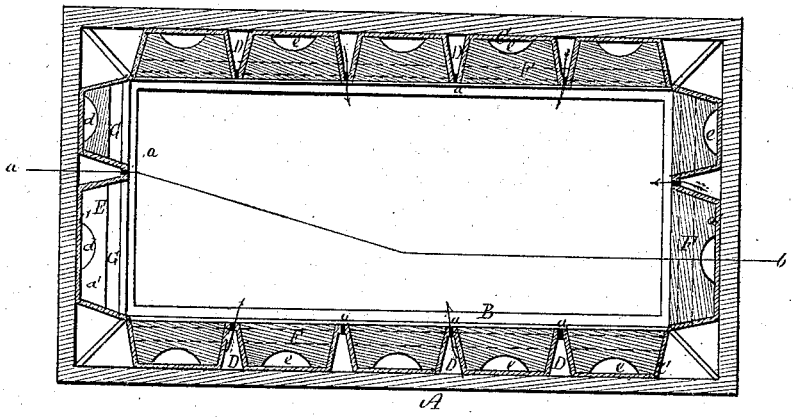

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Fig. 2.
on line a.b. of Fig. 4.

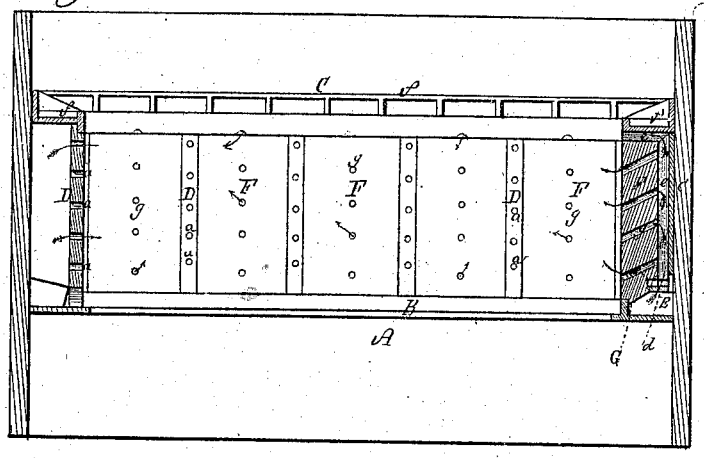


Fig. 3.

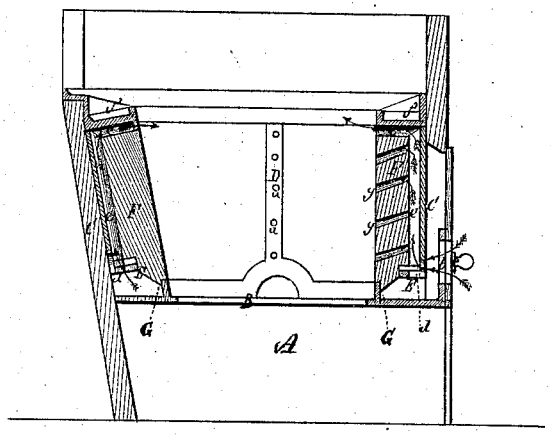
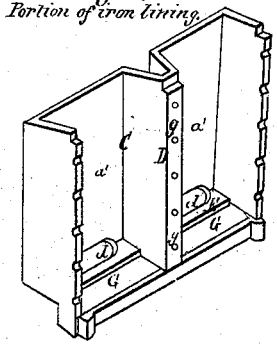


Fig. 6.
Portion of iron lining.



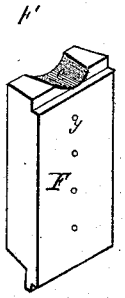


Fig. 7.
Section of brick.

United States Patent Office.

EDWARD MINGAY, OF BOSTON, MASSACHUSETTS.

Letters Patent No. 113,549, dated April 11, 1871.

IMPROVEMENT IN FIRE-POTS FOR STOVES AND FURNACES.

The Schedule referred to in these Letters Patent and making part of the same.

To all to whom these presents shall come:

Be it known that I, EDWARD MINGAY, of Boston, in the county of Suffolk and State of Massachusetts, have made an invention of certain new and useful Improvements in Furnaces; and do hereby declare the following to be a full, clear, and exact description thereof, due reference being had to the accompanying drawing making part of this specification, and in which—

Figure 1 is a plan;

Figure 2, a vertical and longitudinal section;

Figure 3, a vertical and transverse section; and

Figure 4, a horizontal section of the fire-pot or furnace of a stove provided with my improvements.

Figure 5 is a perspective view of one of the fire-bricks which, under my invention, constitute in aggregate the lining of the furnace.

The object of this invention is to provide an effective and ready means of admitting oxygen to the interior of a fire-pot or furnace to aerate the gaseous products of combustion contained therein, in order that such products may be more perfectly consumed, with a resulting advantage of economy of fuel; and

To this end the invention herein embodied consists in disposing within the said furnace, and about its interior walls, a corrugated, undulating, or fluted lining of cast-iron, into the inner larger recesses of which the fire-bricks are inserted, the smaller or outer recesses serving as air-ducts through which oxygen passes in its transit to the furnace, the fire-bricks being formed at rear with air-channels which coincide with apertures formed in the bottom of the iron lining, and in conjunction with which they constitute passages for admittance of oxygen to the top of the furnace, as hereinafter stated, the tops of the fire-bricks being covered with iron plates which confine them in their proper position, these plates in turn being united by a loose joint, which, while allowing of the inevitable expansion and contraction, insures their proper position.

The accompanying drawing represents at—

A the front portion of a cooking-stove, or that which constitutes the fire-place or furnace; the inner horizontal circumscribing ledge or base which supports the lining, and which, in conjunction with the grate, constitutes the bottom of said furnace, being shown at B.

C, in the above-mentioned drawing, represents a lining formed in corrugations or V-shaped hollow upright spurs, D D, &c., arranged at regular intervals asunder, the lower ends of which are united by a sloping shelf or bottom, E, of a width about equal to that of the base B, the recesses *a* intervening between the spurs being for reception of the fire-bricks F F, &c., which are deposited within them, the extreme lower end of each brick being inserted within an orifice, G, created in the shelf, by which means the lower end of the brick is securely retained in place.

The iron lining C is composed of four sections, one to each side and end of the furnace, and each hollow spur D is perforated with a series of air-ducts, *a a*, &c., by means of which oxygen from the rear side of the lining passes to the interior of the furnace, the sloping bottom of the lining being elevated somewhat above the base B in order to permit of free circulation of oxygen between it and the walls of the furnace.

The supply of oxygen may be admitted at various points, but I prefer to place the air-inlets for this purpose at the front of the stove, as shown at *b b*, &c., in the accompanying drawing, and I provide these openings with a gate or register, *c*, in order to regulate the amount of oxygen passing through them.

In addition to the orifice G, formed in the lining at the bottom of each brick recess, I form in each recess another orifice or air-inlet, *d*, which is disposed outside of the former, and preferably at the angle formed by the junction of the side and bottom of the lining, this air-inlet coinciding with a vertical channel, *e*, formed in the back of each fire-brick, while this channel *e* is continued across the top of each brick.

The lining, or each section thereof, is covered by a thin cap plate of iron, composed of four sections, *f f f f*, the corners of which are mitered and united by a loose tenon and socket joint, as shown in fig. 1, in order to adapt them to the expansion and contraction to which they are necessarily subjected by the action of the fire, the said cap plate serving to confine the upper ends of the fire-brick securely in place.

Each cap-plate section should be provided with a surrounding outer wall that ashes from the fire may settle and accumulate thereupon, in order that heat from the incandescent fuel in the furnace shall not injure them.

Each fire-brick may be pierced with a central vertical range of air-ports, *g g*, &c., by which air entering the channels *e* is discharged upon or over the fuel in the furnace.

My purpose in interposing between each fire-brick or stone a narrow partition of iron, as exhibited in the hollow spurs D, is partly to support them, the bricks, in proper position and protect their edges, but mainly to produce a small radiating surface whereby not only to impart heat to the front wall of the oven, but to heat the air passing through the air-ducts *a a*, &c., before it is discharged upon the fire, for were it permitted to impinge upon such fire while at a low temperature it would defeat, to a certain degree, the objects of the invention, since a comparatively small

amount would tend to lower the temperature of the furnace and check the draught through the same.

Oxygen admitted through the register *c* passes around the entire circuit of the lining, and between it and the base B, and passes by degrees through the ports *a a* and mingles with the gases evolved from the fuel in the furnace, a portion of such oxygen flowing upward through the channels *e* and *g* of each fire-brick, and also mingling with the unconsumed gases of the fire.

It will be seen that by arrangements of parts I am enabled to introduce and commingle with the gaseous products of combustion from the fuel in the furnace a very large amount of oxygen in a warm state, and to perfectly control and regulate this admission of oxygen by means of the register *c*.

One advantage of my arrangement of the lining and fire-brick is, that no large surface of iron is exposed to the direct action of the fire, while the peculiar formation of the lining, with its irregular or corrugated surface, is such that expansion and contraction may take place without injury.

Another advantage of this last-named arrangement is, that should the register *c* become entirely closed, and the supply of oxygen shut off, as would frequently be the case by the carelessness of servants, the lining would not be injured, as the bricks protect it.

Claims.

1. The metallic lining when constructed with hollow perforated spurs or partitions walls, D, between the spaces occupied by the fire-bricks, as herein shown and set forth.

2. In combination with a metallic lining constructed as specified, and provided with recesses G and air-inlets *d*, the fire-bricks fitting in the said lining and recesses G and provided with air-channels or ducts communicating with said inlets *d*, under the arrangement shown and described.

3. In combination with the metallic lining and fire-bricks, constructed and arranged as specified in the preceding clause, the cap plates *f* applied to said lining and bricks, and joined together substantially in the manner shown and set forth.

4. The construction of the cap plates *f*, as provided with a hanging lip for retaining in place the upper ends of the fire-bricks F; of an inclosing ledge for compelling the deposit of ashes upon their upper surfaces; of an air-port to permit oxygen to pass to the fire; and lastly, of tenon-and-socket connections at their mitered corners, all substantially in manner and operating as explained.

Witnesses: EDWARD MINGAY.

FRED. CURTIS,
EDW. GRIFFITH.