(No Model.) 2 Sheets—Sheet 1

H. MASSICKS & W. CROOKE.

HOT BLAST STOVE.

No. 250,558. Patented Dec. 6, 1881.

Fig. 1

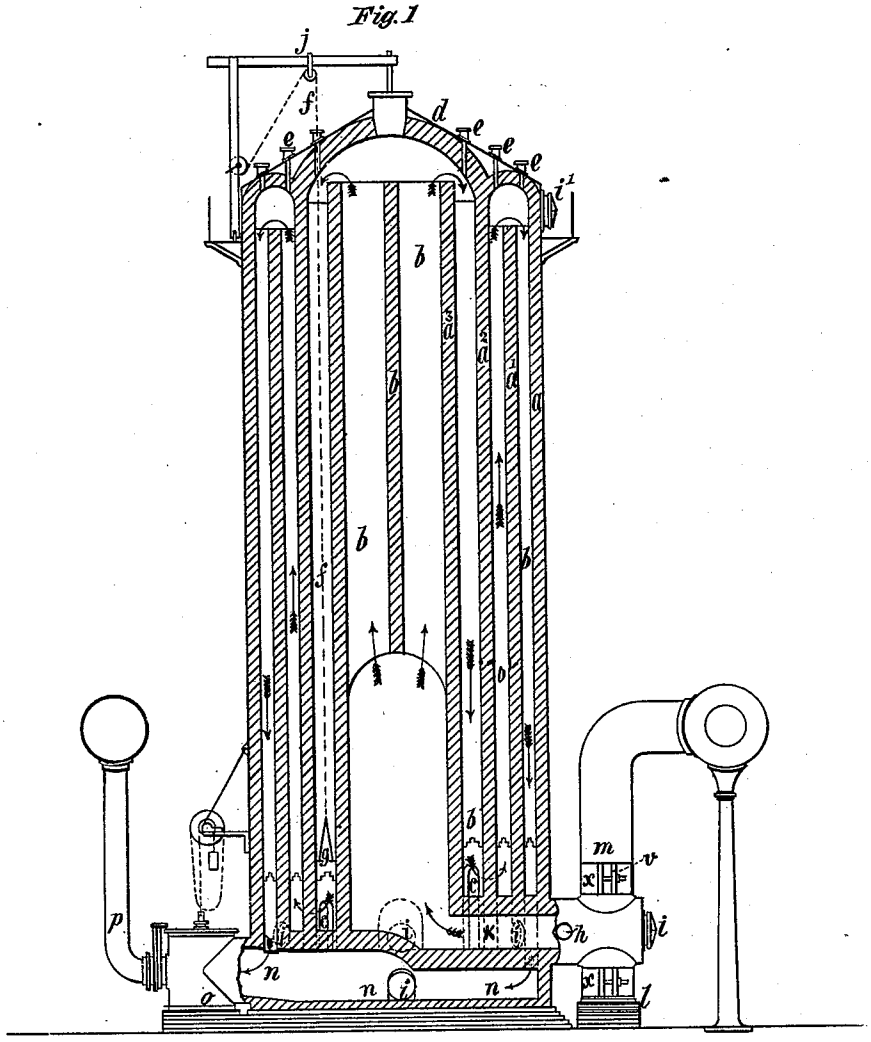
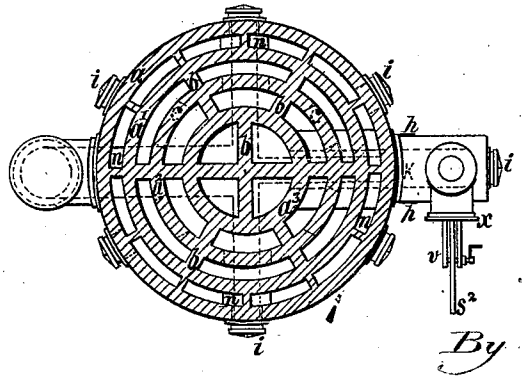


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

H. MASSICKS & W. CROOKE.

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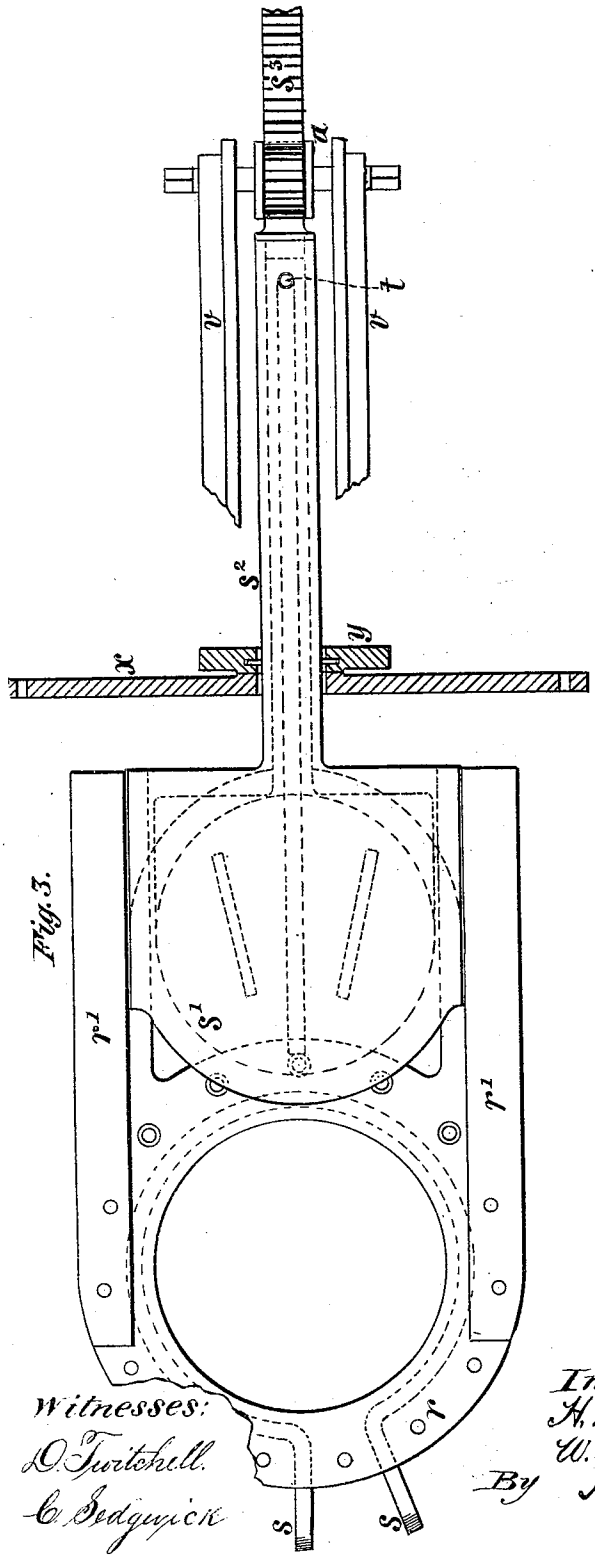


Fig. 3.

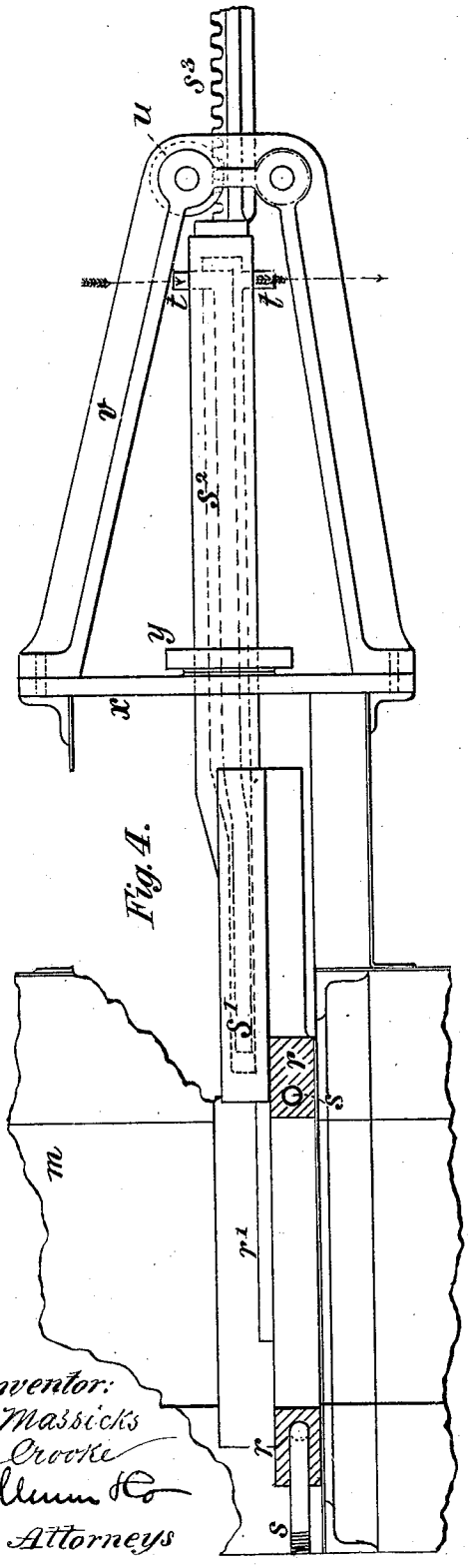


Fig. 4.

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UNITED STATES PATENT OFFICE.

HORACE MASSICKS, OF THE OAKS, AND WALTER CROOKE, OF DUDDON VILLA, PARISH OF MILLOM, COUNTY OF CUMBERLAND, ENGLAND.

HOT-BLAST STOVE.

SPECIFICATION forming part of Letters Patent No. 250,558, dated December 6, 1881.

Application filed June 8, 1881. (No model.) Patented in England March 24, 1881.

To all whom it may concern:

Be it known that we, HORACE MASSICKS, of The Oaks, and WALTER CROOKE, of Duddon Villa, both in the parish of Millom, in the county of Cumberland, England, have invented certain new and useful Improvements in Hot-Blast Stoves, (for which we have obtained a patent in Great Britain, No. 1,312, bearing date 24th March, 1881,) of which the following is a specification.

The object of our invention is to form a stove in which the greatest heat will always be maintained at the center. This we accomplish by constructing and combining the top and walls, as hereinafter described.

In order that our invention may be fully understood and readily carried into effect, we will describe the accompanying two sheets of drawings, reference being had to the figures and letters marked thereon.

On Sheet 1, Figure 1 is a vertical section of a hot-blast stove constructed according to our invention. Fig. 2 is a cross-section of the same; and on Sheet 2 Fig. 3 is a plan, and Fig. 4 is a section, of our improved gas and blast valve.

Similar letters refer to similar parts on the different views.

a, *a'*, a^2, and a^3 are four vertical segmental walls or divisions, made of fire-brick or other suitable material, and there are vertical radial walls or divisions *b* extending from the middle of the stove to the wall *a*, and from near the top to near the bottom of the stove the wall *a* is covered with a casing of wrought-iron, and it extends from the bottom of the stove to the top. The wall *a'* extends from the bottom of the stove to within a short distance of the top. The wall a^2 extends from the bottom to the top of the stove, but has an arched opening, *c*, at the bottom of each segmental passage. The wall a^3 extends from the bottom almost to the top of the stove. The wall a^3 would form a cylindrical chamber in the center of the stove, but the radial walls *b* divide it into segments for the greater part of its length.

d is the top of the stove, which we make conical, and we form a man-hole at the apex, fitted with an air-valve, that may be self-acting.

Instead of using cleaning-doors in the top of the stove, we make a hole, or build into the roof a pipe, *e*, directly over each segmental passage, to admit a rod, chain, or cord, *f*, which is attached to a scraper, *g*, through one of the cleaning-doors *i*, at the bottom of the stove. The scrapers are made preferably of spring-hoop, and fit each segmental passage. The scrapers are raised and lowered by a rotatory crane, *j*, on the top of the stove, thus entirely and quickly removing the gas-dust adhering to the brick-work inside the stove. We place, by preference, a cleaning-door, *i'*, near the top of the stove, that may be used when necessary for repairs.

k is a tubular passage, leading from the middle of the stove to the pipe *l*, that admits the gas to be burned into the stove. The passage *k* also leads to the pipe *m*, that conveys the hot-blast to the furnace for smelting the ore.

n is a passage at the bottom of the stove, that allows the exhausted products of combustion to pass from the stove to the chimney through the valve *o*.

p is the pipe that admits the cold-blast to be heated in the stove and driven to the smelting-furnace through the pipe *m*.

On Figs. 3 and 4, *r* is the seating of our improved gas or hot-blast valve. *s* is a tube cast in it, through which water circulates. *r' r'* are guides, in which the hollow valve *s'* slides. s^2 is the valve-spindle, in which are the valve-pipes *t*, through which water is caused to circulate in the hollow space formed inside the valve *s'*. s^3 is a rack fixed to the spindle. *u* is a wheel gearing into the rack. *v v* are standards carrying the wheel *u*. *x* is the cover which secures the valve in its place in the pipe *l* or in the pipe *m*. *y* is the gland through which the spindle s^2 passes.

The mode of operation is as follows: The hot and cold blast valves in the pipes *m* and *p* are shut. The gas to be burned in the stove to heat it is supplied through the pipe *l*, the valve in *l* being open. Air for combustion is admitted through the inlets *h*. The greater portion of the gas is consumed in the center of the stove, and there the heat is most intense. The gas, partly or wholly consumed, travels in the direction shown by the arrows on Fig.

1, over the top of the circular wall a^3. It descends through the segmental passages of which the wall a^2 forms the outer side. It ascends through the segmental passages of which the wall a' forms the outer side; then descends through the segmental passages of which the wall a forms the outer side, and is carried off through the passage n and valve o (which is open) by the chimney, almost the whole of the heat having been absorbed by the inner walls of the stove. The chimney-valve o and the gas-valve in the pipe l are then closed, and the hot-blast valve in m and cold-blast valve in p are opened, the cold-blast enters the stove through the passage n, ascends the passages between a and a', descends between a' and a^2, ascends between a^2 and a^3, descends the passages inclosed by a, by which time it is highly heated, and is then conveyed through k and m to the smelting-furnace. Two or more stoves are thus used to work a furnace, each alternately being heated.

By the use of our invention a great saving in cost of construction is effected. We obtain a hotter blast than by stoves of the ordinary construction, as the most intense heat is always at the center of the stove, and the blast is conveyed direct from the center to the furnace. The stove is much more durable, as the outer wall is comparatively cool, and little heat is lost by radiation. We dispense almost or entirely with cleaning-doors at the top, and can clean the stove thoroughly and quickly. The conical top is made at a slight cost, it is very strong, and no girders are required. The improved valve and valve-seating for gas or hot blast are not liable to injury from excessive heat, owing to the circulation of water through the pipes.

Having stated the nature of our invention and described the manner of performing the same, we would state that we do not restrict ourselves to the exact details given, as they may be varied without departing from our invention, and the stove may be made of an elliptical or other shape, instead of circular, or a greater or less number of walls may be used.

We are aware that our particular form of scraper is not new, and we reserve the right to make the heat-resisting gas and blast valves the subject-matter of another application.

We declare that what we claim, and desire to secure by Letters Patent of the United States, is—

In a hot-blast stove, the combination of the conical top d, the segmental vertical walls a a' a^2 a^3, and the vertical radial walls b, extending from the middle of stove to the wall a, but not quite to the top or bottom, the walls a' a^3 extending from the bottom not quite to the top, and the wall a^2 provided with an arched opening, c, at bottom, whereby the greatest heat may be retained at the center of stove, as described.

HORACE MASSICKS.
WALTER CROOKE.

Witnesses:
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