

of gas in a room or house, of which occurrence there have been some destructive instances, cannot happen where there is the ventilating chimney-valve, for cold coal gas entering a chimney-flue produces a more powerful draught than hot air does.

this is easy and inexpensive, and by having a piston-plate with holes it can be used as a common grate.

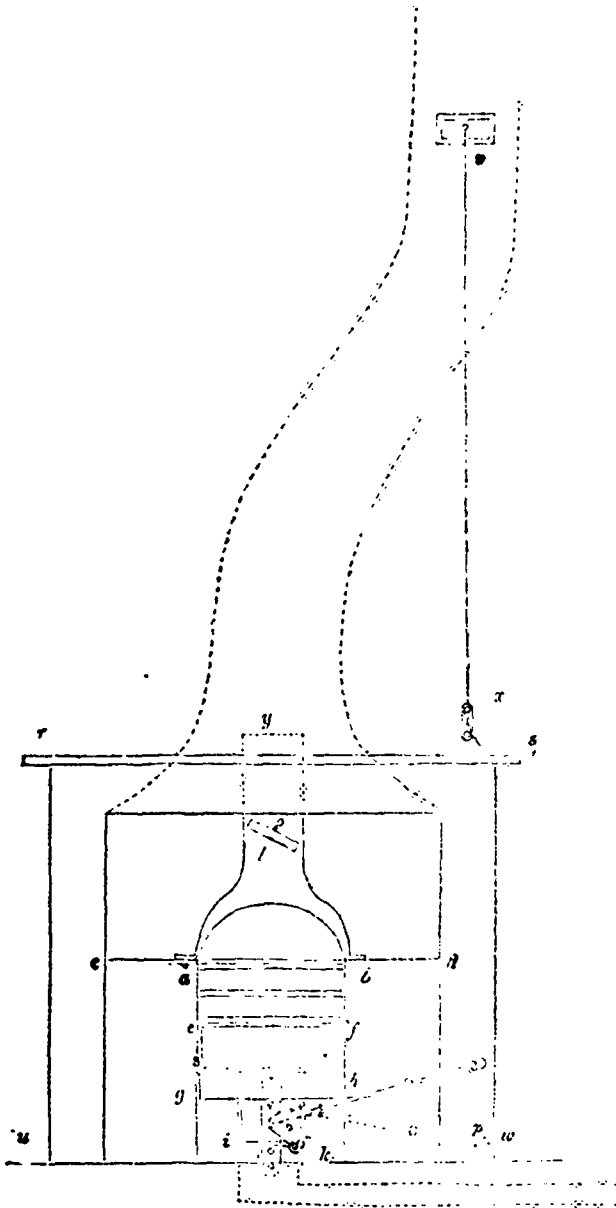
14. Any kind of coal or coke may be used in this grate, even the small culm or coal-dust, which is very cheap. In a common grate, coke or Welsh stone coal would be objectionable, because containing chiefly heavy carbonic acid instead of the steam and carburetted hydrogen of bituminous coal, and the gas, which is poisonous, might spread in the room, but by the strong draught of the hood this could not happen.

I might extend this list, but I need not.

Before concluding, I may direct attention to the remarkable fact, only of late well understood, that of the only four great necessities of life, or things which Providence has left to man in various parts of the earth to procure for himself, namely, fit air, temperature, aliment, and work alternating with rest,—the skillful management of a domestic fire goes far to secure the two first-named, viz., fit air and warmth; but these are the last which men come to understand well, because they are invisible and impalpable, and, therefore, to be perceived only by the eye of the mind after much cultivation.

The diagram represents a common fire-place, with mantel, *r s*, or chimney-piece, two jambs, and a common grate with two bars and bottom, to which four parts the essentials of the new fire-place are added. *c f g h* is a box or receptacle of iron to contain the charge of coal for the day with its open mouth placed where the bottom bars of the grate had been. It may stand on feet on the hearth, or may be fixed to the grate.— Besides its fixed bottom, *g h* it has also a moveable bottom, *s s*, like a piston, on which the coal immediately rests, and is lifted as wanted, or let down as the piston moves; a piston-rod passes through the fixed bottom, steadied by a guide-hole in the stirrup or bar, *i j*, below. The piston-rod has notches or openings in it to receive the points of the poker, *p o*, which acting as a lever, having its fulcrum in the foot of the box or otherwise, lifts the piston. A catch or pall, *k*, falls into the notches as the piston rises, to prevent its return until desired. In the centre of the bottom front is a door which is opened at will to admit a little air if wanted, or for removing small coal or ashes which fall past the piston. Where the grate is set low, a small opening is made in the hearth to allow the end of the piston to descend.

*a b y* is a hood or cover for the fire, like an inverted funnel opened in front, placed over the fire to contract the open space there, and to receive the true smoke of the fire and convey it little diluted into the chimney-flue at *y*. *t* is a valve or damper, placed in the narrow part of the stalk of the hood to give complete control of the current of air passing through. There is an index externally, showing clearly always the position of the valve. *y e* marks the direction of the chimney-flue in the wall, having generally to bend to one side to avoid the fire-place in the room above. *v* is the ventilating chimney-valve, admitting air from near the top of the room to the flue, balanced nearly on its centre of gravity, so that the least pressure from without opens it inwards, but any pressure from within, as of smoke, closes it. There is a wire descending from the valve, with a screw or loop-peg, for partially or wholly closing it. There is a channel underneath the hearth by which fresh air directly from the atmosphere, enters the room, to be warmed under the fender or near the fire, and then to spread in the room. It has a controlling valve.



10. The improved chimney draught in attic or upper rooms will make these more valuable, and will increase the comfort of low houses and cottages.

11. It would, moreover, be convenient occasionally to carry the flue of a close stove, or bath, or the ventilating tube from lamps in staircases, into any acting chimney.

12. This torch-fire (as some have called it, because it burns from above downwards, like a torch or candle) is remarkably adapted also for the purpose of the kitchen

13. The change of any existing grate of an old fashion into