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On a New Smoke-Consuming and Fuel-Saving Fire-Place,
With Accessories Ensuring the Healthful Warming and
Ventilation of Houses.

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DEFECTS OF HEATING AND VENTILATING.

The third and last of the great evils of the present open fires is, that there are great irregularities and deficiencies in their heating and ventilating actions, which bear so powerfully on the public health. The hood and its damper, as influencing these, may appear perhaps of more importance than as saving the fuel.

The hood and its damper, by allowing so small a quantity of air to pass through in comparison with what rises in an open ordinary chimney, lessens in the same degree the cold draught of air towards the fire from doors and windows, and which are common causes to the inmates of winter inflammation and other diseases; and for the same reason, the heat, once radiated from the fire towards the walls of the room, not being again quickly absorbed and carried away by such currents of cold air as are referred to, remains in the room, and soon renders the temperature of the whole more equable and safe.

Still more completely to prevent cold draughts approaching from behind persons sitting around the fire, the fresh air for the room is conveniently admitted, chiefly by a channel which leads directly from the external air under the floor to the hearth, and there allows the air to spread from under the fender. The fender, exposed to the fire near it, becomes hot; the cold, fresh air then rising under it, takes from it the excess of its heat, and so becomes itself tempered before it spreads in the room. The two evils of excess of heat and excess of cold meet to neutralise each other, and to produce a good result.

The importance of general ventilation, again, is strikingly exhibited by such occurrences as the following, which was related at the meeting of scientific friends at which I first described the new fire-place, by Mr. Robert Chambers, of Edinburgh, as having happened not long ago in Glasgow. A large old building, which had been formerly a cotton mill, was fitted up as a barrack or dwelling-house for part of the working classes, and had nearly 500 inmates. Like a usual and crowded human dwelling, fevers and kindred diseases soon became prevalent there. After a time, a medical man who was interested obtained permission from the proprietors of the neighbouring chemical works, in which there was a lofty and very powerful chimney, for the ventilation of the lodging-house. He then connected with this a main tube from the lodging-house, which had branches running along all the passages or galleries, and from the ceiling of every separate room a small tube communicated with these branches. Soon after, to the surprise as well as to the delight of all concerned, severe diseases entirely disappeared from the house and never returned.

Now, the chimney of the new fire-place, although not very tall, has a ventilating power scarcely inferior to that of the

Glasgow chemical works. The arrangement of the hood and its valve, as above described, by allowing only unmixed and very hot smoke to enter the chimney, instead of, as in common chimneys, smoke diluted with many times its volume of colder air, increases the draught just as it does the heat of the chimney, and through an opening then made into the chimney from near the top of a room, all the hot, foul air in the room, consisting, perhaps, of the breath of inmates, smell of meals, burnt air from candles, lamps, &c., and which else accumulates and stagnates at first near the top of the room, is immediately forced into the chimney and away. This is strikingly proved by placing near the ventilating opening a light body, as feathers or shreds of paper suspended to a thread, and seeing with what force it is drawn into the opening. In the diagram the opening is represented at the letter *v*, having the common balanced chimney-valve in it, which, by the wire descending to a screw within reach of the hand, can be left open to any desired degree.

That valve I recommended many years ago, and its use has become pretty general over the country; but, in many cases, what I described as an essential concomitant—the contraction of the chimney-throat and the space over the fire—has been omitted.

This is what I had to say on the correction of the third of the great evils of the common fire, and I hope it has been shown to be possible to construct an open fire-place, scarcely differing in appearance from an ordinary English fire-place, with its pleasing associations, but which shall be smokeless, saving much fuel, and ensuring the healthful warmth and ventilation of our houses.

There are yet subordinate advantages of the new arrangement of fire-place, among which the following may be noted:—

1. Chimney-sweeping can scarce be wanted where there is no soot.
2. Chimney-flues without soot cannot catch fire; and if fire were in any way there introduced, by shutting the hood valve it would be certainly extinguished. Thus a large proportion of the conflagrations of buildings may be avoided.
3. The huge evil (almost universal) of smoky chimneys cannot occur with this grate.
4. The occasional sudden rush of air towards a hot wide chimney, when the door is opened, and which carries readily the light wax-tin dress of a lady towards the grate and inflames it, cannot happen with this grate.
5. The danger of sparks from exploded pieces of coal thrown on the carpet does not exist here, for all the coal is first heated and coked while deep in the coal-box, and covered over. Thus a fire-guard is not wanted on this account.
6. The strong draught of a voracious fire in one room, or in the kitchen of a house, cannot disturb and overcome the action of other chimneys in the house, which is now very common.
7. The strong draught of any well-constructed fire-place may, by a connecting tube be made to ventilate any distant rooms, staircases, cellars, closets, &c.
8. The strong and copious draught caused by momentarily opening the hood-valve or damper will prevent the diffusion of dust when the fire is stirred or disturbed.
9. The chimney-valve by its powerful ventilating effect, obviates all objections to the use of gas-lights in houses, thus leaving the beauty, cleanliness, cheapness, and many conveniences of gas unmarred. Explosion from accidental escape