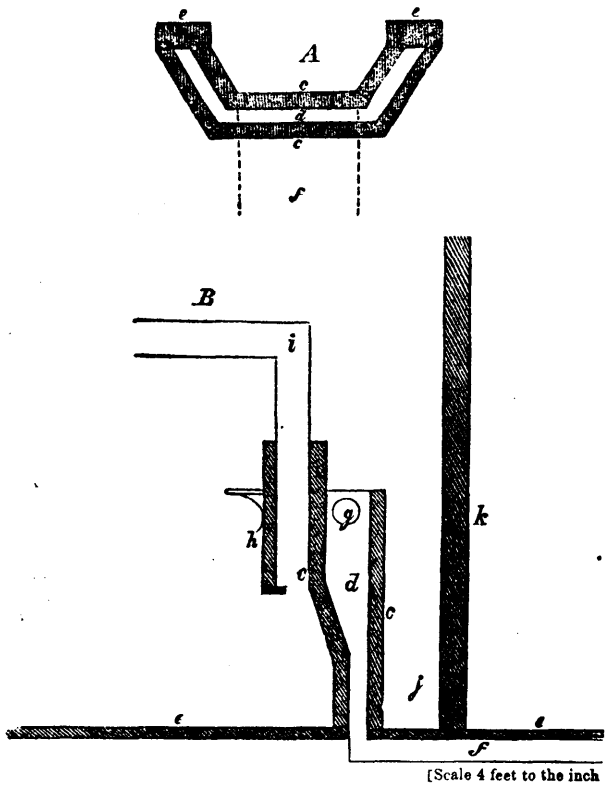
the room. (See *e, e, Sec.* 8., *Fig.* 2.) If these orifices are lower part of the warm air will find its way into the fireplace. The brick chimneys should rise at least two or three feet above the hollow back, and may be surmounted by a flat iron, soap-stone, or brick-top, with an opening for a smoke-pipe, which may thence be conducted to any part of the room, the same as a common stove-pipe.

FIG. 2.

FIREPLACE.



[Scale 4 feet to the inch

A. Horizontal section.
B. Perpendicular section.
c. Brick walls, 4 inches thick.
d. Air space between the walls.
e. Solid fronts of masonry.
f. Air box for supply of fresh air, extending beneath the floor to the front door.
g. Openings on the sides of the fireplace for the heated air to pass into the room.
h. Front of the fireplace and mantelpiece.
i. Iron smoke flue, 8 inches diameter.
j. Space between the fireplace and wall
k. Partition wall.
l. Floor.

The smoke-pipe should rise a foot, then pass to one side, and then, over a passage to the opposite extremity of the room, (when its heat having been exhausted) it should ascend perpendicularly and issue above the roof. (See *i* in *Fig.* 2.)

The following are some of the advantages of this double fireplace; 1. The fire, being made against brick, imparts to the apartment no deleterious qualities which are produced by the common iron stove, but gives the pleasant heat of an open fireplace. 2. None of the heat of the fuel will be lost, as the smoke-pipe may be extended far enough to communicate nearly all the heat contained in the smoke. 3. The current of air heated within the hollow back, and constantly pouring into the room, will diffuse an agreeable heat throughout every part. 4. The pressure of the air of the room will be constantly outward, little cold will enter by cracks and windows, and the fireplace will have no tendency to smoke.

If instead of this fireplace, the common stove be adopted, it should be placed above the air-passage, which may be commanded by a valve or register in the floor, so as to admit or exclude air.

6. VENTILATION.—As the best possible ventilator is an open fireplace a room warmed by such a fireplace as that just described may be easily ventilated. If a current of air is constantly pouring in, a current of the same size will rush out wherever it can find an outlet, and with it will carry all the impurities with which the air of an occupied room is always charged. For this an open fireplace may suffice. But when the room is warmed by a common stove, other provisions must be made for its ventilation. In addition to the various modes of ventilation previously described in this work, we may remark, that a most effective ventilator for throwing out foul air is one opening into a tube, which encloses the smoke-flue at the point where it passes through the roof. Warm air naturally rises. If a portion of the smoke-flue be enclosed by a tin tube, it will warm the air within this tube, and give it a tendency to rise. If then a wooden tube, opening near the floor, be made to communicate, by its uppor extremity, with the tin tube, an upward

FIG. 5.

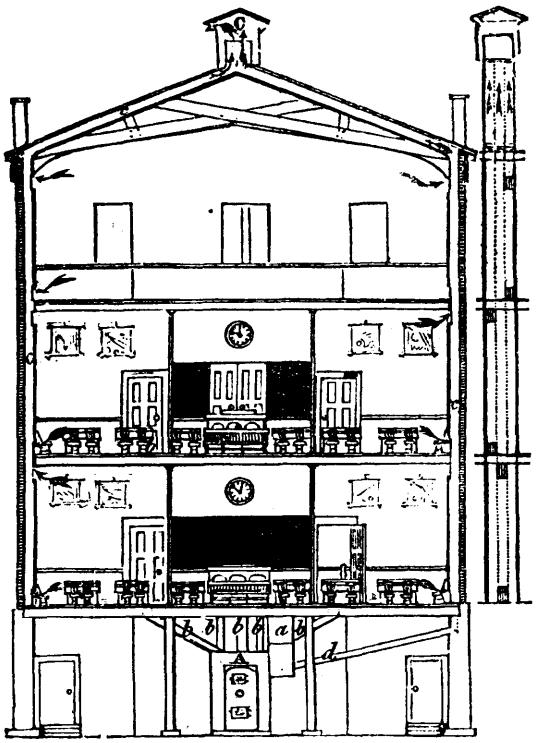


FIG. 4.—SECTION OF SCHOOL HOUSE.

F. Hot air furnace.
a. Cold air ducts.
bbbb. Hot air ducts to the registery in the floors.
c. Foul air ducts—the passage into and through, which is indicated by an arrow.
d. Smoke flue.

current will take place in it, which will always act whenever the smoke-flue is warm.

As heating by hot air is more generally adopted, we give in Fig. 4 a transverse section of two stories of a grammar school-house thus heated, and exhibiting the interior arrangements, maps, master's desk, clocks, black-board, seats, hot air and ventilating apparatus, &c. The flues for hot air to the upper floor should be conveyed in the flues and enclosed in the partition.

Figure 5 gives a lateral section of the ventiducts or foul air flues, showing the manner in which the flues are packed together, and carried up separately from the floor of each room until they discharge into the common ejector at the apex of the roof.

SYMPTOMS OF BAD AIR IN A SCHOOL ROOM.—Every man and woman, who received any portion of their early education in the common school, can testify to the narrow dimensions, and low ceiling of the school-rooms, and to the discomfort arising from the close, stagnant, offensive atmosphere, which they were obliged to breathe. Who does not remember the comparative freshness and vigor of mind and body with which the morning's study and recitations were begun, and the languor and weariness of body, the confusion of mind, the dry skin, the flushed cheek, the aching head, the sickening sensations, the unnatural demand for drink, the thousand excuses to get out of doors, which came along in succession as the day advanced, and especially in a winter's afternoon, when the over-heated and unrenewed atmosphere had become obvious to every sense? These were nature's signals of distress, and who can forget the delicious sensations with which her balmy breath when admitted on the occasional opening of the door, would visit the brow and face, and be felt all along the revitalized blood, or the newness of life with which nerve, muscles and mind were endued by free exercise in the open air at the recess, and the close of the school? Let any one who is sceptical on this point visit the school of his own section, where his own children perhaps are condemned to a shorter allowance of pure air than the criminals of the State, and he cannot fail to see in the pale and wearied countenances of the pupils, the langour and uneasiness manifested, especially by the younger children, and exhaustion and irritability of the teacher, a demonstration that the atmosphere of the room is no longer such as the comfort, health and cheerful labour of both teacher and pupils require.*

*In connection with this subject, we would call attention to the valuable apparatus for ventilation in School-houses, recently patented by a Company in Canada. Full information given on application, &c., J. S. Withers, Esq., Secretary to the Company, Montreal.—*Ed. J. of Ed.*