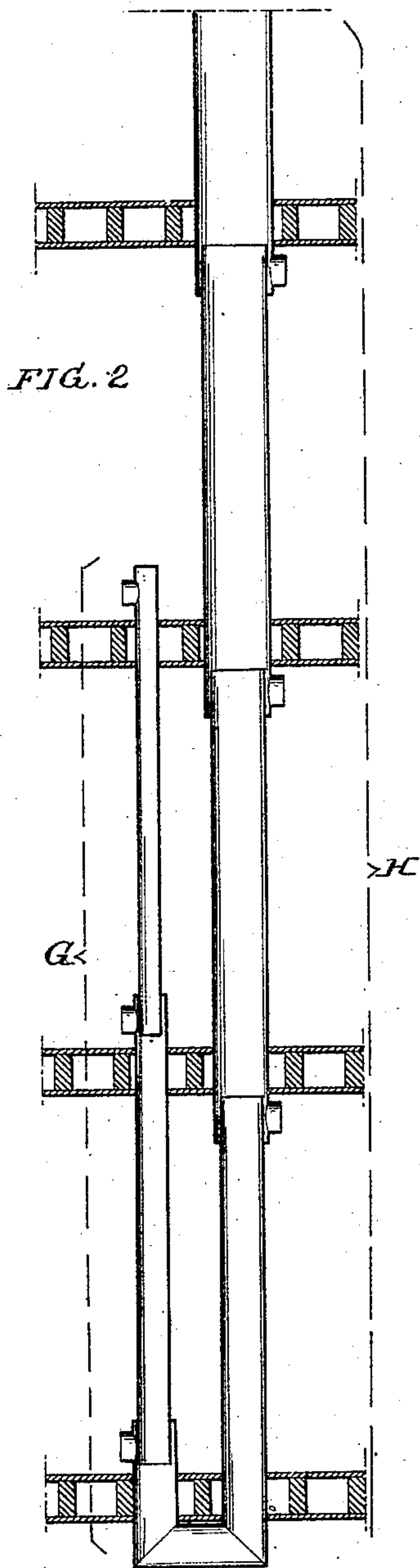
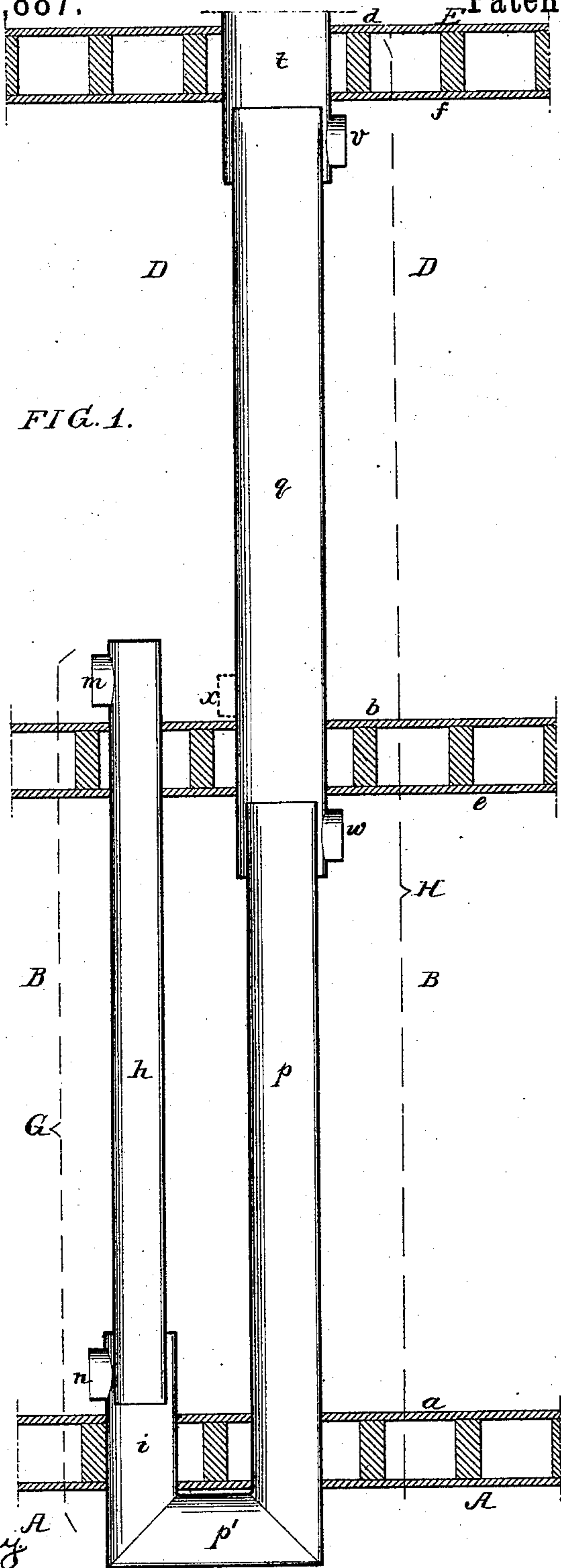


(No Model.)

H. N. WICKERSHAM.
VENTILATING APPARATUS.

No. 304,887.

Patented Sept. 9, 1884.



Witnesses:
Harry Drury
John Clayton.

Inventor:
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by his Attorneys:
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UNITED STATES PATENT OFFICE.

HENRY N. WICKERSHAM, OF WILMINGTON, DELAWARE.

VENTILATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 304,887, dated September 9, 1884.

Application filed March 11, 1884. (No model.)

To all whom it may concern:

Be it known that I, HENRY N. WICKERSHAM, a citizen of the United States, and a resident of Wilmington, New Castle county, Delaware, have invented certain Improvements in Ventilating Apparatus, of which the following is a specification.

My invention consists of an apparatus, fully described hereinafter, for ventilating upper and lower apartments of a building by carrying off the heavy vitiated air from the lower portions of the apartments and the rarefied foul air from the upper portions of the same, this ventilation being effected without any combustion of fuel and without the aid of ejectors, blowers, or other appliances commonly used for creating drafts.

In the accompanying drawings, Figure 1 is a vertical section, showing portions of an upper and lower apartment with the ventilating apparatus; and Fig. 2, the apparatus drawn to a reduced scale and applied to a three-story building.

My invention admits of variations in construction and arrangement of parts, as the character of the building to which it is applied and the disposal of apartments therein may suggest; but I will in the first instance describe my invention as successfully carried into effect in a two-story public-school house, of which A, Fig. 1, is part of the cellar; B, part of the first-floor apartment; D, part of the second-floor apartment, and E part of the garret, *a* being the floor and *e* the ceiling of the first-floor apartment, *b* the floor and *f* the ceiling of the second-floor apartment, and *d* the garret-floor.

For ventilating the upper and lower apartments it is essential, in order to produce the best effect, that there should be two systems of pipes or passages—one system for the downward escape of the heavy vitiated air from the two apartments, and the other for the ascent and final discharge into the atmosphere of both the heavy air and rarefied air. Thus, in Fig. 1, there is a pipe, G, composed of two sections, *h* and *i*, the former being larger than and extending downward into the latter. The section *h* has an inlet, *m*, a short distance above the floor D, for the escape of the heavy and vitiated air from the lower portion of the upper

apartment, D, the section *i* having an inlet, *n*, for the escape of the heavy air from the lower portion of the apartment B. The other system of pipes, H, is composed in the present instance of three sections—namely, the lowest section, *p*, communicating through a connection, *p'*, with the lowest section of the system of pipes G, the intermediate section, *q*, and the highest section, *t*, which extends through the garret-floor and out through the roof, so as to communicate directly with the atmosphere. The pipe *p* must be of less size than and extend into the lower end of the pipe *q*, the latter being of less size than and extending into the highest pipe, *t*. The pipe *q* has an inlet, *w*, near the ceiling *e* of the first-floor apartment, and the pipe *t* has an inlet, *v*, near the ceiling *f* of the second-floor apartment D.

The object of the two systems of pipes may be explained by stating that if, instead of permitting the heavy vitiated air in the apartment D to enter the inlet *m* of the pipe *h*, there should be an inlet in the pipe *q* at *x*, the system of pipes H would not have the desired ventilating effect.

I have found in practice that the apartments can be effectually ventilated by the above-described system of pipes without the aid of appliances for creating a draft—such, for instance, as a stove or heater, ejector, blower, or exhaust mechanism—the rush of rarefied air into the inlets *w* and *v* and through the pipe H causing a downward current through the pipe G, so that the heavy vitiated air of both apartments passes down the pipes, up through the section *p*, and into the section *q*, through which it passes with the rarefied air from the upper portion of the lower apartment into the section *t*, and through the latter with the rarefied air from the upper portion of the upper apartment into the external air.

It is essential, in order to produce the best effect, that the two sets of pipes should be graded in size as shown, the pipe *i* being of larger area than the pipe *h*, owing to the additional volume of vitiated air which enters the pipe *i* at the point where the pipe *h* extends into it. In like manner the pipe *q* must have a larger area than the pipe *p*, to afford a free passage for the heavy vitiated air in addition to the light air admitted at

the inlet *w*, and for the same reason the final-discharge pipe *t* should be larger than the pipe *q*. It is immaterial what the shape of of the pipes or the character of the inlets may
5 be, and the said pipes may be either of sheet metal or of wood or other available material; but in all cases the pipes must be graded in size as set forth, and the inlets for the heavy vitiated air must be near the floor, and for
10 the rarefied air near the ceiling.

The modification, Fig. 2, illustrating my invention as applied to the ventilation of apartments in a three-story building, will be understood without explanation.

15 I claim as my invention—

The combination of upper and lower apart-

ments of a building with two systems, G and H, of pipes communicating with each other at their lower ends, and composed of sections graded in size as described, the system of
20 pipes G having inlets near the floor of the said upper and lower apartments, and the system of pipes H inlets near the ceilings of the apartments, all substantially as set forth.

In testimony whereof I have signed my name
25 to this specification in the presence of two subscribing witnesses.

HENRY N. WICKERSHAM.

Witnesses:

JOHN CLAYTON,
HARRY SMITH.