(No Model.) 2 Sheets—Sheet 1.

C. P. NOBLE.

HEATING AND VENTILATING SYSTEM.

No. 563,679. Patented July 7, 1896.

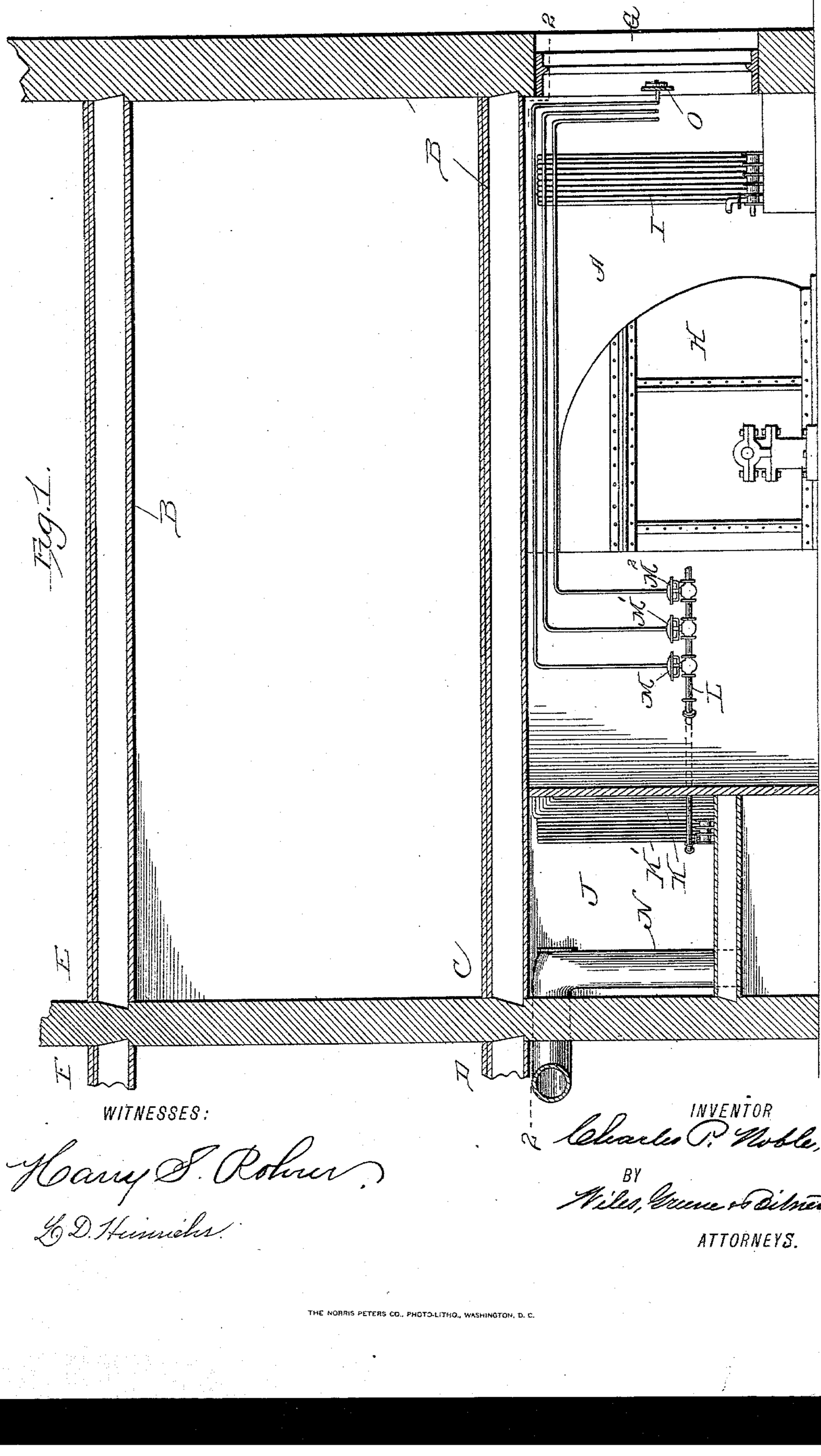

Fig. 1.

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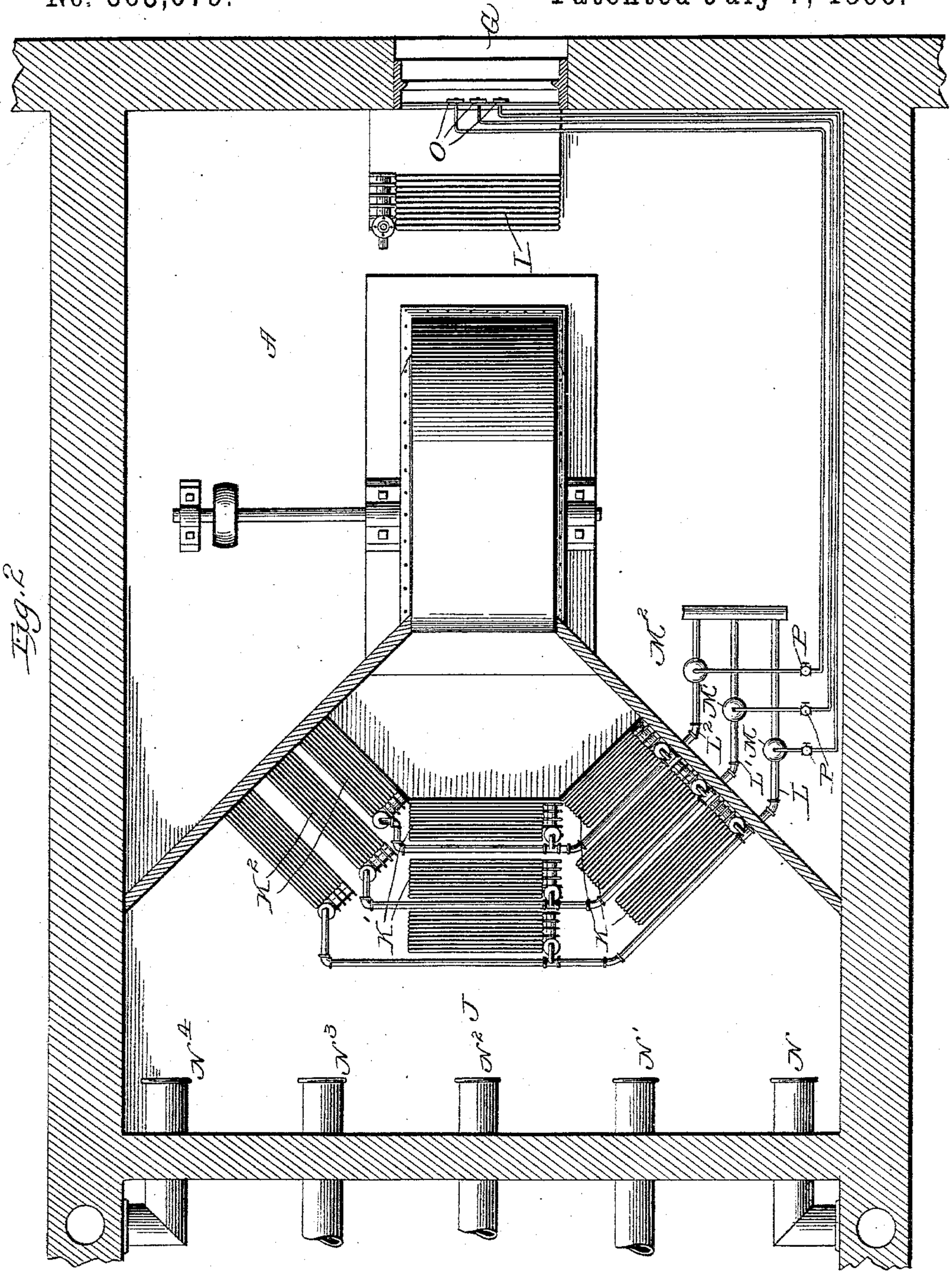

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HEATING AND VENTILATING SYSTEM.

SPECIFICATION forming part of Letters Patent No. 563,679, dated July 7, 1896.

Application filed April 3, 1896. Serial No. 586,057. (No model.)

To all whom it may concern:

Be it known that I, CHARLES P. NOBLE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Heating and Ventilating Systems; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to heating and ventilating buildings having many rooms, such as school-buildings, for example, and its general object is to provide means whereby the temperature of all the rooms may be automatically kept almost exactly at the point selected as the standard, with a minimum expenditure of heat and in spite of either gradual or sudden changes in the open-air conditions. In modern heating and ventilating systems of this general character air equal in volume to about one-seventh of the cubic capacity of the room is forced into the latter every minute, the volume being the same no matter what its temperature, in order that ventilation may in no case be sacrificed. To accomplish the results above mentioned, it is of the greatest importance that this large volume of air introduced should be as little above the temperature of the external air as the resistance of the room to heating will permit. Such resistance depends upon various elements, but principally, of course, upon the temperature of the open air. The excess of temperature should be as small as possible, partly because far less fuel is thus required, but in a far greater degree because when unnecessarily-heated air is used the temperature of the room rises quickly, and as thermostatic devices follow such changes only after an interval, the room is overheated several degrees before regulation occurs. Cooling to a point slightly below the normal usually follows, and then the room is again overheated as before. In other words, the temperature of the room constantly fluctuates, while for the greater portion of the time it is overheated. Unless some special provision be made to secure a different result, this evil is much greater when the external air is itself but a few degrees below the standard for the room; and, indeed, this tendency to overheating is so strong that even in many of the most recent installations of modern apparatus it is a serious and uncontrollable evil.

My invention eliminates the difficulty in providing means whereby portions of the heating devices are successively and automatically cut out as the external temperature rises, and cut in as it falls, while ventilation is maintained by mechanical devices arranged to force into the room a current of air always uniform in volume, regardless of its temperature.

No novelty is claimed for the radiators, fans, valves, thermostats, and the like used in my apparatus, but the arrangement and combination of elements old *per se* is believed to afford the first practically successful solution of the problem above outlined.

Obviously, in embodying the invention, there is room for much variation in the appearance of the apparatus.

The apparatus selected for the purpose of illustrating the invention is shown in the accompanying drawings, in which—

Figure 1 is a sectional elevation of such portion of a building as is needed to show my apparatus in place. Fig. 2 is a sectional plan showing the same apparatus, the plane of section passing through the line 2 2, Fig. 1.

The apparatus is shown as located principally in a small basement room A of a building B, having rooms C D E F to be heated. Air enters the room A through a window or inlet G. Within the room is placed a fan H, and between it and the outside of the window and across the path of the entering air is placed a radiator I for tempering the incoming air. The fan takes air from the room and forces it into a closed heating-chamber J, where it first passes through radiators, preferably in sets, each containing a series of radiators K K′ K^2, heated from a common source, as shown, through pipes L L′ L^2, controlled by valves M M′ M^2, and then enters flues N N′ N^2 N^3 N^4, leading, respectively, to the rooms to be heated. The valves M M′ M^2 are actuated by thermostatic devices, without novelty, placed at O in the path of the entering untempered current and adapted by construc-

tion, adjustable or otherwise, to actuate the valves in succession as the temperature of the current passes, in either direction, certain predetermined points, for example, 20°, 50°, and 70°, for the different valves, respectively. The separate thermostats shown may of course be replaced by a single thermostat adapted to actuate the several valves in succession as the temperature rises or falls. The thermostats are thus placed in the current and away from all heat-retaining bodies, so that they may closely follow changes in the temperature of the external air, which experience shows they will not do, under all conditions, if placed upon a wall or the like. Devices not material to this application, and hence not shown, are provided for regulating the flow of air through the flues to the several rooms.

In illustrating the radiators I have shown three sets of three each, but these numbers are not invariable, four or more being commonly employed.

If the thermostatic devices be set to actuate the several valves at 20°, 50°, and 70°, as before suggested, all the radiators will be active or all will be inactive, according as the temperature outside is below 20° or above 70°, and they will be cut out or cut in in succession as the temperature passes from one extreme to the other, and in general any set is cut out and cut in as often as the temperature of the external air passes the point at which the corresponding valve is operated.

When the building is to be quickly heated, as, for example, before the opening of the school in the morning, it is desirable to use the full heating capacity, even though the outside air be above the point at which part of the sets would be cut out, and I therefore place in the connections, between the thermostatic devices and the valves, cut-outs P, (three-way air-valves when, as shown, pneumatic tubes are employed, or a switch when the connections are electrical,) whereby an attendant may at will render the thermostatic devices inoperative.

What I claim is—

1. In a heating system, the combination with a central closed chamber, of a fan arranged to draw air from outside the building and force it into said chamber, sets of radiators located in said chamber, and thermostatic devices located in the non-heated air of the exterior of the building and adapted to cut out and cut in said sets, in succession, as the open-air temperature rises and falls past predetermined points.

2. In a heating system, the combination with a series of rooms, a corresponding series of flues leading to said rooms, respectively, and a fan arranged to draw air from the exterior of the building and force it into said flues, of sets of radiators placed in the path of the air from the fan, and thermostatic devices placed in the path of the non-heated air passing to the fan and adapted to cut said sets out or in in succession as the temperature of the incoming air passes corresponding points fixed at will.

3. In a heating system, the combination with a series of rooms, a series of flues leading to the rooms, respectively, and a fan arranged to draw air from the exterior of the building and force the same into said flues, of sets of radiators located in the current from the fan, a tempering-radiator placed in the path of air passing to the fan, and thermostatic devices located in the path of the non-heated entering air and adapted to cut out and cut in said sets in succession as the temperature of the incoming air passes certain predetermined points.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES P. NOBLE.

Witnesses:
HARRY BARTON,
WALLACE GREENE.