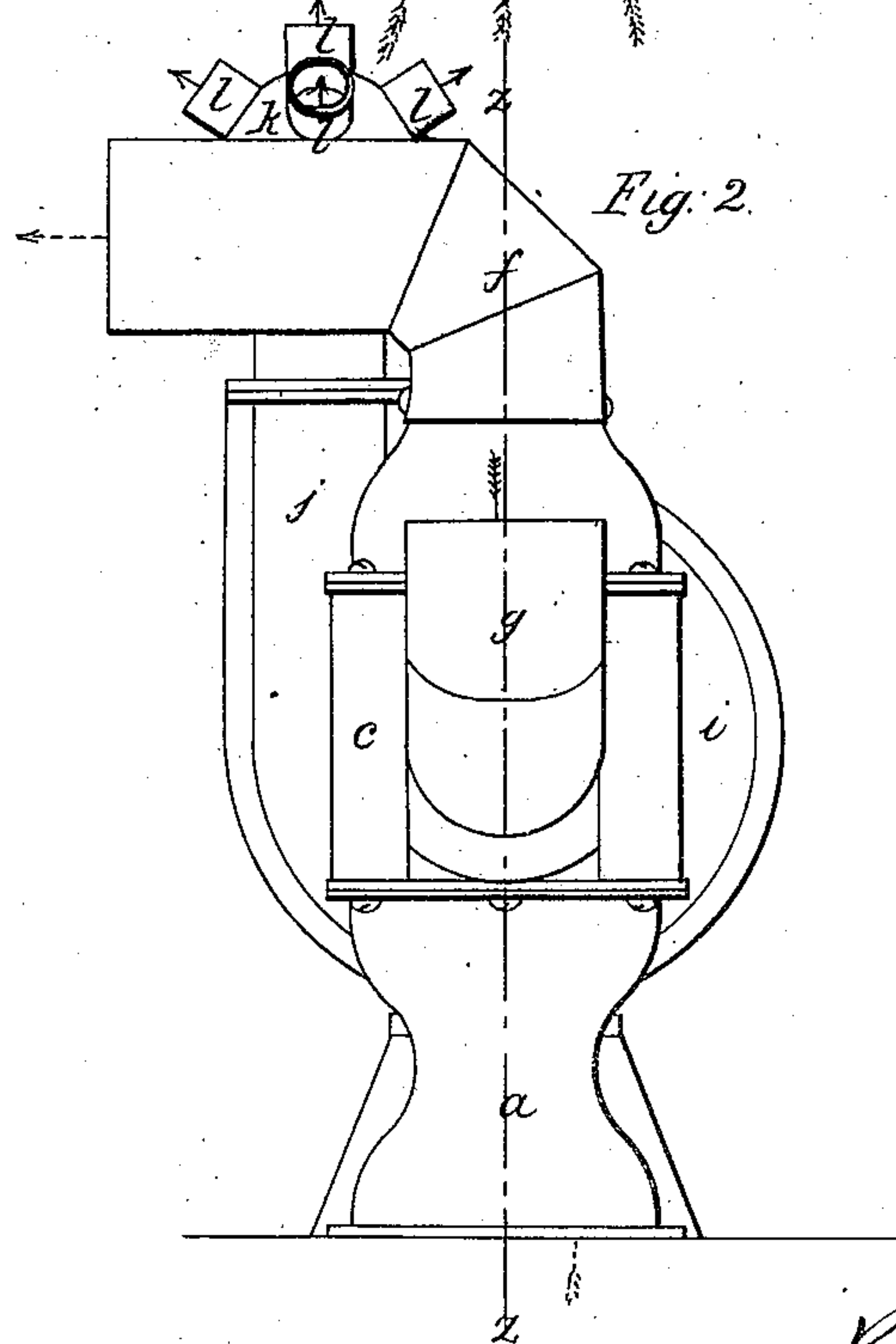
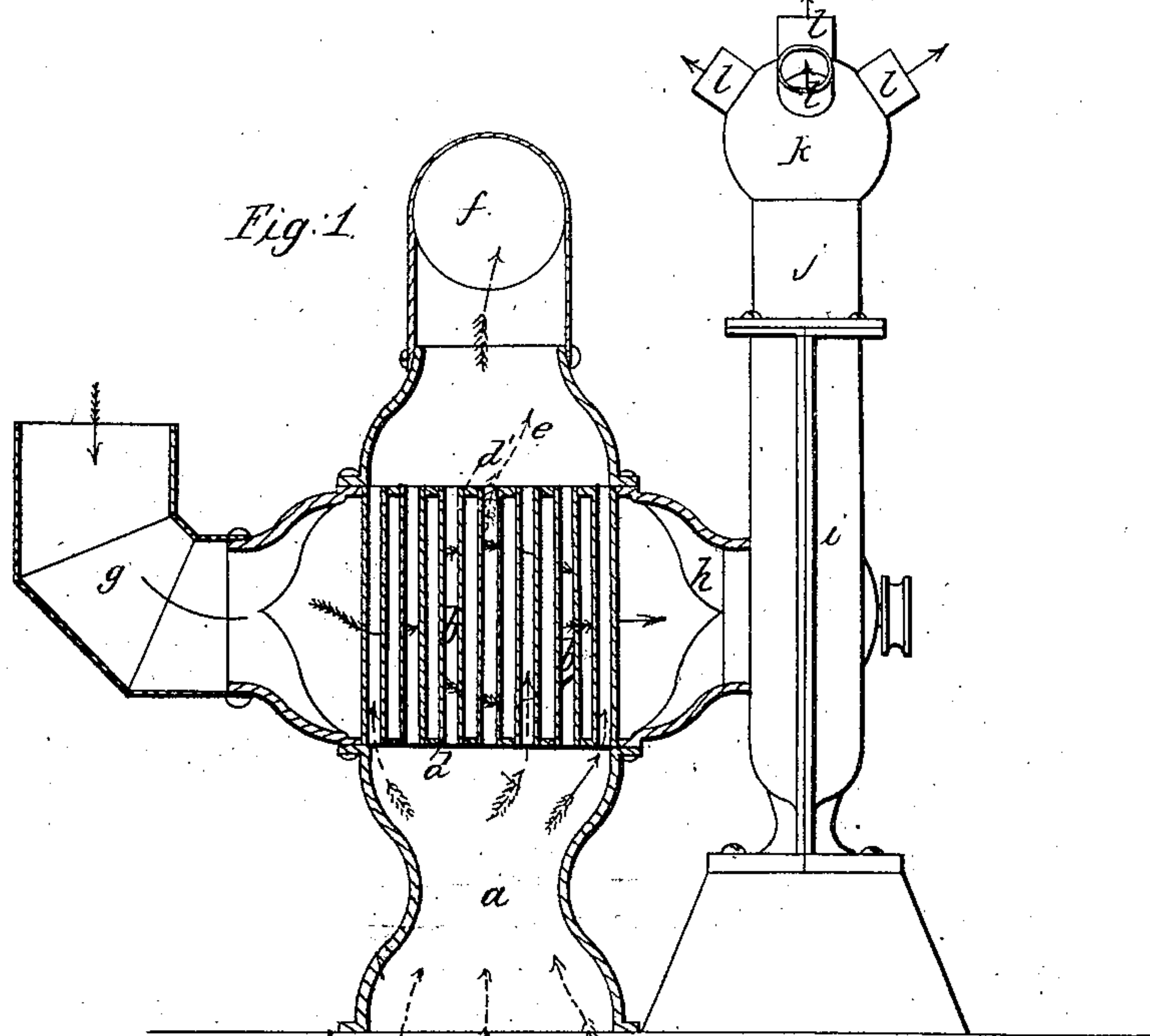


B. F. Sturtevant,

Hot Air Furnace

No. 95,849.

Patented Oct. 12. 1869.



Witnesses;
W. B. Cressy,
Frank Gould

Inventor;
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United States Patent Office.

B. F. STURTEVANT, OF JAMAICA PLAINS, MASSACHUSETTS.

Letters Patent No. 95,849, dated October 12, 1869.

APPARATUS FOR UTILIZING HEAT.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, B. F. STURTEVANT, of Jamaica Plains, in the county of Norfolk, and State of Massachusetts, have invented an Improved Apparatus for Reclaiming Heat from Hot Volatile Products of Combustion; and I do hereby declare that the following, taken in connection with the drawings which accompany and form part of this specification, is a description of my invention, sufficient to enable those skilled in the art to practise it.

In situations where power is used, there is generally escaping into chimneys, from steam-boilers, forges, furnaces, &c., much more heat than is necessary for the purpose of creating a draught, all such excess being actual waste of heat and fuel.

In such cases it is always possible to make use of a rotary blower; and

My invention consists in intercepting escaping hot volatile products of combustion, by means of an enclosed series of tubes, so located and arranged, and combined with inlet and delivery air-pipes, connected to the tube-case, and with a rotary blower, and one or more distributing-pipes leading therefrom, that the escaping current shall pass through the series of tubes, and shall heat a current of air, which, by the action of the rotary blower, combined with the case surrounding the tubes, shall draw air into the tube-case, so as to surround the tubes, and abstract heat from the hot currents passing through the tubes, and shall draw the air so heated into the blower, and shall force it out, through the blower-outlet, through any or all of the distributing-pipes leading from the blower-outlet, said pipe or pipes reaching to one or several apartments, more or less distant from the blower, which, or any of said apartments, may be heated at will, accordingly as the forced current from the blower is made to traverse through one or more of the distributing-pipes.

By this combination I am enabled to economize heat escaping to waste, and to direct and force it, mingled with pure fresh air, to apartments which are so located, with respect to the place from which the heat is received, that natural draught would be ineffectual to create the necessary current, and thus I am enabled, with some expenditure of power, to heat and ventilate distant spaces, without regard to their location.

The drawings show my improved combination, adapted for utilizing the heat escaping from a vertical tubular steam-generator, though the enclosed series of tubes may be interposed between any combustion-chamber and the chimney thereof.

Figure 1 is a sectional elevation of the combination, the section being taken in the plane of the line $z z$, Figure 2, which is an end view of the combination.

a represents a metal piece, which serves as the smoke-box or bonnet, which rests on the upper end of a vertical tubular steam-generator, or which is connected to any passage-way conveying volatile products

of combustion, the piece a confining and directing the escaping volatile products of combustion.

The smoke-box supports an enclosed series of vertical tubes, the tubes being denoted by b , and their surrounding case by c , the heads or tube-sheets of which are marked $d d'$.

The top head d' supports a bonnet, e , which, at its upper end, contracts to suit the diameter of the pipe or flue f , through which the smoke and gases deprived of their excess of heat are led off to a chimney.

At one side of the case c a pipe, g , enters the space containing tubes b , and at the other side of the case is the pipe h , leading to the rotary blower i .

These pipes g and h may be of any length required in various locations, and through them, under the influence of the action of the blower, air enters case c around tubes b , and is drawn out therefrom in a heated condition, in the directions indicated by the arrows marked on the drawings.

The pipe h discharges into the centre of the blower, and, by the action of the fan-wheel therein, is forced from the blower, through its outlet-pipe j , into a chamber or an enlargement, k , from which proceed one or several distributing-pipes l , which may be provided with dampers or valves, arranged so as to control passage through any one or all of said pipes l .

The direction of the hot volatile products of combustion, in passing through the apparatus, is indicated by the dotted arrows seen on the drawings.

The tubes b should have an aggregate area equal to or in excess of the area of either passage, by which the smoke, &c., enter to or escapes from said tubes.

The tubes are arranged vertically, so that they may be easily swept or cleaned, said arrangement being preferable to a horizontal arrangement of the tubes, in which all solid matter, such as ashes, would deposit, and would soon choke up the tubes.

The pipe g may be made of any length, so as to have its end remote from the case c , where it can receive pure fresh air, or the pipe g can be arranged as a return-pipe from the room into which the outlet from the blower delivers.

The blower may be arranged to force instead of to draw air through the case containing the tubes which carry off the volatile products of combustion, in which case the distributing-pipes l would be attached directly to the outlet-pipe h from the tube case.

I claim, for utilizing the heat escaping in currents of volatile products of combustion, an enclosed series of tubes, provided with inlet and outlet-pipes for said volatile products, and with an air-inlet and an air-outlet entering and proceeding from the enclosed space around the tubes, when combined with a rotary blower, by which air is passed rapidly through said air-passages, and is forced from the outlet of the blower in a heated condition, substantially as described.

Witnesses:

B. F. STURTEVANT.

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