No. 662,883. Patented Nov. 27, 1900.

A. G. SÖDERLUND & F. W. LÖNNBECK.

HOT AIR FURNACE.

(Application filed Aug. 12, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 3.

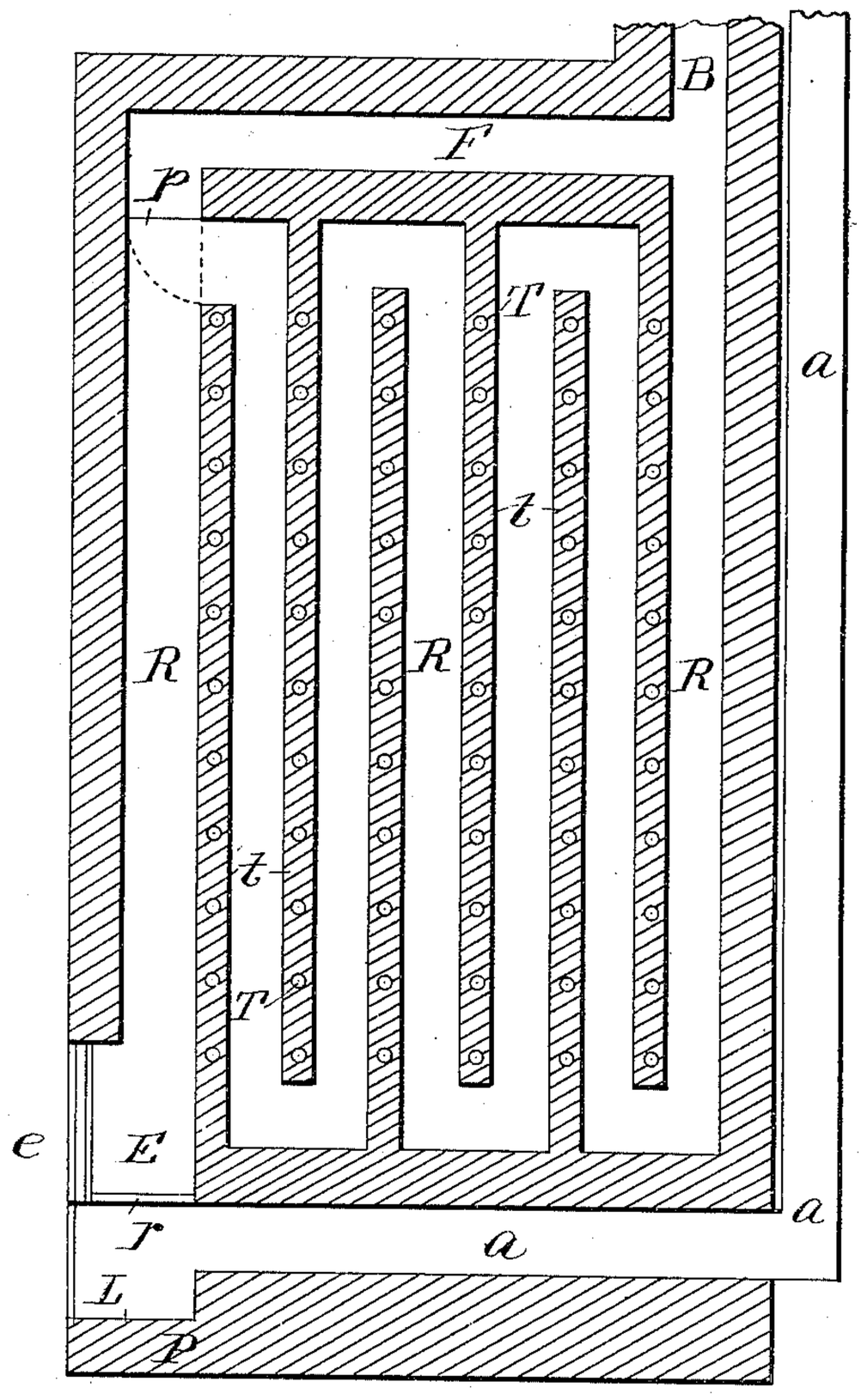
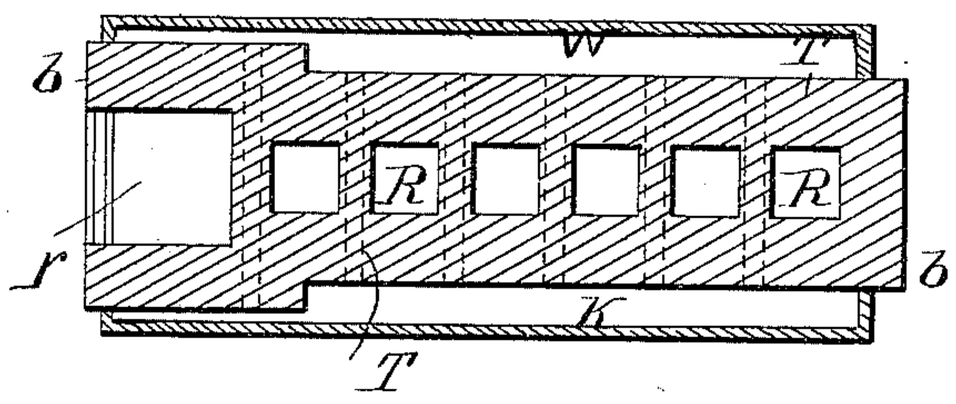


Fig. 1.



WITNESSES:

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INVENTORS

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FIG. 4.

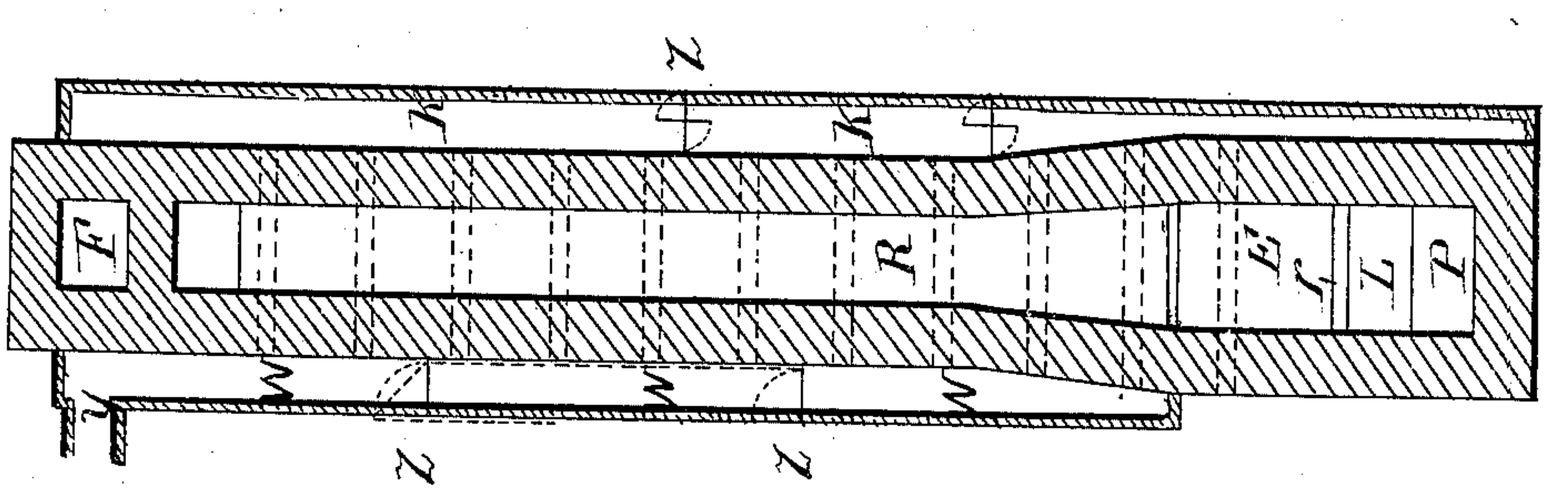


FIG. 5.

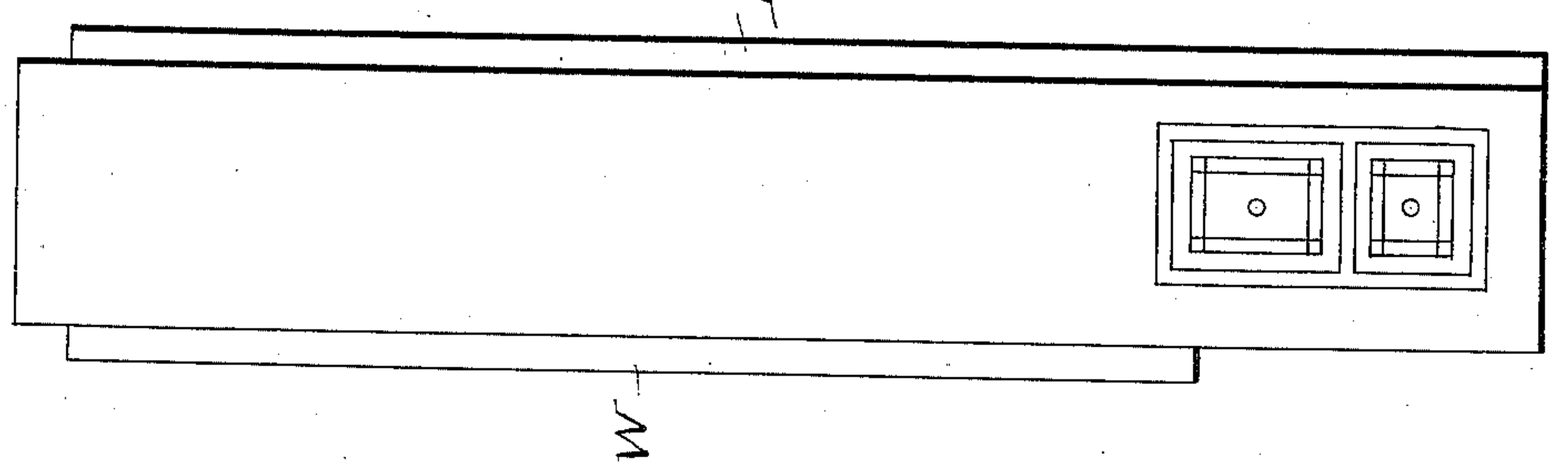
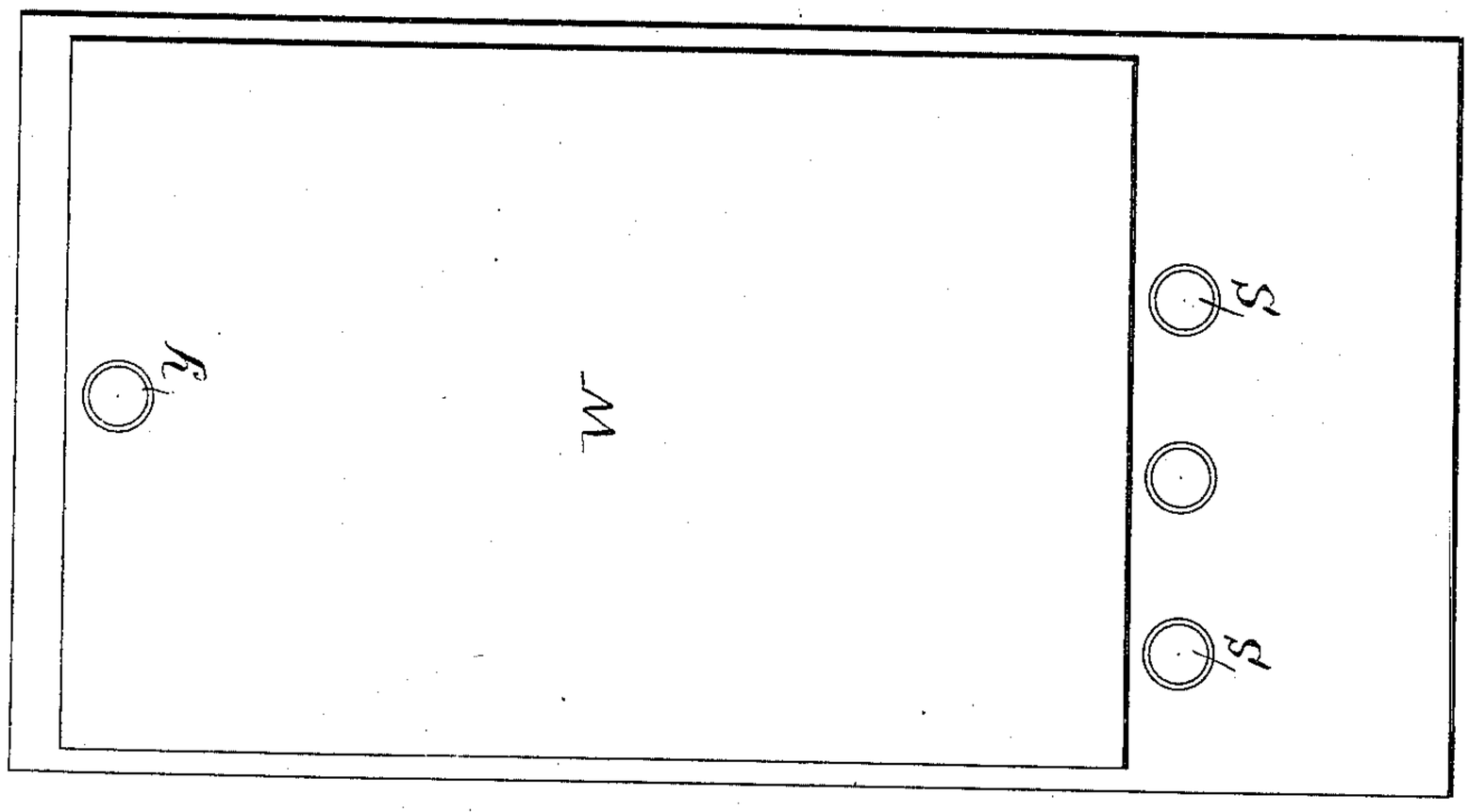


FIG. 2.



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UNITED STATES PATENT OFFICE.

ANDERS GUSTAF SÖDERLUND, OF STOCKHOLM, SWEDEN, AND FREDRIK WALDEMAR LÖNNBECK, OF EKENÄS, RUSSIA; SAID SÖDERLUND ASSIGNOR TO SAID LÖNNBECK.

HOT-AIR FURNACE.

SPECIFICATION forming part of Letters Patent No. 662,883, dated November 27, 1900.

Application filed August 12, 1899. Serial No. 726,991. (No model.)

To all whom it may concern:

Be it known that we, ANDERS GUSTAF SÖDERLUND, master builder, a subject of the King of Sweden, residing at Stockholm, in the Kingdom of Sweden, and FREDRIK WALDEMAR LÖNNBECK, journalist, a subject of the Emperor of Russia, residing at Ekenäs, Finland, in the Empire of Russia, have invented certain new and useful Improvements in Hot-Air Furnaces, (for which application has been made in England, under No. 4,418, dated February 2, 1899, and in Canada, under Serial No. 84,945, dated March 9, 1899,) of which the following is a specification.

This invention relates to an air-heating apparatus whereby fresh air from the outside is heated to a uniform degree and the heating continues long after the fire has been extinguished. It is best described by aid of the accompanying drawings, in which—

Figure 1 is a horizontal section of the warming apparatus; Fig. 2, a side elevation of the same structure; Fig. 3, a longitudinal sectional elevation of the same; Fig. 4, a transverse section of the same, taken in a plane between two rows of pipes. Fig. 5 is a front elevation of the same.

Like letters relate to like parts on all the drawings.

We show a brick or masonry air-heater.

b is the heating-stove; *r*, the furnace-grate; E, the furnace; *e*, the fire-doors; R R, a series of circulation or serpentine flues having brickwork partitions *t;* T T, a series of tubes passing through holes in each of the brickwork partitions *t* and connecting the cold-air chamber K on one side of the heater with the hot-air chamber W on the opposite side of the heater.

L is the foul-air chamber below the grate, and P the ash-pit.

a is the foul-air conduit, which is brought from various parts of the building to the foul-air chamber L, so as to feed the grate with the foul air and allow it to escape with the smoke. F is the waste-flue, and *p* a damper arranged so that at any moment the products of combustion by adjusting this damper can be sent direct into the chimney. This is desirable when first lighting the fire.

B is the chimney.

S S are apertures closed with doors for cleaning the flues.

y is the warm-air outlet, which is taken to orifices in the floors or the bottoms of the walls to the various rooms of the house.

z z, Fig. 4, are alternatively-arranged dampers dividing the hot and cold air chambers, respectively, whereby the passage of the air through the tubes is obliged to take a circuitous course, beginning with air-chamber K, passing through the lower part of chamber W, then through the next part of K, and so on. These dampers can be opened or closed, as required.

The mode of action of the entire apparatus is as follows: The products of combustion issuing from the fire-box E are by means of a long winding flue, or in some cases a single wide flat flue, conducted between walls of brickwork or tiles *t*, in which are embedded the pipes T. The heating apparatus generally can be made of any convenient form, the dimensions varying according to the circumstances of the case and the amount of heat required. The cold air entering the cold-air chamber passes through the tubes embedded in the brickwork to the hot-air chamber. The brickwork, or, more strictly speaking, tilework or fire-clay blockwork inclosing the tubes is of sufficient thickness to be not easily burned or worn away. It, together with the walls of the flue, acts as a reservoir of heat, regulating and equalizing the amount of heat given to the air-tubes and acting as an accumulator of heat, giving it out long after the fire has been withdrawn. In practice it is proposed to make these tubes about eighteen inches in length and one inch in diameter and one-eighth of an inch thickness material in small houses; but they may be of larger dimensions in larger houses. The air-chambers can be made of brickwork, metal, or any other suitable material. They are preferably from six inches to twelve inches in width and the entire set of tubes open out into them. Where it is desired to increase the heating power of the apparatus very considerably, as in extremely-cold weather, the device set forth in Fig. 4 is used, where the hot and cold air chambers are

subdivided by movable partitions and the air caused to circulate to and fro through several pipes before escaping, and thus the greatly-increased heat of the pipes caused by the vigorous combustion is taken up. These partitions are hinged as shown and are either all moved by a single chain or each moved separately, as desired.

We declare that what we claim is—

In an air-heating apparatus, the combination of a masonry casing, a furnace therein, a series of claywork baffle-plates extending alternately from opposite extremities of said casing, and arranged in staggered relation forming a circuitous flue for the products of combustion from said furnace, a smoke-outlet with which said flue communicates, an outer casing forming with said masonry casing hot-air and cold-air chambers on opposite sides of said masonry casing respectively, a series of tubes embedded in said baffle-plates, and providing communication between the hot and cold air chambers respectively and a vertical series of adjustable dampers arranged in the said hot and cold air chambers and adapted to control the length of the path of the air through said heating-tubes, substantially as set forth.

In witness whereof we have hereunto signed our names, this 1st day of July, 1899, in the presence of two subscribing witnesses.

ANDERS GUSTAF SÖDERLUND.
FREDRIK WALDEMAR LÖNNBECK.

Witnesses:
JOHAN NYMAN,
H. OELLMER.