No. 858,286. PATENTED JUNE 25, 1907.

J. M. HEVERLY.

FURNACE.

APPLICATION FILED JAN. 23, 1906.

2 SHEETS—SHEET 1.

FIG. 1.

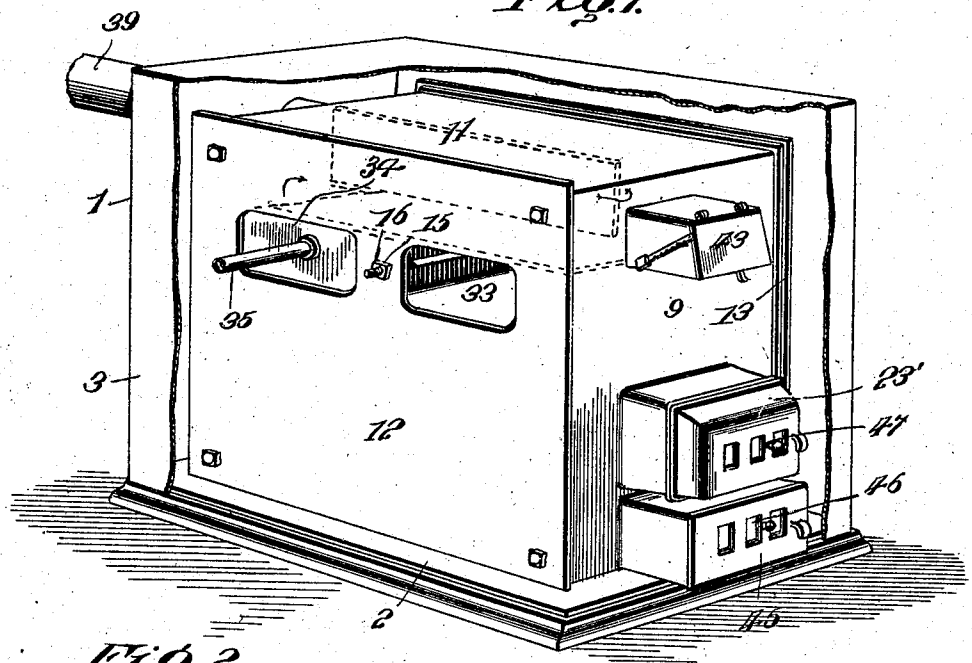
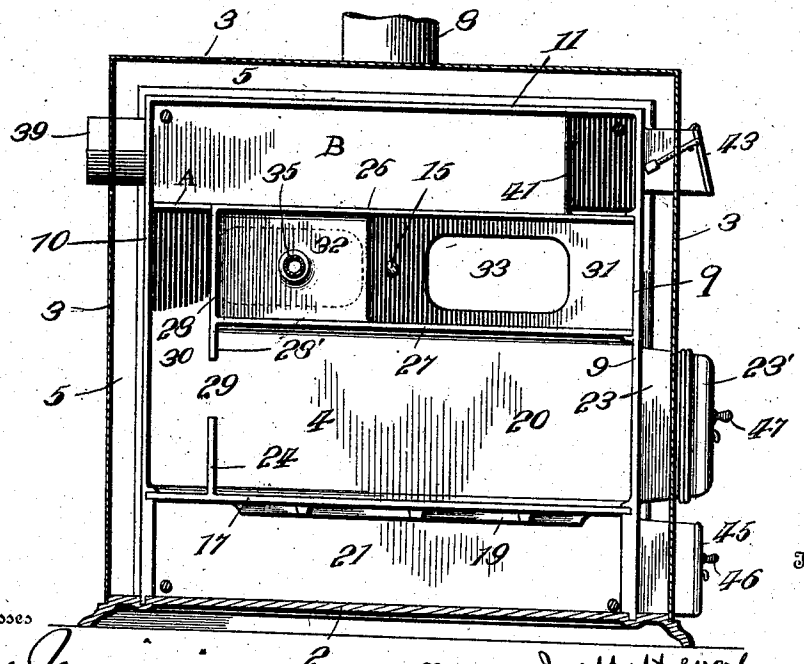


FIG. 2.



Witnesses

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2 SHEETS—SHEET 2.

FIG. 3.

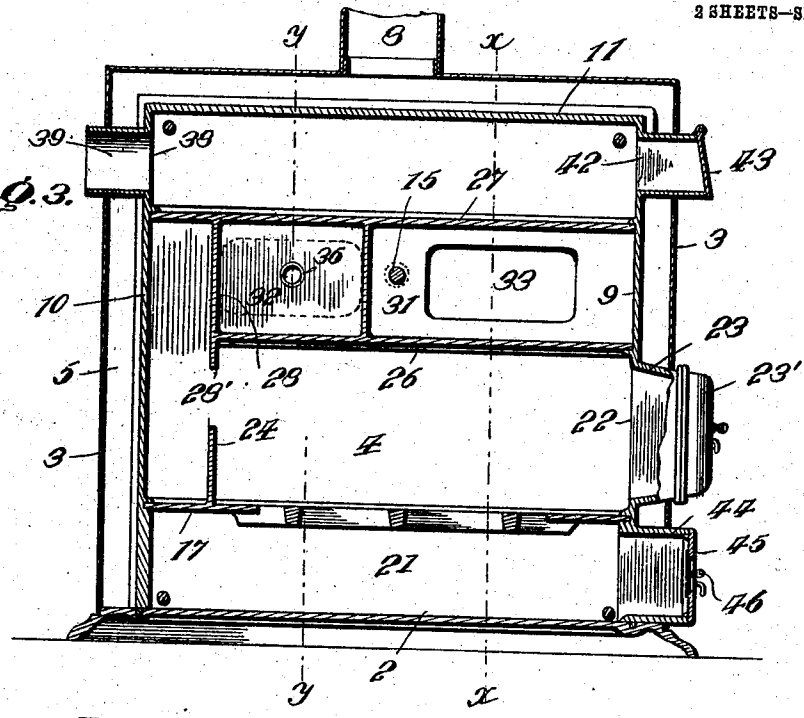


FIG. 4.

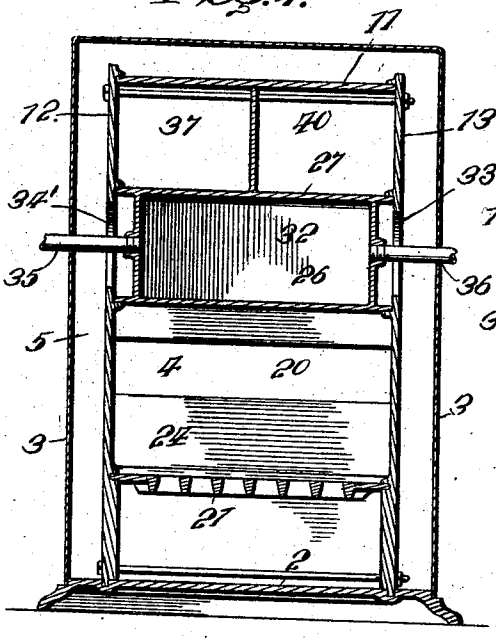
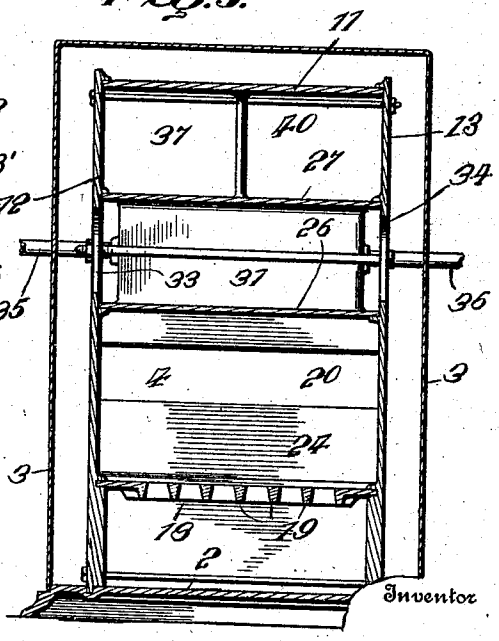


FIG. 5.



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UNITED STATES PATENT OFFICE.

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FURNACE.

No. 858,286. Specification of Letters Patent. Patented June 25, 1907.

Application filed January 23, 1906. Serial No. 297,498.

To all whom it may concern:

Be it known that I, JAMES M. HEVERLY, a citizen of the United States, residing at Altoona, in the county of Blair and State of Pennsylvania, have invented certain new and useful Improvements in Furnaces, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention relates to improvements in a combined hot air and hot water furnace.

The object of my invention is to provide a furnace of this character which is adapted to be used as a combined hot air and hot water heating furnace, and in which the air and water are more thoroughly heated than in furnaces of this character.

Another object of my invention is to provide a simple, cheap and effective furnace, as will be hereinafter more fully described and shown in the drawings.

In the accompanying drawings, Figure 1, is a perspective view of my improved furnace showing the casing broken away, and showing in dotted lines the smoke flues in the inner casing. Fig. 2, is a vertical longitudinal sectional view showing one of the side plates removed, and showing the interior of the fire pot. Fig. 3, is a vertical longitudinal sectional view taken through the center of the furnace. Fig. 4, is a transverse vertical sectional view taken on the line *y*—*y* of Fig. 3. Fig. 5, is a transverse vertical sectional view taken on the line *x*—*x* of Fig. 3.

Referring now to the drawings, 1 represents my improved furnace which, as shown, is made of a rectangular form although the same could be made of any desired form. The said furnace consists of a base 2 upon which is mounted the outside casing 3, and which has an inside casing 4 therein, which, as is well understood, is smaller than the outside, casing, leaving the hot air space 5 between said casings, and entirely surrounding the inside casing. The said hot air space is provided with a cold air supply of any character, and by means of which cold air is fed from the outside to the hot air space 5. In communication with said space 5 above the inside casing is a pipe 8 leading to the room to be heated, and while I have shown but one of these hot air pipes it is understood that there is a separate pipe for each room to be heated.

The inner casing 4, as shown, rests upon the base within the outer casing, and said inner casing is formed of the end plates 9 and 10 supporting the top plate 11. The said casing is closed by the enlarged side plates 12 and 13, which are firmly clamped together by the bolts 15 passing transversely through the frame and provided on the outside of the side plates 12 with nuts 16, whereby the several plates are firmly clamped together to form the complete inner casing.

The plates forming the inner casing are either cast or stamped of sheet metal, and the frame above the base is provided with a horizontal plate 17 which is provided with a central opening 18 in which are mounted the grate bars 19, and as shown, form the fire-pot 20 above and the ash pit 20 below. The end plate 9 above the plate 17 is provided with an opening 22 which is provided with the door casing 23 which extends out through the casing 3, and is provided with a door and by means of which access is had to the fire pot. The plate 17 adjacent its rear end and beyond the grate, is provided with a transverse vertically-extending plate 24 which forms the rear wall of the fire-pot.

The end plate 9 above the fire-pot is provided with the two inwardly-extending horizontal plates 26 and 27 which are of a length to extend nearly across the entire frame, and connected together at their rear end by a vertically-disposed plate 28 which is in a vertical alinement with the plate 24. The said plate 28 extends downward below the lower plate 27, and 28', and leaves a space 29 at the rear above the fire-box through which the gases and smoke pass to the vertically-arranged flue 30.

The plates 26 and 27, as shown, are of a width to extend across the stove and form a tight joint with the side plates 12 and 13, and thus form an air space 31 within the inner casing intermediate its top and bottom. The said space adjacent its rear end, is provided with a tank 32 which is of a width slightly less than that of the plates. The said tank is water-tight and adapted to hold water, as will be hereinafter more fully described. The said plates 12 and 13 opposite the air-space 31 are provided with the elongated openings 33 and 34, oppositely arranged. The openings 33 and 34 are adjacent the forward end of the air space and establish a communica-

tion directly through the casing for allowing air within the hot-air space to pass therethrough and to become heated more thoroughly. The openings 33′ and 34′ are arranged opposite the tank 32 and in communication with the tank are pipes 35 and 36 which extend outwardly through the outer casing to any desired radiator at any point, and thus I provide a combined hot air and hot water heater.

The space 37 above the upper plate 26, as shown, is in communication with the vertical gas or smoke flue 30 at one side through an opening A which is at one side of the space. The end plate 10 of the inner casing has an opening 38 communicating with the space 37 on the opposite side from the opening A. The stove pipe 39 is in communication with an opening in the casing and extends outwardly through the outer casing 3 to the chimney. The said opening A, as shown, is at one side of the space 37 and the smoke pipe at the opposite side, and extending from the rear wall 10 forwardly between the two openings is a vertical division plate B which extends from the upper end of the outer casing to the partition or plate 27, and by means of which the space between the same is divided into two horizontal passages 37 and 40. The said plate B has its forward end cut away, as indicated at 41, which forms a communication between the passages 37 and 40, as will be hereinafter more fully described. The gases, smoke, etc., pass upwardly through the passage 30 through the opening A, and into the passage 37, and travel forward across the upper face of the tank, and hot air passages and through the opening or cut-away portion 41, and travel rearwardly through the passage 40 and out the stove pipe, thus increasing the length of passage of the smoke and gases, whereby the upper, rear and lower faces of the hot air space and tank are directly affected by the heat of the products of combustion.

The end plate 9 opposite the upper space 40 is provided with an opening 42 having a door 43 and forming the damper to regulate the draft to the fire. It will be seen that when the door is opened the air passes from the outside to the space 37 and out through the flue 40 and decreases the draft in the flue 37, and thus regulates the burning of the fire.

The ash-space 21 is provided with an outwardly-extending door housing 44 which extends outward through the outer casing and is provided with a door 45 by means of which the draft to the furnace is regulated by means of the damper 46. By means of this it is also understood that the ashes are removed from the furnace. The door 23′ is also provided with a damper 47.

When it is not desired to use the hot water heating system, the pipes 35 and 36 are removed and the air passes through the tank, the same as through the space in front of the same, and thus adds an additional heating surface for the air.

From the foregoing description, it will be seen that the air within the space 5 is more thoroughly heated, as the air has a larger heating surface, owing to the passages through the inner casing.

Having thus described my invention, what I claim and desire to secure by Letters Patent, is:—

1. A furnace of the character described, comprising an inner and outer casing forming a hot air space between the same, a grate within the lower end of the inner casing, a horizontal air passage intermediate the grate and the upper end of the casing, and of a size to leave a vertical smoke flue at the rear of the casing, the said inner casing having openings opposite the horizontal passage and forming communication between the same and the hot air space, a tank within said passage, pipes connected to the tank and passing through the openings in the inner casing, and through the outer casing, and adapted to be used for hot water heating purposes, and divisional plates carried by the upper face of the horizontal air passages to cause the products of combustion to travel twice across the same before entering the smoke pipe.

2. A furnace of the character described, comprising an inner and outer casing forming a hot air space between the same, a grate within the lower end of the inner casing, a horizontal air passage dividing the inner casing intermediate the grate and the upper end, and cut away at one side at the rear to form a smoke flue, the inner casing having oppositely arranged openings opposite the air passage, and forming a communication between the same and the hot air space, a vertically arranged plate extending from the rear wall of the casing at the inner edge of the smoke flue, and extending partially over the air passage and dividing the space above the air passage into two horizontal passages, substantially as shown.

3. A furnace of the character described, comprising an inner and outer casing forming a hot air space between the same, a grate within the lower end of the inner casing, a horizontal air passage dividing the inner casing intermediate the grate and the upper end and cut away at one side to form a vertical smoke flue, a tank within said air passage, pipes connected to the tank and passing through the openings and through the outer casing, and adapted to be used for hot water heating purposes, a vertically-arranged divisional plate extending from the rear wall of the casing on the inside of the smoke flue and extending forward dividing the space between the upper face of the air passage and the top of the inner casing into two horizontal passages communicating with each other

at their forward end, and the rear end of one passage in communication with the vertical smoke flue and the rear end of the other passage in communication with the smoke pipe.

4. A furnace of the character described, comprising an inner and outer casing forming a hot air space between the same, a grate in the lower end of the inner casing, an air passage above the grate and dividing the inner casing into an upper and lower horizontal compartment, connected at the rear and one side by a vertical smoke flue, a tank within said air passage and adapted to be used for hot water heating purposes, and means carried by the upper face of the air passage for causing the products of combustion to travel twice back and forth within the upper compartment before they pass therefrom.

5. A furnace of the character described, comprising an inner and outer casing forming a hot air space between the same, a grate in the lower end of the inner casing, an air passage above the grate and dividing the inner casing into an upper and lower horizontal compartment, said air passage being in communication with the hot air space at its sides, a vertical flue at the rear end of the lower compartment and the air passage, and being in communication with the upper compartment through an opening adjacent one side wall of the inner casing, a vertical divisional plate extending from the rear wall of the inner casing between the upper face of the air passage and the top of the inner casing, and forming a forwardly-extending passage in communication with the smoke flue, the forward end of said plate cut away to form a communication with the passage on the opposite side of the divisional plate, a smoke pipe in communication with the last named passage, and a door communicating with the forward end of the upper compartment for regulating the draft through the same to the smoke pipe.

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

JAMES M. HEVERLY.

Witnesses:
H. A. HEVERLY,
C. E. BROWN.