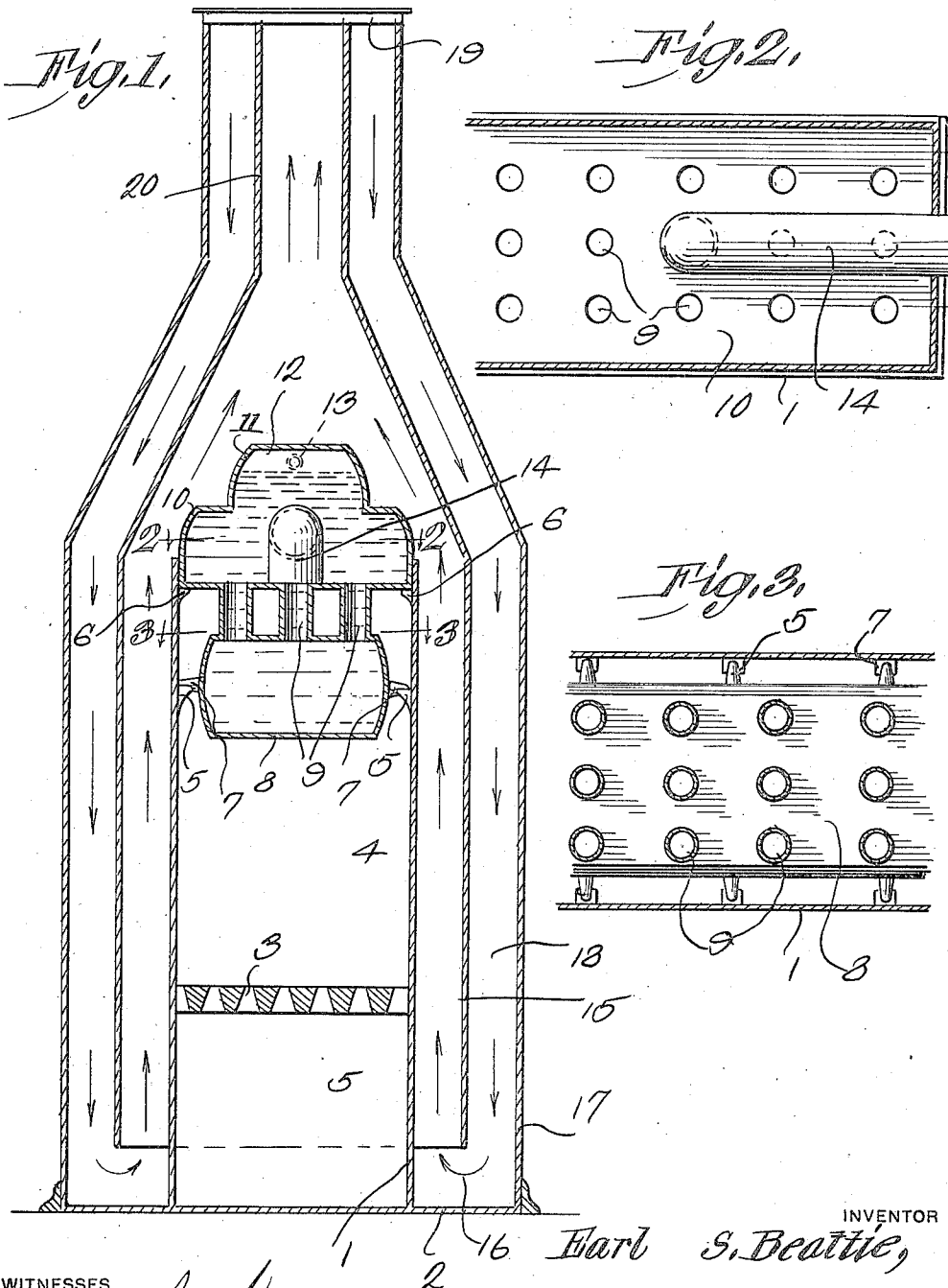


E. S. BEATTIE.
FURNACE.

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1,363,555.

Patented Dec. 28, 1920.



WITNESSES

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FURNACE.

1,363,555.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, EARL S. BEATTIE, a citizen of the United States, residing at Kalamazoo, in the county of Kalamazoo and State of Michigan, have invented certain new and useful Improvements in Furnaces, of which the following is a specification.

This invention relates to furnaces.

One of the main objects of the invention is to provide a furnace of simple construction and operation which is so constructed as to obtain a maximum heating effect from a given amount of fuel.

A further object is to provide a furnace in which both heated air and steam or hot water may be utilized for heating purposes.

A further object is to provide a furnace so constructed that the heated gases which normally escape directly through the flue will be utilized for heating water so as to generate steam, the steam being conducted to suitable radiators.

Further objects will appear from the detailed description.

In the drawings:—

Figure 1, is a transverse vertical section through a furnace constructed in accordance with my invention.

Fig. 2, is a section taken substantially on line 2—2 of Fig. 1.

Fig. 3, is a section taken substantially on line 3—3 of Fig. 1.

The body 1 of the furnace is of substantially rectangular shape in cross section and is provided with the extended base 2. A suitable grate 3 is supported within the body 1 dividing the interior thereof into the fire chamber 4 and the ash pit 5. The body 1 is provided, adjacent the upper end thereof with two pairs or series of spaced inwardly projecting lugs 5' and 6 respectively. The lugs of the lower series cooperate with lugs 7 projecting from the sides of a lower water head 8, the lugs 7 being recessed in their under faces to receive lugs 5', so as to support the water head in spaced relation to the body 1. This water head 8 is connected by suitably spaced water tubes 9 to an upper water head 10 which fits snugly within the upper end of the body 1 and is supported by the lugs 6. The upper water head is provided with a central raised portion 11 which constitutes a water space and a steam dome, the water within the head 10 being normally maintained at such a level as to

leave a steam space 12 in the upper portion of member 11. A steam pipe 13 communicates with the steam space 12 and serves to conduct the steam generated to radiators. A flue pipe 14 is secured through the bottom of the upper water head 10 and communicates with the interior of the fire chamber 4. This flue pipe extends a considerable distance through the upper water head 10, being extended through the back wall of the furnace and connected to a chimney in the usual manner. The heat generated within the fire chamber 4 will serve to quickly raise the water within the water heads 8 and 10 to a high temperature so as to generate steam for heating purposes, the products of combustion flowing freely about the lower water head 8 and the water tubes 9, and against the under face of the upper head 10, so that a large per centage of heat will be readily absorbed by the water thus insuring efficiency in operation. These gases then escape through the flue pipe 14, and when flowing through this pipe, they flow directly through the body of water within the upper water head 10. As the pipe 14 is completely surrounded by this water, practically all of any heat remaining in these gases will be readily absorbed by the water thus preventing the wastage of heat which occurs when these goods are normally permitted to flow directly into the chimney through the flue.

The body 1 of the furnace is surrounded by a casing 15 which extends within a short distance of the lower end of the body 1, leaving an air inlet opening 16 extending completely about the body of the furnace. An outer casing 17 extends upwardly from the base plate 2 about casing 15 in concentric spaced relation thereto. This outer casing provides an inlet air space 18 extending about the casing 15. The upper ends of the casing 15 and the outer casing 17 are flush and are adapted to support a register 19 of usual construction. This register communicates directly with a hall or room which it is desired to heat by hot air. When the furnace is in operation, the heated air will flow upwardly through the neck 20 of casing 15, and through the register 19 into the room or hallway to be heated. This hot air escaping through the register at the central portion thereof will cause the colder air to be drawn downwardly between the outer casing 17 and the casing 15, this air

being then drawn through the inlet opening 16 and upwardly about the body 1 of the furnace so as to be brought into intimate contact therewith and quickly raised to a relatively high temperature by the heat radiated from the body, this heated air being then discharged into the room as previously described. This operation is continuous and the furnace acts to heat in the manner of furnaces of the type known as one-pipe heating furnaces. In addition to using the furnace for heating in this manner, the heat generated within the body of the furnace which would not normally be extracted by the air flowing upwardly within the baffle casing 15, is utilized to heat the water within the water heads 8 and 10 for the generation of steam. In practice, the casing 15 and outer casing 17 communicate directly with a room or hall which it is desired to heat by means of heated air, the steam pipe 13 being connected to radiators which are positioned within the other rooms of the dwelling. In this manner, uniform and efficient heating of the dwelling is insured, while practically all of the heat generated is utilized avoiding the excessive waste of heat which takes place in furnaces of ordinary construction.

The foregoing description and the drawings have reference to what may be considered the preferred, or approved form of my invention. It is to be understood that I may make such changes in construction

and arrangement and combination of parts, materials, dimensions, etc., as may provide expedient and fall within the scope of the appended claim.

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

In a heater, a register, a furnace, an outside casing, an inner casing between the outside casing and the furnace, the inner casing terminating at its lower end a short distance above the bottom of the heater, the space between the intermediate and outer casing forming a passage for the descent of the cold air, and the space between the intermediate casing and the furnace forming a passage for the ascent of the heated air, the two passages communicating at the bottom ends and terminating at the register at their upper ends, a hot water heater comprising upper and lower water heads connected by tubes, the lower water head being suspended in the top of the combustion chamber, and the upper water head closing the top of the furnace and projecting into the ascending air passage.

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

EARL S. BEATTIE.

Witnesses:

CHARLIE J. DOUGLASS,
HARRY J. OAKES.