Dec. 4, 1923. 1,475,984

F. CLARE

HEATING SYSTEM

Filed Jan. 16, 1923 2 Sheets-Sheet 1

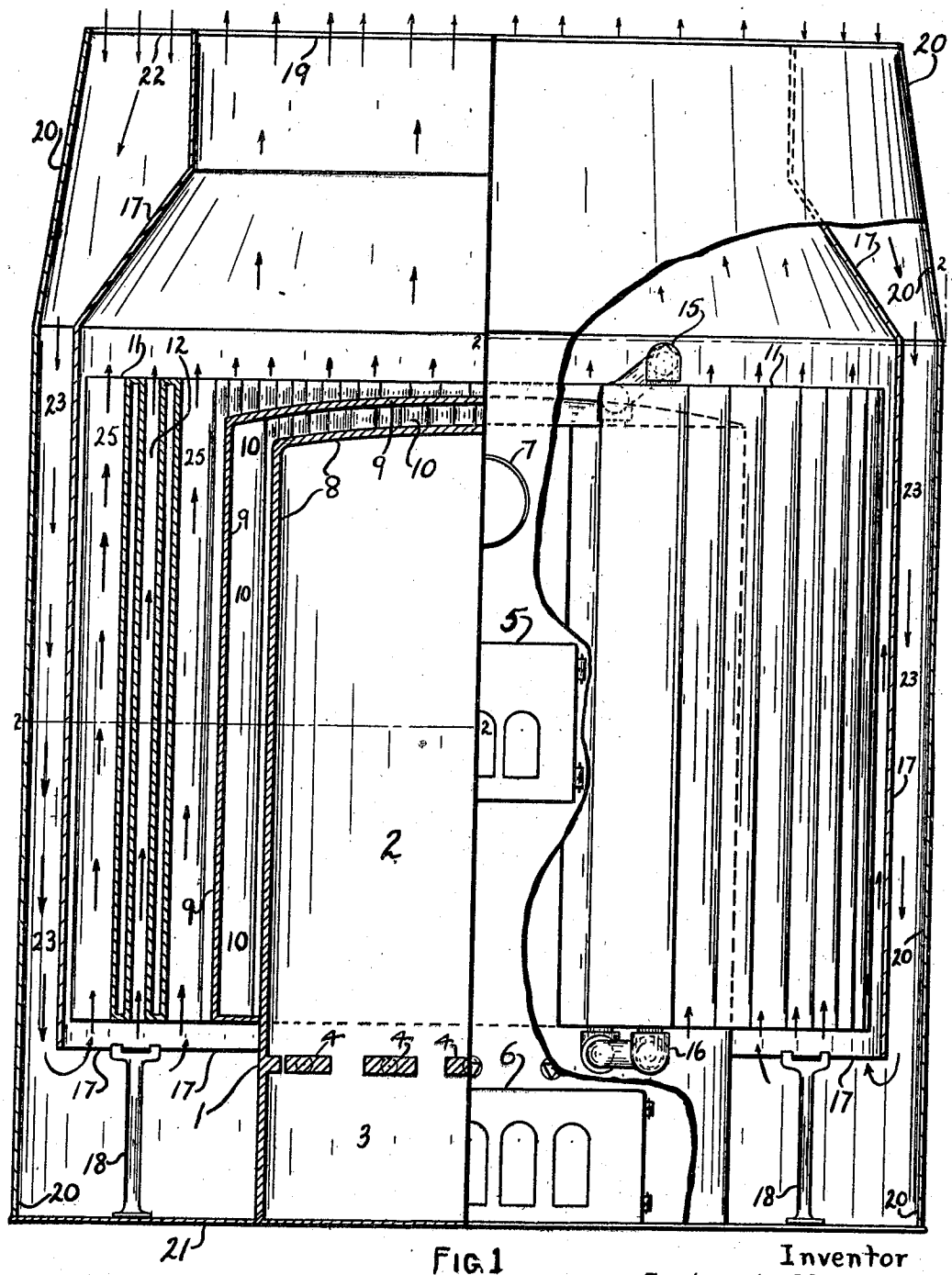


FIG. 1

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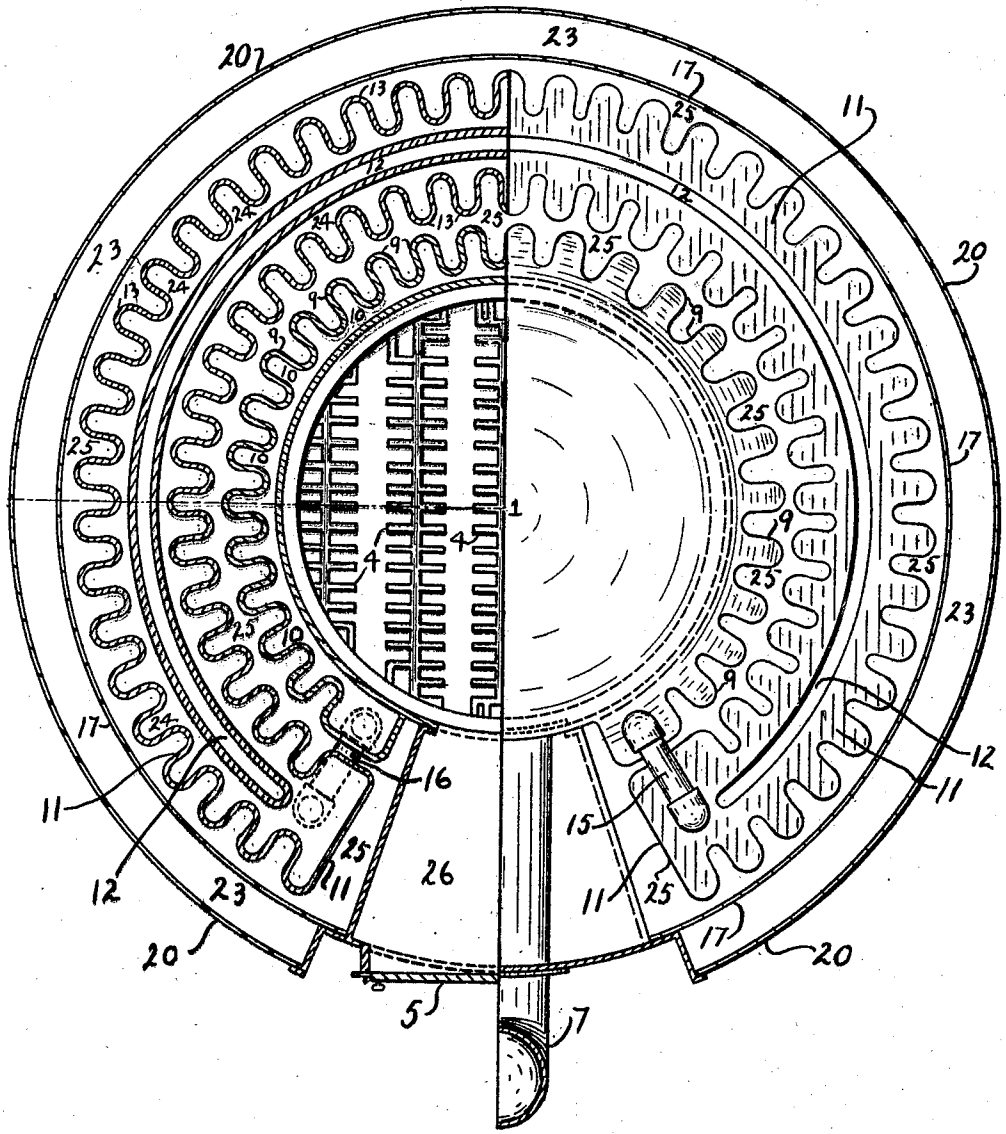


FIG. 2

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Patented Dec. 4, 1923. 1,475,984

UNITED STATES PATENT OFFICE.

FREDERICK CLARE, OF PRESTON, ONTARIO, CANADA.

HEATING SYSTEM.

Application filed January 16, 1923. Serial No. 613,039.

To all whom it may concern:

Be it known that I, FREDERICK CLARE, a subject of the King of Great Britain, and a resident of the town of Preston, in the county of Waterloo, Province of Ontario, Dominion of Canada, have invented certain new and useful Improvements in Heating Systems, of which the following is a specification.

My invention relates to improvements in heating systems with particular reference to hot water and steam and the object of the invention is to apply to such heating systems the essential features of the well known pipeless hot air furnace whereby the many advantages of hot water and steam heating may be combined with the advantages of the pipeless system and the disadvantages of both systems eliminated to a great extent; a further object is to considerably reduce the cost of hot water and steam heating systems. Other objects will appear in the course of the following specification.

My invention consists essentially of a boiler with radiator elements in communication therewith and disposed about the boiler, the boiler and radiator elements being situated within a tubular casing open at its upper end and closed at its lower end, a down-flow air passage within the casing, and an up-flow air passage about the boiler and radiator elements, the lower ends of said passages being in communication with each other all as hereinafter more particularly described and illustrated in the accompanying drawings in which;

Fig. 1 is a front elevation of my improved system, a portion of the casing at the right being broken away to show the interior construction and the left hand side showing a section on the line 1, 1 of Fig. 2.

Fig. 2 is a sectional plan on the staggered line 2, 2, 2, 2 of Fig. 1.

In the drawings like characters of reference indicate corresponding parts in the different views.

1 is a furnace of standard construction 2 being the fire pot, 3 the ash box, 4 the grate bars, 5 the firing door, 6 the ash door and 7 the flue which leads forwardly from the front of the furnace.

The entire upper portion of the furnace is double walled, except at the firing door as will presently appear, 8 being the inner wall and 9 the outer wall and between the inner and outer walls 8 and 9 is formed a water jacket 10, which water jacket constitutes a boiler.

This jacket extends over the top of the furnace as well as the sides.

The outer wall 9 of the jacket is corrugated (see Fig. 2) to increase the radiating surface thereof.

11 is an outer radiator disposed concentrically about the furnace (see Fig. 2) and having the open ended air chamber 12 therein.

The inner and outer walls 13 of the radiator 11 are corrugated to increase the radiating surface thereof.

The lower end of the radiator 11 is substantially at the same level as the bottom of the water jacket 10 while the upper end is slightly above the top of the furnace.

The radiator 11 does not extend completely around the furnace but terminates at each side at the front to permit access to the fire box 2 through the firing passageway 26, which passageway extends through the walls 8 and 9.

5 is the firing door which closes the outer end of the passageway 26.

The front ends of the water jacket 10 are connected at the top and bottom thereof with the top and bottom of the radiator 11 by upper and lower pipe connections 15 and 16 respectively.

17 is an inner open ended shell concentrically surrounding the boiler and supported by standards 18 in such a way that the lower open end thereof is spaced above the base of the furnace.

This shell 17 encloses the furnace and radiator 11 and extends upwardly beyond the top thereof and finally terminates at the top in a register 19.

20 is an outer shell, concentrically disposed about the inner shell 17 and at the lower end forms a tight joint with the base 21 of the furnace.

The upper end of the shell 20 terminates in a register 22 concentrically surrounding the register 19.

Between the inner and outer shells 17 and

20 is formed an annular chamber 23 the purpose of which will appear hereinafter.

24 indicates the interior water compartment within the radiator 11, and 25 indicates air space within the inner shell 17 which is in contact with the corrugated outer faces of the radiator 11 and the wall 9 of the boiler.

The construction and operation of my invention is as follows.

As previously described the water jacket 10 formed between the inner and outer walls 8 and 9 of the furnace constitutes a boiler.

The boiler 9 is in communication with the radiator 11 through the pipe connections 15 and 16 and therefore the heated water will circulate through the system.

The outer wall of the boiler and the walls of the radiator 11 are corrugated in order to increase as much as possible the radiating surface.

The action of the system as regards the delivery of heated air is identical with the ordinary pipeless hot air furnace the passage of air through the system being indicated by the arrows in Fig. 1.

The entire radiating surface of the boiler and radiator 11 is in contact with the air inside the inner shell 17 so that this air becomes heated and rises, being delivered through the register 19.

The cold air descends through the register 22 downwardly through the annular chamber 23 and into the bottom open end of the inner shell 17 where it again contacts with the radiating surface, becoming heated thereby and passes up again through the register 19.

By the provision of the corrugated walls 9, 13 and 14 the radiating surface in contact with the air within the inner shell 17 is increased to a maximum and therefore the economy of the system is increased.

It will be noted that the inner and outer shells 17 and 20 constitute a tubular casing within which the boiler and radiator elements are situated.

Between the walls 17 and 20 of the tubular casing is formed the annular chamber 23, the upper end of which communicates with the cold air register 22 and the lower end of which communicates with the lower open end of the shell 17, while the upper end of the shell 17 communicates with the hot air register 19. It will thus be apparent that the annular chamber 23 constitutes a down flow passage for cool air which communicates with the bottom of an up flow passage for heated air.

Hitherto in hot water and steam heating systems it has been the object to thoroughly insulate the outer wall of the boiler to reduce to a minimum the radiation of heat therefrom, the heating of the building being obtained by the circulation of the hot water or steam through pipes to radiators at various points within the building to be heated, whereas in my system it is the object to increase to a maximum the radiation from the outer wall of the boiler and to effect the heating of the building by the delivery of air which has been heated by contact with this radiating surface, thus eliminating the use of expensive fixtures including pipes and radiators located throughout the building.

Hitherto, in pipeless hot air furnaces the air is heated by contact with the extremely hot radiating surface of the furnace and is thus rendered extremely dry before delivery to the building.

This is one of the great disadvantages of hot air systems and the fact that a much more temperate heating may be obtained by the use of hot water heating accounts for the greater popularity of hot water over hot air.

In my system however the hot air does not come in contact with the hot furnace plates but instead engages the radiating surface of the boiler and radiator elements which are not heated above 212° F.

Therefore all the advantges of the hot water system as above referred to are retained in my system.

Hitherto the high cost of hot water and steam systems, due to expensive fixtures throughout the building, has militated against their universal use and since these are entirely eliminated in my system it will be evident that the advantages of the hot water and steam systems are retained while the disadvantages of the hot air system are eliminated.

Various modifications may be made in the exact form illustrated and therefore the construction shown is to be taken as illustrative only and not in a limiting sense.

For instance the object of the corrugations being to increase the effective radiating surface within the tubular casing this might possibly be obtained by suitable corrugations or fins on the outer wall 9 of the boiler proper without the use of the extra radiator 11 as shown.

What I claim as my invention is;

1. A heating system comprising a casing open at its upper end and closed at its lower end, a water jacketed furnace within the casing, the outer wall of the jacket being provided with corrugations and constituting a heat radiating element, a down flow air passage within the casing, and an up flow air passage about the aforesaid radiating element, the lower ends of the passages being in communication with each other.

2. A heating system comprising a casing open at its upper end and closed at its lower end, a water jacketed furnace, the outer wall of the jacket provided with corrugations and

constituting a heat radiating element, additional radiator elements disposed about the furnace and in communication with the water jacket, the furnace and radiator elements situated within the casing, a down flow air passage within the casing, and an up flow air passage about the furnace and radiator elements, the lower ends of the passages being in communication with each other.

FREDERICK CLARE.

Witnesses:
W. JARDINE,
M. H. SMITH.