Jan. 2, 1923. 1,440,810

A. ZACHARIAS.
AUXILIARY HEATER.
FILED JUNE 8, 1921.

Fig. 1

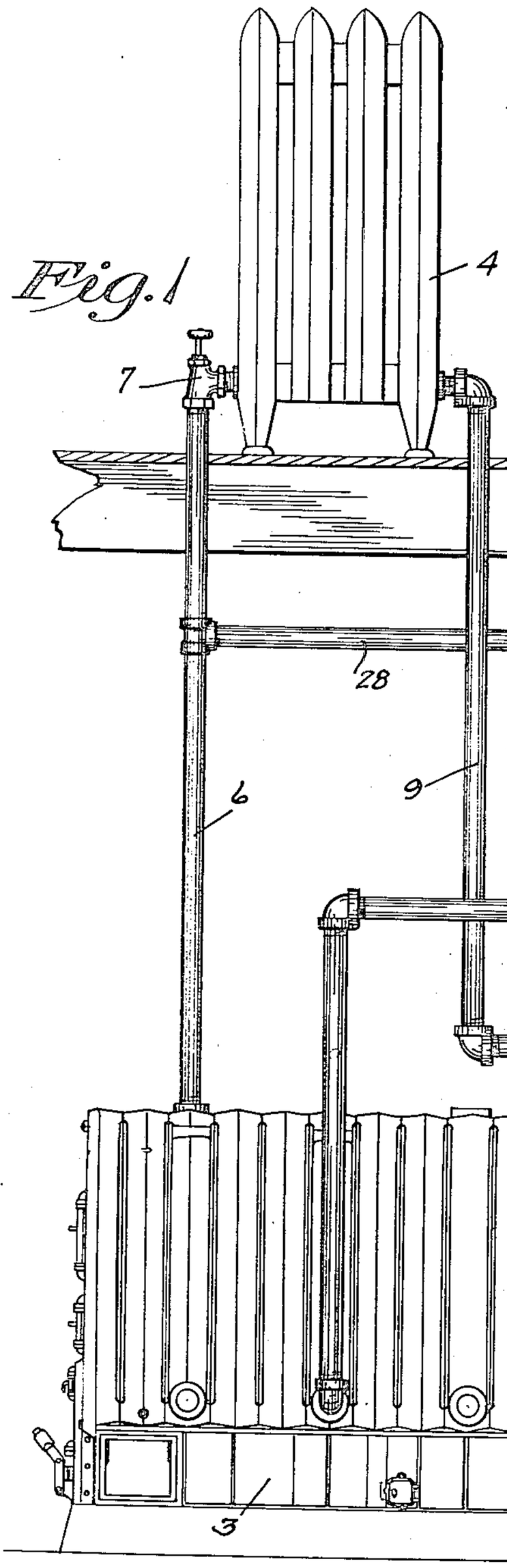
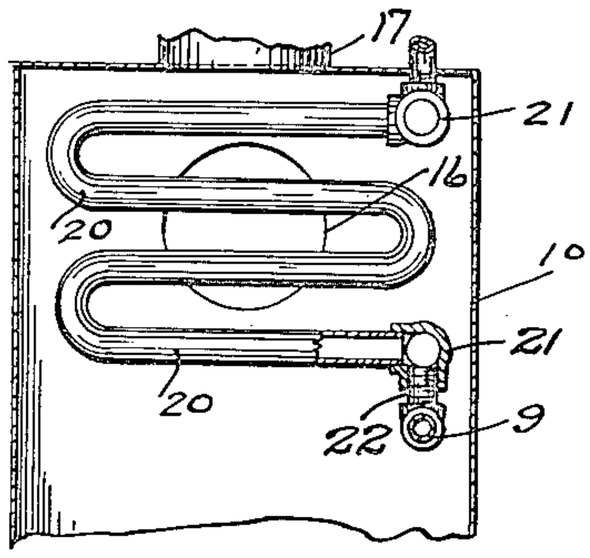


Fig. 2



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UNITED STATES PATENT OFFICE.

AUGUST ZACHARIAS, OF MINNEAPOLIS, MINNESOTA.

AUXILIARY HEATER.

Application filed June 8, 1921. Serial No. 475,884.

To all whom it may concern:

Be it known that I, AUGUST ZACHARIAS, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Auxiliary Heaters; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My present invention is directed to heating apparatus and more particularly to steam and hot water heating systems for flat buildings, apartment houses and other dwellings, and provides an improved auxiliary heating device incorporated therein in a novel manner.

In the accompanying drawings, which illustrate the invention, like characters indicate like parts throughout the several views.

Referring to the drawings:

Fig. 1 is a view partly in vertical section and partly in elevation, some parts being broken away, illustrating my invention as applied in a hot water or steam-heating system; and

Fig. 2 is a fragmentary section on the line 2—2 of Fig. 1.

The numeral 3 indicates a hot water or steam boiler of the usual or any suitable construction, and the numeral 4 indicates a radiator located above the floor 5. The top of the boiler 3 is connected to the radiator 4 by a hot water delivery pipe 6 preferably equipped with a valve 7. From the radiator 4 is extended a return pipe 9, which usually would be connected directly back to the boiler, but, in accordance with this invention, is indirectly connected thereto, in a manner that will presently appear, and has a valve 8.

The numeral 10 indicates a smoke box or secondary combustion chamber preferably of sheet metal and, as shown, of rectangular form, having in its bottom a hopper-like flange 11 that delivers to a removable drawer or catch pan 12. This housing 10 is connected to the flame or smoke outlet passage of the boiler by a smoke pipe 13, which, as shown, has the customary check damper 14. Said housing 10 is connected to a flue or chimney 15 by one or more smoke pipes and, as shown, is so connected by two smoke pipes 16 and 17, the former of which leads from the upper portion of one side of the casing and the latter of which leads from the top of the casing. Said smoke pipes 16 and 17, respectively, are provided with dampers 18 and 19, by means of which they may be independently opened and closed.

Within the upper portion of the housing 10 is a tubular auxiliary water heater, preferably and as shown made up of a plurality of manifold pipes 20 and headers 21, to which they are connected at their ends. The return pipe 9, already noted, is connected by a coupling 22 to the lower header 21 and the upper header 21 is connected by a secondary return pipe 23 to the lower portion of the boiler 3. Thus, the auxiliary heater is interposed within the complete return pipe 9—23. The numeral 24 indicates a pipe equipped with a normally closed valve 25, but from which, when desired, warm or hot water may be drawn off from the auxiliary heater. This pipe 24 may lead to any suitable point in the building.

The numeral 26 indicates a hot water tank, which, as shown, is horizontally disposed and supported from the floor structure 5 by hanger straps 27. One end of the tank 26 is connected to the steam pipe 6 by a pipe 28 shown as equipped with a normally open globe valve 29, and the other end of said tank is connected by a pipe 30 to the coupling 22 and, hence, with the auxiliary heater 20—21.

The numeral 31 indicates a water supply pipe, which leads from a suitable source of supply such as a city water main or an elevated supply tank, and is provided with a normally closed valve 32. The numeral 33 indicates a hot water draw-off pipe, which is equipped with a valve 34 and leads to any suitable point or points where a supply of hot water is desired.

The flames or hot gases from the combustion chamber of the boiler will pass through the smoke pipe 13 into the housing or secondary combustion chamber 10 and thence out through one or the other or both of the smoke pipes 16 and 17. Because of the large cross section of said housing, the smoke, in moving therethrough and turning upward, will move very slowly and the soot or incomplete products of combustion will be precipitated to the bottom of the housing and, as shown, caught in the drawer or pan 12. Thus, smoke, to a large extent, is eliminated.

The action of the hot gases or flames on

the tubes of the auxiliary heater will heat the water in said heater to a quite high degree of temperature, depending, of course, considerably on the intensity of the combustion. As the flue 13 enters the casing 10 midway between top and bottom, the upper portion of said casing is utilized as the secondary combustion chamber, while the lower portion thereof affords a dead air chamber for the precipitation of soot and the like.

If all of the valves shown, except the valve 25, be opened, then the hot water from the boiler will flow upward through the pipe 6 in part to the radiator 4 and in part through the pipe 28 to the hot water tank 26; and the water will return to the auxiliary heater, from the radiator 4 through the pipe 9 and from the tank 26 through the pipe 30. The water will, of course, be brought to quite a high degree of temperature in passing through the auxiliary heater 20—21 and this heater water will pass out through the pipe 23 to the boiler, where it will be heated to a still higher degree of temperature and thence delivered to the radiator and radiators and to the hot water tank.

If the valve 8 be closed, the circulation of water will be entirely through the hot water tank 26. If the valve 29 be closed and the valve 8 opened, circulation will be through the radiator or radiators and not through the hot water tank. If hot water is desired, it may be drawn off by opening the valve 34 in the pipe 33, or it may be drawn off by opening the valve 25 in the pipe 24.

When the supply of water is from a yielding source such as a city water main or elevated tank, no special expansion tank will be required, but when the water is otherwise supplied or when the circuit is closed, an expansion tank could be provided at any suitable point.

It will, of course, be understood that the invention above described is capable of use in connection with commercial steam generating boilers and that the expression "heating plant" is herein used in a broad sense to include such structures.

What I claim is:

In a heating plant, the combination with a main boiler and a casing connected to the smoke pipe thereof and affording a secondary combustion chamber, of a tubular auxiliary water heater located in said secondary combustion chamber above the smoke pipe connection thereto from said boiler, said casing having a smoke pipe leading from the upper portion thereof, a radiator, a hot water tank, return pipes connecting said radiator and hot water tank to the lower portion of said auxiliary heater, a secondary return pipe leading from the upper portion of said auxiliary heater to the lower portion of said boiler, a hot water delivery pipe leading from the upper portion of said boiler to said radiator and having a branch pipe leading to said hot water tank, a water pressure supply pipe leading to said hot water tank and supplying water to the heating system, and a valve-equipped hot water draw-off pipe leading from the upper portion of said tank.

In testimony whereof I affix my signature.

AUGUST ZACHARIAS.