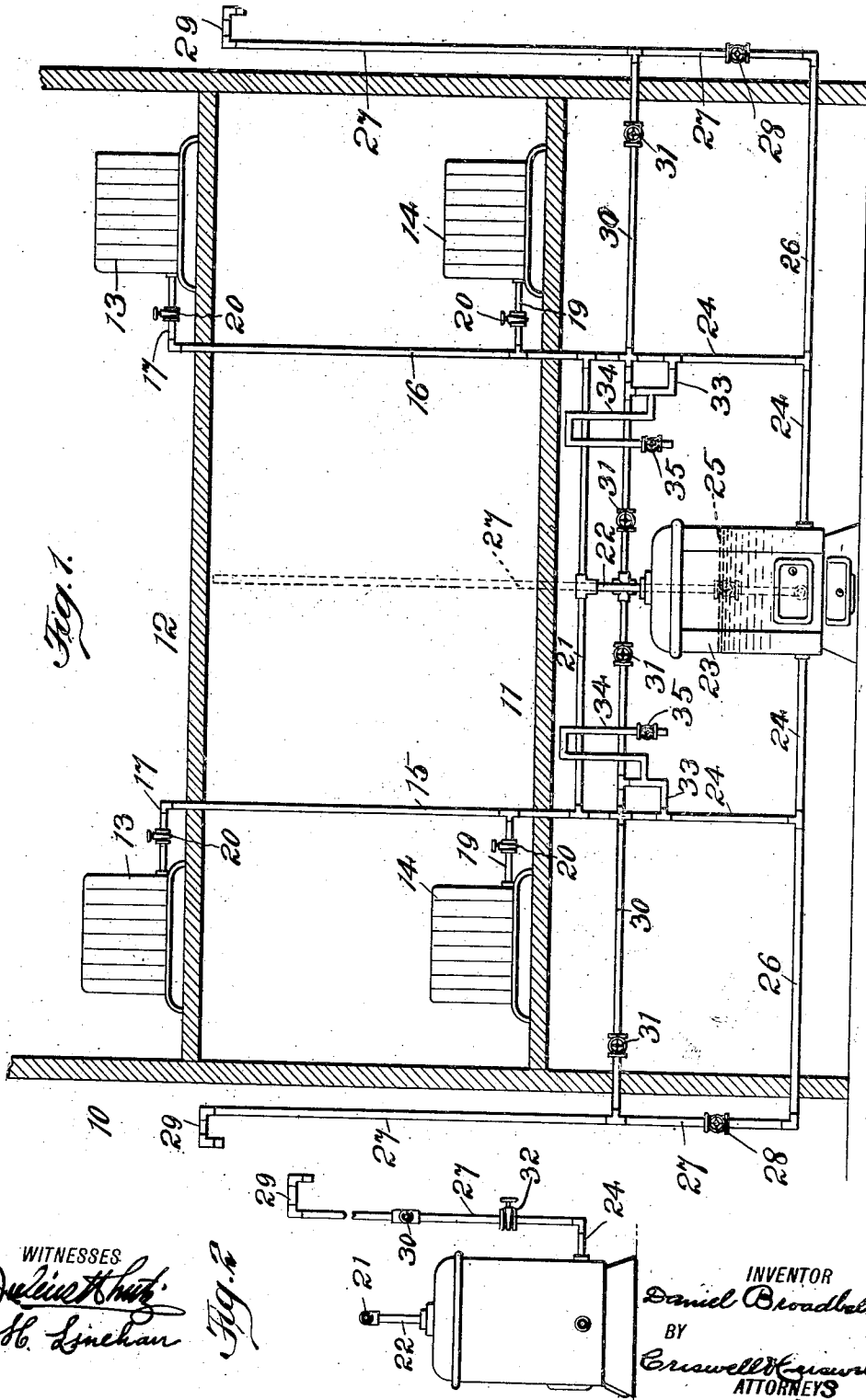


D. BROADBELT.
STEAM HEATING SYSTEM.
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935,960.

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UNITED STATES PATENT OFFICE.

DANIEL BROADBELT, OF NEW YORK, N. Y.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, DANIEL BROADBELT, a citizen of the United States, and a resident of New York, borough of Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Steam-Heating Systems, of which the following is a full, clear, and exact description.

This invention relates more particularly to heating systems for houses, apartments and the like.

The primary object of the invention is to provide simple and efficient means whereby proper circulation may be obtained in the heating connections in such a way that the usual pounding of the pipes may be effectually overcome, and to provide means whereby suitable ventilation may be secured throughout the entire system or at parts thereof to prevent the collection of air in the pipes.

A further object of the invention is to provide means whereby unnecessary pressure is automatically relieved, and to prevent leakage or other injury to the connections by reason of any excess of pressure.

With these and other objects in view the invention will be hereinafter more particularly described with reference to the accompanying drawings, which form a part of this specification, and will then be pointed out in the claims at the end of the description.

In the drawings, Figure 1 is a vertical section through a building in which is arranged one form of heating system embodying my invention; and Fig. 2 is a vertical section showing the boiler and the arrangement of one of the vent or stand pipes.

The building 10 may have two or more floors 11 and 12, and on the floor 12 are the radiators 13, and on the floor 11 are similar radiators 14. The radiators 13 are connected to the main steam pipes 15 and 16 by the short pipes 17, and the radiators 14 are connected to said main steam pipes by the short pipes 19, each of said short pipes being suitably controlled by a valve 20. These two main steam pipes 15 and 16 may extend the entire height of the building, and are connected together by a horizontally-extending steam pipe 21, and a short pipe 22 connects this pipe 21 to the steam space of the boiler 23. The pipes 15 and 16 extend downward and are connected to the return pipes 24 on each side of the boiler 23 below

the water line of said boiler, the latter being indicated at 25. As will be seen when steam is generated in the boiler it will pass from the boiler through the pipe 22 to the pipe 21 and through said pipe to the vertical steam pipes 15 and 16 to any or all of the radiators, and in case of condensation of the steam, the water will return through the pipes 15 and 16 to the return pipes 24 and into the boiler again, though it will be understood that a separate return pipe from the radiators may be employed if desired.

To prevent air from collecting in the pipes or connections and to relieve said connections of any excess of pressure so as to avoid pounding and to give proper circulation to the steam, I provide pipes 26 which may connect with the return pipes 24 on each side of the boiler, and to each of said pipes 26 may be connected a vent or stand pipe 27 in each of which is a valve 28, and said stand pipes may be of the same diameter and extend upwardly a suitable distance so as to prevent the ordinary pressure in the boiler from forcing the water out of said pipes, the upper ends of which are open and may be provided with a short L-shaped pipe 29 with the open end extending downward so as to prevent dust and the like from entering said pipe. The stand pipes 27 are connected above the water line to the return pipes 24 by means of a horizontally-extending vent pipe 30, and said pipe may be controlled between each of the stand and the return pipes by a valve 31. There may be any desired number of stand pipes and one of said pipes may be at the rear of the boiler and may be provided with a valve 32. The pipe 30 is connected by short angular pipes or connections 33 to the return pipes 24 on each side of the boiler below the point where the steam pipes join the return pipes, and from the angular connections 33 extend upward and downward vent pipes 34. These vent pipes 34 are each substantially U-shaped in form, and are each provided with a valve 35, and said pipes project upward far enough to prevent the water from being forced out of the vents 34 when the valves 35 are opened, but will permit the steam or air or any excess pressure in the heating system to be relieved at these points without the loss of the water, as the angular connections provide a direct connection for the return of any water to the boiler. By means of the connections shown the entire system or any

part thereof may be relieved of any excess pressure by reason of the collection of air or otherwise without the loss of water, and in such a way as to improve the circulation of the steam, and to prevent pounding in the pipes.

From the foregoing it will be seen that simple and efficient means is provided whereby a proper circulation of the steam may be obtained and the water of condensation properly returned to the boiler; that proper relieving means are provided whereby explosions are prevented and certain parts of the system automatically relieved of any excess pressure in the pipes and the parts effectually relieved of any air that might collect therein or otherwise cause pounding in the pipes, and that said system is such that it may be applied to the ordinary heating system with very little expense.

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

1. The combination with a boiler of vertically arranged steam pipes and heating devices in communication therewith, of return pipes connected to the steam pipes and also to the boiler below the water line thereof, connections between the boiler and the steam pipes above the water line for the passage of steam to said steam pipes, a plurality of vent or stand pipes extending upward and having their upper ends open and adapted to contain a column of water of a greater height than the water line of the boiler, connections forming communication between the stand pipes and the boiler below the water line thereof, pipe connections between the stand pipes and said return pipes above the water line of the boiler, said connections also forming communication between the stand pipes, valves in said connections for controlling the same, together with U-shaped vent pipes arranged in the pipe connection between the stand pipes and communicating with the return pipes.

2. The combination with a boiler of a vertically arranged steam pipe and heating devices in communication therewith, of return connections communicating with the steam pipes and with the boiler below the water line thereof, connections forming communication between the boiler and the steam pipe above the water line for the passage of steam to said steam pipe, a stand pipe extending upward and having its upper end open and adapted to contain a column of water of a greater height than the water line in the boiler, a vent pipe connecting the return pipe and stand pipe together, and an inverted U-shaped vent pipe communicating with the vent pipe and with the return connections for the purpose set forth.

3. The combination with a boiler of vertically arranged steam pipes and heating devices in communication therewith, of return pipes connected with the steam pipes and with the boiler below the water line thereof, connections forming communication between the boiler and the steam pipes above the water line for the passage of steam to said steam pipes, a plurality of stand pipes extending upward and having their ends open and adapted to contain a column of water of a greater height than the water line in the boiler, a vent pipe connecting the stand pipes and the return pipes, valves arranged in said connections for controlling the same, together with U-shaped vent pipes communicating with the return pipes for the purpose set forth.

4. In a heating system, the combination with a boiler, of return pipes connected therewith below the water line of said boiler, a plurality of stand pipes open at their upper ends and communicating with the boiler below the water line thereof, main steam pipes leading from the return pipes, connection forming communication between the boiler and the steam pipes above the water line thereof, heat radiating devices in communication with the steam pipes, a vent pipe forming a communication between the several stand pipes and the return pipes above the water line of the boiler, and an angular connection having an upwardly extending vent pipe and forming a communication between the vent pipe and the return pipe.

5. In a heating system, the combination with a boiler, of return pipes connected therewith below the water line of said boiler, a plurality of stand pipes open at their upper ends and communicating with the boiler below the water line thereof, main steam pipes leading from the return pipes, connections between the boiler and the steam pipes above the water line thereof, heat radiating devices communicating with the steam pipes, a horizontally extending pipe connection forming a communication between the several stand pipes and the return pipes above the water line of the boiler, an angular connection forming a communication between the horizontally arranged pipe and each vertical return pipe, and an inverted U-shaped vent pipe for each angular connection extending upward to prevent water from passing therethrough, and valves for controlling the several connections.

This specification signed and witnessed this seventh day of March A. D. 1908.

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Witnesses:

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