

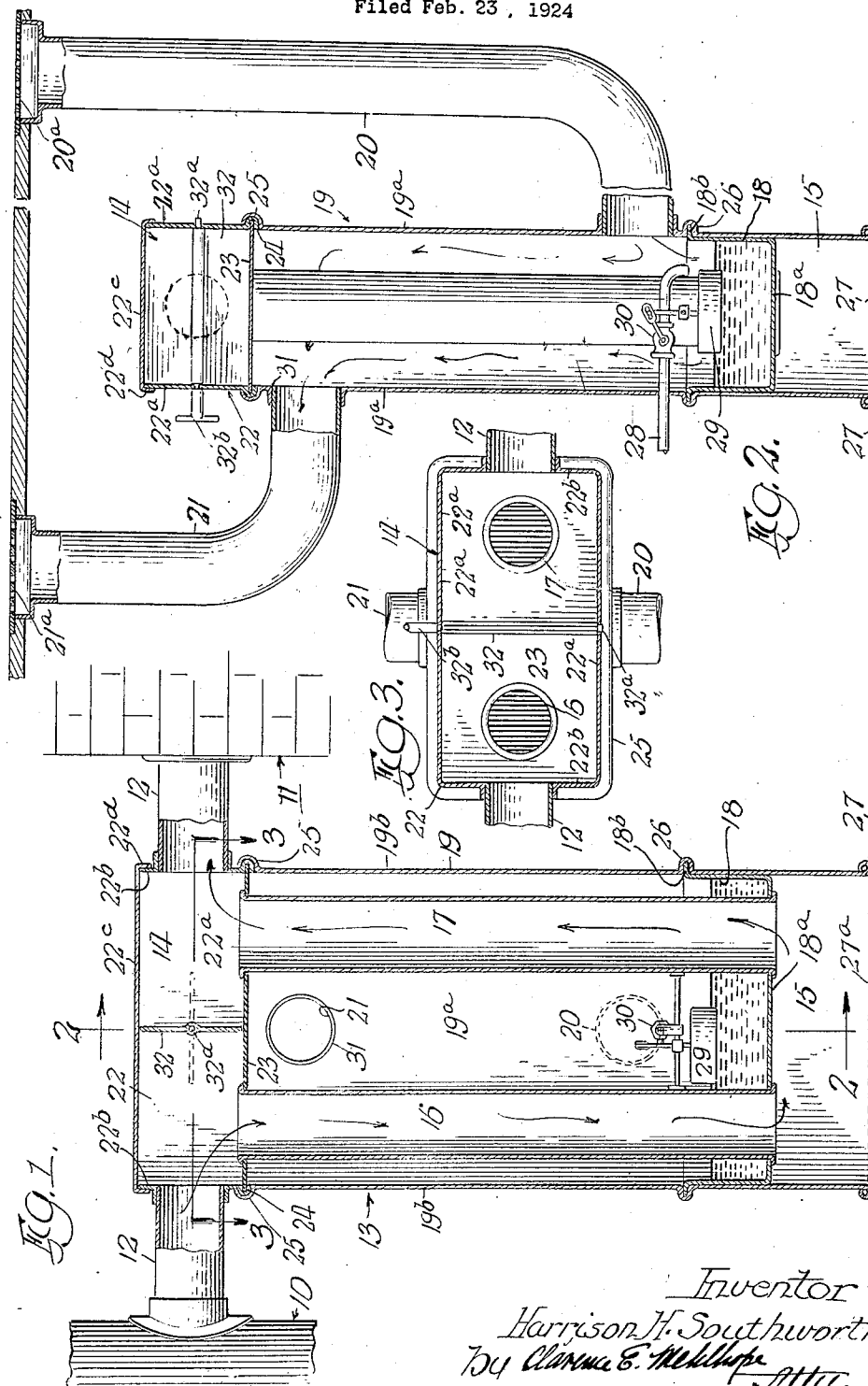
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HEATING AND VAPORIZING AUXILIARY FOR FURNACES

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UNITED STATES PATENT OFFICE.

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HEATING AND VAPORIZING AUXILIARY FOR FURNACES.

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To all whom it may concern:

Be it known that I, HARRISON H. SOUTHWORTH, a citizen of the United States, and a resident of Evanston, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Heating and Vaporizing Auxiliaries for Furnaces; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to a combination heating and vaporizing auxiliary for furnaces and consists of the matters hereinafter described and more particularly pointed out in the appended claims.

The object of the invention is to provide an auxiliary heating device to be interposed between the furnace and the stack to utilize the heat, otherwise wasted through the stack in the normal operation of the furnace, and to furnish fresh, warm, moisture-laden air to supplement the heat of the radiators connected to the furnace.

Another object of the invention is to produce a device of the kind, which is simple in construction, which may be manufactured and assembled at small cost, and which may readily and easily be installed in connection with any furnace, either at the time or after the furnace itself has been placed and connected to the radiating system.

The several advantages of the invention will appear more fully as I proceed with my specification.

In the drawings:

Figure 1 is a view representing a vertical central section of the novel heating and vaporizing furnace auxiliary installed in position between a furnace and the stack or chimney.

Figure 2 is a view representing a vertical section, in a plane indicated by the line 2—2, of Figure 1.

Figure 3 is a horizontal section, in a plane indicated by the line 3—3 of Figure 1.

Referring now to that embodiment of the invention illustrated in the drawings: 10 indicates a furnace of any familiar construction, as a hot water or steam heat furnace; 11 indicates the chimney or stack; 12 indicates the pipe leading the products of combustion from the furnace to the stack; and 13 indicates the novel heating and vaporiz-

ing furnace auxiliary interposed between the furnace and the stack and connected on opposite sides to lengths of the pipe 12, so that the products of combustion will be directed through the furnace auxiliary on their way from the furnace to the stack.

The furnace auxiliary 13 is constructed to provide a hollow header 14; a hollow base 15; vertical flues, arranged in pairs, in this case a single pair of flues, 16, 17 connecting the header 14 and the base 15 and providing in connection with the hollow base a vertical return bend; a by-pass member 32 located in the header between the planes of the flues and adapted for deflecting the products of combustion through either the pair of flues and the vertical return bend or directly through the header; an open top water pan 18 through which the flues 16 and 17 extend, with their bottom ends secured in suitable openings in the bottom wall 18^a of the water pan so that the vertical return bend above referred to is formed in part by the said bottom wall 18^a of the pan; a jacket drum 19 enclosing the space about the flues 16 and 17 above the water pan 18; a cold air register conduit 20 opening into the jacket drum 19 in the neighborhood of the water pan 18; and a warm air register conduit 21 leading from the top of the jacket drum. 20^a indicates the cold air register and 21^a the warm air register, each located in a floor above the furnace and connected to its respective conduit.

The entire device except the water pan 18 is made of thin sheet metal and may be made in any form best suited to the space in which it is to be located. The pan is preferably made of heavier metal, as cast iron or steel. The device as shown is made rectangular in cross-section and is wider in a direction parallel to the plane of the flues 16, 17 and of the furnace pipe 12. The header 14 consists of an elongated rectangular shell 22 with side walls 22^a, 22^a and apertured end walls 22^b, 22^b in which are engaged the proximate ends of the lengths of the furnace pipe 12. Said shell is closed by a top wall 22^c attached thereto in any convenient way as by a down-turned flange 22^d. The bottom wall of the header is provided by a flat metal sheet 23 which is made somewhat greater in length and breadth than the interior dimensions of the header, so that the bottom margins of the walls 22^a, 22^b of the header may be beaded thereon as indicated at 24.

The flues 16, 17 are ordinary sheet metal pipes. Their upper ends open through suitable holes in the metal sheet 23, in which holes they are secured in any well-known convenient manner. As already mentioned, the bottom ends of said flue pipes 16, 17 are secured in suitable holes in the bottom wall 18^a of the water pan 18.

The jacket drum 19 is a rectangular sheet metal shell having side walls 19^a, 19^a and end walls 19^b, 19^b which preferably extend from the sheet wall 23 of the header 14 to the basement floor or other foundation on which the base of the device rests. Said walls 19^a and 19^b are attached by a bead 25 to the bead 24 on the header and a bead 26 formed towards the bottom of said walls provides a support for an outwardly turned flange 18^b at the top of the water pan 18. The parts of the walls 19^a, 19^b of the drum, which are below the bottom of the pan 18, constitute the side and end walls of the hollow base 15. The base 15 is closed at the bottom either by the basement floor 27 or if desired, a sheet metal bottom wall 27^a may be provided, as indicated by dotted lines.

Water for vaporizing purposes is supplied to the pan 18 by means of a water pipe 28 led into the device through one of its vertical walls 19^a. A float 29 and water cock 30 operated thereby controls the supply of water to the pan and maintains the water at a predetermined level in the pan.

The cold air conduit 20 opens into the jacket drum 19 through a suitable hole in its side wall 19^a, said hole being located just above the pan 18 and preferably directly opposite the said float and water-cock, so that it permits ready access for adjustment of those parts, when the end of the conduit is withdrawn. The warm air conduit 21 opens into the jacket drum 19 through a hole 31 in its other side wall 19^a immediately below the sheet metal bottom wall 23 of the header 14.

The by-pass member 32 is located in the header 14 with its axis pin 32^a journaled in the side walls 22^a of the header in a plane extending transversely of the header between the flues 16 and 17. A handle 32^b provides for the control of the by-pass member from the outside so that it may be closed, as indicated in full lines, to shut off the direct passage from the furnace to the stack and thus deflect the products of combustion through the pair of flue pipes 16, 17 and the vertical return bend connecting said pipes, or may be opened as indicated in dotted lines, to open a direct passageway through the header to permit a direct flow from the furnace to the stack. When the by-pass member is closed and the direct path through the furnace pipe is cut off, the hot

products of combustion from the furnace are compelled to follow the path indicated by the arrows—down the flue 16 through the water in the pan 18; about the return vertical bend connecting the bottom ends of the flues 16 and 17 and in contact with the bottom wall 18^a of the water pan; thence up the flue 17 through the water in the pan 18; and thence through the header 14 to the pipe 12 and stack 11.

The operation of the device will be manifest from the foregoing description. When the furnace is first started or freshly fired, the by-pass member 32 is opened, so that the requisite draft may be provided until the fire is brought to proper burning. The member 32 is then closed. As is well known, when a furnace is burning under normal conditions, an enormous amount of heat is carried off with the products of combustion. This heat, carried by said products of combustion along the path above described heats the flue pipes 16 and 17 and the return vertical bend connecting said flue pipes, the top wall of which bend is the bottom wall 18^a of the steel water pan. The heat from the pipes 16 and 17, where they pass through the water in the said pan, and the heat from the said bottom wall of the pan, vaporizes the water in the pan in large quantities. At the same time the cold air from the cold register, coming into the bottom of the drum 19 above the pan, is warmed by contact with the hot flue pipes and with the warm vapor, with which it becomes heavily laden. Thereafter it rises in the drum in contact with the hot flue pipes, as indicated by the arrows in Figure 2, and then passes out through the warm air conduit and through the warm air register 21^a.

The novel furnace auxiliary thus not only supplements the heating power of the furnace by supplying warm air through the register 21^a produced by heat that is otherwise lost, but it also provides in a highly efficient manner a large amount of moisture with said warm air.

I claim as my invention:—

1. A heating and vaporizing auxiliary for furnaces, comprising a hollow header, vertical flue pipes, one leading from and one returning to said header, an open top water pan through which said flue pipes extend, means providing a vertical return bend connecting the bottom ends of said flue pipes below said pan, one part of said means being the bottom wall of said pan, a jacket enclosing said flue pipes and pan, a cold air conduit leading into said jacket in the neighborhood of said pan, and a warm air conduit leading from said jacket at a point above said tank.

2. A heating and vaporizing auxiliary for furnaces, comprising a hollow header, flue pipes, one leading from and one returning

to said header, an open top water pan through which said flue pipes extend, means connecting said flue pipes at their ends beyond the pan, said means being open on one side adjacent said pan, a jacket enclosing said flues and pan, a cold air conduit and a warm air conduit respectively connected to said jacket at points near and remote from said pan.

3. A heating and vaporizing auxiliary for furnaces, comprising a hollow header, a hollow base spaced below said header, a jacket enclosing the space between said header and base, an open top pan having a bottom wall which provides a top wall for said hollow base, laterally spaced flue pipes connecting said header and base, said flue pipes extending through said pan and opening through the bottom wall thereof, and warm and cold air conduits respectively connected to said jacket.

4. A heating and vaporizing auxiliary for furnaces, comprising a hollow header, vertical flue pipes, one leading from and one returning to said header, an open top water tank through which said flue pipes extend, means providing a vertical return bend connecting the bottom ends of said flue pipes below said pan, one part of said means being the bottom wall of said pan, a jacket enclosing said flue pipes and pan, float controlled means for maintaining a predetermined water level in said pan, a cold air conduit leading into said jacket in the neighborhood of said pan, and a warm air conduit leading from said jacket at a point near said header.

5. A heating and vaporizing auxiliary for furnaces, comprising a hollow header, flue pipes, one leading from and one returning to said header, an open top water pan through which said flue pipes extend, means connecting said flue pipes at their ends beyond the pan, said means being open on one side adjacent the pan, a jacket enclosing said flues and pan, means for supplying water to said pan and for maintaining a constant predetermined level of water in said pan, and cold and warm air conduits respectively connected to said jacket at points near and remote from said pan.

6. A heating and vaporizing auxiliary for furnaces, comprising a hollow header, a hollow base, spaced below said header, a jacket enclosing the space between said header and base, an open top pan having a bottom wall which provides a top wall for said base, laterally spaced flue pipes connecting said header and base, said flue pipes extending through said pan and opening through the bottom wall thereof into said base, means for supplying water at a constant predetermined level in said pan, a warm air conduit leading from said jacket at a point near said header, and a cold air conduit opening into

said jacket at a point near the top of said pan.

7. A heating and vaporizing auxiliary for furnaces, comprising a hollow header, flue pipes, one leading from and one returning to said header, an open top water pan into which said flue pipes extend, means connecting said flue pipes at their ends in the neighborhood of the pan, said means being adapted in part to contact with the contents of said pan, a jacket enclosing said flue pipes and pan, and a cold air conduit and a warm air conduit respectively connected to said jacket at points near and remote from said pan.

8. A heating and vaporizing auxiliary for furnaces, comprising a hollow header, vertical flue pipes, one leading from and one returning to said header, an open top water pan through which said flue pipes extend, means providing a vertical return bend connecting the bottom ends of said flue pipes below said pan, one part of said means being the bottom wall of said pan, a controllable by-pass member located in said header between said flue pipes adapted for deflecting the products of combustion through said flue pipes and return bend or directly through said header, and a jacket enclosing said flue pipes and pan.

9. A heating and vaporizing auxiliary for furnaces, comprising a hollow header, flue pipes, one leading from and one returning to said header, an open top water pan through which said flue pipes extend, means connecting said flue pipes at their ends beyond the pan, said means being open on one side adjacent said pan, a controllable by-pass member located in said header between said flue pipes adapted for deflecting the products of combustion through said flue pipes and the said means connecting their ends or directly through said header, and a jacket enclosing said flues and pan.

10. A heating and vaporizing auxiliary for furnaces, comprising a hollow header, flue pipes, one leading from and one returning to said header, an open top water pan into which said flue pipes extend, means connecting said flue pipes at their ends in the neighborhood of the tank, said means being adapted in part to contact with the contents of said pan, a controllable by-pass member located in said header between said flue pipes adapted for deflecting the products of combustion through said flue pipes and said means connecting their ends or directly through said header, and a jacket enclosing said flue pipes and pan.

11. A heating and vaporizing auxiliary for furnaces, comprising a hollow header, a hollow base spaced from said header, a jacket enclosing the space between said header and base, an open top pan having a bottom wall which provides a top wall for said hollow

base, laterally spaced flue pipes connecting
said header and base, said flue pipe extend-
ing through said pan and opening through
the bottom wall thereof, and a controllable
5 by-pass member located in said header be-
tween said flue pipes adapted for deflecting
the products of combustion through said
flue pipes and hollow base or directly
through said header.

In testimony that I claim the foregoing 10
as my invention, I affix my signature in the
presence of two witnesses, this 19th day of
February, A. D. 1924.

HARRISON H. SOUTHWORTH.

Witnesses:

T. H. ALFREDS,
JOHN P. MEHLHOPE.