

STEAM HEATING APPARATUS.

No. 447,330.

Patented Mar. 3, 1891.

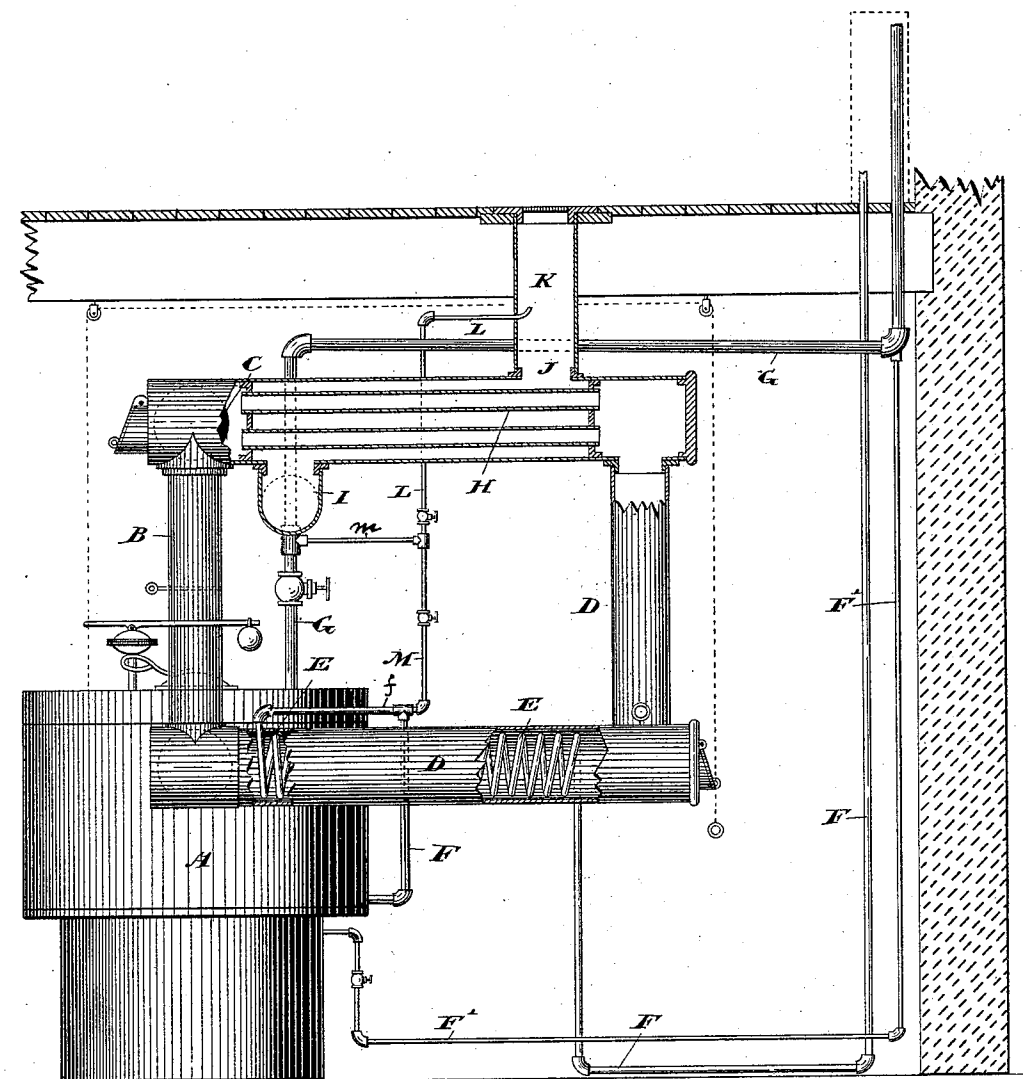


Fig. 1

Witnesses.

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STEAM-HEATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 447,830, dated March 3, 1891.

Application filed April 24, 1890. Serial No. 349,369. (No model.) Patented in Canada April 19, 1890, No. 34,135.

To all whom it may concern:

Be it known that I, ROBERT WILLIAM KING, engineer, of the village of Georgetown, in the county of Halton, in the Province of Ontario, Canada, have invented a certain new and useful Improvement in Steam-Heating Apparatus, (for which I have obtained a patent in Canada, No. 34,135, dated April 19, 1890,) of which the following is a specification.

10 The object of the invention is, first, to arrange an apparatus in connection with a steam-heating boiler by which the steam condensed while passing through the radiator is returned to the boiler through the smoke-flue, so as to reduce the temperature of the smoke in the said flue; secondly, to provide means by which the steam which may be condensed before it reaches the radiator is returned to the boiler independently of the condensed steam from the radiator; thirdly, to provide effective means for preventing the collection of air in the coil or in the downpipe leading from the coil or passage-way to the boiler, and, fourthly, to provide means for heating and moistening fresh air which may be admitted into the apartment; and it consists, essentially, first, of a steam-heating boiler connected to a steam-radiator by a steam-pipe extending from the steam-space of the boiler to a point at the inlet of the radiator and by a return-pipe extending from the outlet of the radiator to the water-space of the boiler, in combination with a coil situated in the smoke-flue of the boiler and connected with the said return-pipe between the radiator and the boiler; secondly, of a pipe extending from the main steam-pipe direct to the bottom of the boiler; thirdly, of a pipe connecting the upper part of the coil or passage-way in the smoke-flue with the main steam-pipe.

The figure is an elevation, partially in section, showing the parts involved in my invention.

In the drawing, A represents a steam-boiler, and B a direct smoke-flue leading from the said boiler to the chimney C.

D is an indirect smoke-flue leading from the boiler to the chimney C. Suitable dampers are provided, so that the smoke and heated gases from the boiler may be caused to pass either through the direct flue B or through the indirect flue D.

E is a pipe, which I show in the drawing in the form of a coil located in the indirect smoke-flue D; but of course a straight pipe might be used, or a passage-way might be made in the flue itself. This pipe or passage-way E is connected to the main return-pipe F, which conveys the condensed steam from the radiators back into the boiler A; but as the water must pass through the pipe or passage-way E before it reaches the boiler it absorbs the heat of the smoke and gases in the smoke-flue D, thereby reducing the temperature of the smoke in the flue and producing the economical effect sought.

G is the main steam-pipe, the condensation from which I do not wish to return to the boiler through the pipe F, as it is of higher temperature than the condensed steam in the said pipe F, and would in a measure prevent it acting so beneficially on the smoke. I therefore connect the pipe G independently with the boiler through the pipe F'.

With the view of utilizing the heat of the smoke and gases in the smoke-flue D, I place in a convenient section of the said smoke-flue a series of tubes or partitions H, and at that point form an inlet I and an outlet J, which latter is connected to a flue K, leading to the apartment it is desired to heat. The flues or partitions H are arranged to separate the smoke from the air passing through the flue D.

L is a pipe leading from the steam-pipe G to the hot-air flue K, so that a spray of steam may be thrown into the said flue for the purpose of moistening the heated air.

M is a pipe connected at one end to the steam-pipe G by a shorter pipe *m*, and at its other end to the upper portion of the coil E' or to the downpipe F at the angle formed by said downpipe F and a horizontal pipe *f*, connecting the outlet end of the coil with said downpipe. This pipe M provides means for the escape of any air which may accumulate in the coil E or in the pipe F, thus insuring a free circulation of the water in the coil E into the boiler through the pipe F.

Having described the mechanical parts involved in my invention, I shall now proceed to explain the theory and operation of my improvement. The coils or radiators in the building are made sufficiently large and are so arranged that at all times the water of con-

densation passing from them will be cold, or nearly so, and thus in passing through the pipe or passage-way E it absorbs the heat in the flue, reducing the temperature in the said flue, checking superfluous draft, and thus securing a great economy in the consumption of fuel.

All return-pipes from mains carrying the hotter return-drips in my system are conveyed by separate pipes or mains back to the boiler direct instead of into the pipe or passage-way E. Were they connected direct with the pipe or passage-way E, the warm water in them would render my system less efficient as a means of cooling or reducing the temperature of the hot draft passing from the boiler to the chimney.

In steam-heating systems hitherto employed it is customary to use what are termed "indirect radiators" for the purpose of warming fresh air by radiating steam-pipes confined in a suitable receptacle and discharging the heated air through a register in the floor into the apartment. One serious objection to these indirect radiators is their direct connection with the outside frosty air. In severe climates they are very liable to be frozen and to be destroyed by the bursting of the pipes or whatever they may be composed of. However desirable it may be to admit warm fresh air for ventilating purposes, the indirect steam-radiator plan in steam-heating systems has been found both expensive and dangerous. By my invention, where ventilation becomes part of the object to be arrived at in connection with the steam-heating, I secure the desired end by admitting the air into the smoke-pipe D at the point described, which effectually heats the air before admitting it into the apartment through the flue K, and the air so admitted may be moistened, as before mentioned, by a spray of steam escaping from the end of the pipe L.

Owing to the reduced temperature of the smoke by the time it reaches the air-heater I have described, the evils of the overheated air from purely hot-air furnaces are avoided, and I secure the best points in both the steam and hot-air systems of heating, the moistened air being admitted into the apartment at about the normal temperature of the room,

and consequently the air thus admitted does not ascend immediately to the top of the apartment, but will remain where it may be breathed.

What I claim as my invention is—

1. A steam-heating boiler and a smoke-flue therefor, a steam-radiator, a main steam-pipe extending from the steam-space of the boiler to a point at the inlet of the radiator, and a return-pipe extending from the outlet of the radiator, in combination with a coil situated in the smoke-flue of the boiler and connecting the said return-pipe with the boiler, substantially as and for the purpose specified.

2. A steam-heating boiler and a smoke-flue therefor, a steam-radiator, a main steam-pipe extending from the steam-space of the boiler to a point at the inlet of the radiator, a return-pipe extending from the outlet of the radiator, a coil or water-pipe situated in the smoke-flue of the boiler and connecting said pipe to the boiler, in combination with a return-pipe leading from a point in the main steam-pipe before it reaches the radiator directly to the boiler, substantially as and for the purpose specified.

3. A steam-heating boiler and a smoke-flue therefor, a steam-radiator, a main steam-pipe extending from the steam-space of the boiler to a point at the inlet of the radiator, a return-pipe extending from the outlet of the radiator, a coil or water-pipe situated in the smoke-flue of the boiler and connecting said pipe to the boiler, in combination with a pipe leading from the upper part of the coil E to the main steam-pipe G, substantially as and for the purpose specified.

4. The combination, with the boiler, the smoke-flue, and indirect smoke-flue, of the pipe E in the indirect smoke-flue, the main steam-pipe G, the return-pipe F, the hot-air flue, the pipe L, connected with the main steam-pipe and emptying into the hot-air flue, and the pipe M, connecting the steam-pipe with the pipe E, substantially as and for the purpose specified.

Georgetown, March 24, 1890.

ROBERT W. KING.

In presence of—

G. H. KENNEDY,
JOSEPH BARBER.