R. S. GILLESPIE.

STEAM-RADIATOR.

No. 189,452. Patented April 10, 1877.

Fig:1. Fig:2.

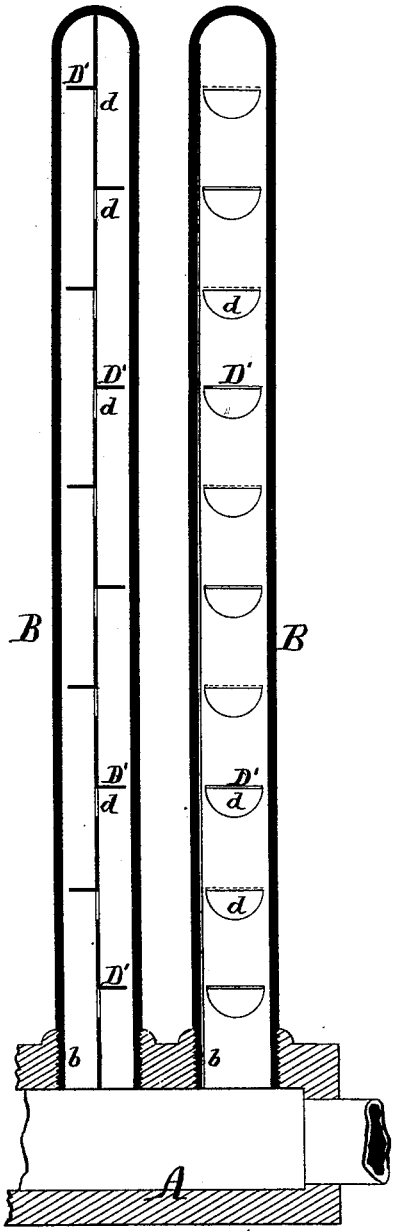
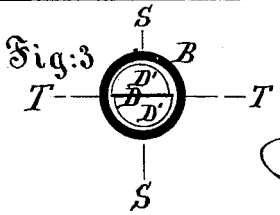


Fig:3



Witnesses:

A. Henry Gentner Jr.

Chas. C. Stetson.

Inventor:

R. S. Gillespie

by his attorney

C. C. Stetson

UNITED STATES PATENT OFFICE.

RICHARD S. GILLESPIE, OF NEW YORK, N. Y.

IMPROVEMENT IN STEAM-RADIATORS.

Specification forming part of Letters Patent No. **189,452**, dated April 10, 1877; application filed March 15, 1877.

To all whom it may concern:

Be it known that I, RICHARD S. GILLESPIE, of the city and county of New York, in the State of New York, have invented certain new and useful Improvements relating to Steam-Radiators for Warming Buildings, of which the following is a specification:

Notwithstanding all the refinements in the way of partitions, perforations, and analogous means in the interior of radiators, there is still a difficulty—in some situations very serious—in consequence of radiators remaining cold in cold weather for minutes, and sometimes for hours, after the steam is let on. I propose to overcome the difficulty by inducing small cross-currents or an active agitation or churning of the particles.

I can use the ordinary straight single tubes, each with one end closed and the other end tapped into a hollow base-piece, which base is put in communication with a steam-boiler. The peculiarity is in the interior. I provide separate plates, which may be readily thrust in by any sufficient force, and, having rounded the end, cause it to form, when forced home, a tolerably-tight fit against the entire interior, even including the rounded interior of the closed end. It is not important that the fit be close. There may be considerable leaks, inasmuch as the tendency of the steam and air to pass is very gentle; but I make as close a fit as is conveniently practicable along the entire edge and at the end. The circulation is provided by apertures. Over each aperture is a deflector, which may be conveniently formed of the metal cut out of the aperture, and simply bent outward nearly at right angles. All changes of pressure and all currents in the interior of the apparatus cause the deflectors and holes to be of service—the holes by allowing the thin fluid to pass through in small streams and agitate and break up the whole, while the deflectors increase the efficiency in this respect.

The following is a description of what I consider the best means of carrying out the invention.

The accompanying drawings form a part of this specification.

Figures 1 and 2 represent two different sections of my radiator, indicated as two radiators set in the same base. Fig. 1 is a section on the line S S in Fig. 3, at right angles to the plane of the dividing-plate. Fig. 2 is a section on the line T T in Fig. 3. Fig. 3 is a horizontal section through one radiator.

Similar letters of reference indicate corresponding parts in all the figures.

A is a base of cast-iron, of any ordinary or suitable form. It is connected with a steam-boiler by pipes controlled by valves. (Not represented.) The radiator-tube is indicated by B, and its threaded neck by *b*. Each radiator is closed at the top, and is tapped into a threaded hole in the base A, as usual. The dividing-partition D is formed of sheet-iron, certain parts being indicated by *d* and D′. The edges are turned at right angles to increase the stiffness and make it easier of insertion, as also, by the elasticity, to aid in maintaining its position in the radiator-tube B. In its manufacture I cut a considerable number of semicircular incisions in the dividing-plate. The **D**-shaped pieces of metal thus partially liberated are bent outward, some on one side and some on the other of the plane, and left standing nearly at right angles thereto. These pieces form deflectors.

When steam is let on, the air in the top of each radiator is compressed, and the steam rushes up part way to the top. In doing so it strikes one or more of the lower deflectors D′, and corresponding currents are turned through the lower holes *d*. The agitation thus induced is repeated, more or less modified, with each fluctuation in the pressure. The agitation compels the rapid mixing of the adjacent particles of air and steam, by which process the whole is rapidly transformed into such mixture, and the air thus conducted away to the boiler by the active circulation soon induced.

Steam is lighter than air of the same pressure, in the proportion of about eight hundred and fifty to one thousand. The difference is sufficient to induce the steam to rapidly displace the air, if it can be thrown into currents and agitated. My partition is so liberally perforated that the steam may circulate through it with freedom after the air is displaced. The perforations, also, by the aid of the deflectors D′, serve to promote the displacing of the air

by agitating the steam and air on the first access of the steam, and with each subsequent change of pressure. Each of the throbs, pulsations, or waves, which are so common when steam is let into a large area of cold chambers, induces an agitation by reason of the holes and deflectors, which would be nothing but a mere rising and sinking of the steam, if such were not present.

Many modifications may be made in the size and number of apertures and in their form, and, consequently, in that of the deflectors. The deflectors may be dished somewhat like the bowl of a spoon, with the hollow side downward, if preferred. The exterior or main body B of the radiator may be of cast-iron, instead of the ordinary wrought-iron, and may be varied in size and form, and indefinitely, provided the interior construction be made to correspond, so that the apertures and the deflectors shall serve as above described. There may, of course, be any desired number of radiators on a single base.

I claim as my invention—

The partition D, having the orifices *d* and deflectors D′, in combination with a steam-radiator, B, and base A, as herein specified.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

RICH. S. GILLESPIE.

Witnesses:

THOMAS D. STETSON,

CHAS. C. STETSON.