2 Sheets—Sheet 1.

J. R. WORSWICK & J. A. PRINDLE.

STEAM-RADIATOR.

No. 192,140. Patented June 19, 1877.

FIG. 1.

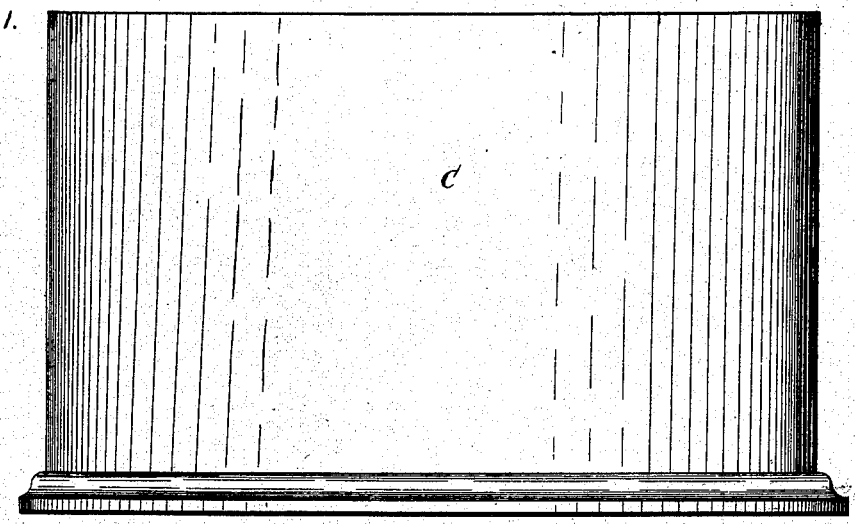
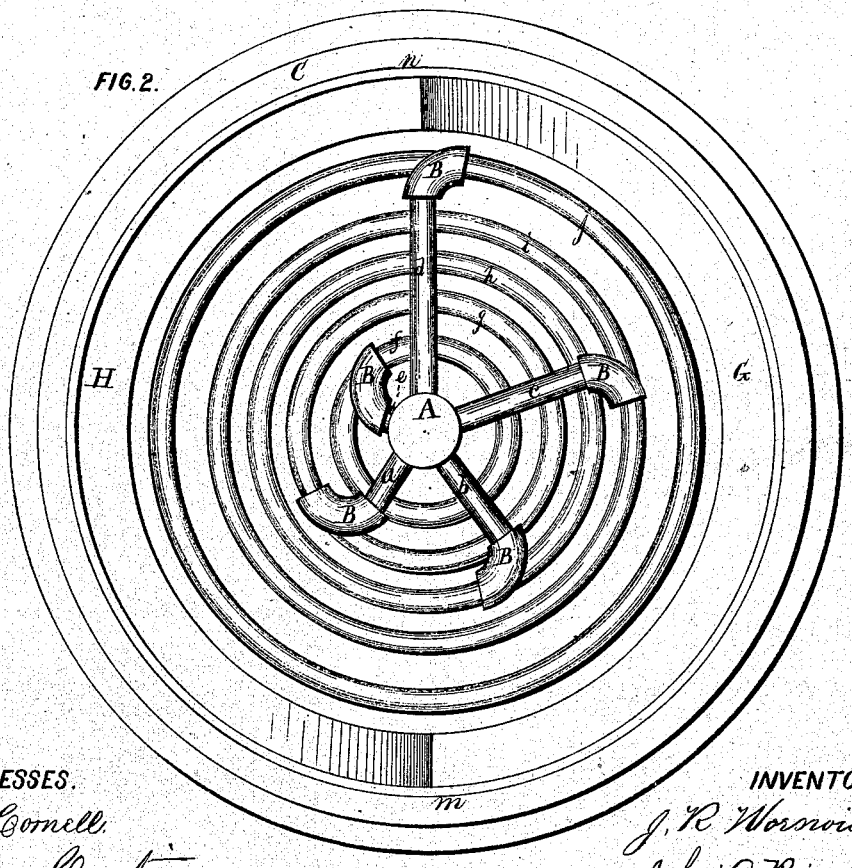


FIG. 2.



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2 Sheets—Sheet 2.

J. R. WORSWICK & J. A. PRINDLE.

STEAM-RADIATOR.

No. 192,140. Patented June 19, 1877.

FIG. 3.

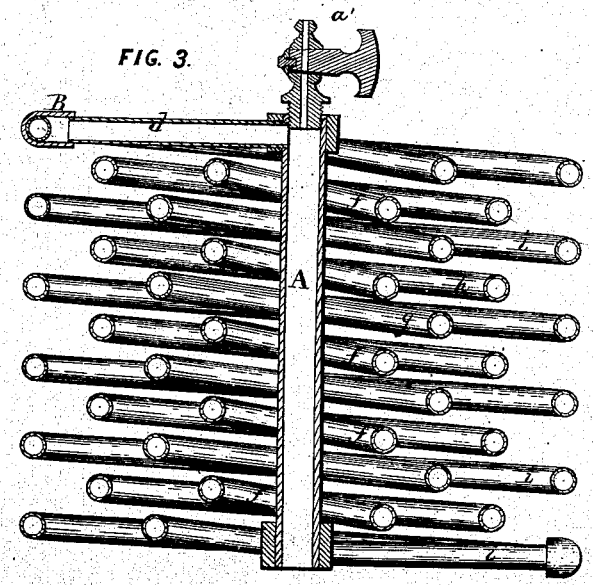
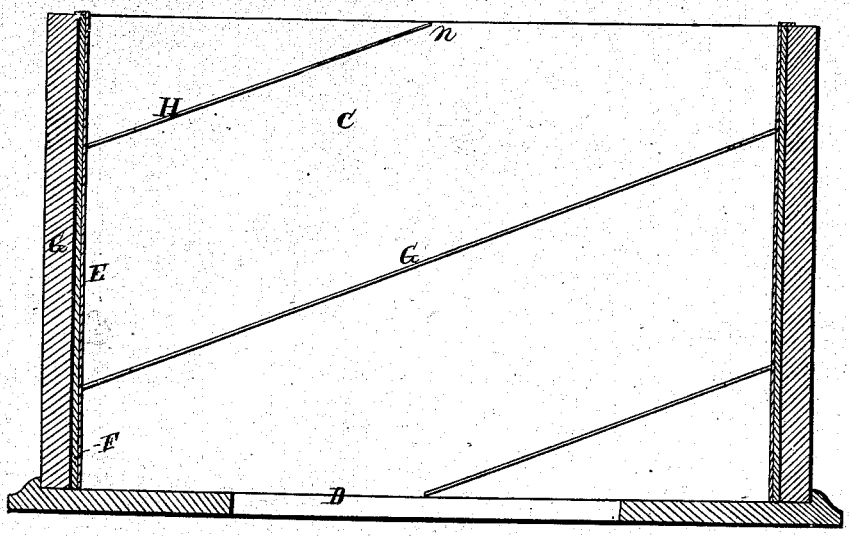


FIG. 4.



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UNITED STATES PATENT OFFICE.

JAMES R. WORSWICK AND JOHN A. PRINDLE, OF CLEVELAND, OHIO.

IMPROVEMENT IN STEAM-RADIATORS.

Specification forming part of Letters Patent No. **192,140**, dated June 19, 1877; application filed September 10, 1875.

To all whom it may concern:

Be it known that we, JAMES R. WORSWICK and JOHN A. PRINDLE, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and Improved Steam-Radiator; and we do hereby declare that the following is a full, clear, and complete description thereof, reference being had to the accompanying drawings, making part of the same.

Figure 1 is an outside view of the radiator. Fig. 2 is a top view of the inside. Fig. 3 is a transverse vertical section of coils of pipe of the radiator. Fig. 4 is a transverse section of the shell or case for inclosing the coils.

Like letters of reference refer to like parts in the several views.

This invention is a steam-radiator consisting of a series of coils of pipes, commencing and terminating in a vertical tube or steam-pipe, forming the axis of the several coils. Said coils are inclosed in a cylindrical shell or case provided with spiral deflectors, all of which is constructed as hereinafter more fully described.

In Fig. 3, A represents the vertical axial tube referred to, the lower end of which is put in connection with a steam-pipe leading from the boiler. From the upper end of the pipe A radiate pipes *a*, *b*, *c*, *d*, and *e*, Fig. 2, the ends of which terminate in elbows B. From each of the elbows proceeds a pipe, *f*, *g*, *h*, *i*, and *j*, coiling spirally around the pipe A down to its lower end, in which they terminate by being connected therewith in the same manner as are their upper ends, viz., by radial tubes and elbows. It will be seen that the several spiral coils have the tube A as a common axis, as above said. C is a cylindrical case or shell, having an open top and opening D, Fig. 4, in the bottom. Said shell is lined with sheet metal E, Fig. 4, between which and the shell is interposed a filling of felt F or other non-heat-conducting material. Around the inside of the shell is a spiral flange, G, Fig. 2, commencing at the upper end of the shell at the point *m*, and winding around down to the lower end, and terminating at the end of the vertical line dropped from said point *n* of beginning. H is also a spiral flange, commencing at *n* on the opposite side of the upper end of the shell, and in like manner winding around down to and terminating at the end of a vertical line dropped from said point *n* of beginning; hence both of the flanges make a circuit of the inside of the shell, commencing at the top and terminating below at the end of a vertical line dropped from the points of beginning.

Having described the construction of the radiator, the operation of the same is as follows: This radiator is designed to be set in the floor. To this end a hole is made therein to admit the upper end of the shell, which is therein secured and covered with a grating. Steam is admitted to the coils of pipes through the vertical pipe A and radial pipes branching therefrom, as above described, whereby the whole mass of coils becomes heated, radiating the heat upward into the room through the grating, and laterally to the sides of the shell, from which it is reflected back into the coils, as it cannot readily pass through the case for the resistance of the non-heat-conducting material referred to.

Of the many advantages the heater above described has over others we instance the following: It has a larger heating-surface, and therefore a greater heating capacity, than others of the same external diameter. As an example, a radiator about eighteen inches high and thirty-four inches in diameter, made of one-inch pipe, contains some one hundred and fifteen square feet of heating-surface. The peculiar construction of the heater provides for contraction and expansion without in any degree exerting unusual strain upon its connections, and its spiral form gives it an elasticity that guards it from injury from sudden shocks, such as would be produced by a change of temperature, however sudden. By means of the air-cock *a'* in the top of the central tube the air is readily expelled from the coils, and the condensed steam will easily and readily flow from top to bottom of the spiral coils, passing into the water-pipe connected with the bottom of the central pipe, there being no point in the coils which can fill with water; hence all parts of the heater or coils must at all times be doing effective work. All the joints in this heater can be screw-joints—the most secure and durable for this class of work.

The manufacture of this radiator is easy

and inexpensive as compared with other radiators, it being made of tubing—an article of merchandise the coiling of which is easily and rapidly done, requiring but ordinary skill and tools for that purpose, and without in the least departing from the character of the radiator. It can be constructed of any desirable dimensions, ranging from a few inches in height and diameter, to any number of feet and of any number of coils.

The case or shell, being lined with a reflecting material, backed up with some non-heat-conducting substance, will retain in and about the coils all the heat from lateral radiation, or nearly so. At the same time the spiral flanges attached to the inside of the shell deflects the air coming in from below into the coils, thereby causing a full and complete heating up of the air and radiating the same into the room or space above.

What we claim as our invention, and desire to secure by Letters Patent, is—

The series of tubular coils herein specified, more or less in number, in combination with the shell or case C and spiral flanges H G, substantially in the manner as set forth, and for the purpose specified.

J. R. WORSWICK.
JOHN A. PRINDLE.

Witnesses:
J. H. BURRIDGE,
A. F. CORNELL.