

E. F. GORDON.  
Steam-Radiator.

No. 227,517.

Patented May 11, 1880.

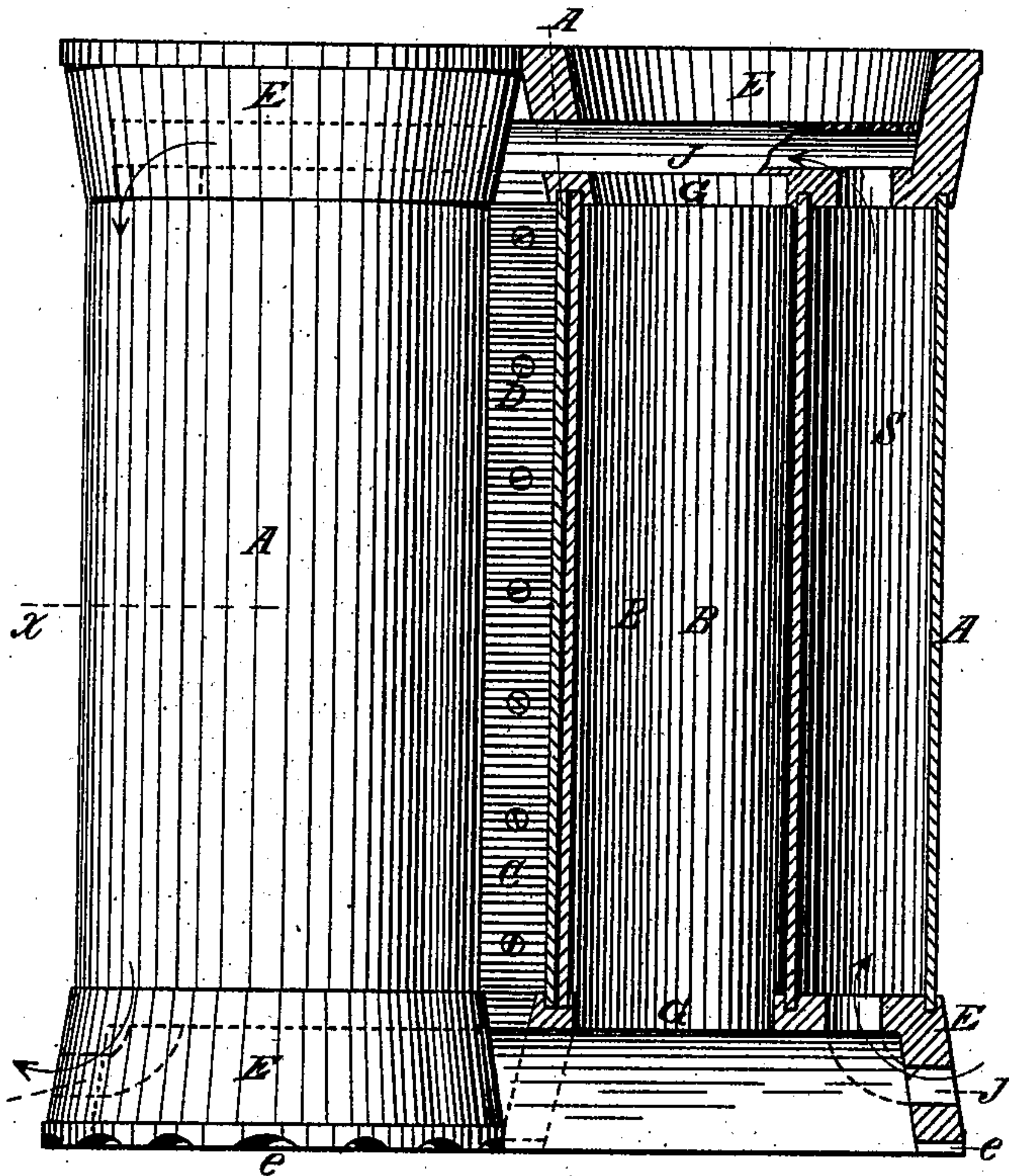


FIG. 1.

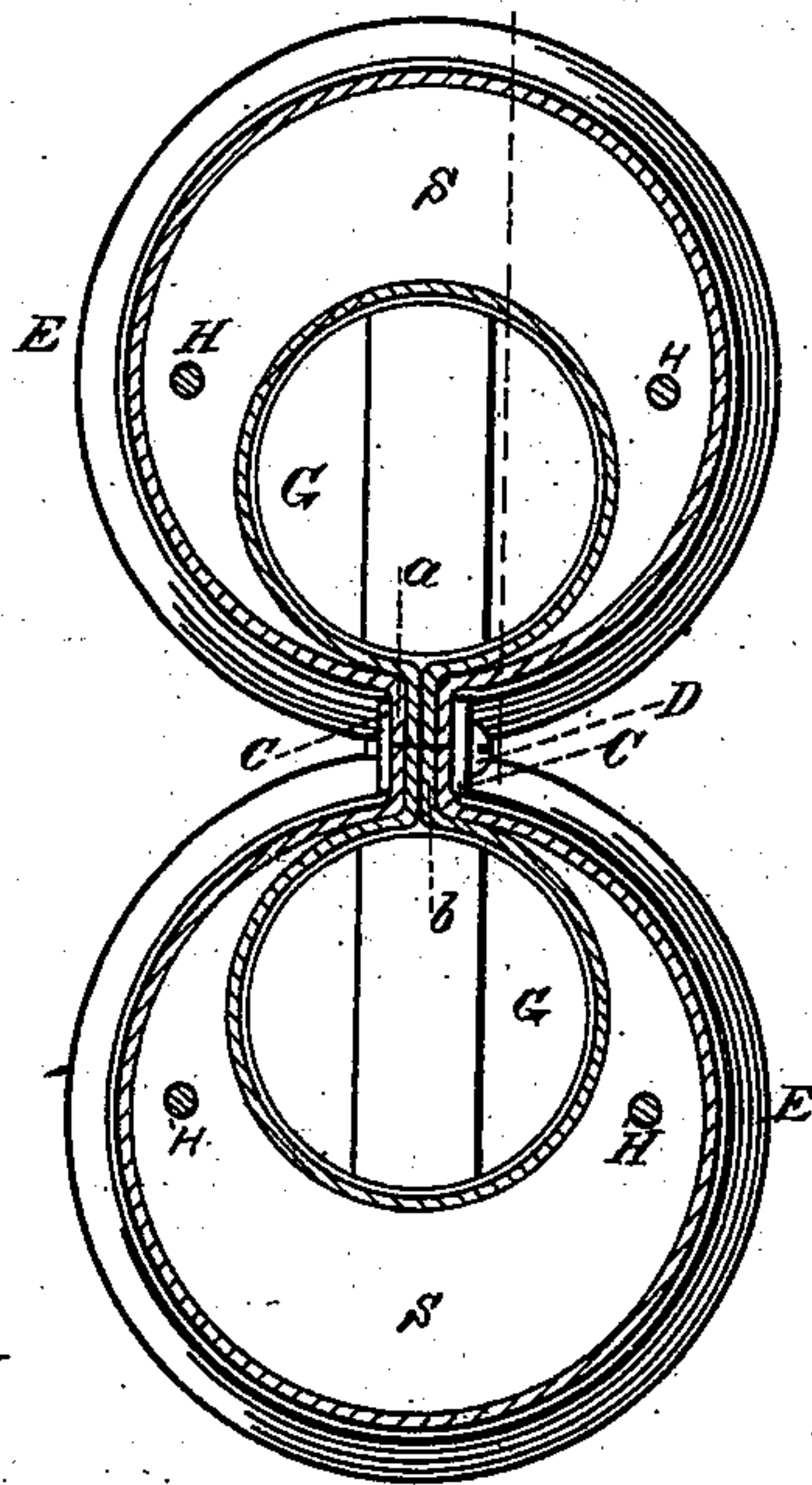


FIG. 2.

Witnesses:

E. A. Phelps  
W. M. Parker

Inventor:

Edward F. Gordon.

by A. H. Spencer  
his attorney.



# UNITED STATES PATENT OFFICE.

EDWARD F. GORDON, OF CONCORD, NEW HAMPSHIRE, ASSIGNOR TO  
HORATIO HOBBS, OF SAME PLACE.

## STEAM-RADIATOR.

SPECIFICATION forming part of Letters Patent No. 227,517, dated May 11, 1880.

Application filed October 13, 1879.

*To all whom it may concern:*

Be it known that I, EDWARD F. GORDON, of Concord, New Hampshire, have invented certain Improvements in Steam-Radiators; and I do hereby declare that the following is a full, clear, and exact description of the same, and the accompanying drawings an illustration.

The object of my improvement is to simplify and cheapen radiators, as well as to improve their appearance and increase their radiating power.

My invention consists in a radiator tube or series of tubes composed of an inner and outer sheet-metal shell, with base and cap to close at the ends the space between the two shells, and provided with clamping means for confining the edges steam or air tight; also, in the other devices and combinations of devices recited in the claims.

The best mode in which I have contemplated applying my inventions is shown in the drawings, in which—

Figure 1 is partly a side elevation and partly a vertical section of a pair of my radiating-tubes joined by the clamps, the base, and cap. Fig. 2 is a horizontal section taken at line *x*, Fig. 1.

Sheet metal possesses many qualities especially adapting it to the requirements of a radiator-tube beyond those pertaining to ordinary wrought or cast iron tubes. Among these qualities are lightness and economy of metal, and consequently a radiator-tube of this material will become heated and begin to radiate heat much quicker after the admission of the steam than would the tubes ordinarily used, and less steam would be condensed and wasted. Economy in use therefore follows the employment of this material, as well as economy in original construction and greater facility of repairs.

The peculiarities of construction and connection of the tubes which I have devised will be readily understood by inspection of the drawings.

Each tube is duplex, or composed of an outer shell, A, and an inner one, B, between which is a space, S, for the steam, hot air, cold air, or other heating or cooling medium conducted through the radiator. These shells

may be placed concentrically or eccentrically to each other, leaving the space S either substantially annular or more or less crescent-shaped in cross-section.

For various reasons I prefer the crescent form indicated in Fig. 2, produced by placing the inner tube, B, in contact with one side of the larger tube, which incloses it. By this arrangement of the two shells I am enabled to clamp the edges of both and make an air-tight joint by holding such edges between two clamping-plates tightened together by screws or rivets.

In practice my radiator-tubes are used in pairs with a suitable base and cap, as denoted in the drawings, each tube of such pair having the inner and outer shells with the space between them connected by a steam-pipe, J, and with inlet and outlet to provide for circulation. Any desired number of these unitary radiators may be employed and properly connected, according to the amount of heating or cooling surface required.

In order to unite to each other at one operation the two tubes of a pair and the two shells of each tube, as well as to avoid running either of the clamp-bars inside of the inner shell, I form each shell, as clearly shown in Fig. 2, with a flange or straight lip along one side, consisting of the meeting edges of the metal sheet turned outwardly and parallel, the flanges *b* of the inner shell lying between and in contact with those, *a*, of the outer. These parts of the tubes are turned toward each other and abut, so that the clamping of one secures both, the clamp screws or rivets passing through the metal flanges or between them along a central line. If preferred, the flanges may interlock or lap by each other and may be riveted firmly together. In either case I interpose litharge, red lead, or some cement to perfect these joints and others in the apparatus. By the use of the clamp-plates C and screws D, I am enabled to disconnect the tubes of a pair and readily remove either one, if desired.

From the preceding description it will be apparent that by my invention a vast increase in radiating power is obtained, since the inner surface of the shell B is utilized for that pur-



pose, the air within it rising when heated, and being replaced continually by cool air from below. To provide for this circulation I form both base E and cap F with an opening, G, corresponding with that through the shell B, and of as great an area as is practicable. I also set the base above the floor to admit air freely, or I form air-inlets *e* in the base for the same purpose. When a marble slab or other cover is placed upon the caps I form similar channels in or through the caps or covers, that the circulation of this air-current may not be impeded.

The bases and caps are preferably iron castings formed with grooves to receive the edges of the sheet metal at bottom and top of each tube or shell and hold them in position, and having wider openings to receive the flanges *a b* and clamp-bars C. The base and cap are united by vertical bolts H or other suitable means. I am accustomed to form in these castings, by coring, suitable channels J, for entrance and exit of the steam and for its passage in the cap from one tube to the other, and thus I avoid extra joints, piping, and fitting, and reduce expense.

I do not deem it necessary to describe the mode of rolling the sheet-metal shells to form

the tubes, as such process will be readily understood by any skilled metal-worker.

I claim as of my invention—

1. The duplex tube herein described, adapted to radiate from its inner and outer surfaces, having its inner and outer shells united along one side by clamping-plates, and formed with a space between these surfaces for the circulation of a heating or cooling medium, substantially as set forth.

2. A radiator-tube formed, as described, of two sheet-metal shells having flanges *a b* clamped or riveted together, substantially as set forth.

3. The combination of the sheet-metal tube A B, having interior and exterior radiating-shells arranged eccentrically, with an open base and cap, substantially as set forth.

4. The improvement in forming radiator-tubes herein described, consisting in rolling to shape the sheet-metal shells and uniting their edges by clamping-plates, substantially as set forth.

EDWARD F. GORDON.

Witnesses:

ALLISON M. STICKNEY,  
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