

M. E. DANFORTH.
RADIATOR.
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914,929.

Patented Mar. 9, 1909.

Fig. 1

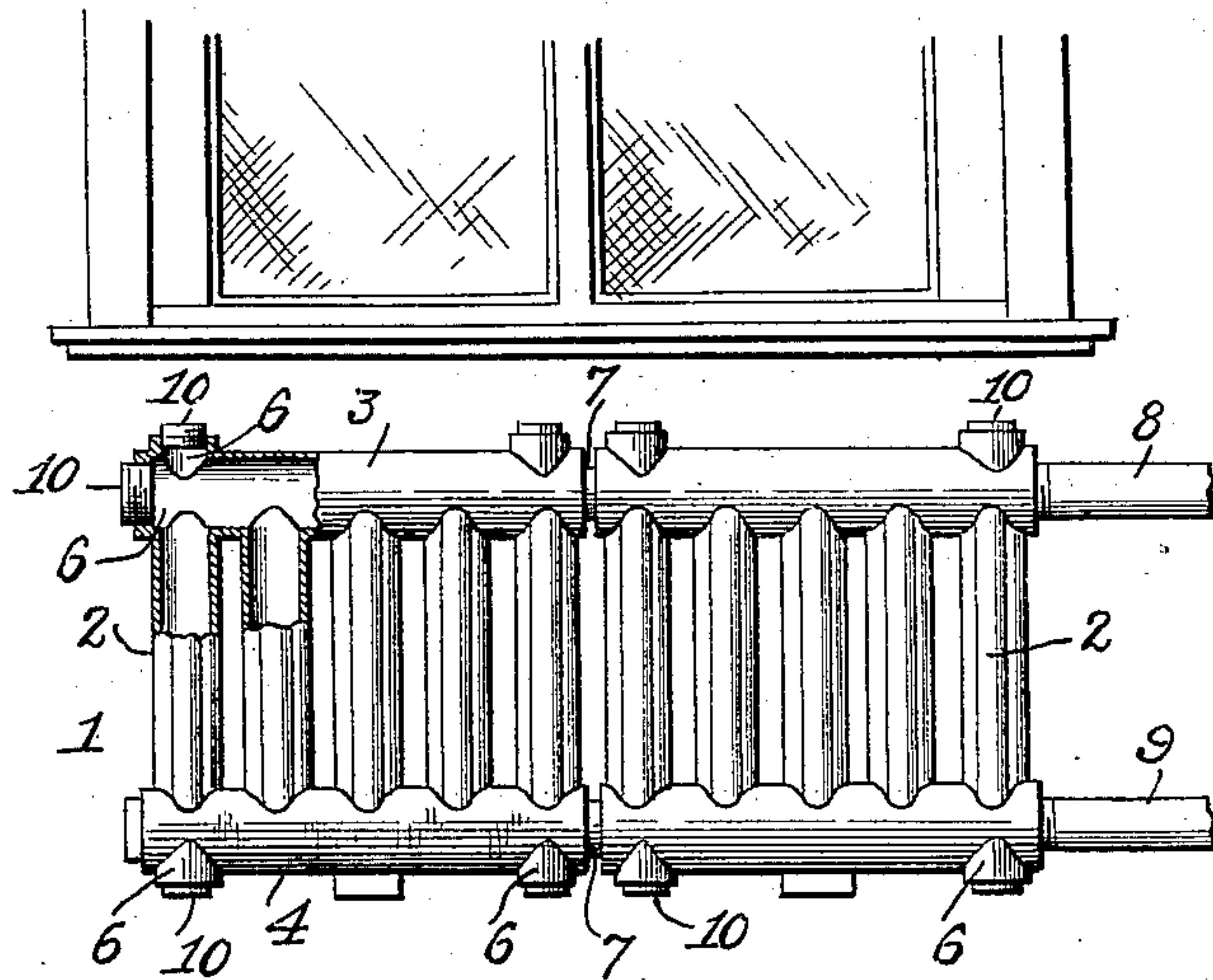


Fig. 2.

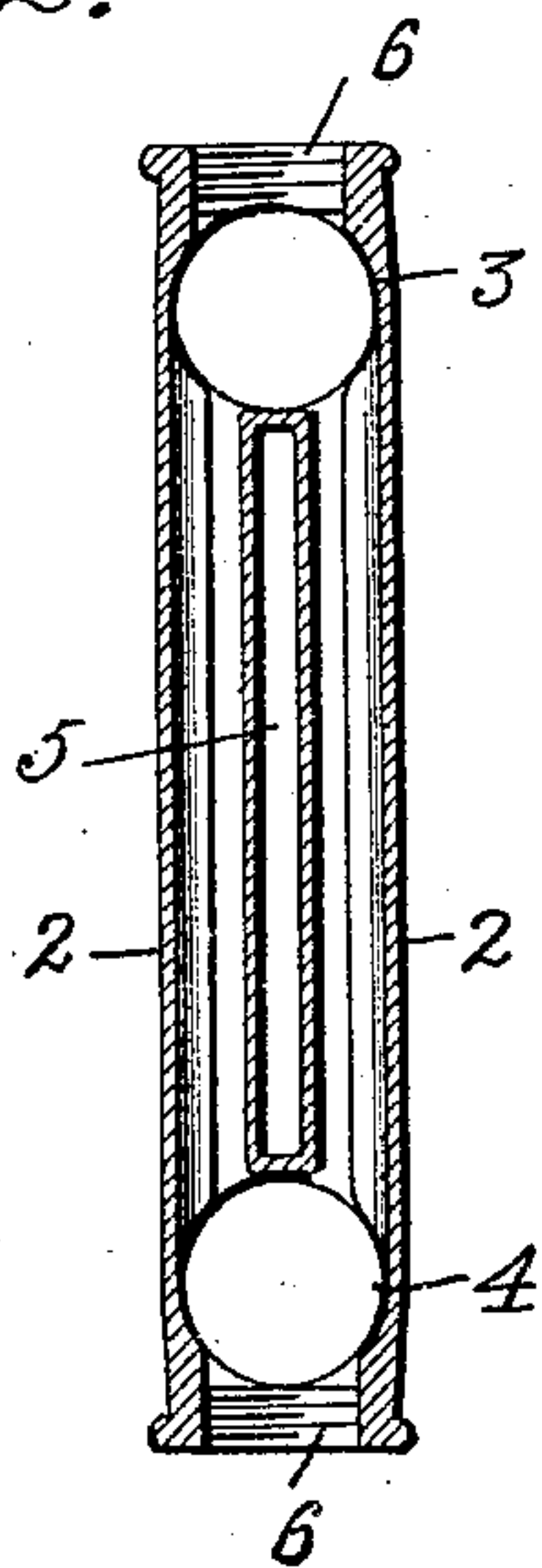
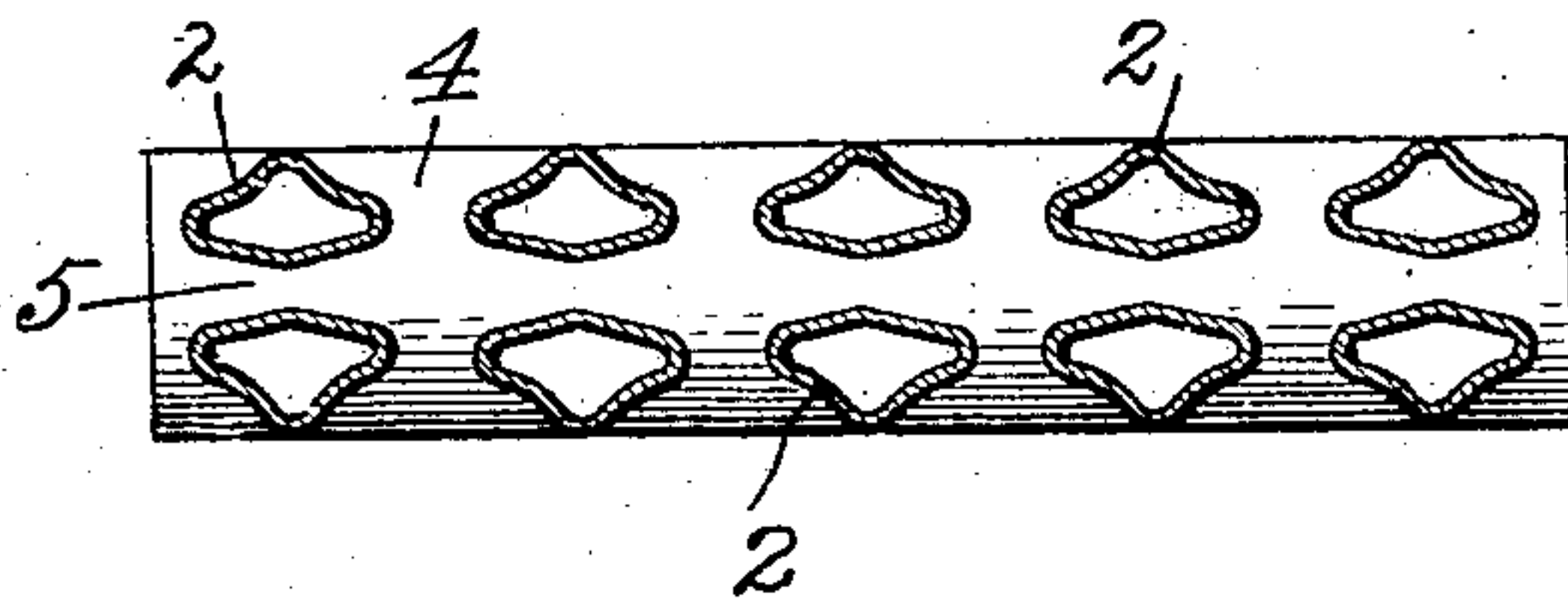


Fig. 3.



Witnesses

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UNITED STATES PATENT OFFICE.

MONTGOMERY E. DANFORTH, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR TO THE UNITED STATES RADIATOR COMPANY, OF DUNKIRK, NEW YORK, A CORPORATION OF NEW YORK.

RADIATOR.

No. 914,929.

Specification of Letters Patent.

Patented March 9, 1909.

Application filed June 3, 1908. Serial No. 436,438.

To all whom it may concern:

Be it known that I, MONTGOMERY E. DANFORTH, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Radiators, of which the following is a specification.

My invention relates to radiators, and more particularly to that class adapted to be supported from the wall or wainscot, and has for its object to provide an improved construction of radiator section formed integrally of cast-iron and embodying a maximum of radiating surface, said section adapted to be connected with any number of similar sections to form a complete radiator of any size. This object I accomplish in the manner and by the means hereinafter described and claimed, reference being had to the accompanying drawing in which:

Figure 1 is a side elevation of a portion of a room having my improved radiator fastened to the wall and showing the same made up of two sections. Fig. 2 is an enlarged vertical transverse sectional view through the radiator section. Fig. 3 is an enlarged horizontal sectional view of said radiator section.

Similar numerals of reference denote corresponding parts in the several views.

In the said drawing the reference numeral 1 denotes one of my improved radiator sections composed of a hollow cast-iron frame made up of a battery of tubes 2 connecting upper and lower longitudinal tubes 3 and 4. By reference to Figs. 2 and 3 it will be seen that the vertical connecting tubes 2 are formed in pairs transversely, thus providing two longitudinal rows of said tubes, leaving therebetween an air space 5. It will also be seen that said vertical connecting tubes 2 lie substantially flush with the upper and lower longitudinal tubes 3 and 4, so that the combined diameters transversely of said tubes 2 plus their intervening space 5 does not exceed the diameter of tubes 3 and 4, which gives all the advantages of the double row of tubes 2 as to their radiating capacity, while still maintaining the flat characteristic of a wall radiator.

Each radiator section 1 has its upper and lower tubes 3 and 4 provided with screw-threaded openings 6, which provide means for connecting thereto similar sections extending in any direction, and also for connecting thereto the usual supply and return pipes.

Thus, in Fig. 1 I have shown two sections 1 connected in series horizontally by screw-threaded thimbles 7, and having the supply pipe 8 and return pipe 9 connected to one of said sections at one end, it being understood that the openings 6 not so used are to be closed by screw-plugs 10, as shown.

From the above description it will be understood that the radiator sections 1 may be connected in series in any desired number and in any direction, both vertically and horizontally, to form a radiator of any size and shape. The most important feature of construction, however, is the arrangement of double tubes 2, whereby the intervening air space 5 is left therebetween, thus practically doubling the radiating surface and enabling much smaller radiators to be used for a given heating requirement. A further advantage of this integral construction is that the radiators will be of almost exactly the same size, as in a construction where the transverse pairs of tubes were formed separate a variation in the facing of the same will be multiplied by the number of pairs. That is to say, if the pairs of tubes were bored one sixty-fourth of an inch short, a radiator of twenty loops would be five-sixteenths of an inch short. Still another advantage of the integral construction is that the sections can be made lighter, as no heavy hubs are necessary to stand the boring and the strain of assembling with the taper slip nipples usually employed.

It will be apparent that to cast an integral section embodying a plurality of transversely arranged pairs of tubes, as shown, presented a much more difficult problem than that presented in casting either an integral section embodying a plurality of single tubes, or in casting transversely arranged pairs of tubes separately. Thus, with the single tube construction but a single core is required, while with the pairs of tubes cast separately the mold may be arranged so that its cores will lie side by side, while with applicant's double tube construction the mold must be arranged to provide a plurality of sets of cores of three each. This applicant has accomplished by his particular configuration wherein the pairs of transversely arranged straight tubes are connected by outer parallel tubes of a diameter equal to the combined diameters of said pairs of tubes.

I have shown my improved radiator sec-

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tions each formed with a series of five sets of tubes 2, though the size of said sections may be increased if desired by increasing the number of said sets of tubes to say seven or
5 nine. So, also, while I have shown said tubes 2 as substantially triangular in cross area, as seen in Fig. 3, still I do not confine myself to said particular shape, which may be varied at will.

10 Having thus described my invention, what I claim as new and desire to secure by Letters-Patent, is:

1. A radiator section, composed of an integral hollow casting embodying a plurality of
15 pairs of oppositely disposed straight tubes spaced apart and arranged with the members of each pair parallel to the members of an adjacent pair, and oppositely disposed outer parallel tubes connected to the ends of said
20 straight tubes, said outer tubes being of a diameter at least equal to the combined diameters transversely of the pairs of straight tubes plus their intervening space.

2. A radiator section, composed of an integral hollow casting embodying a plurality
25 of pairs of oppositely disposed straight tubes spaced apart and arranged with the members of each pair parallel to the members of an adjacent pair, and oppositely disposed outer
30 parallel tubes connected to the ends of said straight tubes, said outer tubes being of a diameter at least equal to the combined diameters transversely of the pairs of straight tubes plus their intervening space, said outer parallel
35 tubes being provided at their ends with openings arranged at right angles to each other whereby said section may be connected with other similar sections in horizontal or vertical alinement in the same plane.

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

MONTGOMERY E. DANFORTH.

Witnesses:

PERCY B. HILLS,
A. B. DARNALLS.