Sept. 1, 1931. S. D. SPRONG 1,821,080

RADIATOR

Filed Oct. 15, 1930

Fig. 1.

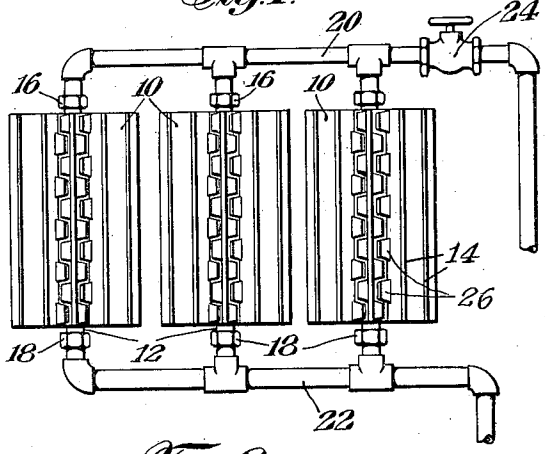


Fig. 2.

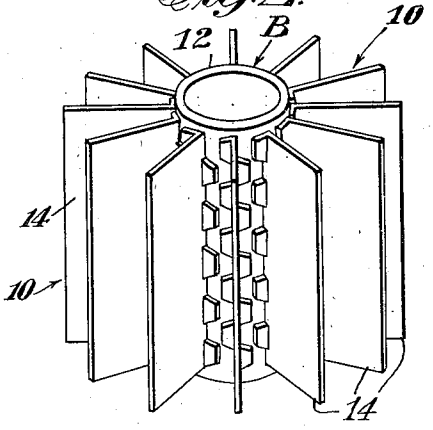


Fig. 3.

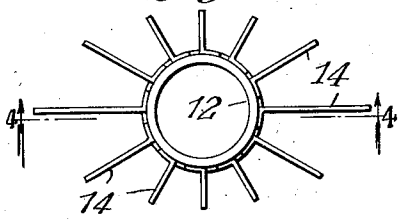


Fig. 6.

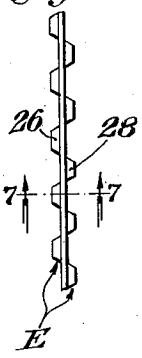


Fig. 7.

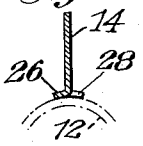


Fig. 8.

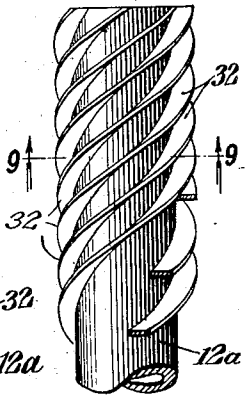


Fig. 4.

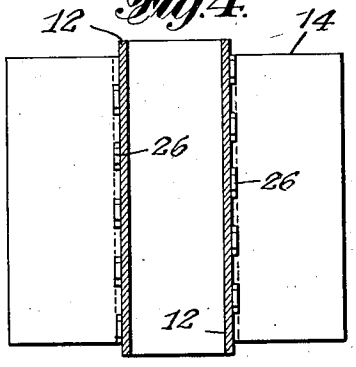


Fig. 9.

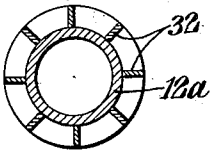


Fig. 5.

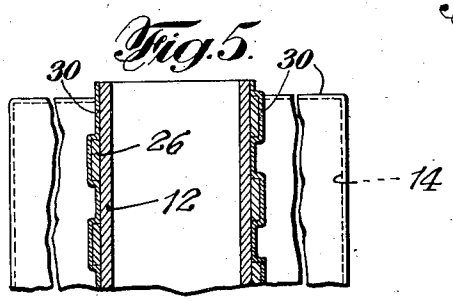
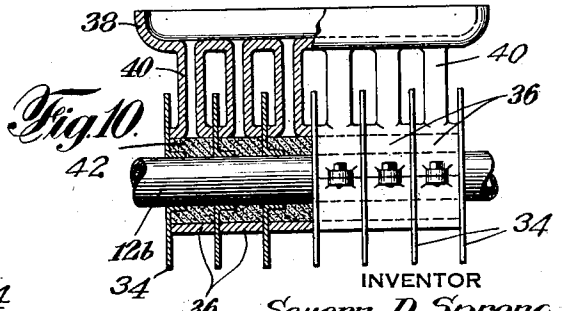


Fig. 10.



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UNITED STATES PATENT OFFICE

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RADIATOR

Application filed October 15, 1930. Serial No. 488,713.

This invention relates to improvements in radiators and aims to provide an article of this character which can be made from standard size pipe with sheet metal radiating elements bonded thereto. In one embodiment of the invention, the pipe is surrounded by a multiplicity of fins which have projecting portions seated against the periphery of the pipe, the fins and the pipe being united to form one integral structure by means of a thin body or film of metal of substantially lower melting point than the metal of which the pipe and fins are composed.

The invention will be fully apparent from the following specification when read in connection with the accompanying drawings and will be defined with particularity in the appended claim.

In the drawings:—

Fig. 1 is a side elevation of a radiator embodying the invention;

Fig. 2 is an enlarged perspective view of a portion of one of the radiator elements shown in Fig. 1;

Fig. 3 is a horizontal section illustrating a step in the method of production of my improved radiator;

Fig. 4 is a longitudinal section on line 4—4 of Fig. 3;

Fig. 5 is a view similar to Fig. 4, but illustrating a further step in the method of manufacturing a radiator;

Fig. 6 is an enlarged edge view of one of the radiating fins shown in Figs. 2 to 4 inclusive;

Fig. 7 is a section on line 7—7 of Fig. 6;

Figs. 8 and 9 are detail views of a modified form of the invention, Fig. 9 being a horizontal section on line 9—9 of Fig. 8;

Fig. 10 is a view illustrating a modification in which the heat radiating fins are secured to the pipe by means of a body of metal cast therearound.

Referring first to Fig. 1 of the drawings, numerals 10 designate as a whole radiator elements, each comprising a length of pipe 12 and a multiplicity of radiating fins 14. In the radiator illustrated in Fig. 1, three such radiator elements 10 are indicated, these being connected by unions 16 and 18 with inlet and outlet pipes 20 and 22, respectively, the inlet pipe being provided with suitable control valve 24.

The number of radiating elements 10 may of course be varied to suit the particular requirements depending upon the amount of radiation required for the particular room in which the radiator is installed. Each radiating element 10 is of identical construction hence a detailed description of one will suffice for all.

The heat radiating fins 14 are formed of sheet metal such as sheet iron and cold rolled steel. Or, if desired, in some cases the elements may be made of sheet copper or aluminum, both of which possess the desirable characteristic of rapidly conducting heat.

Each fin 14 in the construction of Figs. 2 to 7 inclusive is provided with a series of oppositely projecting ears or lugs 26—28 which are adapted to be seated flush against the substantially cylindrical surface of the pipe 12. The ears on adjacent fins are so arranged that they stagger so that the ear of a given fin lies about midway between two ears of an adjacent fin. This arrangement of the ears also provides for securing a good heat conducting joint between the fin and the pipe. In the production of the radiator unit of Figs. 1 to 7 inclusive, the several fins are positioned and held by any suitable temporary fastening means so that the ears seat against the outer surface of a pipe. The assemblage is then dipped into a hot galvanizing bath such as spelter or molten zinc. When the fins and pipe are made of ferrous metal such as iron or steel, this dipping operation serves the double purpose of coating the metal with a non-corrodible skin and also effectively bonds the heat radiating fins to the pipe so as to make a good heat conducting joint. After the assemblage has been held in the galvanizing bath for a short time, it is withdrawn. This operation will deposit a thin film or coat of zinc or the like over the entire surface of the fins and will also cover the exterior of the pipe. This galvanized

film of metal enveloping the fins and the pipe is indicated at 30 in Fig. 5.

Prior to dipping the pipe and the assembled fins in the galvanizing bath, the assemblage may be preheated and also dipped in a suitable flux such as sal ammoniac. Also after the galvanized assemblage has been removed from the bath, it may be subjected to a suitably controlled cooling or annealing treatment so as to improve the surface appearance or texture of the coating.

The fins or heat radiating members in Figs. 2 and 3 extend substantially radially in plan and extend longitudinally of the pipe. In some cases, the pipe may be bent from a round to a substantially elliptical shape in plan and some of the fins may be of greater length than others as shown in plan in Fig. 3 so that the outer ends of the fins lie within the outline of a fairly flat ellipse. This arrangement provides considerable radiating surface and yet the fins do not project an objectionable distance out into the room. The major axis of the ellipse will usually extend parallel with the wall adjacent to which the radiator is located.

In Figs. 8 and 9, I have illustrated a modification wherein the radiator element consists of a pipe 12^a which is surrounded by a plurality of ribbon-like helical fins 32. These fins, it will be understood are bonded to the pipe by means of a body or film of metal of substantially lower melting point than that of the pipe and fins.

Instead of securing the fins by dipping the assembled parts in a bath of galvanizing material or the like, I also contemplate securing them in place by a cast body of molten metal. For example, as shown in Fig. 10, I may assemble the fins 34 around the pipe 12^b and provide separable mold sections 36. I can then pour molten iron, lead or the like into the runner 38. This will feed through gates 40 and thus cast the body of metal 42 about the pipe 12^b and in contact with the several fins 34. Thus the fins and the pipe will be secured to one another with a good heat conducting joint.

Instead of securing fins to pipe by dipping the assemblage in a galvanizing bath or by casting a body of molten metal around the parts, I contemplate in some cases the use of a metal spray gun. By using such a gun, the fins will be assembled with the pipe and molten metal will be sprayed under pressure over the surface of the fins. Upon cooling of this metal, the parts will thus be effectively bonded to one another with a good heat conducting joint.

From the foregoing it will be apparent that my improved radiator can be expeditiously manufactured from stock pipe and sheet metal punchings at low cost with a minimum expenditure for labor in assembly. Practically all foundry work is avoided and this materially cuts down the cost of production.

While I have described quite specifically certain embodiments of the invention herein illustrated and I have indicated the preferred method of producing my improved radiator, it is not to be construed that I am limited thereto since various changes may be made by those skilled in the art without departing from the invention as defined in the appended claim.

What I claim is:—

A radiator comprising a pipe, a plurality of fins extending substantially longitudinally thereof, said fins having ears seated against and curved to fit the pipe and a thin film of metal bonding the ears to the pipe, the ears on said fins being bent outwardly from opposite surfaces thereof, the ears on a given fin being staggered with respect to those on an adjacent fin.

In witness whereof, I have hereunto signed my name.

SEVERN D. SPRONG.