No. 742,672. PATENTED OCT. 27, 1903.

W. R. KINNEAR.

SHEET METAL RADIATOR.

APPLICATION FILED MAR. 18, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

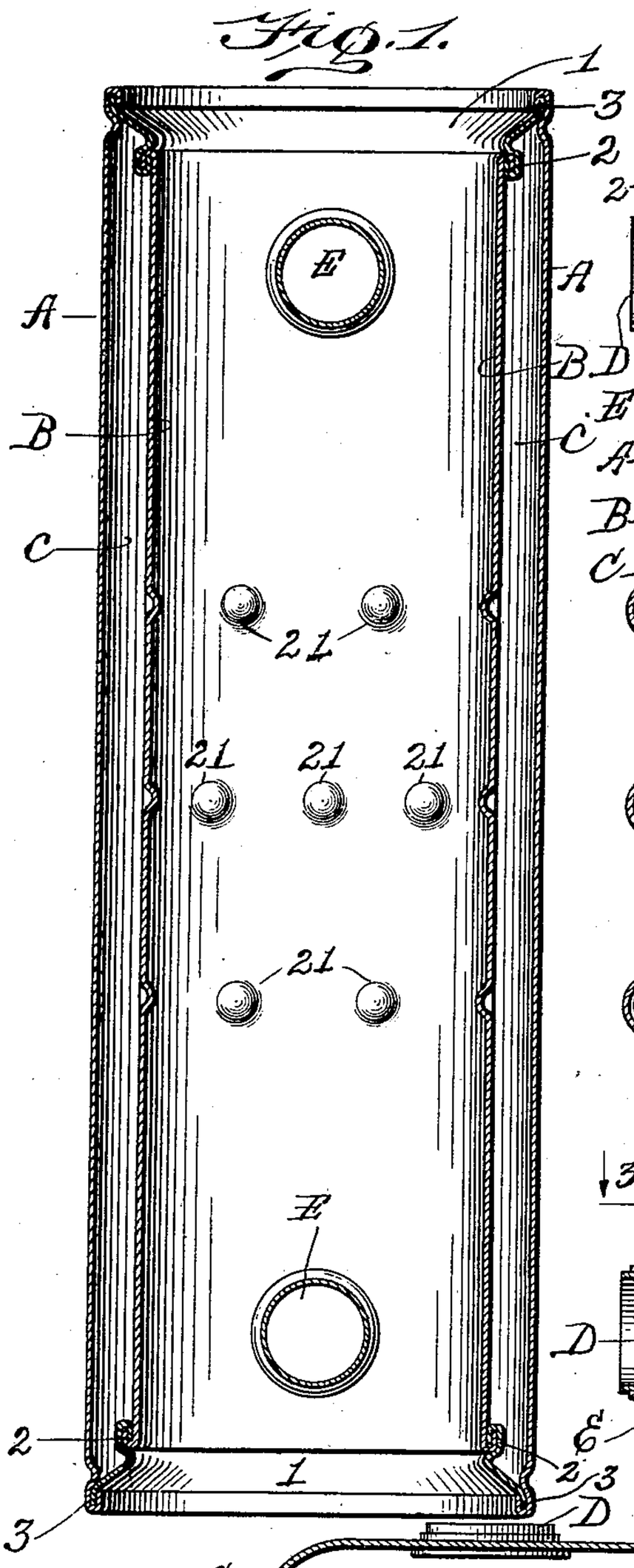


Fig. 2.

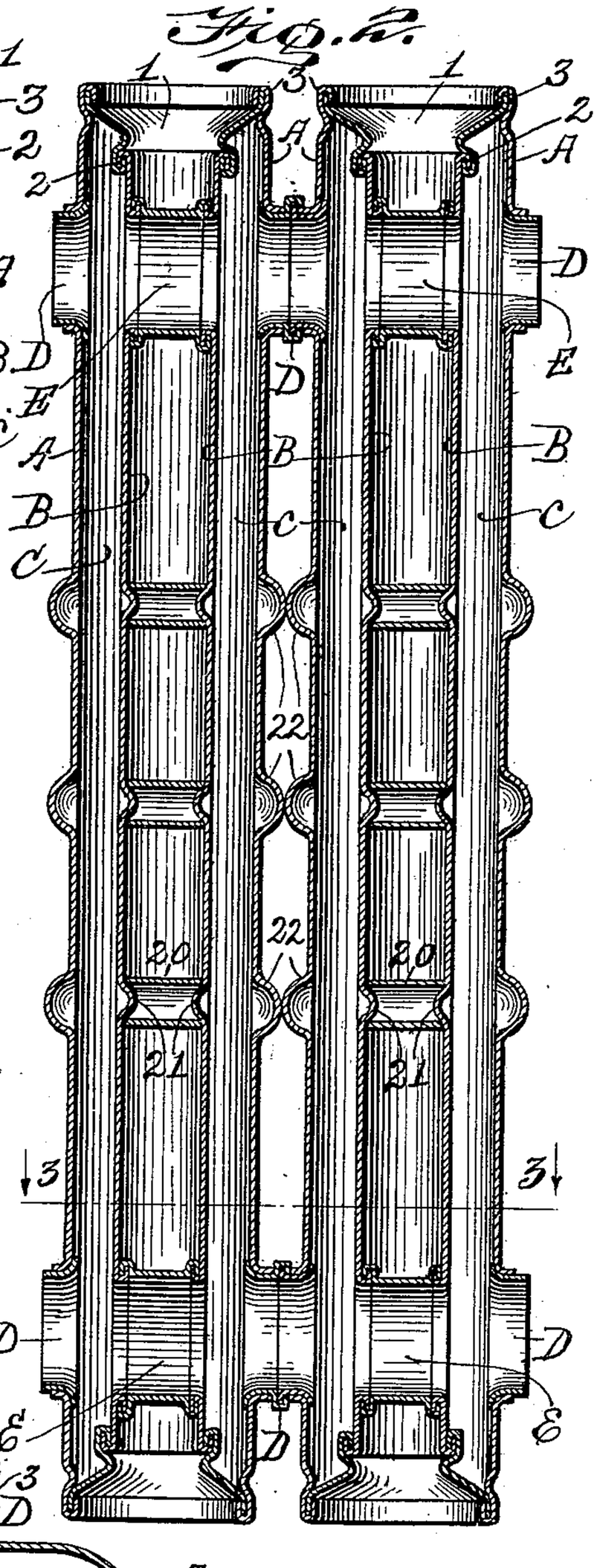
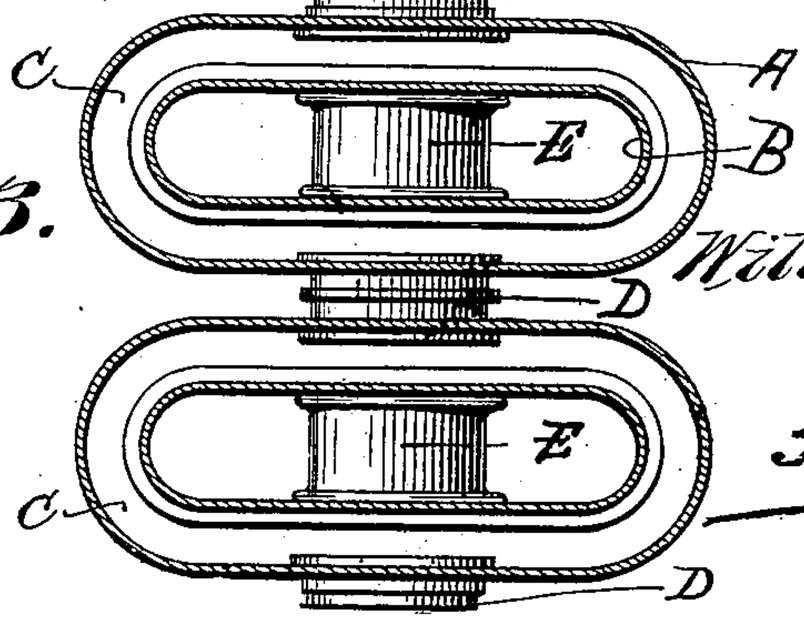


Fig. 3.



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SHEET METAL RADIATOR.

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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 4.

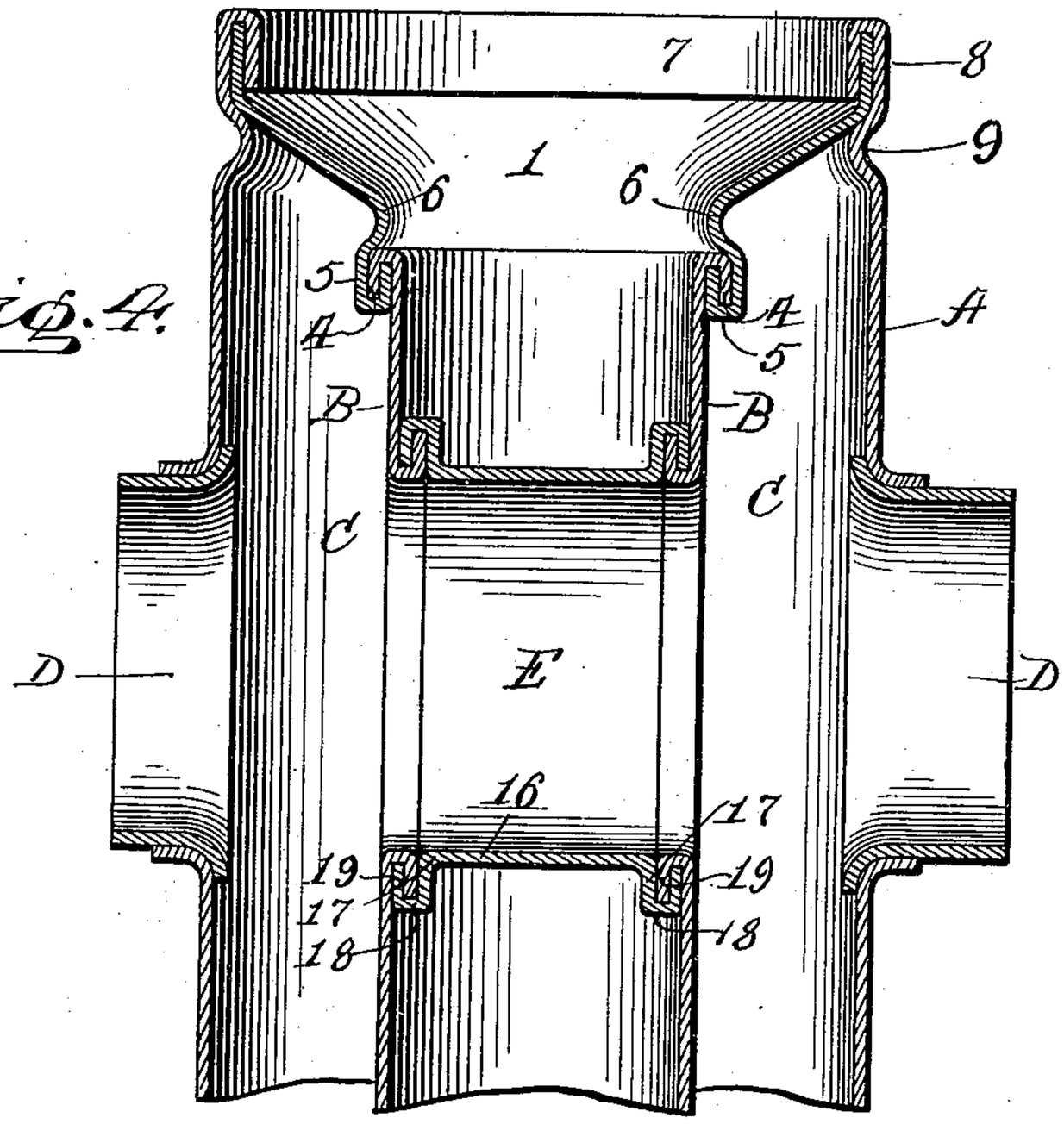


Fig. 5.

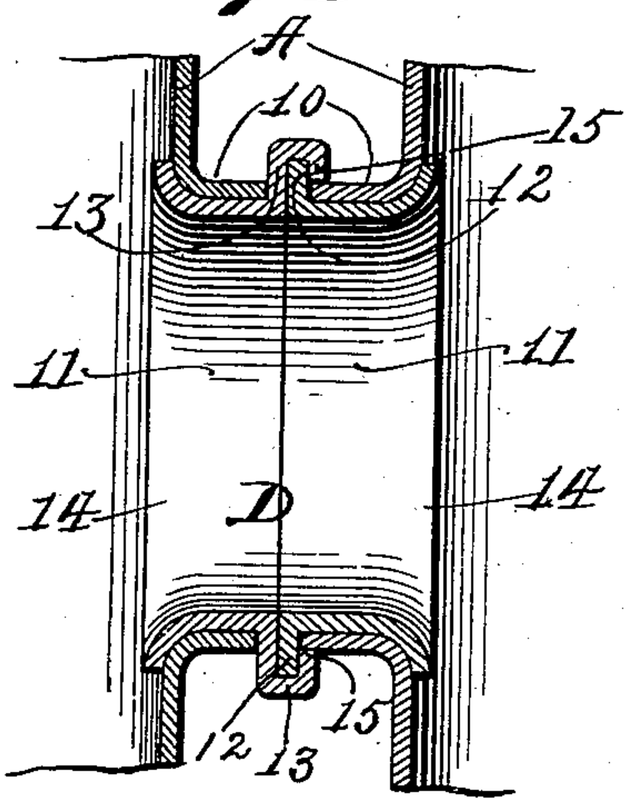
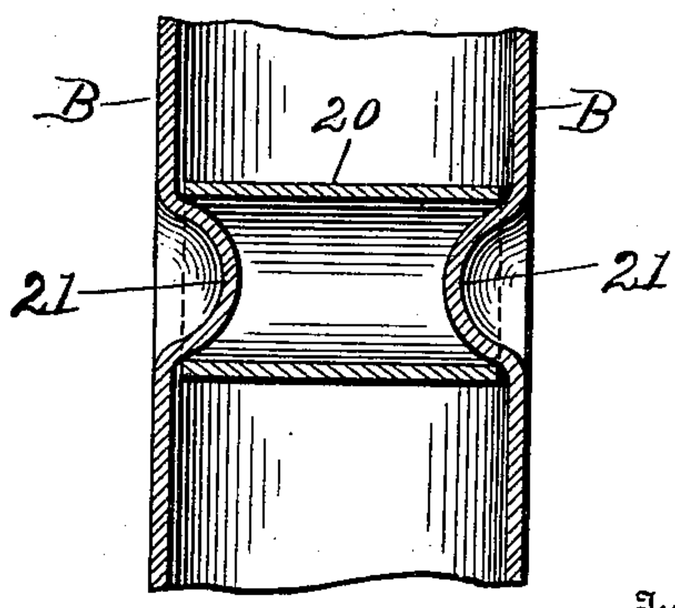


Fig. 6.



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No. 742,672. Patented October 27, 1903.

UNITED STATES PATENT OFFICE.

WILLIAM R. KINNEAR, OF COLUMBUS, OHIO.

SHEET-METAL RADIATOR.

SPECIFICATION forming part of Letters Patent No. 742,672, dated October 27, 1903.

Application filed March 18, 1903. Serial No. 148,396. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM R. KINNEAR, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Sheet-Metal Radiators, of which the following is a specification.

My invention relates to radiators constructed of sheet metal, and has for its object to provide certain novel features of construction whereby radiators may be constructed of sheet metal with greater facility and a more substantial structure will be obtained.

My invention will be fully understood upon reference to the accompanying drawings, in which—

Figure 1 is a vertical transverse section of a radiator unit constructed in accordance with my present invention and embodying some of the features thereof. Fig. 2 is a vertical section through two connected radiator units in which the several features of my present invention are embodied. Fig. 3 is a horizontal section on the line 3 3, Fig. 2. Fig. 4 is an enlarged sectional detail view of the upper end of a radiator unit. Fig. 5 is a sectional detail view of a connection between two units of a radiator, and Fig. 6 is a detail sectional view of the means for sustaining the opposed inner walls of a radiator unit against bulging under internal pressure.

My invention relates to that type of radiators in which the unit is constructed of inner and outer tubular members placed one within the other, suitably spaced apart so as to leave a chamber between them for the heating medium and having their upper and lower ends suitably connected so as to close said chamber.

A represents the outer member, and B the inner member, of a radiator of this type, while C is the chamber between said members which receives the heating medium. In closing the upper and lower ends of the chamber C, I have heretofore proposed to deflect the metal composing the walls, so that they may be brought together and united by suitable seam. Under some conditions it is not convenient to obtain the necessary flaring of the inner member to bring its edges against the edges of the outer member. One feature of my present invention therefore consists in introducing a connecting-piece 1, which is seamed at 2 to the inner member and at 3 to the outer member, the piece 1 being formed flaring, so as to maintain the distance between the inner and outer members, while connecting them together. This connection may be employed to advantage at both top and bottom, and the specific construction thereof is preferably that which is shown more clearly in Fig. 4—that is to say, the upper edge of the inner member is formed with a downturned lip 4, while the filling-piece 1 is provided with a groove 5 to receive said lip and with a shoulder 6, that projects over the end of the inner member sufficiently to prevent downward displacement of the filling-piece 1, the connection with the outer member A being effected through means of an inner downturned lip 7, which receives a vertical flange 8 on the filling-piece 1, and a crimp or annular shoulder 9 on the outer member extending beneath the flange 8 sufficiently to prevent displacement of the latter. The connection made as above described is dipped in a soldering, galvanizing, or other suitable bath, which hermetically closes the joints and cements the metal together.

In radiators as heretofore devised by me I have described connections D between the opposed faces of outer members A in adjacent units of a radiator, the connections between the members A, and the pipes for conveying the heating medium to and from the radiator. These connections have been constructed in various ways, which are quite effective for the purposes intended; but another feature of my present invention consists in a novel construction of these connections, which is illustrated more clearly in Fig. 5, wherein the outer members A are provided with horizontally-projecting flanges 10, while fitted within said flanges are thimbles 11, projecting beyond the flanges and formed, respectively, with a tongue 12 and groove 13, lying substantially in a vertical plane. The tongue-and-grooved extensions on the thimbles 11 are proportioned so that the tongue and groove abut against the edges of the flanges 10 and securely lock the thimbles in connection with their flared inner

ends 14. At the same time the outer side 15 of the groove 13 overlaps the outer end of one of the flanges 10 and gives additional tightness to the joint. The joint, constructed as described, is dipped in a suitable soldering, galvanizing, or other bath in order to permanently close the joints and connect the parts. This form of joint between units is particularly desirable, because it permits the use of heavy and higher grade or different quality of metal for forming the connection than would be possible if the connection is made with parts integral with the radiator units.

I have also described in previous applications filed by me a flue E, extending transversely across the central air-space of a double tubular radiator unit in order to connect opposite sides of the chamber in the line of the inlet and outlet openings of the radiator. I have heretofore described this flue as being formed by turning in metal from the walls of the inner member; but the width of the air-space extending vertically through the inner member is necessarily somewhat restricted if the circulating-flue is to be made entirely of metal taken from the walls of the inner member. Another feature of my present invention consists in forming this flue from an additional tube 16, bent at its respective ends to form shoulders 17 and locking-grooves 18, while the metal surrounding the openings formed in the inner member B is turned inward and then radial with respect to the axis of the flue, so as to form tongues 19, that fit the grooves 18. When the members are secured together, as shown in Fig. 4, one portion of each groove 18 abuts against the walls of the member B, while the other portion of said groove forms a shoulder on the opposite side of the tongue 19, and the whole structure, in addition to affording convenient and effective structure of the flue, securely ties the walls together and sustains them against buckling in either direction.

When sheet-metal radiators are used in steam heating systems, and particularly when constructed on double tubular plan, it is desirable to have some means for sustaining the opposite walls of the inner member against internal pressure of the heating medium, in order that said walls may not be forced together and restrict the vertical air-flue through the radiator unit. A further feature of my present invention consists in introducing compression members 20 of tubular form at suitable points and in suitable numbers between the opposed walls of the inner member B, these compression members being preferably of tubular form and being sustained in position by hemispherical or convex bosses 21, struck up and projecting inwardly from the walls of the member B. The bosses 21 are made to fit the tubes 20 and hold them rigidly in position, these parts being preferably still further secured together by the soldering or galvanizing bath to which the entire radiator is preferably subjected.

22 represents abutting bosses struck up and projecting outwardly from the outer members A in such position that they come together when the radiator units are united and add rigidity to the structure. These form no part of my present invention, as they are described and claimed in another application filed by me.

Having thus described the invention, the following is what I claim as new therein:

1. In a sheet-metal radiator, constructed of two tubular members placed one within the other with a chamber-space between them; means for connecting adjacent edges of the respective members, which consists in a filling-piece having a tongue-and-groove joint with the end of the inner member, formed with a shoulder projecting over said inner member to prevent disengagement with said joint, extended in an inclined direction outwardly from said shoulder, a distance corresponding to the space between the members, then extending parallel to the axis of the radiator to form a tongue, and connected with the outer member by an inturned overlapping lip forming a groove which receives said tongue, said outer member being constructed with an inwardly-extending peripheral groove forming a shoulder overlapping the tongue of the filling-piece, and having its outer wall extending parallel and in contact with the inclined portion of the filling-piece to prevent the disengagement of the parts.

2. In a sheet-metal radiator, means for connecting the opposed walls of adjacent units, consisting of the outwardly-projecting flanges formed on said walls, thimbles fitted within the openings, flared at their inner ends to engage in said openings, bent radially outward at their outer meeting ends at such points as to cause them to abut against the outer ends of the flanges on the walls, and formed with tongue-and-groove connection at their radially-extending ends.

3. In a sheet-metal radiator, means for connecting the opposed walls of adjacent units, consisting of the outwardly-projecting flanges formed on said walls, thimbles fitted within the openings, flared at their inner ends to engage in said openings, bent radially outward at their outer meeting ends at such points as to cause them to abut against the outer ends of the flanges on the walls, and formed with tongue-and-groove connection at their radially-extending ends, the outer wall of the groove being made to overlap the outer edge of one of the flanges on the wall of the member to be connected.

4. In combination with a sheet-metal radiator, consisting of two tubular members placed one within the other, with a chamber between them, to receive a heating medium under pressure, and providing a central air-

flue; a circulating-passage connecting opposite points in the wall of the inner member extending across air-heating flue, and sustaining the walls of the inner member against pressure of the heating medium; said circulating-passage being constructed of a tube formed with radially-extending but inwardly-opening grooves at its respective ends, connected to the walls of the inner member by radially-extending lips formed around openings in said inner member and fitting in the grooves of the tube, whereby the parts are made to abut and are locked together in both directions.

5. In a sheet-metal radiator constructed with an inner tubular member, the means for sustaining the walls of the inner member against internal pressure, which consists of a suitable compression member placed between said walls and convex or hemispherical bosses struck up from said walls and projecting into the ends of the tubular compression member.

The foregoing specification signed this 17th day of March, 1903.

WILLIAM R. KINNEAR.

In presence of—
J. GREEN,
HARRY E. KNIGHT.