(No Model.)

E. F. LANDIS.

STEAM RADIATOR.

No. 371,598. Patented Oct. 18, 1887.

Fig. 1.

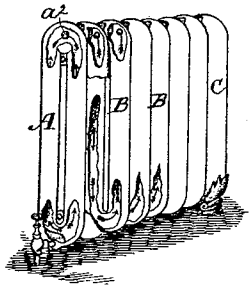


Fig. 2.

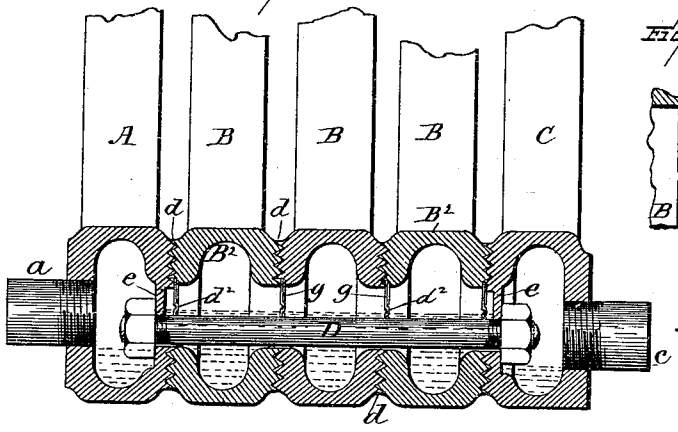


Fig. 11.

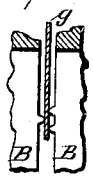


Fig. 3.

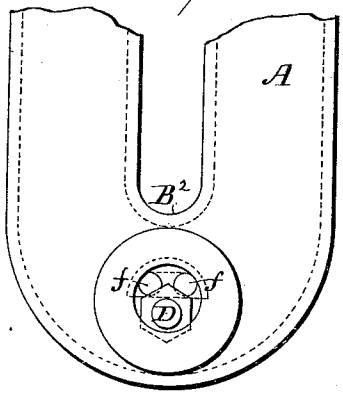


Fig. 4.

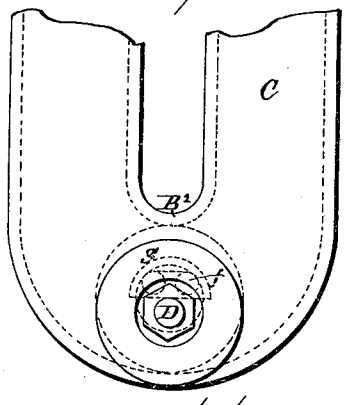


Fig. 5.

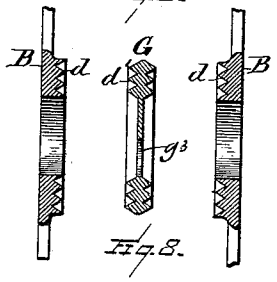


Fig. 8.

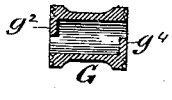


Fig. 10.



Fig. 6.

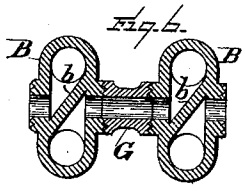


Fig. 9.

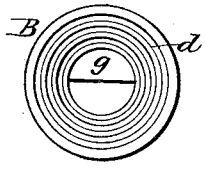
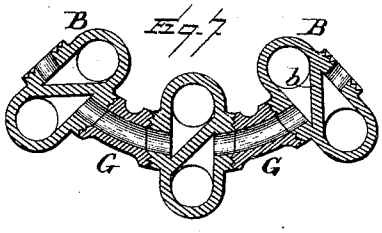


Fig. 7.



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atty.

N. PETERS. Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

EZRA F. LANDIS, OF LANCASTER, PENNSYLVANIA.

STEAM-RADIATOR.

SPECIFICATION forming part of Letters Patent No. 371,598, dated October 18, 1887.

Application filed February 8, 1887. Serial No. 226,932. (No model.)

To all whom it may concern:

Be it known that I, EZRA F. LANDIS, a citizen of the United States, residing at Lancaster, in the county of Lancaster, State of Pennsylvania, have invented certain new and useful Improvements in Steam-Radiators, of which the following is a specification, reference being had therein to the accompanying drawings.

The object of my invention is to produce a radiator in which the sections will be easily retained steam-tight whatever may be their relative arrangement, the invention relating mainly to the construction of the joints between said sections.

The invention will first be described in connection with the drawings, and then be pointed out in the claims.

In the drawings, Figure 1 is a perspective view of a radiator constructed in accordance with my invention. Fig. 2 is a longitudinal vertical section of the lower portion of the same. Fig. 3 is a front view of the lower portion of one of the end sections of the radiator. Fig. 4 is a similar view of the opposite end section. Fig. 5 represents in vertical section a portion of two radiator-sections with a washer used between them. Fig. 6 is a horizontal section of a longer washer to keep the radiator-sections farther apart. Fig. 7 is a horizontal section through three radiator-sections with washers forming a part of a circular radiator. Fig. 8 is a vertical section through one of the washers, showing a steam-trap at one end and a water-trap at the other. Fig. 9 is an end view of the lower portion of one of the sections, showing the steam-trap in position. Fig. 10 shows one of the removable steam-traps. Fig. 11 is a vertical section of one of the steam-traps retained between portions of two radiator-sections.

The steam is admitted, as usual, through the pipe *a* into the bottom of the end section A, and after ascending therein passes through the perforations a^2 into the top of one of the branches of the section B. The top of each section having a diagonal partition, *b*, as shown in Figs. 6 and 7, the steam descends in one of the branches of said sections B, passes under its bend B^2, and ascends into the second branch thereof to its top opening, through which it passes to enter another section, and the operation is repeated until it reaches the bottom of the end section C, from which it passes, with the water of condensation, into the discharge or return pipe *c*.

To produce a steam-tight joint presenting a large surface for the paint, cement, or substance between the faces of the sections at the point of junction, these faces are provided with a series of concentric grooves, *d*, substantially U or V shaped in cross-section and arranged so as to become interlocked when two radiator-sections are brought together in position to be united. These sections may be united together by bolts passing, as usual, above their bends B^2; but I prefer to locate the binding-bolt uniting the lower end of the sections as near the center of the bearing-surface as possible, and to conceal said bolt, dispense with packing under its head and nut, and prevent water or steam from leaking out of the radiator at these points, it is placed entirely within the sections, as shown at D.

To form a rest for the head or nut upon said bolt, the opening in the lower end of the end sections, A and C, has a partition, *e*, formed, preferably, integral with said sections; but to permit the water of condensation to escape, said partitions have openings *f* above the level of the bolt D, as shown in Fig. 3; but to prevent, also, the steam from passing through the openings *f* from the bottom of the section A to the section B, and in fact between each section, there is placed a pendent gate or steam seal, *g*, made of thin sheet metal, that is retained between the inner edges of the grooved surfaces *d*; and to further insure the proper retention of the sheet-metal gates the inner circular rib upon the joint is provided with a few small pointed projections or staggered teats, d^2, to indent said gates. When there is no objection to having the radiator-sections slightly farther apart, a washer, G, as shown in Fig. 5, is placed between the sections, and said washer has a pendent partition, g^2, that extends halfway from the top to form a steam-seal; or it may extend the whole way across and have only a perforation, g^3, near the bottom, sufficiently large for the passage of the bolt D and the water of condensation around it. The washer G has concentric grooves *d'* on both sides of its face to become interlocked with the grooves *d* upon the joints of the radiator-sections.

The washers G may be of any suitable

length, as shown in Figs. 6 and 8, and they may have their faces converging, as shown in Fig. 7, so that the same sections may be used to produce either a rectangular radiator or a circular radiator of any diameter desired.

When the washers G are of sufficient length, they may have, as shown in Fig. 8, a steam seal, g^2, at one end, and a water seal partition, g^4, at the other end, to connect the end sections to the middle sections.

Having now fully described my invention, I claim—

1. In a steam-radiator, the combination of sections having their joint-faces provided with V-shaped grooves arranged concentrically and adapted to become interlocked, with a bolt uniting said sections and wholly inclosed therein, substantially as and for the purpose described.

2. In a steam-radiator, the combination of sections having their joint-faces provided with concentric grooves, a steam-sealing plate between said faces, and a bolt uniting said sections and wholly inclosed therein, whereby leakage, if any, is retained within the radiator, substantially as and for the purpose described.

3. In a steam-radiator, the combination of sections having their joint-faces provided with concentric grooves, and between said faces washers provided with steam-sealing and water-sealing plates, and a bolt, substantially as and for the purpose described.

4. In a steam-radiator, the combination of sections having their joint-faces, with central openings in said faces and a bolt passing through said openings and wholly inclosed within said sections, whereby leakage, if any, is retained within the radiator, substantially as and for the purpose described.

In testimony whereof I affix my signature in presence of two witnesses.

EZRA F. LANDIS.

Witnesses:
T. B. HOLAHAN,
E. K. MARTIN.