

No. 645,611.

Patented Mar. 20, 1900.

O. E. WAIT.  
RADIATOR.

(Application filed Feb. 25, 1899.)

(No Model.)

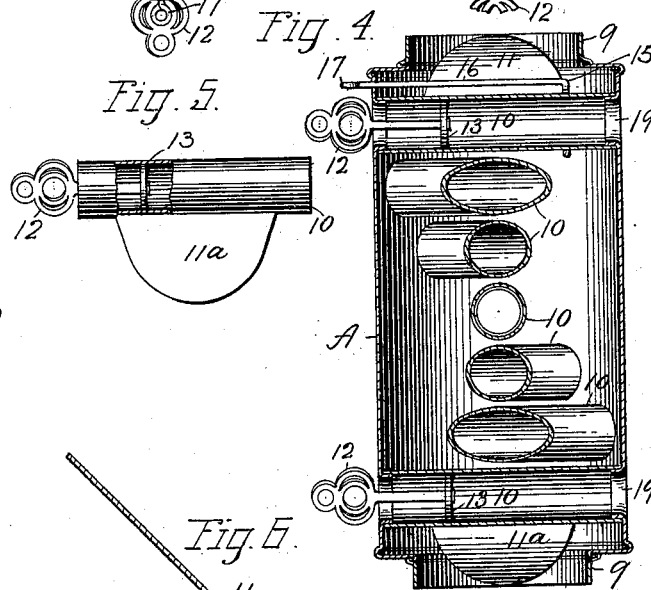
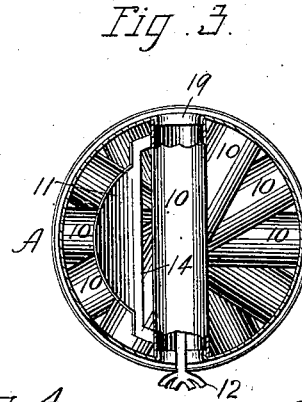
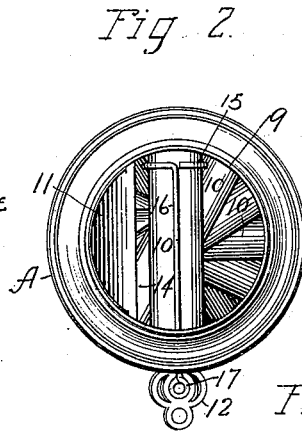
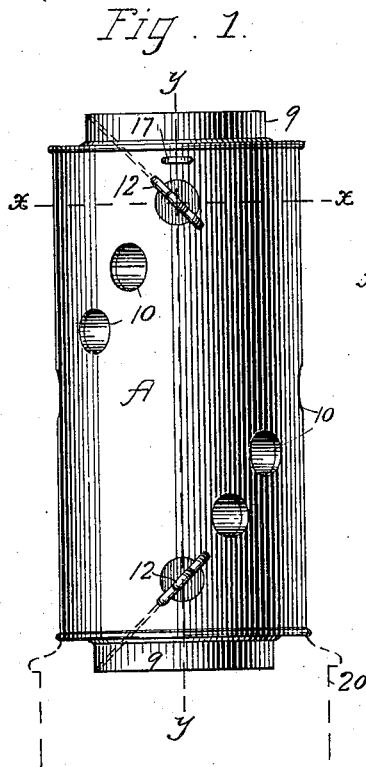


Fig. 5.

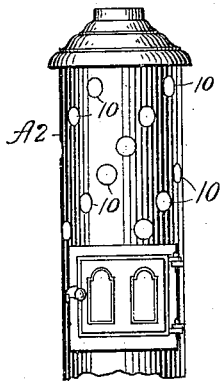
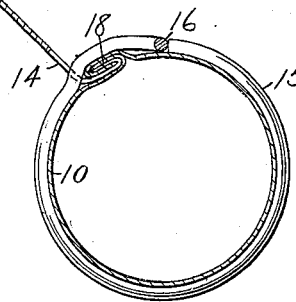


Fig. 6.

Fig. 7.



WITNESSES

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OSCAR E. WAIT, OF SPRINGFIELD, VERMONT, ASSIGNOR OF ONE-HALF TO  
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## RADIATOR.

SPECIFICATION forming part of Letters Patent No. 645,611, dated March 20, 1900.

Application filed February 25, 1899. Serial No. 706,814. (No model.)

*To all whom it may concern:*

Be it known that I, OSCAR E. WAIT, a citizen of the United States, residing in Springfield, in the county of Windsor and State of Vermont, have invented certain new and useful Improvements in Radiators, of which the following is a specification.

My invention relates to improvements in radiators of the class known as "heating-drums;" and the objects of my improvement are simplicity and economy in construction and efficiency and convenience in use.

In the accompanying drawings, Figure 1 is a side elevation of my radiator. Fig. 2 is a plan view of the same. Fig. 3 is a horizontal section of the case and end portions of the upper cross-tube on the line *xx* of Fig. 1, the middle portion of the said cross-tube, together with the damper-handle and wing, being shown in plan view. Fig. 4 is a vertical section on the line *yy* of Fig. 1 looking toward the left, the damper-handles being shown in side elevation. Fig. 5 is a detached side elevation, partly in section, of the lower cross-tube and damper. Fig. 6 is an enlarged transverse section of the upper cross-tube, damper, and cleaner. Fig. 7 is a transverse section through the middle of a cross-tube similar to those shown in the preceding figures, but with its middle portion somewhat flattened. Fig. 8 is a side elevation of my radiator as made integral with the body of a cylindrical stove and with an additional series of cross-tubes.

A designates a cylinder or casing having flanges or collars 9 at each end for convenience of connecting said ends with pipes or a stove and pipe or otherwise connecting said casing with any conductor of heated air or the heat and smoke that pass from a fire-box to the chimney. As shown, the lower end is the influent end and the upper the effluent end. While for convenience of manufacture I employ a cylinder, the casing may be of other forms—as, for example, octagonal—without changing the other features of my invention.

Within the casing I arrange cross-tubes 10, which are open at their outer ends and extend through from side to side of the casing. I prefer to arrange said cross-tubes in one or more spiral series. The drawings in Figs. 1,

2, and 3 show one series of spirally-arranged cross-tubes, which extend half-way around the casing and divide the said casing mainly into two spiral passages extending from end to end. The cross-tubes extending wholly through the casing from side to side and crossing each other form what may be called a "longitudinal" core that will force the smoke, gases, heated air, or other fluid toward the sides of the casing and prevent the same from passing through the casing in the form of a central column. The upper cross-tube, with reference to the position shown, is provided with a wing or damper 11, that will substantially close either one of the spiral passages of the casing, the said cross-tube being hung in its bearings so as to partially rotate and provided with any suitable means to turn it—as, for example, the handle 12, the shank of which is secured to a disk 13, that is fixed within the said cross-tube. The damper for the upper cross-tube is connected thereto at the ends only, so as to leave a narrow unobstructed slot or opening 14, Figs. 2 and 3, by the side of said cross-tube, whereby a cleaner 15 may be used in connection with said tube. The cleaner 15 is in the form of a ring or wire scraper, closely fitted to and surrounding said cross-tube, and is provided with a shank 16 and handle 17, the shank extending through a hole in the case, with the handle on the outside, as shown. The shank may be long enough to permit the cleaner to be moved longitudinally over substantially the length of the cross-tube by pulling or pushing on the handle for the purpose of removing soot or other accumulation on the said tubes after use. I have shown only one such cleaner; but like or similar cleaners may be applied to as many of the tubes as may be desired. The lower cross-tube is provided with a similar damper 11<sup>a</sup>; but unlike the damper 11 it has no slot, as it is not designed for use with a cleaner. Both dampers may be secured to the tubes when the tubes are formed with locked edges, as shown in Fig. 6, by means of a folded edge 18, locked into the longitudinal seam of the cross-tubes, the said seam being an ordinary form of lock for uniting the edges of sheet metal, as in stovepipes and other articles.

I secure the cross-tubes within the casing by means of turned-in flanges or hollow bosses 19 on the casing, that extend into the ends of the cross-tubes, as shown in Figs. 3 and 4. In order to do so, the holes are first punched in the casing somewhat smaller than in their completed form. The cross-tubes are forced into place with their ends in front of two opposite holes. The bur on the inside, as usually formed by the punch that makes said holes, will assist in holding the said cross-tube temporarily in place. A properly-formed punch or spinning-tool is then forced into the holes to turn the flanges 19 into the ends of the tubes, as shown, when they are securely fastened in place. It may also be noted that by having the ends of the cross-tubes abut against the inner face of the casing said tubes can never be loosened by longitudinal expansion.

In Fig. 1 I have indicated the position of the dampers by broken lines and also by the damper-handles, in which positions the lower damper closes the lower end of one of the spiral passages, while the upper damper closes the upper end of the other spiral passage, or, in other words, the passage that is open at the bottom is closed at the top and the passage that is closed at the bottom is open at the top, thereby compelling the heating fluid that enters the open end of one spiral passage to mainly pass between the cross-tubes into the other passage in order to find an exit.

While I prefer to place dampers on the two end cross-tubes, as described, all dampers may be dispensed with, if desired, or some or all of the cross-tubes may be flattened, as shown in Fig. 7, and provided with means to partially rotate them, so that they may in a degree serve as dampers.

The position of the casing may be varied according to circumstances, and it may be used in all the various ways of other radiators of its class. It may be placed on the top of a cylinder or other stove, as indicated by the stove-top 20 in broken lines, Fig. 1, or it may have its casing A<sup>2</sup> made integral with the upper part of a cylinder-stove, as shown in Fig. 8. In this figure I have illustrated an additional series of cross-tubes, both series having

a tube each in the same horizontal plane. While the spiral arrangement of the cross-tubes is preferred, the advantages of the series of cross-tubes dividing the casing into two passages with dampers at the influent and effluent ends would be substantially the same if the cross-tubes were not arranged spirally. I prefer that the cross-tubes shall be straight; but this is not essential, provided the opposite ends of the tubes lead to the exterior of the casing for conducting the heat from the center to the outside of the casing.

It is apparent that some changes from the specific construction herein disclosed may be made, and therefore I do not wish to be understood as limiting myself to the precise form of construction shown and described, but desire the liberty to make such changes in working my invention as may fairly come within the spirit and scope of the same.

I am aware that a radiator or heating-drum consisting of an outer cylinder, a smaller inner cylinder closed at both ends, and short radial tubes crossing the annular space between said cylinders is old, and I hereby disclaim the same.

I claim as my invention—

1. A radiator consisting of a casing having influent and effluent openings, a series of closely-arranged cross-tubes within said casing dividing the passage therethrough into two longitudinal passages and dampers at the effluent and influent ends adapted to close the passage on either side of said series of cross-tubes, substantially as described.

2. In a radiator, a cross-tube having a locked longitudinal seam, and a damper having a folded edge 18 locked within the said longitudinal seam, substantially as described.

3. The combination of a radiator-casing having two longitudinal passages therethrough, with a damper centrally arranged at one end thereof and adapted to open one of said passages and close the other, and vice versa, substantially as described.

OSCAR E. WAIT.

Witnesses:

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