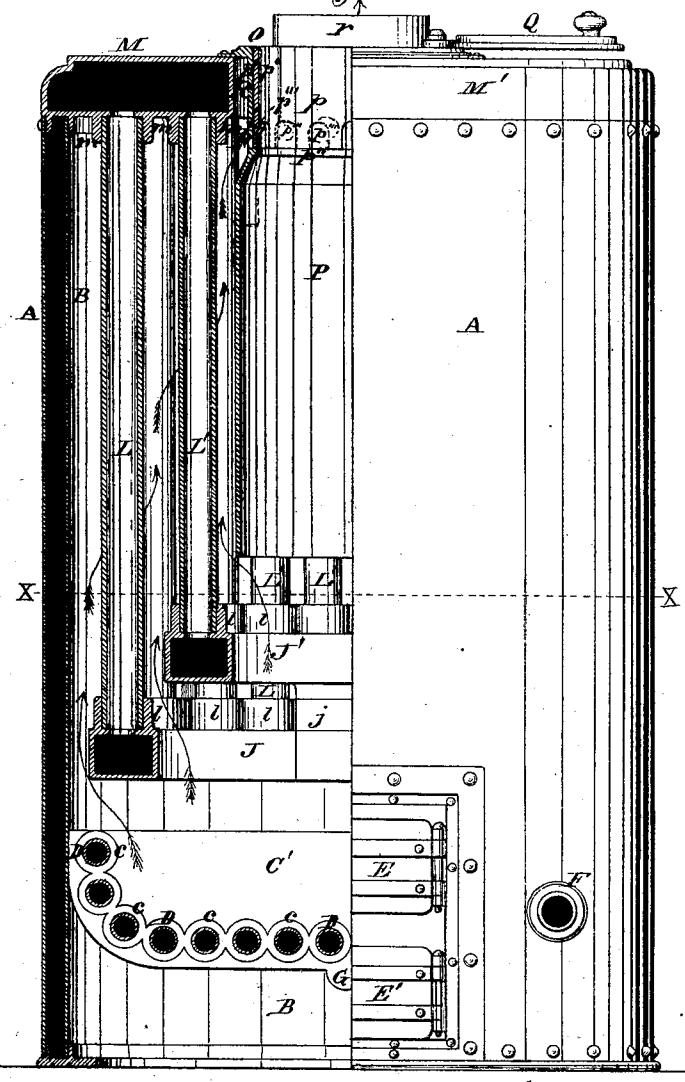
2 Sheets--Sheet 1.

# A. MARRIOTT.

## Water-Heater for Heating Buildings.

No. 135,135. Patented Jan. 21, 1873.

*Fig. 1.*




**WITNESSES:**

Jas. L. Ewin

Walter Allen

**INVENTOR:**

Ambrose Marriott

By Knight Bros. Attys.

2 Sheets--Sheet 2.

# A. MARRIOTT.

## Water-Heater for Heating Buildings.

No. 135,135. Patented Jan. 21, 1873.

*Fig. 2.*

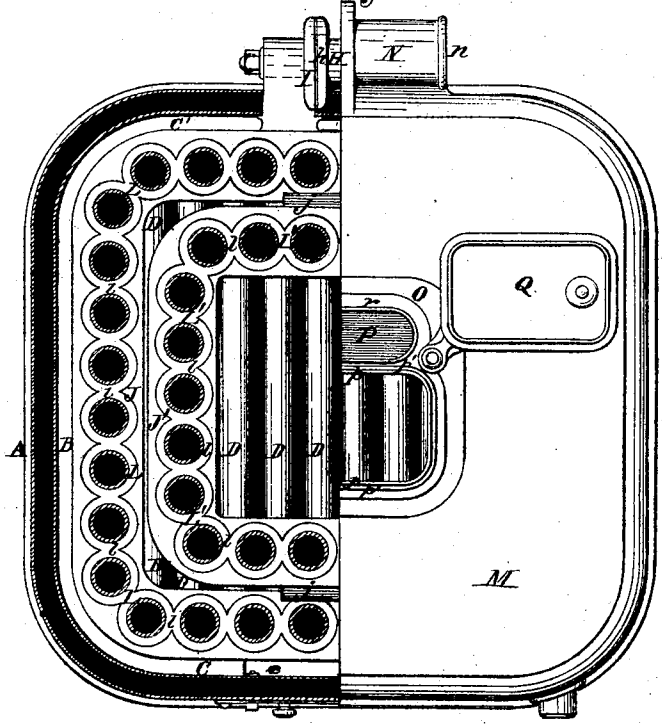
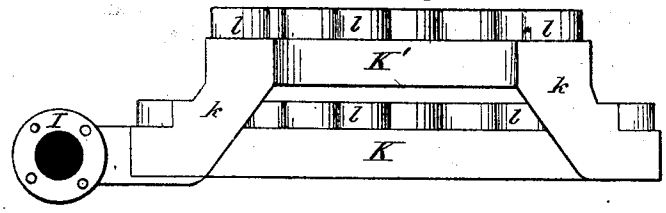



*Fig. 3.*




**WITNESSES:**

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**INVENTOR:**

Ambrose Marriott

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# UNITED STATES PATENT OFFICE.

AMBROSE MARRIOTT, OF ST. LOUIS, MISSOURI.

## IMPROVEMENT IN WATER-HEATERS FOR HEATING BUILDINGS.

Specification forming part of Letters Patent No. **135,135**, dated January 21, 1873.

*To all whom it may concern:*

Be it known that I, AMBROSE MARRIOTT, of the city and county of St. Louis and State of Missouri, have invented a certain Water-Heating Apparatus for Heating Buildings, of which the following is a specification:

The first part of my invention relates to the arrangement of the water pipes and chambers surrounding the fire and fuel chambers. The grate consists of two hollow castings, situated at the front and rear, connected and communicating together through a number of horizontal water-pipes. The chamber within one of these castings communicates with the return water-pipe, and the chamber in the other casting communicates through an ascending pipe with annular water-chambers communicating by circular series of vertical pipes, surrounding the fuel-chamber with an upper annular water-chamber communicating with the outflow water-pipe. The second part of my invention consists in the manner of constructing the castings containing the annular water-chambers, each of said castings being made in two semi-annular sections, the chambers communicating with each other at only one side by a flange-joint outside the general perimeter of the castings, so as to require no tight joint except at such place.

In the drawing, Figure 1 is one-half in front elevation and one-half in vertical axial section, with a view of the parts beyond the section plane. Fig. 2 is one-half a top view of the apparatus, the other half being shown in horizontal section at the line X X, Fig. 1, with a top view of the parts beneath. Fig. 3 is an inside elevation of one of the sectional castings.

A is the outer and B the inner cylindrical shell concentric with A. The annular space between these shells is, preferably, filled with some refractory material that will check the escape of heat, such as fire-clay, plaster of Paris, &c. Near the bottom of the case is a grate, consisting of two hollow castings, C and C′, connected by tubular grate bars or pipes D. The outer sides of the castings C C′ are made to conform to the shape of the case B, and upon their inner sides is cast a number of sockets, *c*, to receive the ends of the tubular grate-bars D, through which the water-spaces in the castings C C′ communicate together. The pipes D are, preferably, secured in the sockets *c* with iron cement, the sockets being made of size sufficient to allow the introduction of the cement outside the end of the pipe. The front casting C has an aperture, *e*, in its upper part opposite the fire-door E to permit access to the fire and grate. E′ is the ash-pit door. F is a pipe extending from the water-chamber in the casting C through the shell A B, and in communication with the return water-pipe, through which the water returns from the heaters in the building. From the casting C′ extends a pipe, G, which passes through the case A B, and then ascends and ends in a T-pipe, H, having at each end a flange, one of which is shown at *h* in Fig. 2. These flanges are jointed to flanges I in the castings J J′, K K′, which castings are similar to each other, except that they are made right and left to occupy opposite sides of the apparatus. These castings are constructed with communications *j* between the parts J J′, and similar communications *k* between the parts K K′, the castings each consisting of two semi-annular portions, J J′ and K K′, and having tube-sockets *l* cast upon their upper sides to receive the lower ends of the tubes or pipes L L′, which may be secured in the sockets with iron cement. These tubes or pipes form the connection between the lower annular water-chambers in the castings J J′, K K′, and the chamber in the upper annular casting M M′, which latter is also made in two semi-annular sections communicating together at N, where *n* is a socket to receive the end of the pipe carrying the heated water to the heaters in the building. *m* are sockets receiving the upper ends of the pipes L L′. The top of the apparatus, consisting of the castings M M′, has a central aperture, in which is a collar, O, from which depends the cylinder P, open at bottom and containing the reserve fuel, (the fuel being consumed only at the base.) Q is the cover of the cylinder P. Around the neck (or reduced part) of the cylinder P is an annular flue, R, for the escape of smoke, said flue forming the communication between the space around the pipes L L′ and the chimney *r*. The neck of the cylinder P consists of an imperforate cylinder, *p*, which is made to slide out upward from the portion *p′*. The latter is cast in one piece with the

main part of the cylinder P and the supporting-collar O. $p''$ is a flange supporting the cylinder $p$. $p'''$ are apertures in the part $p'$ to admit (when the cylinder $p$ is raised) of the introduction of an instrument to clean the soot from the outside of the pipes L L'. The position of these apertures is shown by dotted lines in Fig. 1. They are closed by the cylinder $p$, except when the pipes L L' are being cleaned.

The operation of the apparatus is as follows: After filling the water-space with water the fire is kindled at the base (that is in proximity to the grate) and the products of combustion pass around all sides of the castings J J' and K K' and the pipes L L', heating the water and causing it to flow upward from the water-grate, through the pipe G H and through J J', $j$, $k$, K K', and the pipes L L', to the water-chambers in the crown-castings M M' and outlet-passage N to the heaters in the building, from which it returns and enters the water-grate through the pipe F. The products of combustion do not pass through the fuel-cylinder P, but pass all around the same and find vent through the flue and chimney R $r$, as before stated. As the fuel is consumed it is supplied from the cylinder P in the manner common to "base-burning" stoves.

In place of the casing A B the apparatus may be inclosed in fire-brick, the casing, as described, being a non-essential part of my improvement.

Two important advantages follow the making my annular castings J J', K K', and M M' in semi-annular sections, as described, instead of making each of one whole annular casting: First, the unequal expansion and contraction of the inside and outside causes no fracture in the metal, (which the annular casting when made whole is subject to.) Second, each upper portion or section of the apparatus—consisting of castings J J' and M and pipes L L' for the one side, or of castings K K' and M' and pipes L L' for the other side—may be put together in the shop and taken into the building subsequently. This cannot be done in most cases when the whole is in one piece, as it is then, besides being of unmanageable weight, too bulky to be passed through ordinary doors, and consequently the separate parts have to be secured together in the building, where the labor is done at a disadvantage.

I claim as my invention—

1. The provisions, in a water-heating apparatus, of the tubular fire-grate C C', D, pipe H, and annular castings J J', $j$, K K', $k$, and M M', whether made in sections, as described, or otherwise, and tubes L L', all arranged substantially as set forth.

2. The combination of the annular castings J J', K K', and M M' with tubes L L', when said castings are made in semi-annular sections, substantially as and for the purposes set forth.

3. The perforated neck $p'$ and imperforate cylinder $p$, substantially as and for the purpose set forth.

AMBROSE MARRIOTT.

Witnesses:
SAML. KNIGHT,
ROBERT BURNS.