

B. T. BABBITT.  
Furnace Grate.

No. 91,999.

Patented June 29, 1869.

Fig. 1.

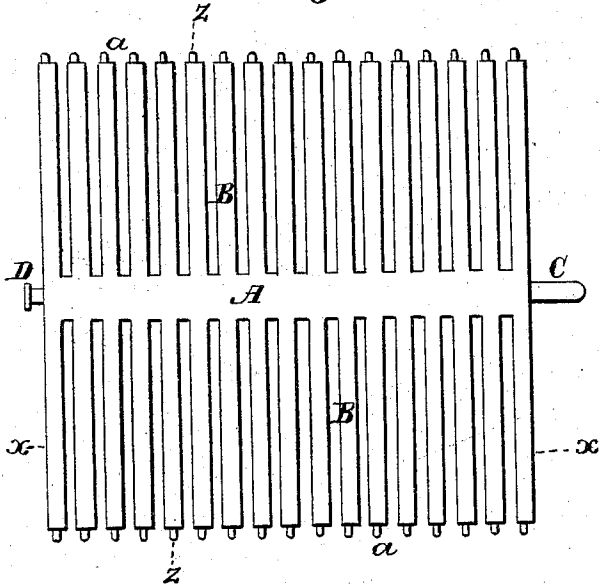


Fig. 4.

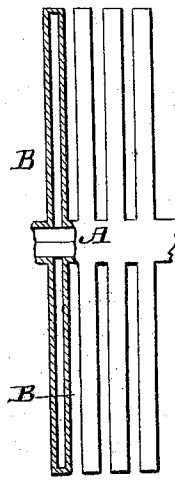


Fig. 2.

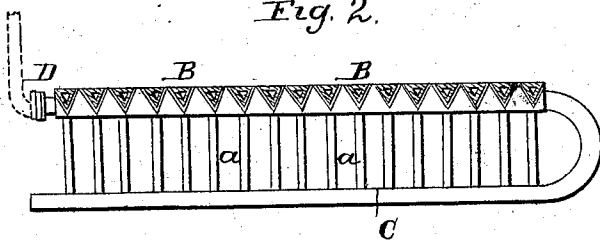
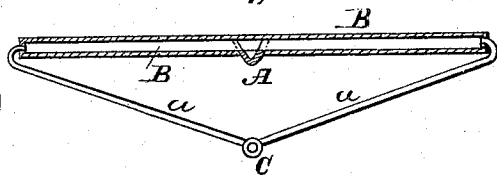


Fig. 3.



Witnesses:

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# United States Patent Office.

BENJAMIN T. BABBITT, OF NEW YORK, N. Y.

Letters Patent No. 91,999, dated June 29, 1869.

## IMPROVEMENT IN GRATES FOR STEAM-GENERATOR AND OTHER FURNACES.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, BENJAMIN T. BABBITT, of the city, county, and State of New York, have invented a new and useful Improvement in "Fire-Grates," and that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, forming part of this specification, in which—

Figure 1 represents a plan of a fire-grate, constructed in accordance with my improvement.

Figure 2, a section of the same, through the line  $z z$  in fig. 1, and

Figure 3 a section through the line  $z z$ .

Figure 4 is a plan of a grate, in part, constructed in accordance with the invention, with the circulating pipes shown in previous figures omitted.

Similar letters of reference indicate corresponding parts.

My invention consists in a novel construction of tubular grate, for the circulation or passage of water through it, whereby not only is a large water-heating surface secured, and the grate, by being kept cool, restrained from burning out, but its durability enhanced against injury or breakage by expansion and contraction of its parts, and the structure, to secure these advantages, may be got up cheap.

Said grate is more particularly designed for use in steam-boiler furnaces, but is applicable to other fire-places, and more especially wherever a supply of heated water is required. It will suffice here, however, to describe the invention as a water-grate for steam-boiler furnaces.

Referring to the accompanying drawing, the grate proper, as made up of an intermediate or central hollow bar, A, and hollow branch bars, B, is or may be made of a single casting.

The branch-bars B are arranged to project at right angles from the central bar, on either side of it, and disposed to lie parallel to each other, at suitable distances apart, said branch-bars being in open communication at their inner ends with the main bar, but closed at their outer ends, as shown in fig. 4, excepting where circulating-pipes are used in addition, as will be hereinafter explained.

The passage or circulation of water through the grate is established by introducing it under pressure, as for instance, by the action of a pump, into the one end of the main bar A, as by a pipe, C, arranged below the

grate, and after circulating through the branch-bars B, allowing it to escape, as by an outlet, D, and connecting-pipe, from the opposite end of the main bar into the boiler or other place of discharge.

A grate thus constructed may be got up cheap, and presents an extensive water-heating surface, which not only is productive of economy as regards feed of previously-heated water to the boiler, but also as regards the durability of the grate by the cooling provision which is made throughout the whole body of the structure.

But an important characteristic of this grate is the freedom for independent expansion and contraction, in direction of their length, of the several bars of which the grate is composed, by reason of said bars being left free or disconnected from each other at their outer ends, whereby all tendency to injury or breakage, from irregularity of expansion and contraction, is avoided.

To enlarge or promote the free circulation of water through the grate without injuriously or seriously affecting this characteristic of its construction I connect any or all of the branch-bars, B, at their outer ends, with the supply-pipe C, by bent wrought-iron, copper, or other suitable and comparatively flexible tubes,  $a$ , which, while serving to produce circulation, do not impede, to any practical extent, the independent expansion and contraction of the several bars that are still disconnected from each other at their outer ends.

What is here claimed, and desired to be secured by Letters Patent, is—

1. The construction of the grate, consisting of the hollow main bar A, provided with suitable inlet and outlet-passages for establishing flow of water through the grate and hollow side or branch-bars, B, left free or disconnected from each other at their outer ends, and in communication with the main bar at their inner ones, substantially as specified.

2. The combination, with the hollow main and branch-bars A and B, constructed and arranged substantially as specified, of the bent tubes  $a$ , made of more flexible metal than the bars, substantially as specified.

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Witness:  
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