

C. E. HOLT.  
Grates.

No. 156,637.

Patented Nov. 10, 1874.

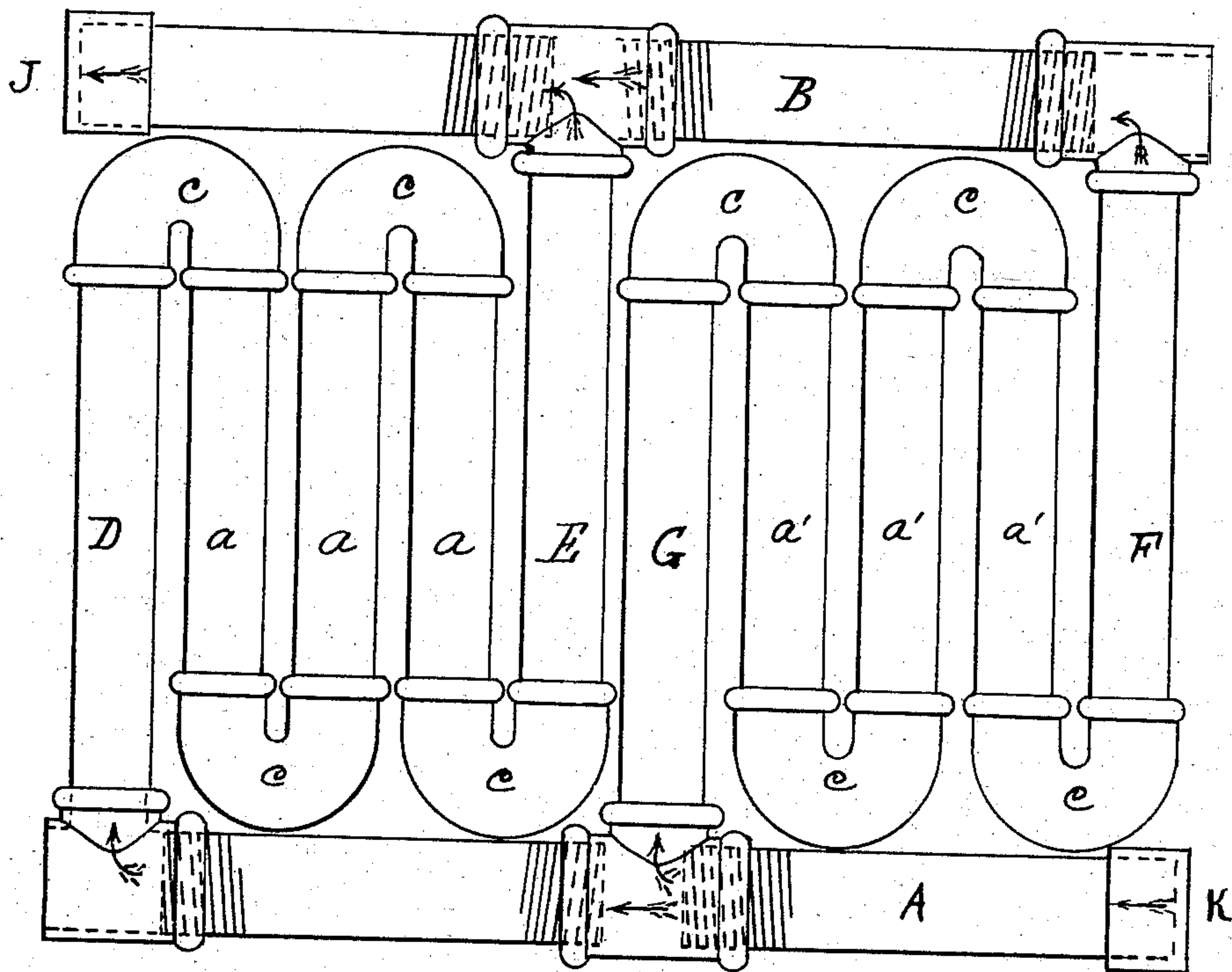


FIG. 1

WITNESSES

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## IMPROVEMENT IN GRATES.

Specification forming part of Letters Patent No. **156,637**, dated November 10, 1874; application filed April 9, 1874.

*To all whom it may concern:*

Be it known that I, CHARLES E. HOLT, of Boston, in the county of Suffolk, State of Massachusetts, have invented a certain new and useful Improvement in Water-Heating Grates, of which the following is a description sufficiently full, clear, and exact to enable any person skilled in the art or science to which my invention appertains to make and use the same, reference being had to the accompanying drawing forming a part of this specification, in which—

Figure 1 is a plan, showing my improvement.

My invention relates to that class of furnace-grates in which the bars are tubular; and consists in a novel construction and arrangement of the parts, as hereinafter more fully set forth and claimed, by which the grate is not only protected from the destructive action of the fire, but is rendered an efficient water-heater.

In the drawing, A and B are long pipes, arranged to form the sides of the grate. Between these pipes there is a series of short pipes, *a a*, coupled together and to the longer pipes D E F G by the connections *c c*, as shown, the pipes D G being also connected with the pipe A, and the pipes E F with the pipe B.

From the foregoing the nature and operation of my invention will be readily obvious to all conversant with such matters.

It is well known that the bars of ordinary furnace-grates are rapidly burnt out and destroyed; also, that the "water-backs," or devices for heating water, as ordinarily arranged, in connection with furnaces, ranges, &c., are complicated and liable to derangement, and frequently occupy space required for the fuel and other purposes. The design of my invention is to obviate these difficulties, and to this end I construct the bars of my improved grate of steam-pipe, arranged in a novel manner, and force the water to be heated through the same, passing it into the grate through the

pipe A, and out through the pipe B, as shown by the arrows. On entering the grate by the pipe A a part of the water passes through the pipe G, and is returned through the series of pipes *a' a' a'* into the pipe F, whence it passes into the pipe B. Another portion of the water passes through the pipe D, and is returned through the pipes *a a a*, and thence through the pipe E into the pipe B, by which it becomes thoroughly heated.

It will be seen that the pipes G, *a' a' a'*, and F form one section of the grate, and the pipes D *a a a* E another section, a grate of any size being produced by adding the requisite number of sections to form the same, the inlet being at K, and the outlet at J.

By causing water to flow through the grate in the manner described, the bars are prevented from burning out, and the water is much more effectively heated than it would be if passed directly through straight pipes, while, by constructing the grate in sections, arranged as shown, the ill effects of contraction and expansion are largely obviated.

I am aware that it is not new to heat water by passing it through the bars of a furnace-grate, and therefore do not claim the same, broadly, the distinguishing feature of my invention consisting in the peculiar manner of constructing and arranging the bars of the grate.

Having thus described my invention, what I claim is—

The water-heating grate described, consisting of the section G *a' a' a'* F, and section D *a a a* E, the pipes D G being connected with the inlet-pipe A, and the pipes E F with the outlet-pipe B, the whole being combined and arranged to operate substantially as and for the purpose set forth.

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Witnesses:

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HELEN E. METCALF.