

W. B. MACK.  
BOILER.

Patented July 31, 1888.



INVENTOR:  
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# UNITED STATES PATENT OFFICE.

WILLIAM B. MACK, OF BOSTON, MASSACHUSETTS.

## BOILER.

SPECIFICATION forming part of Letters Patent No. 386,998, dated July 31, 1888.

Application filed August 20, 1887. Serial No. 247,423. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM B. MACK, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Boilers for Heating and Steam-Generating Apparatus, of which the following is a specification.

My invention relates to boilers or contrivances for heating water for the purpose of heating or warming apartments of buildings, &c.

My invention will first be fully described, and then pointed out with particularity in the claim.

Reference is to be had to the accompanying drawings, and to the letters of reference marked thereon, forming a part of this specification, the same letters designating the same parts wherever they occur.

Of the drawings, Figure 1 represents a front view of my improved boiler and a portion of its appurtenances. Fig. 2 represents an end or side view of the same. Fig. 3 represents a vertical sectional view of a portion of Fig. 1, parts being shown as broken out. Figs. 4 and 5 represent vertical sectional views similar to Fig. 3, showing modified constructions of the invention.

In carrying out my invention I construct the return-tubes *a a* of wrought-iron, preferably bending the same at the return-point *b*, and flaring or flanging their connecting ends, as at *c c*.

*d* designates the main or connecting tubes, adapted to be built into the brick-work or wall of the furnace, and constructed in sections, as most clearly shown in Figs. 3, 4, and 5, each section being provided with a partition, *e*, which cuts off direct communication between the connecting ends of the return-tubes, so as to make certain of the circulation of the water in the boiler through the return-tubes and connections or mains.

The return-tubes are first constructed and their flaring or flanged ends *c* placed in proper position in the molds for the main or connecting sections *d*, and the latter cast thereon. In this way an absolutely water and steam tight joint is secured between said sections and return-tubes. It is preferred to tin the ends of the tubes before they are put into the

molds. Each section *d*, excepting the lower section, is cast with a flange, *f*, on each end, one of which flanges has a wedge-shaped rib, *g*, formed thereon, which rib is adapted to enter a groove or depressed seat, *h*, of approximately the same shape as said rib, formed in the adjacent flange of the next section, so that when the two sections are bolted together through the flanges *f* the rib *g* will be drawn and wedged into the groove *h*, so as to form a perfectly water-tight joint at this point. The lower end, *i*, of the lower section is closed, as shown in Fig. 3, and is provided with an inlet-port, *j*, as shown, for the admission of water. This inlet-port communicates with a supply-pipe, *k*, which is common to the several tiers of return-tubes, constructed as has been described, and the several connecting-mains *d* communicate with a common receiving-reservoir, *l*, whence the heated water rises through the discharge-pipe *m* to the registers or the like, to be returned again to the supply-pipe *k* to be reheated.

When the apparatus is employed for generating steam, a return-pipe, *z*, will be connected with the reservoir and supply-pipe *k*, as indicated in dotted lines in Fig. 2.

Instead of bending the return-tubes, as at the point *b*, said tubes may be made as separate parts and the several pairs connected by means of a separately-formed "crook" or "bow" connection or coupling, *n*, as shown in Fig. 4; or separate connecting-sections *o*, similar to the sections comprising the connecting-sections *d*, may be cast on the ends of the return-tubes *b*, as shown in Fig. 5. In this case each section *o* will have one end *p* closed, which closed and projecting end may be so formed as to be closely seated in a depression, *q*, formed in the adjacent end of the next section. In this way the tiers of return-tubes may readily be built to any desired height, and any desired number of tiers may in like manner be attached to the supply-main *k*, through the tubes of all of which tiers the water will circulate constantly while there is heat in the furnace.

It is obvious that changes may be made in the form and arrangement of parts constituting my invention without departing from the nature or spirit thereof.

I claim—

The combination, with a pair of return-tubes,  
of a connecting-section, *d*, to which said tubes  
are attached, said connecting-section being  
5 provided with a partition, *e*, at a central point,  
and on one end with a rib, *g*, and on the other  
end with a groove or depressed seat, *h*, as set  
forth.

In testimony whereof I have signed my name  
to this specification, in the presence of two  
subscribing witnesses, this 9th day of August,  
A. D. 1887.

WILLIAM B. MACK.

Witnesses:

ARTHUR W. CROSSLEY,  
C. F. BROWN.