

(No Model.)

B. B. LAMPREY & A. C. BUGBEE.  
FURNACE MOUTH LINING.

No. 421,588.

Patented Feb. 18, 1890.

FIG. 2.

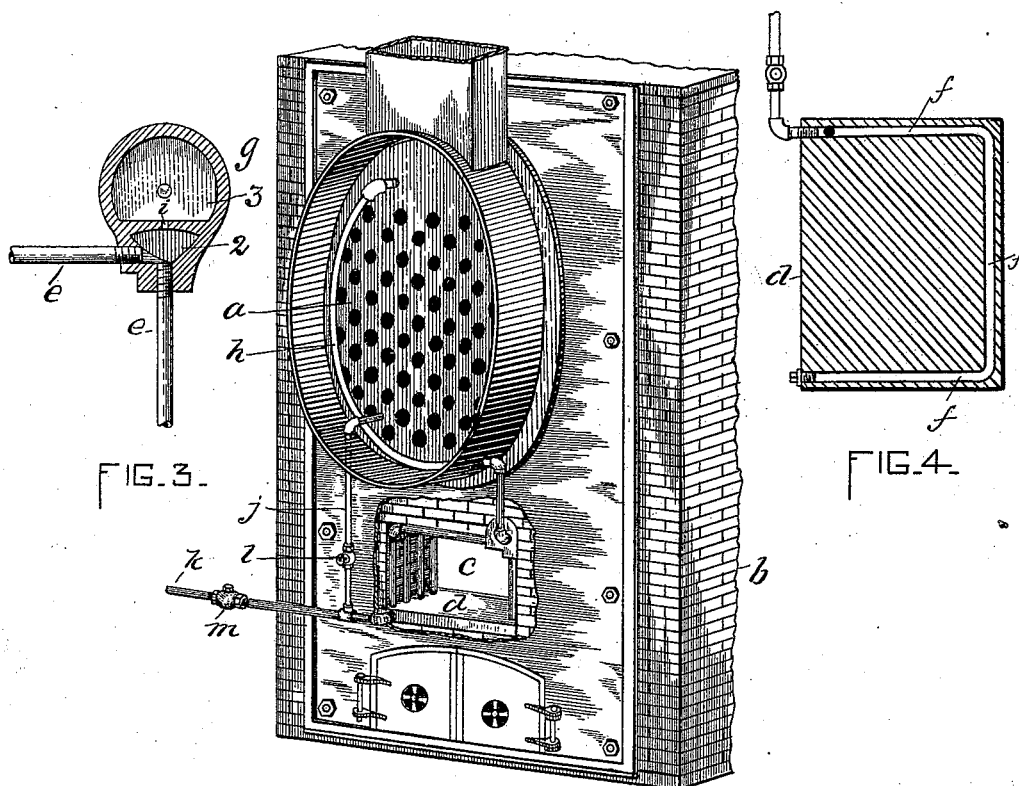


FIG. 3.

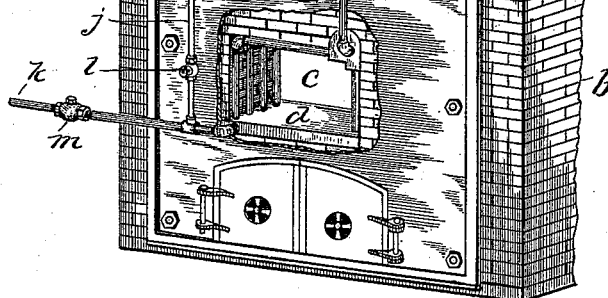


FIG. 4.

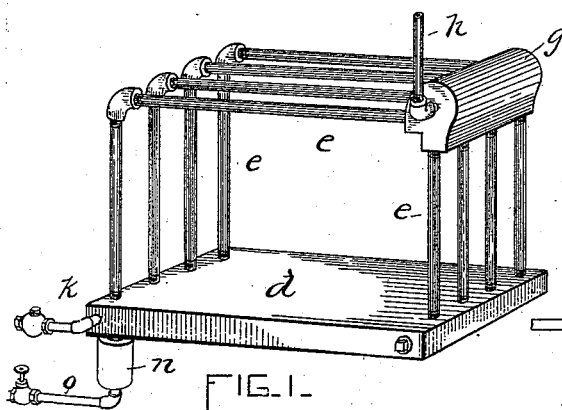
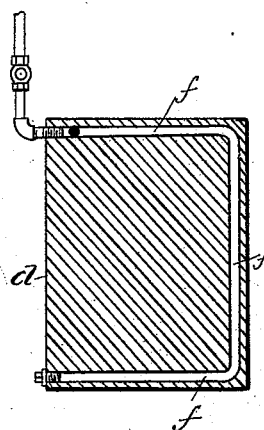


FIG. 1.

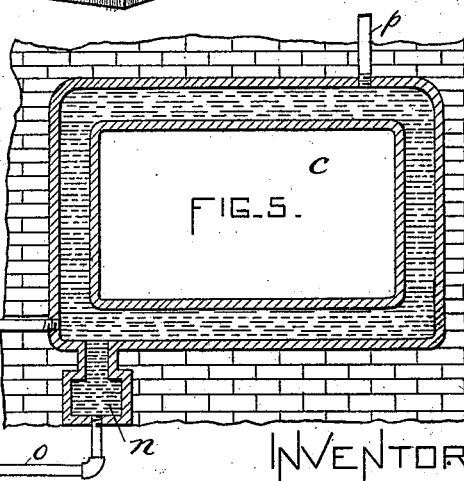


FIG. 5.

WITNESSES.

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# UNITED STATES PATENT OFFICE.

BEN B. LAMPREY AND ALMON C. BUGBEE, OF LAKE VILLAGE, NEW HAMPSHIRE, ASSIGNORS TO THE LAMPREY MANUFACTURING COMPANY, OF SAME PLACE.

## FURNACE-MOUTH LINING.

SPECIFICATION forming part of Letters Patent No. 421,588, dated February 18, 1890.

Application filed June 10, 1889. Serial No. 313,699. (No model.)

*To all whom it may concern:*

Be it known that we, BEN B. LAMPREY and ALMON C. BUGBEE, of Lake Village, in the county of Belknap and State of New Hampshire, have invented certain new and useful Improvements in Furnace-Mouth Linings, of which the following is a specification.

Our invention relating to the mouths of furnaces embraces improvements upon the contrivance shown and described in United States Letters Patent No. 388,367, granted to us August 22, 1888.

The invention in said Letters Patent consists of a series of connected pipes extending up the sides and along the top of the furnace-mouth, which series of pipes are so connected with the injector and boiler as that when water is pumped into the latter it will circulate through the pipes and become heated or partially heated before it enters the boiler and at the same time prevent the burning out of the furnace-mouth.

Experience has demonstrated that so far as heating the feed-water is concerned, as also preventing the burning out of the furnace-mouth while the pump is "on," this contrivance works very well in the accomplishment of its object; but soon after the pump is turned "off" the water in the pipes, particularly along the top of the furnace-mouth, is converted into superheated steam, stopping the circulation of water through the pipes, failing not only to prevent the burning out of the furnace-mouth, but resulting eventually in the burning out of the pipes themselves. We have found that the difficulties recited are entirely overcome by providing the pipes (or it may be a hollow shell or other contrivance) forming a lining to the furnace-mouth with a dome, into which the steam generated in the pipes may collect and from which it may escape into the boiler, providing at the same time for admission to the pipes of water from the boiler when the pump is not on, so that at all times a constant circulation of water is kept up in the lining to the furnace-mouth, preventing the burning out of the latter, heating the feed-water when the pump is on, and materially assisting in

the generation of steam when the pump is turned off.

Our invention consists of means having characteristics and capabilities which overcome the difficulties and reach the desired ends mentioned, all as hereinafter more fully described and subsequently claimed.

Reference is to be had to the annexed drawings and letters and figures of reference marked thereon, which form a part of this specification, the same letters and figures designating the same parts or features, as the case may be, wherever they occur.

Of the drawings, Figure 1 is a perspective view of one form of furnace-mouth lining embodying our improvements. Fig. 2 is a like view of the same, showing it applied to the furnace and boiler. Fig. 3 is a sectional detail, showing the construction of the steam-dome and the relationship of the pipes thereto. Fig. 4 is a horizontal sectional view through the base-plate, showing a way of connecting the pipes therewith. Fig. 5 is a sectional view of a modified form of furnace-mouth lining to which our improvements may as well be applied.

In the drawings, *a* designates the boiler; *b*, the furnace, and *c* the furnace-mouth; the latter being provided with a lining consisting of a base-plate *d* and a series of pipes *e*, extending up the sides and along the top of the mouth *c*, and connecting at their lower ends in any suitable way or by any suitable means, that here shown being a hollow *f*, formed in the base-plate *d* and extending along the sides and rear thereof, as shown in Fig. 4.

*g* is a steam-dome connected with the series of pipes, preferably at the highest or one of the highest points thereof, which steam-dome may be constructed in various ways, that here shown consisting of two compartments 2 3, the former constituting a means of communication between the pipes at the point of their connection with the dome, and the latter comprising the steam-dome proper, in which the steam generated in the pipes *e* may collect and from which it may escape through the pipe *h* into the boiler at a high

point, or through which chambers and pipe water may be forced into the boiler, the communication between the chambers 2 3 being by means of ports or holes *i* therebetween.

5 *j* is a pipe, forming a means of communication between a lower point in the boiler and the inlet-pipe *k*, said pipe *j* being provided with a globe valve *l*, so that communication therethrough may be cut off when desired.

10 It will be understood that the pump or ejector (not shown) is connected with the inlet-pipe *k*, which latter device may be provided with a check-valve, as at *m*.

*n* is a mud-drum, the sediment settling into which may be blown off through the pipe *o*.

15 When it is desired to feed or eject water into the boiler, valve *l* will be closed and the pump turned on, when the water will be forced through the pipes *k e*, steam-dome *g*, and pipe *h* into the boiler, being heated *in transitu* in the series of pipes *e* or other structure forming a lining to the furnace-mouth. When the pump is shut off, globe-valve *l* will be opened, so that as fast as steam is generated in the pipes it may collect in the steam-dome *g* and escape into the boiler, water being supplied to the lining-pipes again through the pipe *j*, thus keeping up a constant circulation in said pipes and preventing the same and the furnace-mouth from burning out, and at the same time materially assisting in the generation of steam.

25 Where a hollow casing is used as a lining for the furnace-mouth, as is shown in Fig. 5, the steam-dome may be connected with the pipe *p*, and the pipe *k* may be made to afford a means of communication between the boiler and inlet-pipe *o* with the same results as before described with respect to the pipes *e*.

40 It is obvious that changes may be made in the form and arrangement of parts of our im-

provements without departing from the nature or spirit thereof.

Having now described the nature of our improvements and a way of constructing and 45 manner of using the same, we declare that what we claim is—

1. A furnace-mouth lining constructed and arranged for the circulation of water and steam therein, combined with a steam-dome 50 connecting with the lining, a pipe affording means of communication between the steam-dome and boiler, and another pipe affording means of communication between the boiler and said lining, substantially as set forth. 55

2. A furnace-mouth lining constructed and arranged for the circulation of water and steam therein, combined with a steam-dome connecting with the lining, a pipe affording means of communication between the steam- 60 dome and boiler, a pipe affording means of communication between the boiler and said lining, and an inlet-pipe communicating with said lining, substantially as set forth.

3. A furnace-mouth lining constructed and 65 arranged for the circulation of water and steam therein, combined with an inlet, a pipe affording means of communication between said lining and a high point in the boiler, and another pipe affording means of communica- 70 tion between said pipe and a lower point in the boiler, substantially as set forth.

In testimony whereof we have signed our names to this specification, in the presence of two subscribing witnesses, this 28th day of 75 May, 1889.

BEN B. LAMPREY.  
ALMON C. BUGBEE.

Witnesses:

A. C. MOORE,  
E. C. COVELL.