2 Sheets—Sheet 1.

K. M. JARVIS.

BOILER SETTING.

No. 189,862. Patented April 24, 1877.

Fig. 1.

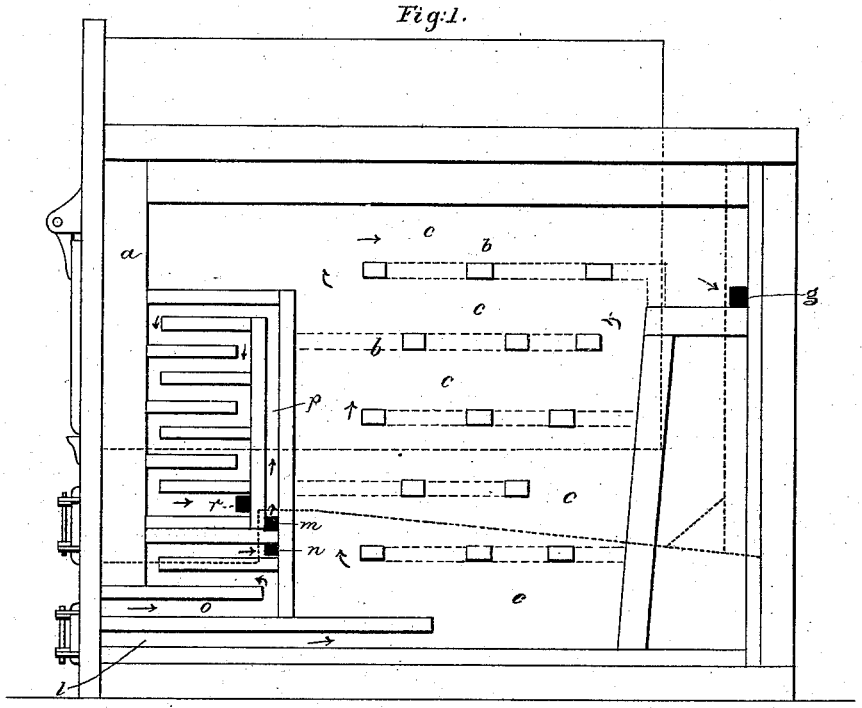
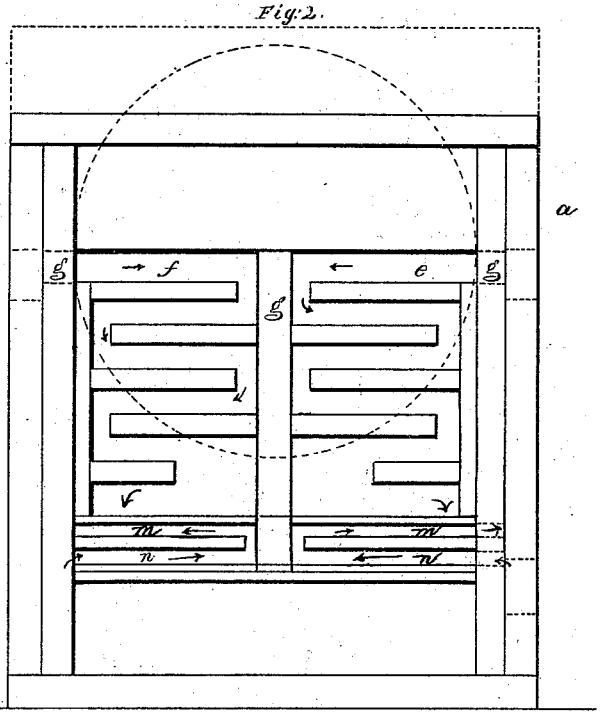


Fig. 2.



Witnesses.
L. H. Latimer.
W. J. Pratt.

Inventor
Kingsbury M. Jarvis
per Crosby & Gregory Att'ys.

2 Sheets—Sheet 2.

K. M. JARVIS.

BOILER SETTING.

No. 189,862. Patented April 24, 1877.

Fig. 4.

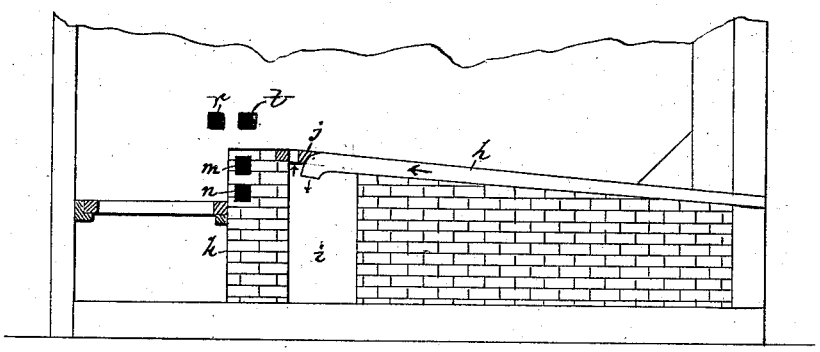
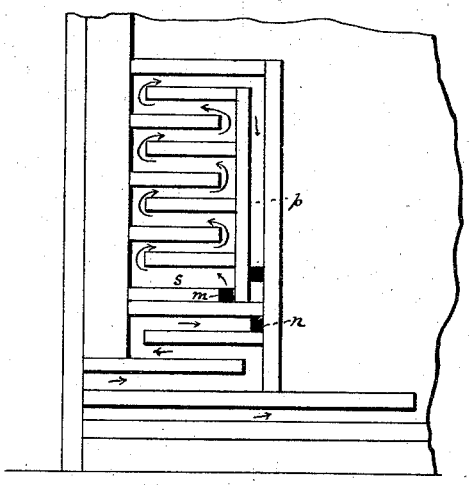


Fig. 3.



Witnesses.

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Inventor.

Kingsbury M. Jarvis

per Cowsby & Gregory

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UNITED STATES PATENT OFFICE.

KINGSBURY M. JARVIS, OF PEABODY, MASSACHUSETTS.

IMPROVEMENT IN BOILER-SETTINGS.

Specification forming part of Letters Patent No. **189,862**, dated April 24, 1877; application filed March 7, 1877.

To all whom it may concern:

Be it known that I, KINGSBURY M. JARVIS, of Peabody, in the county of Essex and State of Massachusetts, have invented Improvements in Boiler-Setting, of which the following is a specification:

This invention relates to gas-consuming furnaces for steam-boilers; and is an improvement on United States Letters Patent No. 176,639 and No. 186,734, heretofore granted to me, and to which reference may be had.

The object of this present invention is to improve the furnaces described and represented in such former patents, so as in a greater degree to heat the air introduced to complete the combustion of the fuel and gases evolved during the process of combustion.

In this invention I utilize the bridge-wall and the back of the furnace, as well as the side walls, for the heating of the air to be discharged into the combustion-chamber.

Figure 1 represents, in sectional elevation, the side wall of a boiler-setting or furnace; Fig. 2, a view, looking from the front of the furnace, showing the air-passages in the back wall and bridge-wall; Fig. 3, a modification, and Fig. 4 a section, of bridge-wall and bottom of combustion-chamber.

The greater portion of the side walls are made double, and, as shown in Fig. 1, are connected together back of the bridge-wall by means of ties *b*, preferably bricks, leaving a large space, *c*.

These ties may be of any desired number.

Instead of these ties I may use horizontal flues or passages, they, in such case, running horizontally, as denoted in dotted lines *d*, connecting the ties, or the flues may run in other well-known directions therein. The back wall has formed therein ducts *e f*, each communicating with the air-space in the side wall next to it by a passage, *g*. The ducts *e f* communicate, at bottom, with the tapering tubes *h*, common to my Patent No. 186,734, such tubes opening into the chamber *i*, under the perforated plate *j*, back of the bridge-wall *k*. Air entering the flue *l*, communicating with the atmosphere, (shown at the front, but it may be at the back part of the setting or wall,) flows through the chamber *c* or flues in the side wall, thence into the passage *g*, through ducts *e*, as denoted by arrows, thence into the tapering pipes. The air, as it is heated, being allowed to expand, and delivered into the chamber *i*, it rises through the perforated plate and into the gases passing over it.

The bridge-wall is provided with bridge-wall ducts *m n*. Air entering the ducts *o* will pass into ducts *n* back along the duct *m*, and thence along the duct *p* leading in a tortuous direction to the opening *r*, from which it is discharged, in a highly-heated state, into the combustion-chamber near the bridge-wall. Instead of the duct *m* leading into the vertical part of the duct *p*, as in Fig. 1, it may lead into the part *s*, as in Fig. 3, and thence ultimately down the passage *p*, through an opening, *t*, leading therefrom into the combustion-chamber near the bridge-wall. The long ducts and passages herein referred to will all, preferably, be made to increase in area from their air-receiving to their air-discharging mouths or passages, to afford ample space for the expansion of the air as it is heated.

The boiler may be of any usual construction, and it will be set above, and with reference to the grate, bridge-wall, and flame-bed, substantially as described in Patent 186,734.

The coal or other fuel rests against the bridge-wall, and, by reason of the ducts therein, I am enabled to heat the air passing through such ducts very hot. The duct *m* might lead through a shorter duct than duct *p*, into the combustion-chamber.

The perforated plate, instead of being made of iron, may be made of fire-brick material, and so, also, the flame-bed, pipes, or ducts.

I claim—

1. The combination, with the side and bridge walls, of ducts leading from the passages in the side walls into and out from the bridge-wall and into the side wall and combustion-chamber, to heat the air passing through such bridge-wall ducts, substantially as described.

2. The ducts *m n* in the bridge-wall, in combination with the duct *p*, and opening in the side wall opposite the combustion-chamber, substantially as described.

3. The ducts in the back of the wall, substantially as at *e*, in combination with the

tapering pipes or flues, substantially as described.

4. The side wall, provided with its air-passages, and the back wall and its ducts *e*, in combination with tubes or flues *h* leading into the chamber *i*, all to heat and discharge air into the combustion-chamber, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

KINGSBURY M. JARVIS.

Witnesses:
G. W. GREGORY,
A. F. UPTON.