2 Sheets--Sheet 1.

# W. L. McNAIR.

## Furnaces for Heating Tubes.

No. 166,399. Patented Aug. 3, 1875.

Fig. 1.

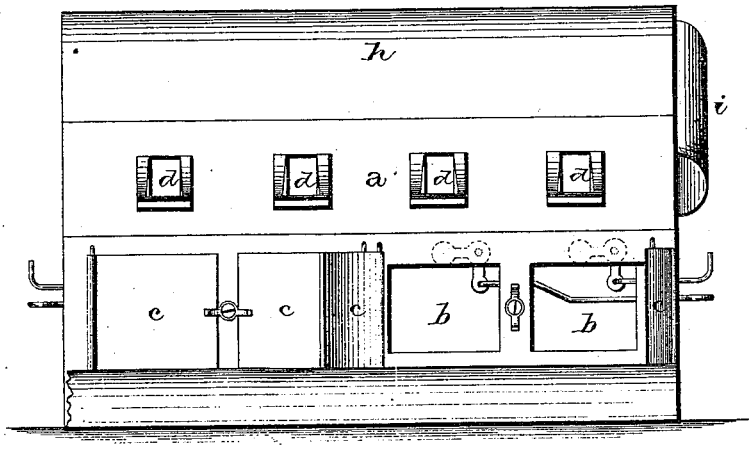



Fig. 2.

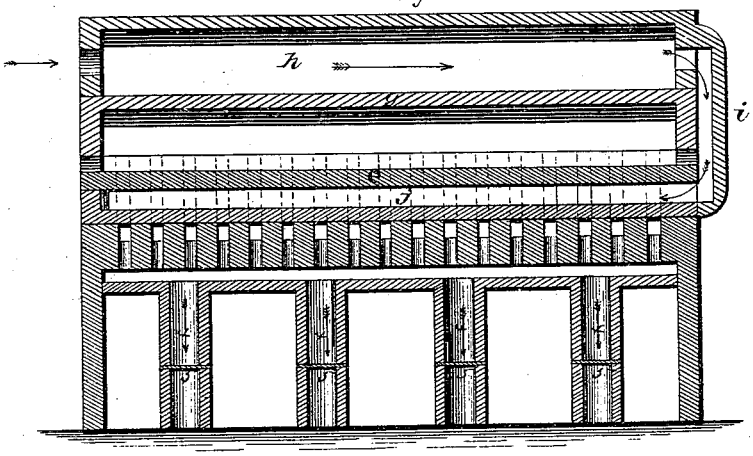
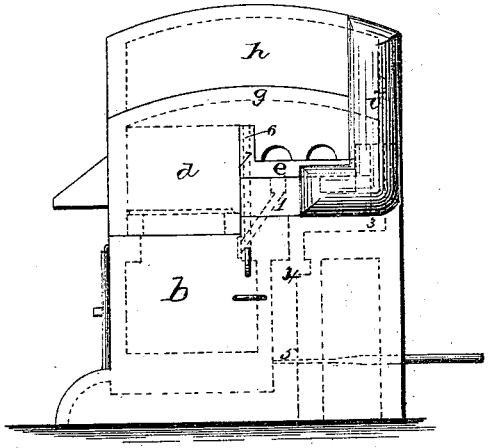



Fig. 3.




WITNESSES

J. Wm. Garner

Wm. Bilpperman,

INVENTOR

Wm. L. McNair

per

F. A. Lehmann,

Atty.

2 Sheets--Sheet 2.

# W. L. McNAIR.

## Furnaces for Heating Tubes.

No. 166,399. Patented Aug. 3, 1875.

Fig. 4

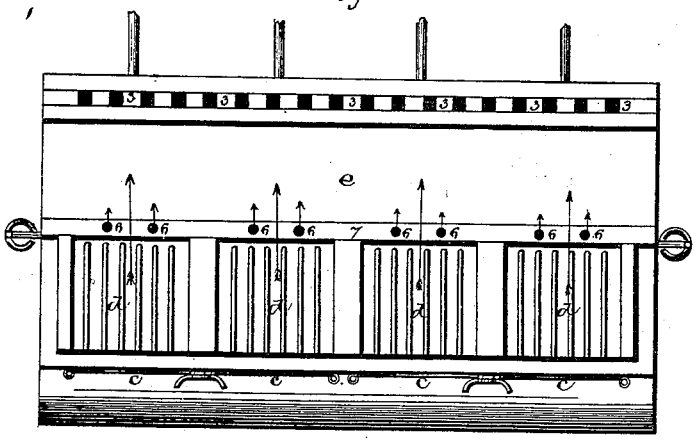


Fig. 5

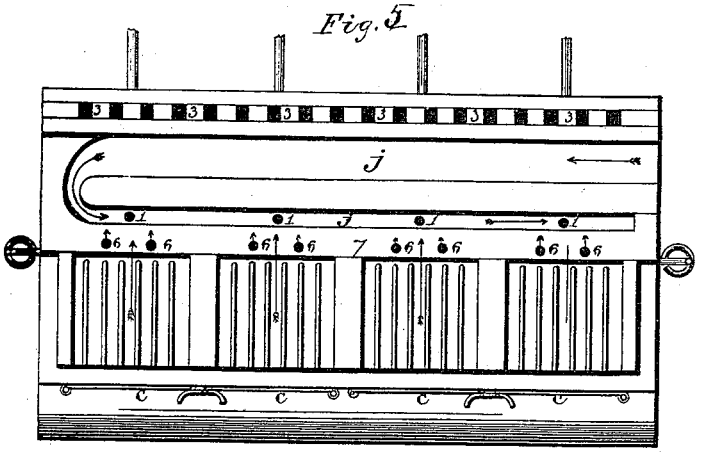
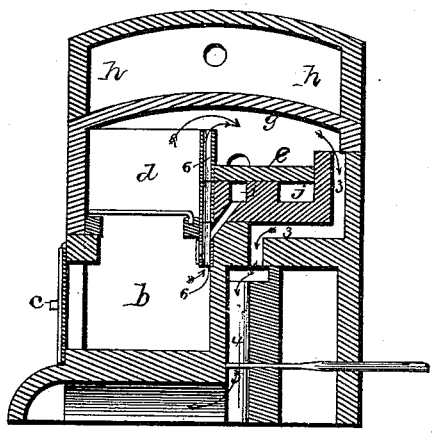


Fig. 6.



WITNESSES.

J. Wm. Garner.

Wm. B. Upperman.

INVENTOR.

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F. A. Lehmann, Atty

# UNITED STATES PATENT OFFICE.

WILLIAM L. McNAIR, OF ALLEGHENY, ASSIGNOR TO WILLIAM GRAFF & CO., OF PITTSBURG, PENNSYLVANIA.

## IMPROVEMENT IN FURNACES FOR HEATING TUBES.

Specification forming part of Letters Patent No. **166,399**, dated August 3, 1875; application filed June 22, 1875.

*To all whom it may concern:*

Be it known that I, WILLIAM L. McNAIR, of Allegheny, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Heating-Furnace for Metal Tubes; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to an improved heating-furnace for metal tubes; and it consists in first placing the hot-air flue directly under the heating-hearth, so as to raise the temperature of the air as high as possible before admitting it into the ash-pit; second, the arrangement and combination of parts that will be more fully described hereinafter.

The accompanying drawings represent my invention.

*a* represents the frame of my furnace, which may be of any desired size, shape, or construction. In the front of the furnace are any suitable number of fire-chambers of the usual construction, under which are the ash-pits *b*, which pits are provided with the doors *c*, for retaining the blast within the pits. The products of combustion pass from the fire-chambers *d*, over the top of the welding or heating hearth *e*, and against the top or roof *g* of the furnace. This roof becomes red hot, and throws off a large amount of heat; and in order to utilize this heat, that would otherwise be wasted, I form another roof over this one, or a series of flues, clamps, or otherwise, leaving an air-chamber, *h*, between them. The blast is admitted at one end of this chamber, traverses its whole length over the hot roof *g*, and then passes down through a pipe, *i*, into a flue, *j*, that runs the whole length of the welding or heating hearth *e*, and then doubles on itself, and runs the length of the hearth a second time. As the hearth *e* and roof *g* are kept red hot, by the time that the blast has passed through the chamber *h* and flue *j* and reaches the blast-holes 1, it is raised to a high temperature. From the flue *j*, the blast passes through the holes 1 into the ash-pits just under the grates, the holes being provided with suitable valves for regulating the force of blast, which valves may be all operated at once, or independently.

The products of combustion, after passing over the top of the hearth *e*, pass down through the diving-flues 3, under the hearth, down through the flues 4, provided with the valves 5, under the ash-pits, and from thence into a flue that runs along the front of the furnace, and from this flue under the boiler. As the flues 3 pass just under the flue *j*, the blast is thus heated from both above and below. By means of the valves 5, the draft can be regulated at will, so as to check or increase the combustion at any part of the furnace.

In order to insure as perfect a combustion as possible, there are a number of holes, 6, made through the bridge-wall 7, which holes open at their lower ends into the ash-pit. Through these holes 6 passes a part of the blast, so as to supply oxygen to the flame and gases.

Having thus described my invention, I claim—

1. In a heating-furnace, the combination of the hot-air chamber *h*, pipe *i*, flue *j*, air-holes 1, ash-pit *b*, fire-chambers *d*, hearth *e*, and flues 3, substantially as shown.

2. The flue *j* for the blast, arranged under the welding or heating hearth, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 9th day of June, 1875.

WILLIAM L. McNAIR.

Witnesses:

DAVID L. SMITH,

WALTER WILSON.