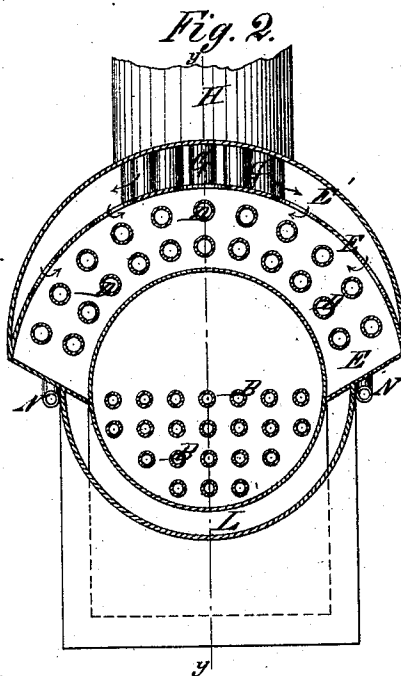
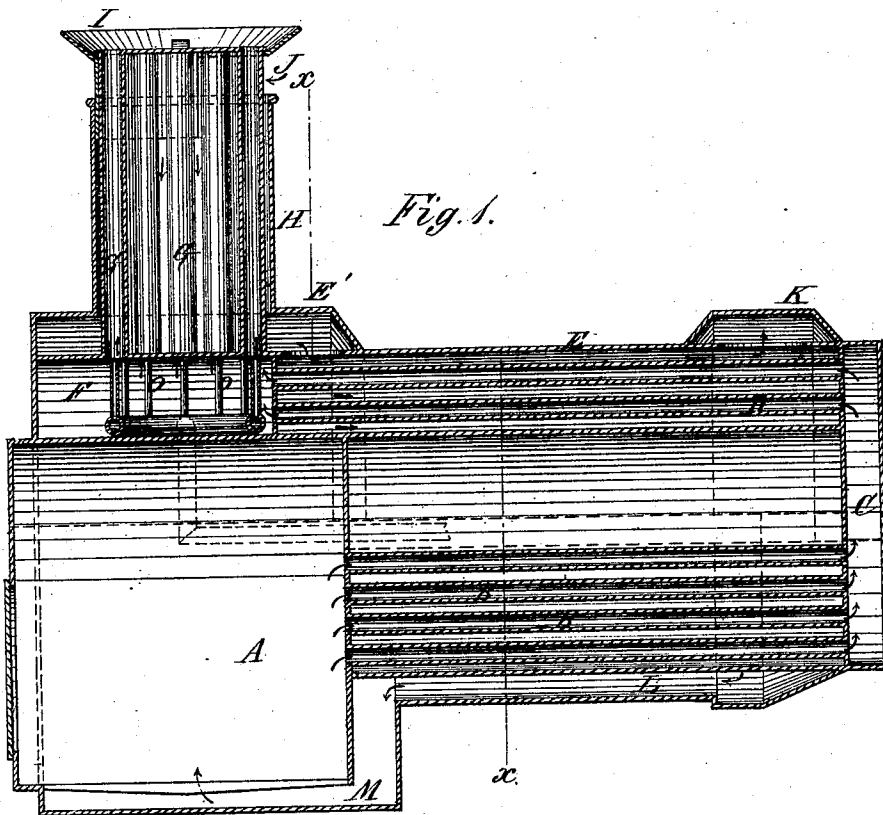


C. THONGER.

DEVICE FOR HEATING AIR FOR FURNACES.

No. 178,977.

Patented June 20, 1876.



WITNESSES:

H. Rydquist.
John Goethals

INVENTOR:

INVENTION:
C. Thonger
BY
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ATTORNEYS.

UNITED STATES PATENT OFFICE.

CHARLES THONGER, OF COURTRIGHT, CANADA.

IMPROVEMENT IN DEVICES FOR HEATING AIR FOR FURNACES.

Specification forming part of Letters Patent No. **178,977**, dated June 20, 1876; application filed May 9, 1876.

To all whom it may concern:

Be it known that I, CHARLES THONGER, of Courtright, Ontario, Canada, have invented a new and Improved Boiler-Furnace, of which the following is a specification:

The object of the invention is to utilize some of the waste heat of a boiler-furnace for heating the air supplied to the furnace for the support of combustion. As applied to a locomotive-boiler, the smoke passes through the boiler-flues to the smoke-box, as usual, thence back in a casing covering and surrounding the upper part of the boiler, which tubes terminate in a breeching, from which the smoke escapes through vertical tubes, which form the smoke-pipe, and are surrounded by a casing, down which the air for feeding the furnace passes to the casing on the boiler containing the smoke-pipes, and to a jacket at the rear, from which it passes along under the boiler to the ash-pit.

In the accompanying drawing, Figure 1 is a longitudinal sectional elevation of a locomotive-boiler constructed according to my invention, the section being taken on the line *y y* of Fig. 2. Fig. 2 is a transverse section taken on line *x x*.

In the drawing, A represents the furnace; B, the tubes passing through the boiler to the smoke-box C; D, tubes extending from the smoke-box through the casings E, covering

and surrounding the upper part of the boiler, to the breeching, from which it escapes through the tubes G, forming the smoke-pipe, and being surrounded by the casing H, into the upper end of which the air enters, through the hood I, at J, passing down into casings E E', and along to jacket K, and to casing L at the bottom, from which it enters the ash-pit M, to feed the fire with hot air, the heat being obtained from that which is at present wasted, thus effecting a considerable economy, and the contrivance affords a hot jacket for the boiler, which is another source of economy. O represents the nozzles for discharging the exhaust-steam into tubes G, and N the exhaust-pipes conducting the steam thereto.

For other boilers the contrivance will be substantially the same, but may be modified to some extent to suit different forms and conditions.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

The multitubular smoke-pipe G, return-tubes D, and casings H, E, E', K, and L, combined with a boiler, substantially as herein shown and described.

CHAS. THONGER.

Witnesses:

THOMAS WRIGHT,
EDITH WRIGHT.