**Specification of William Hendry : boilers and flues for consuming smoke.**


**Contributors**

Hendry, William.

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A.D. 1861, 2nd MARCH. N° 535.

# SPECIFICATION

OF

# WILLIAM HENDRY.

## BOILERS AND FLUES FOR CONSUMING SMOKE.

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A.D. 1861, *2nd March.* N° 535.

# Boilers and Flues for Consuming Smoke.

(*This Invention received Provisional Protection only.*)

**PROVISIONAL SPECIFICATION** left by William Hendry at the Office of the Commissioners of Patents, with their Petition, on the 2nd March 1861.

I, WILLIAM HENDRY, Brickbuilder, residing at Number 220, Thistle Street, Hutchesontown, of Glasgow, in the County of Lanark, do hereby declare the nature of the said Invention for "IMPROVEMENTS IN THE BUILDING OF BOILERS AND BOILER FLUES FOR THE CONSUMPTION OF SMOKE," to be as follows:—

One improvement for Cornish boilers of two tubes consists in building in two flues at the back of the boiler, which lead the smoke and flame or heat from each tube to the side of the boiler farthest from it, or the side nearest the next tube and through the side flues to the front of the boiler, where a square vertical hole left in the brickwork is placed leading down to the flame bed below the boiler, and from thence to the chimney. Opposite this hole is placed a square pipe of cast iron or other suitable material of the same size through the brickwork, slanting down to the furnace above the fire-bars, the furnace being partly in the brickwork in front of the boiler and partly in the tube. This pipe has a flange cast on the end next the hole with a valve working on a hinge on the bottom of this flange to close alternately the hole, and the pipe by a chain fixed on one end to the side of this valve, and on the other end to a weight working on two pulleys. Where the chain works through the brickwork it is attached to a small rod passing through a stuffer on the level of the brickwork, and to the end of this rod is attached the other

part of the chain to the valve. The furnaces are fired alternately, so that when one fire is red or "spent" the other is "green," or newly fired. The smoke of the "green" fire passes through the tube and through the flue at the back to the side flue when it reaches the hole at the front, which is closed by the fireman by sliding up the weight and letting the valve fall on the hole leaving the pipe open, which it enters and goes down on the red fire where it is converted into flame before passing the fire-bridge. The flame and heat from the red fire in the meantime passing through its flues reaches the square hole at the front of its side flue, which it finds open, and the pipe being shut it enters the hole which leads to the flame bed, and from thence to the chimney. By simply opening and closing the pipes and holes by the valve the smoke of the one fire may be led into the other, or into the chimney, at pleasure, the suction of the draught keeping the valve air-tight.

For Cornish boilers of single tubes two boilers are placed alongside each other with the side and back flues, as before described, with this difference, that there is a wall built in between the two boilers so as to make side flues with openings to the back flues on the boilers. At the front of the boiler and end of these flues there is placed a hole (always open) leading down to the flame bed. In these flues and at the back of the whole there is fixed two damper frames, in which work two dampers for opening and closing the flues. The "green" smoke of the one furnace passes through its tube and back flue, and finding the side flue next to the other boiler closed by the damper, so that it cannot get down to the flame bed, it travels round the other side flue to the hole at the front, which is closed by the valve when it enters the furnace by the pipe and is converted into flame. The flame and heat from the "spent" furnace travelling through its tube and back flue and through its two side flues (the one nearest the other boiler having the damper open, so as to allow part of the flame and heat to pass down the hole into the flame bed), reaches the holes and descends into the flame bed and from thence to the chimney.

For two hemispherical or "egg" ended boilers placed alongside each other the flues are built precisely the same as in the boilers last described, and if the main flue or chimney is at the back of the boiler an additional flue, which can be built in the boiler seat, is required to carry off the flame or heat from the holes backward to the chimney. If the chimney is in front of the boiler so such flue is required, as the heat can be led off direct to it.

For a single hemispherical or "egg" ended boiler the flues are built the same as in the boiler first described. The furnace and flame bed below the boiler are divided by a brick wall so as to make two distinct furnaces and

flame beds with either a single or two distinct ash-pits. When the two furnaces work with a single ash-pit the division wall is built from the fire-bars upwards, resting on an iron plate supported on iron columns rising from the floor of the ash-pit. In all these boilers the furnace bars are preferred to be sloping down from the back to the front of the furnace so as the more thoroughly to burn or consume the smoke. The dampers described are wrought by chains working on pulleys, as previously described.

The pipes leading to the furnace, previously described, may have a small tube attached from the outside of the brickwork with a cock to let air from the outside with the smoke as it enters the furnace, and assist in the elements of combustion.

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