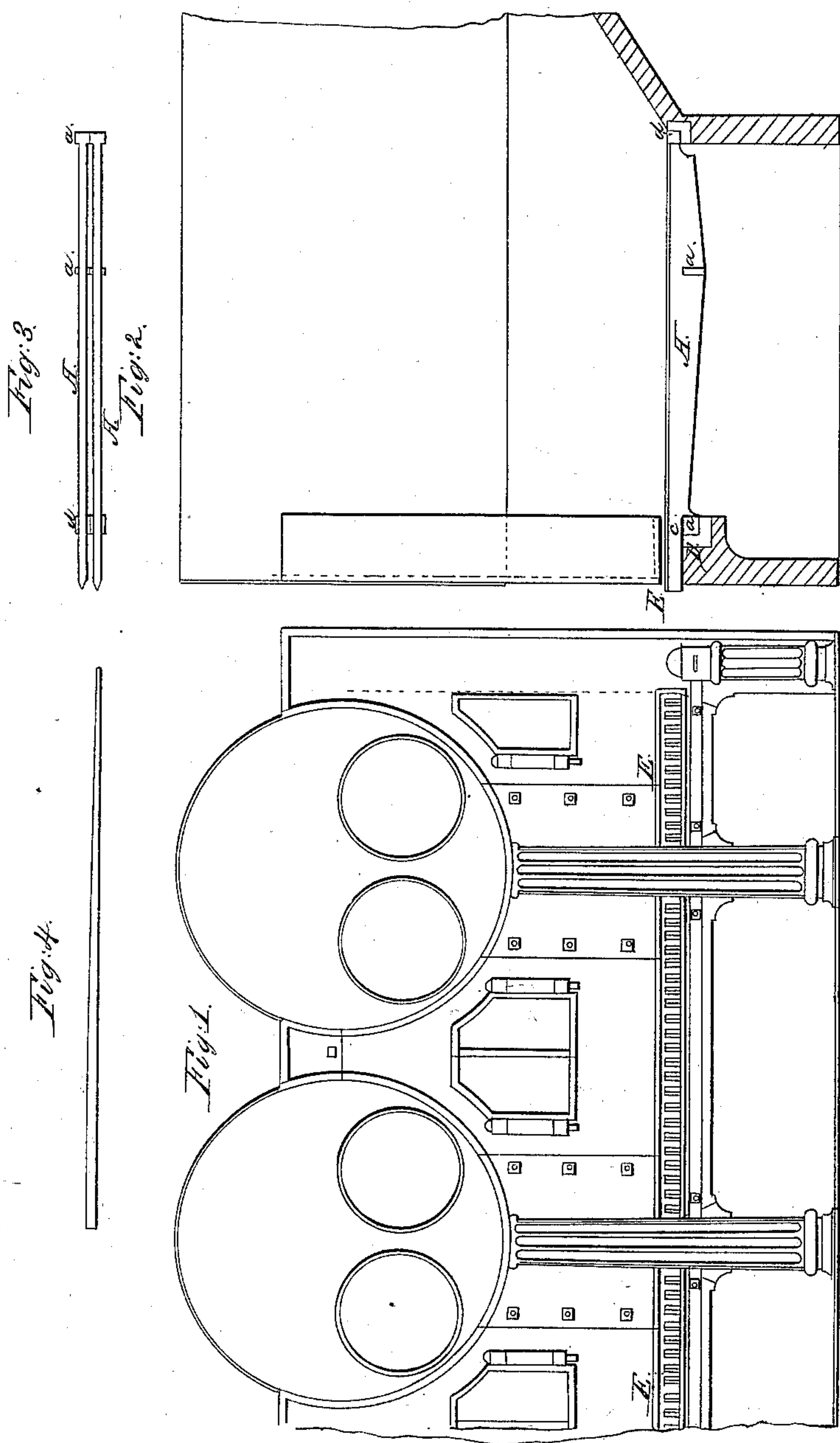


F. Armstrong,
Furnace-Grate Bar.

N^o 8732.

Patented Feb. 17, 1852.



UNITED STATES PATENT OFFICE.

FRANCIS ARMSTRONG, OF NEW ORLEANS, LOUISIANA.

CONSTRUCTION OF GRATE-BARS FOR FURNACES.

Specification of Letters Patent No. 8,732, dated February 17, 1852; antedated August 17, 1851.

To all whom it may concern:

Be it known that I, FRANCIS ARMSTRONG, of the city of New Orleans, in the State of Louisiana, have invented a new and useful
5 Improvement in the Construction of Grate-Bars of Furnaces, which is described as follows, reference being had to the annexed drawings of the same, making part of this specification.

10 The nature of my invention and improvement consists in a peculiar form of the grate bars, they being different in their construction from those used in the ordinary furnace in steam ships or vessels, having near their
15 forward ends inside of the fire fronts, jogs about half the width of the bars to secure them in their proper position without interfering with the passage of the poker into the openings in front and the spaces between
20 them throughout their whole length, the fireman by their use being able to move the poker longitudinally over and upon said jogs during the operation of clearing out the obstructions from the spaces between the
25 bars. The advantages of this mode of constructing the bars being readily seen; for it is well known that in the absence of an adequate supply of the oxygen of the air to support combustion the fuel cannot be made to
30 produce the heat it is capable of giving out; it being a well settled principle in combustion that "in all cases the quantity of heat evolved is proportional to the quantity of oxygen which enters into combination."

Description.

Figure 1 is a front, or end elevation of two furnaces and two boilers, constructed and arranged in the usual manner—except so far
40 as relates to the grate bars and openings in the front plate through which they pass. Fig. 2 is a vertical longitudinal section of the same. Fig. 3 is a top view or plan of two of the bars detached from the furnace.
45 Fig. 4 is a plan of the poker used between the improved grate bars.

Each grate bar is formed or shaped in the manner represented at A in Figs. 2 and 3 having their sides parallel, tops horizontal,
50 ends tapered, and bottom swelled and made with three jogs *a, a, a*, on each side of each bar extending from the bottom to near the center thereof designed to strike against

corresponding jogs on the adjacent bars for keeping them at a uniform distance apart 55 and to form parallel spaces or channels between the bars for the ready introduction of a long straight poker B for clearing out any accumulated ashes, or cinders, or coals, that may chance to lodge between the bars 60 and clog and stop the spaces. The front and rear end of each grate bar are reduced in depth forming shoulders *c* which are to rest against the horizontal bars D of the frame of the furnace.

65 The outer ends of the bars are tapered for the purpose of increasing the draft and for allowing a more ready introduction of the poker. The bars when properly adjusted with the jogs on a line and in contact become stationary, but may be easily removed for any purpose desired by raising the rear ends and drawing the bars inward which is easily accomplished. The openings E in the front of the furnace must be of such size as 75 to permit the ends of the bars to pass through freely and to form the spaces necessary for the free admission of the air and for the introduction of the poker when required to clear the grate of injurious obstructions. The bars A cannot be with- 80 drawn from the outside nor from the inside during the operation of the furnace—the fire must be completely extinguished before they can be removed. The aforesaid jogs *a* 85 of the bars should be made to extend from the bottom upward to the level of the tops of the transverse supporting bars D. Having the jogs thus constructed they are entirely out of the line of the traverse of the 90 poker when inserted between the bars and moved back and forth horizontally.

Having thus described my improvement in the construction of bars of grates of furnaces and the manner of arranging them 95 and the effect produced by the use of the same, what I claim as new and of my invention and desire to secure by Letters Patent is—

The form and construction of the grate 100 bars for furnaces having jogs *a* in the blade of the bar A extending from the lower line or edge of the bar up to the level of the lower line *c* of the extension through the fire front, thereby securing the advantage of 105 having said grate bars held permanently in

their required position by the said jogs touching each other and at the same time leaving all that section of the openings above the jogs free for the admission of a
5 poker between the bars to remove any solid matter produced from the combustion of the fuel.

In testimony whereof I have hereunto signed my name before two subscribing witnesses.

FRANCIS ARMSTRONG.

Witnesses:

E. JACOBS,
B. MOSES.