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F. C. KNIGHT & H. V. PEARCE.

NATURAL DRAFT REGENERATOR FOR FURNACE FLUES.

APPLICATION FILED OCT. 15, 1904.

Fig. 1.

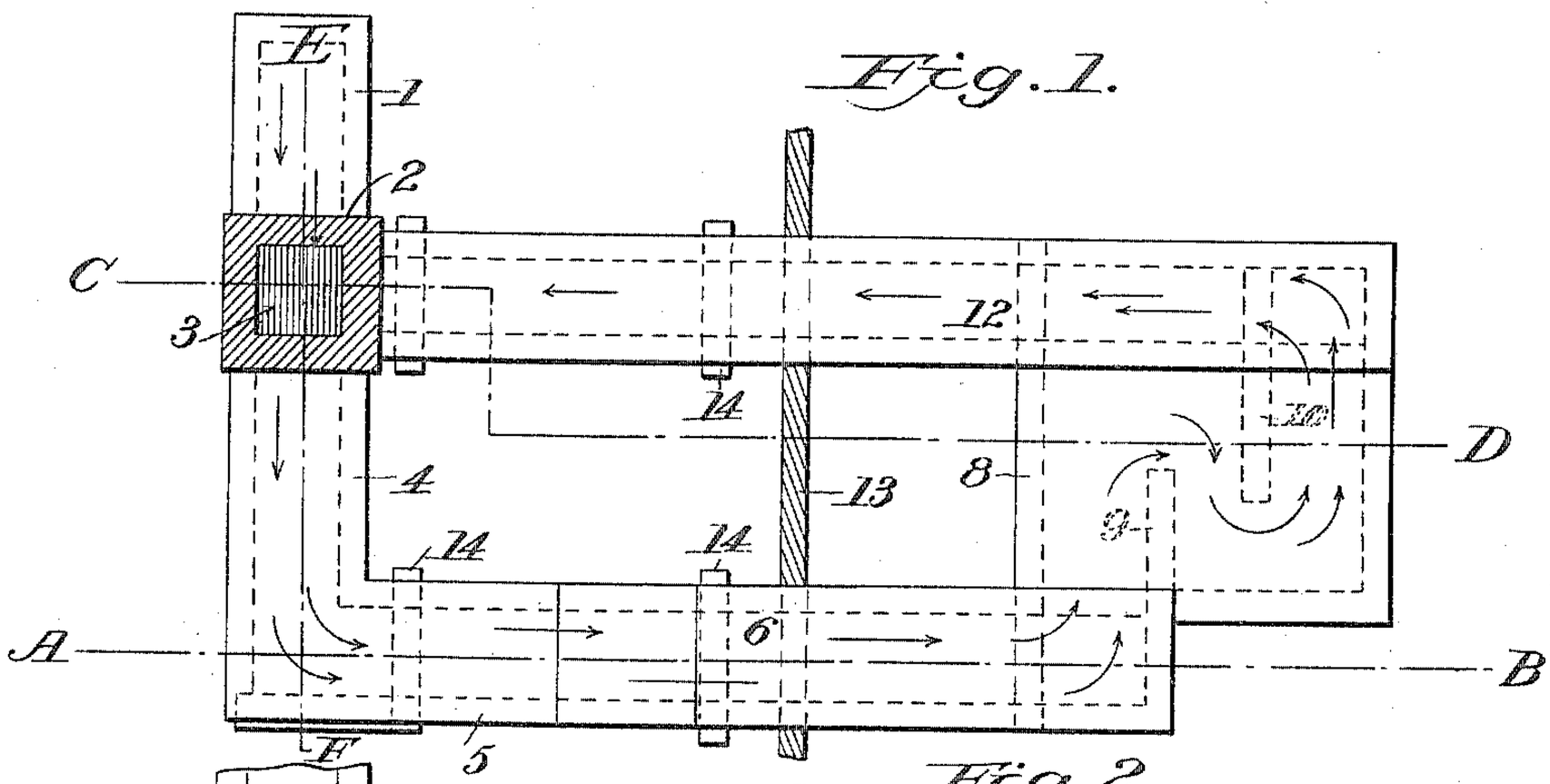


Fig. 2.

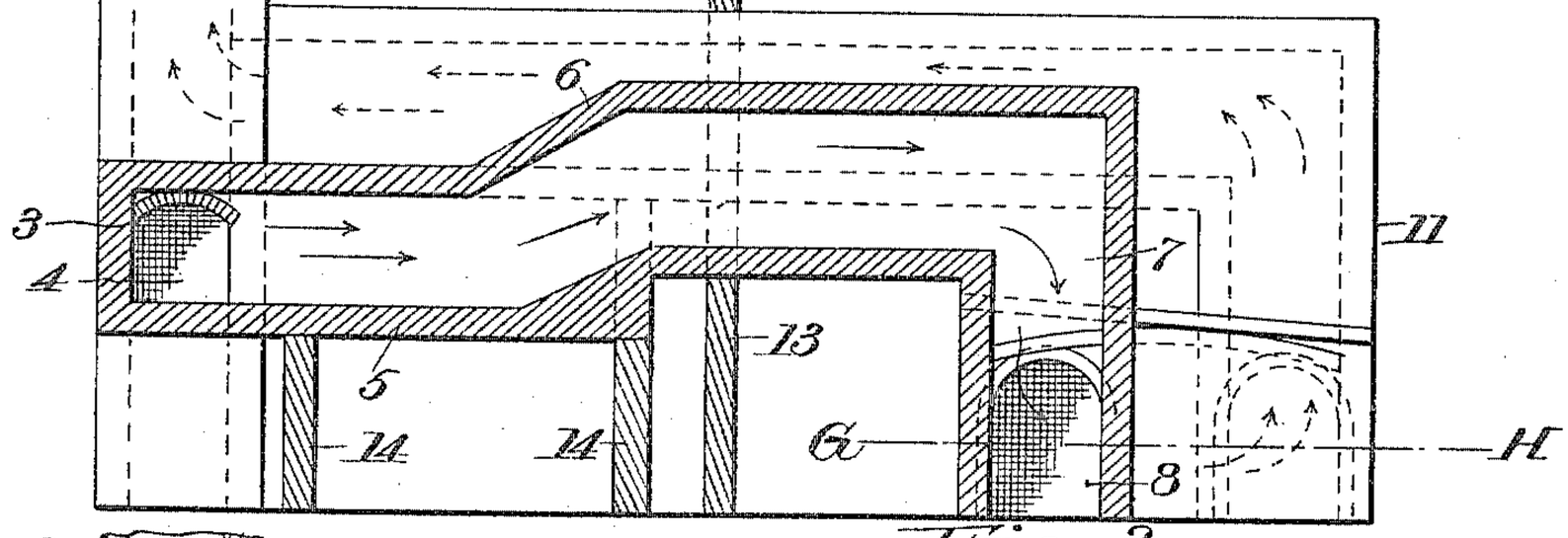


Fig. 3.

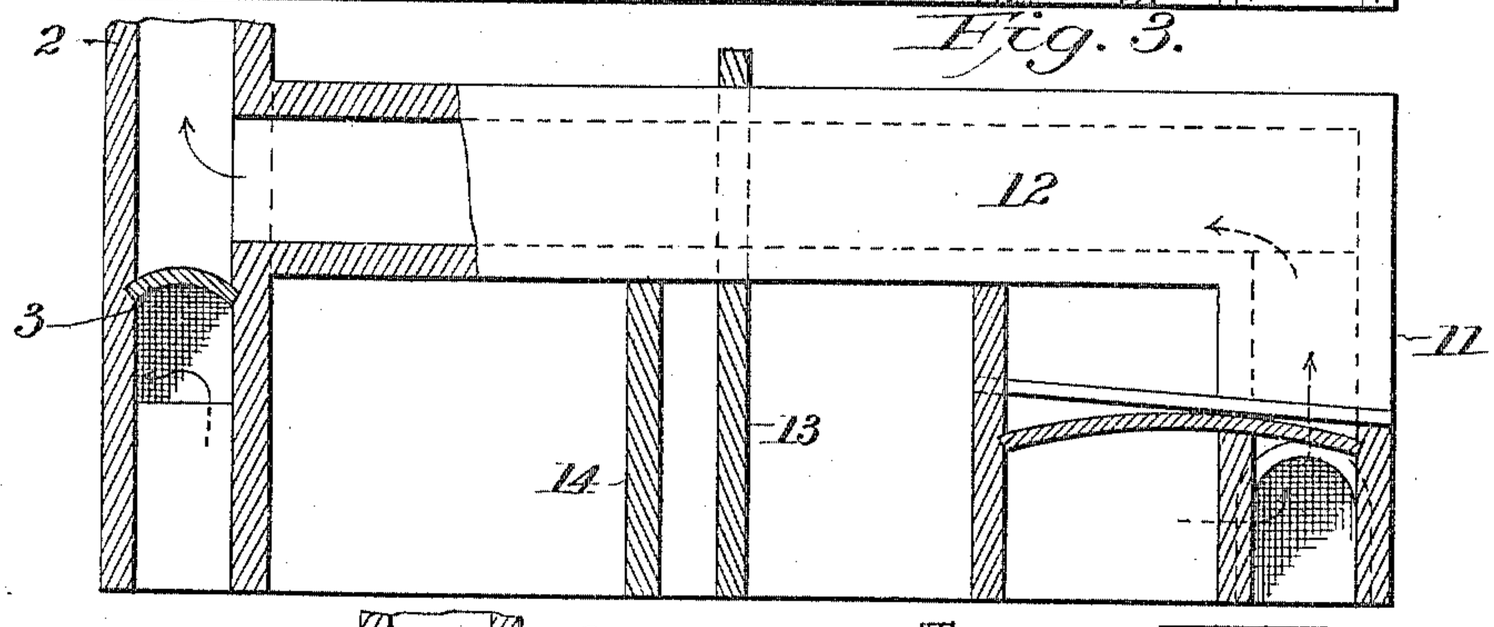


Fig. 4.

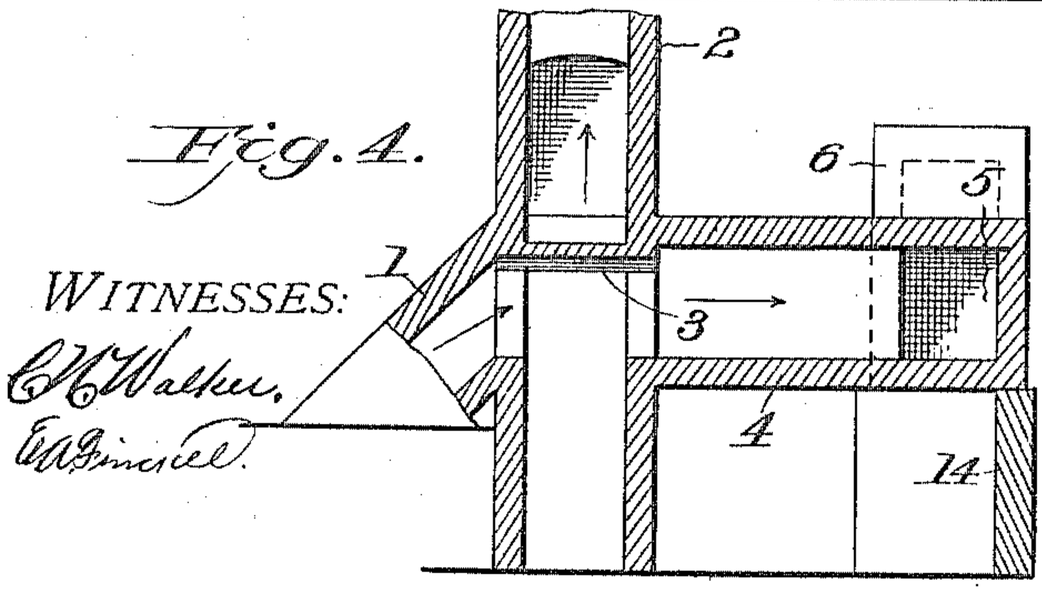
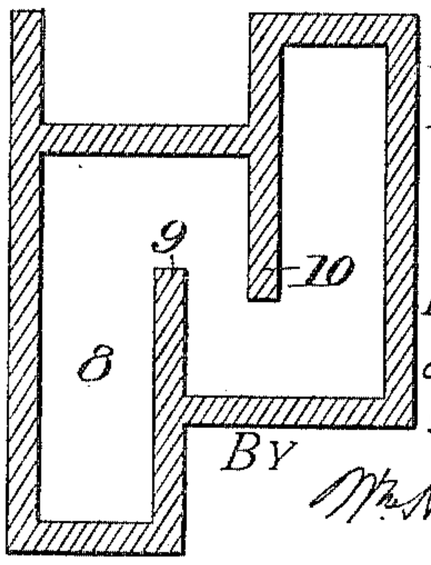


Fig. 5.



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FREDERICK C. KNIGHT AND HAROLD V. PEARCE, OF DENVER, COLORADO; SAID KNIGHT ASSIGNOR OF ONE-THIRD OF HIS RIGHT TO SAID PEARCE.

NATURAL-DRAFT REGENERATOR FOR FURNACE-FLUES.

No. 817,072. Specification of Letters Patent. Patented April 3, 1906.

Application filed October 15, 1904. Serial No. 228,625.

To all whom it may concern:

Be it known that we, FREDERICK C. KNIGHT and HAROLD V. PEARCE, subjects of the King of Great Britain, residing at Denver, in the county of Denver and State of Colorado, have invented a certain new and useful Improvement in Natural-Draft Regenerators for Furnace-Flues, of which the following is a full, clear, and exact description.

Furnaces for smelting ores may be used with additional economy and efficiency by interposing a tortuous flue or series of communicating chambers between the furnace-flue and the stack. We find that good results may be accomplished in the way of saving values and maintaining efficient draft by connecting the smoke-flue of the furnace with the lower part of the stack, shutting off or closing the stack above by an arch or other wall, continuing the flue in a tortuous form or by means of a series of communicating chambers, preferably in several horizontal and vertical planes, and finally causing it to enter the stack above the arch or wall, where its gaseous products receive fresh heat radiated from the arch or wall and renewed velocity and escape into and out through the stack.

In the accompanying drawings, illustrating the invention, in the several figures of which like parts are similarly designated, Figure 1 is a top plan view with the stack in horizontal section. Fig. 2 is a vertical section taken in the plane of line A B, Fig. 1. Fig. 3 is a vertical section taken in the plane of line C D, Fig. 1. Fig. 4 is a vertical section taken in the plane of line E F, Fig. 1. Fig. 5 is a horizontal section taken in the plane of line G H, Fig. 2.

The flue 1 may come directly from the furnace, (not shown,) which may be any reverberatory or other furnace for smelting ores or other purposes. 2 is the stack into which the furnace-flue enters. Above the point where the furnace-flue enters the stack the said stack is closed by means of a masonry arch or wall 3, so that the gases and other waste products escaping from the furnace through the flue cannot pass upward and out of the stack, but instead these gases, &c., enter a laterally-extending horizontal flue or chamber 4, alined with the mouth of the furnace-flue on the opposite side of the stack, and this chamber 4 opens into another horizontal chamber 5 at an angle thereto, made with a rise 6 and a vertical dip 7, the last opening into a horizontal chamber 8, having deflecting-walls 9 and 10, and this chamber has at its far end a riser-flue 11, which opens into a horizontal chamber or flue 12, which is arranged at a somewhat higher level than chambers 4 5 6 and opens into the stack above the arch 3.

The hot gases striking the arch will heat it sufficiently to cause is to radiate heat into the stack above it, which radiated heat commingling with the gases entering the stack above the arch from chamber 12 insures the proper furnace-draft, while the tortuous passage of these gases through the flues or chambers insures the recovery by deposition of any values contained in the gases. As already sufficiently indicated, the stratum of hot air adjacent the arch enables the gases to regain their velocity lost by passing through the tortuous chambers, or, in other words, regenerates the draft.

It has been found also that there is a considerable saving in fuel by the use of our invention.

As shown, the furnace and stack and the immediate flue connections may be located within the outer wall 13 of the building and the tortuous flue outside.

The flue may be provided with hand-holes or manholes for ready access to it, or other means may be utilized for cleaning out the flue. Piers 14 may be suitably disposed for supporting the flue. The flues may be of masonry or other suitable or available material.

Many variations in the form and arrangement of the tortuous passage may be availed of within the principle of our invention, which may be broadly stated to be first passing the gases through but not into the stack, and thereby heating the stack, then conducting these gases through a tortuous passage, and returning them to the same stack within the heated zone.

What we claim is—

1. A natural-draft regenerator for furnace-flues, comprising a stack transversely closed hermetically near its base, and a flue for conveying away the gases and other wastes from a furnace, said flue passing through the

stack below its closure and shut off from direct communication with the outlet in said stack by said closure and entering the stack again above said closure through a series of intercommunicating chambers.

2. A natural-draft regenerator for furnace-flues, comprising a stack, a furnace-flue opening into the stack, a permanent hermetical arch in the stack above the flue, a return-flue entering the stack above the arch and communicating with its outlet, and a series of intercommunicating chambers interposed between the stack and the return-flue and forming a tortuous passage for the gases from the furnace.

3. A natural-draft regenerator for furnace-flues, comprising a stack permanently and hermetically stopped near its base, a furnace-flue entering the stack below its stopped portion and serving to create and maintain a hot zone within the stack adjacent its stopped portion, and a tortuous flue extending from the stack and communicating with the furnace-flue and returning and opening into the stack in the hot zone therein above the stopped portion.

In testimony whereof we have hereunto set our hands in the presence of two witnesses.

FREDERICK C. KNIGHT.
HAROLD V. PEARCE.

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W. E. RICHARDS,
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