

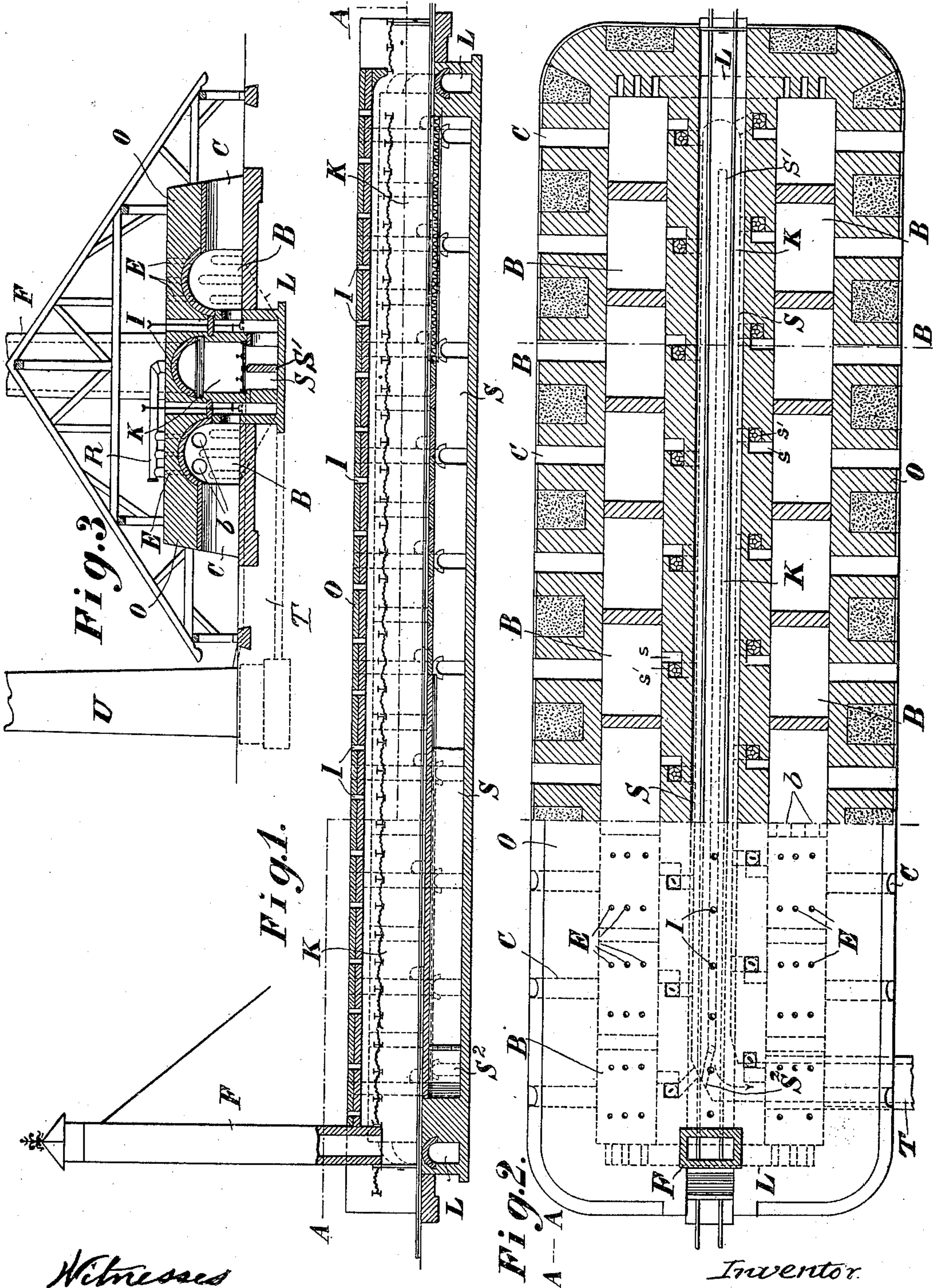
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Patented Apr. 16, 1901.

H. F. J. WEIJERS.
COMBINED KILN AND DRYING OVEN.

(Application filed July 12, 1899.)

(No Model.)



Witnesses
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UNITED STATES PATENT OFFICE.

HENRI FRANS JOSEPH WEIJERS, OF UDENHAUT, NETHERLANDS.

COMBINED KILN AND DRYING-OVEN.

SPECIFICATION forming part of Letters Patent No. 672,302, dated April 16, 1901.

Application filed July 12, 1899. Serial No. 723,553. (No model.)

To all whom it may concern:

Be it known that I, HENRI FRANS JOSEPH WEIJERS, a subject of the Queen of the Netherlands, residing at Udenhaut, Netherlands, have invented certain new and useful Improvements in a Combined Kiln and Drying-Oven, (for which I have applied for patents in England, No. 4,831, dated March 4, 1899; in Austria, dated March 13, 1899; in France, No. 272,840, dated January 14, 1899; in Belgium, No. 109,909, dated January 16, 1899; in Spain, dated January 18, 1899; in Italy, dated January 23, 1899; in Russia, dated March 13, 1899, and in Hungary dated March 25, 1899,) of which the following is a specification.

This invention relates to a combined kiln and drying-oven in which the drying-chamber is formed as a channel over the smoke-flue between the rows of chambers of the oven, so that the longitudinal sides and the bottom of the drying-chamber are inclosed by chambers containing hot air or other gases, and the drying-chamber is thus heated only by radiation from the neighboring parts without separate fire, and that air can be drawn in and introduced to the drying-chamber through the chambers temporarily undergoing cooling.

In order that this invention may be the better understood, I now proceed to describe the same, reference being had to the accompanying drawings and to the letters marked thereon.

Figure 1 shows a longitudinal section. Fig. 2 shows a horizontal section on the line A A, Fig. 1. Fig. 3 shows a transverse section on the line B B, Fig. 2.

In similar ovens as constructed at present a great amount of heat is accumulated in the interior, the great part of which heat escapes ultimately to the outer atmosphere without having been utilized, while the drying apparatus—say in a brickworks—is heated separately. In consequence the cost of the plant and working is unnecessarily increased, which disadvantage is entirely obviated by this invention, and, further, fresh air is drawn in, as before mentioned, into the chambers which have been in operation, the hot air or gases from such chambers having passed to the drying-chamber through a tube R. In this man-

ner circulation is produced in the apparatus and the burned material is quickly cooled.

The oven formed by the wall O is constructed so that the kiln-chambers B are arranged at the sides of and at the same level as the drying chamber or channel K, which is situated in the middle of the oven. These chambers B are heated in the usual manner, and the flames may be led from one chamber to the other through apertures, such as indicated in dotted lines in Fig. 3. To carry the flames or fire from one corner-chamber to the corner-chamber of the opposite row of chambers, channels L are provided beneath the drying-chamber K. The chambers B are all accessible from the outside by orifices C in the walls O, and exit-flues E are arranged in the crowns of the chamber B. The drying chamber or channel K, arranged between the rows of chambers B, has also orifices I in its crown, which communicate through the tube R with the orifices E of those kiln-chambers B which have been in operation and which are to be cooled. The drying chamber or channel K runs through the whole length of oven and is closed at each end by a door. It has rails along its floor, on which run the trucks carrying the materials to be dried. Below the drying chamber or channel K is situated the smoke channel or flue S, through which the gases pass from the chambers to the uptake. These gases enter the flue S through channels s, provided with suitable valves s'. Thus the drying-chamber is situated between the two rows of kiln or fire chambers and above the smoke-escape flue. In consequence three of its sides are heated along its whole length by heat radiating from parts containing hot gases. In order to make the conditions for radiation as favorable as possible, the bottom of the drying-chamber K, which forms also the top of the smoke-flue S, is formed of corrugated sheet-metal iron plates and partially arched. Exhaust-steam may be used to advantage in the customary manner in the flue S as a source of heat and draft. The draft for the air and the carrying off of the water-vapor is produced by a chimney F or a ventilator. This produces a strong current of air through the whole length of the drying-channel. The ceiling k, of corrugated

sheet metal, which is interposed between the channel K and its arched crown of masonry, provides a longitudinal channel K' above said metal ceiling *k* and communicating with the channel K at the end remote from the draft-chimney F, as shown in Fig. 1. Into this channel K' the gases are delivered through the apertures I from such of the kiln-chambers B as are being cooled, these gases being thus compelled to pass through the extreme length of the drying-channel K and back again to the draft-chimney F, and by this means their waste heat is more fully utilized.

As shown in Fig. 3 and in dotted lines in Fig. 2, the smoke-flue S, beneath the drying-channel K, is divided longitudinally by a partition S', extending nearly from end to end, as shown in Fig. 2, a communication being left, as shown at the right-hand end of Fig. 2, around the partition, while at the left-hand end the divided smoke-flue is shown communicating with a smoke-flue T, leading to the stack U. (Shown in Fig. 3.) At the left-hand end of the partition S' there is also indicated in dotted lines, in slightly oblique position, a damper S², which, as there shown, shuts off communication from the farther side or member of the smoke-flue to the chimney-flue T. In this position it will be apparent that the gases entering the smoke-flue S from the range of chambers B on the farther side of the structure will be conducted in a circuitous path around the partition S', so as to traverse the length of the structure from end to end and back again before escaping to the smoke-flue T. If, however, the above deflecting-plate (the damper S²) be turned to the other position, so as to cut off the lower section of the flue S, it will be apparent that the gases from the chambers B on the near side of the structure will in like manner be carried from one end to the other of the smoke-flue and back again in a circuitous path before reaching the discharge-flue T. I am thus enabled to carry the hot gases in a circuitous path from end to end of the oven whichever range of chambers may be for the time in use or giving off the hottest gases or the largest amount of gases of combustion and am enabled to compel the gases of combustion which issue from the combustion-chambers in the vicinity of the discharge-flue to take a course twice the length of the oven, or nearly so, so as to utilize the hot gases to the greatest possible extent. A further important practical advantage of this provision is that I am enabled to cause the flow of the hottest gases of combustion in a direction opposite to the movement of the goods or materials which are being dried.

What I claim, and desire to secure by Letters Patent of the United States, is—

1. The combination of the drying-channel K, the kiln-chambers B, B, on each side of

said drying-channel and the smoke-flue S beneath said drying-channel to heat the same, divided longitudinally by a partition S', and plate S², extending to a wall of the smoke-flue, as and for the purposes shown and described. 70

2. The combination of the two rows of kiln-chambers B, B, the tunnel forming a drying-channel K between said rows of kiln-chambers, and the smoke-flue S beneath said drying-channel, separated therefrom by a roof permitting passage of heat and having a longitudinal vertical partition S', and plate S², forming a continuation of said partition at one end and extending to a wall of the smoke-flue, compelling the hot gases to flow in a circuitous course beneath the floor of the drying-channel, as explained. 75 80

3. The combination of kiln-chambers B, B, in parallel rows, the tunnel-formed drying-channel K located between the rows of kiln-chambers, smoke-flue S beneath the drying-channel, longitudinal partition S' therein, plate S² forming a continuation of the partition S', and extending to a wall of the smoke-flue, tubes R connecting the kiln-chambers B and drying-chambers and apertures C admitting air to the respective kiln-chambers and permitting the passage of air there-through to the drying-chamber K, as explained. 85 90 95

4. The combination of the rows of kiln-chambers B, B, the central tunnel-formed drying-channel K, the smoke-flue S beneath the drying-chamber, vertical partition S' dividing the smoke-flue into two longitudinal sections and passages s conducting gases from the kiln-chambers B, B, to the smoke-flue S, discharge-flue T and deflecting-plate S² placing either section of the flue S in communication with the flue T, as explained. 100 105

5. The combination of two rows of kiln-chambers B, B, tunnel-formed drying-channel K between said rows of kiln-chambers, the smoke-flue S beneath the drying-channel and connections L between the kiln-chambers passing beneath the tunnel-formed drying-channel, substantially as shown and described. 110

6. The combination of the range of kiln-chambers B, the drying-channel K having sheet-metal ceiling *k* forming a longitudinal channel *k'* above it, communicating at one end with the drying-channel K; pipes R forming communication between the respective kiln-chambers B and channel *k'*; and the draft-chimney T communicating with the channel K at the end remote from that at which gases are delivered from the channel *k'*; substantially as and for the purpose set forth. 115 120

In testimony whereof I have hereunto set my hand in the presence of two witnesses. 125

HENRI FRANS JOSEPH WEIJERS.

Witnesses:

E. H. L. MUMMENHOFF,
AUGUST LÜHRS.