

(No Model.)

C. M. HERRMANN.

TWIN FURNACE FOR ENAMELING AND FOR HEATING WITHOUT MUFFLES.

No. 573,975.

Patented Dec. 29, 1896.

Fig. 2.

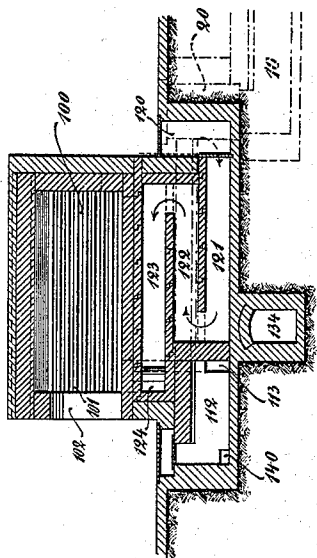


Fig. 4.

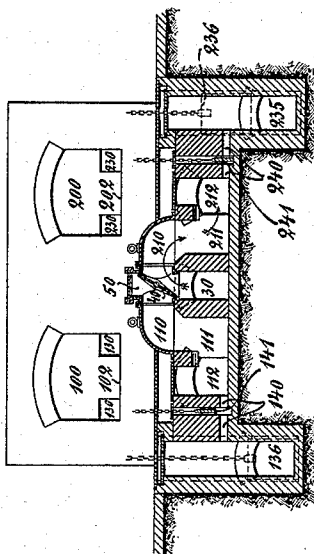


Fig. 1.

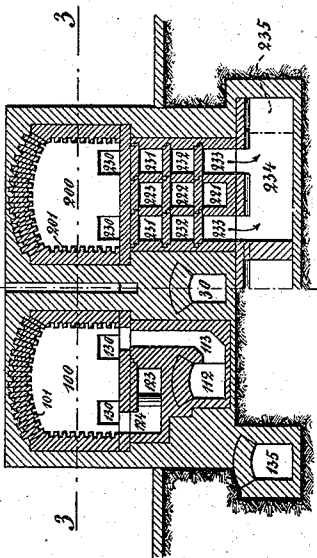
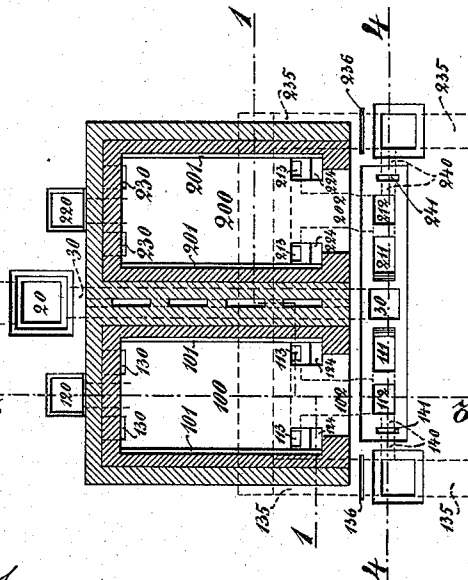


Fig. 3.



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# UNITED STATES PATENT OFFICE.

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## TWIN FURNACE FOR ENAMELING AND HEATING WITHOUT MUFFLES.

SPECIFICATION forming part of Letters Patent No. 573,975, dated December 29, 1896.

Application filed December 19, 1895. Serial No. 572,660. (No model.) Patented in Germany June 19, 1894, No. 80,107.

*To all whom it may concern:*

Be it known that I, CARL MAXIMILIAN HERRMANN, a subject of the King of Saxony, residing at Dresden, in the Kingdom of Saxony, German Empire, have invented a new and useful Twin Furnace for Enameling and for Heating without Muffles, (for which I have obtained a patent in Germany, No. 80,107, bearing date June 19, 1894,) of which the following is a specification.

My present invention relates to that kind of twin furnaces which is applicable for heating all kinds of material and for enameling iron articles, such as cooking-pans, &c., without the use of muffles. In such twin furnaces the heating of the material charged, without being inclosed in a muffle, in one of two chambers of the furnace is effected by radiation of the heat from the walls of the chamber which have been heated from the inside prior to the introduction of the material, while the other chamber of the twin furnace remains empty and is prepared for the following charge. The furnace is heated by gas, and the heating is in that sense continuous that the current of heating-gas is never cut off, but only directed from the one chamber to the other. The second chamber, for instance, is heated during the whole time taken up by charging the first chamber, backing the material therein, and emptying the same, and only thereafter the current of gas is shifted to the first chamber, and so on. The arrangements for shifting the current of heating-gas from one chamber to the other must be so as that the entrance of even a small quantity of gas to the charged chamber, which would in most cases damage the material under treatment, is prevented. Such arrangements may consist in a system of valves kept gas-tight by water seals. These are, however, connected with serious inconveniences, among which not the least is the reduction of the space in front of the furnace. For obviating these inconveniences I have found other means, which form the subject of my present invention, and these consist in the addition of two small auxiliary passages provided with cut-off devices.

The annexed drawings show a twin furnace of the described type and provided with the

new means for preventing the entrance of gas in the chamber charged with the material.

Figure 1 is a vertical section taken on the line 1 1 of Fig. 3. Fig. 2 is a vertical section taken on the line 2 2 of Fig. 3. Fig. 3 is a cross-section taken on the line 3 3 of Fig. 1, the switch and the bent tubes connected therewith being omitted. Fig. 4 is a vertical section taken on the line 4 4 of Fig. 3.

Each of the two chambers 100 and 200 of the twin furnace is provided on the internal surfaces with longitudinal ribs 101 and 201 for increasing the intensity of the heat and with a charging-opening 102 and 202, the door of which is omitted in the drawings.

The heating-gas is supplied to the furnace through a channel 10 and is controlled by a valve (not shown) arranged in the chamber 20 and passes underneath the furnace through channel 30 to the switch 40, which is disposed as a three-way valve in a casing 50. In the position shown in the drawings it leads the gas through the angular piece 210, the channels 211 and 212, and the two passages 213, branching off to both the sides, to the front part of the furnace-chamber 200, the way to the chamber 100 through the bent pipe 110 and channels 111 112 113 being closed by the switch 40.

The air for combustion is aspirated through the shaft 220 behind the chamber 200 and reaches, through channels 221 222 223 and the two passages 224, the front part of the chamber near the mouth of the gas-passages 213, where the ignition of the mixture of gas and air takes place.

The gases of combustion after the flame has heated the walls of the chamber find their exit through two channels 230 on the opposite end of the chamber 200, which channels lead into the channels 231, 232, and 233. The channels 233 unite in one channel 234, arranged in transverse direction of the chamber and opening into the box 235, which is provided with a chimney-damper 236. The double channels 231, 232, and 233, through which the gases of combustion escape, surround, as shown in Fig. 1, on both sides the channels 223, 222, and 221, through which the air is aspirated, so that the air on its entrance in the chamber is already heated to a

considerable degree, whereas at the same time the gases of combustion are cooled down so far that they do not reach the chimney with a higher temperature than is necessary for securing the draft. The connection of the air-channels 221 222 223 is to be seen in the vertical section of the corresponding channels 121 122 123 of the other chamber. (Shown in Fig. 2.) For the channels 231 232 233 and the corresponding channels 131 132 133 of the other chamber the connection is in principle the same—they form also a zigzag line—with the difference, however, that the connection of the upper with the middle channel is disposed toward the front, whereas it is toward the rear for the middle and lower channel, so that the air and the gases of combustion flow in contrary direction. The channels 134, Fig. 2, and 135 for the exit of the gases of combustion from the chamber 100 are, together with the chimney-damper 136, also arranged symmetrically to the channels 234 and 235 and to the chimney-damper 236 of the chamber 200. The damper 136 is closed and the damper 236 is open, so that no air can pass through the chamber 100, which is presumed to be charged with the material to be treated.

The safety device which forms the subject of the present invention consists in two auxiliary passages 140 and 240 and in the cut-off devices disposed therein, which, by the way of example, are shown in the drawings as dampers 141 and 241, respectively. The auxiliary passage 140 connects the gas-channel 112 with the channel 135 at a point between the chimney and the chimney-damper 136, and the auxiliary passage 240 connects the gas-channel 212 with channel 235 at a corresponding point. The damper 141 is open and 241 is closed. By this arrangement no gas can escape going from channel 212 through pas-

sage 240 past the chamber 200 into the channel 235, and any small quantity of gas which through leakage of the switch 40 may arrive by way of the bent tube 110 and the channel 111 into 112 is sucked by the draft of the chimney through 140 into channel 135. The latter being cut off from the chamber 100 by the chimney-damper 136, the leakage gas passes into the chimney without finding an entry into the chamber 100.

If after discharging the chamber 100 the switch 40 is shifted for reheating this chamber, the chimney-damper 136 and the auxiliary damper 241 are opened and the dampers 236 and 141 are closed. The chamber 200 can thereupon be charged and the whole operation of the chambers is reversed, as against the position in which this is shown in the drawings.

What I claim is—

In a twin furnace for alternately heating one chamber and charging the other with material not inclosed in muffles the combination with means for shifting the current of heating-gas from the one chamber to the other, of two auxiliary passages each of which connects the gas-supply channel of the one chamber with the channel for the exit of the gases of combustion of the said chamber at a point between the chimney-damper and the chimney, and of a cut-off device in each of these auxiliary passages, essentially as and for the purpose set forth.

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

CARL MAXIMILIAN HERRMANN.

Witnesses:

OSKAR MIRSCHIROR,  
HERNANDO DE SOTO.