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REVERSING MECHANISM IN OVENS OF THE REGENERATIVE TYPE.

APPLICATION FILED MAY 24, 1910.

1,032,129. Patented July 9, 1912

Fig. 1.

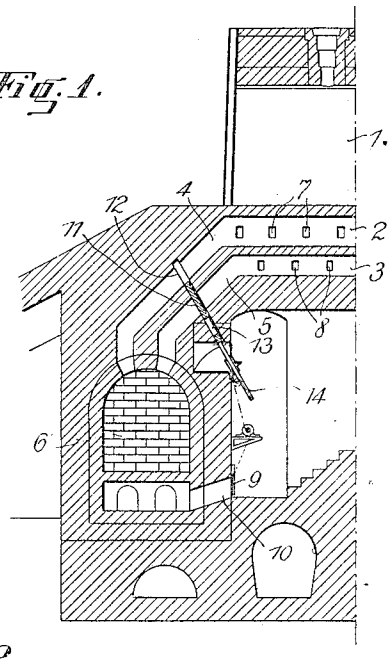


Fig. 2.

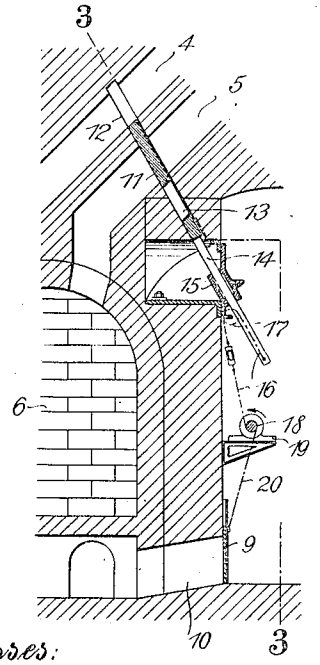
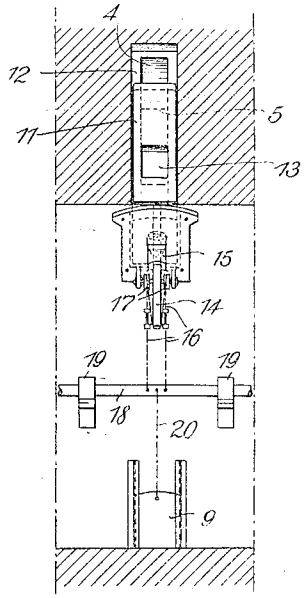


Fig. 3.



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UNITED STATES PATENT OFFICE.

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REVERSING MECHANISM IN OVENS OF THE REGENERATIVE TYPE.

1,032,129. Specification of Letters Patent. Patented July 9, 1912.

Application filed May 24, 1910. Serial No. 563,129.

To all whom it may concern:

Be it known that I, LUDWIG CARL FLACCUS, a citizen of the German Empire, and a resident of König Albertstrasse 50, Stettin, in the Kingdom of Prussia, Germany, have invented certain new and useful Improvements in Reversing Mechanisms in Ovens of the Regenerative Type; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in reversing mechanisms for ovens of the regenerative type and particularly for coke ovens of the regenerative type. And the object of the improvements is to provide a reversing mechanism in which the reversing valves are not subjected to injury from and destruction by the high temperature to which they are exposed.

A further object of the improvements is to provide a reversing mechanism which is simple in construction and reliable in operation, and in which the valve of the passage, through which the air for supporting combustion flows from the regenerator to the flues of the oven and the valve of the passage through which the combustion gases are conducted from the flues to the regenerator are operatively connected with the valve which controls the admission of the air for supporting combustion to the generator.

For the purpose of explaining the invention an example embodying the same has been shown in the accompanying drawing in which the same letters of reference have been used in all the views to indicate corresponding parts.

In said drawings—Figure 1, is a vertical longitudinal section of the left hand part of a coke oven of the regenerative type, Fig. 2, is a similar section of a part of the oven shown in Fig. 1 and illustrating the valve mechanism on an enlarged scale, and Fig. 3, is a cross-section of the part of the oven shown in Fig. 2 taken on the line A—B.

Referring to the example illustrated in the drawing the coking chambers 1 of a coke oven are disposed above two channels 2 and 3 located one above the other and communicating with a regenerator 6 through inclined passages 4 and 5. Through lateral passages 7 and 8 the channels 2 and 3 communicate with the flues of the coke oven (not shown), and their function is to alternately supply air for supporting combustion to the said flues, and to remove the combustion gases from the flues. In the former case the regenerator 6 the checker work of which has previously been heated by combustion gases is used for supplying to the flues preheated air for supporting combustion which is admitted to the said regenerator through a channel 10 adapted to be closed by a slide valve or gate 9, and in the latter case the air admitting valve 9 for controlling the admission of air to the regenerator is closed and the combustion products are withdrawn from the flues and conducted through the said regenerator.

The passages 4 and 5 through which the regenerator 6 communicates with the channels 2 and 3 are provided with a slide valve or gate 11 which is slidable on an inclined guide way 12 disposed transversely of the said passages 4 and 5. The slide valve is made of a slab of refractory material, such for example as chamotte (fire-clay), and it is formed with an aperture 13 the size of which corresponds substantially to the cross-section of the passages 4 and 5. By its gravity the slide valve has the tendency to slide down its inclined guide way 12, and it is held in its position by a push rod 14 bearing against its lower end and guided in a sleeve 15. By advancing the said push rod 14 the gate 11 can be shifted upward, while upon a release of the push rod it slides down its inclined guide way 12 by its gravitation.

The use of an operating push member engaging the valve from below, (instead of a pulling member extending upwardly from the valve) is of especial advantage in the event of breakage or partial melting of such operating member. With an operating member extending upwardly from the valve, the melting or breaking of the operating member will cause the valve to drop to the bottom, taking a position in which it is liable to be injured or destroyed by the intense heat. With a push rod, however, should the upper end of the rod melt, or even in the event of breakage, the valve will drop only a short distance, coming to rest on the remaining or unbroken part of the push rod.

In the example illustrated the passage 4

has the function to remove the combustion gases while through the passage 3 the air for supporting combustion is supplied to the flues of the coking chambers 1.

The lower end of the valve 11 is therefore cooler and more durable than its upper end, and for this reason it is an advantage to have the push rod 14 engage the lower end of the valve, as this is less liable to be injured. The inclined arrangement of the valve 11 not only enables it to move by gravity to one of its positions, but causes the weight of the valve to bear on the seating surface on which it slides, the weight of the valve or gate thus contributing to secure a tight fit of the valve on its seat. The plunger or push rod 14 being separate from the gate 11 and only in loose engagement therewith, can be removed and renewed readily without disturbing the gate.

It will be seen that the lower end of the valve 11 bears loosely on the upper end of the push rod 14 and is therefore capable of sliding thereon transversely. Thus, any upward movement of the push rod will positively lift the valve, yet an independent lateral movement of either of these parts will always be allowed, so that it does not matter whether the push rod moves perfectly true and straight or not, or whether the sleeve 15 is in perfect alinement with the guideway 12.

In the position of the parts shown in the drawing the gate 11 has such a position, that the combustion gases are directed through the passage 4 into the regenerator 6, while the valve 9 which controls the supply of fresh air to the regenerator is in its closing position. If however by moving the push rod 14 upward the gate 11 is pushed upward, the valve 9 for controlling the admission of the air is simultaneously opened, as will presently be described.

To the lower end of the push rod 14 tension elements, such for example as ropes 16 are attached which extend upward over pulleys 17 and are attached to a shaft 18 mounted in brackets 19. The said shaft is also connected with the gate 9 for controlling the admission of air by means of a tension element, such for example as a rope 20. The connection is such, that when rotating the shaft 18 in the direction of the arrow shown in Fig. 2 the rope 20 as well as the ropes 16 are wound on the said shaft. By thus winding the ropes 16 on the shaft the push rod 14 is advanced in such a way as to bring the aperture 13 of the gate 11 into register with the air admitting passage 3, while the passage 4 is closed against the regenerator by the upper part of the slide valve 11. Simultaneously, by winding up the rope 20 the air valve 9 is opened, so that air is admitted through the passage 10 into the regenerator 6, where it is heated, and from whence it passes through the passage 3 into the flues of the coking chambers 1.

As the element which controls the communication between the regenerator and the channels 2 and 3 through the passages 4 and 5 consists exclusively of the slide valve 11 which is made of a slab of refractory material adapted to withstand high temperatures, any injury to or destruction of the said element, and therefore inoperativeness of the reversing mechanism caused by such destruction is avoided. The reversing mechanism can be actuated in a most simple way, and it is absolutely impossible that the valve 9 which controls the admission of the air to the regenerator should remain in its opening position when the regenerator is brought into communication with the passage for withdrawing the combustion gases from the flues.

While in describing the invention reference has been made to a particular embodiment of the same, and to certain details of construction, I wish it to be understood, that my invention is not limited to the construction of the apparatus shown or to the use of the same in a coke oven. For example the means for connecting the valves 11 and 9 with each other or with the shaft 18 may be constructed in a different way.

I claim herein as my invention:

1. The combination with a structure having a channel for the passage of a fluid, and an inclined slideway transverse to said channel, of a slide valve movable downward along said slideway by gravity, and an actuating member for shifting said valve upward, those portions of the valve and of the actuating member which engage each other being capable of a transverse relative sliding movement.

2. The combination with a structure having two channels for the passage of fluids of different temperatures, and an inclined slideway transverse to said channels, of a slide valve, made of refractory material, movable downward along said slideway by gravity, and means connected with the end of the valve adjacent to the cooler channel, for shifting said valve upward.

3. The combination with a structure having a channel for the passage of a fluid, an inclined slideway transverse to said channel, and an inclined guide in line with said slideway, of a slide valve movable along said slideway, and a pushing member, separate from the valve yet adapted to engage the same, said pushing member being movable along said inclined guide.

4. The combination with a structure having an upper channel for the passage of a relatively hot fluid, a lower channel for the passage of a relatively cooler fluid, and an inclined slideway transverse to said chan-

nels, of a slide valve of refractory material movable downward along said slideway by gravity, and means, connected with the lower end of the valve, for pushing it upward.

5. The combination with a structure having two channels for the passage of fluids of different temperatures, and a slideway transverse to said channels, of a slide valve movable along said slideway, and valve-shifting means connected with the end of the valve adjacent to the cooler channel.

6. The combination with a structure having a channel for the passage of a fluid, an inclined slideway transverse to said channel, and an inclined guide in line with said slideway, of a slide valve movable along said slideway, and a pushing member, separate from the valve yet adapted to engage the same, said pushing member being movable along said inclined guide and the engaging portions of the valve and of the pushing member respectively being capable of a transverse relative sliding movement.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

LUDWIG CARL FLACCUS.

Witnesses:

GEO. LILIEGUIST,

EMIL SCHMIDT.