

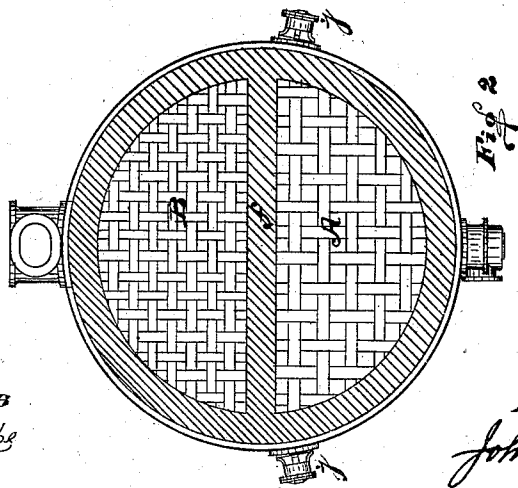
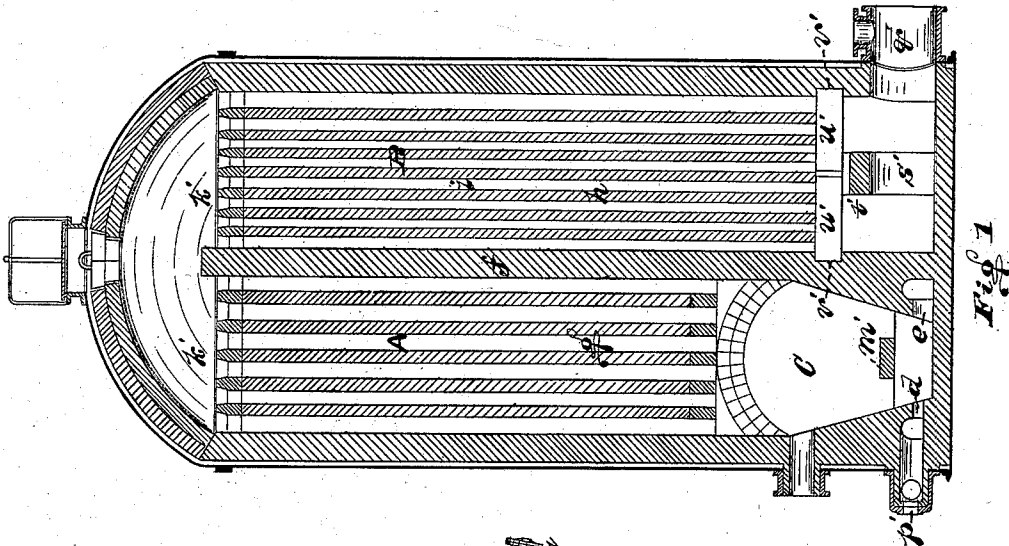
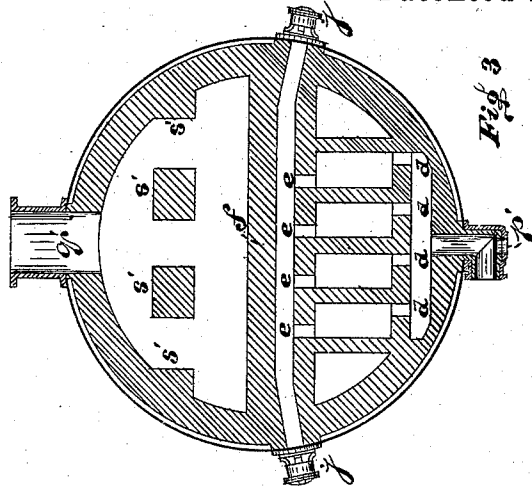
(No Model.)

J. M. HARTMAN.

REGENERATIVE STOVE FOR HEATING AIR.

No. 257,574.

Patented May 9, 1882.



Witnesses
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REGENERATIVE STOVE FOR HEATING AIR.

SPECIFICATION forming part of Letters Patent No. 257,574, dated May 9, 1882.

Application filed October 21, 1881. (No model.)

To all whom it may concern:

Be it known that I, JOHN M. HARTMAN, a citizen of the United States, residing at Philadelphia, in the State of Pennsylvania, have invented new and useful Improvements in Regenerative Stoves for Heating Air or other Gases for Metallurgical Purposes, of which the following is a specification.

This invention relates to improved means for heating air or other gases; and it consists, first, in a new arrangement of regenerators; second, in equalizing the currents of gas and air through the whole of the regenerators. I attain these objects by the means illustrated in the following drawings, in which—

Figure 1 is a vertical section of the stove, showing the regenerators, the combustion-chamber, and piers, arches, and girders for supporting the regenerators. Fig. 2 is a horizontal section of the stove, showing the top of the regenerators. Fig. 3 is a horizontal section of the stove, showing the bottom of the combustion-chamber and the piers under the regenerators.

Similar letters refer to similar parts throughout the several views.

Regenerative stoves, when applied to blast-furnaces, heat the air forced into the furnaces. They consist of an air-tight iron shell lined with fire-brick, and contain a mass of brick-work having numerous vertical passages or flues through it called a "regenerator," and a vertical combustion-chamber alongside of and extending to the top of the regenerator. An opening, *p'*, with a valve at the bottom of the combustion-chamber, admits the gas, and another opening with a valve admits air to burn the gas. The products of combustion ascend the combustion-chamber, descend through the regenerator, heating it up, and finally escape to the chimney through an opening, *q'*, and valve below the regenerator. After gas has been burned through the stove for six hours it is sufficiently heated. The air-valve, the gas-valve, and chimney-valves are now closed, and air is blown through the stove into the furnace for two hours. In its passage through the regenerator the air is heated to 1200° or 1400°, which economizes the coal used in the furnace. After two hours on a blow the air is shut off from the stove, which leaves it full of air under

pressure. A discharge-valve at the bottom of the stove is opened suddenly, which allows the air under pressure to escape from the stove. The gas escaping from the blast-furnace is used to heat these stoves, and during combustion a great amount of dirt and ashes is deposited on the walls from the flame. The time during which the air is being blown through the stove is called "stove on a blow," and the time gas is burning through a stove is called "stove on gas."

Heretofore regenerative stoves have usually been built with a combustion-chamber on one side, and extending the whole height of the stove. Where there is but a single regenerator it is impossible to produce uniform circulation of the gas through each passage of the regenerator, and where there are two or more regenerators, with a combustion-chamber the height of the stove, the cross-division walls of the regenerator occupy so much space that the heating-surface of the stove is seriously decreased. Each additional pass of the gas up and down the regenerators requires more chimney-drafts and higher chimneys.

I prefer to place in each stove two regenerators, A B, and place a short combustion-chamber, C, under one of them. To burn the gas properly in this short combustion-chamber the gas is admitted at the bottom through a number of openings, *d d d*, and the air is admitted through a number of openings, *e e e*, nearly opposite the gas-openings. By this means a short, quick combustion is made before the gas and air reach the regenerator A. Should any of the gas and air pass the regenerator A unconsumed, it will burn in the space under the dome.

By increasing horizontally the space heretofore occupied by the combustion-chamber the first regenerator, A, is increased in horizontal section, which gives more passages or flues, thereby decreasing the friction of the gas, and with it the height of the chimney. Increasing the horizontal section of the first regenerator, as above described, decreases the section of the second regenerator, B. This will give a more even distribution of air and gas through both regenerators, as the flue-area is more nearly equalized between them. It is found by experience that the gas in the stoves concentrates

more at the center and causes the stoves to work hotter there than around the circumference.

I prefer to carry the division-wall *f* above the regenerator, which will cause the gas to ascend above the regenerator in a vertical line before crossing to the second regenerator. This will also cause the gas to descend in a vertical line to the second regenerator, and give an even distribution through that also. The same even distribution will be given to the air by this wall.

The term "regenerative stove," as applied to this patent exclusively, is a stove in which the heat is taken up on the surface of the brick-work forming the regenerator, and is afterward given off from the same surface. This stove is intermittent in action, and is known in the arts as the "single-surface" system. In contradistinction to this is the pipe-stove or "double-surface" system of heating, where the heat is absorbed on one surface and given off on the opposite surface after being transmitted through the pipe. This stove is continuous in operation, and is known in the arts as the "double-surface" system.

I am aware that two parallel regenerators have been used with a parallel combustion-chamber and three division-walls. I am aware that a double-surface system pipe-stove, having two parallel pipe-chambers and a combustion-chamber under one of the pipe-chambers, has been used. I am aware that the walls of a combustion-chamber in a single regenerator stove have been slightly extended above the regenerator.

I claim—

In an air-tight regenerative stove, the combination of the combustion-chamber C at the bottom of the stove, the separate regenerator A above the combustion-chamber, the separate regenerator B, both constructed with vertical passages, and the division-wall *f*, projecting above the said regenerators, substantially as described.

JOHN M. HARTMAN.

Witnesses:

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