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REGENERATIVE GAS HEATER

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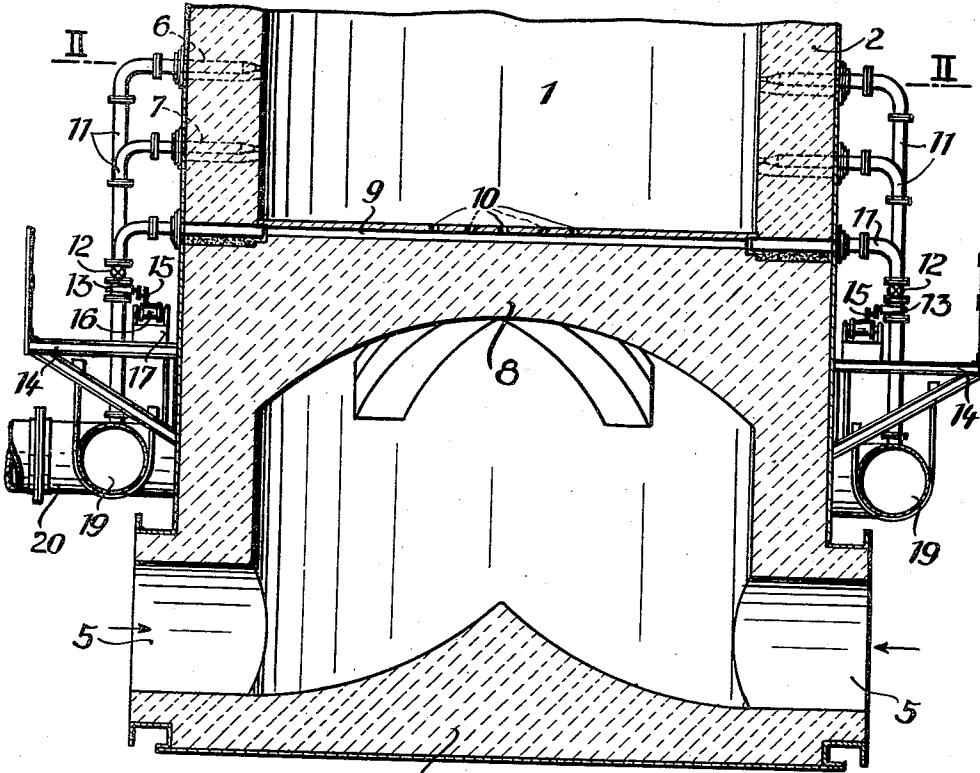


Fig. 1

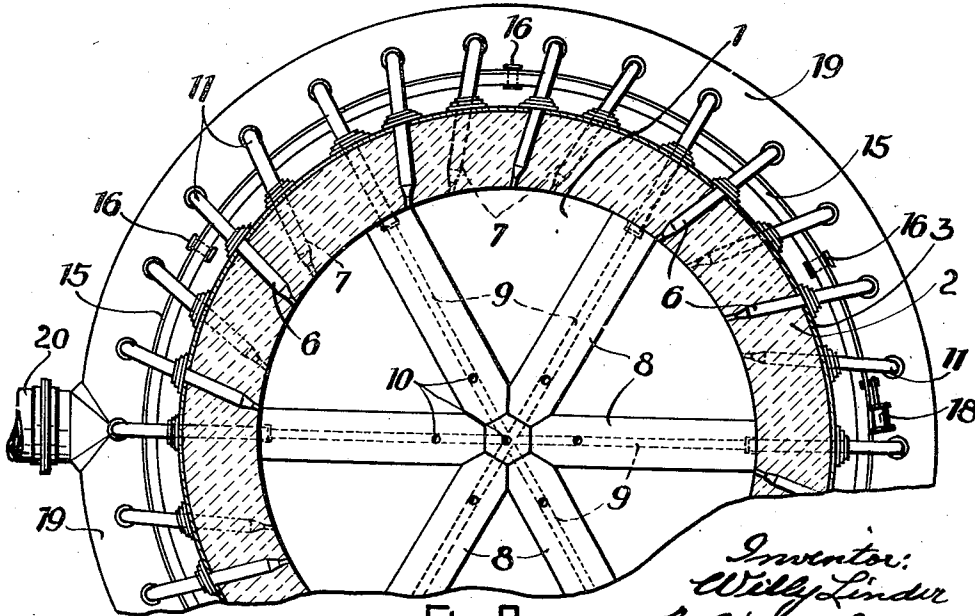


Fig. 2

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REGENERATIVE GAS HEATER

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6 Claims. (Cl. 263—19)

In Letters Patent of Joseph Daniels for improvements in regenerative heaters and the like, No. 2,141,036, a new type of regenerative heaters for gases or vapours, e. g. for gases serving as heat carriers for continually operated water gas producers or for carrying out other gas reactions at high temperatures, is disclosed. That heater is provided with a separate combustion shaft arranged outside the casing for the chequerwork and extending from the dome thereof. In this combustion shaft the combustion of the media serving for the heating of the chequerwork takes place. The burner arranged at the bottom of the shaft according to the above mentioned patent comprises a series of parallel walls extending over the whole cross section of the shaft. Gas and air are introduced separately into alternate spaces between said walls so that a complete combustion is effected over the whole area of the shaft and combustion gases of very high temperature are produced which have no tendency to give what I call surface combustion when touching the chequerwork.

Now, the object of my present invention is to provide further improvements in the burner system of the gas heater and its combustion shaft respectively.

My invention principally consists in providing nozzles for introducing the fuel-gas, which are distributed over the whole circumference of the shaft, said nozzles being arranged radially or tangentially to the shaft axis just above the upper side of arch-like diametrical partition walls which are provided with suitable gas distributing channels which open into further nozzles arranged at the upper side of said partition walls, and the combustion air is introduced into the shaft from the space beneath said arch-like partition walls through the intermediate spaces therebetween.

The burner system according to the present invention is of special advantage with regard to regenerative heaters provided with a combustion shaft of great diameter. My invention ensures a complete and uniform combustion of the fuel gas and air within the combustion shaft of the heater in that the media are perfectly distributed over the whole area notwithstanding its diameter.

With the above and other objects and features of my present invention in view, I shall now describe a preferred embodiment thereof on the line of the accompanying drawing, in which:

Fig. 1 is a vertical section taken longitudinally

through the burning system arranged at the bottom of the combustion shaft.

Fig. 2 is a horizontal cross section on line II—II of Fig. 1.

For simplicity's sake the heater casing comprising the chequerwork and the connection between the chequerwork casing and combustion shaft is not shown on the drawing since these parts of the heater may be designed in any suitable manner.

The combustion shaft, part of which is shown in the drawing comprises substantially a vertical preferably cylindrical chamber 1. The walls 2 of the combustion shaft 1 are made of suitable refractory brickwork which is enclosed by a casing 3 consisting of sheet plate or the like. Near the bottom 4 of the shaft, openings 5 are arranged in the side walls of the shaft for introducing air under pressure. Above the air openings 5 a series of radially or tangentially arranged gas nozzles 6, 7 is provided, preferably in two rows one above the other. The nozzles 6 of the upper row alternate with the nozzles 7 of the lower row, so that a circle of closely adjacent nozzles results.

Below the gas nozzles 6, 7 arched partitions 8 are arranged in the shaft 1, said partitions being provided with gas distributing channels 9. The partitions meet in the centre of the shaft. Gas nozzles 10 are disposed on the upper side of the partitions 8 and the gas channels 9 are connected to the nozzles 10, arranged preferably at uniform distances from the shaft centre.

The gas channels 9 are connected outside the shaft casing with gas pipes 11 controlled by regulable valves 12 and shut-off valves 13. These valves 12, 13 are accessible from a service platform 14. The shut-off valves 13 are actuated by a common mechanism, as by means of a ring-like controller 15 slidably mounted on rolls 16 which are arranged in bearings 17, said bearings 17 being attached to the platform 14. A hydraulically or pneumatically operated piston 18 serves for actuating the controller.

The gas pipes 11 are connected to a ring-like distributing main 19, suspended from the service platform 14 and the ring main 19 is finally connected to the fuel gas supply 20.

After the chequerwork of the heater is heated up the direction of flow is reversed. The gases to be treated are passed first in through the heater. The heated up gases are then drawn off from the heater downwardly through the shaft 1 and are taken off from the shaft 1 through suitable upper gas offtake openings ar-

ranged in the side wall of shaft 1 above the gas nozzles 6, 7, or through the bottom openings 5.

I have now above described my present invention on the lines of a preferred embodiment thereof, but my invention is not limited in all its aspects to the mode of carrying it out as described and shown, since the invention may be variously embodied within the scope of the following claims.

I claim:

1. A combustion shaft comprising nozzle-like openings in the walls of the combustion shaft for introducing fuel gas thereinto, arch-like vertical partition walls arranged within the said combustion shaft below said wall openings, further fuel gas inlets for the upper side of said partition walls, air inlets arranged in the wall of the combustion shaft beneath said partition walls in such a manner, that air introduced through such openings may pass through the intermediate spaces between the partition walls up into the upper part of the combustion shaft.

2. A combustion shaft comprising: an annular series of arch-like diametrically extending partition walls spanning the shaft and meeting at the axis thereof; nozzles for introducing fuel gas for combustion distributed around the shaft and extending through the shaft wall just above the upper surfaces of said partition walls; gas distributing channels extending longitudinally over the upper parts of the partition walls and terminating in nozzles porting upwardly from the upper sides of said partition walls; and combustion air inlet means to the shaft space beneath the partition walls for introducing the air for combustion in the shaft above the arched

walls from the space beneath said walls through the intermediate spaces between the partition walls.

3. Apparatus as claimed in claim 2, and in which the nozzles in the shaft wall are arranged to discharge fuel gas into the shaft tangentially to the shaft axis.

4. Apparatus as claimed in claim 2 and in which the nozzles in the shaft wall are arranged in rows of upper and lower nozzles with the nozzles of each row alternating in position side-by-side with the nozzles of the other row.

5. Apparatus as claimed in claim 2, and in which the nozzles for the gas distributing channels that extend longitudinally over the partitions are arranged around the center of the shaft at a uniform distance therefrom.

6. A combustion shaft comprising: arch-like radial walls extending from the shaft walls towards its axial center and meeting at the center and spaced from each other leaving sector-like spaces just above the lower part of the shaft; fuel-gas nozzles arranged around the shaft and extending through the shaft walls above the upper surfaces of the radial walls and directly communicating tangentially with the shaft chamber above the radial walls; and combustion air inlet means to the shaft chamber below the lower surfaces of the radial walls for introducing air from the space beneath the radial walls through the sector-like spaces between the radial walls, for combustion of the fuel-gas discharged tangentially into the shaft chamber above the radial walls by the aforesaid fuel-gas nozzles therefor.

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