Dec. 3, 1929. J. PLASSMANN 1,737,681

RETORT FOR CARBONIZING BITUMINOUS FUELS

Filed June 14, 1926 2 Sheets-Sheet 1

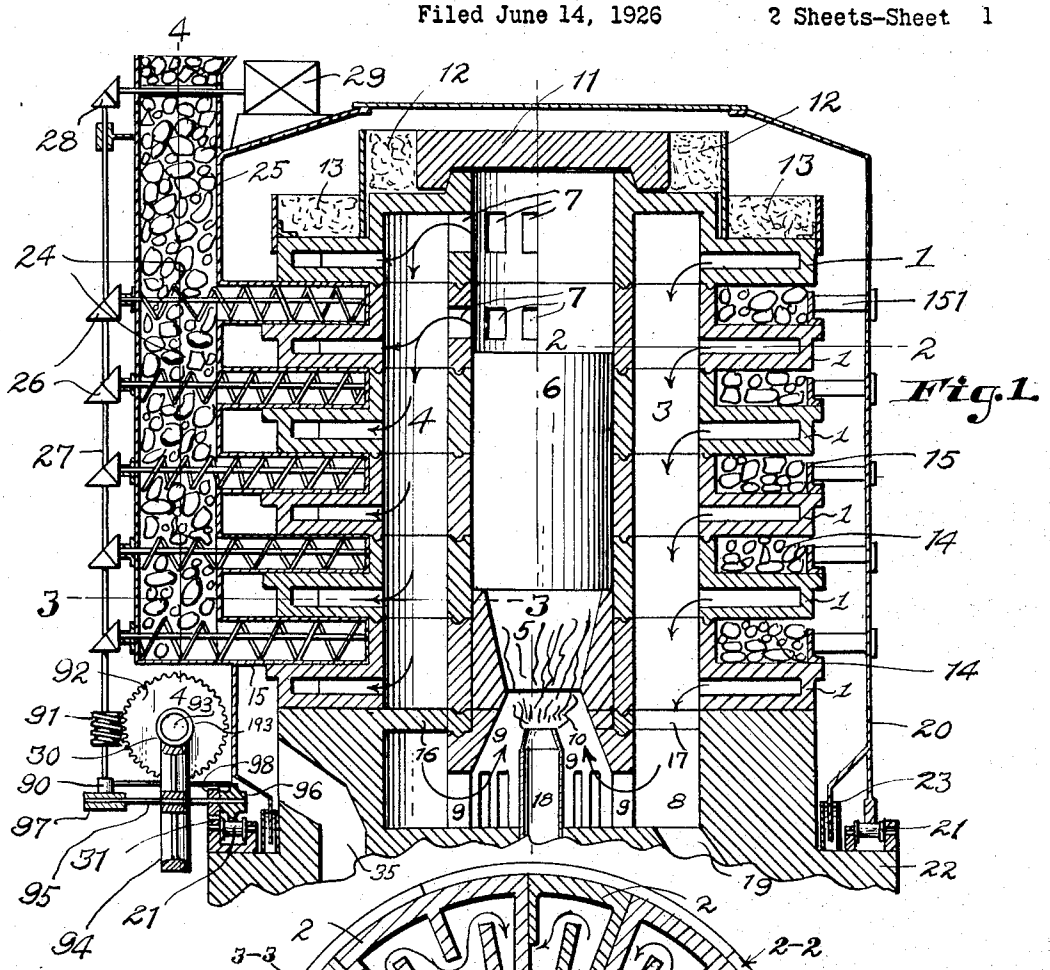


Fig. 1.

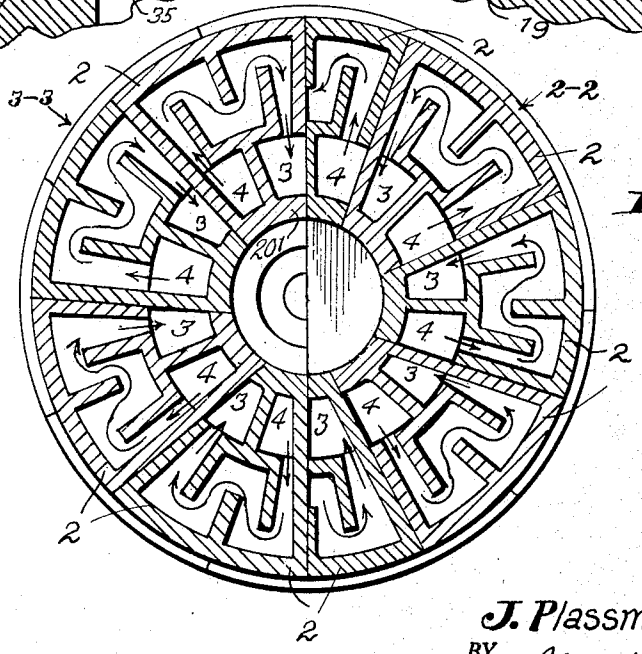


Fig. 2.

INVENTOR.
J. Plassmann
BY Marks & Clerk
ATTORNEYS.

Dec. 3, 1929. J. PLASSMANN 1,737,681

RETORT FOR CARBONIZING BITUMINOUS FUELS

Filed June 14, 1926 2 Sheets-Sheet 2

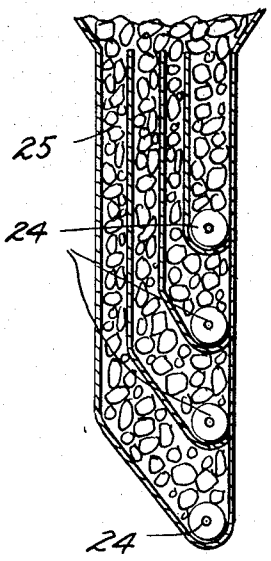


Fig. 3.

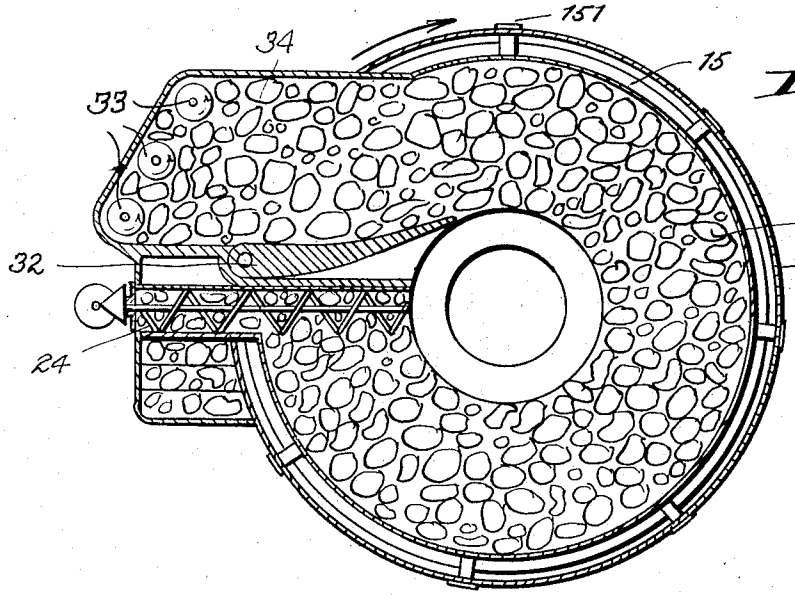


Fig. 4.

INVENTOR.
J. Plassmann
BY Marks & Clerk
ATTORNEYS.

Patented Dec. 3, 1929

1,737,681

UNITED STATES PATENT OFFICE

JOSEF PLASSMANN, OF DUISBURG, GERMANY, ASSIGNOR TO CHEMISCH-TECHNISCHE GESELLSCHAFT M. B. H., OF DUISBURG, GERMANY

RETORT FOR CARBONIZING BITUMINOUS FUELS

Application filed June 14, 1926, Serial No. 115,935, and in Germany June 30, 1925.

This invention relates to a retort for carbonizing bituminous fuel and represents an improvement in regard to the carbonizing and heating chambers shown and described in my Patent No. 1,671,448, May 29, 1929, filed July 10, 1925.

In several cases, especially when the operation of retorts for carbonizing bituminous fuels, is to be effected with high temperatures, the annular carbonizing chambers of the retort, must be made of strongly refractory material, for instance ceramic material. The possibility of producing such a retort is based on the particularity of the hereinafter described construction, in which the annular carbonizing chambers of the retort are composed of segment bodies made of refractory material, the said segment bodies being preferably superposed in rows with the segments of each row offset with respect to the segments of the rows above and below it. As it is possible to subject such an annular chamber retort made of ceramic material to comparatively high temperatures, said retort can be employed for the production of coke and gas in gas generating plants and further for the production of blast furnace coke. In the same manner such a retort can be used for the roasting of ore or similar heating processes. In the production of carbonized gas coke, or of gas coke in gas generating plants, highly heated water-steam can be added to the coke by means of suitable devices, before the coke leaves the retort, in order to increase the final output of gas.

In the accompanying drawing, in which one form of construction of my improved carbonizing retort is illustrated as example,

Figure 1 is a vertical section through the carbonizing retort,

Figure 2 is a horizontal cross section through the same, the left-hand side being a section along the line 3—3 of Figure 1 and the right-hand side a section along the line 2—2 of Figure 1.

Figure 3 is a vertical section along the line 4—4 in Figure 1 and Figure 4 is a cross section through the top carbonizing chamber.

Referring to the drawings, the retort comprises a casing 20 enclosing a set of alternately superposed annular carbonizing chambers 14 and annular heating chambers 1, the carbonizing chambers 14 being closed at their inner circumference. The casing 20 is carried and guided by rollers 21 mounted in bearing members on the foundation 22 and is fitted with a skirt which extends into a water seal 23 for isolating the interior of the retort from the outside air. The means for charging the retort with fuel consists of a series of worms 24 which convey the fuel from a vertical supply container 25 into the carbonizing chambers 14, which are wholly independent of each other. Each worm is located in a separate casing and is rotated by means of bevel gears 26 from a shaft 27 which in turn is driven through bevel gears 28 by a motor 29. The shaft 27 also turns the casing 20 through the intermediary of gearing. On the shaft 27 is fixed a worm 91 which meshes with a worm wheel 92 fixed on a shaft 93, the bottom end of the shaft 27 resting in a footstep bearing 90. On the shaft 93 is also fixed a worm 193 which meshes with a worm wheel 94 fixed on a shaft 95 which at its left hand end is journalled in a bearing 97 and at its right hand end in a bearing 96, both of which bearings are fixed to the casing 20. On the shaft 95 is also fixed a gear pinion 98 which meshes with a circular rack 31 surrounding the retort concentrically and fixed to the foundation 22 of the retort. By this means, when the shaft 27 rotates, the pinion 98 rolls upon the circular rack 31 and drives the casing 20. To each worm casing is attached a scraper 32 which removes the coke from the respective carbonizing chamber 14, the coke being conveyed to breaking worms 33 which crush the larger pieces of coke and convey the whole of the coke into the discharge hopper 34.

The construction of the parts described up to now, with the exception of the carbonizing and heating chambers, is substantially the same as that described in the specification of my Patent No. 1,671,448, May 28, 1929. According to the present invention, however, the carbonizing and heating chambers are formed in a central assembly of separate segments 2 made of ceramic material, said seg-

ments being built up in superposed rows with the segments in each row offset with respect to the segments of the rows above and below it. The inner walls 201 of the segments, when the latter are assembled, form the combustion shaft 5, each segment comprising a shallow portion forming the heating chambers 1 and a deeper portion of smaller radius in which the heating passages 3, 4 are formed, the segments being provided with partitions or baffle walls for guiding the heating gases in opposite directions in adjacent superposed rings of heating chambers.

The heating gases are introduced into the retort through a burner 18 arranged in the bottom of the shaft 5 and flow through a nozzle 10 above which is arranged a heat equalizing accumulator 6 of latticed chamotte stones, through which the gases pass on their way to the upper part of the shaft. Above the accumulator 6, apertures 7 in the walls 201 of the uppermost rows of segments establish open communication between the shaft 5 and the heating passages 4 so as to enable the heating gases to pass into the heating chambers 1. The purpose of the heat equalizing accumulator is to smooth out or neutralize fluctuations in the temperature of the heating gases from the burner 18. From the passages 4 the gases are conducted in the direction of the arrows through the circular chamber segments 2 to the heating channels 3 and from there into the annular space 8 at the bottom of the retort. The guiding of the gases within the segments 2 is effected by the baffle walls therein in such a manner, that in the superposed segment rings the gases are conducted in alternate directions through the segment heating chambers. From the annular space 8 a portion of the gases is led to the nozzle 10 by apertures 9 and then enters the shaft 5 again in order to be conducted through the heat equalizing accumulator 6 again to the apertures 7 and the heating passages 4. The heating gases are drawn into the combustion shaft 5 by the injector action of the hot gases issuing from the burner 18 in conjunction with the nozzle 10. The remainder of the gases in the annular space 8 is allowed to escape from the retort through the outlet passage 19. The upper part of the shaft 5 is closed by means of a cover 11. The uppermost ring is insulated by means of the heat insulating material 12 and 13, which at the same time tightly covers the joints between the separate segments. The fuel is held in position in the carbonizing chambers 14 by means of the rings 15, fixed to the casing 20 by means of holders 151. Above the annular space 8 the cover plate 16 is provided, which has an aperture 17, through which the gases enter from the heating channels 3 into the annular space 8.

The gases generated during the coking of the fuel in the chambers 14 are withdrawn from the space between the casing 1 and the segments 2 by suction through the gas outlet passage 35.

I claim:

1. A carbonizing retort comprising in combination a structural unit comprising an assembly of a plurality of segments made of refractory material, having a hollow portion of reduced radius and a hollow portion of larger radius and capable when assembled of forming a set of alternately superposed annular carbonizing chambers and segmental heating chambers, the former being closed at their inner end and wholly independent of each other, said segments having inner walls which form a central vertical combustion shaft, a casing surrounding said structural unit, said inner walls being provided with openings which establish communication between said combustion shaft and said segmental heating chambers.

2. A carbonizing retort comprising in combination a structural unit comprising an assembly of a plurality of segments made of refractory material offset with respect to one another, having a hollow portion of reduced radius and a hollow portion of larger radius and capable when assembled of forming a set of alternately superposed annular carbonizing chambers and segmental heating chambers, the former being closed at their inner end and wholly independent of each other, said segments having inner walls which form a central vertical combustion shaft, a burner in said combustion shaft for supplying heating gases to said segmental heating chambers, said inner walls being provided with inlet and outlet openings which establish communication between said combustion shaft and said segmental heating chambers, baffles in the segmental heating chambers for guiding the heating gases in opposite directions in adjacent superposed rings of heating chambers and a casing surrounding said structural unit.

3. A carbonizing retort as set forth in claim 1, and having a burner in the combustion shaft and a heat equalizing accumulator in said combustion shaft above said burner comprising an assembly of latticed refractory bricks through which the whole of the heating gases from the burner are capable of being passed, as and for the purpose set forth.

In testimony whereof I affix my signature.

JOSEF PLASSMANN.