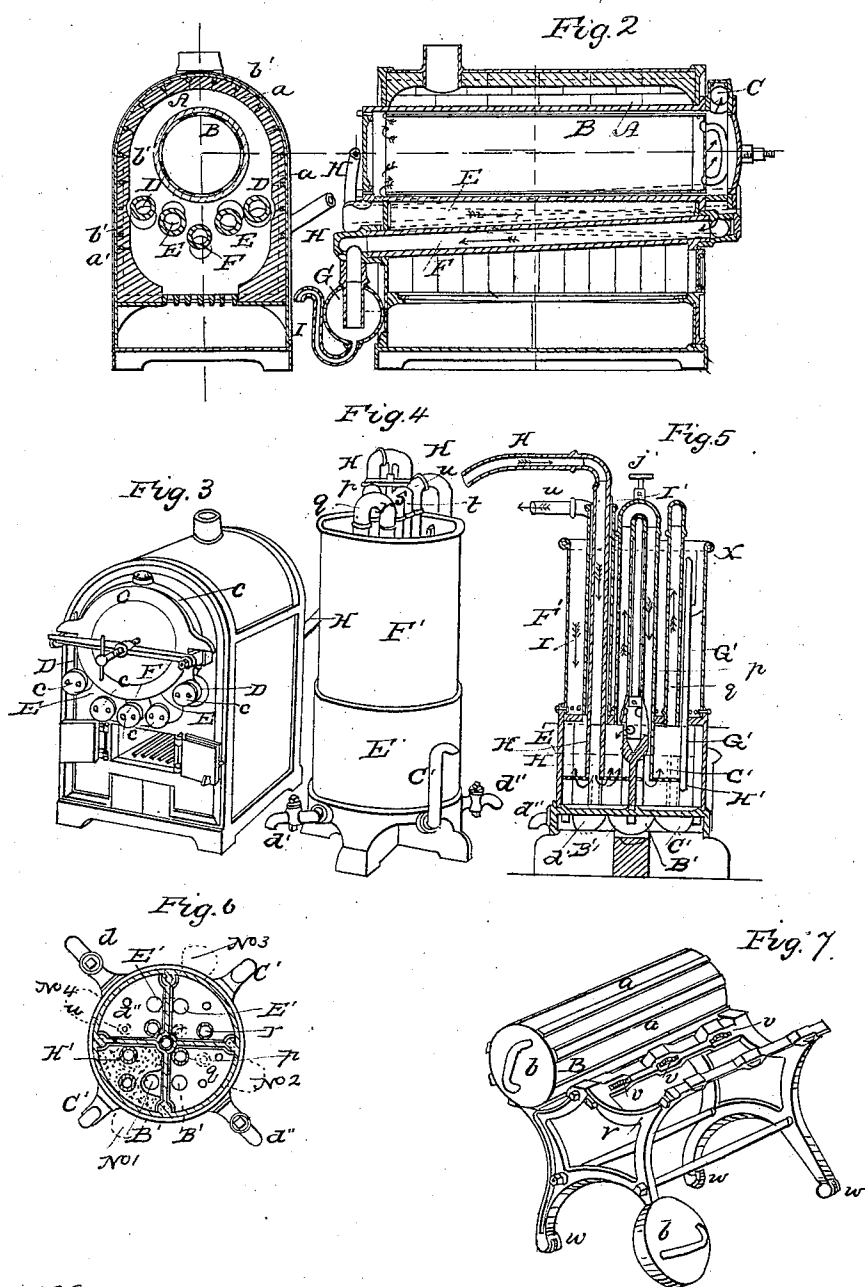


A. SCHWANINGER.

Apparatus for Generating and Purifying Gas.

No. 29,318.

Patented July 24, 1860.



Witnesses
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APPARATUS FOR GENERATING GAS.

Specification of Letters Patent No. 29,318, dated July 24, 1860.

To all whom it may concern:

Be it known that I, ALEXANDER SCHWANINGER, of the city of Milwaukee, in the State of Wisconsin, have invented certain new and
5 useful Improvements in Apparatus for Generating Gas; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings and to the letters
10 and marks thereon.

Of the drawings Figure 1 is a cross section of the gas generator; Fig. 2 a longitudinal section thereof; Fig. 3 a perspective
15 view of the generator; Fig. 4 a perspective view of the condenser, cooler and washer; Fig. 5 a vertical section of the same; Fig. 6 a horizontal section made at the red line of Fig. 5; and Fig. 7 a perspective view of a
20 carriage or trestle for the retort box, with the box upon it, and a cap for the back end of the box shown as lying at the foot of the carriage.

In each of the figures where like parts are shown like letters and marks are used to
25 designate the parts.

The cast iron retort is marked (A), within which is a sheet or plate iron box (B), which box has ribs or projections (*a*) on its exterior surface forming channels or passages for the gas between (B) and (A).
30 The front end of the box (B) is closed, its rear end being open. The material from which the gas is to be generated is put into the box (B) and the box is then shoved into the retort (A). The gas on being formed
35 passes between (A) and (B) from the rear end of (B) to the front end of the retort (A), as indicated by the arrows in Fig. 2, thence into pipes (C) passing down on both
40 sides of the front end of the generator into pipes (D), and thence to the back end of the furnace into pipes (E), and then to the front end again into pipe (F), and through pipe (F) to the back end into the hydraulic
45 tar chamber (G) and through pipe (H) to the condenser, washer and cooler. The tar will run out through the siphon pipe (I).

In using this apparatus the design is to have two boxes like (B), so that when one is
50 withdrawn the other can be inserted. A cap (*b*) is used to cover the back end of the one box when withdrawn and to be kept on while it is cooling and thus save the coke and prevent the escape of its gas or smoke.
55 It will be noticed that pipes (D) (E) (F)

descend or incline downward, so that the tar will run to the chamber (G). The ends of all the pipes have caps (*c*) which can readily be removed when it is desirable to clean them. These pipes are surrounded
60 with the fire, and have a greater amount of fire surface than those of the common construction; and if one is injured or destroyed it can easily be removed without disturbing the others or the retort.

The bottom of the condenser is a cast iron plate, having connecting pipes (B') and siphon pipes (*c'*) and cleaning cocks (*d'*), and forming the foundation of the cooler, condenser, and washer. On this plate rests
65 cylinder (E') which has cross partitions forming four chambers. Near the top of (E') and forming part of the same is a plate or intermediate head with holes to admit the pipes which are fitted in it water-tight. The cylinder (E') extends above this
70 head plate, forming a vertical flange for the attachment of the wrought iron cylinder (F') to which the flange is riveted and a water tight joint formed. The cylinder
75 (F') is the cooler. It is filled with water from a reservoir, the water line being indicated in Fig. 5 by *x*. A siphon pipe (G') passes through the cooler into the washer chamber.

In the center of the cooler and washer there is a cock, which in Figs. 5 and 6 is colored yellow, attached to a stem or rod (*g'*) having at its top a handle (*j'*). By turning this cock I can wash any one or all
80 of the four chambers below, the water passing from the cooler (F') and out through faucets (*d''*), or through siphon pipes (*c'*) as I prefer to have it. In Fig. 6 the cock is represented as open to the wash chamber
85 No. 1, washing that chamber, the tar and impurities passing through pipe (B'), shown on the bottom of Fig. 5, into washer box No. 2 and out through cock (*d''*). By reversing the center cock the water will pass
90 into chamber 3, and out through (B') into chamber 4 and out at cock (*d''*). By turning the center cock one quarter around all the chambers are closed.

In Fig. 6 is shown a washer plate (H')
105 occupying only one chamber, and in Fig. 5 such plate (H') is shown on the lower end of gas pipe (H) and covering the whole surface of the four washer chambers. The gas having passed through pipe (H) into
110

the chamber below washer plate (H') comes up through small holes thus spreading and being washed perfectly and thoroughly.

In the cooler (F') is a cylinder or pipe 5 (I'), inclosing pipe (H), which is secured on the intermediate plate of (E') and is water tight, and through this pipe or cylinder (I) pipe (H) passes into the water chamber, the heat from the pipe (H) escaping out of the top of the pipe (I), and 10 thus the water in the cooler (F') is not so much heated while the gas is received in the washer box warm. Passing in through (H), see Figs. 4, 5, and 6, the gas rises up 15 through pipe (o), goes down pipe (p), up through (q), down through (r), up through (s), down (t), up (u), and thence to the purifier and gas holder.

The carriage or trestle (V), Fig. 7, is for 20 the purpose of handling the retort boxes. In the bed for the boxes are small rollers (v) upon which, when the box is filled, it can be easily run into or out of the cast iron retort. This carriage will accommodate two boxes. 25 It has rollers (w) on its feet and can be run upon a track made and placed in a suitable condition for the retorts. The one box charged with the material for forming gas resting on one of the beds the carriage is 30 moved up opposite to the retort, the box drawn out and placed on the empty bed of the carriage and the cap (b) placed upon its open end, the carriage then being moved laterally so as to bring the fresh charged 35 box opposite to the retort. This box is shoved into the retort and the carriage moved back to deliver the expended or coke box.

By referring to Figs. 1 and 2 of the drawings it will be perceived that the outside or 40 shell of the furnace, which is made of cast

iron, has attached to its inner surface projections (a') with somewhat inclined or beveled sides, which projections are of about half the thickness of the bricks (b') which 45 constitute the fire surface of the furnace, and that while the one half of the bricks rest within recesses formed by these projections the other half of their edges or sides are in contact. This manner of attaching 50 the bricks to the cast iron shell entirely protects the metal from the actual contact of the fuel, and gives a perfect and uniform brick surface or lining to the furnace, allowing of any one or more bricks, broken or imperfect, to be removed without disturbing 55 the other bricks. It will, further, be perceived that the retort and the entire series of alternately inclining pipes are so arranged and placed within the furnace that they are entirely surrounded by the heat, 60 and that any one or more of the parts or pieces composing this series or arrangement may be inspected or removed and replaced without disturbing the other pieces or parts.

What I claim as my invention, and desire 65 to secure by Letters Patent, is—

The retort-box constructed with the ribs and arranged within the retort as described in combination with the arrangement of pipes, whereby the retort and pipes are 70 entirely surrounded by heat, the tar allowed to flow down and the retort box or any one of the pipes can be removed without disturbing the other parts as herein set forth.

This specification signed at Milwaukee 75 this 19th day of May 1860.

ALEX. SCHWANINGER.

Witnesses:

JOHN CUMMINGS,
ALEXANDER C. COLZHAUSEN.