No. 718,887. PATENTED JAN. 20, 1903.

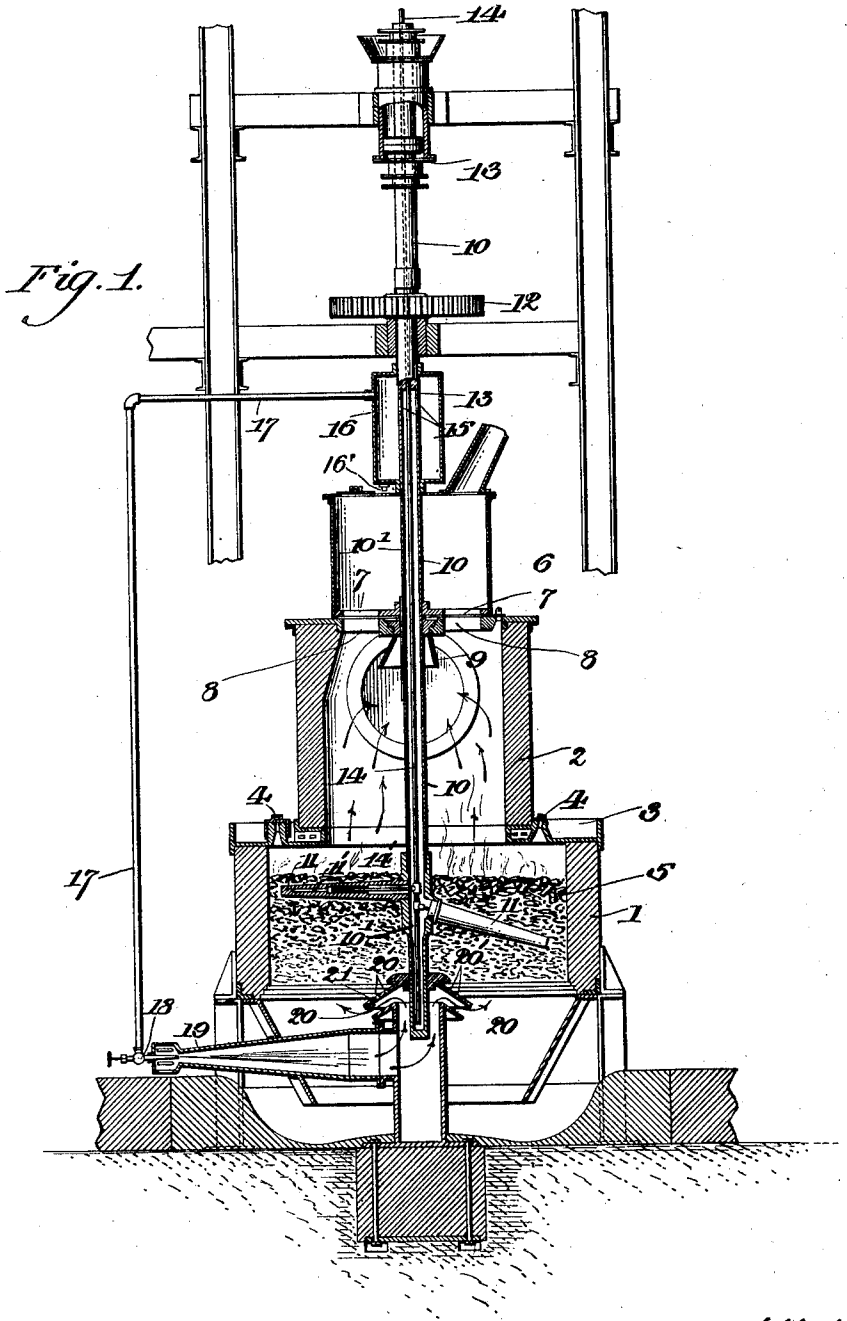
B. TALBOT.

PROCESS OF MAKING GAS.

APPLICATION FILED MAY 6, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.



WITNESSES:

Utley Crane

INVENTOR:

Benj. Talbot,

By Charles N. Butler,

Atty

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 2.

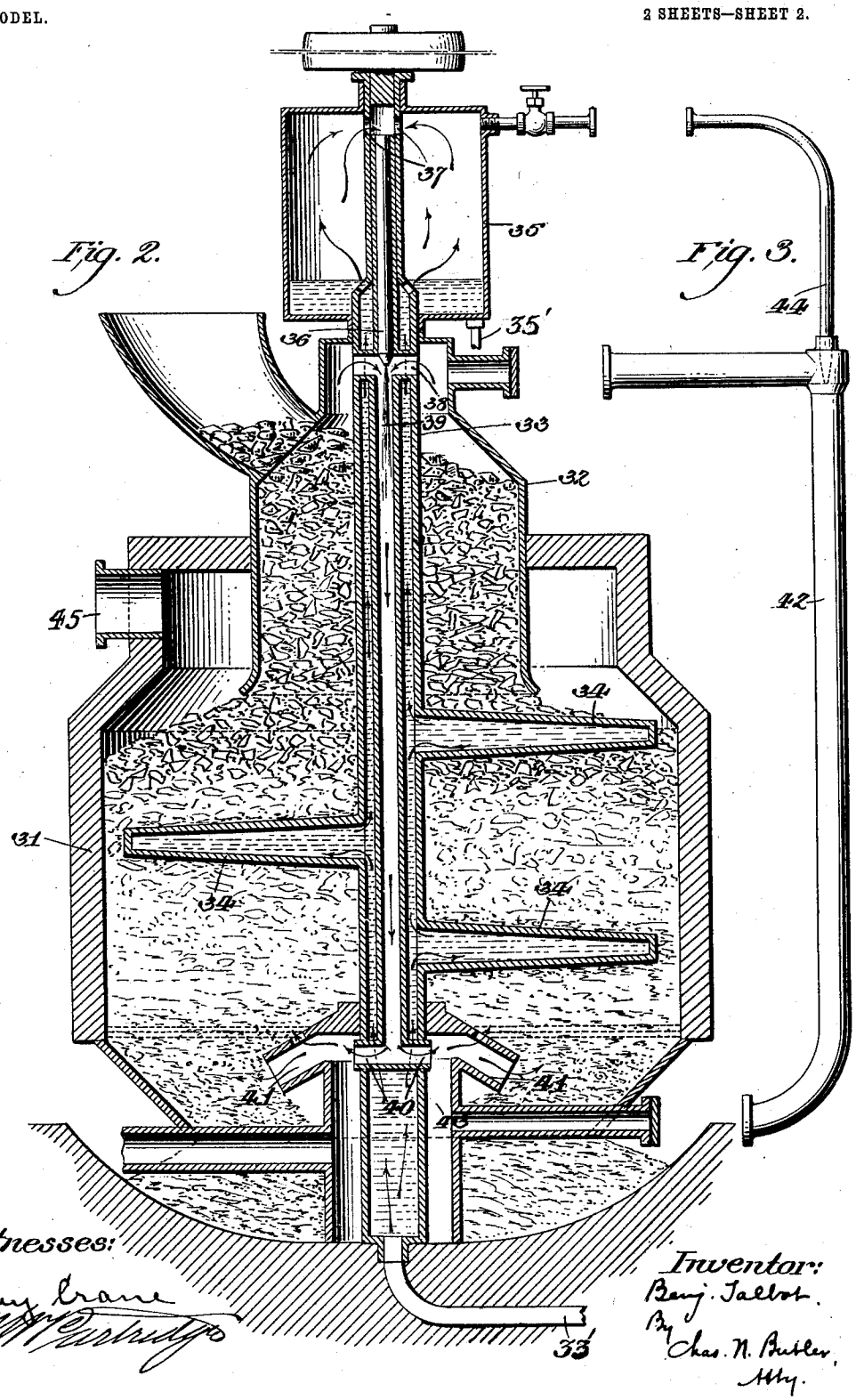


Fig. 3.

Witnesses:

Utley Crane

W. F. Gerhardt Jr.

Inventor:
Benj. Talbot.
By Chas. N. Butler,
Atty.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

BENJAMIN TALBOT, OF LEEDS, ENGLAND.

PROCESS OF MAKING GAS.

SPECIFICATION forming part of Letters Patent No. 718,887, dated January 20, 1903.

Application filed May 6, 1902. Serial No. 106,925. (No specimens.)

To all whom it may concern:

Be it known that I, BENJAMIN TALBOT, of Leeds, county of York, England, have invented certain new and useful Improvements in the Manufacture of Gas, of which the following is a specification.

In the manufacture of gas by the distillation of coal with air and steam for heating furnaces and driving engines it is a chief desideratum to produce as much carbon monoxid as possible in proportion to the consumption of coal, to recover the ammonia that is evolved, and to use the least amount of steam compatible with the results desired. The volatile products evolved in the process of distillation contain carbon monoxid, carbon dioxid, ammonia, and more or less carbonaceous matter that has not been permanently gasified, but condenses. The carbon dioxid is evolved in the presence of an excess of oxygen at a high temperature and is transformed in a greater or less degree into carbon monoxid by combination with further carbon evolved at a region of combustion of lower temperature and less oxygen, while the condensing carbonaceous products are evolved in the absence of much oxygen at a temperature below that of the regions of combustion, this product not being subjected to such conditions as to result in its conversion into permanent gas. The ammonia evolved is dissociated at high temperatures, and to prevent this it has been considered necessary to flood the producer with steam; but the use of a large amount of steam results in the production of a poor gas, low in carbon monoxid and high in carbon dioxid, and also involves material expense for the production of the steam.

It is the object of this invention to facilitate the combination of carbon dioxid with carbon, to produce a large amount of carbon monoxid, to prevent the dissociation and facilitate the recovery of ammonia, and to oxidize the condensing carbonaceous products.

I have found that I can produce a rich gas high in carbon monoxid and low in carbon dioxid, recover large quantities of ammonia with the use of little or no steam, and oxidize the condensable carbonaceous products by maintaining a comparatively uniform layer of coal at a temperature approximating the temperature of combustion of carbon at the surface of the body of burning coal, preventing the formation of incandescent craters or vertical cavities in the upper strata and stirring the distilling body transversely by means of water-cooled mechanism adapted for regulating the rate of combustion and distributing air to the regions of combustion by preference with only so much steam as is required for the introduction of the necessary quantity of oxygen.

In the accompanying drawings, Figure 1 is a vertical sectional view of a gas-producer adapted for the practice of this invention. Fig. 2 is a vertical sectional view showing a modification of the mechanism illustrated in Fig. 1, and Fig. 3 is an elevation of mechanism for modifying the operation of the gas-producer shown in Fig. 2.

As shown in Fig. 1 of the drawings, the operation is practiced in a gas-producer having a body 1, with a neck 2 connected therewith by the water-cooled channel 3, through which there are openings 4, giving access to the distilling-coal 5. A hopper 6, having revolving feeding mechanism 7, supplies coal regularly through the several openings 8, and a revolving spreader 9 distributes it in the producer-neck as it falls to the producer-body. The revoluble and longitudinally-movable shaft 10, which operates the feeding and spreading mechanism, carries the arms 11, which are revolved at different elevations through the body of coal by means of the wheel 12 and piston 13, as required for spreading the coal and keeping it in loose condition for the perfect circulation of the gases therethrough. The shaft 10 has the chambers 10′, and the arms 11 have the chambers 11′, to which water is supplied by the pipe 14 and branches 14′, the water cooling the stirring apparatus, regulating the temperature of the body of coal, and providing steam for introducing the air required for combustion. The chamber 10′ is provided with the outlets 15, through which steam and water are delivered to the drum 16, having a trapped outlet 16′, by which the desired level or head of water is maintained

in the drum, the steam being carried by a pipe 17 to a valve-controlled jetting device 18, located in the intake of the air-pipe 19, which leads by the passages 20 beneath the hood 21 of the blast-pipe and the passages 20′ therethrough to the incandescent zone of the fuel in process of combustion. By this mechanism the coal may be regularly fed and uniformly distributed, so that upon the incandescent body there is maintained a complete covering of fuel at a temperature approximating that of the combustion of coal in which craters and vertical openings are prevented from forming, while the body is kept loose by the uniform revolution of the stirrers, which are adapted for both regulating the rate of combustion and supplying steam for introducing the air necessary for combustion.

As shown in Fig. 2, the producer-body 31 has the neck 32, constructed as a retort, extending into the body, through which coal is supplied to the fuel in process of combustion and in which a quantity of coal is maintained. The revoluble hollow shaft 33, having an inlet, as 33′, for the admission of water, carries the arms 34, which spread the coal and keep the burning fuel in loose condition. Water circulating through the shaft and arms into the drum 35, which collects the steam therefrom, the drum having a trapped outlet 35° for regulating the head or level of water therein. The shaft 33 contains a steam-jetting nozzle 36, to which steam from the drum 35 is supplied by the apertures 37. The steam-jet draws the products of distillation which rise in the retort 32 through the apertures 38 into the conduit 39, which has the outlets 40 into the passages 41, by which air is supplied to the coal.

As shown in Fig. 3, a conduit 42 may be connected with the top of the retort 32 and with the air-inlet passage 43 for carrying the products of distillation which rise in the retort to the incandescent zone of the producer, a steam-jet 44 being employed to induce the flow through the conduit. This mechanism regularly feeds and uniformly distributes coal to the regions of combustion, the permanent gases formed at a temperature of combustion rising from the surface of the coal in the producer-body and passing through the outlet 45, while the condensable carbonaceous matters distilled in the retort and at a temperature lower than that of producing the permanent gases are carried back to the incandescent zone of the producer-body for oxidation.

The mechanism permits the circulation of water through the stirring device, by which and the coördinate operations the rate of combustion may be controlled.

Having described my invention, I claim—

1. The manufacture of gas by the distillation of coal, which consists in uniformly feeding and spreading coal upon the surface of a bed of distilling coal, uniformly stirring said bed of coal transversely and preventing the formation of craters through the surface thereof, regulating the rate of combustion by means of said stirring operation, and introducing air to the zone of combustion at a rate regulated by means of a regulable steam-jet, substantially as specified.

2. The manufacture of gas by the distillation of coal, which consists in uniformly feeding and spreading coal upon the surface of a bed of distilling coal, maintaining a temperature approximating that of the combustion of carbon at the surface of said bed of coal, uniformly stirring said bed of coal transversely and preventing the formation of craters through the surface thereof, and introducing air to the zone of combustion, substantially as specified.

3. The manufacture of gas by the distillation of coal, which consists in uniformly feeding and spreading coal upon the surface of a bed of distilling coal, maintaining the upper stratum or strata of the body of coal at a temperature approximating that of the combustion of carbon, uniformly stirring said body of coal transversely and preventing the formation of incandescent craters or cavities through the upper stratum or strata thereof, regulating the rate of combustion by the circulation of water through said stirring mechanism, and introducing air to the zone of combustion, substantially as specified.

4. The manufacture of gas by the distillation of coal, which consists in maintaining a temperature approximating that of the combustion of carbon at the surface of the body of distilling coal, uniformly stirring said body of coal transversely so as to prevent the formation of craters or vertical openings in the upper strata thereof, regulating the rate of combustion by circulating water through mechanism revoluble through said body of coal, and introducing air to the zone of combustion by means of steam limited to the amount necessary for supplying the amount of oxygen required for efficient combustion, substantially as specified.

5. The manufacture of gas by the distillation of coal, which consists in stirring a body of distilling coal, circulating water through the stirring mechanism, collecting steam from water heated by circulation through said stirring mechanism, and utilizing said steam for inducing combustion in said body of coal, substantially as specified.

6. The manufacture of gas by the distillation of coal, which consists in stirring a body of coal in process of combustion, circulating water through the stirring mechanism, and effecting the return of products of distillation to the region of combustion by means of said water circulating stirring mechanism, substantially as specified.

7. The manufacture of gas by the distilla-

tion of coal, which consists in stirring a body of coal in process of combustion, regulating the rate of combustion by the circulation of water through the stirring mechanism, and returning the condensable products of distillation to the incandescent zone of the distilling coal, substantially as specified.

In testimony whereof I have hereunto set my hand in the presence of the subscribing witnesses.

BENJAMIN TALBOT.

Witnesses:
UTLEY E. CRANE,
THOMAS S. GATES.