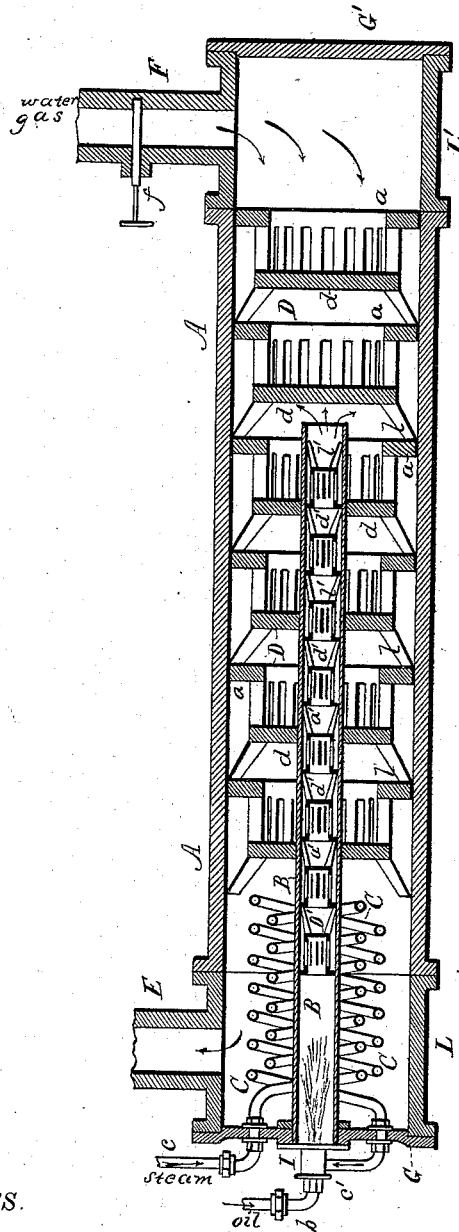


(No Model.)

A. G. MEEZE.
PROCESS OF MANUFACTURING GAS.

No. 382,374.

Patented May 8, 1888.



WITNESSES.

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ARTHUR G. MEEZE, OF REDHILL, COUNTY OF SURREY, ENGLAND.

PROCESS OF MANUFACTURING GAS.

SPECIFICATION forming part of Letters Patent No. 382,374, dated May 8, 1888.

Application filed October 29, 1887. Serial No. 253,747. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR G. MEEZE, a subject of the Queen of Great Britain, residing at Redhill, in the county of Surrey, England, have invented certain new and useful Improvements in the Process of Manufacturing Gas; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to the manufacture of illuminating-gas by the mutual decomposition of steam and hydrocarbon fluid in contact with suitable heated surfaces—such as deflecting and impact devices—and by combining with the nascent gases and vapors of such decomposition a suitable regulated proportion of natural gas, hydrogen, carbonic oxide, or mixture of hydrogen and carbonic oxide, commonly known as “water-gas,” preferably in a heated condition.

The object of the invention is to produce thorough decomposition and recombination of the steam and hydrocarbon oil, and to combine with the rich hydrocarbon gas and vapor in the nascent state a chemically-active or combustible diluting agent—such as hydrogen, marsh-gas, or carbonic oxide—and cause the formation of fixed light-giving compounds of high candle-power.

My process will be described in detail in the description of the operation, and the matter constituting my invention will be defined in the claims.

A suitable apparatus for carrying out my invention is illustrated in the accompanying drawing, which represents a vertical longitudinal section of a double or through retort containing a steam-superheating coil, an ingress-pipe, and deflecting and impact devices.

I preferably use a fire-clay retort, A, of the double-length variety, having a mouth-piece, L L', and lid G G' at each end, and of any convenient cross-section, such as round, elliptical, or D-shaped. A number of retorts may be set in a bench and fired like ordinary gas-coal-distilling retorts. It is also my purpose to adapt existing coal-gas retorts for carrying out my process by fitting them with the internal devices and connections herewith described. In connection with my retorts suit-

ably set in benches I provide a steam-boiler, an oil-tank, and preferably an exhauster and motor. (Not shown in the drawing.)

The body of the retort is filled with deflecting and impact devices D, each composed of an annulus, *a*, disk *d*, a connecting-body having numerous narrow longitudinal openings, and inclined spacing or separating legs *l*. The deflecting devices D are made of a shape to correspond with the cross-section of the retort, so as to provide uniform passages between them and the walls of the retort. Two or more of the deflectors at the right-hand or rear end of the retort, where the water-gas is supplied, are made with solid disks *d*, to act as heaters for the inflowing water-gas; but the remaining deflectors have their disks *d* provided with central perforations to receive the ingress-pipe or small retort B. This internal retort, B, is preferably made of thin wrought-iron or other suitable metal, and of about one-fourth to one-sixth the diameter of the surrounding retort A, and long enough to extend from the front to about two-thirds or three-fourths the length of such outer retort, as shown. It is neatly fitted at its front end in an opening in lid G, and is provided with a flange or ring shrunk thereon, which may be bolted to the lid, and is supported centrally in retort A by deflectors D, as shown. Deflectors D', made with rings *a'*, disks *d'*, and legs *l'*, and preferably of cast-iron, are fitted in retort B from its rear open end to near its front end, leaving sufficient space at front for the proper injection of steam and oil. The injector I is fitted by a flange to lid G, so as to open centrally into retort B. The double steam-superheating coil C is preferably arranged at or near the front of retort A around retort B, and steam-supply pipe *c* connects with its induction end through the lid, while pipe *c'* leads from its outlet end through the lid to injector I. A supply-pipe, *b*, for petroleum, shale-oil, or other hydrocarbon fluid, also connects with injector I. The steam-pipe may connect with the front end of the injector, while the oil-pipe connects with its top or side. A pipe, F, having controlling-valve *f*, connects with mouth-piece L', for supplying hydrogen gas or water-gas. Stand-pipe E, leading to the hydraulic main or seal-box, connects with mouth-piece L'. The lid G, steam-coil C, and injector

I may be so connected that they may be removed together without disturbing the ingression-pipe or retort B.

The deflectors D in the outer retort are preferably made of refractory material, though they will do good service if made of metal. Vapors and gases—such as steam, oil-vapor, and gas—cannot be effectually heated, decomposed, and combined by radiation from contiguous hot surfaces, and I have found it necessary to cause the vapors and gases to pass by direct and repeated impact in contact with the hot surfaces extending through the area of the retort, in order to effect their uniform and economical decomposition and combination to form a homogeneous fixed gas. For securing the improved results above stated I have found the deflecting and impact devices D D' to admirably answer the purpose. They are important features in successfully carrying out my process.

In order to manufacture gas the operation is as follows: The retorts are fired in the ordinary way, and when heated to the proper gas-making temperature, well known to engineers, a supply of high-pressure steam from the boiler is admitted by pipe *c* through an ordinary regulating-valve to the superheating-coil C, where it is highly superheated, and thence to injector I. The hydrocarbon oil is then admitted in regulated quantity from the supply-tank by pipe *b* to the injector, from which it is thrown in a vapor-spray by the jet of superheated steam into ingression-pipe or retort B. The steam and oil-vapors are thoroughly mixed and highly heated, nearly to the point of decomposition, by contact with the deflecting and impact devices D' in their passage through retort B, and are discharged therefrom into outer retort, A, where the production of fixed gas at once begins. After gradually admitting oil to the injector, hydrogen (light carbureted hydrogen, such as natural gas or water-gas) is admitted in regulated quantity from a holder or other source of supply through pipe F into the rear of retort A, where it is heated by contact with deflectors D. The heated gas meets the highly-heated current of oil-vapor and steam flowing from retort B, and the mixture flows in contact with the deflecting and impact devices surrounding retort B, resulting in their complete decomposition and recombination to form a fixed high-grade illuminating-gas. In this reaction hydrogen gas chemically unites with the rich hydrocarbon vapor or gas in the nascent state to form fixed carbureted hydrogen gas of a merchantable character, and some of the carbonic oxide and marsh-gas enter into new combinations, by which the light-giving quality of the final product is improved. The hydrocarbons are thus all utilized and prevented from being destructively decomposed with the formation and deposit of lamp-black or hard carbon on the one hand, or, on the other hand, from passing off in the form of tarry condensable vapor.

The exact proportion of oil and steam ad-

mitted through the injector is readily determined by the operator by means of a test-light or other suitable test, and will necessarily vary considerably with the character of the hydrocarbon oil used and the candle-power of gas desired. An exhaustor and motor are preferably used for drawing off the gas as generated.

The apparatus herein described is not claimed in this application, as it is made the subject of a separate application, filed December 8, 1887, for apparatus for manufacturing gas.

It has heretofore been proposed to decompose steam in a bed of fuel in a furnace and pass the whole resulting product without regulation or control of the flow directly into a flue leading to a superheater, and at the same time to cause petroleum to flow upon an inclined table and be vaporized by the heat thereof, and the vapors to descend through the flue along with hydrogen or other gases from the generator or furnace. It is stated that these gases comingling and being fixed by the heat of the superheater pass off to the holder. In the above connection it is also described that steam may be passed into an annular chamber around the upper part of the generator, so that the highly-heated steam comes into contact with the petroleum dropped upon the shelf and aids in vaporizing the same.

My process is distinguished from the above in the fact that the steam and hydrocarbon oil are injected in regulated proportions into a heated chamber, where the oil is vaporized and the vapors thoroughly mixed with the steam, and the mixture highly heated by special means, which I have described above. The thorough mixture and preliminary heating of the oil-vapor and steam have not been performed by others in the manufacture of gas from oil, steam, and afterward a diluting-gas—such as hydrogen or water gas—added.

Another distinguishing feature in my process is that of admitting the diluting-gas in regulated and controlled quantity and proper proportion to the mixing and fixing retort, and there heating it before admixture with the heated steam and oil-vapor, so that a gas of more even quality and controlled candle-power may be produced.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The process of manufacturing gas which consists in first injecting steam and hydrocarbon oil into a heated chamber or retort and therein vaporizing the oil, thoroughly mixing the vapor with steam and highly heating the mixture, then heating hydrogen or water gas in a separate chamber and mixing it while hot with the heated mixture of oil-vapors and steam, and causing decomposition and recombination by passing the mixture by direct impact in contact with numerous heated deflecting-surfaces till it is converted into a fixed gas.

2. The process of manufacturing gas which consists in injecting steam and hydrocarbon

oil in regulated quantities into a heated chamber or retort and therein vaporizing the oil, thoroughly mixing the vapor with steam and highly heating the mixture, admitting a regulated quantity of hydrogen or water gas into a retort, heating it and mixing it while hot with the highly-heated mixture of oil-vapors and steam, and causing decomposition and recombination by passing the mixture by direct

impact in contact with numerous heated deflecting-surfaces till it is converted into a fixed gas.

In testimony whereof I affix my signature in presence of two witnesses.

ARTHUR G. MEEZE.

Witnesses:

W. H. H. YOUNG,
D. S. HAMMOND.