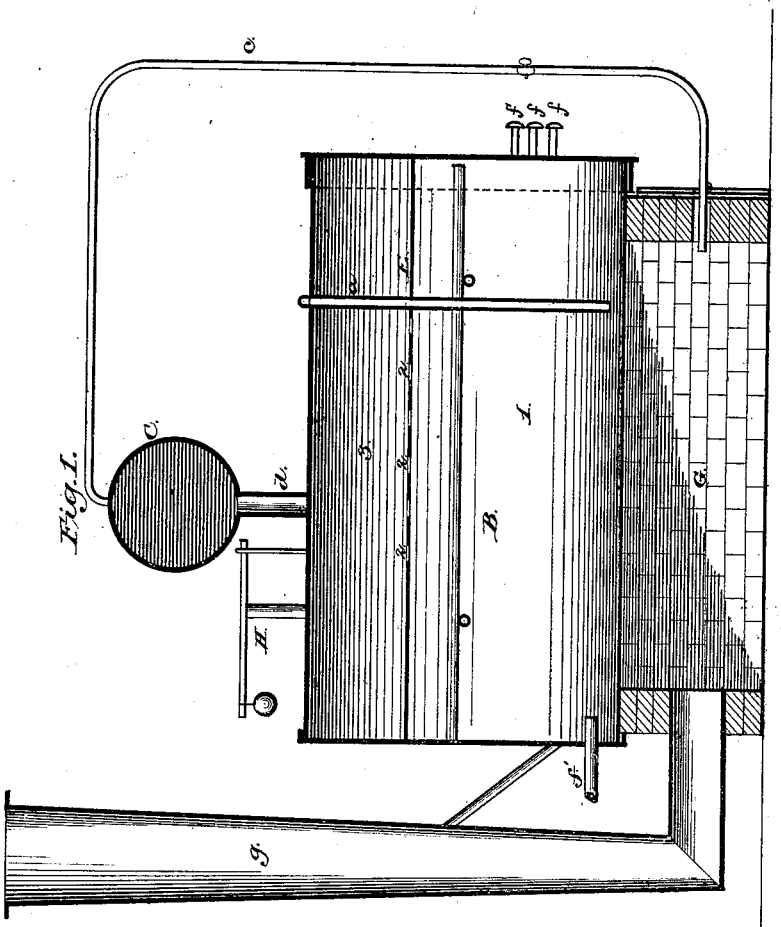
3 Sheets—Sheet 1.

# W. S. GILLEN.

## Process and Apparatus for Preparing Hydrocarbon Gas from Gas-Wells.

**No. 199,363.** **Patented Jan. 22, 1878.**

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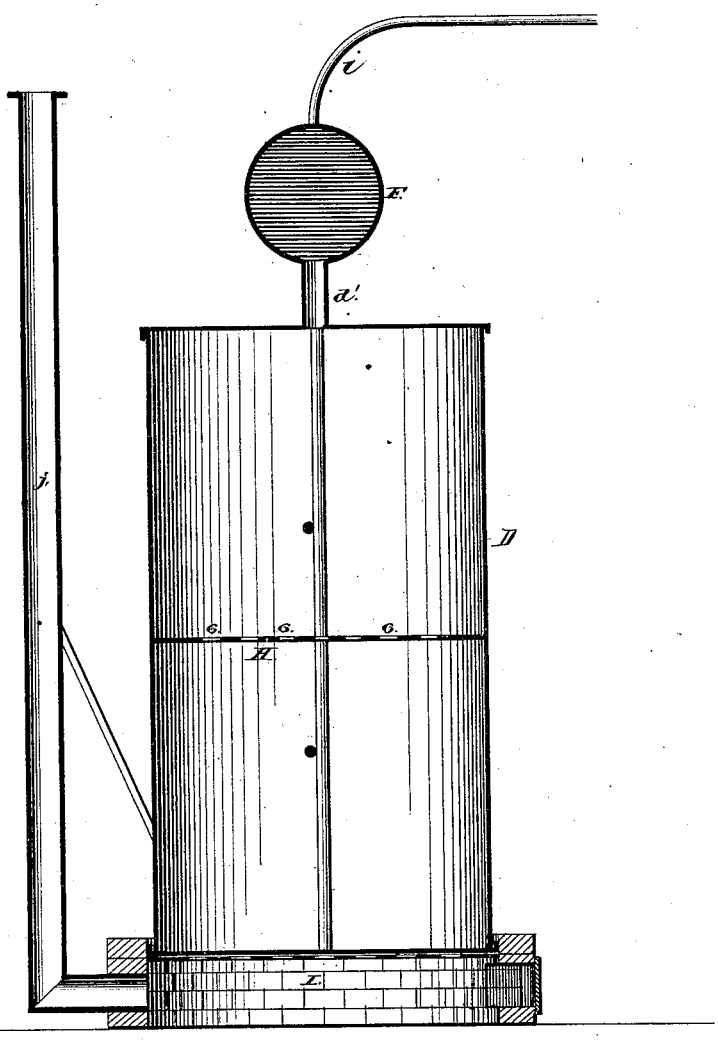
## Process and Apparatus for Preparing Hydrocarbon Gas from Gas-Wells.

**No. 199,363.** **Patented Jan. 22, 1878.**

*Fig. 2.*

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3 Sheets—Sheet 3.

# W. S. GILLEN.

## Process and Apparatus for Preparing Hydrocarbon Gas from Gas-Wells.

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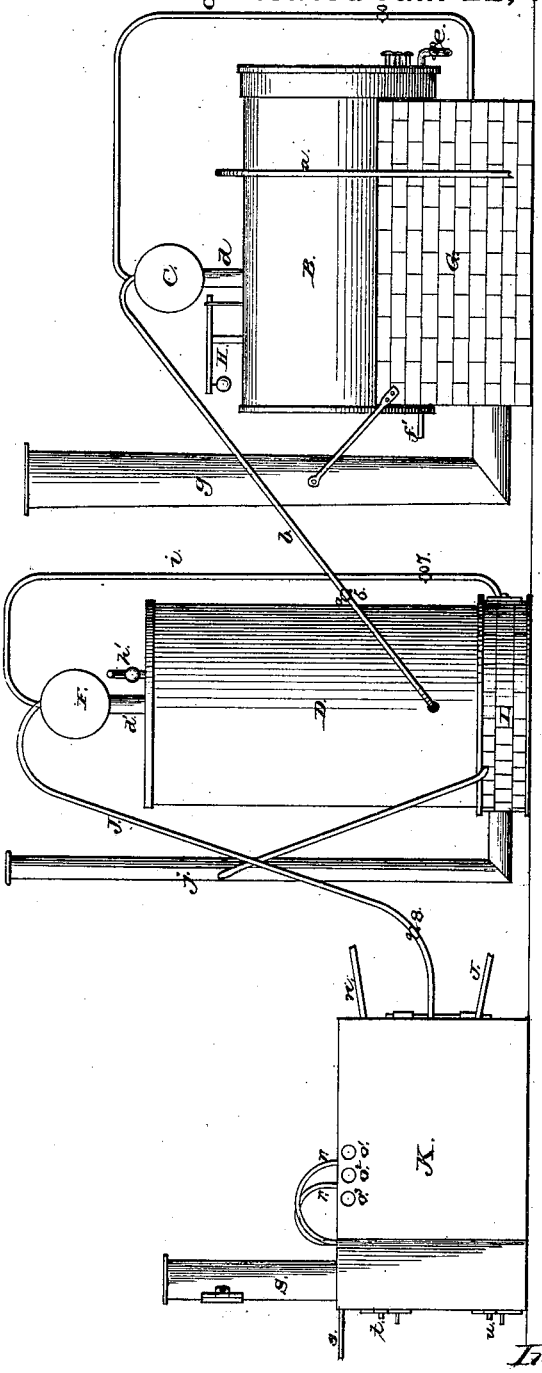

Fig. 3

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# UNITED STATES PATENT OFFICE.

WILLIAM S. GILLEN, OF PITTSBURG, ASSIGNOR TO DAVID B. ASHBAUGH, OF LEECHBURG, AND H. C. CAMPBELL, OF PITTSBURG, PA.

## IMPROVEMENT IN PROCESSES AND APPARATUS FOR PREPARING HYDROCARBON GAS FROM GAS-WELLS.

Specification forming part of Letters Patent No. **199,363**, dated January 22, 1878; application filed February 16, 1877.

*To all whom it may concern:*

Be it known that I, WILLIAM S. GILLEN, of the city of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Process and Apparatus for Preparing Hydrocarbon Gas from Gas-Wells or other gas-supply as fuel for furnaces for manufacturing purposes; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawing, and to the letters of reference marked thereon, which form a part of this specification.

The hydrocarbon gas from oil or gas wells is mixed with vapor and water, the quantity of which varies. The vapor and water mingled with the gas condenses it to such a degree that it cannot be used while in that state for manufacturing purposes.

In order to prepare this gas as a fuel to be used in furnaces for manufacturing iron and steel, I have devised a process, produced by means of the following apparatus, to attain the required chemical result, viz.:

First, a boiler, constructed of boiler-iron, that will withstand a high pressure, and of such size and shape as may be desired or required. It is provided with a water-supply pipe, mud-valve, water-gages, and safety-valve, having in the inside a perforated plate, which is firmly fastened to the sides and ends near the middle of the boiler, which is intended to be laid horizontal, so as to divide it into two apartments—upper and lower. A steam or gas drum is placed on the upper side of the boiler, constructed of the same material as the boiler, and of such size as the requirements may demand, and is connected by a short pipe with the upper apartment of the boiler. The boiler is placed upon brick-work having a fire-chamber and stack. A pipe leading from the drum of the boiler passes into the fire-chamber through the front wall and near to the bottom of the boiler. The end of this pipe that extends into the fire-chamber is perforated on the upper side, so that the gas, &c., escaping may be ignited, the flames striking up against the bottom of the boiler to heat it. A pipe attached to the gas-well or other gas-supply leads into the boiler, through the upper apartment, into the lower, and to within a few inches of the bottom, so that the gas, &c., can flow in freely, striking against the bottom.

Second, a heater, constructed of the same material and strength as the boiler, and of such size and shape as may be desired, is divided into two apartments—an upper and lower—by a perforated plate fastened firmly to the sides near the middle. A drum, similar in strength, size, and shape to that on the boiler, is placed on the top of the heater, and connected with the upper apartment by a pipe. This heater is set upon a brick-work having a fire-chamber and stack. A pipe from the drum on top supplies the fire with gas, &c., which, being ignited, heats the heater. The heater is connected with the boiler by a pipe leading from the drum of the boiler into the lower apartment of the heater near the bottom. The drum of the heater has a pipe which conducts the gas, &c., into the fire-chamber of the furnace.

Third, the process produced by the above-described means consists in subjecting the gas, impregnated with vapor and water as it comes from the earth, to heat by conducting it into the boiler through a supply-pipe, the discharge being downward against the bottom. The boiler being heated converts the vapor and water into steam, which rises mingled with the gas, and passes from the lower to the upper apartment of the boiler through the perforations in the inside plate. The water raised by the steam adheres to the under side of the metal plate. The gas and steam, freed to a great extent from the water, enter the upper apartment. The heat dries the gas and steam before it passes into the drum. The moisture and water are thus separated. The heated gas and dried steam are conducted from the drum by a pipe into the lower apartment of the heater. The heated steam keeps the temperature of the gas up and adds force to it in its passage through the pipe into the heater, where it is thoroughly dried and superheated by passing through the perforations to the upper apartment of the heater. The heated gas and dried steam then pass into the drum of the heater,

expanded and heated to a highly-inflammable state. In this condition it is conveyed into the fire-chamber of the furnace ready to be ignited, so as to burn with better effect and create greater heat than can be attained by any other process.

Figure 1 represents a longitudinal and sectional view of the boiler B. Fig. 2 represents a sectional view of heater D. Fig. 3 is an elevation of the boiler, heater, and metallurgic furnace.

Having thus described the nature of the process and apparatus, I proceed to describe it in connection with the drawings.

The gas-supply pipe *a* conveys the gas, water, and vapor from a gas-well or other like gas-supply into the lower apartment of the boiler B, where it is discharged against the bottom. The gas rises out of the water mingled with steam, passes from the lower apartment 1 through the perforations 2 in plate E to the upper apartment 3. It being heated, and the water separated, passes into the drum C through the connecting-pipe *d*. A sufficient quantity of gas, &c., to heat boiler B is conveyed from drum C through pipe *c* into the fire-chamber G, which has stack *g* to give draft. A safety-valve, *h*, relieves the boiler B of over-pressure of gas, &c. The water-gages *f* indicate the quantity of water. Mud-valve *f'* is used to clean the boiler B. The water-supply pipe *e* is to be used to supply water when there is not a sufficient quantity discharged with the gas. The heated gas and steam are conveyed from drum C by pipe *b* into heater D. The flow through pipe *b* is regulated by a stop-cock, 5, near where it enters the heater D. The gas and steam are again subjected to heat in the heater D, and pass from the lower apartment through perforations 6 in plate H, then through pipe *d'* into drum F, heated, dried, and expanded. A pipe, *i*, from drum F supplies gas, &c., to fire-chamber I to heat the heater D, the flow of gas being regulated by a stop-cock, 7, in pipe *i*.

Stack *j* is to give draft. Safety-valve *h'* regulates the pressure in heater D. Pipe J conveys the gas and steam into the fire-chamber of the furnace, ready to be ignited and burn with the best effect. The flow of gas through pipe J is regulated by a stop-cock, 8, near the furnace.

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

1. The process of preparing hydrocarbon gas or oil from gas or oil wells or other gas-supply as a fuel for furnaces for manufacturing purposes, by forcing it into boiling water to thoroughly wash, purify, and mingle it with steam, then superheating and drying, so as to expand and increase the inflammable qualities, and finally conducting it into the burner of the fire-chamber of a furnace, ready to ignite and burn with the best effect, as and for the purposes hereinbefore specified.

2. The combination of boiler B, having perforated plate E and drum C, with heater D, having perforated plate H and drum F, as connected together by pipe *b*, and with furnace K by pipe J, as and for the purposes hereinbefore specified.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

WILLIAM S. GILLEN.

Witnesses:
H. C. CAMPBELL,
GEORGE H. WOODS.