

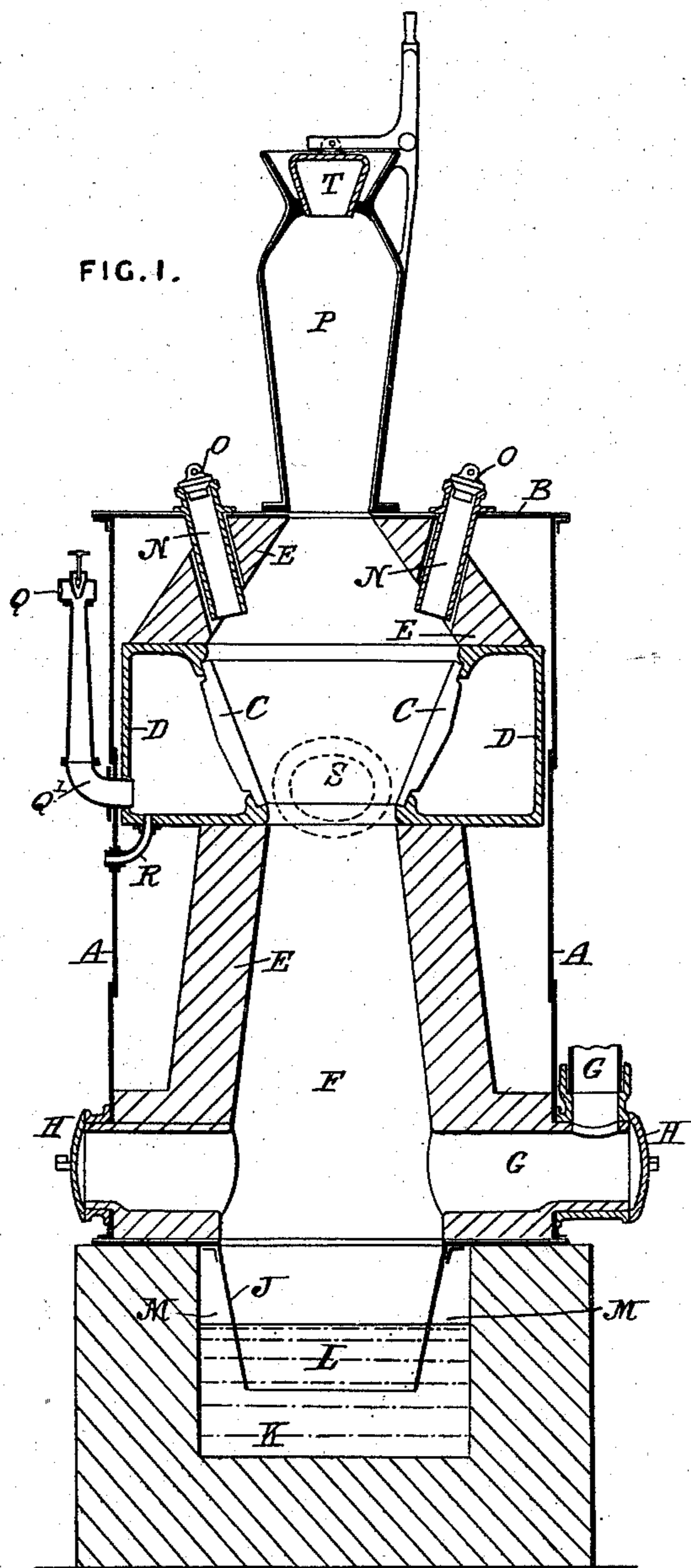
(No Model.)

2 Sheets—Sheet 1.

C. W. PINKNEY.
APPARATUS FOR PRODUCING GAS.

No. 568,038.

Patented Sept. 22, 1896.



Attest:
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Inventor:
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(No Model.)

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FIG. 2.

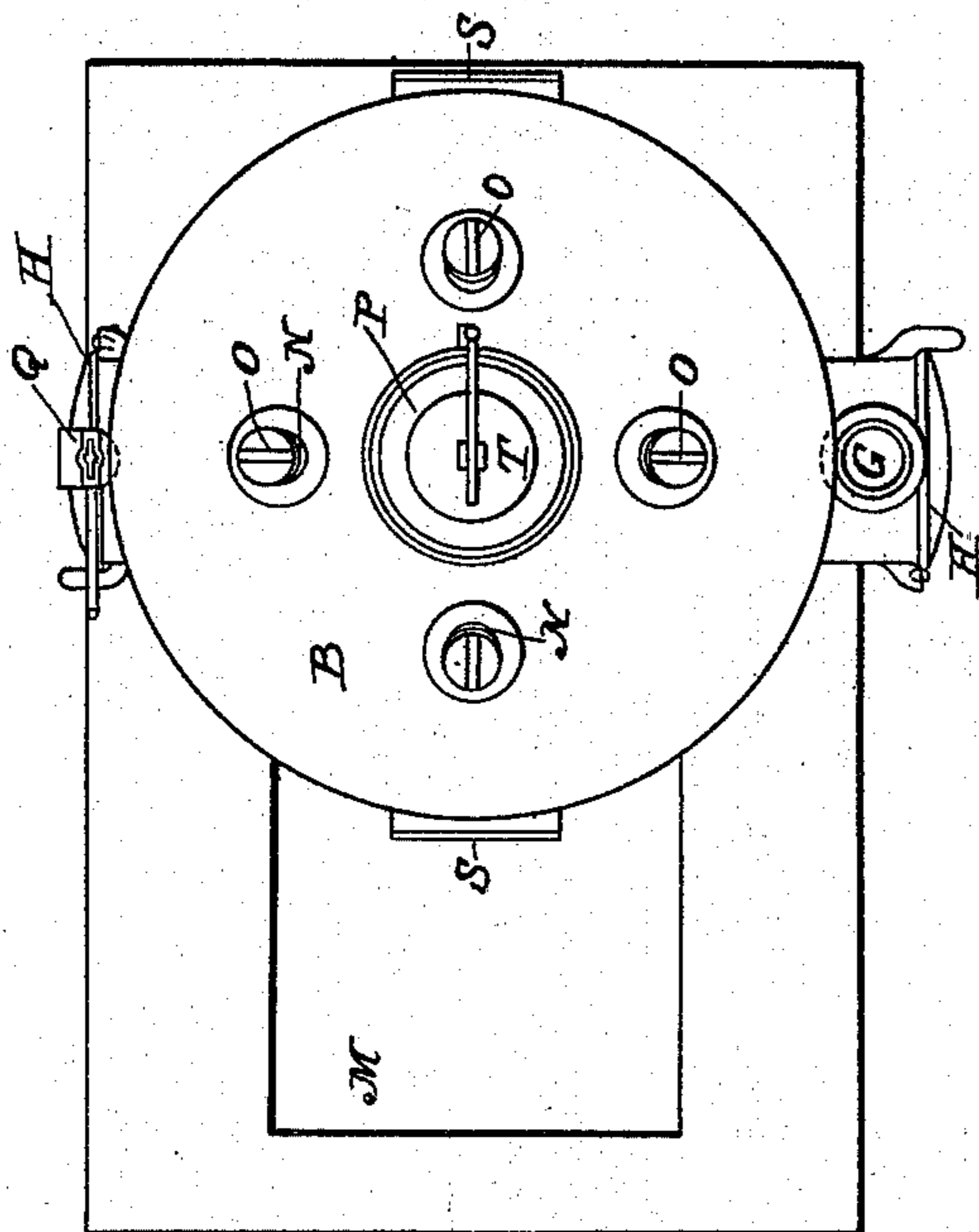


FIG. 4.

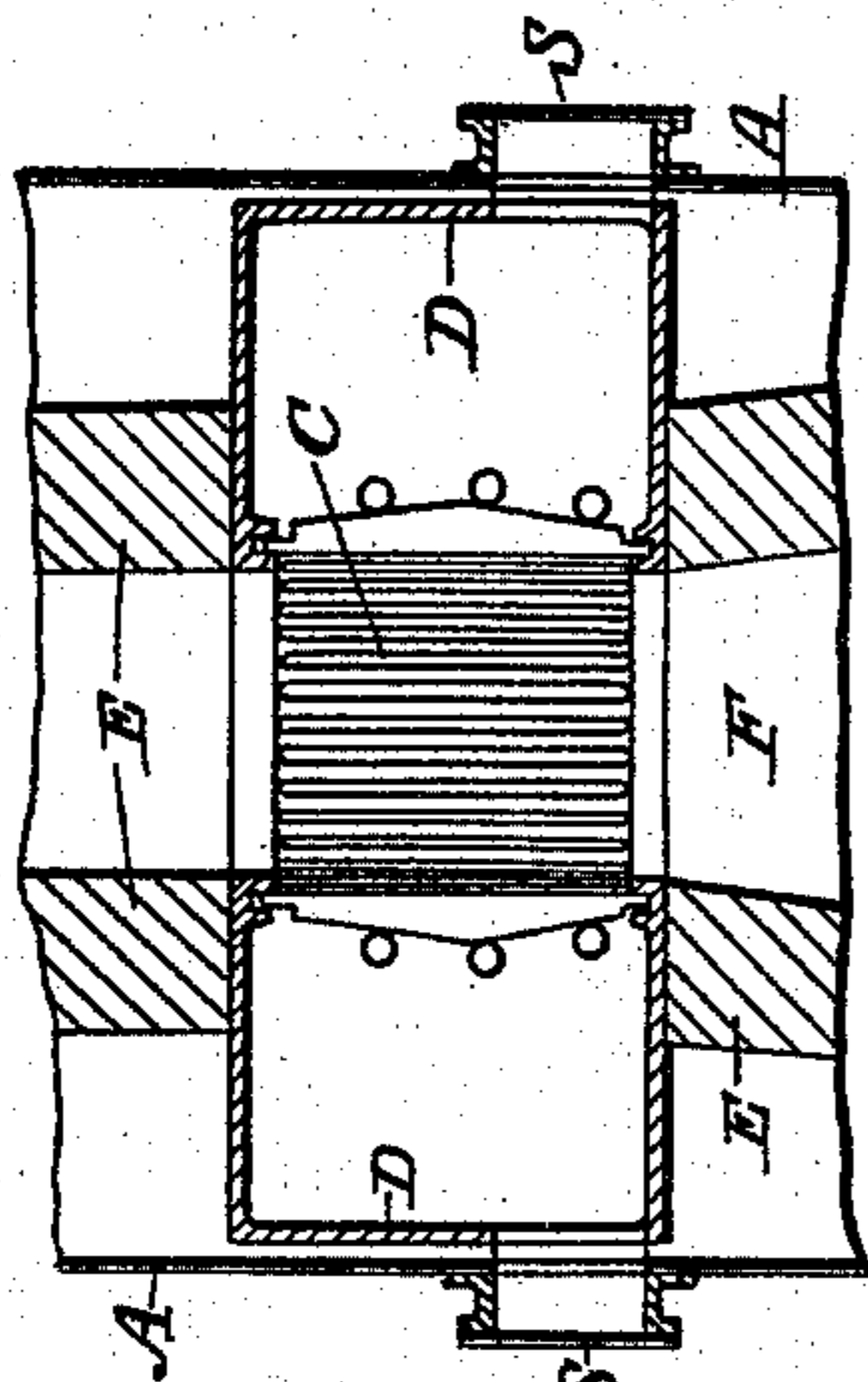


FIG. 5.

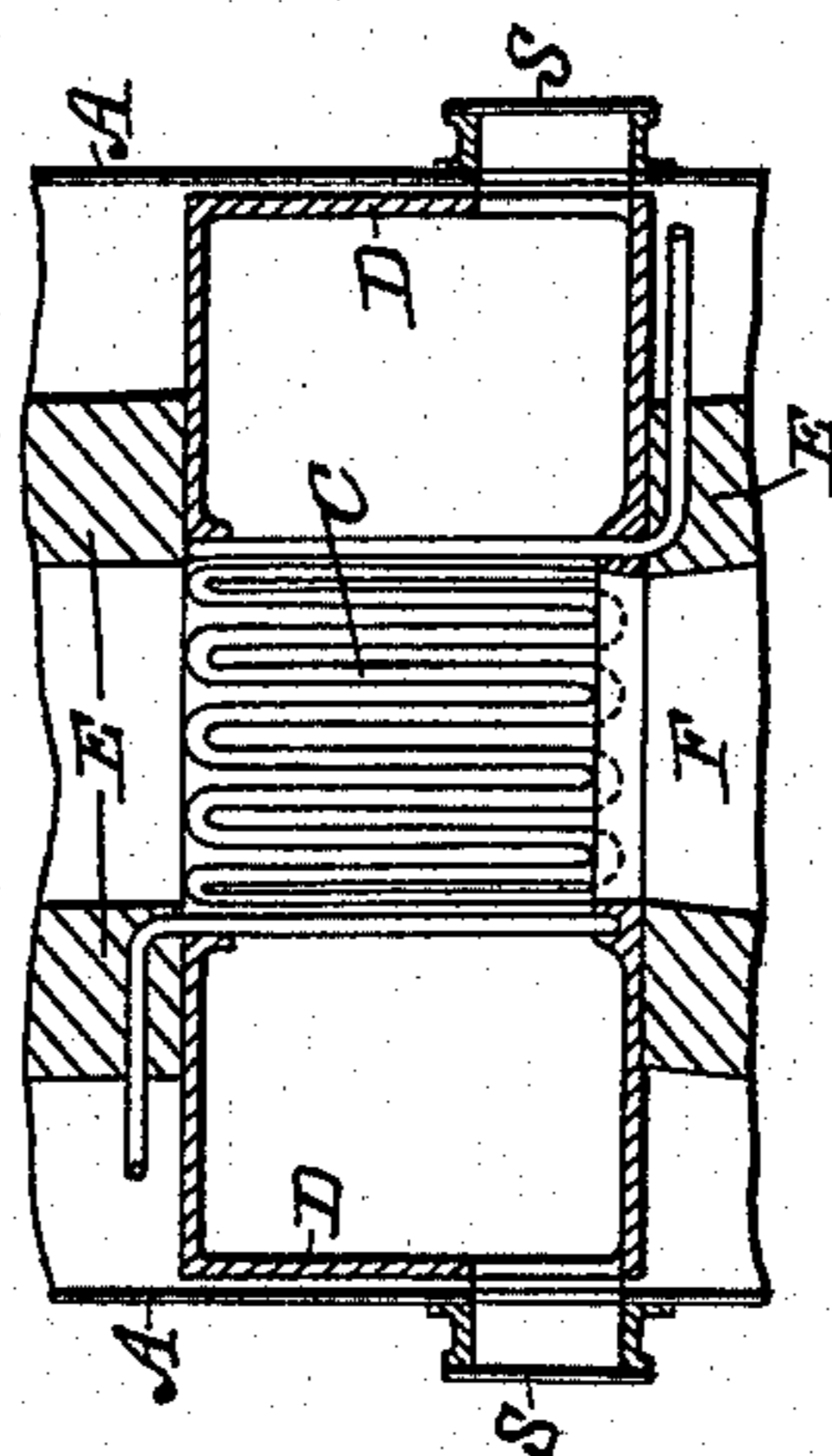
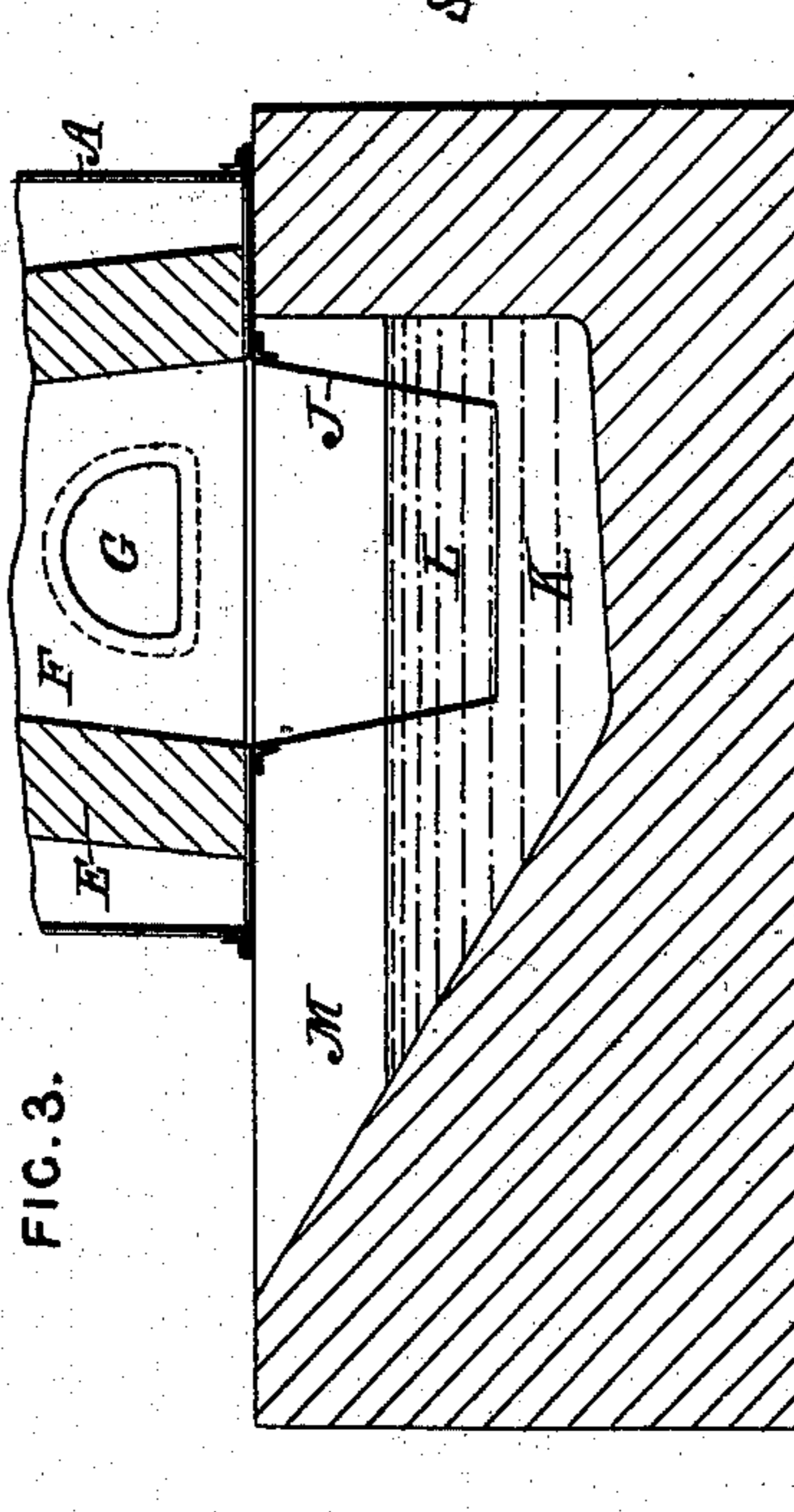


FIG. 3.



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UNITED STATES PATENT OFFICE.

CHARLES W. PINKNEY, OF SMETHWICK, ENGLAND, ASSIGNOR OF ONE-HALF TO THE TANGYES, LIMITED, OF BIRMINGHAM, ENGLAND.

APPARATUS FOR PRODUCING GAS.

SPECIFICATION forming part of Letters Patent No. 568,038, dated September 22, 1896.

Application filed November 7, 1895. Serial No. 568,204. (No model.) Patented in England January 29, 1895, No. 2,017.

To all whom it may concern:

Be it known that I, CHARLES WILLIAM PINKNEY, engineer, a subject of the Queen of Great Britain and Ireland, residing at 77 Raglan Road, Smethwick, in the county of Stafford, England, have invented certain Improvements in Apparatus or Furnaces for Producing Gas from Carbonaceous Matter, (for which I have obtained a patent in Great Britain, No. 2,017, dated January 29, 1895,) of which the following is a specification.

This invention relates to apparatus or furnaces for producing gas from carbonaceous matter, and has for its principal object to provide means whereby the more volatile hydrocarbons or tarry matters can be readily and efficiently converted into fixed or permanent gases in the generator.

According to this invention I provide (within a suitable casing, if necessary) a space for the lower portion of the fire, below this space being the outlet for the gas produced and above it a continuation of the fire-space, the said continuation being constituted by vertical or inclined bars or grating, around which is a casing or inclosure, into which steam and air are admitted. Above the said bars or grating the fire-space is continued, and terminates in a hopper by which the green fuel is fed into the apparatus. The lowest part of the fire-space may terminate in a water well or lute to enable the ashes to be withdrawn without stopping the working of the apparatus.

When the apparatus is at work after the fire has been started, say to about the middle of the bars or grating, and green fuel has been supplied above this, the steam and air are admitted into the space surrounding the bars or grating and passing therethrough will pass down through the hot fuel beneath and be decomposed and take up carbon from the fuel, and at the same time the green fuel above gives up its volatile hydrocarbons or tarry compounds, which also pass down with the steam and air, and the whole is converted into gas well suited, for instance, for use in gas-engines, after it has been passed through scrubbers or other devices that may be necessary to treat it to fit it for use.

The bars or grating aforesaid may be ar-

ranged in any suitable manner, such as vertically in a circle or in an inclined position, so that the space they inclose is narrower below than above, the fire-space below being preferably larger at its lower part than at its upper part. Doors or openings for lighting, stirring, and inspection may be provided at any suitable parts of the apparatus.

The steam or the air, or both, may be superheated before they are admitted to the fuel, and this may be effected by passing them through pipes surrounding the bars or grating or the fire-space, or the bars or grating may constitute the said pipes.

In order that this invention may be well understood, I have illustrated in the accompanying drawings an apparatus or furnace constructed in accordance therewith.

Figure 1 is a vertical section of the apparatus, and Fig. 2 is a plan. Fig. 3 is a section of the lower part of the apparatus at right angles to Fig. 1; and Figs. 4 and 5 are modifications, as hereinafter described.

The circular casing A is made of steel tightly riveted together at the joints, the top plate B being securely bolted to the said casing A to prevent any of the hydrocarbons leaking into the atmosphere. Surrounding about the middle or toward the upper portion of the furnace is a vertical grating C, inside the box D, the space between the grating C and box D forming a passage for steam and air to enter through the grating C.

In Fig. 1 the grating C is shown inclined or of conical form, with the smaller part downward; but it can be vertical, as shown in Fig. 4, if desired.

The casing A is lined with fire-brick E or its equivalent.

The part F of the furnace extending from the grating C to the outlets G is preferably taper, as shown in Fig. 1, (the larger part being at bottom.) The doors H are for clinkering and cleaning purposes. Underneath the furnace at L is a water lute or seal for clinkering purposes when the generator is required to work continuously. The continuation J is formed slightly conical to prevent the fire inside the furnace from falling too quickly when the ashes or clinkers are being removed from the space K in the water seal

L in the chamber M. The holes lined with tubes N are for stirring purposes, and are made secure, when working, by the heavy sealed plugs O. The fuel is fed through the

5 hopper P.

Q is the blower-box, and Q' the steam and air inlet passage. Several blowers can be used, if desired, at different parts to insure the steam and air passing around the grat-

10 ing C.

R is a pipe used when starting to drain off any water of condensation caused by the steam coming into contact with cool surfaces, a cock being fixed at the outer end of the

15 said pipe R, to be closed when the apparatus is at work. Any ash can be removed from the box D through the doors S. If it be desired to superheat the steam before it passes into the fuel in the furnace, any suitable ar-

20 rangement of superheating-pipes can be used. For example, a coil of steam-pipes can be put inside the box D, close up to grating C, as shown in Fig. 4, or the grating-bars can be made of tubing, through which the steam, on

25 its way from the boiler to the blower, can be made to pass, thereby becoming highly heated. This is shown in Fig. 5.

When the apparatus is to be put into operation, water is placed in the chamber M to the predetermined height, and the continua-

30 tion J is filled with ashes or small fuel to a level or about a level with the outlet G, and the hopper-valve T is opened and a fire is lighted through the clinker-doors H, which

35 fire should be continued until it reaches the middle of the grating C. This can be seen by removing one of the doors S. The furnace is then filled up with fuel, and the doors H S and hopper-valve T are closed, and steam is

40 turned on at the blower-box Q, which steam will mix with atmospheric air on its way down the passage Q' into the grating-box D. The said steam and air will pass together through the grating C, into and down through

45 the heated fuel underneath the grating C, to the outlet G. The said steam and air on their way through the said fire will become decomposed and take up carbon, and the green fuel above the grating is (owing to the heat be-

50 neath it) giving up its volatile hydrocarbons, which are also compelled to pass downward with the decomposing steam and air, so that the whole becomes thoroughly formed into carbon monoxid gas. It then passes out at

55 the outlet G and may be passed through scrubbers into a gas-holder or to the place of consumption or utilization.

Having now particularly described and ascertained the nature of this invention and

in what manner the same is to be performed, 60 I declare that what I claim is—

1. In apparatus or furnaces for producing gas from carbonaceous matter, a vertical or practically vertical chamber for the carbonaceous matter, the said chamber having be- 65 tween the upper part for receiving the fresh fuel and the lower part provided at its lower end with an outlet for the gases an intermediate part surrounded by a grate-section, and means for introducing air and steam through 70 said grate-section, whereby the mixture of air and steam entering through the grate passes downwardly through the heated fuel beneath the grate to the outlet, carrying with it volatile hydrocarbons released from the 75 green fuel in the upper part of the vertical space by the heat from the underlying fuel, substantially as described.

2. In apparatus or furnaces for producing gas from carbonaceous matter, a vertical or 80 practically vertical fuel space or chamber, divided into an upper zone for the green fuel having an inlet for said fuel, a lower zone for the incandescent fuel having at its bottom a gas-outlet, and an intermediate zone sur- 85 rounded by a grate, and means for supplying air and steam through said grate to the fuel, whereby said mixture of air and steam passes downwardly through the incandescent fuel to the gas-outlet, carrying with it volatile 90 hydrocarbons which are released from the green fuel in the upper zone of the chamber by the heat from the underlying fuel, substantially as described.

3. In apparatus or furnaces for producing 95 gas from carbonaceous matter, an upright chamber divided into an upper zone for the green fuel, having an inlet for said fuel, a lower zone for the incandescent fuel having at its bottom a gas-outlet, and an intermedi- 100 ate zone formed by an annular grate having its bars arranged in a substantially upright position, and a casing about said grate having a steam and air inlet thereto, whereby the mixture of steam and air passes through 105 the grate downwardly through the incandescent fuel to the gas-outlet, carrying with it volatile hydrocarbons which are released from the green fuel in the upper zone by the heat from the underlying incandescent fuel, 110 substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

C. W. PINKNEY.

Witnesses:

E. HARKER,

ORLANDO CECIL POWER.