

(No Model.)

3 Sheets—Sheet 1.

G. S. SANFORD.
OIL OR GAS BURNER.

No. 471,753.

Patented Mar. 29, 1892.

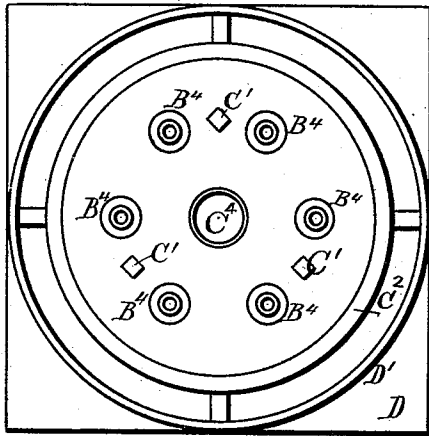


Fig. 1.

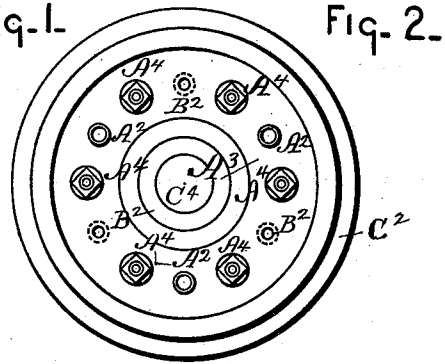


Fig. 2.

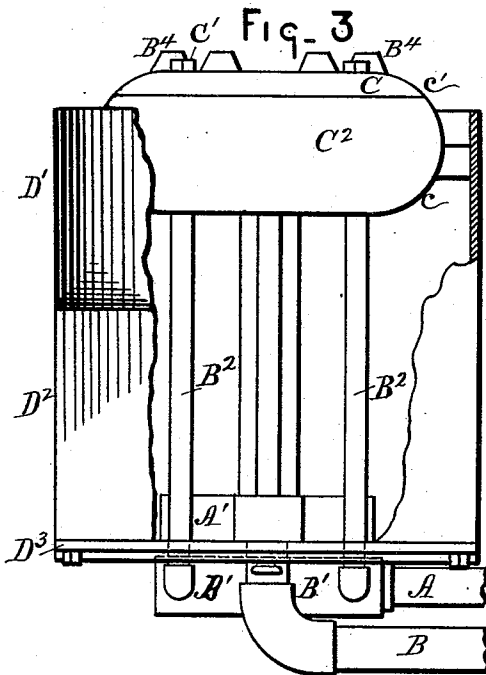


Fig. 3.

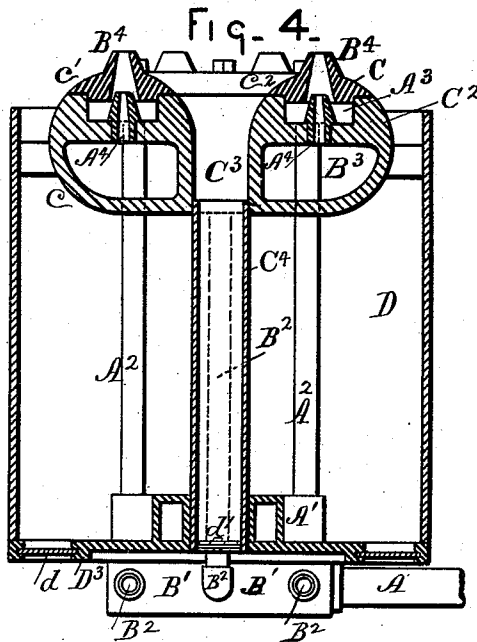


Fig. 4.

WITNESSES

F. Clough.
M. A. Reever.

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Fig. 5.

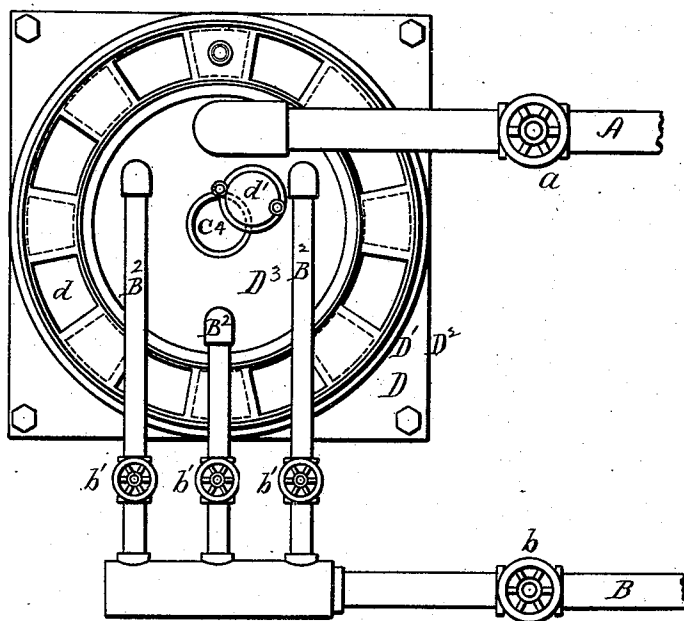
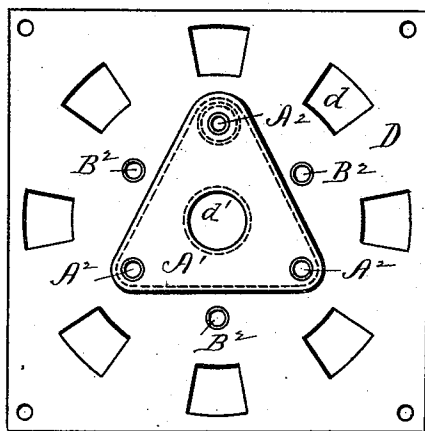


Fig. 6.



WITNESSES

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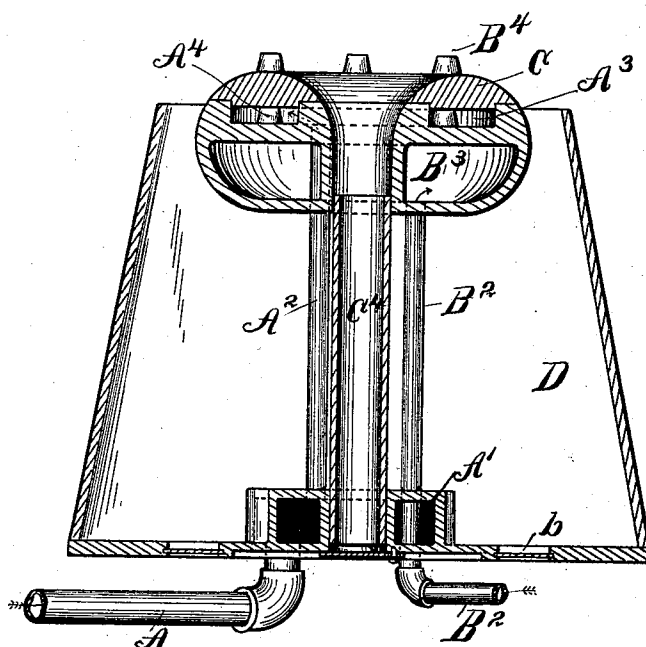
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Fig. 7.



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UNITED STATES PATENT OFFICE.

GEORGE SMITH SANFORD, OF MOUNT CLEMENS, ASSIGNOR OF ONE-HALF TO
WILLIAM H. HILL, OF DETROIT, MICHIGAN.

OIL OR GAS BURNER.

SPECIFICATION forming part of Letters Patent No. 471,753, dated March 29, 1892.

Application filed January 17, 1891. Serial No. 378,090. (No model.)

To all whom it may concern:

Be it known that I, GEORGE SMITH SANFORD, a citizen of the United States, residing at Mount Clemens, county of Macomb, State of Michigan, have invented a certain new and useful Improvement in Oil or Gas Burners; and I 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 pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

In the drawings, Figure 1 is a view in elevation of the discharge end of my burner. Fig. 2 is a view of the same with the end plate removed. Fig. 3 is a plan view, partly in section and partly in elevation. Fig. 4 is a central sectional view of the same. Fig. 5 is an end view of the rear end of the burner. Fig. 6 is an inside view of the said rear end of the machine, showing the manifold oil-receiver. Fig. 7 is a sectional view showing the arrangement of the respective chambers and conduits, form of burner, and casing.

My invention has for its object the production of a burner for burning hydrocarbon oil, and more particularly for use with crude petroleum, the same being equally applicable for use in the burning of natural gas.

The particular features of my invention are hereinafter described, and will be more distinctly pointed out in the claims.

In carrying out my invention, A represents an oil-feeding conduit, and B a steam-supply conduit.

A' is a chamber into which oil is first introduced and from which it is led by several pipes A² to a chamber A³, adjacent to the inner end of the burner.

B' is a manifold, from which one or more steam-pipes (preferably several) B² lead the steam to and discharge the same into a chamber B³, just back of the chamber A³.

B⁴ represents nozzles at the inner end of the burner, and A⁴ represents steam-nozzles leading from the chamber B³. The steam-nozzles are each projected into the nozzles B⁴, so that when a jet of steam issues from the nozzles A⁴ it acts as an injector to draw in the oil from the chamber A³ and expel the same thoroughly commingled with the said steam from the noz-

zles B⁴. This action of the steam tends, also, to produce a vacuum in the chamber A³, and so draws the oil forward from the chamber A' by suction into the chamber A³. This oil, caused thus to enter the chamber A³ through the several pipes A², is distributed with substantial uniformity throughout the said chamber A³, thus preventing an inordinate feed of oil from any particular nozzle B⁴. So, also, the steam being fed to the chamber B³, preferably by several pipes B², is uniformly distributed in the said steam-chamber, thereby causing the steam to issue with substantial uniformity from each of the said steam-nozzles A⁴.

C represents a cover-plate at the extreme forward end of the burner, held in place by bolts C' to the body C² of the burner.

C³ represents a central air-orifice, preferably provided with a tube C⁴, extending back through the chamber A' at the rear end of the burner.

D is a shield surrounding the burner. It is preferably made cylindrical along its forward portion D', so as to uniformly distribute the entering air about the exterior of the burner; but it is preferably squared along the portion D², so as to facilitate its being bricked into a stove-door or furnace-front.

D³ is a plate, which I prefer to provide at the rear end of the burner, and it may or may not be cast solid with the chamber A', as shown in Fig. 4. It is provided with any suitable air-governing valves or registers d' for regulating the admission of air about the exterior of the burner and with any suitable valve d' for governing the admission of air through the tube C⁴ to the interior or central orifice of the burner. The sides of the burner adjacent to the forward end are preferably curved, as shown at c, so that air entering through the case D shall not be deflected away from the burners, but be guided by this rounded surface directly to the base of the nozzles B⁴. The end portions c' are likewise preferably curved, so as to prevent, as much as may be, any eddying of the currents, which would cause an ununiform discharge of the air about the exterior of the burner at its forward end. The discharge end of the central orifice C³ is likewise curved outwardly into bell form at c², so that air entering may be directed to the bases

of the nozzles B⁴. This construction of the burner insures a very perfect combustion of the oil or gas if the same is being burned, since the construction compels a thorough mingling of the hydrocarbon, steam, and air closely adjacent to the discharge end of each nozzle B⁴. Should the draft of air be too great, either through the middle or outside of the burner, it may be regulated to any degree by the registers *d* and *d'*. *b* represents a general steam-valve and *b'* separate steam-valves for each steam-conduit for more perfectly regulating the admission of steam, and the valve *a* is provided for regulating the flow of oil or hydrocarbon into the chamber A'.

I prefer to form the nozzles A⁴ of brass or non-oxidizable metal. The shield D terminates, preferably, a little back of the forward end of the burner, so as to permit the forward end of the burner to become highly heated, thus serving in a large measure to vaporize the hydrocarbon before issuing from the nozzles B⁴.

Should the chamber A³ become clogged with coke or other residuum, the end C may be removed and the chamber cleared.

What I claim is—

1. An oil or hydrocarbon burner composed

of the steam-chamber B³, oil-chamber A³, with their respective nozzles B⁴ and A⁴ and inlet-pipes B² and A², central air-passage C⁴, having a bell-mouth discharge end, whereby the air from said passage is permitted to pass outward directly to said nozzles, and a casing for conducting the air to said nozzles outside of said burner, the face of said burner supporting said nozzles being rounded to permit the air conducted to the burners by said casing to pass over said face directly to said nozzles, substantially as described.

2. An oil or hydrocarbon burner consisting of the chambers A³ B³, with their respective nozzles A⁴ B⁴, oil-distributing chamber A', and communicating oil and steam pipes, as described, the central air-conduit leading back through the oil-distributing chambers, the case D, a closing-plate at the end of the burner, and means for regulating the admission of air through said case and central passage, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

GEORGE SMITH SANFORD.

Witnesses:

MARION A. REEVE,
DELL J. BROWNE.