

(No Model.)

R. A. BURY & R. M. BIDELMAN.

DEVICE FOR GENERATING AND BURNING GASES.

No. 313,575.

Patented Mar. 10, 1885.

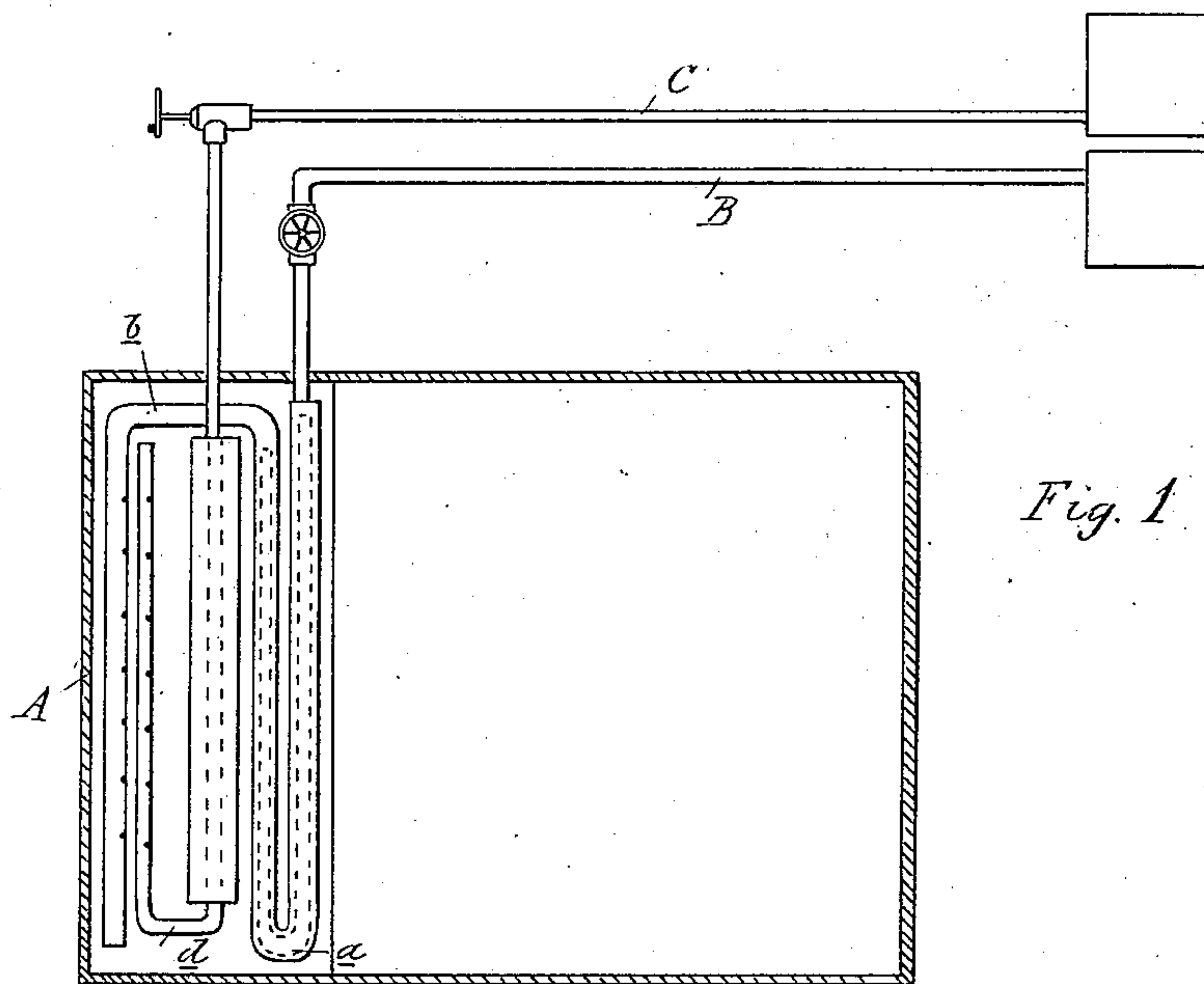


Fig. 1

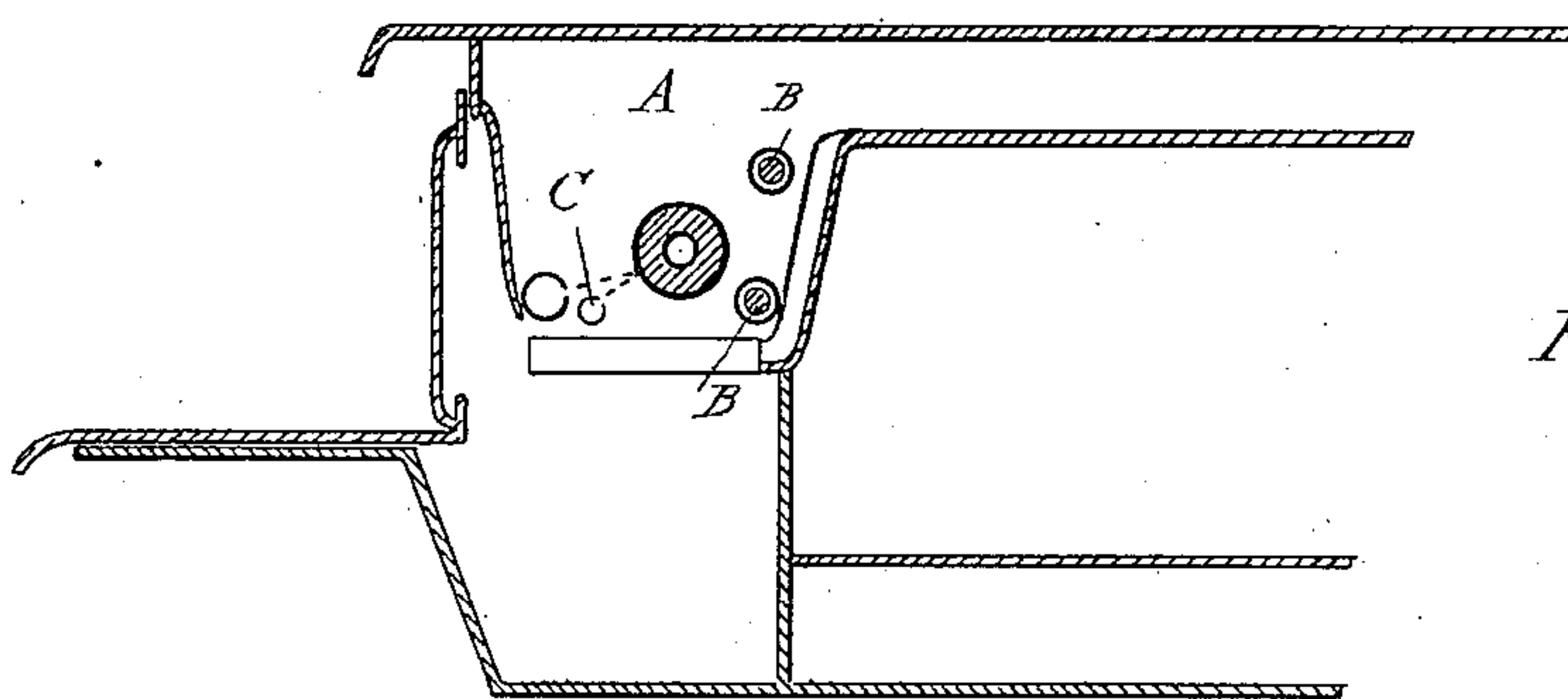


Fig. 2

Attest  
*E. Scully*

Inventors  
Richard A. Bury  
and Robert M. Bidelman  
By *Thos. D. Sprague* Atty.

# UNITED STATES PATENT OFFICE.

RICHARD A. BURY AND ROBERT M. BIDELMAN, OF ADRIAN, MICHIGAN.

## DEVICE FOR GENERATING AND BURNING GASES.

SPECIFICATION forming part of Letters Patent No. 313,575, dated March 10, 1885.

Application filed December 26, 1883. (No model.)

*To all whom it may concern:*

Be it known that we, RICHARD A. BURY and ROBERT M. BIDELMAN, of Adrian, in the county of Lenawee and State of Michigan, have invented new and useful Improvements in Devices for and Processes of Generating and Burning Gases; and we do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to certain new and useful improvements in appliances for the manufacture, combustion, and consumption of gas formed from crude petroleum or other inflammable oil or product thereof and water, and adapted for all (or nearly all) purposes where fuel is required—to wit, for heating, for culinary purposes, for steam-generators, and for the forging or melting of metals, the heating of retorts, &c.

The invention consists, essentially, in the incasing of a portion of the oil-supply pipe in asbestos or other refractory material, and also in the peculiar combinations and the construction and arrangement of parts, hereinafter more fully described and claimed.

The invention will be shown and described in this specification and its accompanying drawings as applied to and in use in the fire-box or combustion-chamber of an ordinary cook-stove, although various other arrangements of the parts may be had to produce the same result without departing from the spirit of our invention.

Figure 1 is a plan view of the fire-box of an ordinary cook-stove, inclosing the appliances for generating and burning the gases. Fig. 2 is a vertical cross-section showing the relative position of the parts.

In the accompanying drawings, which form a part of this specification, A represents the fire-box of a cook-stove, into which is led, through either end, the pipe B, the outer end of which is connected with any suitable source of water-supply. This pipe, after entering the fire-box, extends nearly to the opposite end thereof, near the upper rear corner, so as to be somewhat above and in rear of an inflammable log or point of resistance, which will

be hereinafter described. A return-bend, *a*, on this water-pipe carries it down and along the bottom of the fire-box in rear of said log or point of resistance, preferably nearly to the end of such fire-box, through which the pipe enters, and another return-bend, *b*, leads said pipe again to the opposite end of the fire-box on a level plane in front of and slightly below the axial center of the point of resistance, and the interior end of this pipe is then stopped by a cap or otherwise. A cock interposed in the pipe between the source of water-supply and the stove regulates or cuts off the supply of water when desired. Another pipe, C, communicating with a suitable source of oil or petroleum supply, is led through the same end of the stove, near the center of the fire-box, to a point near its opposite end, where a return-bend, *d*, leads it across the front of said fire-box on or about the same plane and contiguous to or about parallel with the water-pipe at this point. This pipe, outside the stove and between it and the source of oil-supply, is provided with a needle or other suitable valve to regulate the supply of oil, and the area of this valve is preferably smaller than the area of any one of the jet-holes in the pipe through which the oil is first discharged in the fire-box. This pipe C, after it enters the fire-box, is covered with asbestos or any other refractory substance, or is incased in, by wrapping around it, a number of thicknesses of asbestos paper or felt until it is sufficiently large, the size being varied according to the work to be done, to form a point of resistance and compel the gases from the petroleum and the water-pipes to mingle, and against which the combustion of these gases takes place. The water-pipe inside the stove may be of larger area than sufficient to supply the necessary quantity of water, and a wire or round iron rod be inserted in such pipe, the area of the cross-section of this rod being from a half to two-thirds the area of the bore of the pipe, in order to form an annular space in which the water in its first passage into the stove along its first extension across the fire-box may be converted into steam and be superheated. In that portion of the oil-pipe which lays in front of and



just below the axial center of the log there are bored a number of very fine holes in a direction that any discharge from such holes will strike the asbestos or other point of resistance just in front of and below its axial center, and in the water-pipe, laid parallel to and in the same plane with (or nearly so) this portion of the oil-pipe just described, are bored a similar series of jet-holes in such a direction that the discharge therefrom will strike the discharge from the oil-pipe at a line between such oil-pipe and the asbestos log or point of resistance, which is formed, as above described, upon the oil-pipe in its first passage across the fire-box. The relative positions of these various parts will be readily seen by reference to the drawings. The supply sources of the water and petroleum or other combustible product may be at any desired distance from the point where their contents are to be discharged and converted, but care should be taken that they be sufficiently above the plane of the fire-box or point where such conversion is to take place to give a ready and necessary fall. The parts now being in position, the valve in the petroleum-pipe should be opened, and a small quantity of oil will pass through that portion of the pipe inclosed within the asbestos log into the return part of the pipe, (the terminal point of which has been stopped,) and will be ejected through the small hole jets. A lighted match applied now to these jets ignites the oil, and the flames will envelope, under the usual draft-force of the fire-box, the asbestos log or point of resistance, which will become rapidly and highly heated, and thereby vaporize the petroleum passing through the inclosed pipe, which gas will now escape through the jets and burn. Now a small supply of water should be let in by opening to a suitable extent the valve in the water-pipe, and in passing through that portion of the pipe above parallel to and in rear of the asbestos log or other point of resistance, such pipe being exposed to the flame of the burning petroleum-gas, the water is evaporated into steam in such passage through this portion of the pipe, which, as it becomes gradually hotter, superheats such steam, which then passes through the return-bend of the water-pipe to that portion of the pipe which lays in front of or contiguous to the jetted portion of the petroleum-pipe. This superheated steam, now issuing under pressure

through the jets in the water-pipe, strikes the gas from the jets in the petroleum-pipe, and both are thrown against the asbestos or other resistance log, which furnishes a point of incombustible resistance which compels these gases to so mingle that they become to a certain extent homogeneous and burn with great fierceness. The amount of flame may be regulated, of course, by the valves and cocks, and, if it is thought desirable, these cocks may be so put in as to give perfect control of each one of the jets, although in the drawings they are shown as controlling the general system.

It will be noticed that the first generation of gas is created by burning the crude petroleum, or other inflammable product, which decomposes such petroleum or product as it passes through the pipes; then the burning gases thus created are employed to decompose the water-supply, which, being converted into gas, is then mingled with the gases first converted, to produce a perfect combustion and a constant generation of the two gases indefinitely.

What we claim as our invention is—

1. In a device for the purposes described, the oil-pipe C, a portion of which is wound or incased with asbestos or other refractory material to form a point of resistance for the gases from the oil and water pipes after they are discharged through the jets in the same, substantially as and for the purposes set forth.

2. In a device for the purposes described, the combination of a water-heater, as B, and an oil-heater, as C, a portion of said oil-heater being incased with asbestos or other refractory material to form an incombustible point of resistance, the said heaters being constructed and arranged substantially as herein shown and described, whereby the combustion of the oil furnishes the necessary initial heat to convert the oil into gas on its passage from the source of supply to the jets, and the gas and steam mingle, after issuing from the jets in the pipes in which they are generated, and are thrown against said incombustible point of resistance, substantially as and for the purpose specified.

RICHARD A. BURY.  
ROBERT M. BIDELMAN.

Witnesses:

H. S. SPRAGUE,  
E. SCULLY.