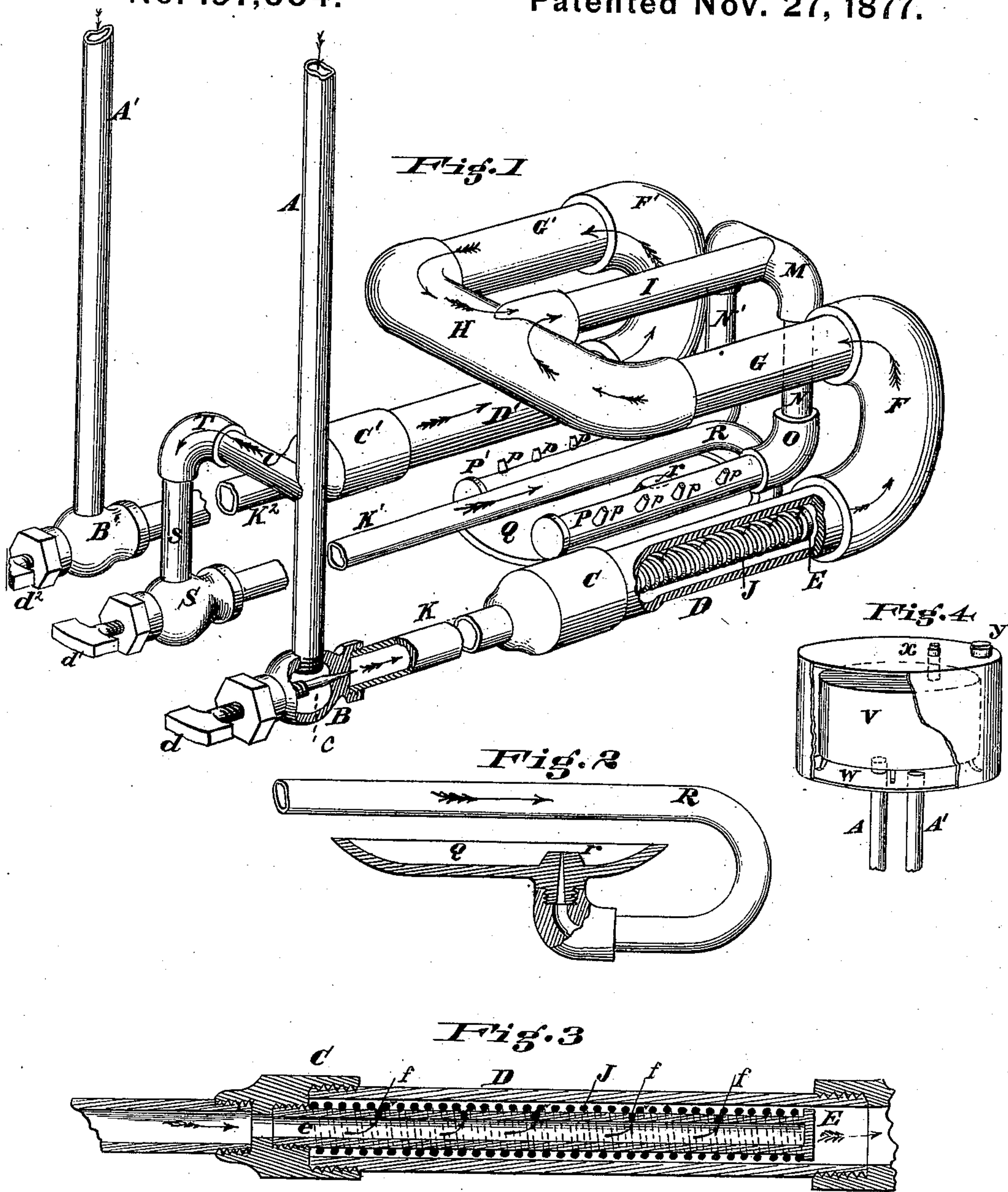


G. W. COLEMAN.  
Hydro-Carbon Burner.

No. 197,604.

Patented Nov. 27, 1877.



Attest

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# UNITED STATES PATENT OFFICE.

GEORGE W. COLEMAN, OF KALAMAZOO, MICHIGAN.

## IMPROVEMENT IN HYDROCARBON-BURNERS.

Specification forming part of Letters Patent No. **197,604**, dated November 27, 1877; application filed August 23, 1877.

*To all whom it may concern:*

Be it known that I, GEORGE W. COLEMAN, of Kalamazoo, in the county of Kalamazoo and State of Michigan, have invented certain new and useful Improvements in Hydrocarbon-Heaters, of which the following is a specification:

My invention relates to a hydrocarbon burner and heater, which is arranged to generate gas from the products of petroleum and mingle with a current of superheated steam, thereby producing a hydrocarbon-flame of great intensity, for heating stoves and other apparatus.

The improvements will be fully hereinafter described.

Referring to the drawings, Figure 1 is a perspective view of my invention, with parts broken away to show the construction. Fig. 2 is a broken section of the burner and pan. Fig. 3 is a central section of the retort-pipe and diffuser. Fig. 4 represents the water and gasoline tank.

A represents an upright pipe connecting the gas-retort to the gasoline-tank, containing gasoline or other products used for generating carbon gas. B represents a coupling; *c*, a needle-valve or conical cut-off. C represents a coupling; D, a pipe. E represents a diffuser, which I prefer to make as follows: *e* is a pipe, having a series of jets, *f*, which pipe lies within pipe D, and is screwed into coupling C, as shown in Fig. 3. Around pipe *e* is one or more coils of wire, for the purpose of furnishing a large amount of metal and heating surface. F represents a return-bend; G, a transverse pipe, and H an elbow T-joint. I represents a pipe parallel with G. M represents a double elbow-coupling; N N', branch pipes; O, an elbow-coupling; P P, gas-pipes, having a series of burner-tips, *p*. These tips can be omitted and orifices used in place; but the latter are not as good as the tips, which will not burn out as rapidly as a perforated pipe. Q represents a pan for holding gasoline for lighting, to start the generation of steam and gas. Burner *r* is supplied with fluid by means of pipes R K<sup>1</sup> S, and connected by means of couplings T and U to pipe A, which connects with the supply-tank V. Parts D, E', F, and G represent the retort, which is heated by the

intense flame generated by the mingled currents of steam and carbon vapor or gas.

This form of retort is very simple and effective, and may be combined with a different form of boiler than the one shown; but this form of boiler is likewise cheap, simple, and effective. The parts C', D', F', and G' form the boiler, and should contain a diffuser, E', as it increases the efficiency by a higher heating of the steam.

A', B', C', D', G', and pipe F' represent parts similar to those before described as represented by their corresponding letters—pipe D' containing a diffuser constructed and arranged in the same manner as diffuser E', pipe A' being connected to the water-tank. This heater is arranged to generate gas upon the right-hand side or first-described parts, and the left-hand side to generate steam. They are exactly alike in their construction and arrangement, excepting that pipe A is tapped by pipe U and its connections, so as to admit gasoline from the tank V to the burner-pan Q, for starting the initial generation, heating, and combustion. *d'* is a cock or cut-off for letting gasoline into pan Q, or cutting off the supply.

It is obvious that the diffuser E' inside of pipe D or D' may be made in various ways, so as to increase the amount of metal and supply the pipe with the vapor of gasoline, so that the heat will convert the heavy vapor into gas adapted to take up and mingle with the superheated steam to form a hydrocarbon gas; but the plan here shown I deem the cheapest and best. So, also, instead of branch pipes N N' and burners P P', a single pipe and burner might be employed; but it will not be as efficient as the device here shown.

This apparatus is designed to be placed inside of a cast-iron box or stove.

The pipes K K<sup>1</sup> K<sup>2</sup> are represented as broken off at the points where they pass through the walls of the stove. These pipes may be of any desired length.

Pipes A A' connect with the tank, as shown in Fig. 4, which is constructed as follows: V is a gasoline-tank, set inside of water-tank W; *x*, a supply-pipe for supplying gasoline, and *y* a pipe for supplying water to tank W.



When thus constructed there is no danger of the gasoline-tank taking fire. This form of tank is not essential for the use of the devices specified in the first three claims, but it is an improvement highly desirable.

The mode of operation is as follows: The apparatus is properly placed in a box-stove; pipe A is connected to tank V, filled with gasoline, and pipe A' to tank W, filled with water, thumb-screws  $d$  and  $d^2$  being turned so as to prevent the gasoline from entering pipe D'. Thumb-screw  $d^1$  is opened, so as to fill pan Q with gasoline or other burning-fluid, which is then lighted. The flame will surround the various coils of pipes and heat them rapidly. As soon as pipes D and D' are heated to a blue heat-cock  $d$  is opened and gasoline admitted into the pipe  $e$ , which vaporizes the gasoline, which passes into pipe D around pipe  $e$ ; from thence into pipes G, through joint H, into pipe I. All of these surfaces will soon become highly heated by the flame surrounding the pipes, and the gasoline is converted into vapor when it arrives at pipe I, where it meets with a superheated current of steam, which, in like manner, has been generated upon the other side of the apparatus, and a hydrocarbon gas is formed by the commingling of the steam and carbon vapor, and which is conducted through pipes P P', and to burners  $p$ , when the gas is ignited by coming into contact with the flame from burner  $r$  or pan Q. By adjustment of the cocks  $d$  and  $d^1$ , the amount of combustion can be increased or diminished at will.

This device has many advantages over any

other hitherto used: First, it is exceedingly simple in arrangement, and cheaply constructed from ordinary gas-pipe and couplings; second, it is more durable than common retorts and boilers.

I claim—

1. The gas-retort composed of the horizontal pipes D and G, and their connecting-pipes F, in combination with the burners P and their connecting-pipe, substantially as herein set forth.

2. The combination of the steam-boiler, composed of the pipes D' and G', and their connecting-pipe F', the connecting-pipe H, and retort D F G, and the burners P and their connecting-pipes, substantially as herein specified.

3. The combination of the outer horizontal pipe D, internal tubular diffuser E, having a series of jet-openings,  $f$ , and the coil J, arranged around the diffuser E, between the same and the outer pipe, with the burner P, and the pipes connecting the burner and pipe D, substantially as and for the purpose described.

4. In combination with the steam-boiler and retort, constructed and arranged as described, the pan Q and its supply-pipe R, for the purpose of starting the operation of the apparatus, substantially as set forth.

In testimony whereof I have hereunto set my hand this 18th day of August, 1877.

GEORGE W. COLEMAN.

Witnesses:

E. E. WOOD,  
W. P. BIDDLE.