

(No Model.)

R. THOMPSON.

HYDROCARBON VAPORIZER AND BURNER.

No. 465,398.

Patented Dec. 15, 1891.

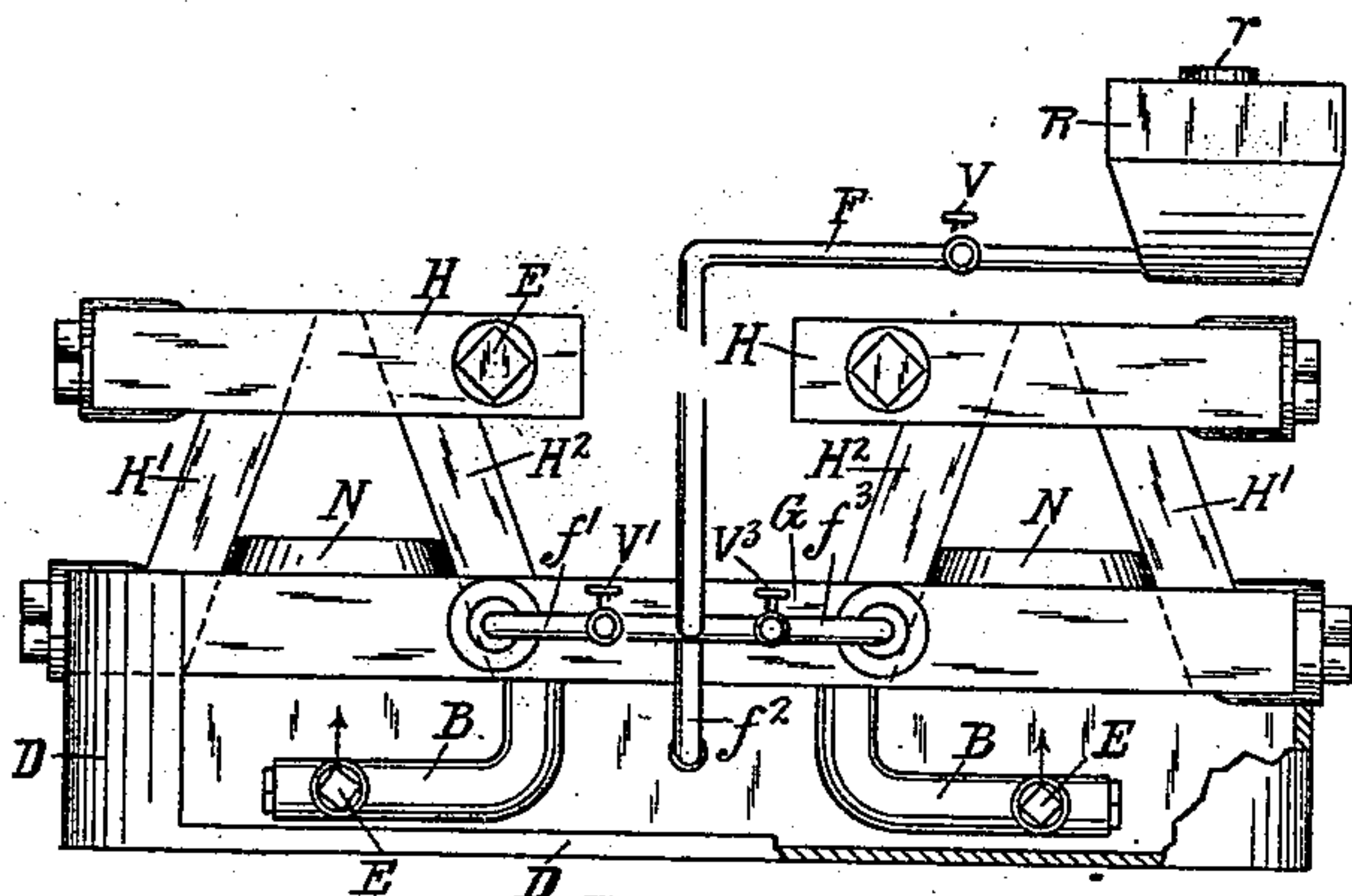


Fig. 1.

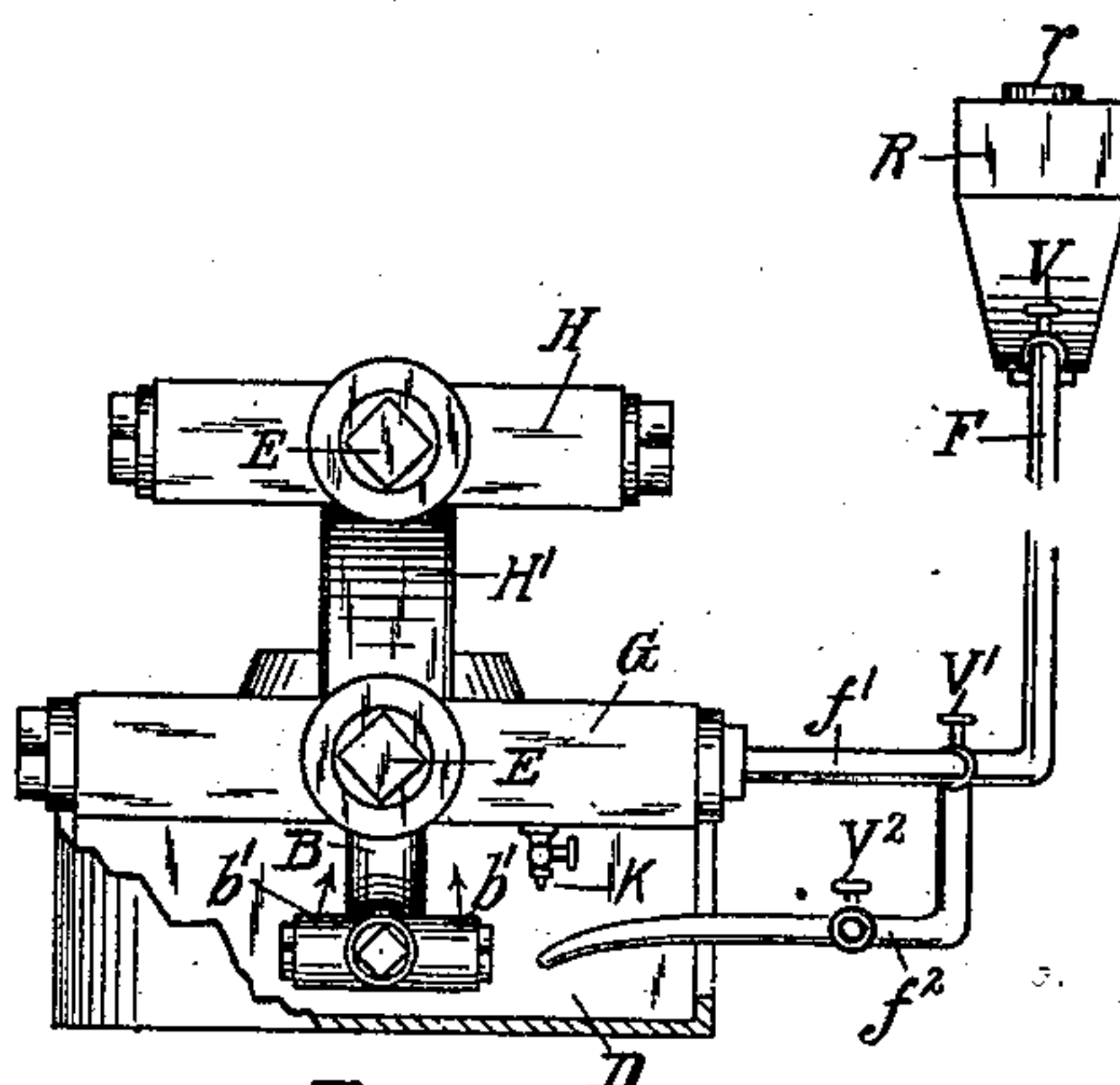


Fig. 2.

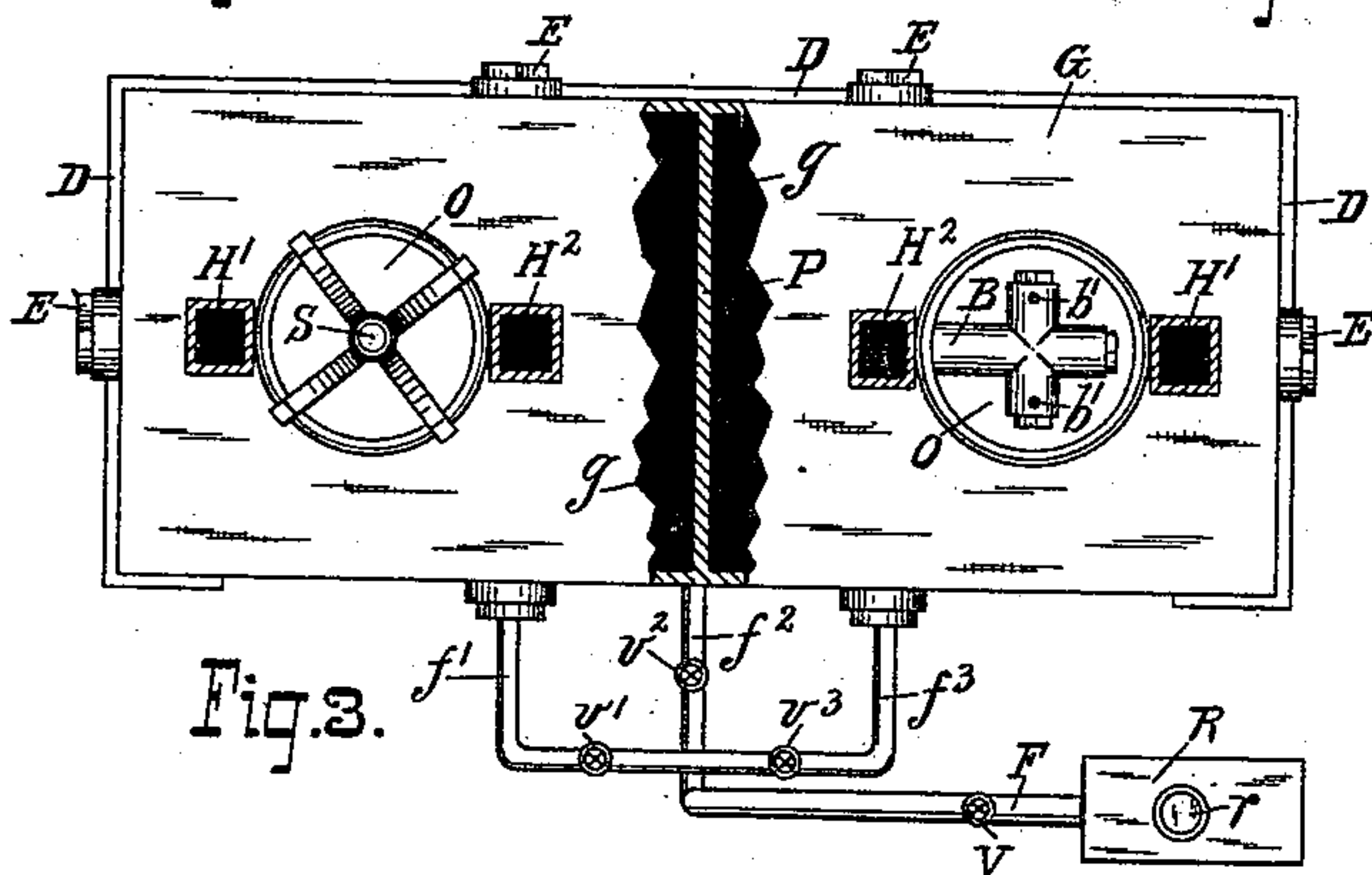


Fig. 3.

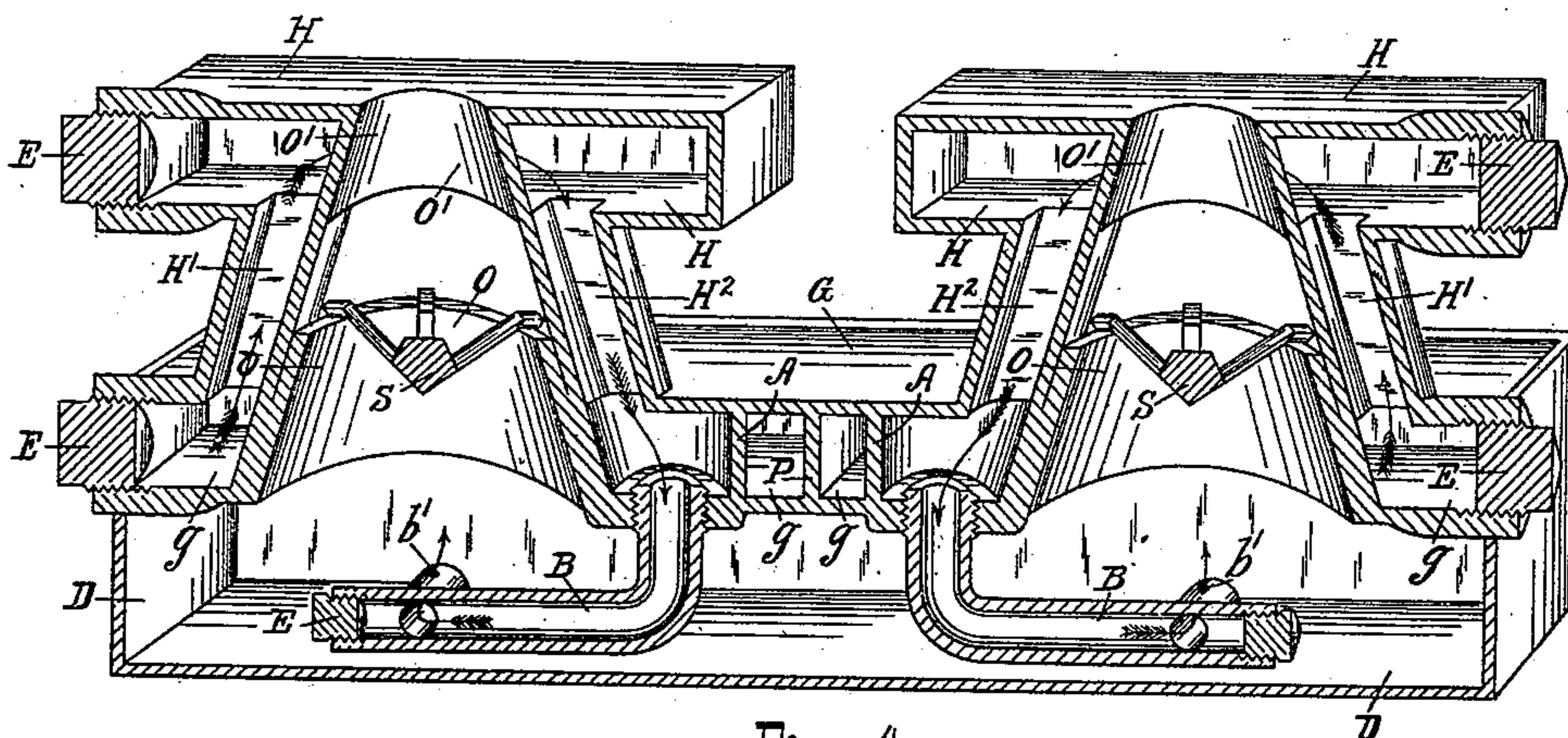


Fig. 4.

Witnesses

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# UNITED STATES PATENT OFFICE.

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## HYDROCARBON VAPORIZER AND BURNER.

SPECIFICATION forming part of Letters Patent No. 465,398, dated December 15, 1891.

Application filed June 29, 1891. Serial No. 397,765. (No model.)

*To all whom it may concern:*

Be it known that I, RICHARD THOMPSON, a subject of the Queen of Great Britain, and a resident of London, in the Province of Ontario, Canada, have invented certain new and useful Improvements on Hydrocarbon Vaporizers and Burners, of which the following specification, taken in connection with the accompanying drawings, forms a full, clear, and exact description.

My invention relates to an apparatus for vaporizing and burning liquid hydrocarbon, which apparatus may be used in an ordinary heating or cooking stove, or under a boiler, or in connection with a hot-air furnace for burning the vapor or gas generated from the oil or other liquid hydrocarbon therein in place of coal, wood, or other similar fuel.

The object is to provide an apparatus which will be perfectly safe in operation and which will first convert the oil into vapor or gas and then burn the same.

It consists of the improved construction and combination of parts of the same, as will be hereinafter first fully set forth and described, and then pointed out in the claim.

Reference being had to the accompanying drawings, Figure 1 is a side elevation of an apparatus embodying my invention, and Fig. 2 is an end elevation of same in both of these views. The oil-pan is partly cut away. Fig. 3 is a plan view of the generating-chamber, through one opening of which is shown a plan view of the conical divider, the burner being removed, and in the other opening a plan view of the burner is shown, the conical divider being removed. Fig. 4 is an enlarged detail central longitudinal section of a perspective view of an apparatus embodying my invention.

G designates a generator having one or more partitions P, which divide the generator into two or more separate and distinct generating-chambers *g*.

H H designate separate and distinct superheating-chambers.

H' H<sup>2</sup> designate superheating chambers or passages which open into and form a commu-

nication between the generating and superheating chambers *g* and H and the burner B, respectively.

A designates a partition-wall in each generating-chamber *g*, which encircles and forms a conduit between the adjacent openings of the superheating-chambers H<sup>2</sup> and the burners B. This partition-wall A separates the superheated vapor or gas from the contents of the generating-chamber and conducts said superheated vapor or gas to the burner B. These burners B are secured to the body of the generating-chamber and are preferably formed T-shaped, in each of which two openings *b'* are formed.

O O' designate openings formed in the generator and superheater, respectively, above the openings *b'* in the burner B. The sides of these openings O O' are walled up to prevent the escape of the contents of the generating or superheating chambers at these points.

N N designate rings or flanges projecting above and surrounding the openings O in the generator. These flanges are for the purpose of preventing the flame from spreading and to conduct it toward the openings O' in the superheating-chamber.

S S designate conical dividers placed in the openings O, projections from which dividers rest on the upper edges of the rings N around the openings O O, which dividers are not only used for the purpose of dividing the flame of the vapor when burning and directing it against the sides of the openings O, but to prevent or altogether reduce the noise made by the vapor rushing out through the openings *b'* of the burner and also to retard the escaping vapor, and thereby prevent its rapid exit from extinguishing the flame.

D designates the oil-pan, in which a little oil or other liquid hydrocarbon is placed and ignited to heat the generating-chambers sufficient to generate any liquid hydrocarbon passing into said chambers into a vapor or gas. The edges of this pan may be used as a support on which this apparatus may rest.

E E are screw-plugs inserted in screw-sock-



ets in different parts of the apparatus for the purpose of permitting the removal of any impurities which may collect in any part of said apparatus.

5 R designates a reservoir which is placed on a shelf or any other suitable support at any suitable height above the apparatus.

F is a tube or pipe communicating with said reservoir R, which is provided with the valve V, and which tube has the branches  $f'$   $f^2$   $f^3$ , provided with the valves  $v'$   $v^2$   $v^3$ . The branches  $f'$  and  $f^3$  open into the generating-chambers  $g g$  and the branch  $f^2$  opens into the oil-pan D below the generator G.

15 K designates a faucet at the bottom of each of the generating-chambers, which permits any surplus liquid hydrocarbon remaining in the generating-chamber to be drawn off.

The operation is as follows: After the reservoir has been filled through the cap  $r$ , open the valve V and close the valves  $v'$   $v^3$ . The flow of oil is thus directed into the branch tube  $f^2$  and from thence into the oil-pan D, and the amount passing into this pan D is regulated by the valve  $v^2$ . After sufficient oil has passed into the oil-pan D through the branch tube  $f^2$ , close the valve  $v^2$  and ignite the oil in said oil-pan D, the combustion of which oil in the pan D will raise the temperature of and heat the generator G sufficient to form any liquid hydrocarbon therein into a vapor or gas. Then open the valve  $v'$  only, if one opening only in the stove is required; but if two openings in the stove are required open the valve  $v^3$  also. This will permit a small steady supply of oil to pass into both of the generating-chambers  $g g$ , and the temperature required to form this oil into a vapor or gas will be maintained by the combustion of this vapor or gas at the burners B. The vapor or gas formed in the generating-chambers  $g g$  passes up through the superheating chambers or passages  $H'$ , where said vapor is first superheated, thence around the sides of the opening O in the superheating-chambers H, where it is again superheated, and thence down through the superheating passages or chambers  $H^2$ , where it is further superheated, and from thence to the burners B, out of which it passes through the openings  $b'$ , at which points this vapor or gas is ignited, the flame from which burner passes up through the openings O O in the generator and superheater, and is deflected by the divider S against the adjacent sides of the generating-chamber  $g$ , superheating chambers or passages  $H'$   $H^2$ , and the superheating-chambers H, and retains the required temperature in these superheating-chambers, so that the vapor from the instant that it is formed until it is ignited at the burner B is not only continuously superheated, but the superheating is increased as the vapor passes onward to the burner. The result of this is that the vapor is disintegrated and expanded to an extreme degree. This

effects a great saving in the fuel used, because of the large volume of vapor or gas generated therefrom.

By forming partitions P in the generator G separate and distinct generating-chambers  $g g$  are formed, and by connecting each generating-chamber  $g$  with the reservoir R by a branch tube provided with a valve and connecting each generating-chamber with a superheating-chamber H, as shown and described, two, four, or more generating-chambers and superheating-chambers may be used in a stove. A superheating-chamber with a burner B below, as described, could then be adjusted under each opening in the stove. By this construction any one opening in the stove could be used, as required, with only one burner—that is, the burner below said opening in operation. This would effect a large saving of fuel over the hydrocarbon vaporizers and burners of this class in common use, which from their construction do not permit of the operation of one burner independent of any of the other burners or the independent operation of any portion of the apparatus, and when using this apparatus under a steam-boiler or in a hot-air furnace, instead of reducing the size of the opening which supplies the oil to the generator to reduce the heat, the supply of oil to one or more of the generating-chambers could be shut off, as required, for this purpose, and by forming the ring-flanges N N around the upper edges of the openings O O in the generator a longer passage is formed, through which the burning flame rushes, and as the flame rushes through these long passages a large volume of air is drawn in with it to perfect and complete the combustion of the vapor, and these ring-flanges N N are extended or reduced, according to the degree of effectiveness required and in proportion to the size of the apparatus.

The burner B is formed T-shaped, from the openings  $b'$  in the two arms of which T the streams of vapor will strike against and pass through each other. This will cause them to pass up through and intermingle with one another and with the air drawn into the opening O. This will effect a perfect and complete combustion of the whole, and the result of this perfect combustion will be that sediment will be prevented from collecting in the generator and superheater, and an apparatus which will be very economical in the use of fuel will be produced.

Having thus described my invention, I claim—

The combination of the generator G, having the partition wall or walls P, which form the separate generating-chambers  $g g$  therein, in each of which openings O and partition-walls A are formed, the extension or ring flange N around the opening O, the superheating-chambers H H, in which the openings O' are



formed, the conical divider S, and the super-  
heating chambers or passages  $H' H^2$ , the T-  
shaped burner B, in the arms of the T of  
which the openings  $b' b'$  are formed, and the  
5 tube F, formed with the branches  $f' f^2 f^3$   
and provided with the valves  $V v' v^2 v^3$ , sub-  
stantially as shown and described, and for  
the purpose specified.

In testimony whereof I affix my signature  
in the presence of the two undersigned wit- 10  
nesses.

RICHARD THOMPSON.

Witnesses:

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S. MCBAIN.