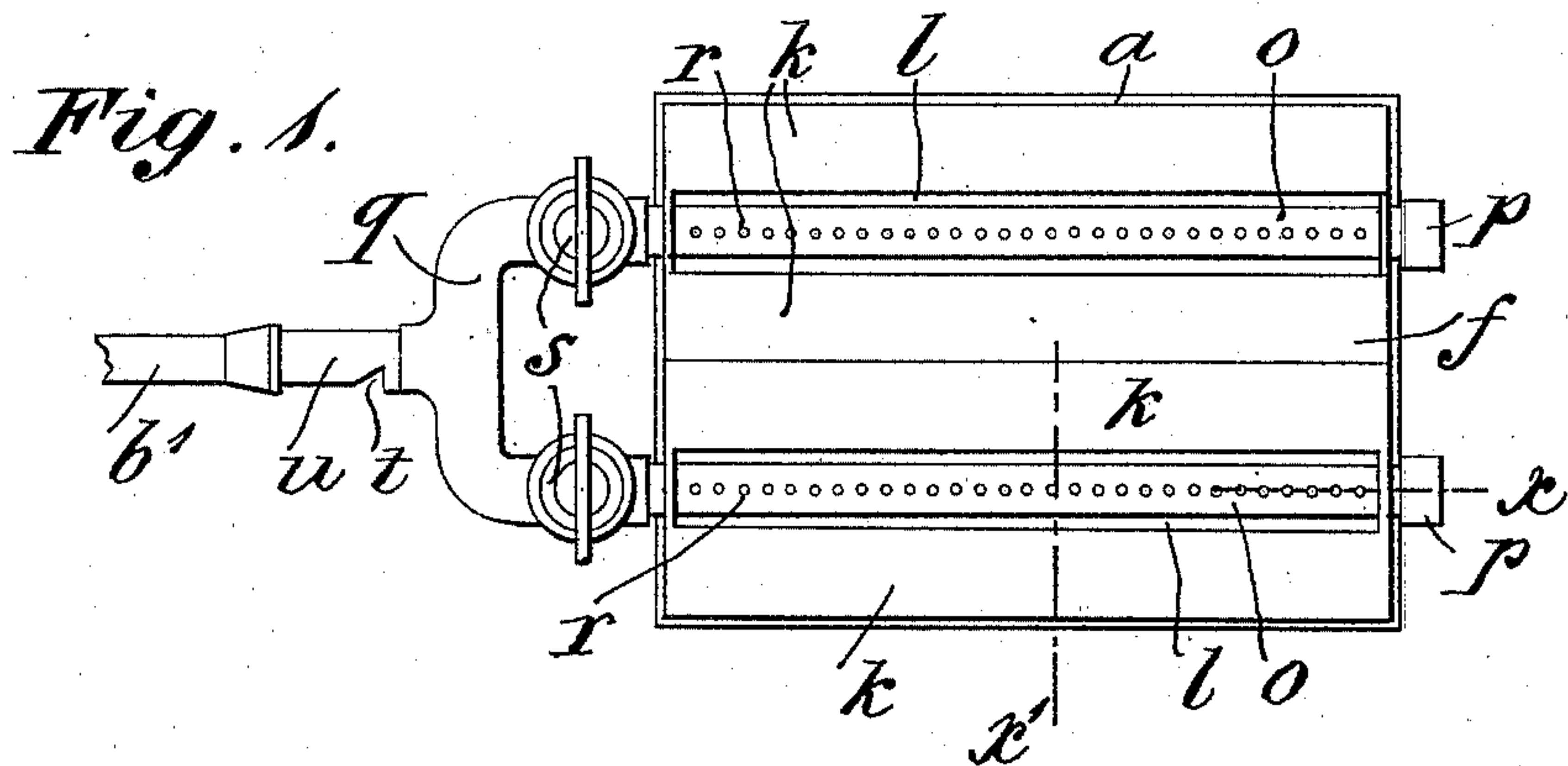


(No Model.)

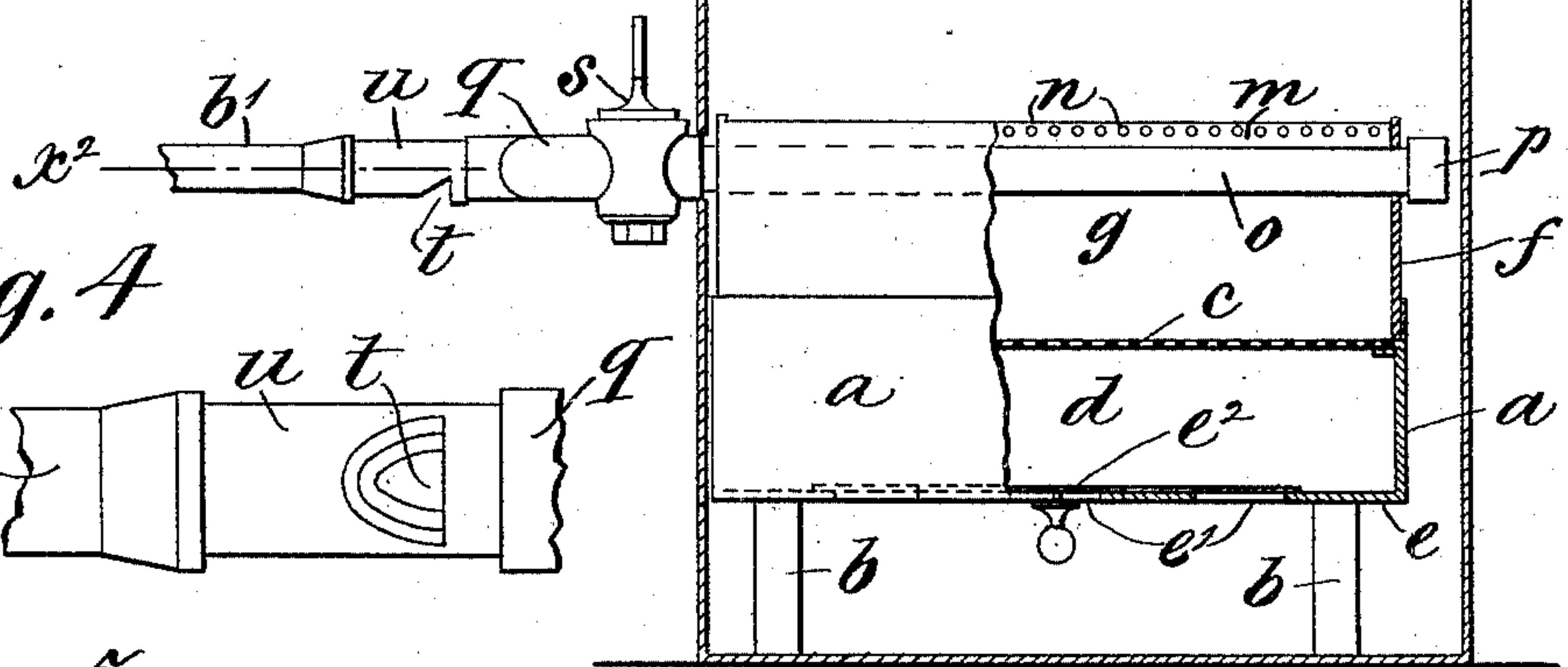
G. ROBERTS.  
GAS OR HYDROCARBON VAPOR BURNER.

No. 446,016.

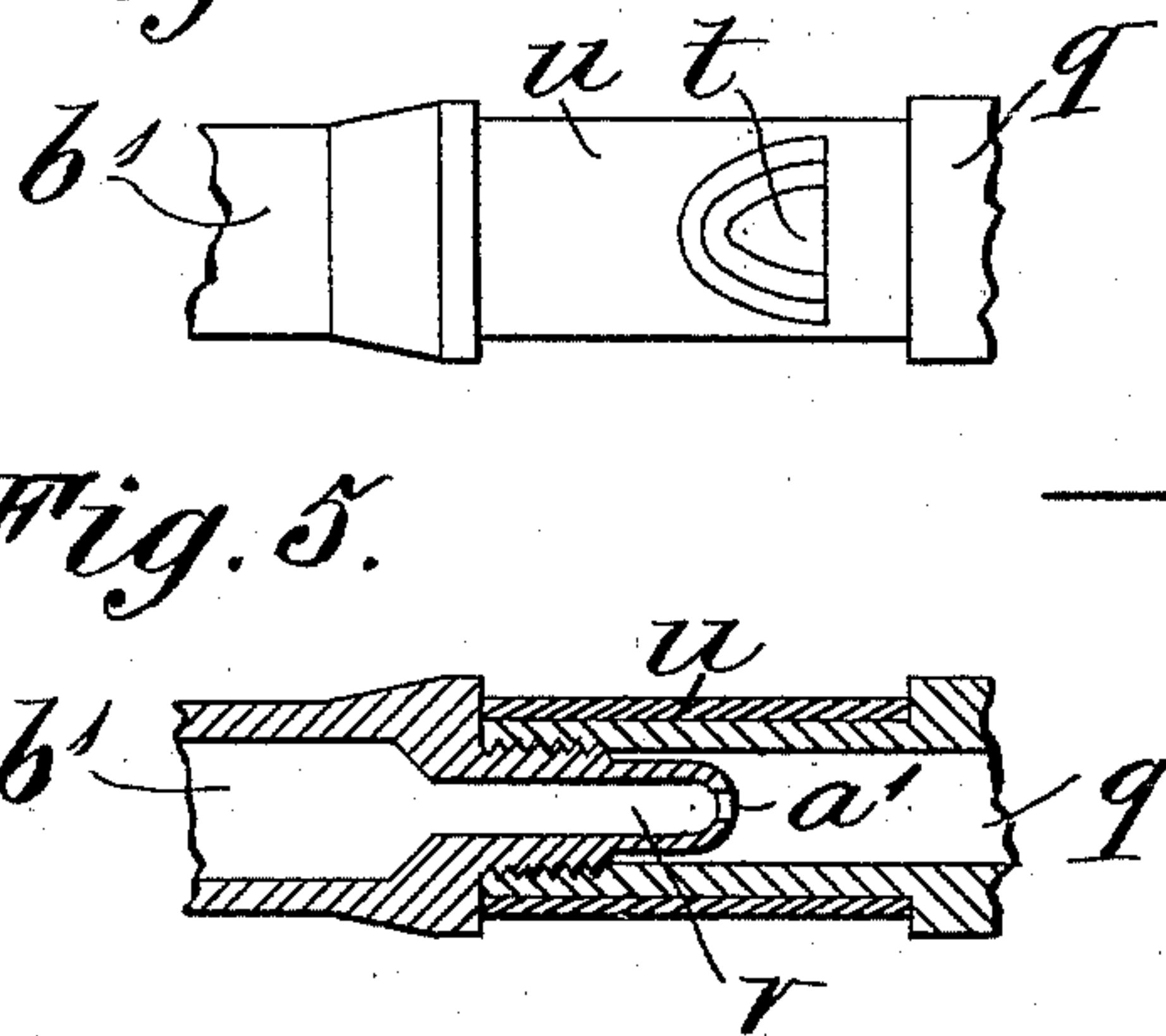
Patented Feb. 10, 1891.



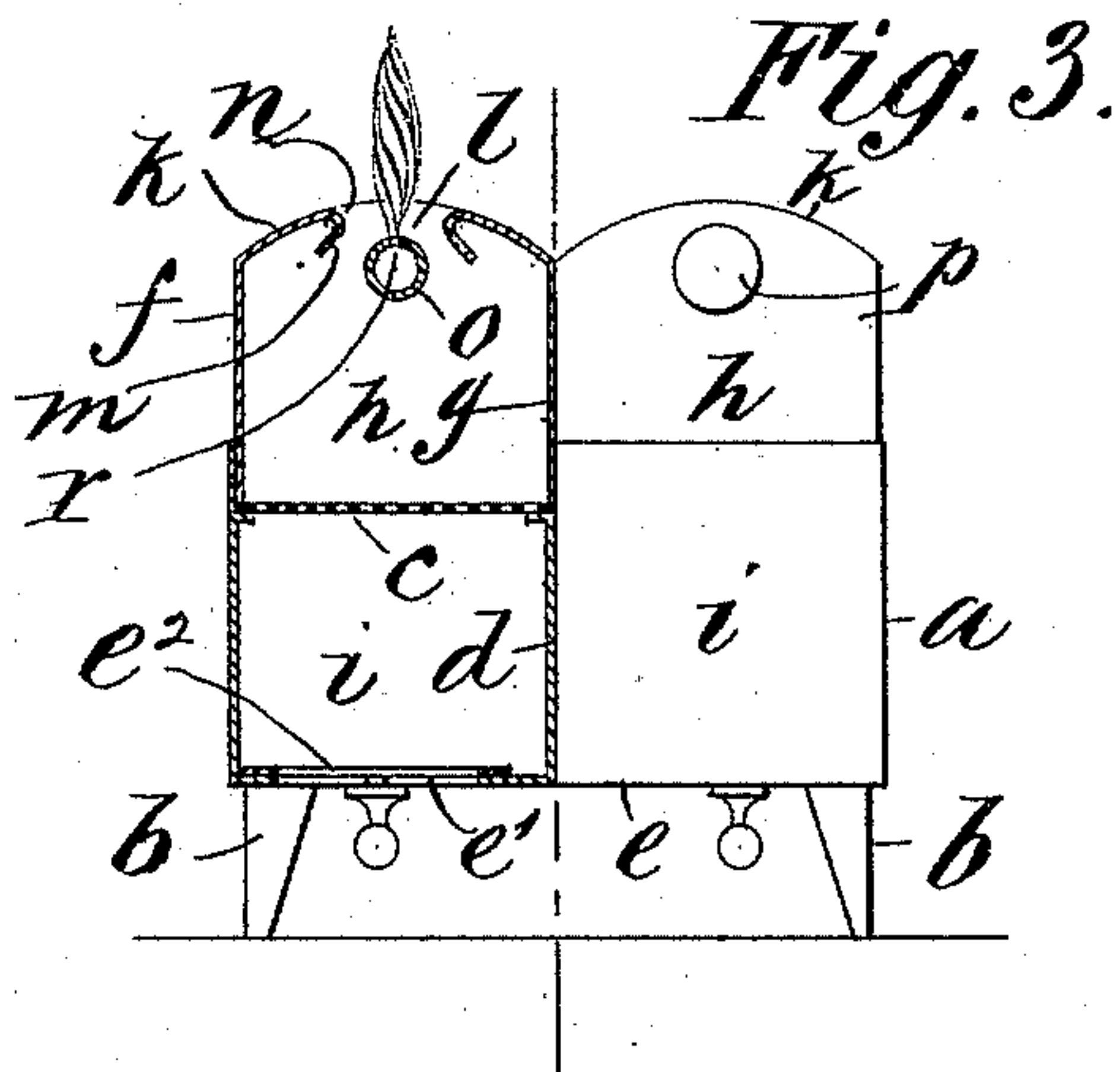
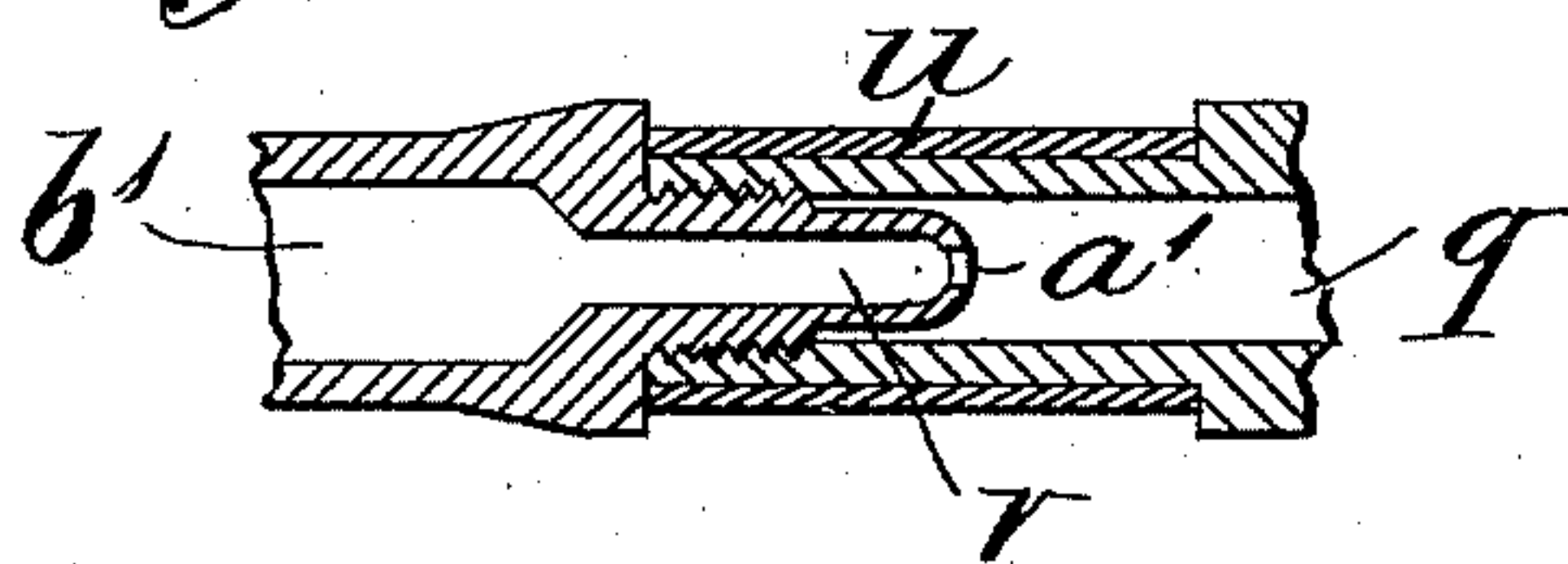
*Fig. 2.*



*Fig. 4.*



*Fig. 5.*



Witnesses

H. R. Millard  
J. Millard

Inventor.

George Roberts

By his Attorney

Charles G. Simpson



# UNITED STATES PATENT OFFICE.

GEORGE ROBERTS, OF MONTREAL, ASSIGNOR OF ONE-HALF TO JOHN HALLY, OF TORONTO, CANADA.

## GAS OR HYDROCARBON-VAPOR BURNER.

SPECIFICATION forming part of Letters Patent No. 446,016, dated February 10, 1891.

Application filed October 23, 1890. Serial No. 389,041. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE ROBERTS, a subject of the Queen of Great Britain, residing at the city of Montreal, in the District of Montreal and Province of Quebec, Canada, have invented new and useful Improvements in Gas or Hydrocarbon-Vapor Burners; and I do hereby declare that the following is a full, clear, and exact description of the same.

10 This invention has reference to the construction of a burner which may be used for heating or lighting purposes, or both, in which gas, gasoline, or hydrocarbon vapor may be used to generate the desired heat or light.  
15 When used as a heater, it may be placed inside a stove, fire-grate, furnace, or under a stand, and although the invention may be made in single form yet I prefer to make it of a number of folds or sections, so that by  
20 the use of a greater or less number of sections the heat and light may be regulated to a greater extent than can be accomplished by the adjustment of the ordinary stop-cocks by which the flow of gas, &c., to the whole burner is controlled; and the object of my invention  
25 is to provide a more convenient form of gas-heater for general use, and to construct the invention so that it will be very light, portable, and suitable to be connected with any  
30 gas pipe or burner in the apartment of a house by means of a flexible hose, and may also, if desired, be applied to stationary stoves, &c. I attain these objects by the burner illustrated in the accompanying drawings, in  
35 which similar letters of reference indicate like parts.

Figure 1 is a plan of the burner. Fig. 2 is a part side elevation and part section. The section of the parts that are shown in section  
40 is taken at line  $x$ , Fig. 1, while the pipe  $o$  and cap  $p$  are shown in elevation. Fig. 3 is a half end elevation and half transverse section of the burner, the sectional part being taken at line  $x'$ , Fig. 1. Fig. 4 is a plan of the under  
45 side of the extremity of the branch pipe  $q$ , showing the opening  $t$ . Fig. 5 is a section of the end of the branch pipe  $q$ , sleeve  $u$ , and pipe  $b'$ , taken on line  $x^2$ , Fig. 2.

$a$  is a rectangular casing carried on supports  
50  $b$  at any desired height. This is adapted to

support within it a horizontal perforated diaphragm  $c$ .

As shown, the invention is of duplicate form, the space between the perforated diaphragm  $c$  being divided into two parts by a  
55 diaphragm  $d$ , extending the entire length of the casing  $a$ , and from the bottom  $e$  up to the under side of the diaphragm  $c$ . If desired, however, the width of the casing may be increased, and it may be divided into a greater  
60 number of parts, thus enabling the burner to be made in a corresponding number of folds or sections.

In the bottom  $e$  of the casing  $a$  openings  $e'$  are formed to each of the sections  $i$  for the  
65 air to pass up through, and, as shown, a damper  $e^2$  is provided to each, so that the openings for the passage of air may be adjusted in size or altogether closed.

$f$  is a casing fitted to the top of the casing  
70  $a$ , resting by its edges upon the edges of the diaphragm  $c$ . This is provided with a longitudinal diaphragm  $g$ , dividing it into sections  $h$ , agreeing with the sections  $i$  of the casing  $a$ . Each section has an arched top  $k$ , having an  
75 opening  $l$ . The edges of the arched top are bent under and form downwardly-projecting ridges  $m$ . These are provided with perforations  $n$  on both sides of the openings  $l$ . Each  
80 section  $h$  has a gas-pipe  $o$ , passing longitudinally through it in the position shown.

$p$  are caps closing one end of the pipes, while the other ends are connected with a branch pipe  $q$ .

$r$  are perforations which serve as ordinary  
85 burner-jets. These and the perforations  $n$  may, if desired, be made in the form of elongated openings or slits.

$s$  are stop-cocks, one for each pipe  $o$ .

In the main part of the branch pipe  $q$ , on  
90 its under side, an opening  $t$  is formed, as shown, this orifice being similar to that of a common whistle. Over this said part of the pipe  $q$  is closely fitted a sleeve  $u$ , having a corresponding opening to the opening  $t$ .  
95

In the end of the pipe  $q$  is screwed a nipple  
100  $v$ , having an orifice  $a'$ , the parts being so arranged that the orifice  $a'$  will come nearly flush with the opening  $t$ , as will be seen by comparing Fig. 4 with Fig. 5. The nipple is



made integral with a pipe  $b'$ , which may be connected in any desired manner with any ordinary gas-pipe in the room in which the burner is to be used. The burner thus constructed may be situated within the fire-place of any stove, cooking-stove, furnace, fire-place, or open work, or inclosed casing  $c'$ , which may be provided with mica or other lights to allow the light emitted from the burner to radiate within the apartment in which the burner is situated.

In operating the said burner when made of a number of sections greater than one, any desired number of sections may be put in operation at the same time by opening the corresponding stop-cocks  $s$  and lighting the gas or vapor escaping from the perforations  $r$ . Such of the sections as are lighted will have the dampers  $e^2$  opened to allow a current of air to pass up through them. This current of air is by the diaphragm  $c$  distributed or prevented from rising locally from the openings  $e'$ , being thereby made to rise equally throughout the whole area of the sections  $h$ , in doing which a portion of it is caught by the ridges  $m$  and caused to form jets of air by passing through the perforations  $n$  to act on both sides of the flame from the perforations  $r$  of the pipe  $o$ . Should any of the sections  $h$  not be put into operation, the dampers  $e^2$  of those sections will be closed to prevent a current of cold air passing up, and have a detrimental effect by intermingling with the heat produced by the sections in operation.

By the opening  $t$  an amount of air is admit-

ted to intermingle with the gas, &c., escaping from the nipple  $v$ . This opening may be regulated in size, and consequently the amount of air admitted through it, by adjusting the position of the sleeve  $u$  upon the main portion of the branch pipe  $q$ .

What I claim is as follows:

1. The combination, in a burner for gas, gasoline, or hydrocarbon vapor, of the casing  $a$ , having damper or dampers  $e^2$  and openings  $e'$ , section or sections  $i$ , perforated diaphragm  $c$ , with a casing  $f$ , having corresponding sections  $h$ , each provided with a pipe  $o$ , having perforations  $r$ , and each provided with openings  $l$ , downward-extending ridges  $m$ , having perforations  $n$ , the whole constructed and arranged substantially as shown and described.

2. The combination, in a burner for gas, gasoline, or hydrocarbon vapor, of the casing  $a$ , having damper or dampers  $e^2$  and openings  $e'$ , section or sections  $i$ , perforated diaphragm  $c$ , with a casing  $f$ , having corresponding sections  $h$ , each provided with a pipe  $o$ , having perforations  $r$ , and each provided with opening  $l$ , downward-extending ridges  $m$ , having perforations  $n$ , with a branch pipe  $q$ , having adjustable opening  $t$  for the admission of air, the whole constructed and arranged to operate substantially as shown and described, for the purposes set forth.

GEORGE ROBERTS.

Witnesses:

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DANL. MAIDING.