

No. 735,831.

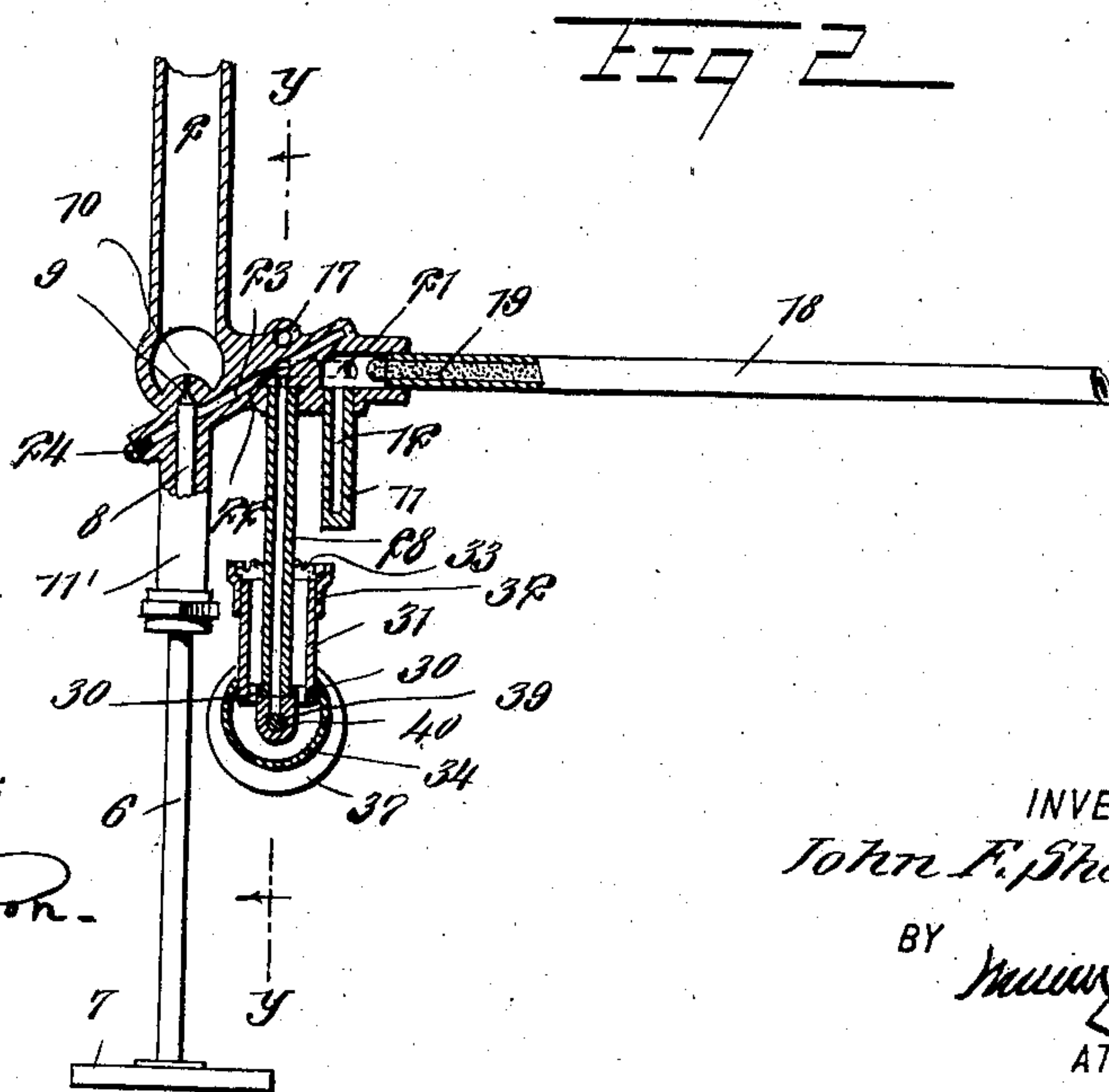
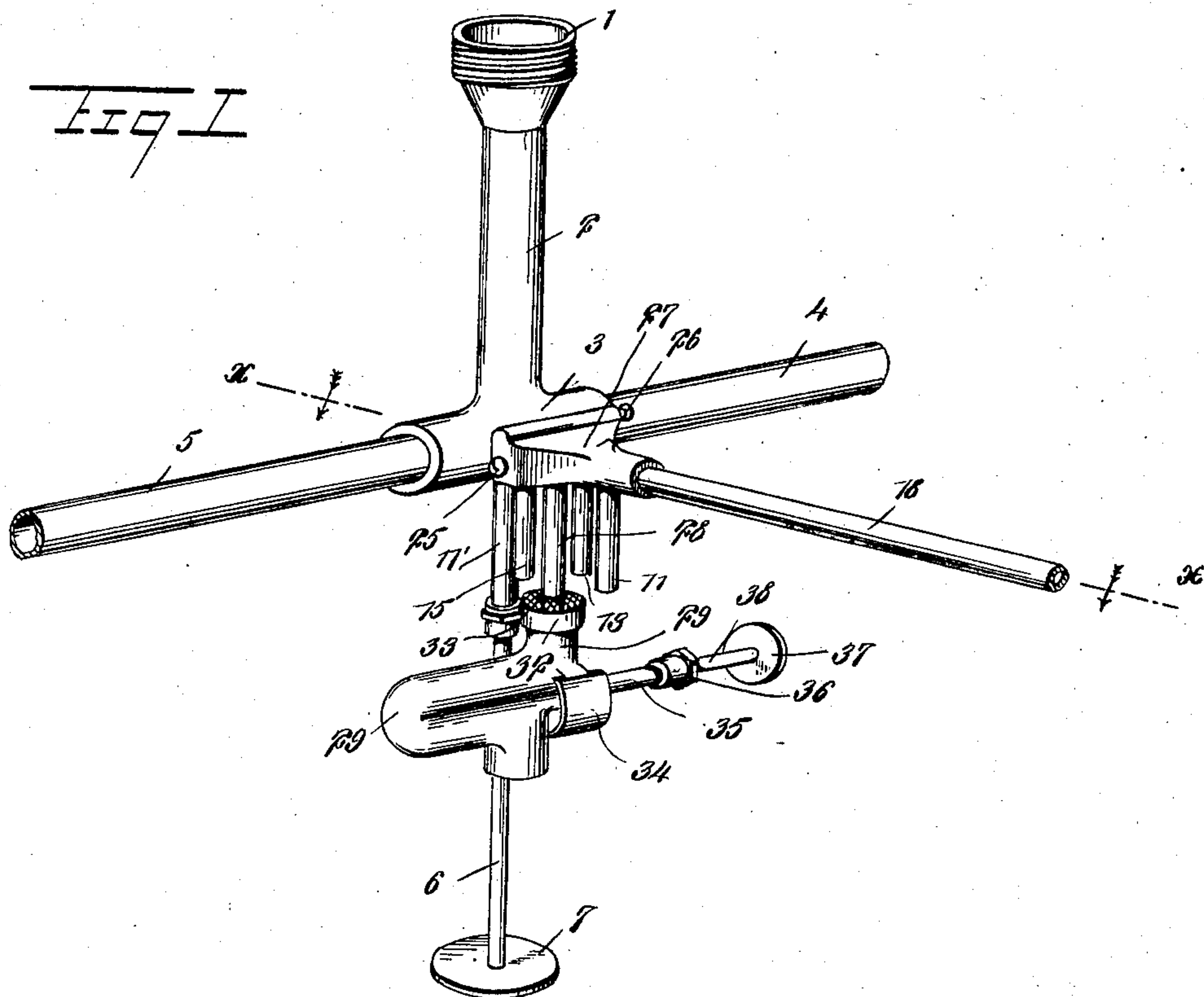
PATENTED AUG. 11, 1903.

J. F. SHELTON.  
HYDROCARBON VAPOR GENERATOR.

APPLICATION FILED AUG. 28, 1901.

NO MODEL.

2 SHEETS—SHEET 1.



WITNESSES:  
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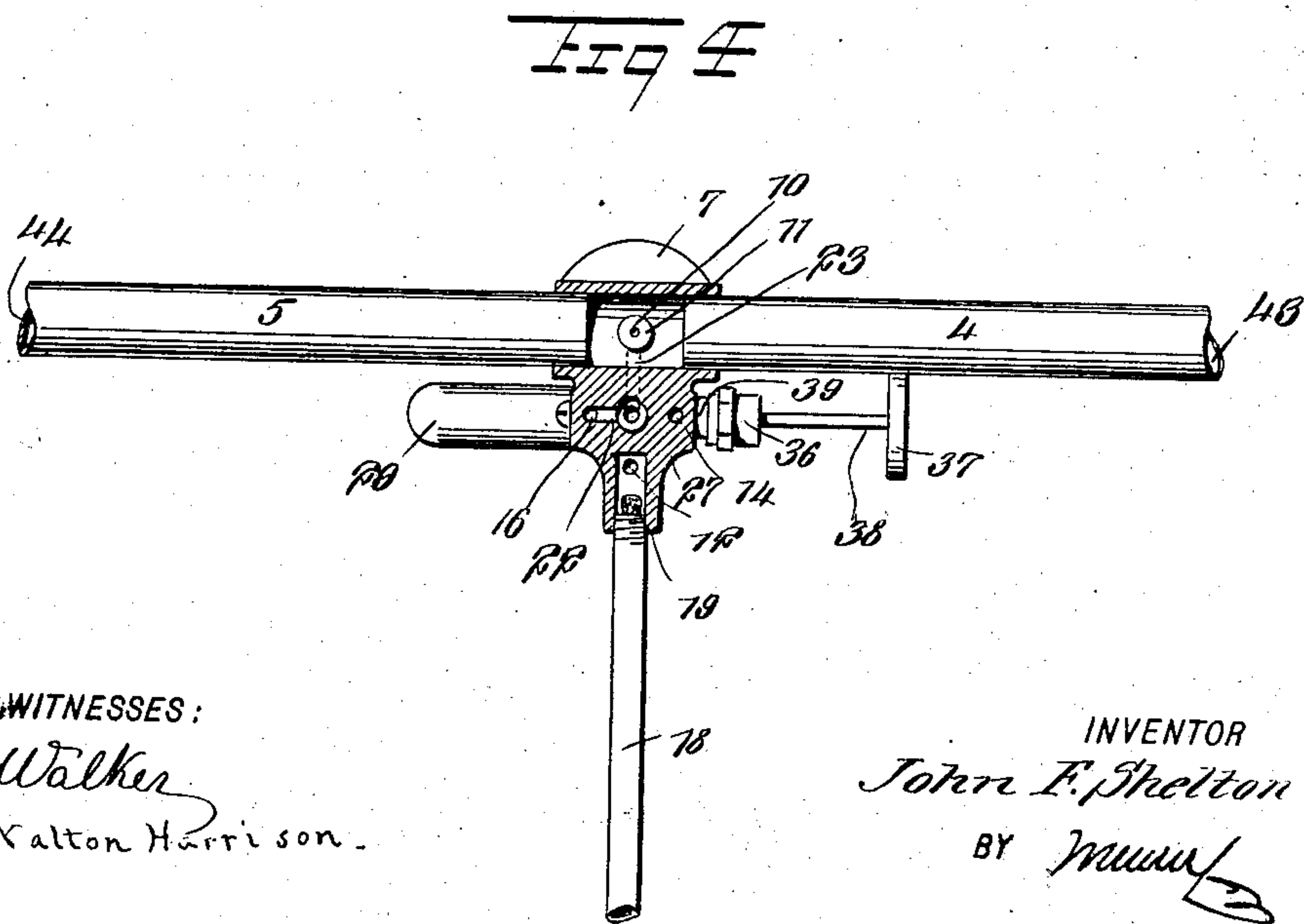
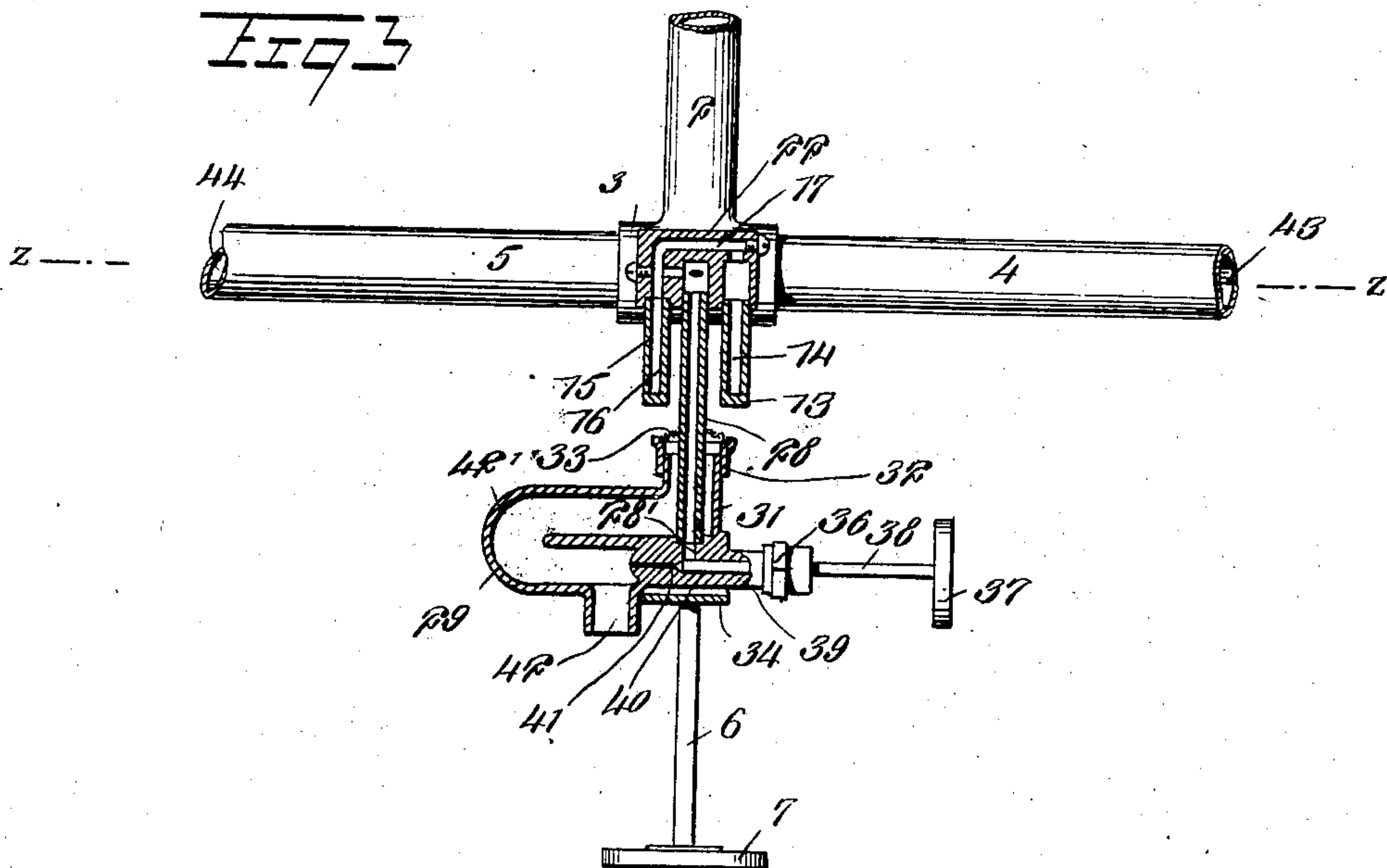
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BY

*M. M. M.*

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# UNITED STATES PATENT OFFICE.

JOHN FRANKLIN SHELTON, OF FORT WORTH, TEXAS.

## HYDROCARBON-VAPOR GENERATOR.

SPECIFICATION forming part of Letters Patent No. 735,831, dated August 11, 1903.

Application filed August 28, 1901. Serial No. 73,568. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN FRANKLIN SHELTON, a citizen of the United States, and a resident of Fort Worth, in the county of Tarrant and State of Texas, have invented new and useful Improvements in Hydrocarbon-Vapor Generators, of which the following is a full, clear, and exact description.

My invention relates to hydrocarbon-generators, and more particularly to means for causing the hydrocarbon fluid to vaporize readily.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a perspective view of my device. Fig. 2 is a vertical section on the line  $x x$  of Fig. 1 looking in the direction of the arrows. Fig. 3 is a vertical section on the line  $y y$  of Fig. 2 looking in the direction of the arrows. Fig. 4 is a horizontal section on the line  $z z$  of Fig. 3.

The main burner is screw-threaded and is mounted upon a funnel-shaped end 1 of the tube 2, which is provided with a T 3, into which are inserted the large air-tubes 4 and 5 for the purpose of supplying the burner with air, this arrangement constituting a form of the Bunsen burner.

Secured to the T 3 is a head 27, provided with depending tubular pockets 11, 13, and 15 and connected with the hydrocarbon-supply pipe 18. The hydrocarbon liquid enters through the pipe 18 and fills the internal cavities 12, 14, and 16 of these pockets, first filling the cavity 12 of the pocket 11, thence flowing obliquely to the right fills the cavity 14 of the pocket 13, thence proceeds across through the passage 17 to the cavity 16 of the pocket 15, after filling which it proceeds through the passages 21, 22, and 23, whence it divides, a part going down into a tube 28 and a part going into the conical passage 9 and thence to the jet 10 in the nipple 11'. This jet 10 is controlled by the needle-valve 8, which is mounted upon the stem 6 and terminates in the hand-wheel 7, and by turning this hand-wheel to the right or left the escape of the liquid through the jet 10 is governed. The part of the liquid which descends

through the tube 28 enters a narrow passage 28' in the frame below, whence it proceeds to the conical passage 41, closed by the needle-valve 40, which is mounted upon a revoluble stem 38, located in the fixed tube 39, rendered tight by means of the joint 36, and terminating in the hand-wheel 37. This valve is substantially of the same structure as the one above described; but it controls the admission of the hydrocarbon liquid through the conical passage 41 to the open space 42' in the crooked air-tube 29.

Surrounding the tube 28 is a jacket 32, mounted upon the tubular frame 31 and supporting the wire-gauze 33. The end 42 of the air-tube 29 is open. At 30 are holes in the air-tube, these holes being distributed upon each side of the ridge 39, containing the passage in which the needle-valve 40 works. An iron hood 34 loosely surrounds these holes, as shown more particularly in Figs. 1 and 2. 19 is a stopper, made, preferably, of asbestos wrapped with gauze. Its object is to curtail the flow of hydrocarbon liquid through the tube 18.

The operation of my device is as follows: A volatile hydrocarbon being admitted to the apparatus by means of the pipe 18 fills the depending pockets and adjacent tubes, as above described. By turning the hand-wheel 37 a little of the liquid is injected into the large crooked tube 29 and immediately vaporizes at a rate depending upon the temperature of the surrounding parts. The free air enters through the opening 42 and mingles with the vapor, thus forming an aerated vapor capable of combustion. A match now being applied to the gauze 33 and also to the ends of the iron hood 34 ignites the vapor in two places. If desired, the formation of vapor in the crooked air-tube 29 can be facilitated by heating said air-tube slightly by the external application of a match or torch before igniting the vapor. The vapor passes through the gauze 33 and readily burns above the same. It also passes downward through the holes 30 and burns around the lower part of the frame, more particularly at the ends of the iron hood 34. It will thus be seen above the gauze 33 there will be a blaze, which I term a "subflame," and that at the extreme



lower part of the apparatus, particularly at the ends of the iron hood 34, there is another small flame, the two flames being supplied by two branching portions of the flowing vapor.

5 The flame at the ends of the hood 34 heats all of the parts immediately adjacent and serves to vaporize the little portion of hydrocarbon fluid which enters the tube 29 through the jet 41. This vapor passes upward out through  
10 the gauze 33 and also downward through the holes 30, thus making two distinct flames, as above described. The flame emanating from the gauze 33 serves to heat the depending pockets 11, 13, and 15, the tube 28, the head  
15 27, the T 3, and the air-pipes 4 and 5 and at the same time to vaporize such of the hydrocarbon liquid as passes through the jet 10. It is at this point that the vapor is formed in large quantities to feed the burner proper,  
20 this vapor being immediately admixed with more or less air entering through the passages 43 and 44 of the air-pipes 4 and 5, this action being the same as in the well-known Bunsen burner. The vapor thus aerated  
25 passes downward through the tube 2 to the main burner.

It will be noticed that the main volatilizing device is equipped with a series of pockets forming a series of distinct volatilizing-chambers adapted to be charged successively with  
30 hydrocarbon and that it has a branched or divided fuel supply, one of said branches leading to the pipe having the Bunsen air-feed, while the other branch of said divided  
35 passage communicates with the downwardly-extending tube 28 and is adapted to supply the overflow and non-volatilized hydrocarbon to the crooked air-tube 29, thus causing the  
40 overflow liquid to be vaporized in the tube 28, and the resulting vapor is commingled with air before the combustible mixture is admitted to the subflame-burner.

The tubes 4, 5, and 2, connected with the head 27, constitute a Bunsen air-feed for the  
45 main pipe adapted to supply a series of burners, and this air-feed device receives the fuel from the vapor-passage in the head 27, so that the fuel and the air will be commingled previous to supplying the combustible  
50 mixture to the main pipe.

The jacket 32 and the gauze 33 constitute the subflame-burner, which is situated immediately below the depending pockets forming the main volatilizing device. This subflame-burner is supplied with vapor mixed  
55 with air from a local or secondary volatilizing device. This secondary volatilizing device is formed by a ridge 39, containing the jet 41 and the regulating-valve, and said jet  
60 discharges the vapor directly into the crooked air-tube. The secondary volatilizing device receives the fuel through the tube 28, which is carried from the head 27 directly through the subflame-burner, and the vapor supplied  
65 by the jet 41 and the crooked tube 29 is mixed with air, which is admitted freely to the crooked tube 29 through the mouth 42. This

crooked tube, having the free-air inlet communicating with the jet 41 and with the subflame-burner, produces or constitutes a second  
70 Bunsen air-feed for the subflame-burner. A secondary burner is employed in operative connection with the secondary volatilizing device to heat the latter, this secondary burner being formed by the ports 30 and the surrounding hood 34. The ports 30 are supplied  
75 with vaporized fuel, which is conveyed there to through the secondary volatilizing device and its jet 41 and the crooked air-tube 29.

Having thus described my invention, I  
80 claim as new and desire to secure by Letters Patent—

1. In a vapor-generator, a head arranged for attachment to an oil-supply pipe and having depending tubular pockets forming distinct vaporizing-chambers and a vapor-passage terminating in a vapor-outlet, a mixing-tube arranged to receive the jet of vapor from  
85 such outlet, and air-inlet tubes arranged to discharge air into the mixing-tube, a tube depending from such head and in communication with the vapor-passage therein, such tube having an outlet arranged to discharge  
90 a jet of vapor horizontally, a mixing-tube arranged to receive the jet of vapor so discharged, such mixing-tube being curved and provided with a burner-head arranged about  
95 the depending tube and in position to heat the air-inlet tubes, and a hooded secondary burner arranged at the lower end of such depending tube. 100

2. A hydrocarbon-vapor generator comprising a head provided with a main valved jet and with a series of chambered pockets, a fuel-pipe attached to the head, said head being  
105 also provided with an irregular passage extending through the head and communicating with said main jet and said fuel-pipe to supply fuel successively to the chambered pockets and to the main jet, a pipe depending from said head and communicating with  
110 the irregular passage thereof, and a subflame-burner connected with said depending pipe and disposed adjacent to the chambered pockets. 115

3. A hydrocarbon-vapor generator comprising a head having a main valved jet and a fuel-inlet, a series of chambered pockets depending from the head at points between the fuel-inlet and the main jet, said head being  
120 also provided with an irregular passage which extends from the fuel-inlet to the main jet and communicates with the pockets to supply fuel successively thereto, a subflame-burner disposed adjacent to the pockets, and an air-feed communicating with said head adjacent  
125 to the main jet.

4. A hydrocarbon-vapor generator comprising a main generator having depending pockets connected with each other and with the  
130 fuel-supply source, said pockets forming distinct vaporizing-chambers which communicate with a discharge-pipe, means for successively feeding fuel to said depending pock-



ets, and a subflame-burner having an air-feed and communicating with one branch of the fuel-supply.

5. A hydrocarbon-vapor generator comprising a main vaporizer provided with depending pockets forming distinct vaporizing-chambers which are connected with each other and with a fuel-supply, and a gaseous-supply pipe leading from said pockets, a subflame-burner, the main vaporizer being also provided with a branching passage for directing the greater portion of the fuel to said pipe for distribution and supplying the smaller portion of the fuel to said subflame-burner for heating the generator.

6. A hydrocarbon-vapor generator comprising a main generator provided with a channel having a downwardly-extending branch, an off-bearing pipe having an air-feed and connected with said channel to receive the greater portion of hydrocarbon vapor and to mix the vapor with air and deliver a combustible mixture for distribution to a burner, a subflame-burner located beneath said generator, and a depending tube connecting said burner with a depending branch of said generator, and adapted to convey a small percentage of vapor from said channel to said burner, said tube being in the path of the flame of said burner and adapted to vaporize any overflow liquid fuel supplied to the divided channel, and an air-feed for said subflame-burner.

7. A hydrocarbon-vapor generator comprising a main generator having a divided or branched fuel-discharge and a group of depending vaporizing-pockets located between the fuel-inlet and said divided discharge, an air-feed for the hydrocarbon vapor, and the subflame-burner in communication with the branch of the fuel-supply discharge in the main generator, said subflame-burner also having an air-feed.

8. A hydrocarbon-vapor generator comprising a main generator having means for volatilizing fuel, an air-feed for supplying air to the hydrocarbon vapor, a subflame-burner located below and receiving its fuel-supply through said main generator, an air-feed for said burner, and a hooded secondary burner located below said subflame-burner.

9. A hydrocarbon-vapor generator comprising a head provided with an irregular passage, an off-bearing pipe connected with one end of said passage and having means for admitting air thereto, a group of vaporizing-pockets connected with other parts of said irregular passage of the head and lying in the path of a hydrocarbon-feed to said head, and a subflame-burner adjacent to the head.

10. A hydrocarbon-vapor generator having a head provided with an irregular passage in communication with a hydrocarbon-inlet to said head and serving to change the course of the inflowing liquid, a series of depending chambered pockets communicating with certain parts of said passage, an off-bearing pipe

provided with air-inlets and having communication with one end of said passage in the head, and a subflame-burner connected with said passage and disposed adjacent to the head and the depending pockets.

11. A hydrocarbon-vapor generator comprising a head provided with a hydrocarbon-feed inlet and with an irregular passage extending from said inlet, a group of chambered pockets communicating with certain parts of the passage of the head and disposed adjacent to the feed-inlet to lie in the path of the inflowing hydrocarbon, an off-bearing vapor-pipe connected to said head for communication with one end of the passage therein, a valve controlling the communication between said pipe and the head, and a subflame-burner disposed adjacent to the head and the chambered pockets.

12. A hydrocarbon-vapor generator comprising a head having a hydrocarbon-feed inlet, an off-bearing vapor-pipe leading from said head, a depending pipe connected to the head, a crooked air-tube having an air-inlet and supporting at one end a subflame-burner which surrounds the depending pipe, and a valve controlling the passage of vapor from the depending pipe into the crooked air-tube.

13. A hydrocarbon-vapor generator comprising a head having a hydrocarbon-feed inlet, an off-bearing vapor-pipe leading from said head, a depending pipe connected to said head, a crooked air-tube attached to the depending pipe and provided at a point intermediate of its length with an air-inlet, a subflame-burner supplied from said air-tube and surrounding the depending tube and disposed adjacent to the head, and a valve controlling the admission of vapor from the head to said crooked air-tube.

14. A hydrocarbon-vapor generator comprising a head having a hydrocarbon-feed inlet, an off-bearing pipe leading from said head, a depending pipe connected to said head, a crooked air-tube, a subflame-burner connected to said crooked air-tube, a secondary burner supplied with vapor from said air-tube, and a valve controlling the passage of vapor from the depending pipe to the crooked air-tube.

15. In a hydrocarbon-vapor generator, a crooked tube provided with a ridge having a passage and with a jacket or casing, vapor-ports being provided in said ridge adjacent to the jacket and forming a secondary burner, a pipe communicating with the passage of the ridge, a valve in said passage for controlling the inflow of vapor from the pipe to the crooked air-tube, and an air-inlet to said crooked air-tube, combined with a main volatilizing device, and a subflame-burner communicating with the crooked air-tube and disposed adjacent to the main volatilizing device.

16. In a hydrocarbon-vapor generator, the combination with a main vaporizer and a vapor-pipe leading therefrom, of a secondary



vaporizer, a crooked air-tube having a secondary hooded burner and an air-inlet, the latter being located at a point intermediate of the length of said tube, a depending pipe  
5 connected to the secondary vaporizer and provided with a valved discharge-opening arranged to discharge into said crooked air-tube, and a subflame-burner surrounding the depending pipe and connected to said crooked  
10 air-tube, said subflame-burner being disposed

adjacent to the main vaporizer and to the lower end and the valved discharge-opening of the depending pipe.

In testimony whereof I have signed my name to this specification in the presence of 15 two subscribing witnesses.

JOHN FRANKLIN SHELTON.

Witnesses:

E. E. FOSDICK,

Mrs. GEO. D. WEAVER.