

No. 686,707.

Patented Nov. 19, 1901.

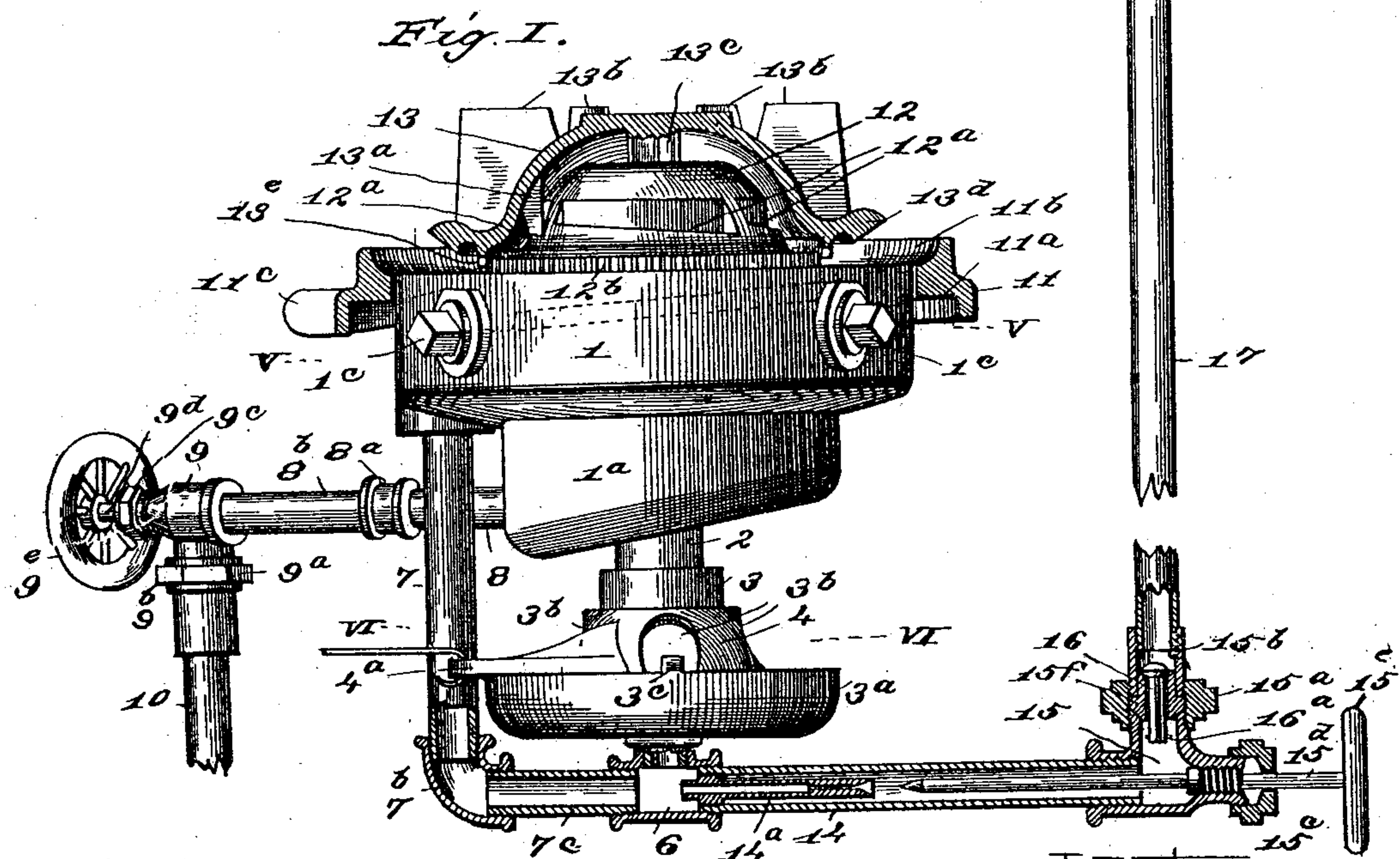
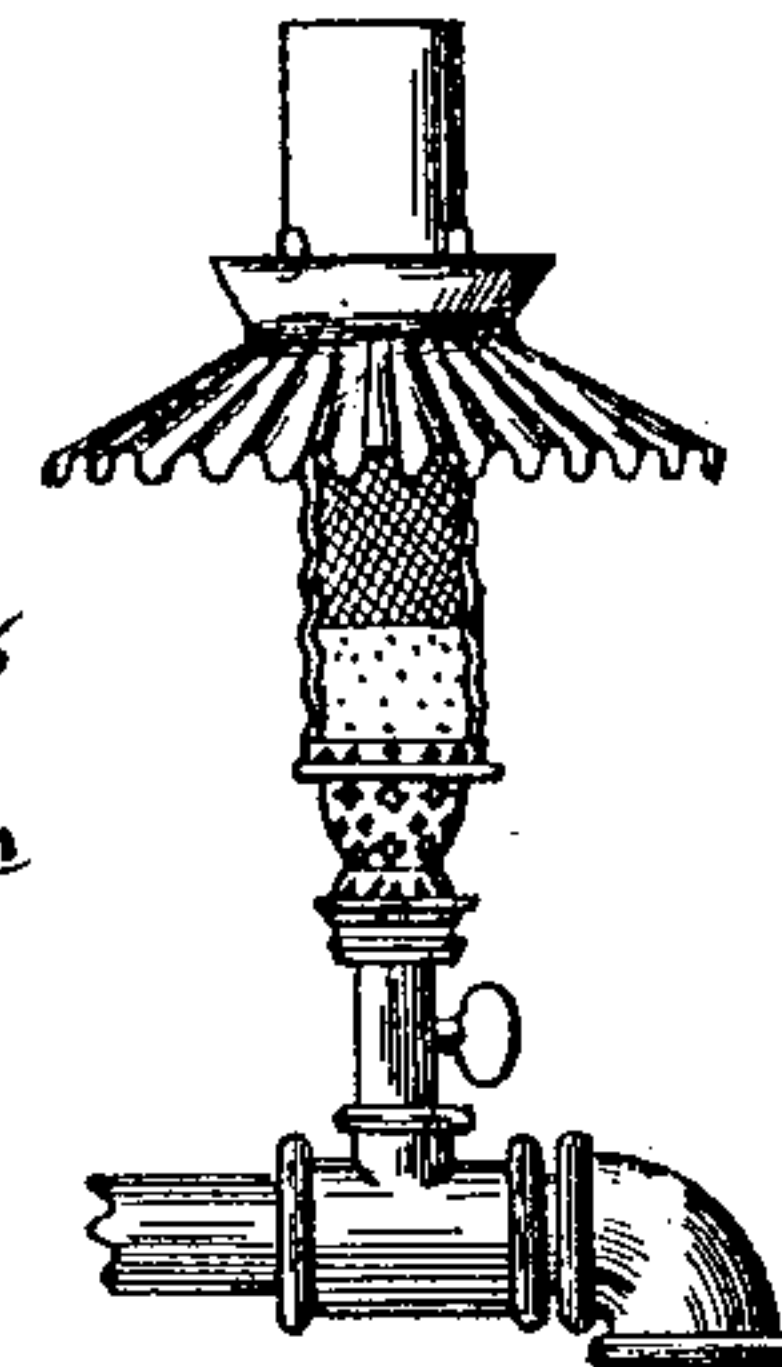
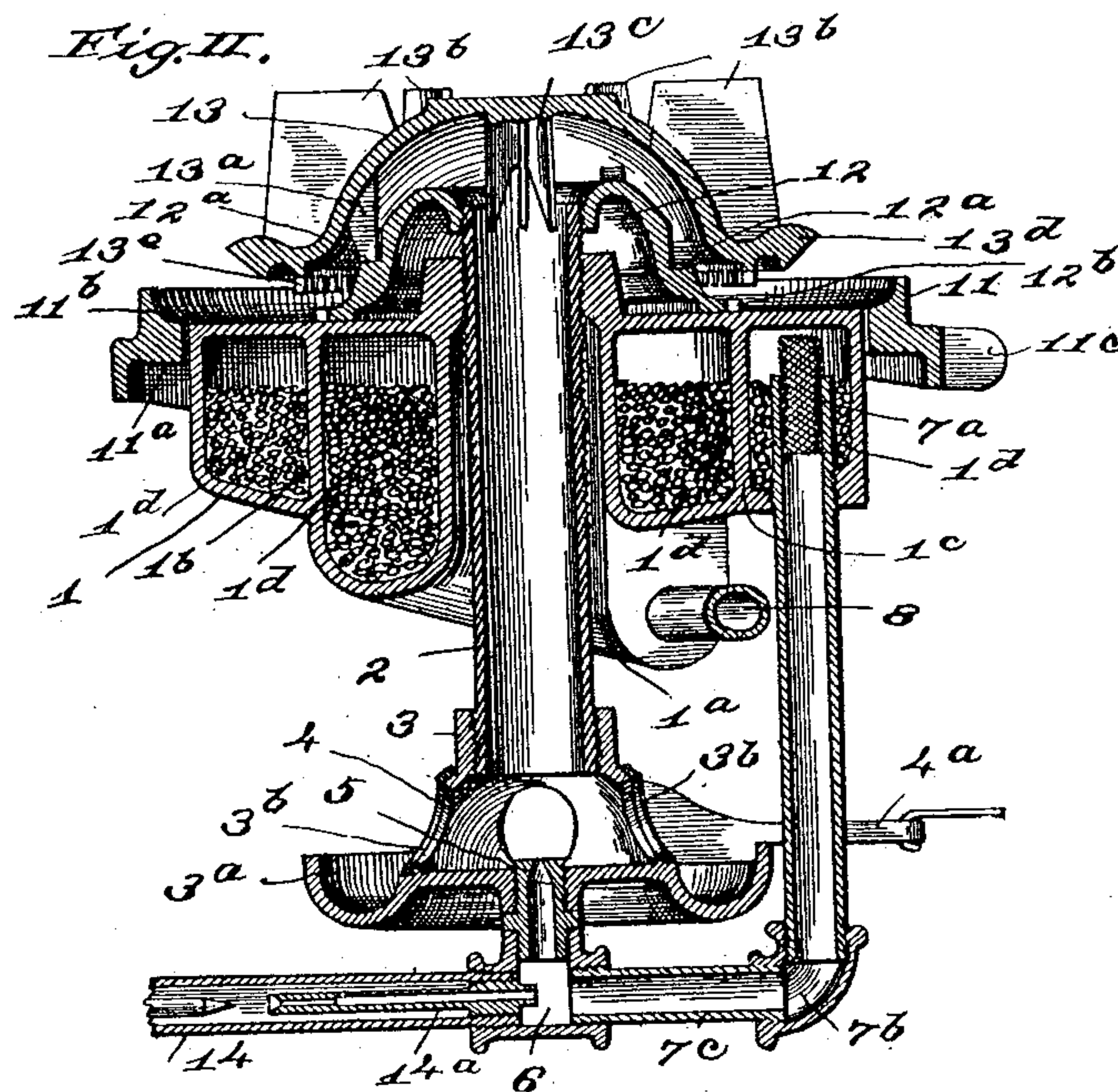
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HYDROCARBON GAS OR VAPOR BURNER.

(Application filed Mar. 2, 1899. Renewed Sept. 5, 1901.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses

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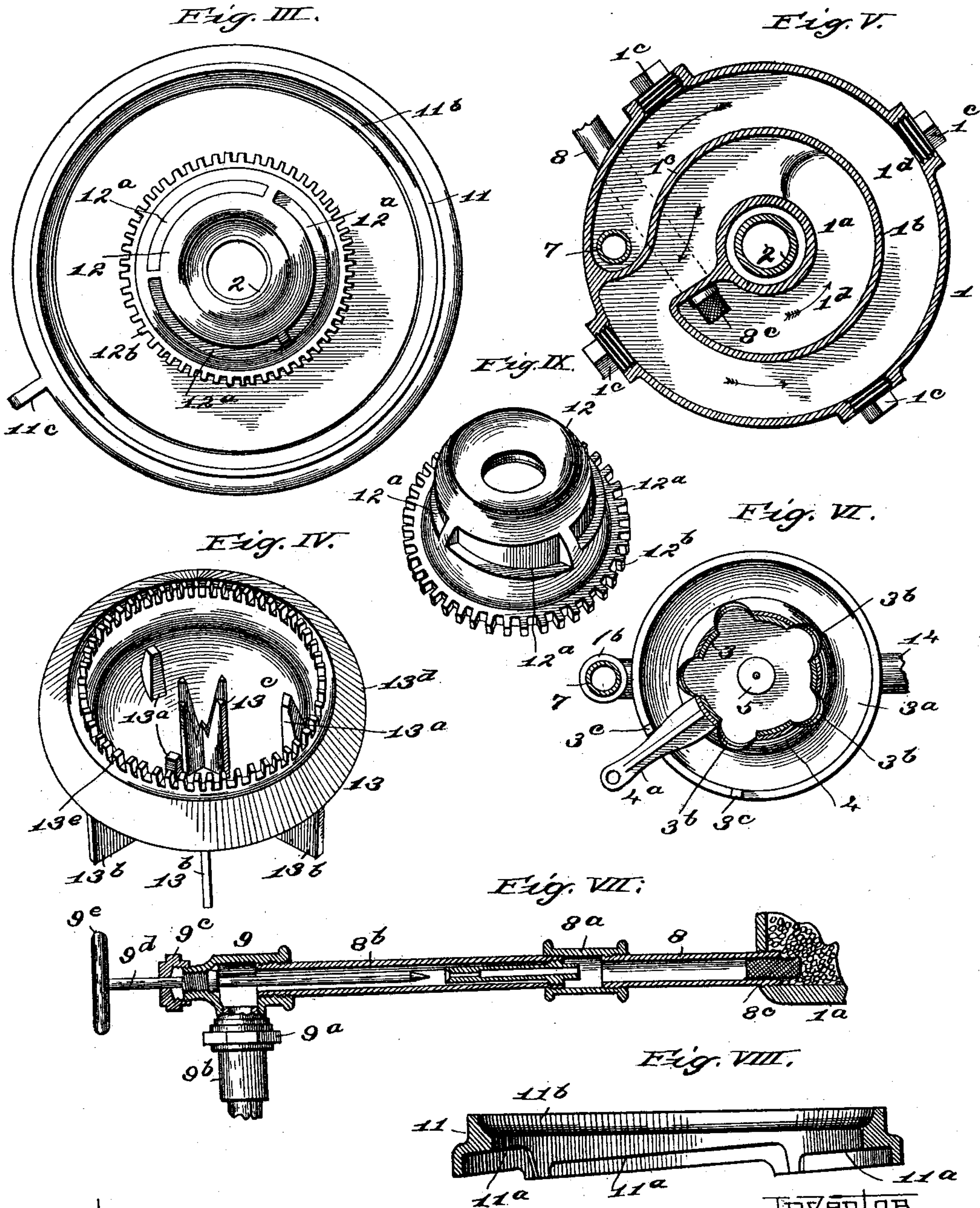
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2 Sheets—Sheet 2.

(No Model.)



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UNITED STATES PATENT OFFICE.

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HYDROCARBON GAS OR VAPOR BURNER.

SPECIFICATION forming part of Letters Patent No. 686,707, dated November 19, 1901.

Application filed March 2, 1899. Renewed September 5, 1901. Serial No. 74,388. (No model.)

To all whom it may concern:

Be it known that I, DANIEL W. BOWMAN, a citizen of the United States of America, and a resident of Toledo, in the county of Lucas and State of Ohio, have invented certain new and useful Improvements in Hydrocarbon Gas or Vapor Burners, of which the following is a specification.

My invention relates to improvements in hydrocarbon-burners for producing both heat and light from natural gas, artificial gas, gasoline, and coal-oil; and the objects of my invention are, first, to produce more heat or more light with a less consumption of gas or oil; second, to avoid the difficulty of carbonizing in the generator; third, to simplify the construction of generators and burners, and, fourth, to obtain a cheaper and more durable burner by the use of which all the heat and light producing properties of the oil or gas are consumed. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a front elevation of my invention complete. Fig. 2 is a vertical central section of my invention. Fig. 3 is a top or plan view showing the top of the generator with the inside cup or locking-cap in position on it. Fig. 4 is a vertical perspective view of the top cap, which is represented in an inverted position, showing its slotted burner-ring, its supporting-legs, and its center adjustable mixer. Fig. 5 is a horizontal section of the generator, taken on the dotted line 5 5, Fig. 1. Fig. 6 is a horizontal section of the lower mixer, taken on the dotted line 6 6, Fig. 1. Fig. 7 is a longitudinal central section of the supply-pipe with its valves and connection to the generator. Fig. 8 is a section showing the inside of the adjustable ring to confine the blaze and turn it up. Fig. 9 is a top side perspective view of the inside cup or locking-cap, taken separately.

Similar figures refer to like parts throughout the several views.

Referring to the drawings, 1 is a generator which is circular in form and is provided with various detail parts, as a deep spiral pit or entry-chamber 1^a, extending down from its bottom, circular internal walls 1^b, a series of screw-plugs 1^c around its band or edge, and as a retarding medium an internal partial

filling of gravel 1^d, as is shown in Fig. 2. It is also provided with a center threaded hole by means of which it is secured to the upper end of a stand-pipe 2, which is provided with a long running thread above and a short thread below, to which short thread below is secured a mixer-shell 3, which is provided with an oil-valley 3^a below, a series of holes 3^b above, and stops 3^c on the edge of the oil-valley. Over the series of holes 3^b is fitted a capped damper-ring 4, which has a corresponding series of holes to the holes 3^b and is provided with a lever 4^a, by means of which it may be shifted around, so as to close off all or a part of the draft and prevent the blaze from entering the stand-pipe and mixer as desired.

To the center and bottom of the mixer-shell 3 is screwed a jet-plug 5, in which there is a small hole, which is central under the hole in the stand-pipe 2. Also to the lower end of the jet-plug 5 is screwed a T-fitting 6, to the one end of which is screwed a pipe-nipple 7^c, an elbow 7^b, and a vertical pipe 7, the upper end of which is screwed into the bottom of the generator 1 and is provided in its upper end with a gauze covering 7^a, which keeps the filling 1^d from entering the pipe 7. To the other end of the T-fitting 6 is screwed a pipe 14, which has screwed into the one end of it a plug-valve seat 14^a, which has a hole through it lengthwise and a square on the one end of it for a wrench, and the other end provided with a long valve-seat, cut away so as to leave a chamber between it and the inside of the pipe 14. The other end of the pipe 14 is screwed into an angle-valve body 15, which has a packing-nut 15^a, a union-nipple 15^b, a packing-nut 15^c, a valve-stem 15^d, and a hand-wheel 15^e. The valve-stem 15^d, being long and provided with a thread and collar, reaches to the seat on the end of the plug-valve seat 14^a. This angle-valve body 15 is also provided with a check-valve 16 in the union-nipple 15^b of its upper branch, which has its seat in the body of the nipple 15^f and is held in by the pin 16^a below.

The vertical pipe 17 above is designed to show a conducting-pipe for the gas extending up and branching off to desirable places for attaching improved burners for light, as is indicated by the light-burner shown in Fig. 1,

which light-burner is not a part of this invention; but the angle feed-valve is shown substantially the same as that used above on the supply-pipe leading to the generator, which is shown in detail more particularly in Fig. 7 of the drawings, in which is shown the pipe-nipple 8, with its gauze strainer 8^c, entered in the broken section of the generator 1^a, then the coupling 8^a on the other end connecting it to the angle-valve body 9 by its extension-pipe 8^b, the peculiar feature of which is its plug-valve seat (shown also in Figs. 1 and 2) 14^a below, in which is shown a long tubular seat screwed into the pipe at the coupling-joint, the seat for the valve-stem 9^d being at the end of the tubular part, which is less in diameter than the threaded portion, so that when it is in its proper position in the pipe there is a chamber between it and the inside of the pipe, which serves as a cooler for the valve-seat when burning oil and prevents carbonizing and clogging the valve-passage by the heat from the generator, but in burning gas it does not show any advantage.

Returning to the generator 1 and the stand-pipe 2, as shown in Fig. 2, the stand-pipe projects above the top of the generator, and on it is also screwed an inside cup or locking-cap 12. This cap is coned up on the outside and curved in on the top to the pipe 2 and forms a cooling-chamber over the center portion of the generator. Its lower outer edge or periphery, resting on the top of the generator directly over the internal vertical wall, is formed into a series of teeth 12^b, and on its coned outer surface are shown three sections of a spiral ascending track 12^a, which serves as a supporting-track for the legs 13^a, which are on the underside of the top cover 13 and three in number and serve to elevate the said cover when it is rotated partially around, and the legs 13^a are caused to travel up the inclined supporting-track 12^a, which also serves to keep the top cover central on the inside cup and the generator. The cover is also provided with an outer circle of teeth 13^c on its under side, which shut down over the outside of the row of teeth on the outer edge of the cap 12, the two forming a gate and mixer for the gas before it reaches the point of burning. The flanged projection beyond or outside of the circle of teeth 13^c is shaped into a round groove and a projecting corner and surface, which serve to separate the green from the blue flame in the burner and give a stability to the blaze. The top cover 13 is further provided with a downward-projecting fluted center core 13^c, either fixed or movable on the lid, which projects down into the top of the stand-pipe and forms an adjustable center gate and mixer for the gas, while the rise and fall of the top cover by the inclined track and the legs regulate the flow of gas and the flame for a large or small fire.

The upper side of this top cover 13 is provided with a series of radial flanges 13^b, which serve to make a surface suitable to set any kind of

a cooking utensil onto. Further, there is a ring around the outside of the generator which is termed an "adjustable confining-ring," 11, which has inclined tracks on its under side, which rest on the bosses and plugs 1^c on the generator and as it is partially rotated rises and falls and turns the blaze upward and inward by its adjustment up or down, as desired.

Having now clearly described the various parts of my invention, it is necessary next to show their manner of working and their relation to each other, which is as follows, briefly: The pipe 10, which is shown broken off under the valve-body 9, is connected to a supply of gas or oil. Now open the angle-valve-body 9 by rotating the hand-wheel 9^c. The oil or gas passes through it and into the pipe 8, where it passes through the valve-opening in the plug-valve seat 8^b and passes through the gauze strainers 8^c into the deep spiral entry-chamber 1^a and rises through the sand or gravel filling 1^d and around the winding passage in the generator 1 and out and down through the pipe and elbow and pipe into the T-fitting 6 and up through the jet-plug 5 into the lower first mixer 3, and at this joint, if it is oil or gasoline that is being used, it flows out and fills the oil-valley 3^a, and it is there ignited to heat the generator 1 and stand-pipe 2 above. While this is being done the valve-body 9 must be closed and also the mixer-damper 4 until all of the oil is burned and the flame is extinguished in the oil-valley. At this point gas is generating in the generator 1. Now open the valve-body 9 and the oil flows again to the generator 1, and the gas passes out of the generator through the pipes and through the jet-plug 5 and passes up through the stand-pipe 2 and out through the internal or adjustable central mixer 13^c, where it spreads out in the cavity between the inside cap 12 and the top cover 13 and finds a passage out through the egress-mixer formed by the two rings of teeth 12^b and 13^c, where it must be ignited to start the burner; but if it is gas that is being used the gas flows right on through in the same manner without using the oil-valleys; but in either case the mixer-damper 4 must be closed when the burner is being ignited; but after it is burning the mixer-damper 4 must be opened to give the rising column of gas the needed supply of air to mix with it and increase the heat and combustion at the burning-point outside of the egress-mixer, as described. After burning a few moments the generator and the cap and top cover become more thoroughly heated and the generating and mixing become perfect. The cold feed to the generator may be regulated by the valve-body 9; but the flow or feed and perfect combustion at the burning-point are regulated to a delicate exactness by the partial rotation of the top cover 13, which causes it to rise and fall, and the volume of cold feed, together with the adjustment of the top cover 13 to control the feed

of the hot mixed gas and air to the burning-point, makes the light or strong fire, as desired.

Also by raising or lowering the confining-ring 11 the blaze may be curled up or spread out.

5 By keeping the fire-ring and the intense heat outside of the toothed mixer-rings I am able to keep the center column much cooler from the bottom of the pit up under the binding-cup 12 and so prevent the generator from carbonizing and control my burner perfectly. I
10 also decrease the consumption of gas and increase the supply of oxygen from the air by the perfect graded system of ingress, internal, and egress mixers that I make use of, each
15 one turning and mixing the column of gas and air together differently. Further, after the combustion is perfect and the generating is regular the angle valve-body 15 may be opened and a supply of gas taken off of superior quality through the pipe 17, the flow and
20 back pressure of which may be controlled by the valve-body 15 and the check-valve 16, as shown and described.

25 Having described my invention and its operation, what I claim as new, and desire to secure by Letters Patent, is—

1. In a hydrocarbon gas or vapor generator and burner a generator 1, provided with a

circular vertical internal wall, a horizontal inlet and a vertical outlet a deep spiral pit 30 around the center core for the inlet and an internal partial filling of sand or gravel substantially as shown and specified.

2. In a hydrocarbon gas or vapor generator and burner a generator 1, stand-pipe 2 and 35 an inside cap 12 with its outer circle of teeth and its spiral inclined track in combination with a top cover 13 with its under side provided with short legs to rest on the inclined spiral track on the cap 12 and its circle of 40 teeth to fit over the circle of teeth on cap 12, and its winged or fluted mixer-plug to fit in the end of the stand-pipe 2, and its outer flanged projection 13^d as specified.

3. The combination of a burner, a fluid-fuel 45 supply-pipe in proximity thereto, a tubular valve-seat in said pipe and spaced from the walls thereof, and a valve in said pipe for controlling the flow of fuel through the tubular valve-seat as described. 50

Signed by me at St. Louis, Missouri, this 27th day of February, 1899.

DANIEL W. BOWMAN.

Witnesses:

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MAYME SCHWARTZ.