No. 756,977. PATENTED APR. 12, 1904.

J. P. NAGEL.

LAMP.

APPLICATION FILED AUG. 15, 1901.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

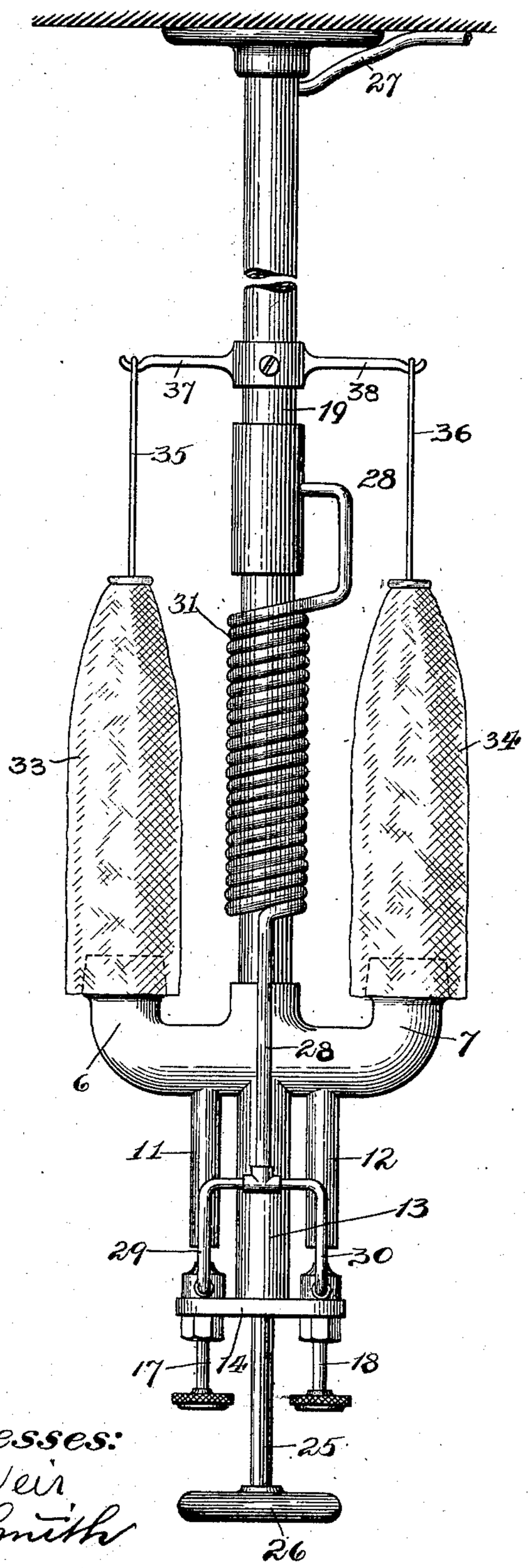
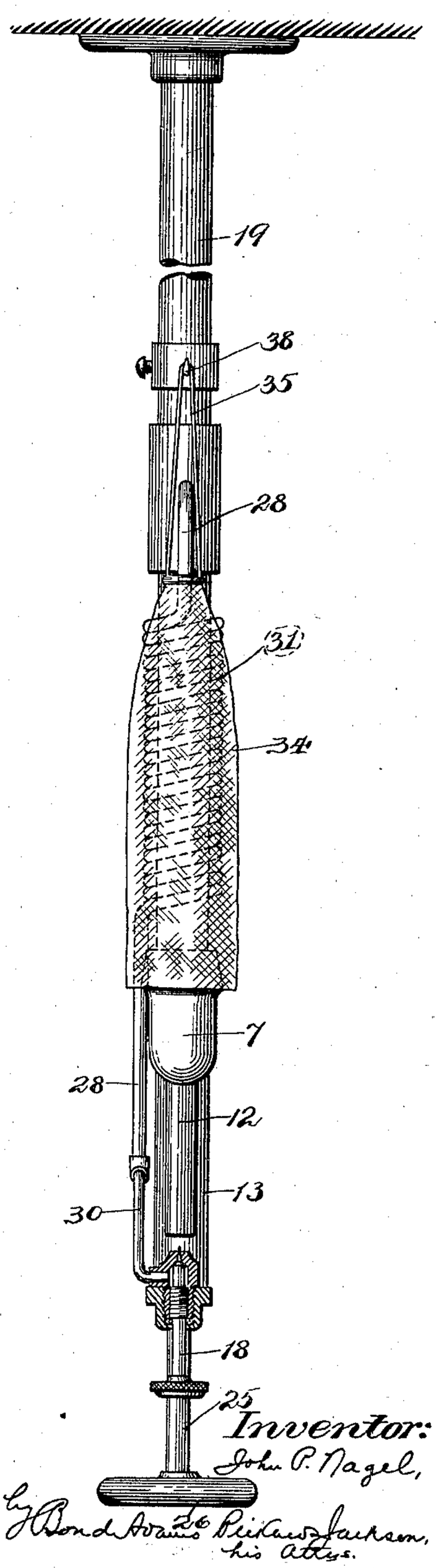


Fig. 2.



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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 3.

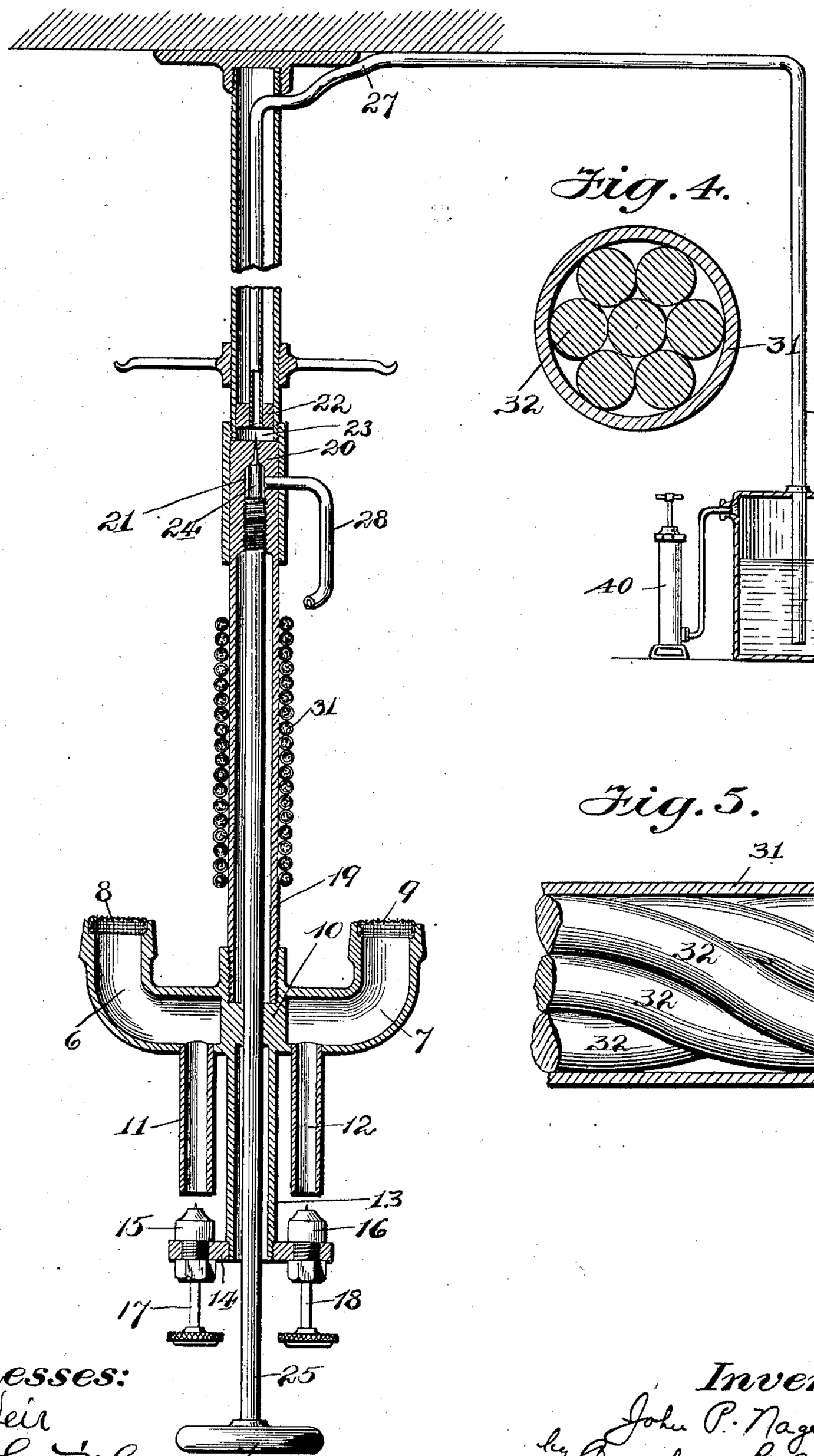

Fig. 4.

Fig. 5.

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UNITED STATES PATENT OFFICE.

JOHN P. NAGEL, OF CHICAGO, ILLINOIS.

LAMP.

SPECIFICATION forming part of Letters Patent No. 756,977, dated April 12, 1904.

Application filed August 15, 1901. Serial No. 72,095. (No model.)

To all whom it may concern:

Be it known that I, JOHN P. NAGEL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Lamps, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to lamps, and has for its object to provide certain improvements in lamps designed to consume gas generated from gasolene or other suitable liquid. In lamps of this description it is necessary to provide a generator for vaporizing the liquid, the vapor formed being then conducted to the burners, where it is consumed in connection with an incandescent mantle of what is generally known as the "Welsbach" type. This general type of lamp is well known; but heretofore much difficulty has been experienced in providing the burner with a supply of gas at a constant pressure, the consequence being that in lamps as heretofore constructed the light has not been steady. By my invention I provide certain improvements by which the liquid is effectually transformed into vapor and the vapor at high pressure supplied to the burners. Moreover, my improvements provide for maintaining practically constant the pressure of the gas as supplied to the burners. This I accomplish by providing a generator consisting of a tube having a constricted passage or passages through it, by which the ready flow of the liquid therein is impeded except when under high pressure, in combination with means for supplying a combustible fluid thereto under pressure. The constriction of the passage through the generator-tube I secure by inserting in said tube a core formed of a number of strands of wire or other suitable material, said core being of such thickness as to fit tightly in the bore of the generator-tube. The best results are secured by twisting the strands together in the form of a cable, thereby forming spiral passages through which the liquid and gases are compelled to pass. The liquid employed, preferably gasolene, is contained in a suitable reservoir connected by a pipe with the generator and is forced through said pipe and into the generator by air-pressure applied to the reservoir. The pressure of the air in the reservoir is sufficient to force the liquid to a greater or less extent into the generator, where it is subjected to intense heat and converted into vapor. After passing through the generator it is supplied to the burners through a suitable injector or injectors. The constriction of the passage through the generator prevents the vapor from flowing freely therein except when under high pressure. Consequently the pressure may vary to a considerable extent in one part of the generator without materially affecting the pressure of the gas as discharged from the injectors. The result is that a steady supply of gas of practically uniform pressure is furnished to the burners, and the illumination is therefore maintained at a practically constant intensity.

My invention also involves certain other improvements by which a plurality of burners are supplied from a common source of gas and certain other improvements in details of construction which will be hereinafter set forth.

In the accompanying drawings, Figure 1 is a view of the lamp, showing the burners in side elevation. Fig. 2 is a view showing one of the burners in end elevation. Fig. 3 is a vertical section. Fig. 4 is an enlarged detail, being a cross-section of the generator tube and core; and Fig. 5 is a longitudinal section of the same.

Referring to the drawings, 6 7 indicate the burners, which, as shown, are provided with gauze tips 8 9, respectively. The burners 6 7 are tubular in form and are connected at their lower ends by a coupling 10. (Best shown in Fig. 3.)

11 indicates a tube which communicates with the lower portion of the burner 6 and is open at its lower end, as shown in Fig. 3.

12 indicates a similar tube connected with the burner 7.

13 indicates a supporting-tube which projects downwardly from the coupling 10 and carries a cross-head 14 at its lower end, in which are mounted injectors 15 16, provided with valves 17 18, respectively. The injectors 15 16 lie immediately below the tubes 11

12, respectively, into which they are adapted to discharge gas, as will be hereinafter described.

19 indicates a supporting-tube which is secured to the upper portion of the coupling 10 and rises therefrom, as shown in Fig. 3. Said tube 19 is adapted to be secured to the ceiling or other suitable support for suspending the lamp.

20 indicates a plug mounted in the upper portion of the tube 19 and provided with a valve-chamber 21.

22 indicates a second plug fitted in the tube 19 a short distance above the plug 20, forming a chamber 23 between said plugs, as shown in Fig. 3. A fine passage is provided leading from the chamber 23 to the valve-chamber 21, which passage is controlled by a needle-valve 24, mounted in the valve-chamber 21.

25 indicates the valve-stem of the needle-valve 24, said valve-stem extending down through the tubes 19 and 13 to a point below the cross-head 14, where it is provided with a hand-wheel 26, by which it may be rotated to operate the needle-valve.

27 indicates a tube leading from a suitable reservoir 39 to the chamber 23. The reservoir 39 is adapted to contain gasolene or other suitable liquid and is provided with a pump 40, by which air may be forced into the reservoir to force the gasolene from said reservoir through the pipe 27. Usually a pressure of about fifty pounds to the square inch is employed for that purpose.

28 indicates a generator-tube the upper end of which communicates with the valve-chamber 21, as shown in Fig. 3. The intermediate portion of said generator-tube is wound around the tube 19, forming a cylindrical coil, as shown in Fig. 3. The lower portion of the generator-tube is bifurcated, forming auxiliary tubes 29 30, which communicate, respectively, with the injectors 15 16, as shown in Fig. 1. The generator-tube 28 is provided with a core composed of a cable 31, formed of strands 32, twisted together, as shown in Figs. 4 and 5. Said cable fits closely in the generator-tube, forming constricted passages therethrough, through which the liquid or gas must pass on its way from the valve-chamber 21 to the injectors.

33 34 indicate incandescent mantles for the burners 6 7, respectively, said mantles being suspended by rods 35 36 from horizontal arms 37 38, carried by the tube 19, as shown in Fig. 1. The two mantles 33 34 are arranged at opposite sides of the tube 19, and between them is the generator-coil, so that said coil is subjected to the heat of both burners. The arrangement of the generator-coil is similar where only one burner is used, in which case, of course, it is subjected to heat at one side only. Any desired number of burners may be used.

The operation is as follows: Compressed air being supplied to the reservoir, the liquid gasolene is forced through the pipe 27 to the chamber 23. If the valve 24 be closed, the gasolene proceeds no farther. When said valve is open, the gasolene is admitted through valve-chamber 21 to the generator 28, into which it passes, filling the passages of the generator to a greater or less extent. It will be understood that the size of the passages, as illustrated in Fig. 4, is greatly exaggerated, in practice the passages being exceedingly fine. To light the lamp, it is first necessary to apply heat to the generator until sufficient gas has been produced to furnish an initial supply to the burners. This is accomplished by holding a torch to the generator for a few minutes before opening the valves 17 18 of the injectors. As soon as a sufficient quantity of gas has been produced the valves 17 18 are opened, causing the injection of the gas into the tubes 11 12. It will be observed that the injectors are a short distance below the lower ends of the tubes 11 12, so that passages are provided for admitting air to said tubes 11 12 with the gas. The air and gas thus supplied to the tubes 11 12 are mixed in their passage and thence pass up through the tips 8 9 of the burners 6 7, respectively, where they are consumed in the mantles. As soon as the burners are lighted the heat thereby produced acts upon the liquid in the generator and furnishes a supply of gas for further consumption.

While my improved generator, as herein illustrated and described, is designed more particularly for use in lamps, I wish it to be understood that I do not restrict myself to its use for generating gas for illuminating purposes, as it may be employed for any other purpose to which it is adapted. My invention, further, is not restricted to the specific details of the construction illustrated and described, except in so far as such details are particularly claimed.

That which I regard as my invention, and desire to secure by Letters Patent, is—

1. In a lamp, a burner, a support for said burner, said support being provided with a plug having a valve-chamber, means for supplying a suitable fluid to said chamber, a generator communicating with said chamber and arranged in proximity to the burner, whereby the fluid in the generator will be gasified, a valve for controlling the flow of fluid from the valve-chamber to the generator, means for conducting the gas from the generator to the burner, a core inside of said generator consisting of a plurality of twisted strands, and a second valve for controlling the flow of gas to the burner.

2. In a lamp, a plurality of burners, a supporting-tube for said burners, said tube being provided with a plug having a valve-chamber, means for supplying a suitable fluid to said chamber, a generator communicating with the said valve-chamber and surrounding the

burner-supporting tube in proximity to the burners, whereby the fluid in the generator will be gasified, a valve for controlling the flow of fluid from the valve-chamber to the generator, means for conducting gas from said generator to the burners, and a valve for each burner for controlling the flow of gas thereto.

3. In a lamp, a plurality of burners, a tube for supporting said burners, said tube being provided with a plug having a valve-chamber, a second plug in the tube having a perforation in communication with the valve-chamber, a pipe leading into the tube above the second plug for conveying a suitable fluid to the valve-chamber, a generator communicating with said valve-chamber and consisting of a pipe coiled around said burner-supporting tube and having branches at its lower end communicating with said burners, a core in said generator consisting of a plurality of twisted strands, a valve for controlling the flow of fluid from the valve-chamber to the generator, and a valve for each burner for controlling the flow of gas thereto.

4. In a lamp, a burner, a tube connected with the burner and extending above and below the same, a plug in the upper end of the tube having a valve-chamber, a generator in communication with the valve-chamber arranged in proximity to the burner, whereby the fluid in the burner will be gasified, means for supplying a suitable fluid to the valve-chamber, a valve for controlling the flow of the fluid from the valve-chamber to the generator, having a stem extending longitudinally of and below the tube and provided at a point below said tube with an actuating device, means for supplying gas from the generator to the burner, and a second valve for controlling the flow of gas to the burner.

5. In a lamp, a burner, a supporting-tube for said burner, said tube being provided with a plug having a valve-chamber, means for supplying a suitable fluid to said chamber, a generator communicating with said valve-chamber and surrounding the burner-supporting tube in proximity to the burner whereby the fluid in the generator will be gasified, a valve for controlling the flow of fluid from the valve-chamber to the generator, means for conducting gas from said generator to the burner, and a valve for said burner for controlling the flow of gas thereto.

6. In a lamp, a burner, a supporting-tube for said burner, said tube having a chamber therein, means for supplying a suitable fluid to said chamber, a generator communicating with said chamber and surrounding the burner-supporting tube in proximity to the burner whereby the fluid in the generator will be gasified, valve mechanism for controlling the supply of fluid from said chamber to said generator, means for conducting gas from said generator to said burner, and a valve for the burner for controlling the flow of gas thereto.

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