

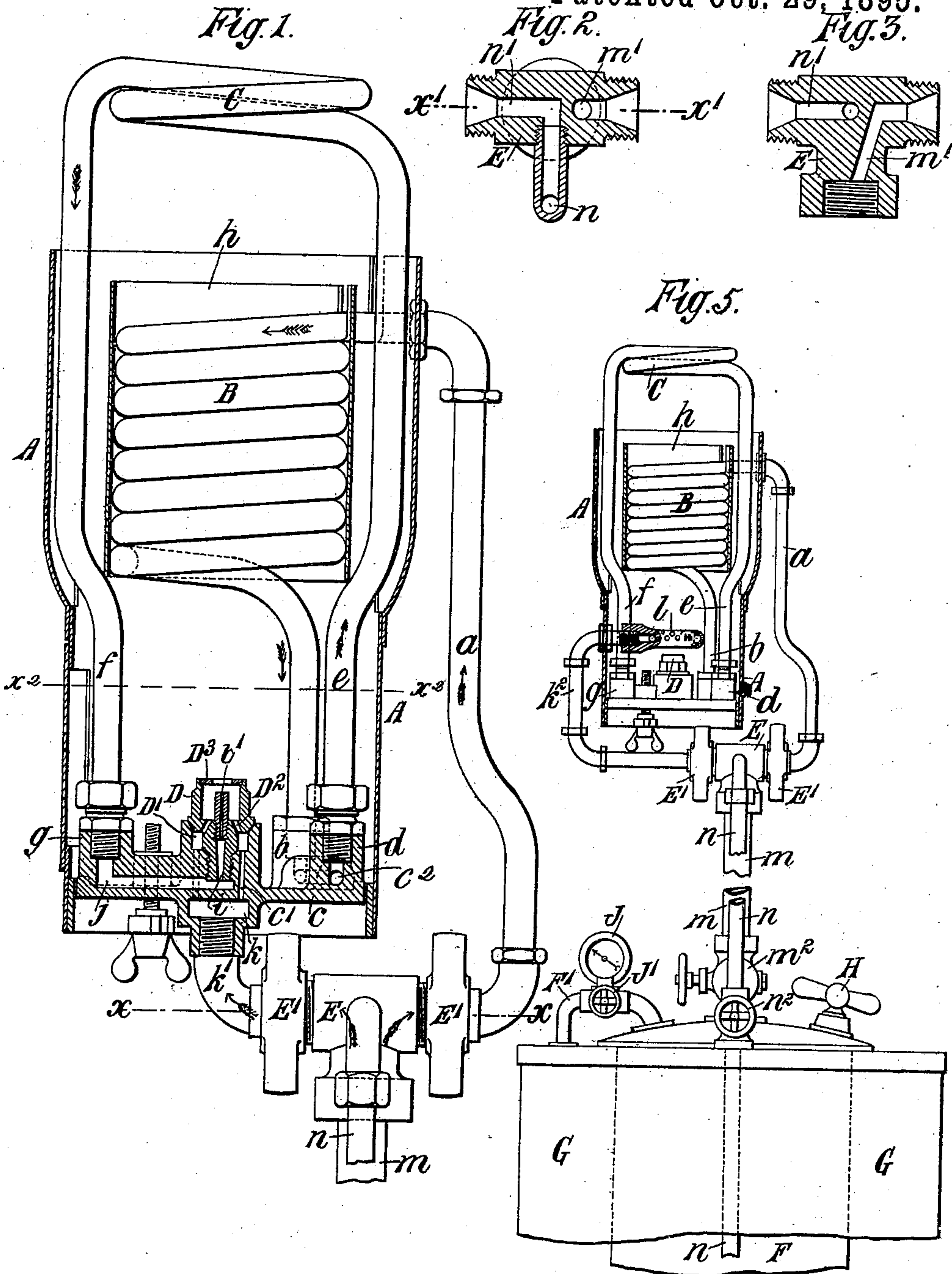
(No Model.)

3 Sheets—Sheet 1.

J. McL. McMURTRIE.
APPARATUS FOR DISTRIBUTION AND BURNING OF FLUID HYDROCARBONS.
FOR LIGHTING OR HEATING PURPOSES.

No. 549,073.

Patented Oct. 29, 1895.



Witnesses:
Dennis Sumbly.
Robert Everett.

Inventor:
John McLeownan McMURTRIE.
By James L. Norris.
Atty.

(No Model.)

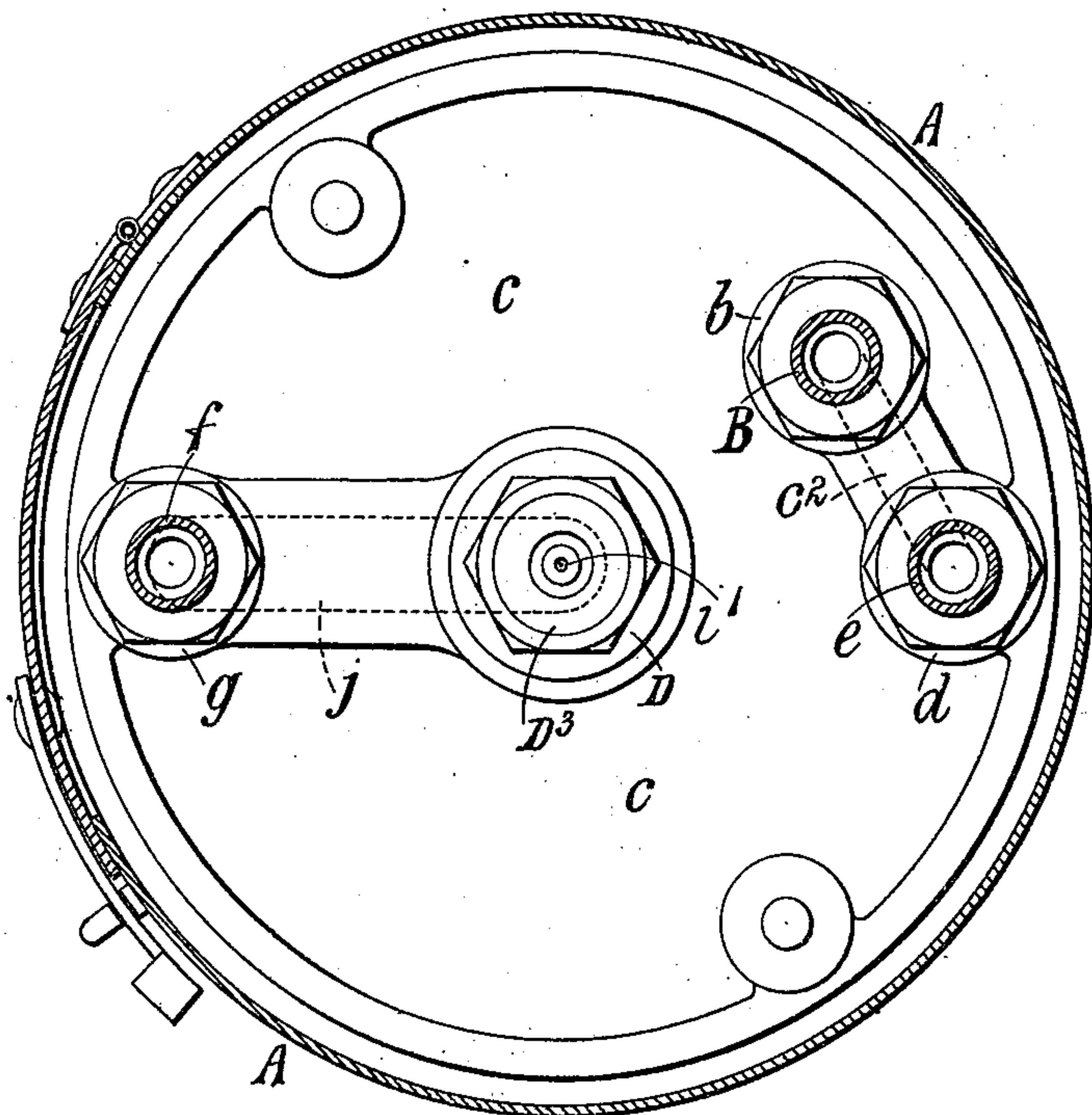
3 Sheets—Sheet 2.

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Patented Oct. 29, 1895.

Fig. 4.



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3 Sheets—Sheet 3.

J. McL. McMURTRIE.

APPARATUS FOR DISTRIBUTION AND BURNING OF FLUID HYDROCARBONS
FOR LIGHTING OR HEATING PURPOSES.

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Fig. 6.

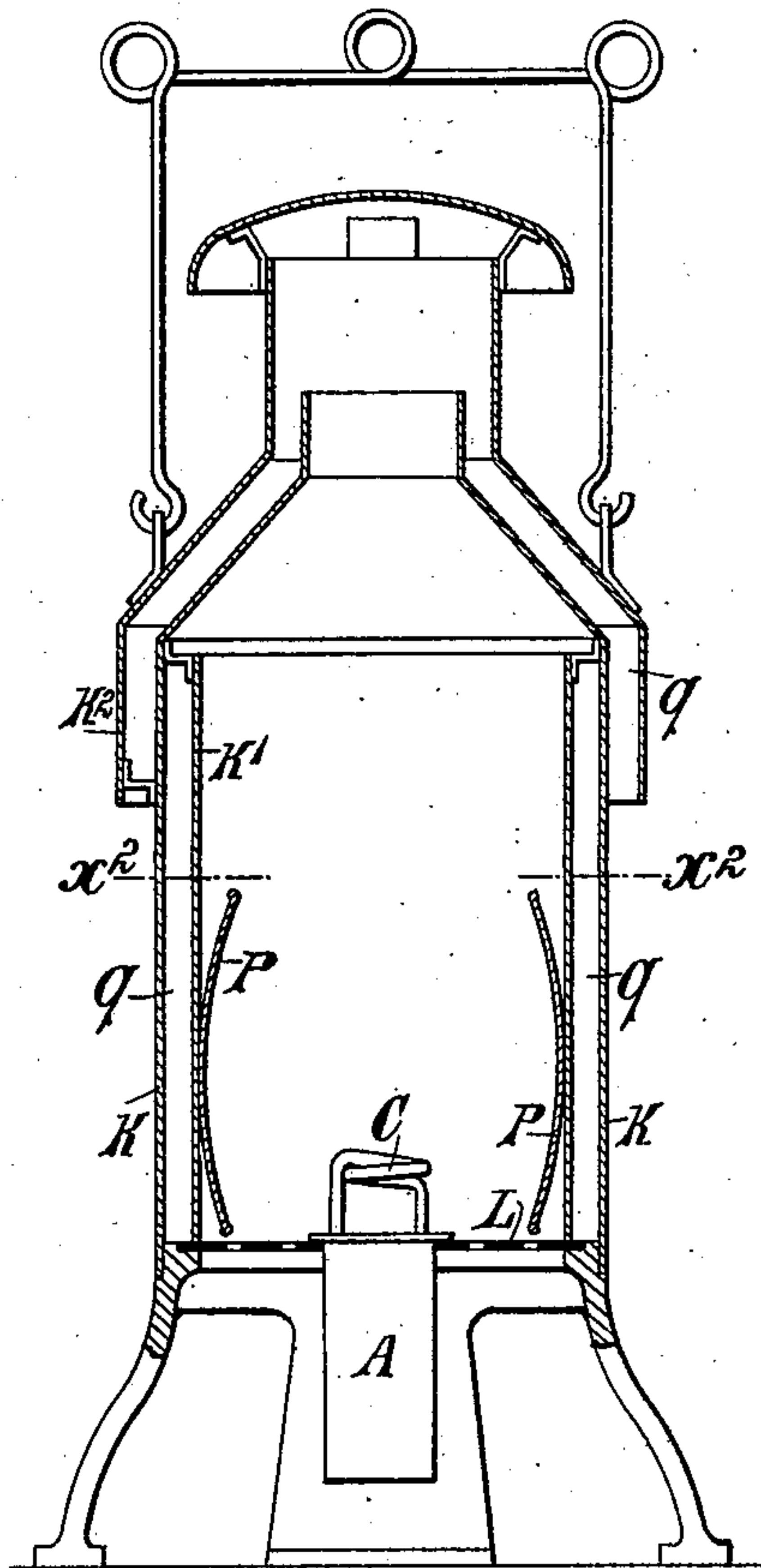
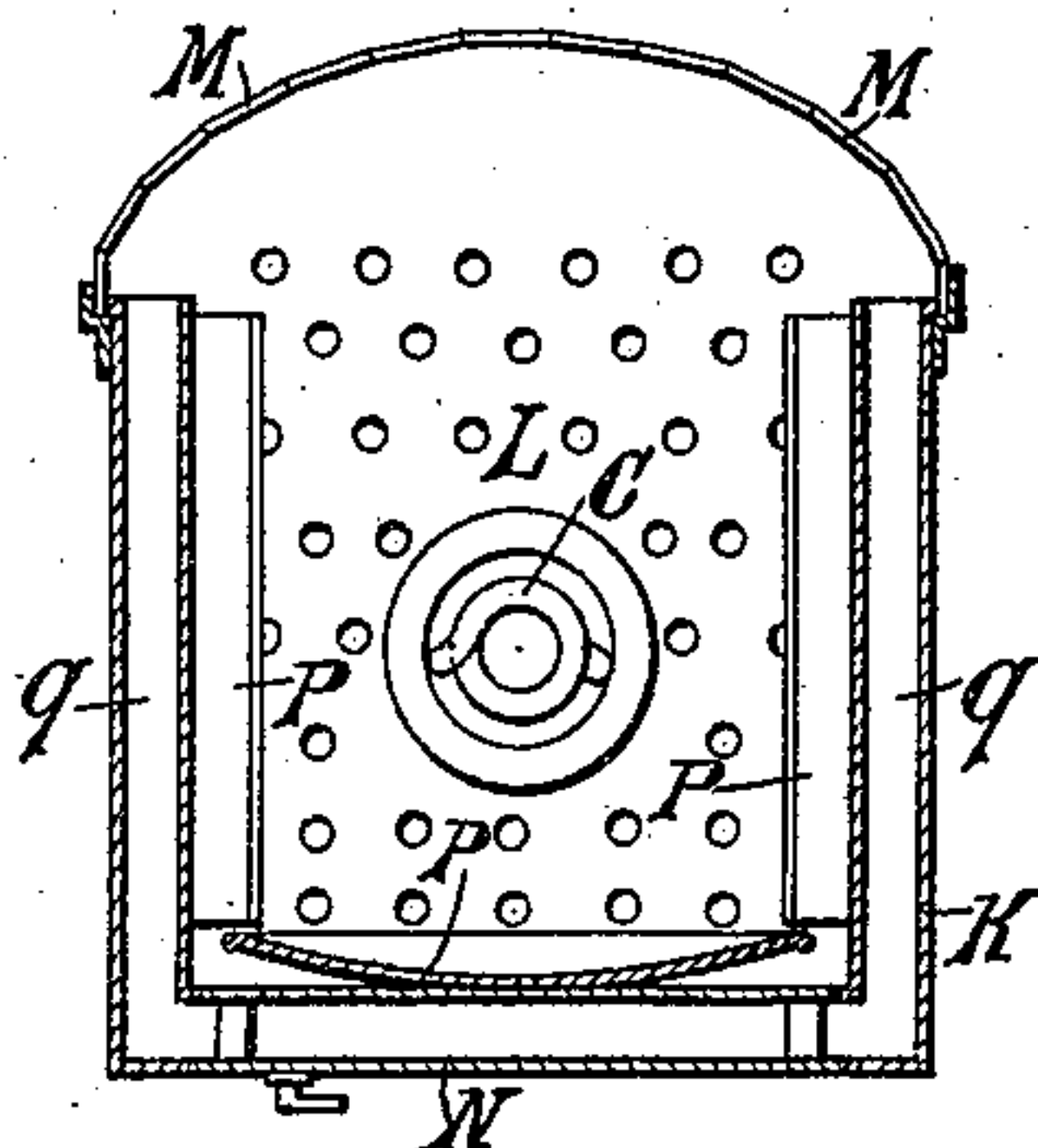


Fig. 7.



Witnesses.

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UNITED STATES PATENT OFFICE,

JOHN MCLEOWNAN McMURTRIE, OF GLASGOW, SCOTLAND, ASSIGNOR TO
THE LUCAL, LIMITED, OF SAME PLACE.

APPARATUS FOR DISTRIBUTION AND BURNING OF FLUID HYDROCARBONS FOR LIGHTING OR HEATING
PURPOSES.

SPECIFICATION forming part of Letters Patent No. 549,073, dated October 29, 1895.

Application filed April 6, 1895. Serial No. 544,831. (No model.) Patented in England September 5, 1893, No. 16,701, and in
France August 24, 1894, No. 240,950.

To all whom it may concern:

Be it known that I, JOHN MCLEOWNAN
McMURTRIE, engineer, of Pollokshields, Glas-
gow, Scotland, have invented new and useful
5 Improvements in and Relating to Apparatus
for the Distribution and Burning of Fluid Hy-
drocarbons for Lighting or Heating Purposes,
(for which I have obtained patents in Great
Britain, No. 16,701, dated September 5, 1893,
10 and in France, No. 240,950, dated August 24,
1894,) of which the following is a specifica-
tion.

My invention relates to apparatus for the
distribution and burning of fluid hydrocar-
15 bons for lighting and heating purposes.

My said invention further comprises other
improvements hereinafter described.

In the accompanying drawings I have shown
how my said invention may be conveniently
20 and advantageously carried into practice.

Figure 1 is a side elevation, partly in verti-
cal central section, showing a vapor-burner
or industrial lamp with a gasifier or super-
heater applied thereto according to my said
25 invention. Fig. 2 is a section on the line xx ,
Fig. 1, and Fig. 3 a section on the line $x'x'$,
Fig. 2 illustrating details of construction.
Fig. 4 is a horizontal section on the lines x^2x^2 ,
Fig. 1, drawn to an enlarged scale. Fig. 5 is
30 a side elevation of a burner-head, showing
another modification of my invention. Fig.
6 is a side elevation of a portable lamp con-
structed according to my said invention. Fig.
7 is a diagram illustrating my improved means
35 for the distribution of liquid hydrocarbon to
vapor-burners or industrial lamps.

Like letters indicate corresponding parts
throughout the drawings.

My said invention consists partly in the
40 combination, with a nozzle or burner and with
a vaporizing-coil connected at its upper or
outer end with a supply-pipe, of a gasifying
or superheating coil located above or beyond
the vaporizing-coil and connected with the
45 said nozzle or burner and with the lower or
inner end of said vaporizing-coil next the
nozzle or burner.

My said invention also partly consists in the
combination, with the nozzle or burner and a

vaporizing-coil, of a gasifying or superheat- 50
ing coil-pipe secured at its ends by unions or
couplings to the bottom or base of the lamp-
head, which is formed with suitable passages
whereby the said coil-pipe is connected, re- 55
spectively, with the nozzle or burner and the
vaporizing-coil, so that said gasifying or su-
perheating coil can be very readily removed
and replaced when necessary without dis-
turbance the vaporizing-coil and can be easily 60
altered by shortening its legs, so as to vary
the positions of the coil in the flame, or, if
desired, can for this purpose be replaced by
a coil having longer or shorter legs, as may be
required. In this manner the position of the 65
coil relatively to the flame can be accurately
adjusted so as to obtain the best results. The
arrangement above mentioned affords, more-
over, the advantage that any scale or dirt
carried through the vaporizing and super- 70
heating coils will remain in the passage
formed in the bottom or base of the lamp-
head, and therefore cannot enter and choke
the nozzle or burner.

I sometimes use the said gasifier or super-
heater for superheating and drying or con- 75
verting into a permanent gas steam which
has been generated in the vaporizing-coil, the
gas or dry steam being discharged from the
burner together with liquid hydrocarbon sup-
plied directly thereto. In other instances I 80
supply a liquid hydrocarbon directly to the
burner, and at the same time pass another vol-
atile hydrocarbon through the vaporizing-coil
and gasifier or superheater and conduct the
gas or vapor thence to the burner, where it is 85
burned, together with the hydrocarbon sup-
plied directly to the burner.

The combination of the gasifier or super-
heater with the vaporizing-coil and burner in
the manner herein described is an important 90
feature of my said invention, as I am thereby
enabled to obviate some of the defects or in-
conveniences met with in industrial lamps as
hitherto constructed.

My said invention also partly consists in 95
the combination, with a main reservoir for
fluid hydrocarbon and compressed air, of a dis-
tributing pipe or conduit, auxiliary or sup-

plementary tanks connected therewith and with vapor or spray burners or industrial lamps, a two-way cock connected with said distributing pipe or conduit, and pipes connecting said two-way cock with the main reservoir below and above the level of the liquid therein, respectively. I thus provide for the distribution or supply of the hydrocarbon to any desired number of vapor-burners or industrial lamps from a central or main reservoir situated at any convenient distance from the said burners or lamps.

My said invention further comprises other improvements hereinafter fully described and claimed.

A is the outer metal casing of the burner-head, which casing is open at the top and closed at the bottom, air being admitted to the interior of the same as hereinafter described.

B is a vaporizing-coil arranged in the upper part of the said casing and connected at its upper or outer end with a supply-pipe *a* for the water or for the liquid hydrocarbon, as the case may be, the end of the said coil next the nozzle or burner being secured in a socket *b* in a casting *c*, forming the bottom or base of the burner-head. This socket *b* is in communication through a suitable passage *c*² in the said casting with another socket *d*, in which is secured a pipe *e*, extending upward outside the coil B to the gasifier or superheater C, which in this arrangement consists of one or more turns or coils of pipe arranged a short distance from the open end of the casing, so that a very hot part of the flame will impinge against it. The said gasifier or superheater is connected with the nozzle or burner D by a pipe *f*, extending downward outside the vaporizing-coil B to a socket *g* in the casting *c*, which socket is in communication through a passage J in said casting with the said nozzle or burner, the latter being arranged at a suitable distance from the lower end of the coil B, so as to leave within the casing A a mixing-chamber for the gas or vapor and air. The gasifier or superheater C, being mounted in the sockets *d* and *g* independently of or without being directly attached to the coil B, can be very readily removed and replaced or renewed, when necessary, at a small cost. This mode of combining the vaporizing-coil, the gasifier or superheater, and the burner also imparts great strength, rigidity, and durability to the apparatus. Moreover, by connecting the top or outer end of the vaporizing-coil B with the supply-pipe, and the lower or inner end thereof with the gasifier or superheater C, I obtain better results than heretofore in respect of insuring the vaporization of the liquid before it enters the gasifier or superheater.

I sometimes arrange an inner supplementary casing *h* around the vaporizing-coil in such a manner as to leave an annular space between the said casing and the outer casing A, so that air for supporting combustion will pass downward between the two casings. In this manner the temperature of the air is

raised as it is drawn into the mixing-chamber.

The nozzle or burner which I prefer to employ is made in the form of a metal cup D, which is screwed into a seating in the casting *c* and is provided at the bottom with a central hole *i*, which communicates through the passage *j*, socket *g*, and pipe *f* with the gasifier C.

In the center of the cup D is provided a jet or tube *i'*, forming a continuation of the passage *i*, the jet *i'* extending to a short distance below the level of the opening in the cup D, this opening being, moreover, somewhat contracted by means of an internally-projecting flange or washer D³, as shown in Fig. 1. The burner D is so formed that when screwed into its seating in the casting *c* it forms together therewith an annular chamber D', which is connected by passages *c'* in the said casting *c* with a chamber *k*. The said cup D is, moreover, provided with side orifices D², communicating with the said annular chamber D', and through which liquid hydrocarbon may be drawn by the action of the jet of steam or hydrocarbon vapor or gas issuing from the central orifice *i* of the jet *i'*.

The burner-head shown in the drawings is connected with the stand-pipe *m* and with a pipe *n* by means of a T-piece E, formed with two passages *m'* *n'*. The passage *m'* is in communication directly with the stand-pipe *m* and through the pipe *a* with the upper or outer end of the vaporizing-coil B, while the passage *n'* is in communication directly with the pipe *n* and through the pipe *k'* with the chamber *k*. To allow the burner-head to be inclined at any desired angle the pipes *a* and *k'* are connected to the T-piece E by means of coned couplings adapted to be locked in any desired position by means of caps or nuts E'.

If desired, the gasifier may be made in the form of an annular chamber or of other convenient shape.

In some cases I prefer that the pipe *n* should be in communication with a perforated ring *l* or other suitable discharging device arranged a short distance above the nozzle or burner D, and concentric therewith, as shown in Fig. 4. The burner-head in this arrangement is formed with a vaporizing-coil B and gasifier C, as above described, but the T-piece E is provided with a pipe *k*², passing through the casing A and connected with the perforated ring *l*. In this case the burner D is made with a central orifice *i*, but without the side openings above referred to.

The pipes *m* and *n* communicate, respectively, with two tanks F and G, preferably arranged one within the other, suitable valves *m*² *n*² being provided to control the flow of the liquid therefrom. Each of the said tanks is provided with a filling-plug, the inner tank F being also provided with an air-pump H, whereby the liquid therein may be put under pressure, this pressure or part of it being communicated through a cock or valve or through a reducing-valve to the surface of

the liquid in the tank G by means of an air-pipe F' or other passage above the level of the liquids in the said tanks. A pressure-gage J is provided and also a three-way cock J', whereby either of the tanks F G may be connected therewith or with the other tank.

The apparatus above described may be very advantageously employed as a "steam-lamp," in which case the water is placed in the central tank F and is conducted through the pipe *m*, the coil B, and the gasifier C to the central orifice *i* of the burner D. The liquid hydrocarbon is supplied from the tank G to the nozzle or burner D or to the perforated ring *l* through the pipe *n* and the pipe *k'* or *k*², as the case may be, the said liquid in the former case flowing or being drawn through the side orifices D² into the cup D. By the use of the gasifier C in the manner above described the irregularities in burning and other disadvantages incidental to the use of such lamps by reason of water or saturated vapor being carried over into the burner by the steam will be obviated, since the gasifier will act as a superheater and insure perfect dryness of the steam. If desired, after the lamp has been started the steam generated by the lamp may be employed for forcing the water from the water-tank through the coils to the burner.

In cases where water supplied under pressure, by gravitation, or otherwise is available I dispense with the water-tank and accessories. If the water so supplied is at a suitable and uniform pressure, I attach the water-pipe directly to the coil B. If, however, the pressure be unsteady or too great, I provide a reducing-valve or pressure-regulator on the said pipe. In this case the crude or other oil can be supplied to the burner from the oil-tank by gravitation or by compressed air or by other convenient means.

When my improved apparatus is to be used for heating purposes, I sometimes so employ the same that the steam will be decomposed in the gasifier C. For instance, I allow but a small quantity of oil to flow to the burner. The gasifier C then gets red-hot, the steam flowing through the same becomes decomposed into its elements, and the gas and hydrocarbon vapor issuing from the burner and mixing with the air burns with a large flame of intense blow pipe heat. By allowing more oil to flow to the burner I can tone down or diminish the heat of the flame, as may be desired.

My improved apparatus can be advantageously used for heating boilers for the generation of steam or for other purposes.

When my improved lamp is used with two oils, such as petroleum or other refined or partially refined oil and furnace or other crude oil, the petroleum or the like from the tank F follows the same course as the water in the steam-lamp and is wholly or partially converted in the gasifier C into a permanent gas, in which state it passes along

the pipe *f* and passage *j* to the central orifice *i* in the burner. In the cup of the burner D the heated gases meet the oil from the tank G, which rises through the pipe *n*, and enters the T-piece E by the small side passage *n'* and passes through the orifices *c'* D² into the cup D. This oil is drawn into the flame by the gases issuing from the central orifice *i* and is burned therewith.

When my improved lamp is used with a single oil, such as petroleum, the T-piece E is dispensed with and the pipe *n* serves as the stand-pipe and also for conducting the oil into the top of the vaporizing-coil B.

My improved burner may, if desired, be made in small sizes, as shown in Fig. 5, so as to be portable and capable of being used for lighting, heating, or burning purposes, in which case I preferably construct the burner to work with a single oil. In the modification shown in Fig. 5 I form a handle *p* on the flexible pipe *n*, connecting the burner with the fuel-tank F, so that the lamp may be conveniently handled, or the said lamp in a modified form may be employed for lighting or for cooking or for other heating purposes.

In Fig. 7 I have illustrated my improved apparatus for the distribution of oil to a number of vapor or spray burners or industrial lamps from a central or main reservoir or supply-station.

R is a central oil-tank or main reservoir provided with a hand-pump H for producing an air-pressure on the surface of the liquid therein. If desired, however, this pressure may be advantageously obtained by means of a pump driven by steam or other power, or the said tank or reservoir may be arranged at a convenient height above the lamps to be supplied, so that the distribution of the oil will be effected by gravity. The said tank is also provided with a filling plug or valve H', a pressure-gage J, and other accessories, such as level-indicators or the like. From the said tank or reservoir extends a line of piping *s*, connected with the several lamps or burners, as hereinafter described. Below each burner is provided a small auxiliary or supplementary tank F², which is connected thereto in the usual manner, the upper portion of the said tank being connected through a cock or back-pressure valve *s'* with the line of piping above mentioned. The main line of piping *s* may be put into communication with either the top or the bottom of the supply tank or reservoir R through a two-way cock R', whereby either liquid hydrocarbon or compressed air may be supplied to the auxiliary or supplementary tanks F². For example, when the lamps are to be used the supplementary tanks are put into communication with the bottom of the reservoir R and are wholly or partially filled with oil. The two-way cock R' is then turned so as to put the upper space of the tanks F² into communication with the compressed-air space in the main reservoir R and the lamps are lighted. In

this manner the whole of the lamps can be supplied from one reservoir, and should any lamp get damaged or go out unobserved the waste caused thereby will be kept within limits, as each supplementary tank need only contain sufficient oil to supply one lamp for the required period of lighting, and by reason of the back-pressure valve on each tank any damage to an individual tank will not interfere with the general lighting.

It is obvious that the details of my improved apparatus may be somewhat modified without departing from the nature of my said invention. It is evident, moreover, that I can, if desired, use compressed air instead of steam in my improved apparatus, the air following the same course as the water and steam through the two heating-coils.

What I claim is—

1. An apparatus for the burning of liquid hydrocarbons for lighting or heating purposes; comprising a nozzle or burner connected with one supply-pipe, a vaporizing coil connected at its upper or outer end with another supply-pipe, and a gasifying or superheating coil located above or beyond said vaporizing coil and connected with said nozzle or burner and with the lower or inner end of said vaporizing coil next the nozzle or burner, substantially as hereinbefore described, and for the purposes specified.

2. In an apparatus for burning liquid hydrocarbons for lighting or heating purposes, the combination, with the bottom or base of the lamp-head, of a nozzle or burner, a vaporizing coil and a gasifying or superheating coil-pipe secured at its ends by unions or couplings to the bottom or base of said lamp-head, said base being formed with passages for connecting said coil-pipe respectively

with the nozzle or burner and with the vaporizing coil, substantially as and for the purposes set forth.

3. The combination, with the bottom or base of the lamp-head, of a nozzle or burner attached to said base, a casing surrounding said burner, a supply-pipe connected with said burner for the supply of oil thereto, a vaporizing coil located a short distance from said burner and concentric therewith, which coil is secured at its lower or inner end in a socket in said base, a supply pipe connected with the other end of said vaporizing coil, and a gasifying or superheating coil, located above or beyond the vaporizing coil and having its ends secured in sockets in said base so as to be readily removable therefrom, said base being formed with passages connecting the ends of said gasifying or superheating coil with said burner and vaporizing coil respectively, substantially as, and for the purposes, above specified.

4. In an apparatus for the burning of liquid hydrocarbons for lighting or heating purposes, the combination, with the vaporizing and gasifying or superheating coils, and the base of the lamp-head having passages communicating with said coils respectively, of a nozzle or burner secured in a seating in said base and having a cup provided with a central jet connected by one of said passages with said gasifying or superheating coil, said cup being connected with a supply-pipe by orifices around said jet, substantially as hereinbefore described.

JOHN McLEOWNAN McMURTRIE.

Witnesses:

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