

No. 777,481.

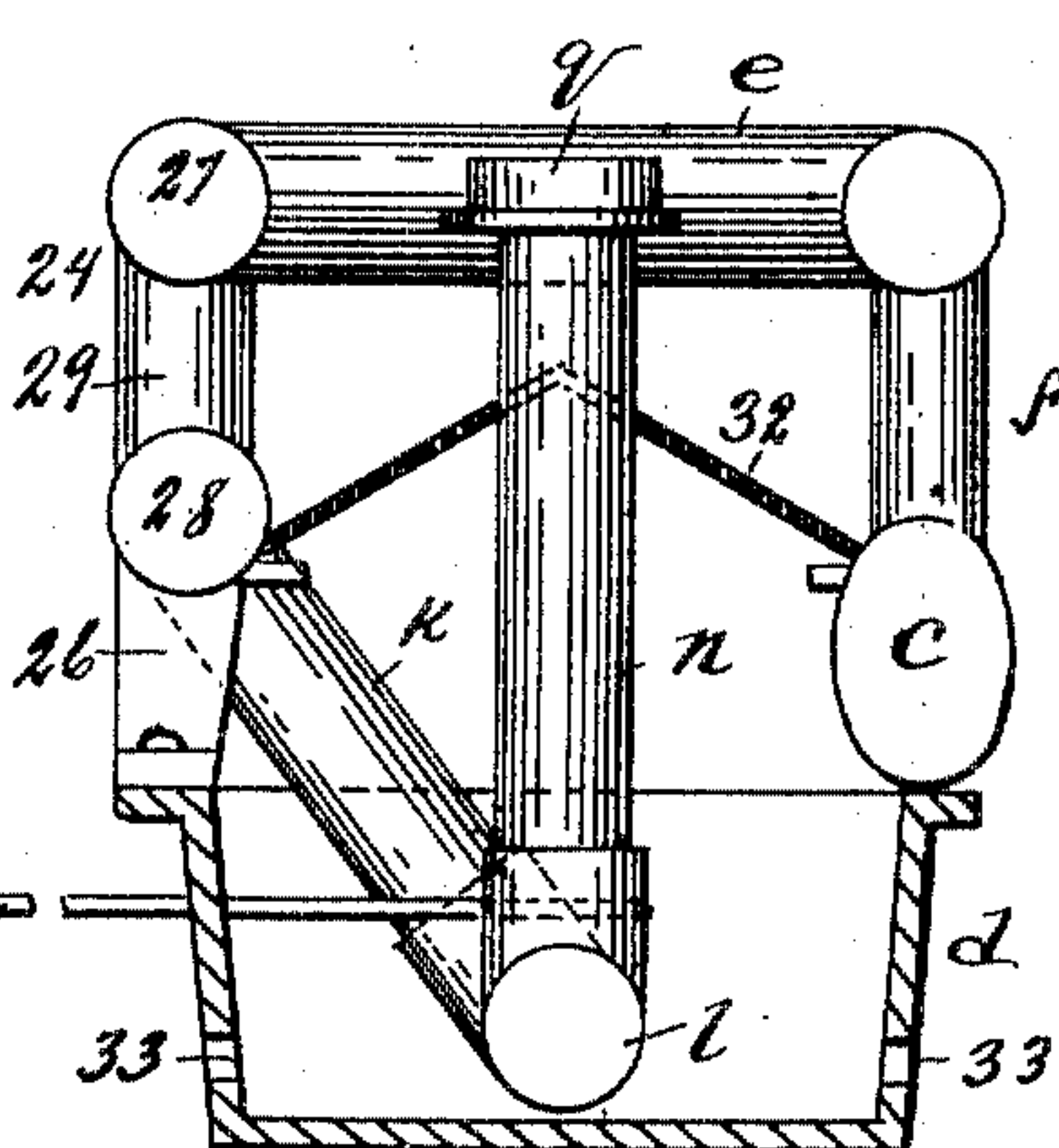
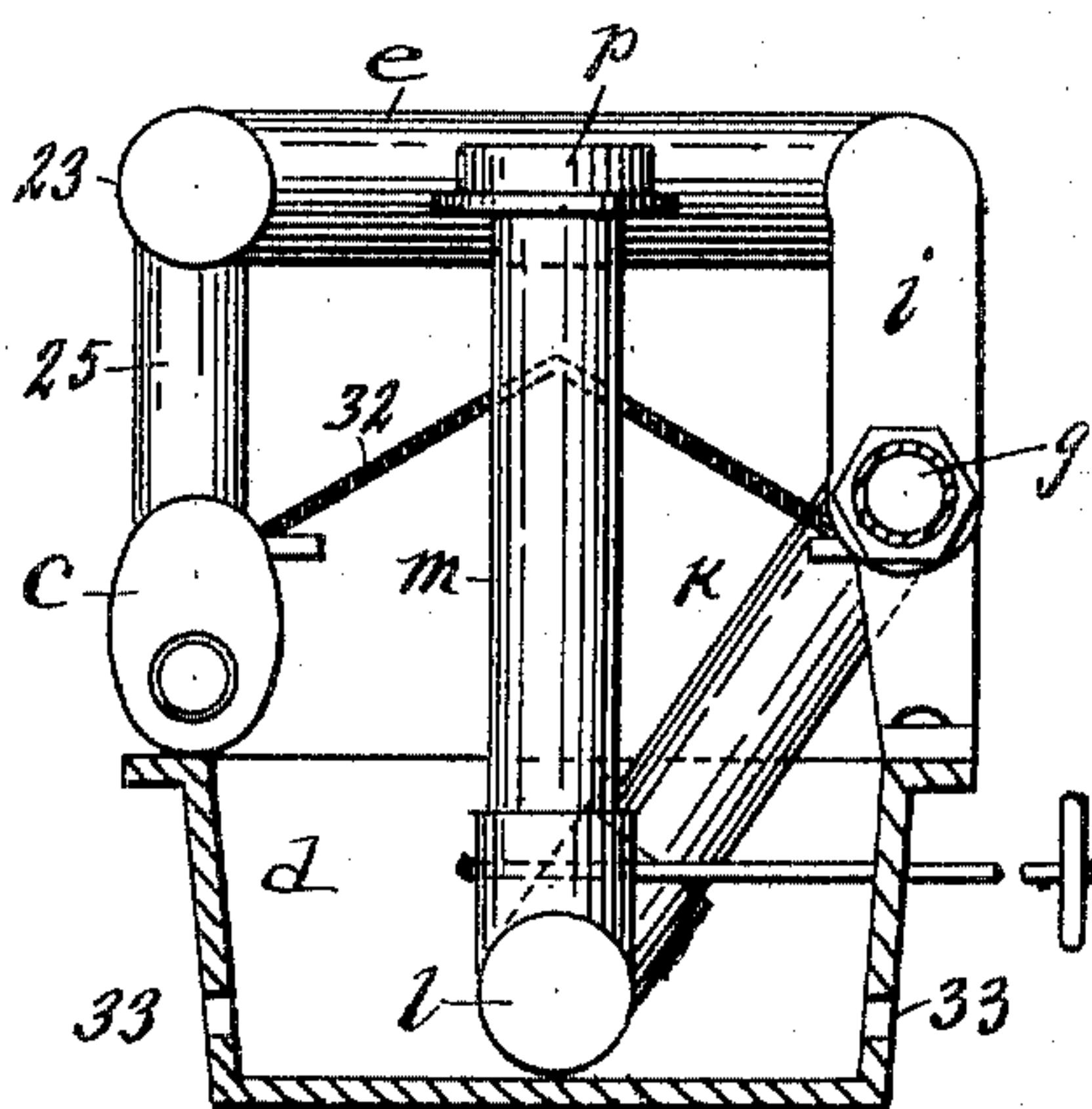
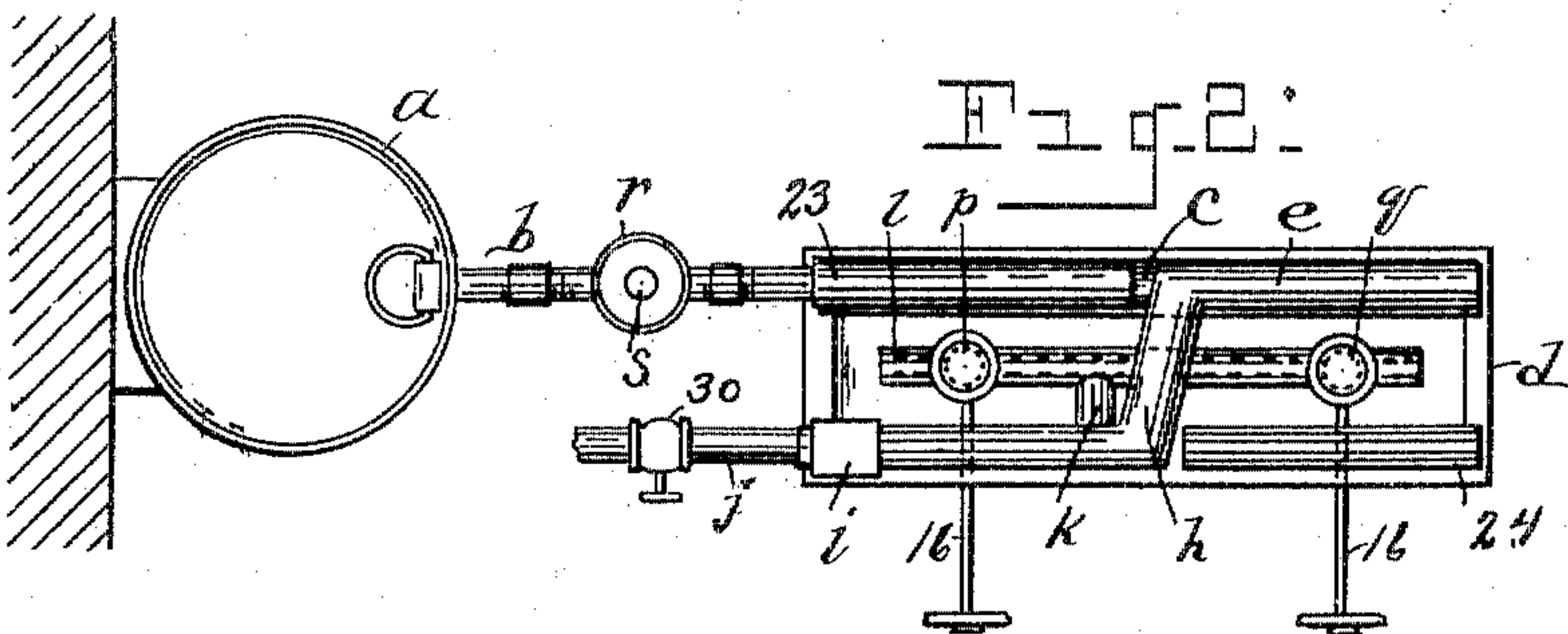
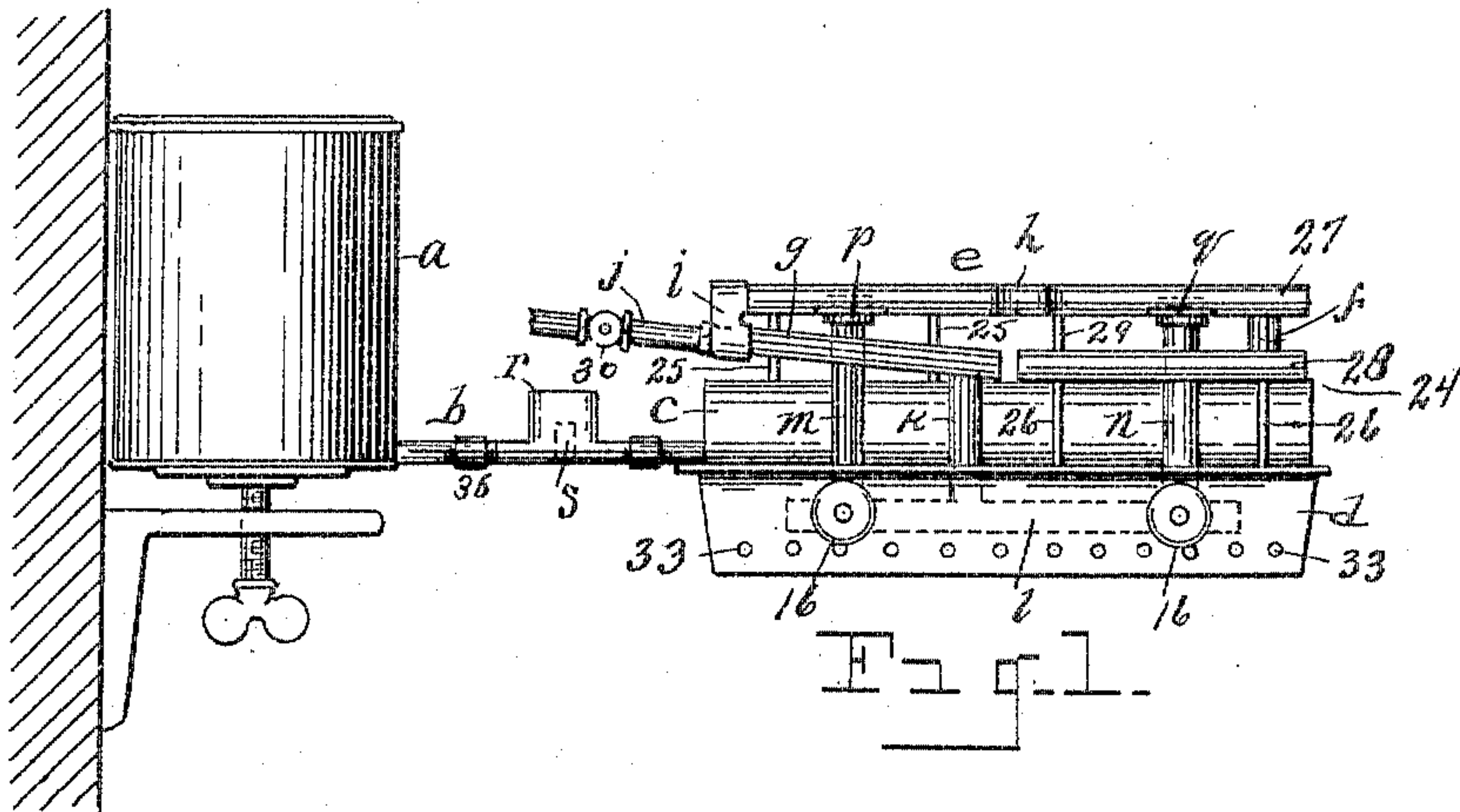
PATENTED DEC. 13, 1904.

E. G. MUMMERY.  
HYDROCARBON BURNER AND WATER FEED THEREFOR.

APPLICATION FILED FEB. 21, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



WITNESSES:

O. B. Parvizgi.  
M. M. Struble.

INVENTOR.

Edwin G. Mummery  
BY Maxwell S. Wright.  
his ATTORNEY.

No. 777,481.

PATENTED DEC. 13, 1904.

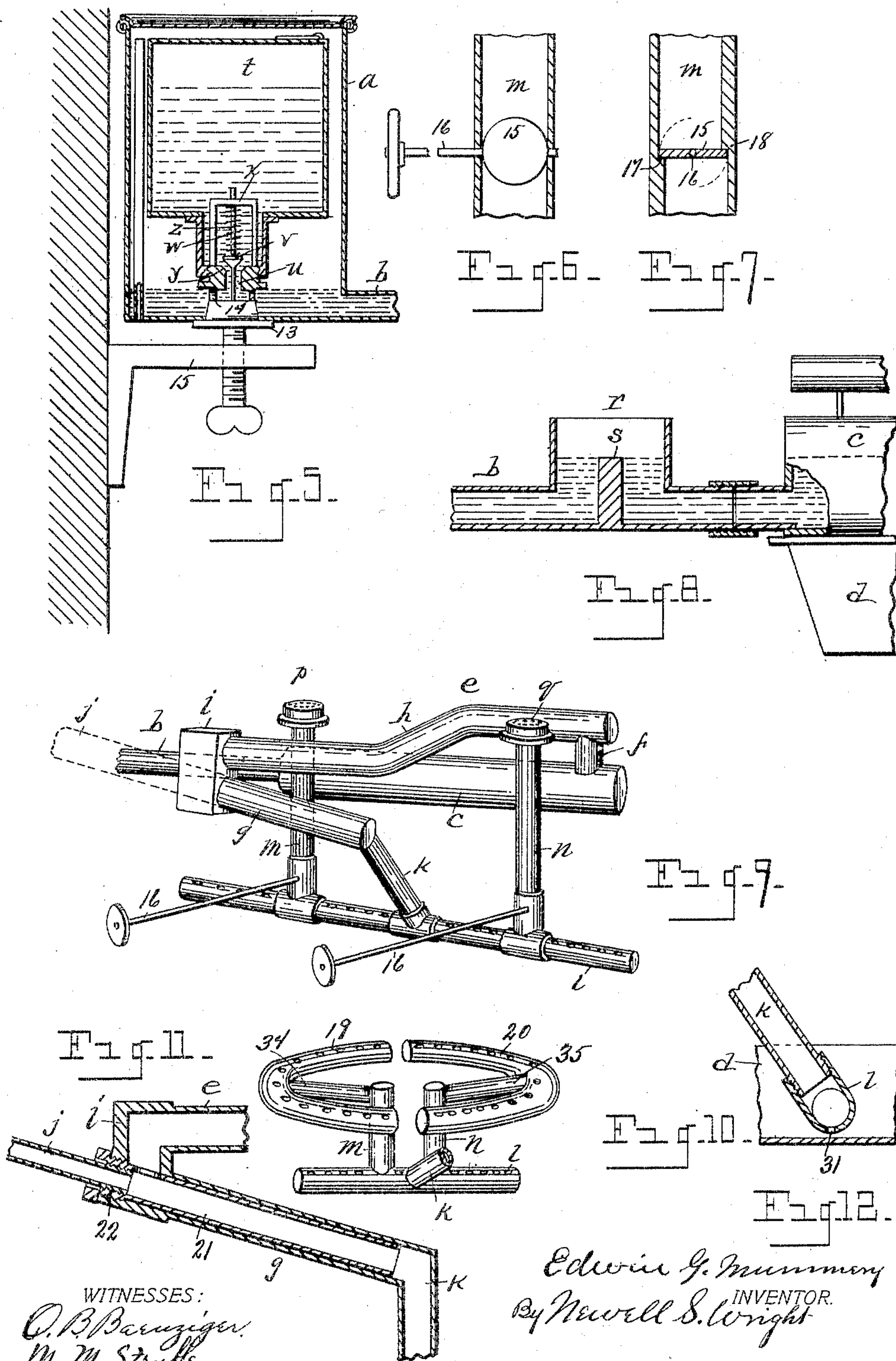
E. G. MUMMERY.

## HYDROCARBON BURNER AND WATER FEED THEREFOR.

APPLICATION FILED FEB. 21, 1903.

NO MODEL.

2 SHEETS—SHEET 2.



WITNESSES:  
O. B. Baruziger.  
M. M. Struble.

Edwin G. Mummery  
By Newell S. Wright <sup>INVENTOR.</sup>

*his* ATTORNEY.



## UNITED STATES PATENT OFFICE.

EDWIN G. MUMMERY, OF DETROIT, MICHIGAN.

## HYDROCARBON-BURNER AND WATER-FEED THEREFOR.

SPECIFICATION forming part of Letters Patent No. 777,481, dated December 13, 1904.

Application filed February 21, 1903. Serial No. 144,471. (No model.)

*To all whom it may concern:*

Be it known that I, EDWIN G. MUMMERY, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Hydrocarbon-Burners and Water-Feeds Therefor, of which the following is a specification, reference being had to the accompanying drawings, which form a part of this specification.

My invention has for its object certain new and useful improvements in a hydrocarbon-burner and water-feed therefor of superior efficiency and utility; and it consists of the construction, combination, and arrangement of devices hereinafter described and claimed, and illustrated in the accompanying drawings, in which—

Figure 1 is a view in side elevation. Fig. 2 is a plan view. Fig. 3 is an end view of the burner, showing parts in vertical section. Fig. 4 is a view of the opposite end of the burner, showing parts in vertical section. Fig. 5 is a view in vertical section through the tank. Fig. 6 is a vertical section illustrating a preferred construction of the valve mechanism, the valve being open. Fig. 7 is a view of the same at right angles to that shown in Fig. 6, showing the valve closed. Fig. 8 is a view in vertical section through the water-indicator, showing adjacent portions of the burner in side elevation, parts being broken away. Fig. 9 is a view in perspective of parts of the burner proper. Fig. 10 is a view in perspective, illustrating a modification in the construction of certain portions of the burner. Fig. 11 is a view in vertical section through the feed-pipe and adjacent parts. Fig. 12 is a detail view showing the communication of the pipe *k* into the burner-pan.

My invention pertains to that class of hydrocarbon-burners in which hydrocarbon fuel is fed to a burner, together with a suitable supply of water to be turned into steam, the steam and the hydrocarbon fuel commingling in the vapor-generator portions of the device to effectually vaporize the fuel and to supply to the hydrocarbon fuel a suitable quantity of oxygen in order to secure perfect combustion.

I carry out my invention as follows: A water tank or receptacle is shown at *a*, supported in any suitable manner, the same communicating, as by a pipe *b*, with a steam-generating chamber or pipe *c*, which is preferably led along the upper edge of a burner-pan, (indicated at *d*.) At the opposite end of said pan from the communication of the water-feed pipe *b* with said chamber the chamber communicates with a return steam-generating pipe or chamber *e*, as through a connecting-pipe *f*, to a commingling chamber or pipe *g*, the pipe or chamber *e* preferably extending across the upper surface of the burner-pan, as indicated at *h*, and communicating with the commingling-chamber *g* through a suitable union *i*. With said commingling-chamber also communicates a hydrocarbon fuel-feed pipe *j*. The commingling-chamber *g* at its end opposite the entrance to the fuel-feed pipe *j* is formed with a downwardly-projecting portion *k*, communicating with a main burner-pipe *l*, preferably located in the base of the burner-pan and with which communicates upwardly-projecting auxiliary burner-pipes *m* and *n*, provided with any suitable burners at their upper ends, (indicated at *p* and *q*.) These burner-pipes *m* and *n* preferably lead upward, so that the flame emitted therefrom will be carried adjacent to any surface to be heated thereabove. The pipe *l* is also perforated for the emission of vapor therefrom, which when ignited, as will be evident, will throw its heat upon the steam and vapor generating chambers thereabove, and whereby a portion of the water fed to the chamber or pipe *c* will be turned into steam, and whereby the commingled steam and hydrocarbon fuel in the chamber or pipe *g* will be heated or vaporized. Where it is desired to spread the flame from the burner more widely, the burner at the top of the pipes *m* and *n* may be made arc shape, for example, as illustrated in Fig. 10.

It will be obvious that by a burner so constructed the water fed to the burner will be vaporized by the heat generated by the burner and that the commingled fuel and steam will also be superheated by the heat of the burner. In the feed-pipe *b* I locate a water-indicator



device, (indicated at *r*,) the same being formed with an upwardly-projecting chamber, as shown in the drawings, which is preferably open at the top and within which projects a vertical standard *s* to the required height of the water-line in the steam-generating chamber *c*. It is also desirable always to have a suitable supply of water within the chamber *c*, and the outlet *f* from said chamber into the pipe *e* is sufficiently large to permit the passage of steam from the chamber *c*, so that the supply of water in the indicator *r* rising to the height of the standard therein will serve to prevent any back pressure of the steam driving the water out from the chamber *c*. The receptacle *a* is provided with an inner receptacle *t*, within which the water is placed, the receptacle *a* having a cover, as shown, readily removable for the insertion and removal of the inner receptacle *t*. The receptacle *t* is placed in the outer receptacle *a* in an inverted position, as shown, the inner receptacle being provided with a discharge-orifice, (indicated at *u*,) controlled by a valve *v* upon a stem *w*, extended through a cap *x*, supported upon the valve-seat *y*, the valve-seat *y* and cap *x* being constructed in a single integral piece, the seat having a threaded connection with the end of the inner receptacle, as shown. A spring *z* exerts its tension upon the valve *v*. The inner receptacle *t* is supported upon an adjusting-screw, (indicated by the numeral 13,) as also the outer receptacle *a*. The valve-seat *u* is supported upon the inner head of the adjusting-screw 13 upon lugs 14. It will be evident that when the receptacle *t* is in place the valve *v* will be opened, allowing the water to be discharged into the outer receptacle *a*. By means of the adjusting-screw 13, which may be passed through a bracket 15 or similar device and having a threaded engagement therein, it will be evident that the height of the receptacles *a* and *t* with relation to the indicator *r* may be raised or lowered, as may be required to secure the proper height of the water within said indicator and within the generating-chamber *c*, the water in the outer chamber *a* being the same height. It will be seen that when the water within the outer chamber *a* rises to a sufficient height it shuts off the air from entering through the opening in the valve-seat *u*, but that when the water-line within the outer chamber *a* descends by the consumption of the water in the generator of the burner an additional supply of water is fed from the inner tank into the outer tank, securing an even pressure of the water-supply, the amount of water-supply being indicated at all times by means of the indicator *r*. The pipe *b* may be made in any suitable manner, so that the water-tank *a* can be raised or lowered with relation to the indicator *r*. The pipes *m* and *n* are provided with controlling-valves (indicated at 15) adjusted by means of a valve-stem 16. I pre-

fer to construct these valves as indicated in Figs. 6 and 7, in which one of the valves is shown in open position in Fig. 6 and in closed position in Fig. 7, the valve-stem of the valve being journaled in the corresponding pipe, so as to carry the valve in a vertical position when the valve is fully opened and into a horizontal position when fully closed. I prefer to construct the corresponding pipe with inner shoulders, (indicated at 17 and 18,) against which the valve will seat when fully closed, as indicated in Fig. 7. The auxiliary burners *p* and *q* will not need to be in operation at all times and by means of the corresponding valves can be closed off, the burner *l* still being in operation.

When it is desired to use the burner embodied in my invention in a furnace, for example, I prefer to construct the auxiliary burners supported upon the pipes *m* and *n* of a modified form, as indicated, for example, in Fig. 10 at 19 and 20, so that the flame can be spread to a greater extent. It will be evident that the burners may be carried to any desired height by lengthening the pipes *m* and *n*.

I prefer that the feed-pipe *j* should have a removable engagement in the pipe *g*. While superheated steam supplied to the mixing-pipe of the burner will be of sufficient quantity to thoroughly vaporize the fuel and take up all the carbon, still a deposit of carbon to a slight degree might take place, and in order to provide for the ready removal of any carbon that might be deposited the feed-pipe *j* has preferably a removable engagement with the commingling-chamber. To this end, as shown in Fig. 11, I have shown the pipe *j* having a threaded engagement with a removable pipe 21, as indicated at 22, the pipe 21 having a threaded engagement in the union *i*. By this means the pipe 21, which communicates with the pipe *e*, may readily be removed, if required.

While the above features embody the essential elements of my invention, I prefer to add thereto, in order to properly hold the flame to secure the thorough heating of the burner, "dummies," (indicated at 23 and at 24, on opposite sides of the pipe *e* and at opposite ends of the burner,) the dummy 23 being provided with supports 25 upon the pipe *c* and the dummy 24 provided with supports 26, resting upon the upper edge of the pan *d*, the burner 24 having two dummy pipes 27 and 28, the one supported upon the other, as by arms 29. The supply-pipe *j* is provided with any suitable controlling-valve 30. It will be understood that when the burner is to be first ignited by opening the valve 30 in the fuel-supply pipe a supply of hydrocarbon fuel is permitted to be discharged through the pipe *k* into the base of the burner-pan, the pipe *l* being provided with an opening 31 to permit the fuel passing therethrough into the burner-pan. To hold a portion of the flame down



upon the adjacent portions of the generating-chambers, I provide a perforated spreader, (indicated at 32,) the same being shown in Figs. 3 and 4 and omitted in the remaining figures.

5 The burner-pan *d* is also provided with perforations (indicated at 33) to admit the air more readily thereinto toward the base thereof.

10 It will be perceived that the burners 19 and 20 are connected with the vertical pipes *m* and *n* by radial pipes 34 and 35.

The pipe *b* at the end toward the receptacle *a* might be made of lead, the said lead pipe connecting with a union 36. It will be apparent that the water is fed to the steam-generating chamber and the feed thereof is controlled entirely by gravity as the water in the steam-generating chamber is vaporized.

What I claim as my invention is—

20 1. A hydrocarbon - burner comprising a burner-pan, a steam-generating chamber adjacent to one of the upper edges of the pan, a water - feed pipe communicating with said chamber, a chamber to prevent back pressure  
25 in the feed-pipe, a water-feed for said pipe embodying an outer receptacle communicating with the water-feed pipe, and an inner water-receptacle within the outer receptacle, the interiors of said inner and outer receptacles  
30 communicable the one with the other, means in the inner receptacle whereby the discharge therefrom may be closed, the said receptacles being arranged so that when the water in the outer receptacle is of proper height the communication between the interiors of the two  
35 receptacles will be closed thereby to prevent the water-feed and the steam-chamber from overflowing with water, a commingling-chamber adjacent to the upper edge of the pan opposite the steam-generating chamber and communicating with the steam-generating chamber, a fuel-supply pipe communicable with the commingling-chamber, and a burner arranged to generate steam in the steam-generating chamber and to assist the steam to vaporize the fuel in the commingling-chamber.

2. A hydrocarbon - burner comprising a burner-pan, a steam-generating chamber adjacent to one of the upper edges of said pan,  
50 said chamber provided with a return steam-generating chamber having its extremities located on opposite sides of the burner-pan, a water-feed pipe communicating with said first-mentioned chamber, a commingling-chamber  
55 adjacent to the upper edge of the pan opposite the steam-generating chamber and communicating with the steam-generating chamber, a fuel-supply pipe communicating with the commingling-chamber, a burner at the base of the pan communicating with the commingling-chamber, and auxiliary burners rising above the upper edge of the pan communicating with the first-mentioned burner, the burner at the base of the pan arranged to generate steam in the steam-generating chamber on one side of the pan, and to heat the commingling-chamber on the other side of the pan.

65 on one side of the pan, and to heat the commingling-chamber on the other side of the pan.

3. A hydrocarbon - burner comprising a burner-pan, a steam-generating chamber adjacent to one of the upper edges of said pan,  
70 said chamber provided with a return steam-generating chamber having its extremities located on opposite sides of the burner-pan, a water-feed pipe communicating with said first-mentioned chamber, a commingling-chamber  
75 adjacent to the upper edge of the pan opposite the steam-generating chamber and communicating with the steam-generating chamber, a fuel-supply pipe communicating with the commingling-chamber, a burner at the  
80 base of the pan communicating with the commingling-chamber, and auxiliary burners rising above the upper edge of the pan provided with vertical supporting-pipes, and with radial pipes connecting the auxiliary burners  
85 with the vertical pipes, the burner at the base of the pan arranged to generate steam in the steam-generating chamber on one side of the pan, and to heat the commingling-chamber on the other side of the pan.

4. A hydrocarbon - burner comprising a burner-pan, a steam-generating chamber adjacent to one of the upper edges of said pan,  
90 said chamber provided with a return steam-generating chamber having its extremities located on opposite sides of the burner-pan, a water-feed pipe communicating with said first-mentioned chamber, a commingling-chamber  
95 adjacent to the upper edge of the pan opposite the steam-generating chamber and communicating with the steam-generating chamber, a fuel-supply pipe communicating with the commingling-chamber, a burner at the  
100 base of the pan communicating with the commingling-chamber, and auxiliary burners rising above the upper edge of the pan communicating with the first-mentioned burner, said auxiliary burners being of arc shape, the burner at the base of the pan arranged to generate steam in the steam-generating chamber  
105 on one side of the pan, and to heat the commingling-chamber on the other side of the pan.

5. A hydrocarbon - burner comprising a burner-pan, a steam-generating chamber adjacent to one of the upper edges of said pan,  
115 said chamber provided with a return steam-generating chamber having its extremities located on opposite sides of the burner-pan, a water-feed pipe communicating with said first-mentioned chamber, a commingling-chamber  
120 adjacent to the upper edge of the pan opposite the steam-generating chamber and communicating with the steam-chamber, a removable feed-pipe communicating with the commingling-chamber, and a burner at the base of the  
125 pan communicating with the commingling-chamber, the burner at the base of the pan arranged to generate steam in the generating-



chamber on one side of the pan, and to heat the commingling-chamber on the other side of the pan.

6. A hydrocarbon-burner comprising a burner-pan, a steam-generating chamber adjacent to one of the upper edges of said pan, said chamber provided with a return steam-generating chamber having its extremities located on opposite sides of the burner-pan, a water-feed pipe communicating with said first-mentioned chamber, and a commingling-chamber adjacent to the upper edge of the pan opposite the steam-generating chamber and communicating with the steam-chamber, a fuel-feed pipe communicating with the commingling-chamber, and a burner communicating with the commingling-chamber, said fuel-feed pipe constructed with a removable pipe extending into the commingling-chamber, said burner at the base of the pan arranged to generate steam in the steam-generating chamber on one side of the pan, and to heat the commingling-chamber on the other side of the pan.

7. A hydrocarbon-burner comprising a burner-pan, a steam-generating chamber adjacent to one of the upper edges of said pan, said chamber provided with a return steam-generating chamber having its extremities located on opposite sides of the burner-pan, a water-feed pipe communicating with said first-mentioned chamber, a commingling-chamber adjacent to the upper edge of the pan opposite the steam-generating chamber and communicating with the steam-generating chamber, a fuel-feed pipe communicating with the commingling-chamber, a burner at the base of the pan communicating with the commingling-chamber, auxiliary burners rising above the upper edge of the pan communicating with the first-mentioned burner, and valves to control the communication of the auxiliary burners with the first-mentioned burner, the burner at the base of the pan arranged to generate steam in the generating-chamber on one side of the pan and to heat the commingling-chamber on the other side of the pan.

8. A hydrocarbon-burner comprising a burner-pan, a steam-generating chamber adjacent to one of the upper edges of said pan, said chamber provided with a return steam-generating chamber having its extremities located on opposite sides of the burner-pan, a water-feed pipe communicating with said first-mentioned chamber, a commingling-chamber adjacent to the upper edge of the pan opposite the steam-generating chamber and communicating with the steam-generating chamber, a fuel-feed pipe communicating with the commingling-chamber, a burner at the base of the pan communicating with the commingling-chamber, said burner-pan supporting the steam-generating chamber, the commingling-chamber and the burner, said burner at the base of the pan arranged to generate steam on

one side of the pan, and to heat the commingling-chamber on the other side of the pan.

9. A hydrocarbon-burner comprising a burner-pan, a steam-generating chamber adjacent to one of the upper edges of said pan, said chamber provided with a return steam-generating chamber having its extremities located on opposite sides of the burner-pan, a water-feed pipe communicating with said chamber, a commingling-chamber adjacent to the upper edge of the pan opposite the steam-generating chamber and communicating with the steam-generating chamber, a fuel-feed pipe communicating with the commingling-chamber, a burner at the base of the pan communicating with the commingling-chamber, said burner-pan supporting the steam-generating chamber, the commingling-chamber and the burner, the burner at the base of the pan arranged to generate steam in the steam-generating chamber on one side of the pan and to heat the commingling-chamber on the other side of the pan.

10. A hydrocarbon-burner comprising a burner-pan, a steam-generating chamber led along the upper edge of said pan, a return steam-generating chamber, a water-feed pipe communicating with the first-named chamber, a commingling-chamber communicating with the steam-generating chamber, a fuel-feed pipe communicating with the commingling-chamber, a burner at the base of the pan communicating with the commingling-chamber, the return steam-generating chamber intermediate the ends of said chamber extending across the upper portion of the burner-pan, said burner-pan supporting the steam-generating chamber, the return steam-generating chamber, the commingling-chamber and the burner, and said burner provided with a feed-opening leading into said pan whereby the fuel may be fed into the pan in initial lighting.

11. A hydrocarbon-burner comprising a burner-pan, a steam-generating chamber adjacent to one of the upper edges of the pan, a water-feed pipe communicating with said chamber, a chamber to prevent back pressure in the feed-pipe and having a standard therein projecting upwardly to the required height of the water-line in the steam-generating chamber, a water-feed for said pipe embodying an outer receptacle communicating with the water-feed pipe, and an inner water-receptacle within the outer receptacle, the interiors of said inner and outer receptacles communicable the one with the other, means in the inner receptacle whereby the discharge therefrom may be closed, the said receptacles being arranged so that when the water in the outer receptacle is of proper height the communication between the interiors of the two receptacles will be closed thereby to prevent the water-feed and the steam-chamber from over-



flowing with water, a commingling-chamber  
adjacent to the upper edge of the pan oppo-  
site the steam-generating chamber and com-  
municating with the steam-generating cham-  
5 ber, a fuel-supply pipe communicable with  
the commingling-chamber, and a burner ar-  
ranged to generate steam in the steam-gener-  
ating chamber and to assist the steam to vapo-  
rize the fuel in the commingling-chamber.

In testimony whereof I have signed this to  
specification in the presence of two subscrib-  
ing witnesses.

EDWIN G. MUMMERY.

Witnesses:

N. S. WRIGHT,  
M. M. STRUBLE.