(No Model.) 2 Sheets—Sheet 1.

F. A. LYMAN.

VAPOR BURNER.

No. 382,652. Patented May 8, 1888.

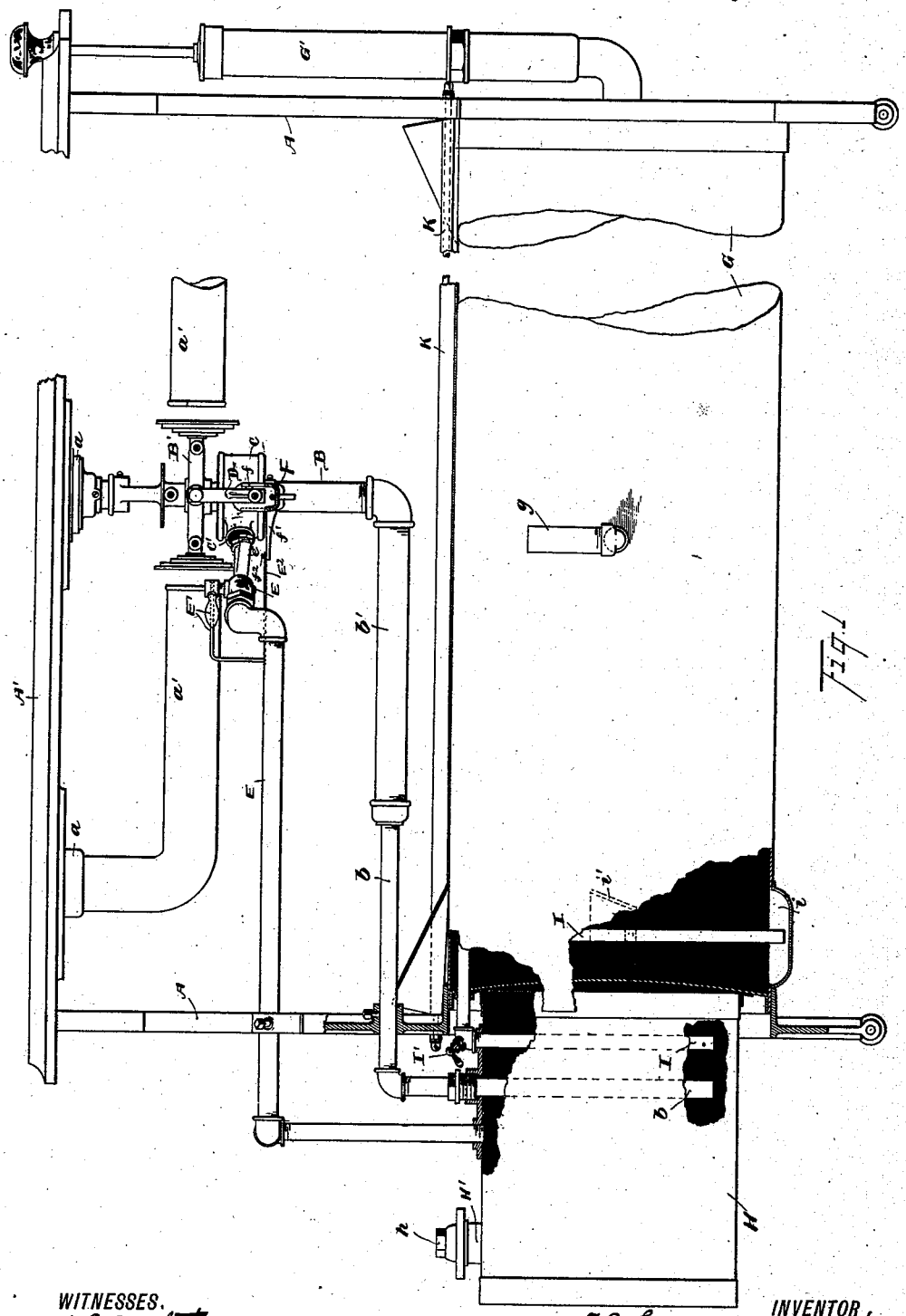

Fig. 1.

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(No Model.) 2 Sheets—Sheet 2.

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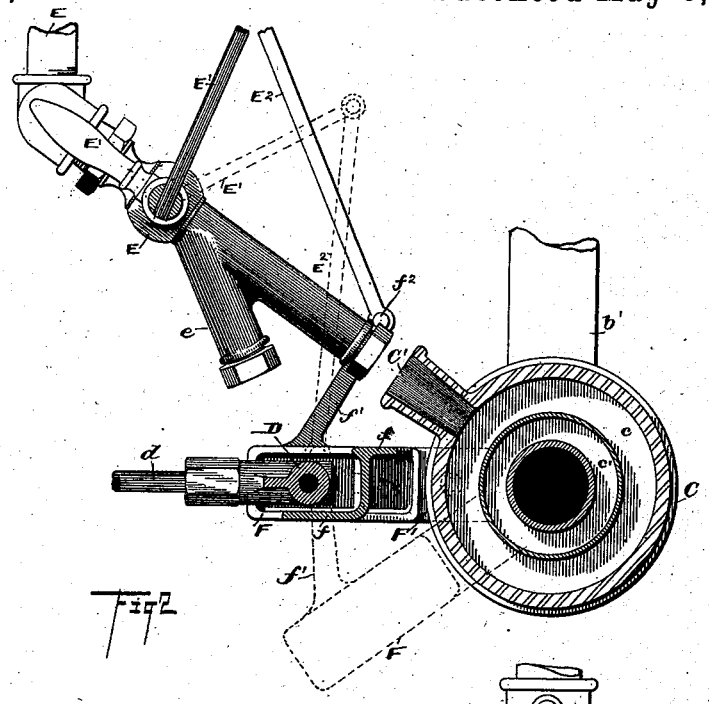

Fig 2

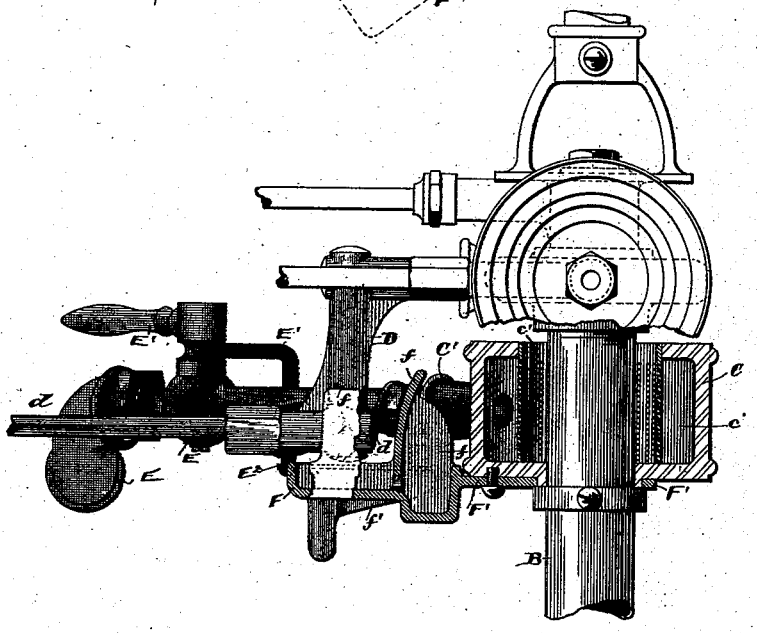

Fig 3

WITNESSES.
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UNITED STATES PATENT OFFICE.

FORDYCE ALLEN LYMAN, OF CLEVELAND, OHIO.

VAPOR-BURNER.

SPECIFICATION forming part of Letters Patent No. 382,652, dated May 8, 1888.

Application filed June 8, 1887. Serial No. 240,676. (No model.)

To all whom it may concern:

Be it known that I, FORDYCE ALLEN LYMAN, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Vapor-Burners; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

My invention relates to improvements in vapor-burner stoves; and it consists in certain features of construction and in combination of parts hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation of a vapor-burner stove embodying my invention. Fig. 2 is a view, partly in plan and partly in section, of the retort, heating-chamber, and connected mechanism; and Fig. 3 is a view in side elevation, partly in section, of the same parts.

A represents the frame of the stove; A′, the stove-top; *a*, the burners, and *a′* the commingling-tubes leading to the extreme burners.

B is the retort, the same having an enlarged end or generator, B′. A supply-pipe, *b*, leads from the gasoline-container to the retort, the one section thereof, *b′*, being enlarged, as shown in Fig. 2. A casing, C, incloses the commingling-chamber *c* and combustion or heating chamber *c′*, the casing C being mounted on and made to rotate a limited distance on the retort. This casing is provided with receiving-nozzle C′, extending laterally, and by turning the casing in the one direction or the other this nozzle is made to present toward the jet-orifice of the needle-valve *d*, or toward the lighting-pipe E.

F is the lighting-cup, that may be used in the ordinary way in connection with the needle-valve *d* when the nozzle C′ is turned in this direction. The lighting-cup is made integral with an arm, F′, and with a flange or hood, *f*, the former being rigidly attached to the casing C, and the latter, by engaging with the valve-arm D, forms a stop to limit the movement of the lighting-cup and casing in the one direction, the hood *f* serving also to direct the flame from the lighting-cup or from the lighting-tube along up the arm D to heat the latter. An arm, *f′*, extends laterally from the lighting-cup, this arm on the free end thereof having an upwardly-projecting lug, *f²*, that by engaging the arm D limits the movement of the lighting-cup in the other direction.

G is an air-reservoir of large capacity, and is provided with an air-pump, G′, of ordinary construction for supplying air under pressure to the reservoir. A safety-valve, *g*, is connected with the reservoir, to prevent a great pressure being had in the latter by the action of the air-pump.

H is the gasoline-container, the same being provided with a filling-nozzle, H′, the latter being closed by a removable screw cap or plug, *h*. An air-pipe, I, leads from the reservoir into the container, and discharges at or near the bottom of the latter. The supply-pipe *b* aforesaid extends to near the bottom of the container H, and the pressure of air admitted from the reservoir through the pipe I forces the gasoline from the container up through the supply-pipe and through the retort. The air passing through the pipe I, being discharged at or near the bottom of the container H, bubbles up through the gasoline, thereby becoming carbureted in its passage, and of course this carbureted air accumulates on top of the gasoline in the container.

The lighting-pipe E is connected with the top part of the container H, and is provided with a stop-valve, E′, on opening which the carbureted air escapes from the mouth of this pipe, and may be directed into the nozzle C′ when the latter is turned in this direction. The discharged carbureted air, as it commingles with the atmosphere in its passage to the nozzle C′, becomes highly combustible, and may be ignited with a match and used for lighting the stove instead of using the lighting-cup F. A branch pipe, *e*, discharges toward the lighting-cup, and this jet of flame therefrom strikes the hood *f*, and is thereby directed along up the arm D for heating the latter, after which by turning back the lighting-cup and the chamber C to direct the nozzle C′ toward the needle-valve *d* the latter may be opened and the stove operated in the ordinary manner. The air-pipe I is provided with a stop-valve, I′, that should be closed in filling the container, so as not to exhaust any air-pressure that at the time may be had in the air-reser-

voir, as such waste of air would necessitate extra labor at the air-pump. In case a slight leakage is had at the air-pump, such as ordinarily would do no harm and would not perhaps be noticeable, yet in standing, for instance, over night, such leakage might produce the pressure in the reservoir to such an extent that the great pressure in the gasoline-container might force some gasoline through the pipe I into the reservoir. A single occurrence of this kind would do no special harm; but if repeated many times more gasoline than desirable might be accumulated in the air-reservoir. A drip-pipe and valve might be had at the bottom of the reservoir to drain off this gasoline; but in so doing the air-pressure in the reservoir would likely be exhausted. In view of these difficulties I have devised the following: The induction end of the pipe I terminates close to the bottom of a cup, pocket, or depression, *i*, preferably made at the bottom of the reservoir, as shown in Fig. 2, and any gasoline that has been forced into the reservoir would be in this depression or cup and covering the mouth of the pipe I, and consequently the fluid in the cup would be forced back into the container as soon as the air-pressure in the reservoir should become greater than the air-pressure in the container. In place of such depression or pocket aforesaid located at the bottom of the reservoir, a cup, *i'*, might be placed, for instance, in the position shown in dotted lines in Fig. 1, some distance from the bottom of the reservoir, the end of the pipe I terminating in this cup, and such device would operate in the same manner as aforesaid. The location, therefore, of the pocket, depression, or cup at the bottom of the reservoir, although preferable, is not essential. Where the cup is located some distance above the bottom of the reservoir, it should be of such ample size as would not likely overflow. The advantage of having the cup or pocket at the bottom of the reservoir is, that if it should overflow the fluid would drain back into the cup and be returned to the container.

A partition, K, is located between the burner and air-reservoir, to protect the latter from the heat of the burner and from consequent expansion. Where the stove is started by means of a lighting-cup in the ordinary manner, it requires some little time to fill the cup by reason of the small opening of the needle-valve, and much more time is required to heat the arm D to vaporize the gasoline in the retort, after which the gas admitted to the commingling-chamber from the needle-valve has to be lighted, the whole operation of lighting the stove requiring usually about five minutes time.

With my improved device by means of the lighting-pipe the carbureted air may be turned on and ignited in the first instance, thereby simultaneously directing a jet of flame against the arm D and directing a jet of vapor into the combustion-chamber, from which latter the heat passes up around the generating-chamber, so that in a few seconds the lighting-cup and chamber C may be swung back and the needle-valve opened to discharge vapor into the nozzle C', and when this latter is done the valve E' is closed and the gas escaping from the needle-valve orifice is ignited in the combustion-chamber by the flame fed from the excess of vapor remaining in the heating-chamber, after which the valve E' is closed, and the stove may then be operated in the usual manner. The whole operation of lighting the stove by means of the lighting-pipe requires usually only about thirty seconds.

The handle of the valve E' is preferably connected by a rod or link, E^2, with the lighting-cup and arranged substantially as shown in Fig. 2, the relation of parts being such that with the valve E' closed the casing C and the lighting-cup will be in position with the nozzle C' presenting toward the needle-valve, and with the valve E' open the nozzle C' will present toward the lighting-pipe. With this arrangement, if the needle-valve is opened before the valve E' is closed, the vapor from the needle-valve will be and remain lighted in the combustion-chamber, such lighting being done by the jet of flame from the lighting-pipe. The operator, therefore, has only to manipulate the handle of the valve E' in starting the burner. The so-called "safety-valve" *g* may be of any ordinary construction, but is not, as its name would imply, for protecting the air-tank from bursting with overpressure, as the air-pump furnished for this purpose is not intended for producing even approximately a pressure that would endanger the tank. Only a limited pressure can be used with the apparatus; otherwise the burners could not be lighted. The function, therefore, of the valve *g* is to keep the pressure within the limits that will render the burner and combustion-chamber operative—that is to say, to prevent an overblast or an excessive blast at these points.

What I claim is—

1. The combination, with mechanism for supplying carbureted air, substantially as indicated, and an oil-supply pipe, of a lighting-pipe for discharging the carbureted air to the burner, said lighting-pipe having two outlets, a valve located in the lighting-pipe for simultaneously controlling both outlets, a movable heating-chamber having a nozzle, and arm D, substantially as set forth.

2. The combination, with an air-reservoir, a pump for supplying air to same, gasoline-container, substantially as indicated, and a pan-like receptacle located within the air-container, of an air-pipe connecting these two vessels, one end of the air-pipe being located at or near the bottom of the gasoline-container and the other end of said pipe terminating near the bottom of the receptacle, substantially as set forth.

3. The combination, with a reservoir, an air-pump, and a gasoline-container, of an air-supply pipe leading from the reservoir into the

container, said air-pipe having an overflow-vessel connected with the induction end of the pipe, substantially as set forth.

4. The combination, with a lighting-pipe having two discharging-nozzles, of a retort, the arm D, a rotating casing, the latter being mounted on the retort and having a receiving-nozzle and a lighting-cup, the latter having an upwardly-projecting hood, substantially as set forth.

5. The combination, with a retort and a lighting-pipe adapted to discharge into the receiving-nozzle of the rotating casing, of a rotating casing mounted on the retort, the casing having a receiving-nozzle attached, and arm D, substantially as set forth.

6. The combination, with an arm, D, a lighting-pipe, a valve therein, a retort, and a rotating casing provided with a receiving-nozzle, of a lighting-cup rigidly attached to the rotating casing, the said cup being connected by a link with the valve-handle of the lighting-pipe, whereby the cup is operated by the movement of the valve, substantially as set forth.

In testimony whereof I sign this specification, in the presence of two witnesses, this 21st day of May, 1887.

FORDYCE ALLEN LYMAN.

Witnesses:

CHAS. H. DORER,

ALBERT E. LYNCH.