(No Model.) 3 Sheets—Sheet 1.

J. E. DONOVAN.

VAPOR STOVE.

No. 489,375. Patented Jan. 3, 1893.

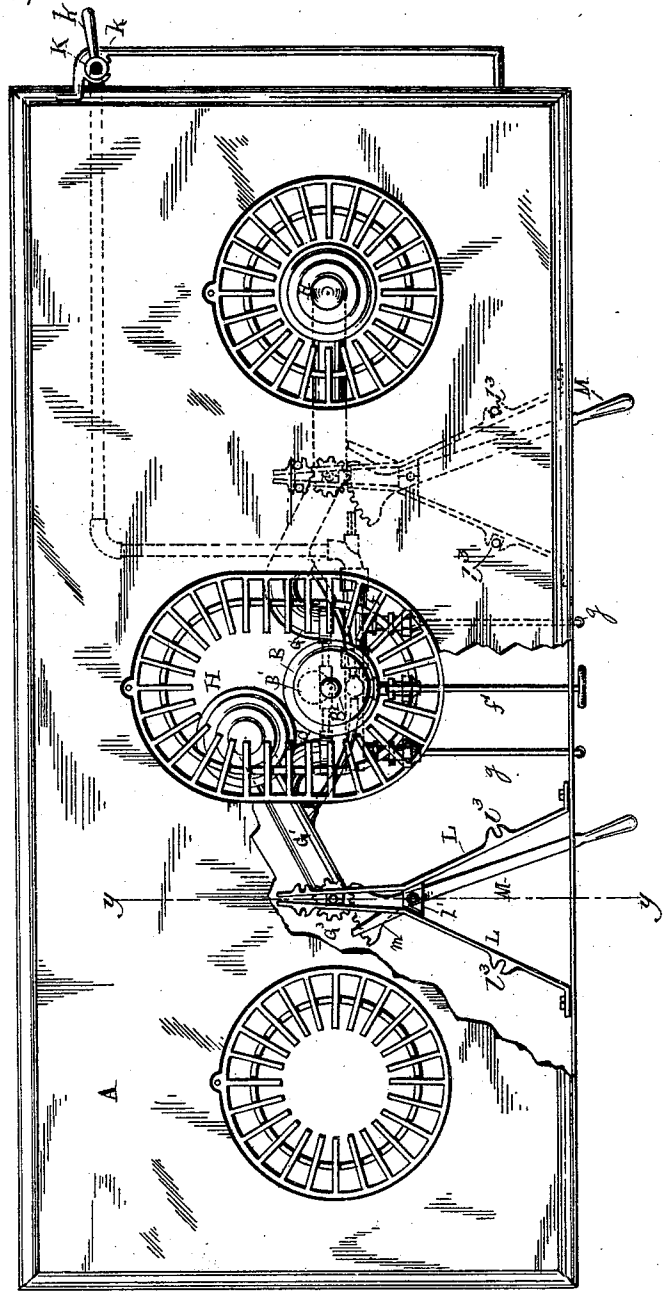

Fig. 1.

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Fig. 2.

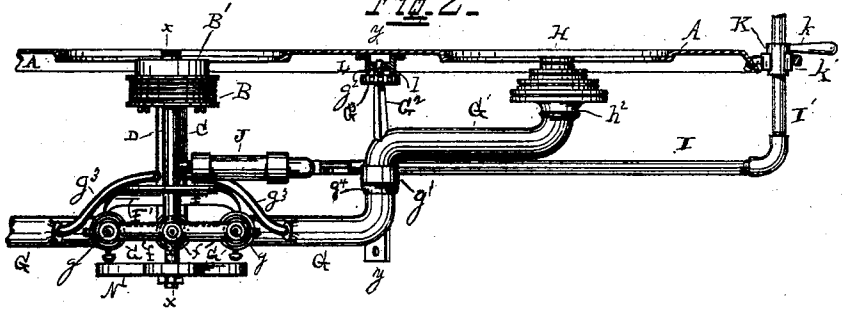


Fig. 3.

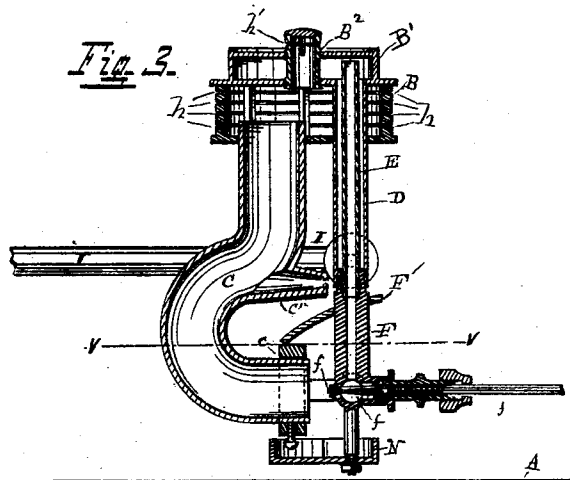
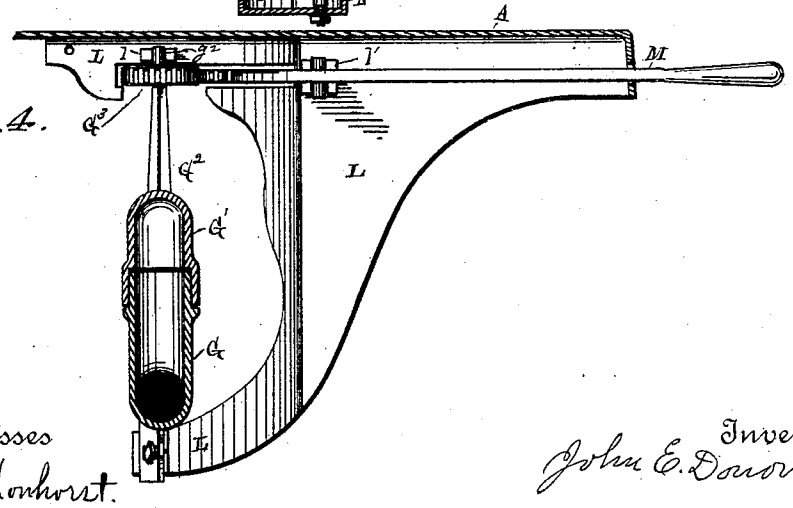


Fig. 4.



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(No Model.) 3 Sheets—Sheet 3.

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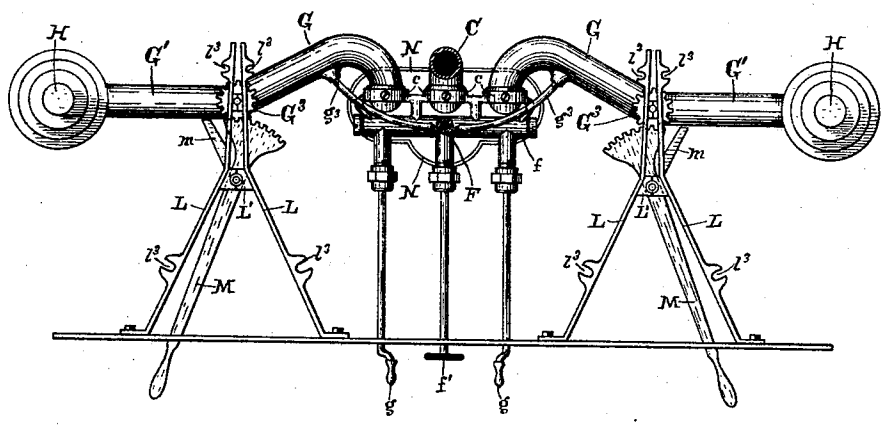
FIG. 5.



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UNITED STATES PATENT OFFICE.

JOHN E. DONOVAN, OF CINCINNATI, OHIO.

VAPOR-STOVE.

SPECIFICATION forming part of Letters Patent No. 489,375, dated January 3, 1893.

Application filed May 13, 1887. Serial No. 238,073. (No model.)

To all whom it may concern:

Be it known that I, JOHN E. DONOVAN, a citizen of the United States, and a resident of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Vapor-Stoves, of which the following is a specification.

My invention relates to that class of cooking and heating stoves in which the fuel is vaporized gasoline.

The invention consists in certain details of construction and novel combination of the parts, whereby a more complete vaporization of the liquid is effected, the burners easily controlled, and the construction of the stove greatly cheapened.

The invention will be first fully described in connection with the accompanying drawings, and then particularly referred to and pointed out in the claims.

Figure 1 is a plan view of the stove with a portion of the top broken away to expose the parts below. Fig. 2 is a vertical longitudinal section through the top showing the central burner, one end burner, and their connections, in front elevation. Fig. 3 is a view upon an enlarged scale and in central vertical section through the central burner and generator taken on line *x x*, Fig. 2. Fig. 4 is a section taken in line *y y* Figs. 1 or 2. Fig. 6 is a plan view of the device with the stove top removed, and the central burner and its connections above line *v v* Fig. 3, cut away.

The top of the stove is of ordinary construction, except the central grated opening, which is enlarged and of oval form, so that the three burners may be brought together under the grating when it is desired to concentrate the heat of all the burners at this point. The top is to be supported by legs braced by an iron frame in the usual manner.

The central burner B, which has a vaporizing chamber B′, above it, is supported on the top of the commingling tube C which opens into said burner. The lower horizontal end of this tube is supported in a ring *c*. This ring, with two others, one upon each side, and the vapor supply channel, *f*, with its branches to receive the needle valves, *f′*, *g*, *g*, and the bars or webs uniting them, are all cast in one piece, (as clearly shown in Fig. 6) and the whole supported upon the ends of the tubes G, which tubes are supported by brackets L, which brackets are part of the stove frame. A fluid-supply tube, D, is cast in one piece with the burner B, its upper end terminating in the vaporizing chamber B′. Within this tube is a tube E, which is screwed into a chamber F. The upper reduced end of this chamber, with the tube inserted, is screwed into the lower end of the tube D. The tube E thus passes centrally through tube D to near the top of the chamber B′. The chamber F communicates by a horizontal channel, *f*, with the vapor supply and commingling tubes G, which feed the side burners, H, H. The horizontal channel, *f*, is provided with three needle valves, *f′* and *g*, *g*. The central one, *f′*, controls the supply of vapor to the commingling tube C, and each of the valves *g*, *g*, control the vapor from channel, *f* through the commingling tubes G to the burner upon the same side as the valve. The fluid coming from an elevated tank, (not shown) passes through the supply pipe I, and a filtering tube, J, to the tube, D, and through it to the vaporizing chamber B′. The tank pipe, I′, is arranged to turn down to a horizontal position in the usual manner, for supplying the tank, but I have provided an improved means for holding it in the vertical position and releasing it when it is to be turned down. This consists of a collar K, made to slide loosely on pipe I′, being cone-shaped on the exterior and provided with a handle *k*, by which it is slipped up or down on the pipe. This collar as seen in Fig. 2 fits into a cone-shaped opening in the bracket, *k′*, which is secured to the end of the top A. The bracket is slotted upon one side to pass the pipe I. When it is desired to turn down the tank, the collar, K, is slipped up, when the pipe, turning upon its joint, will pass out of the bracket *k′*, and down to a horizontal position. When the pipe, I′, again assumes a vertical position, the collar dropping to its seat, retains it in place.

To the under side of the stove top between the central burner B and the side burners H, H, are secured two brackets L, L, which support the tubes and burners and furnish bearings for the movable parts. The lower parts of pipes, G, are secured to these brackets. The upturned ends of these pipes have collars g^4, and necks above these collars which

fit into the enlarged part g', of the parts G, which lead to the end burners, thus forming swivel joints, around which the end burners turn to bring them under the central opening. The tubes G′ have square shafts G^2 cast with them, the shaft and swivel joints having a common axis. The upper ends of these shafts have journals g^2, which have their bearings in lugs l, projecting from adjacent sides of the brackets L. Upon these shafts are secured pinions G^3, the teeth of which mesh into cogged segments on the inner ends of the levers M. These levers have their fulcrums in lugs, l', which project from brackets L. Stop, m, permanently attached to the outer edge of each of the brackets, L, stops the end burners in proper position under the end gratings of top, A. The pipe C, has a branch c' leading near the pipe or chamber F. The end of this branch has a slit for the passage of a jet of vapor, which being ignited heats the chamber F and assists vaporization within it. The pipes G have branches g^3 which also extend to near the chamber F, and are slit to form nipples, so that when either of the valves, g, are opened to bring one of the burners, H, into use, a jet of vapor will be at the same time turned against the chamber F, so that the vaporization will be equal to the demand. A hood or shield F′ passes over the upper end of chamber F, its lower edge resting upon the ring c. The purpose of this is to prevent the jets from the branches c', g^3, igniting the vapor passing from valves f' and g, g, to the tubes C, and G.

N is the customary drip cup in which some of the fluid is ignited to initiate vaporization. In this case it is secured upon a lower threaded projecting rod from chamber F, by a nut.

The central burner B shown upon an enlarged scale Fig. 3, has a vaporizing chamber, B′, on top of it. The fluid supply tube D leads to the bottom of this chamber, and the vapor supply tube E within said fluid supply tube leads from the top of the vaporizing chamber to the discharge which leads to the burner through commingling tubes C, G, G. The burners and plug B^2 have slotted openings through which the vapor issues and is ignited. The heat from the burner vaporizes the fluid in chamber B′. The central burner B is also cast with ribs upon the inside, and slotted at h', the same as the burners H. The top and bottom of chamber B′ are centrally perforated for the purpose of convenience in coring and removing the core after casting. When molded these openings are threaded and closed by the exteriorly threaded hollow plug B^2. This plug is also cast with interior ribs near the top or closed end, and the portion above the chamber B′, is slotted at h', so that in operation a circular sheet of flame will impinge upon the top of the chamber B′, highly heating it and vaporizing the fluid which enters it.

The brackets L have cast with them slotted lugs, l^3, to receive screw bolts by which the brackets are secured to the top, thus avoiding boring or drilling the brackets for the purpose.

To initiate the vaporizing process the tank valve not shown is first opened and the liquid allowed to flow into the upper end of the tube E and thence into the chamber F, through the needle valve and out into the cup N, until the cup is about half full. The needle valve f', is then closed and the liquid in the cup ignited. Before the liquid in the cup is burned out vapor passes through tube C and will issue from the slit h' in plug B^2, which being ignited generates vapor in the chamber B′ which is forced into tube E; the needle valve f' being again opened, the vapor is forced out and into tube C, receiving its full quota of oxygen on its passage to the burner B. The vapor issuing from the burner will be ignited, as also the vapor passing from nipple c. In a very short time the vaporization of the fluid will be perfect. When it is desired to use the side burners their valves, g, are opened, the burners, H, by means of levers, M, swung against the middle burner and ignited. Either one or both may then, by reverse movements of the levers, M, be returned to their places under the end gratings, or left under the central opening, if desired.

It is of course obvious that various means may be employed for swinging the burners, H, in proximity to the burner B, and that in my combinations various well known forms of burners may be substituted for my improved burners, but the means shown for operating the burners, and the burners themselves are the simplest, most easily constructed, and will give better results than any known to me.

It will be seen that the openings to the three commingling tubes, C, G, G, are in the same plane, and that each needle valve for supplying vapor to each, is located axially opposite its respective tube, and the same channel f supplies the heated vapor to each of the commingling tubes C, G, G. It is therefore evident, that should the central valve, f', from any cause, become temporarily deranged, either one or both of the side burners may be used independent of the central burner, as the jet or jets of vapor issuing from one or both of the nipples of pipes, g^3, impinging against the chamber, F, will vaporize the fluid and cause sufficient pressure to insure the discharge of the vaporized fluid into the tubes, G. The vapor passing into the tube will take up sufficient oxygen to insure perfect combustion of the gas when ignited at either or both of the burners H.

I have shown my stove with three burners, and this is the most economical and available number for general purposes, but if economy of space is an object, only two burners may be employed, that is—one of the side burners, H, and its connecting devices may be dispensed with.

What I claim is,

1. In a vapor stove having two or more burners, a jointed supply pipe as G, G′ for one of said burners whereby said burners may be brought together or separated substantially as shown and described.

2. In a vapor stove the combination as specified of two or more burners each having an independent vapor commingling tube and a common vaporizing chamber, independent valves for each to control the supply of vapor, and the branch tubes from each of said commingling tubes having nipples which are in proximity to the common vaporizing chamber, for the purpose set forth.

3. The combination substantially as hereinbefore set forth of the top having the enlarged grated opening for two or more burners, the stationary burner fixed underneath said opening, the movable burners arranged to be swung underneath said opening and against the stationary burner the jointed supply tubes for the movable burners, the shafts G^2 serving as pivots for the jointed tubes and movable burners, the pinions G^3 secured upon said shafts, the cogged levers M engaging said pinions, whereby the burners are moved in either position, and the tube, *f*, for supplying vapor to the burner tubes.

4. The combination substantially as specified of the burner B, the vaporizing chamber B′, the fluid tube and the vapor tube within it, the initial vaporizing chamber F, and initial burners, g^3, the side burners, and their supply tubes, the tube, *f*, and valves, *f′*, *g*, *g*, to control the supply of vapor to the burners.

5. The combination of the initial vaporizing chamber F the tubes C and G, having branches, *c′*, g^3, g^3, the burners, the tube, *f*, and needle valves controlling the supply of vapor to the burner supply tubes, the said branches, *c′*, g^3, g^3 having nipples in proximity to the initial vaporizing chamber so that each nipple will discharge against said chamber as its burner is lighted.

6. The combination in a vapor stove of the movable and stationary burners and their supply tubes, the top A, the brackets L, secured to the top and furnishing bearings for the movable parts and supports for the burners, substantially as set forth.

7. The combination substantially as specified of the burner B, a vaporizing chamber B′ above it, and a hollow plug B^2 closing the central opening in said chamber, and slotted, as at *h′*, substantially as specified.

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