W. J. REED.
Coal-Oil Stove.

No. 219,306. Patented Sept. 2, 1879.

Fig 1.

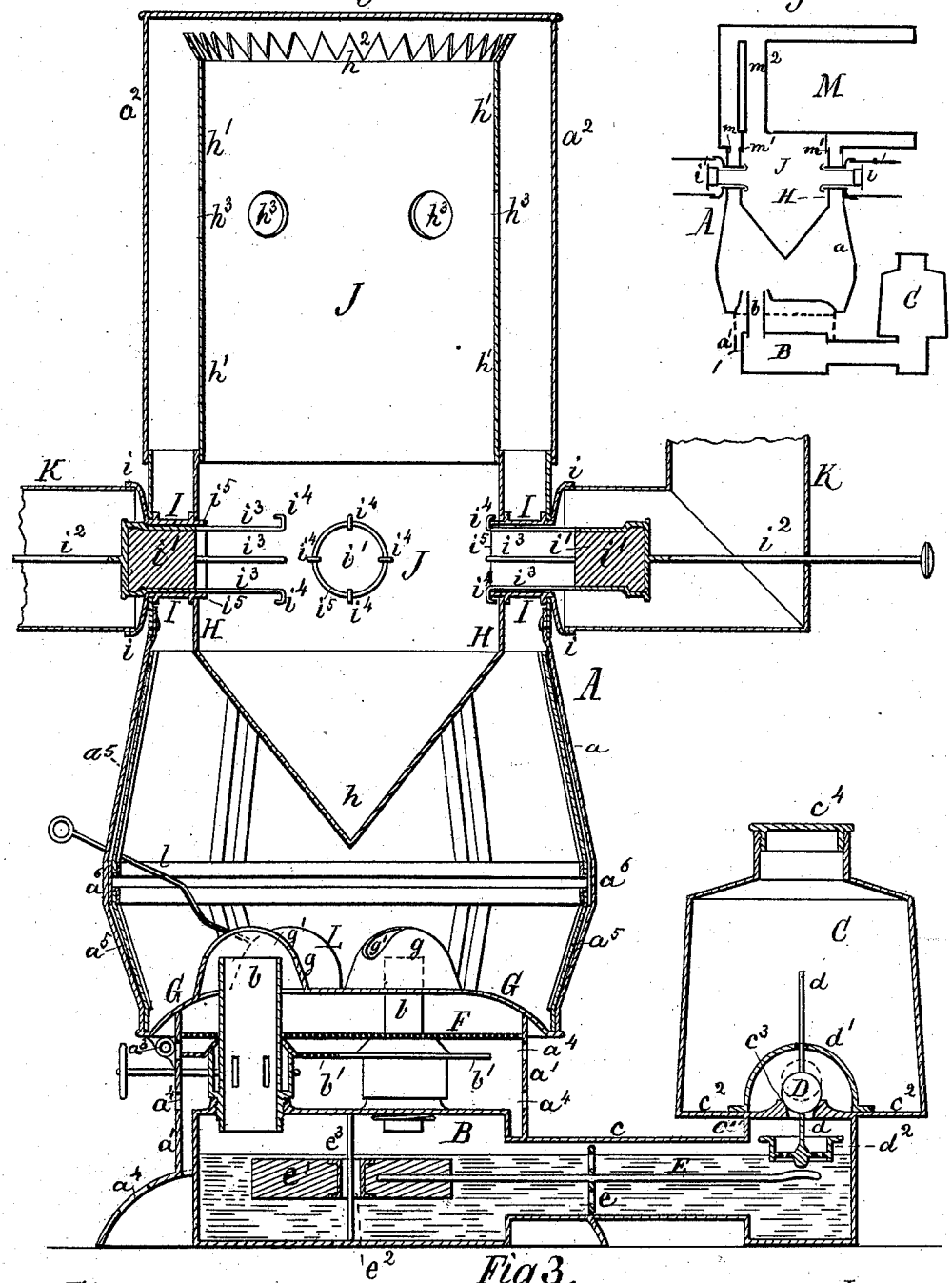
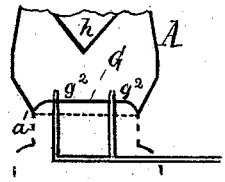


Fig 2.

Fig 3.



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UNITED STATES PATENT OFFICE.

WILLIAM J. REED, OF DANVILLE, PENNSYLVANIA.

IMPROVEMENT IN COAL-OIL STOVES.

Specification forming part of Letters Patent No. **219,306**, dated September 2, 1879; application filed June 18, 1879.

To all whom it may concern:

Be it known that I, WILLIAM J. REED, of Danville, in the county of Montour and State of Pennsylvania, have invented certain new and useful Improvements in Stoves, which improvements are fully set forth in the following specification and annexed drawings, in which latter—

Figure 1 is a vertical central section of my improved stove, and Fig. 2 a diagram of a modification of the same. Fig. 3 is also a diagram of the lower part of said stove as it appears when gas is used instead of oil for fuel.

The nature of my invention consists in a coal-oil or gas stove constructed with air-supply passages, and organized to burn the products of combustion before they reach the exit-passages of the stove by circulation in a chamber which is closed against the influence of the atmosphere at all points except where the draft is admitted and the hot air is allowed to escape from it, and in certain combinations and arrangements of parts, as hereinafter described and specifically claimed.

The coal-oil stoves heretofore used have in many instances been found more or less objectionable on account of the disagreeable odor they emit, the little heat they produce, and the great amount of oil they consume.

To overcome these objections I have constructed a stove in which the burning gases and products of combustion are conducted upward to the top of the stove, and thence down into a reheating-pit, which is heated by the direct contact of the flame from burners below it, and in which pit such portions of the products of combustion as are not fully ignited at first are brought into a condition to be ignited and consumed, while at the same time intense heat is given off, and no odor is imparted to the room in which the stove is situated after the operation of the stove has fairly commenced. I have also provided the oil-reservoir of my stove (when oil is used instead of gas) with an automatic cut-off, whereby the quantity of supply drawn from the reservoir is regulated to exactly meet the demand at the burners.

In the drawings, A represents the shell of a stove, B the oil-cup with the burners *b*, and C the oil-reservoir.

The shell A may be made in three sections, *a*, a^1, and a^2, of which the lower two, *a* and a^1, are connected by a hinge, a^3, in the line of the burners; or, if desired, the middle section, *a*, may be rigidly connected with the lower section, a^1, and provided with an ordinary door. This lower section contains the oil-cup B, provided with ordinary burners *b*, which oil-cup is connected, by a pipe, *c*, with an outer reservoir, C, from which oil is supplied to the cup and the burners. The pipe *c* is constructed with an enlarged portion at c^1, to the upper end of which the bottom c^2 of the reservoir is connected, and in which bottom a valve-seat, c^3, is secured.

The top of the reservoir is provided with an ordinary screw-cap, c^4, for the purpose of filling.

The valve-seat c^3 is supplied with a suitable valve, D, and valve-stem *d*, which is held in central position by a guiding-arch, d^1, fastened to the bottom c^2. The valve-stem *d* extends below the bottom c^2, and is provided with a hollow stopping-button, d^2, which prevents the valve from being lifted higher than necessary. This button d^2 rests upon, and is operated by, the free end of a lever, E, in the pipe *c*. The lever E centrally of its length is provided with a perforated disk, as at *e*, which articulates loosely in the pipe *c*, and serves as a fulcrum for the lever. One end of the lever extends into the oil-cup B, and is therein provided with a cork float, e^1, which has a central guide-hole, as at e^2, and through this guide-hole a rod, e^3, is loosely passed and fastened to the top and bottom of the oil-cup B, as shown.

By this construction the float e^1 is prevented from swaying and losing its connection with the valve D, while with the disk *e* the more expensive construction of a fixed fulcrum is avoided.

The section a^1 of the shell A is provided with draft-holes a^4, which admit atmospheric air around and above the cup B to the burners *b*. These burners are provided with horizontal perforated shields *b'*, and above these shields the section a^1 is provided with a per-

forated diaphragm, F, whereby the air admitted through the draft-holes a^4 is subdivided and prevented from forming heavy currents around the wick-tubes and burners. Above the perforated diaphragm F is a solid diaphragm, G, which forms the bottom of the section a of the shell A of the stove, and is provided with ordinary cones g, having top slots, g', and arranged vertically above the burners b, as shown.

Above the diaphragm G a concentric inner shell, H, having an inverted conical bottom, h, is suspended within the shell A, and held in position by radial tubes I, as shown. These tubes I serve, also, to connect the central heating-chamber, J, with heating-drums and other heating attachments outside of the shell A, and have flaring sockets i, into which common stove-pipes, as at K, are inserted for such purpose. The tubes I are also provided with plug-valves i^1, of suitable material and construction, which are operated by rods i^2 outside the stove-pipe K, and by means of which the communication with the heating-chamber J, through the tubes I, may be regulated or cut off at will.

The inner ends of the plugs i^1 are provided with guide-rods i^3, having end hooks i^4, which hook onto the projecting ends i^5 of the tubes I when the plugs are pulled out, and so prevent the plugs from being entirely withdrawn from said tubes.

The middle section of the outer shell, A, of the stove may be either a solid shell or one provided with mica windows, a^5, of ordinary construction; and this portion of the stove is, by preference, bulged, as at a^6. The upper section, a^2, of the stove is closed at the top and fitted removably upon the upper end of the middle section, a, and made to inclose an inner extension-shell, h^1, of the shell H, which extension is open at top and removably fitted in position within said shell H, as shown. The rim h^2 of the extension h^1 is serrated, as shown, in order to equally divide the heat-currents and products of combustion which pass over into the chamber J, and thus distribute the heat all around the stove at its top portion. The apertures h^3 in the extension h^1 enable the unconsumed products of combustion, when in the chamber J, to come in contact with the flame rising around the shell H, and thus facilitate their ignition.

L is a movable flame-extinguisher, having a handle, z, suitably passed through the wall of the stove, so that the operator from the outside of the stove can place it upon one of the guards g of the burners, in order to extinguish the flame. Each guard will be provided with one of these extinguishers, so that any number of the flames of the burners may be regulated or put out at will, as circumstances may require.

To operate the stove, the reservoir C is supplied with oil, which flows through the open valve-seat c^3 into the pipe c^1 c and oil-cup B, the valve being kept open by the lever E and weight of the float e^1, which latter rests on the bottom of the oil-cup when the filling operation begins. As the oil rises in the cup B the float rises also, and the valve D sinks until it settles into the seat c^3 and closes up the passage for the oil into the pipe c, whereupon the reservoir C begins to fill, and which, when filled, is closed with the screw-cap c^4.

When the surface of the oil in the cup B begins to lower, the float e^1 correspondingly sinks, and the lever E opens the valve D to let a fresh supply of oil into the cup B, and this continues until the rising oil and float will cause the valve to again cut off this supply.

The burners being lighted, the air inside the section a becomes rarefied, and air from without the stove enters through the openings a^4, passes on through the perforated diaphragm F and around the wick-tubes, and out of the slots g^1 in contact with the flame of the burners.

As the flame of the burners comes in contact with the conical portion h of the interior chamber, J, said portion h soon becomes red-hot, and at the same time the products of combustion rise from the burners and pass up between the outer shell, A, and inner shell, H h', to the highest interior portion of the stove, at which point they become arrested in their ascent; and as the rarefaction of incoming air in the section a continues to proceed, and the products of combustion to rise to the highest interior portion of the stove, the accumulated products of combustion are forced down into the chamber J, finally reaching its red-hot bottom at h, and there meet with a powerful heat. The heat at h being intense, the products of combustion are driven back to the highest parts of the stove, while at the same time such products which occupy said higher parts, being less rarefied and under pressure of accumulation, are, in turn, forced down the chamber J, and into contact with the intense heat of the conical portion h. In this manner a current or circulation of the products of combustion is established between the top and bottom of the chamber J, and during the operation the hot air escapes through the tubes I.

When the above-described stove is employed for cooking purposes, an oven may be connected with it in the following manner: In Fig. 2 I have shown my stove with the top parts a^2 and h^1 removed, and an oven, M, with two concentric rims, m m^1, fitted to the upper ends of the parts a and H of the stove. The products of combustion in this case ascend between the rims m m^1 around the oven, and descend through a tube, m^2, in the rear part of the oven to the chamber J below, and the reverberation and action of the products of combustion take place as above described.

The stove may be operated with gas instead of coal-oil, in which case the oil-cup must be removed, as shown in Fig. 3, and gas-burners g^2 inserted into the diaphragm G.

It will be understood that an extinguisher, L, is provided for each burner, and that when the extinguisher is placed over the guard of the burner it not only shuts off the flame of such burner, but also closes the draft around it, and in this manner the heating capacity of the stove can be regulated as circumstances require.

I would also state that I intend to apply my above-described mode of heating to cook-stoves, in which case the superstructure shown in Fig. 1 above the point a^6 would be substituted by the cook-stove; and, further, that by having the mica windows in proximity to the lamp-flames and the highly-heated conical portion *h* of the chamber J, as shown in Fig. 1, my heater possesses great illuminating as well as heating capacity.

I claim—

1. The combination of the burners *b*, diaphragm G, oil-reservoir B, diaphragm F, conical slotted guards *g*, outer shell, A, with air-inlets a^4, and inner shell, H *h*, substantially as and for the purpose described.

2. In a coal-gas stove, the combination of the reservoir C, having a valve, D, the pipe *c*, oil-cup B, lever E, having a fulcrum-disk, *e*, and centrally-guided float e^1, substantially as and for the purpose set forth.

3. The combination of the tubes I and their dampers i^1 with the chamber J and shell A, substantially as and for the purpose described.

4. The combination of the auxiliary circulation-passage *m*, m^1, and m^2 of the part M with the shell A, chamber J and *h*, and burners *b*, substantially as and for the purpose described.

WILLIAM J. REED.

In presence of—

JOHN W. MILES,

J. C. MONTGOMERY.