E. L. MATTESON.

HEATING-STOVE.

No. 192,774. Patented July 3, 1877.

Fig. 1.

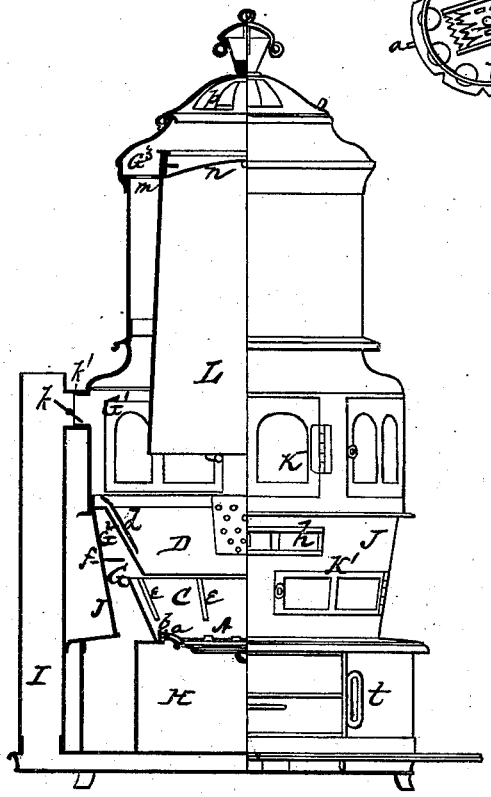


Fig. 2.

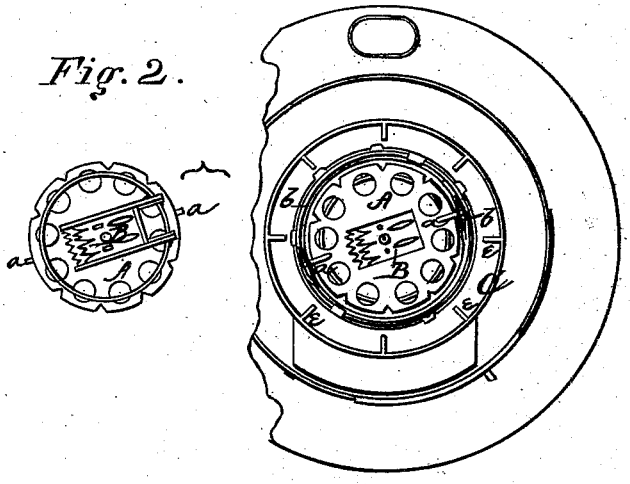


Fig. 3.

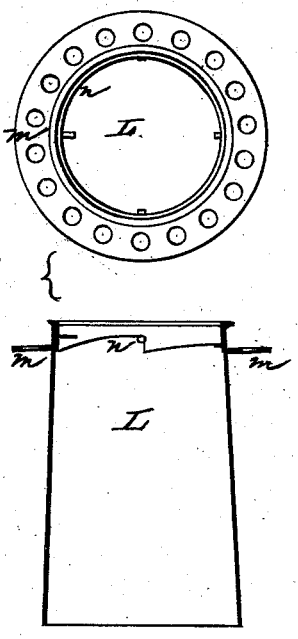
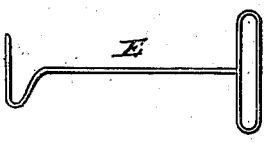


Fig. 4.



Witnesses;

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UNITED STATES PATENT OFFICE.

ELIAS L. MATTESON, OF RANDOLPH, NEW YORK.

IMPROVEMENT IN HEATING-STOVES.

Specification forming part of Letters Patent No. **192,774**, dated July 3, 1877; application filed April 23, 1874.

To all whom it may concern:

Be it known that I, ELIAS L. MATTESON, of Randolph, in the county of Cattaraugus and State of New York, have invented certain new and useful Improvements in Heating-Stoves; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawing, and to the letters of reference marked thereon.

The nature of my invention consists in the construction and arrangement of a heating coal stove and furnace, with smoke and gas burning arrangement, and universally-acting fire-grate, as will be hereinafter more fully set forth.

In order to enable others skilled in the art to which my invention appertains to make and use the same, I will now proceed to describe its construction and operation, referring to the annexed drawing, which forms a part of this specification, and in which—

Figure 1 is a side elevation, one-half in vertical section, of my improved stove. Fig. 2 is a plan view of the fire-pot and base of the stove. Fig. 3 shows the magazine, and Fig. 4 an implement used in the manipulation of the stove.

A represents the fire-grate, which is made dishing in form, and is suspended and balanced by its own weight, concave side uppermost, on two gudgeons or pivots, *a*, made on opposite sides of its upper rim, on which it turns when raked or dumped. These gudgeons bear upon seats made in two segments or semicircular bearings, *b*, which, when in position, surround the grate and move back and forth with it, when shaken, upon ways or guides made in the roof of the ash-pit.

The grate is made dishing to render it strong and self-balancing, as well as to enable it, when rocked or shaken, to collect upon its center dump the clinkers and other refuse matter too coarse to escape through its meshes.

It has a central draw-dump or gate, B, movable back and forth upon suitable ways or guide-stays made upon the grate. The gate or draw-dump B has loops or eyes on its under side to receive the dumping-hook E, Fig. 4, by means of which the entire grate is raked, shaken, or dumped, or the central draw-dump alone opened, and any proportion of the contents of the fire-pot discharged into the ash-drawer, then again closed at will, being so constructed with teeth at its inner end as to pass back easily through the falling column of coal or clinkers to its position, so that the entire grate need not often be dumped.

The fire-pot is made in two funnel-shaped sections, C and D, the larger, D, of which is fixed above with its smaller end extending down into the mouth of the other, C, to prevent escape of coal or ashes between them, at the same time leaving an annular space between the two sections opening upward from the bottom edge, and around the outside of the upper section, and inside of the top of the lower section out into the surrounding combustion-chamber G, and of sufficient capacity for the entire escape-draft of the stove or furnace, it forming the main return-flue thereof, and by its use, in connection with the cold-air draft, from the top of the stove down through and around the magazine, the return-draft for burning of smoke and gas passes down into and through the intense burning in the upper section of the fire-pot, and out over the top of the lower section thereof, thence down around said lower section and around and under the ash-pit H across the base into the escape-pipe I, so that no soot, smoke, or gas can escape combustion, having to pass through two combustion-chambers, besides passing twice through the fire-pot, thereby saving a large percentage of fuel over other burners, and keeping the air from being impregnated with soot, smoke, and gas.

The space around the fire-pot and ash-pit is provided at all points with cold air from the chamber above it, for the purpose of burning the smoke and gas which may have escaped combustion in the fire-pot for the want of a proper supply of air.

The upper section D of the fire-pot is furnished with small tapering flattened return-flues *d* opening out of the combustion-chamber G^1, above the fire-pot, and extending downward toward the bottom of said upper section with their lower ends toward the center of the fire-pot, perforated so as to allow

the air, gas, and smoke to escape and be distributed from them into the central portion of the fire for combustion. These flues are to conduct the air, smoke, and gas from the upper combustion-chamber G^1 down into the central burning, when the circulation through the coal direct is not sufficient, and may be made movable, so as to be taken out at pleasure, and provided with stops, so as to be opened or closed as needed.

The lower section C of the fire-pot rests upon its small end on top of the ash-pit H in a guide-flange to keep it on its bed, and, being detached from the upper section, is free to turn on its end for the purpose of being shaken, and it has projecting eyes or loops made on its outside, into which the dumping-hook E works, and by the use of which said lower section of the fire-pot is freely shaken and the ashes and clinkers thrown down upon the grate, for within this section all the ashes and clinkers accumulate.

It is around and next to the walls of this section C of the fire-pot where combustion is least perfect, and where imperfectly burned coal accumulates, which is by this shaking of the same thrown toward its center and the combustion rendered complete, and which otherwise would get into the ash-drawer unburned and wasted. The longitudinal ribs *e e*, on the inside of the section C, assist in agitating the coal and in sifting out the ashes when shaken, and give strength to its walls, and also form cavities between the coal and fire-pot for the circulation of air.

The movable section C of the fire-pot is approached through one of the lower windows.

The cold-air chamber G^2 around the upper portion of the fire-pot is formed by extending a partition, *f*, from the outer shell J of the stove inward nearly to the fire-pot, leaving space enough for the escape of air between it and the fire-pot, around down into the combustion-chamber G under it. This cold-air chamber is supplied with air through a damper, *h*, between the upper and lower tiers of windows K and K′, and in front of the stove.

The upper combustion-chamber G^1 comprises the space above the fire-pot around the magazine L, up to the cold-air chamber G^3 in the top of the stove, and is for burning the smoke and gas which arise from the fire-pot, and has, when the damper *k* is closed in the cross-pipe *k′*, no outlet except back through the upper section D of the fire-pot, whereby the smoke and gas not consumed therein is returned into the fire by the cold air gradually descending from the cold-air chamber G^3, in the top of the stove. This cold-air chamber surrounding the top of the magazine L is formed by a perforated partition, *m*, extending from the magazine to the shell of the stove at its crown, cutting off the space above it, and supporting the magazine in position.

The partition *m* is perforated, so as to distribute the air from the cold-air chamber G^3 equally around into the combustion-chamber G^1, under it, and precipitate the smoke and gas down to the point of combustion.

There is an annular space between the top of the magazine and the top of the stove for an air-passage into the cold-air chamber G^3, and it is provided with an adjustable belt-shaped stop or damper, *n*, by the use of which the quantity of air admitted into the cold-air chamber is regulated.

The cold-air-inlet damper *p* in the top of the stove opens directly into the magazine, and when the passage into the cold-air chamber G^3 is properly adjusted, the draft is principally down through the magazine, freeing it of gas and smoke, and keeping its contents cool, and from ignition and expansion.

The cold air, as it issues from the magazine at the point of combustion into the fire-pot, becoming suddenly rarefied, rises into the combustion-chamber G^1 around the magazine, causing a partial vacuum, which produces a central current up through the fire-pot from the ash-pit draft, carrying with it into the upper combustion-chamber G^1 the gas and smoke for combustion. At the same the moderate supply-draft into the cold-air chamber G^3, and from it distributed into the combustion-chamber G^1, produces a gentle downward current of cold air, carrying with it to the point of combustion any contiguous gas or smoke.

This descending current of cold air seeks the coolest part of the chamber for its course, which, being around next the outer shell of the chamber, keeps up a whirlpool motion therein by these ascending and descending currents, whereby all the soot, smoke, and gas are carried down and consumed either in the upper combustion-chamber, fire-pot, or lower combustion-chamber G, if they shall so far escape consumption, so that no part of the fuel is wasted nor lost, nor the atmosphere impregnated with soot, smoke, or gas.

The three drafts—*t* at the bottom, *p* at the top, and *h* near the middle—thoroughly ventilate the room the stove occupies.

By the use of the universal acting fire-grate in connection with the shaking fire-pot, the poorest quality of soft or hard coal can be used as readily as any, and its clinkers and stones conveniently worked through and deposited in the ash-drawer.

The stove consumes all the coal, and discharges only ashes, clinkers, and other non-combustible matter into the ash-drawer. It burns up all the gas, smoke, and soot, thereby utilizing all the fuel it consumes, to the saving of a large percentage, which from other heaters escapes into and vitiates the atmosphere, both in and outside the rooms they occupy.

By its triple inlet or supply drafts at the three different points of altitude, it more thoroughly ventilates the room.

The current of cold-air supply through and around the coal-magazine keeps it and the coal cool, preventing the generation of gas

therein, and greatly preserves the walls of the magazine.

By only shaking the lower section of the fire-pot, the central portion of the contents of the entire fire-pot are first thrown upon the grate, and thence into the ash-drawer, leaving the less burned portion next the fire-pot walls to drop last, and there retained for burning.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of the cold air-chamber G^2 and combustion-chamber G, surrounding the fire-pot, in connection with the annular return-flue between the two sections C D of the fire-pot, substantially as and for the purposes herein set forth.

2. A fire-pot for stoves and furnaces, made in two sections, C and D, one entirely above the other, and provided with the flue *d*, in combination with the partition *f*, substantially as described, and for the purposes set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 15th day of April, 1874.

ELIAS L. MATTESON.

In presence of—
J. E. WEEDEN,
R. R. CROWLEY.