2 Sheets—Sheet 1.

W. A. GREENE.

Cooking-Stove.

No. 209,806. Patented Nov. 12, 1878.

Fig. 1.

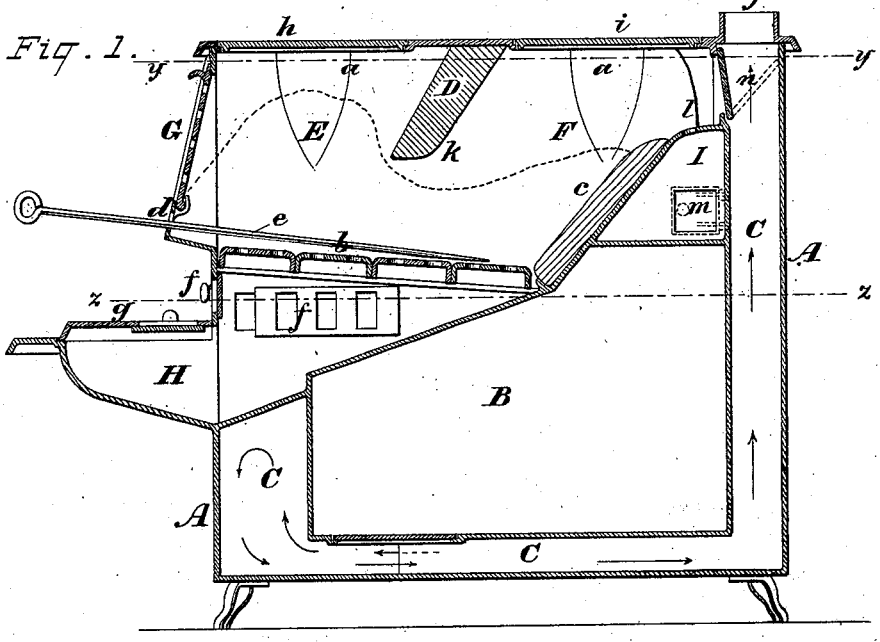

Fig. 2.

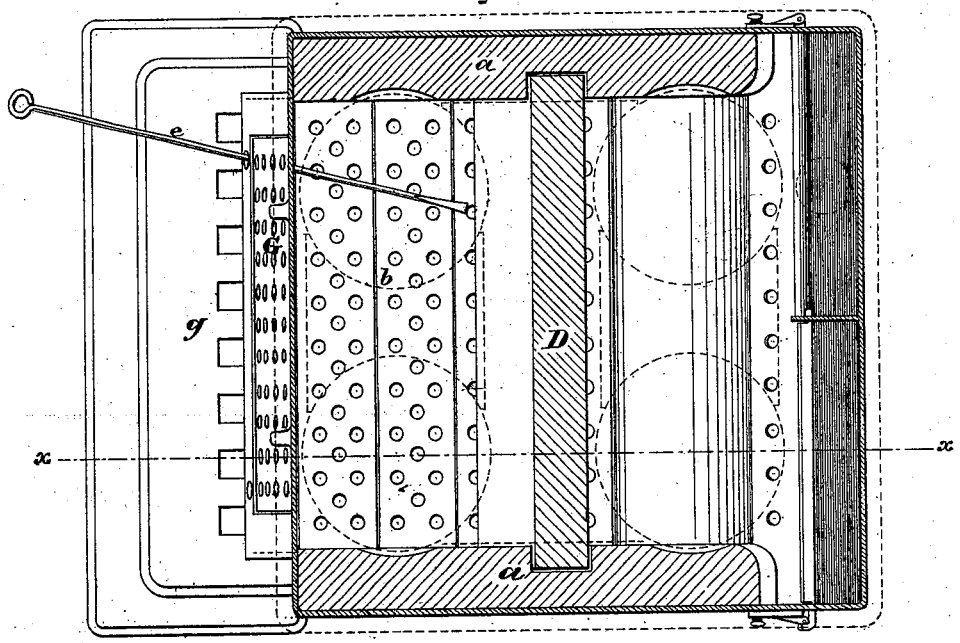

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Fig. 3.

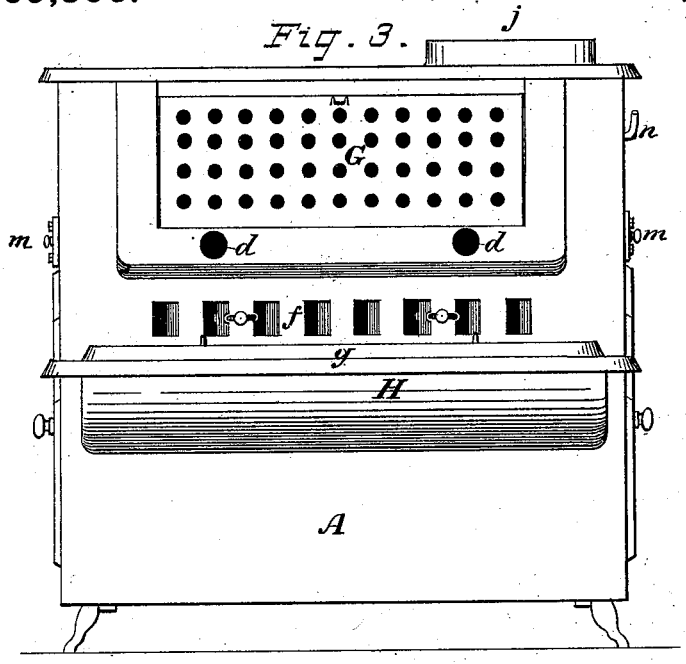
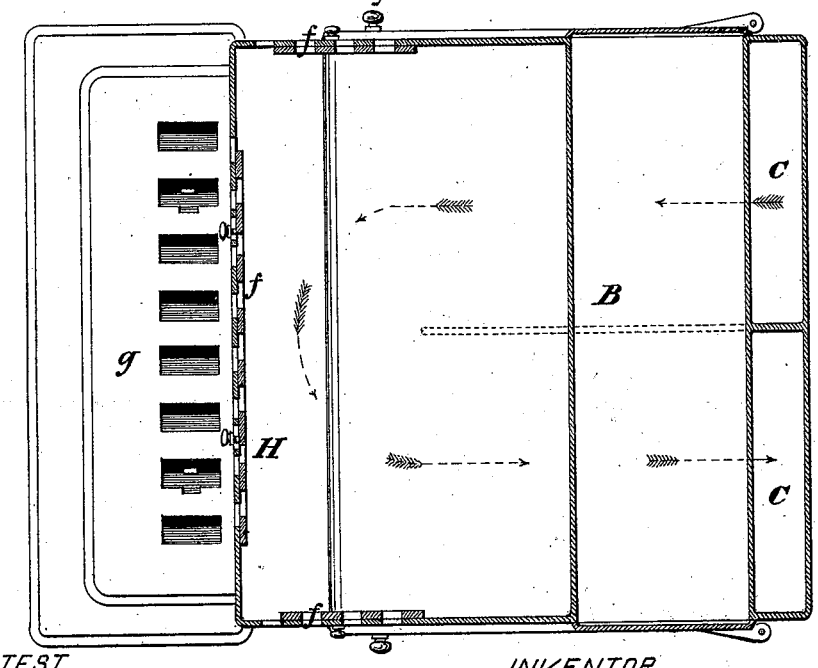


Fig. 4.



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UNITED STATES PATENT OFFICE.

WILLIAM A. GREENE, OF ELIZABETHPORT, NEW JERSEY.

IMPROVEMENT IN COOKING-STOVES.

Specification forming part of Letters Patent No. **209,806**, dated November 12, 1878; application filed July 17, 1878.

To all whom it may concern:

Be it known that I, WILLIAM A. GREENE, of Elizabethport, in the county of Union and State of New Jersey, have invented certain Improvements in Cooking Stoves and Ranges, of which the following is a specification:

This invention relates to stoves for culinary purposes, adapted for burning bituminous coal or fuels rich in hydrocarbons, the object being to prevent as far as possible the formation of smoke and the collection of soot.

To this end the invention consists partly in providing the fire-box or combustion-chamber with a pendent partition of some suitable refractory material, arranged between the charging-door and the flue, whereby the green fuel may be in some degree separated from that portion which is in a state of active and advanced combustion, thus permitting the fuel to give off its more volatile compounds of carbon and hydrogen at a somewhat lower temperature, and compelling them to pass through the incandescent fuel in the other chamber, whereby they are consumed, and the escape of free carbon, in the form of soot or smoke, is prevented. The invention also consists in the peculiar construction and arrangement of the parts and their various novel combinations, all of which will be more fully hereinafter set forth.

In the drawings, Figure 1 is a vertical section of a stove embodying my improvements, taken in the plane of the line *x x* in Fig. 2. Fig. 2 is a horizontal section of the same, taken in the plane of the line *y y* in Fig. 1. Fig. 3 is a front elevation. Fig. 4 is a horizontal section taken below the fire-bed, in the plane of the line *z z* in Fig. 1.

Let A represent the body or walls of the stove; B, the oven, and C the flue around the latter. These are, generally speaking, arranged as in an ordinary cooking-stove.

The fire-box or combustion chamber is partially divided by a pendent partition, D, into a primary chamber, E, and a secondary chamber, F, the former of which receives the fuel and cokes it, and the latter completes the combustion begun in the former. The fire chamber or box is lined at the sides with plates or tiles of some refractory or incombustible material, *a a*, and these are recessed to receive the ends of the partition D, which may be of the same material. At the back of the fire-bed *b* is a sloping plate or tile, *c*, also of refractory material. The fire-bed *b* is very large proportionately, and is composed of perforated sections, arranged side by side substantially, and capable of removal when damaged by excessive heat.

G is a perforated door, through which the fuel is supplied, and which is unprovided with a register, as the proper amount of area is given to its perforations in the construction. Just below the hinges of the door are one or more holes, *d d*, through which may be passed a slicing-bar or poker, *e*, as indicated. The end of this poker is flattened and spread out, somewhat in the form of an oar, and its extremity is cut square off, as shown in Fig. 2. Its use will be explained farther on. Below the door, on both sides and front, are registers *f f*, by which air is admitted under the fire-bed.

H is the ash-pan, which may be cleaned out by removing the cover *g* on the hearth, in the usual way. The top of the stove is provided with the usual cross-centers and circular pot-holes, those marked *h* being over the front fire-chamber, and those marked *i* over the rear chamber.

Having described my invention thus far, I will proceed to explain its operation. The fire is started under the partition D, which is shown as extending down about one-half of the way from the cover to the fire-bed. The fuel, usually bituminous or soft coal, is fed into the chamber E at the door G or at the top, as may be preferred. It takes fire at the back first, and as the temperature increases it becomes charred or coked, losing its hydrogen and free carbon. When it becomes sufficiently coked it is pushed over, wholly or partially, into the chamber F by means of the poker *e* working in the holes *d d*, its flat end standing vertically.

In the chamber F the coal combines with the oxygen from the constantly-incoming current of air, and becomes incandescent, its fixed carbon combining with the oxygen without smoke or with very little smoke. In the mean-

time green or uncoked coal is fed in at the door as needed to supply the place of the coked coal pushed forward.

By reason of the partition D the draft tends downward through the fuel in the chamber E, so that no smoke will rise from it even if the covers *h* be removed, while the hydrocarbons set free in coking are compelled to pass through the incandescent mass in the chamber F, and are decomposed and combined with the heated oxygen before they can reach the outlet-pipe *j* or the flue C. Thus free carbon, of which the soot and the visible parts of the smoke are composed, is all combined, and passes off amid the invisible products of combustion.

Normally the temperature is not nearly so high in the part E as in F, and this enables the cook or operator to use either for his purposes, as he may require, a higher or lower temperature. However, the fire may be permitted to burn back into the primary chamber to some extent, if desired, and the temperature therein raised. This may be varied or regulated to suit the circumstances of the case.

The partition D is preferably set at an angle, as shown, so as to avoid choking up the passage or entrance to the chamber F, and the lower back corner may be rounded, as shown at *k*, to aid in the same. The partition might, however, stand perpendicular, or nearly so, without serious detriment.

I is a chamber over the oven B, in the roof of which are a series of holes, *l l*, which serve the double purpose of permitting the dust and ashes carried up by the draft to sift through into the said chamber, and to let a current of air, which enters the chamber through the side doors *m m*, escape into the combustion chamber just anterior to the exit *j*. This air mixes with the heated unconsumed gases, (mainly carbonic oxide,) and combines with them and with such particles of free carbon as may have passed over unconsumed.

The ordinary damper *n* is used to direct the current of products of combustion either up the pipe *j* or around the oven, as desired, their course in the latter case being indicated by the arrows.

It will be observed that the fire-bed *b*, which consists of a perforated plate or plates, admits the air from below in fine jets throughout its entire surface. I prefer that these perforations should be not more than one-fourth of an inch in diameter, and they should be evenly distributed, the number being sufficient to admit only air enough to support combustion, and not too much. The openings supply the oxygen uniformly, and are too small to allow coal to drop through.

The construction of the grate compels stirring of the fire from above, which is done by means of the poker *e*. This is inserted in one of the holes *d d*, and is used in the manner of a lever, the edge of the hole being the fulcrum. When it is desired to break the coked mass of coal the poker is used to pry it up, and when sufficiently disintegrated the poker is used to push it back into the secondary chamber, as described. To rake the fire, or sift the ashes through the fire-bed into the ash-pan below, the poker is moved or vibrated from side to side over the surface of the fire-bed. By using the poker first in one hole and then in the other, the entire surface of the fire-bed may be reached. The smooth flat surface of the fire-bed facilitates this operation.

I am aware that stoves have been constructed in which a portion of the fire-pot has been parted off by a partition to form a sort of flue, the same being adapted to produce a downward draft in the fire-chamber; but in such cases an opening and damper have been provided in the upper part of the partition to permit the products of combustion to pass through direct to the flues over the oven. In my arrangement two fuel-chambers are provided with a grate under each, and the partition is wholly unprovided with an opening or damper. Actual combustion of solid fuel is being carried on in both chambers during the time the stove is in use, and neither serves the purpose of a flue in any proper sense.

I claim as my invention—

1. In a stove or range for culinary purposes, the fire box or chamber provided with a pendent unperforated partition, arranged transversely across the same under the long center between two sets of pot-holes, so as to form two fuel-chambers for slow and fast cooking, and arranged to cut off communication between the two divisions except under the bottom of the same, substantially as set forth.

2. In a stove or range for culinary purposes, a pendent partition, D, arranged transversely across the fire-box, so as to divide it in two parts, the said partition being inclined, as shown, so as to give the chamber E a hopper shape and avoid choking the passage from the chamber E to F, substantially as set forth.

3. The combination of the refractory side-lining plates *a a* with the refractory partition D, the ends of the latter being arranged to rest in recesses in the former, substantially as set forth.

4. The refractory partition D, having its lower posterior edge rounded or beveled, and arranged to stand inclined in the fire-chamber with its lower edge to the front, substantially as set forth.

5. The combination of the stove-front provided with a hole or holes, *d d*, the poker *e*, having a flattened end, a perforated fire-bed having a smooth and substantially flat surface, and the pendent partition D, all arranged substantially as set forth.

6. A suitable fire-bed, in combination with the partition D and the stove-holes *h i*, arranged on opposite sides of the said partition, substantially as set forth.

7. The perforated door, in combination with the perforated fire-bed and the pendent partition D, all arranged substantially as set forth.

8. The chamber I, provided with a door or

registered aperture, *m*, and having apertures *l l* in its roof, in combination with the fire box or chamber divided into two parts, E F, all substantially as set forth.

9. The combination of the fire box or chamber, divided into two parts, E F, by means of a partition, D, with the oven B and flue C arranged around the same, substantially as herein set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

WILLIAM A. GREENE.

Witnesses:
ARTHUR C. FRASER,
HENRY CONNETT.