

(No Model.)

R. G. FINLAY.
GAS STOVE FOR COOKING, &c.

No. 554,253.

Patented Feb. 11, 1896.

Fig. 1.

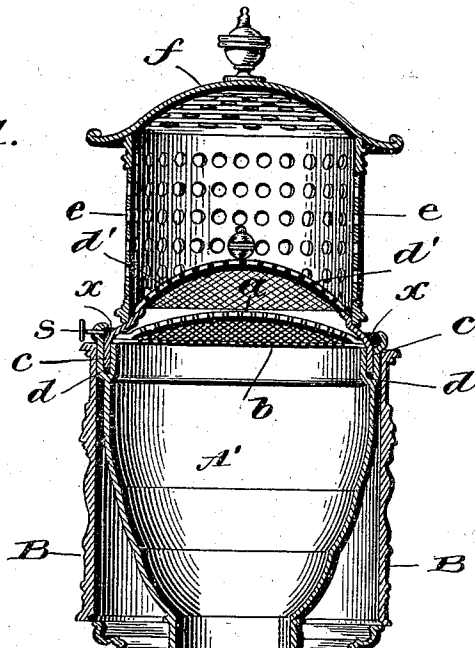


Fig. 2.

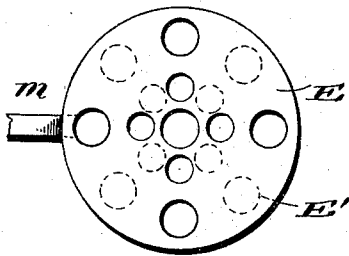
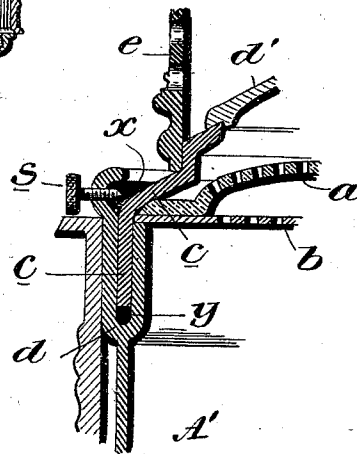


Fig. 3.



Witnesses:

L. C. Hills.
F. B. Keefe.

Inventor:
Robert G. Finlay.
Marshall Bailey
his Atty.

UNITED STATES PATENT OFFICE.

ROBERT GILMOUR FINLAY, OF NEW YORK, N. Y., ASSIGNOR TO THE ELECTRIC FLAMELESS GAS STOVE COMPANY, OF SAME PLACE.

GAS-STOVE FOR COOKING, &c.

SPECIFICATION forming part of Letters Patent No. 554,253, dated February 11, 1896.

Application filed April 26, 1895. Serial No. 547,246. (No model.)

To all whom it may concern:

Be it known that I, ROBERT GILMOUR FINLAY, a citizen of the United States, and a resident of the city, county, and State of New York, have invented certain new and useful Improvements in Gas-Stoves for Heating and other Purposes, of which the following is a specification.

The object I have in view is the production of a gas-stove for heating, cooking, and other purposes in which the parts are so constructed, arranged, and proportioned as to insure complete flameless combustion.

I will first describe my invention by reference to the accompanying drawings, forming part of this specification, and will then point out more particularly in the claims those features which I believe to be new and of my own invention.

In the drawings, Figure 1 is a vertical central section of a stove embodying my invention in its preferred form for heating purposes. Fig. 2 is a plan of the air-admission register. Fig. 3 is a detail sectional view, on enlarged scale, of the joint between the several parts at the top of the expansion-chamber.

I remark at the outset that the shape of the stove can be varied considerably so long as enough air can be admitted for the supply of gas for which the stove is intended, and so long as there is adequate room between the air and gas admission and the point of combustion to insure that intimate mixture of this adequate supply of air with the gas to insure complete combustion. In the drawings, however, I represent that form of stove which I have practically tested, and which in practice gives the result to which my invention is directed—viz., the complete and, certainly so far as external appearances go, the flameless combustion of gas.

The body of the stove consists of an upright tubular portion A, (which is a mixing-chamber,) surmounted by an expansion-chamber A', (which is really part of the mixing-chamber,) and at its base terminating in a conical or flaring portion A², designed to afford the increased area needed for the accommodation of an air-register through which the needed supply of air is admitted into the stove.

The expansion-chamber may be surrounded by an ornamental drum B, and the flaring lower portion may be surrounded by an ornamental base C. Gas may be admitted into the lower part of the mixing-chamber through any suitable or desired number of tips. In this instance one tip D is employed. The gas-supply pipe to which the tip is connected passes up centrally through the air-register, and is supplied with the usual cock *m*. The air-register consists of a stationary perforated plate E and a rotatable perforated plate E' provided with a handle *n* by which the plate may be turned to bring its holes into and out of register with the fixed plate E.

The body A A' A² may be of any suitable material. I now prefer to make it of cast metal.

The top of the expansion-chamber is closed by a concavo-convex perforated diaphragm or burner-plate *a*, placed convex side uppermost; and immediately below it is a flat perforated screen or disk *b*, which prevents back-firing. These plates or disks are held in place by an annular plate-holder *c*, which overhangs and bears upon the burner-plate. Its lower edge is received and seated in an annular socket *d*, formed for it in the top of the expansion-chamber. Packing of plumbago, fire-clay, or other refractory material is provided at the points *x y* to prevent possible escape of gas, and one or more set-screws *s* are used to prevent the holder *c* from lifting. The plate-holder also furnishes a seat for an ornamental open-work removable cap *d*, which serves to secure the combustion of any gases that may escape combustion at the burner-plate.

The perforated fire guard or screen *b* for preventing back-fire, is usually made of sheet metal, preferably sheet-brass. The burner-plate may be made of fire-clay, metal or other suitable material. In practice I have found that sheet-brass gives excellent results. The cap *d*, which also may be of any suitable material, I in practice have made of metal casing in some open-work ornamental pattern.

The foregoing are the parts required for the purpose of effecting complete flameless combustion.

The stove is surmounted by a removable

perforated basket-top *e*, having an ornamental deflector-cap *f*.

The stove is lighted at the burner-plate *a*, the basket-top and the cap *d* first having been removed; and these parts are then replaced in their original position.

While I do not desire to be understood as limiting myself to precise dimensions, any more than I am restricted to any particular shape, yet to a full understanding of my invention it will be profitable to state the dimensions of the parts shown in the drawings, making up as they do the structure in which I have been enabled to produce continuously complete and apparently flameless combustion of the gas, all that is noticeable even on the closest inspection when the stove is in operation being the bright-red heat of the burner-plate and the dull-red heat of the cap *d*.

The tube *A* has an internal diameter of three inches and is about fourteen inches in length. The area of the register-holes when fully open is, say, nine square inches. The expansion-chamber in its greatest width is between six and seven inches, and is seven inches in height to the back-fire screen. The diameter of the burner-plate is about five inches. It is of fine mesh, and at its highest point is about three-sixteenths of an inch above the back-fire screen, which latter in practice is of the same mesh as the burner-plate.

I have found it very desirable to bring the back-fire screen and the burner-plate thus close together for several reasons. In the first place there is very much less liability to back-firing. I have found that the farther the screen is removed from the plate the more apt is back-firing to occur; but aside from this the bringing of these two parts thus close together has a material bearing upon the combustion, for they inclose between them what becomes in effect a combustion-chamber, in which contracted space the mixture of gas and air that filters through the screen is held almost in film form, becoming at once intensely heated and producing what apparently is flameless combustion, manifested only by the bright red of the burner-plate.

If the back-fire screen be removed entirely, or if it be separated from the burner-plate by a considerable distance, the effect is at once apparent. The burner-plate becomes dark, losing appreciably its incandescence, and there appears flame upon and above the surface of the plate. Thus the plate, which, for want of a better term, I denominate the "back-fire screen," because it does act to prevent back firing or flashing, is a material factor in the problem of combustion, and it is in the latter connection that its more important function is found, constituting, as it does, the lower wall of a combustion-chamber.

The top plate of my stove or burner is, in fact, a compound top plate made up of the

burner-plate and back-fire screen brought closely together and inclosing between them a shallow space, which constitutes a combustion-chamber.

The secondary chamber or space inclosed between the burner-plate and the cap *d* above may be and in practice is of greater dimensions. In this secondary chamber all traces of gases are consumed. The above dimensions are designed with particular reference to a six-foot gas-burner or a tip or tips having singly in the one case or conjoined in the other a discharge capacity of six feet per hour. I may use indifferently one six-foot tip or six one-foot tips.

Of course with burners or tips of greater capacity the air-register must have correspondingly greater capacity and the mixing-chamber must have proportionately increased dimensions, with an increase also in the size of the burner-plate and its related parts.

Having described my invention and the best way now known to me of carrying the same into effect, what I claim herein as new, and desire to secure by Letters Patent, is as follows:

1. The combination with the mixing-chamber, the inlets for supplying air and gas thereto and means for regulating the same, of the shallow contracted combustion-chamber, included between and formed by the back-fire screen and the finely-perforated burner-plate placed immediately above and in close proximity to the screen, substantially as and for the purposes hereinbefore set forth.

2. The combination of the mixing-chamber; the inlets for supplying air and gas thereto and means for regulating the same; the back-fire screen *b* at the upper part of the mixing-chamber; the perforated burner-plate *c*, immediately above the back-fire screen; and the reticulated or open-work cap *d*, surmounting the burner-plate.

3. In a gas-stove a mixing-chamber, a perforated diaphragm or burner-plate closing the outlet of said chamber and interposed between a back-fire screen on the one side, and a reticulated or open-work cap on the other side, the spaces included between said parts constituting primary and secondary combustion-chambers, substantially as and for the purposes hereinbefore set forth.

4. The mixing-chamber *A* with expansion top *A'* and a bottom closed by the register *E E'*, and gas-admission tip or tips *D*, in combination with the back-fire screen *b*, the burner-plate *c*, and the cap *d*, all combined and arranged for joint operation, substantially as hereinbefore set forth.

In testimony whereof I have hereunto set my hand this 23d day of April, 1895.

ROBERT GILMOUR FINLAY.

Witnesses:

J. L. FOLLETT,

J. H. HENRY.