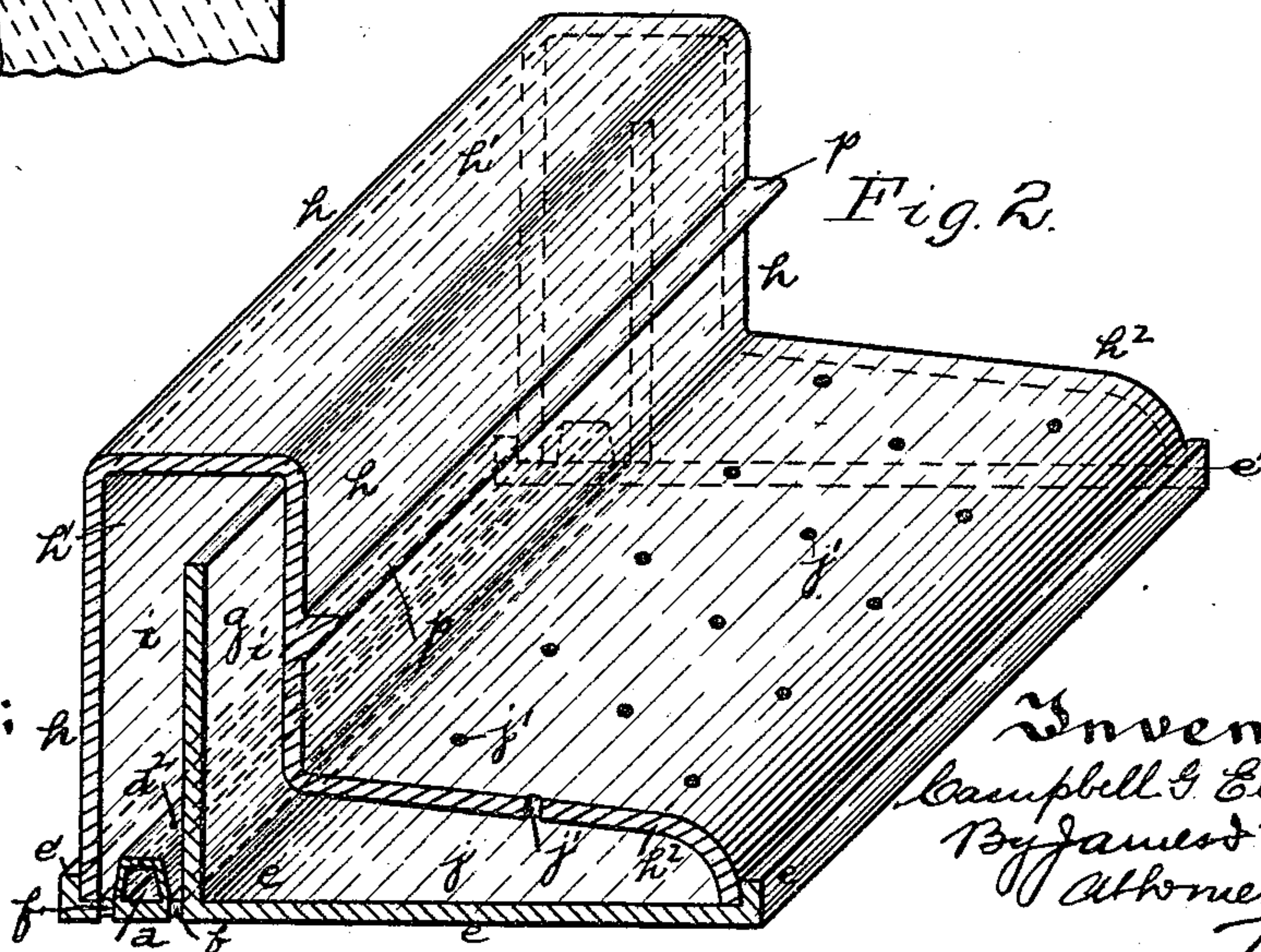
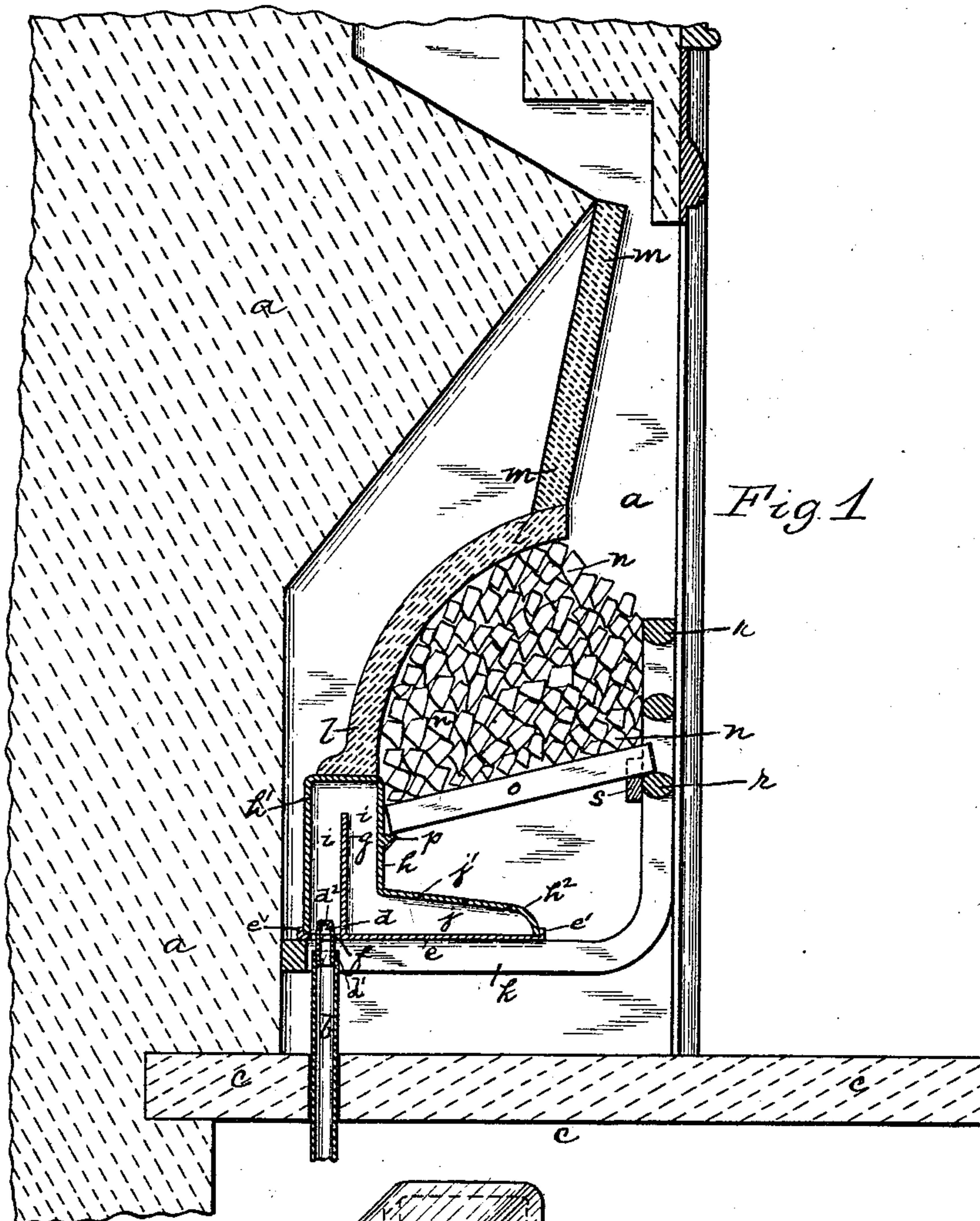


(No Model.)

C. G. ELWOOD.  
GRATE FOR GASEOUS FUEL.

No. 438,749.

Patented Oct. 21, 1890.



Witnesses:  
J. A. Cooke  
Chas. D. Gullen

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# UNITED STATES PATENT OFFICE.

CAMPBELL G. ELWOOD, OF ALLEGHENY, ASSIGNOR OF TWO-THIRDS TO  
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## GRATE FOR GASEOUS FUEL.

SPECIFICATION forming part of Letters Patent No. 438,749, dated October 21, 1890.

Application filed January 6, 1890. Serial No. 335,979. (No model.)

*To all whom it may concern:*

Be it known that I, CAMPBELL G. ELWOOD, a resident of Allegheny, in the county of Allegheny and State of Pennsylvania, have in-  
5 vented a new and useful Improvement in Grates for Gaseous Fuel; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to grates for burning  
10 gaseous fuel, its prime object being to provide a grate in which a thorough combustion of the gas takes place, and one in which the maximum degree of heat is given forth for the amount of gas consumed. It has the fur-  
15 ther object of overcoming the hissing or buzzing noise which almost invariably accompanies the burning of gaseous fuel in open fire-places.

To these ends my invention comprises, gen-  
20 erally stated, a grate for burning gaseous fuel, having a mixing-chamber in the rear of and extending above the burner proper, where the combustion of the gas takes place.

It further comprises a long gas-feeding  
25 chamber situated within the mixing-chamber, said chamber being connected with the gas-supply pipe and having openings leading from said chamber to the mixing-chamber, and said mixing-chamber having air  
30 ports or entrances at the sides of said gas-feeding chamber, whereby a full supply of air to support combustion is mixed with the gas, and both gas and air may be heated before the burning thereof.

35 It also consists in certain improvements which tend to reflect the heat toward the floor of the apartment, whence it may arise and more thoroughly circulate throughout the apartment, all of which will be more fully  
40 hereinafter set forth and claimed.

To enable others skilled in the art to make and use my invention, I will describe the same more fully, referring to the accompanying drawings, in which—

45 Figure 1 is a vertical side section of a grate constructed according to my invention. Fig. 2 is a perspective view of the burner.

Like letters indicate like parts in each.

My improved grate is adapted to be set in the ordinary recess formed in the wall *a* of  
50 the apartment. The gas-supply pipe *b* passes up through the hearth-stone *c* and forms a gas-tight connection with a cap *d'*, formed at the mid-point under the long narrow cham-  
55 ber *d* within the body of the burner. This gas-chamber *d* is preferably cast integral with the base-plate *e* of the burner, and arranged at suitable intervals along the top thereof are the jets or openings *d*<sup>2</sup>, these jets  
60 being so small as to require the gas to be injected into the mixing-chamber at considerable speed, and thereby draw in a sufficient body of air and cause the proper mixing of  
65 gas and air. Air-inlets *f* are formed in the base-plate *e* close to the outside of the walls of the gas-chamber *d*, said inlets being ar-  
ranged at suitable intervals apart along the entire length of the said gas-chamber *d* and on both sides thereof.

In order to prevent the gas from passing  
70 directly to the point of combustion, as will more fully appear, a vertical deflecting-wall *g* is erected at the rear of the base-plate *e* at a point just in front of the first row of air-in-  
75 lets *f*. As will be observed by the drawings, the burner is illustrated as formed in two parts—the base-plate *e* and the parts formed thereon and the cover or top piece *h*. This  
80 cover or top piece *h* is adapted to fit neatly within the flanges *e'* at the front and rear of the base-plate *e*, and has at the rear thereof the elevated portion *h'*, which when in position  
85 on the base-plate *e* forms the mixing-chamber *i*, with the deflecting-wall *g* therein extending almost to the top of said chamber.

The upper part of the burner may, if de-  
sired, be formed of tile or fire-clay or other  
such refractory material. The lower front  
portion *h*<sup>2</sup> of said cover *h* forms the combus-  
90 tion-chamber *j* and has therein the openings *j'*, where the gas is ignited, this forming the burner proper. To allow the air to circulate  
freely beneath the base-plate *e* and enter  
95 through the inlets *f* into the mixing-chamber *i*, the said base-plate is supported by the base-  
bars *k* of the ordinary grate, supported in the



customary way within the fire-place, and the burner, as it extends over the greater part of the base of the grate-basket, prevents a strong draft upwardly through the grate. Upon the elevated portion  $h'$  of the top piece  $h$  (that is, above the mixing-chamber  $i$ ) rests the curved or forwardly-inclined tile or plate  $l$ , said plate being constructed of tiling, brass, or other heat-radiating material, and having its face sufficiently curved to throw the heat down toward the floor of the apartment. It will be noticed that this tile extends forward from a point below the top of the grate over the burner almost to the front of the grate. It thus acts not only to deflect the heat, but also to further prevent the formation of a draft and the carrying of the heat up the flue. Upon the plate  $l$ , I place the back reflector  $m$ , which inclines forward slightly, serving thereby both to reflect the rays of heat out into the apartment and to diminish the width of the chimney-flue, in order to prevent too strong a draft, which would draw the heat up the chimney and prevent the thorough combustion of the gas. The reflector  $m$  may be constructed of glazed tiling, brass, glass, or other good heat-reflecting material, and it is secured in place by any suitable means. The body of broken fire-brick  $n$  or other refractory substance to be raised to incandescence by the burning gas is supported upon the cross-pieces  $o$ , the rear ends of said cross-pieces resting upon the ledge  $p$ , cast on the elevated portion  $h'$  of the top piece  $h$ , the front ends resting upon the horizontal bar  $r$ , and to strengthen their position they also rest upon the bar  $s$ , which may have seats formed therein for the cross-pieces  $o$  to rest in and prevent the lateral movement of the same.

To illustrate the practical operation of my improved grate, the gas is first turned on by a suitable valve situated in the floor of the apartment, when said gas will enter the long gas-chamber  $d$  and escape through the openings  $d^2$  into the mixing-chamber  $i$ , where the gas will be thoroughly mixed with the air entering the said mixing-chamber through the inlets  $f$ . As the inlets  $f$  extend the entire length of the gas-chamber  $d$  and on both sides thereof, all the gas entering the mixing-chamber will be met by a current of air on both sides, and as there is a full opportunity for the entrance of the air, which can flow into the mixing-chamber without any rushing or rapid movement, there is no hissing or buzzing noise created, the burner being practically noiseless. The deflecting-wall  $g$  acts to prevent the intermingled gas and air from passing directly to the point of combustion and directs it up to the top of the mixing-chamber, whence it may escape over the top of the deflecting-wall  $g$  and down the other side thereof to the combustion-chamber and through the openings  $j'$ , where it is ignited. At the same time, as the portion of the burner containing this mixing-chamber extends up-

wardly back of the point where combustion takes place, the mixed gas and air will necessarily be heated in passing through such mixing-chamber and the perfect burning thereof insured. The flames arising from the openings  $j'$  will gradually heat the blocks of fire-brick or other refractory material supported by the bars  $p$  and raise them to incandescence, emitting an intense heat. To further assist in throwing out the heat is the object of the curved tile or plate  $l$ , which, owing to its forwardly-inclined surface, and as it is constructed of good heat-radiating material, reflects the heat down toward the floor of the apartment, whence it may raise the atmosphere of the said apartment. Any heat escaping above the curved tile  $l$  is acted on by the back reflector  $m$ , and by the glazed or polished surface thereof is reflected into the apartment, while the light from the incandescent fire-brick in playing over the reflector adds greatly to the appearance of the grate. By this mode of construction I obtain not only a grate in which the gaseous fuel is perfectly consumed, but one in which practically none of the heat is allowed to escape up the chimney-flue.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A grate for burning gaseous fuel, having a mixing-chamber at the rear of and extending above the burner proper, substantially as and for the purposes set forth.

2. A grate for burning gaseous fuel, having a mixing-chamber in the rear of and extending above the burner proper, and a long gas-feeding chamber connected with the supply-pipe, said gas-feeding chamber situated within and communicating with the said mixing-chamber, substantially as and for the purposes set forth.

3. A grate for burning gaseous fuel, having a mixing-chamber at the rear of and extending above the burner proper, a longitudinally-extending gas-feeding chamber with which the gas-supply pipe communicates directly, said chamber being supplied with a series of openings, and a series of air-inlets at the sides of said gas-feeding chamber, substantially as and for the purposes set forth.

4. A grate for burning gaseous fuel, having a mixing-chamber at the rear of and extending above the burner proper, a deflecting-wall extending part way up within said mixing-chamber, and a gas-feeding chamber back of said wall, substantially as and for the purposes set forth.

5. A grate for burning gaseous fuel, having a mixing-chamber at the rear of and extending above the burner proper, and a curved tile resting upon the top of said chamber, substantially as and for the purposes set forth.

6. In a grate for burning gaseous fuel, the combination of a grate-basket, a burner resting therein, and a tile extending from a point back of the burner and below the top of the



grate-basket in a forward incline to a point near the top of the grate-basket, substantially as and for the purposes set forth.

5 7. In a grate for burning gaseous fuel, the combination of a grate-basket, a burner resting therein, a tile extending from a point back of the burner and below the top of the grate in a forward incline to a point near the top of the grate, and a reflector resting upon said

inclined tile and extending toward the chimney-mouth, substantially as and for the purposes set forth.

In testimony whereof I, the said CAMPBELL G. ELWOOD, have hereunto set my hand.

CAMPBELL G. ELWOOD.

Witnesses:

J. N. COOKE,

ROBT. D. TOTTEN.