

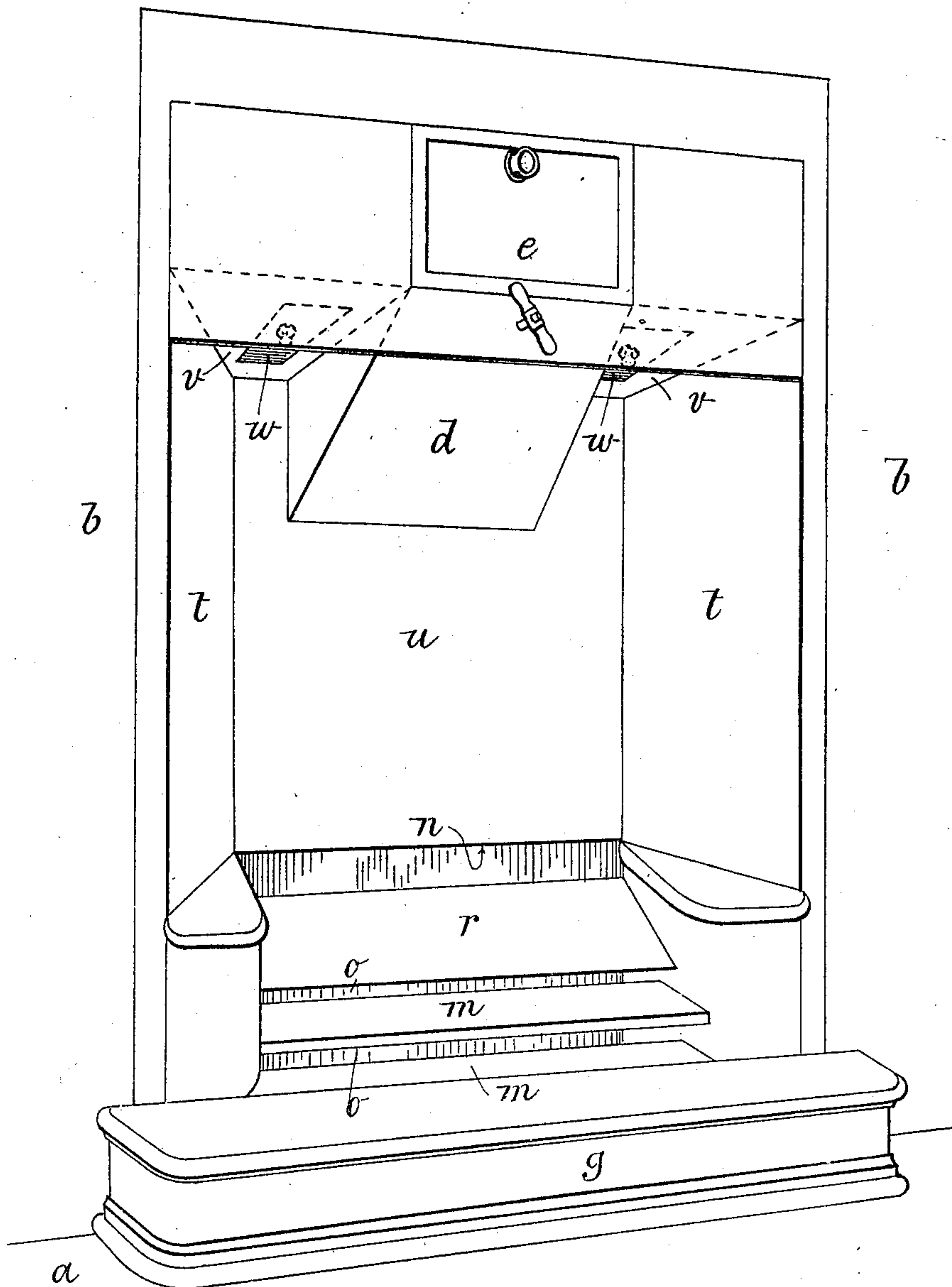
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PATENTED JAN. 23, 1906.

H. C. CLEAVER.
OPEN FIREPLACE.
APPLICATION FILED NOV. 5, 1904.

3 SHEETS—SHEET 1.

F I C . / .



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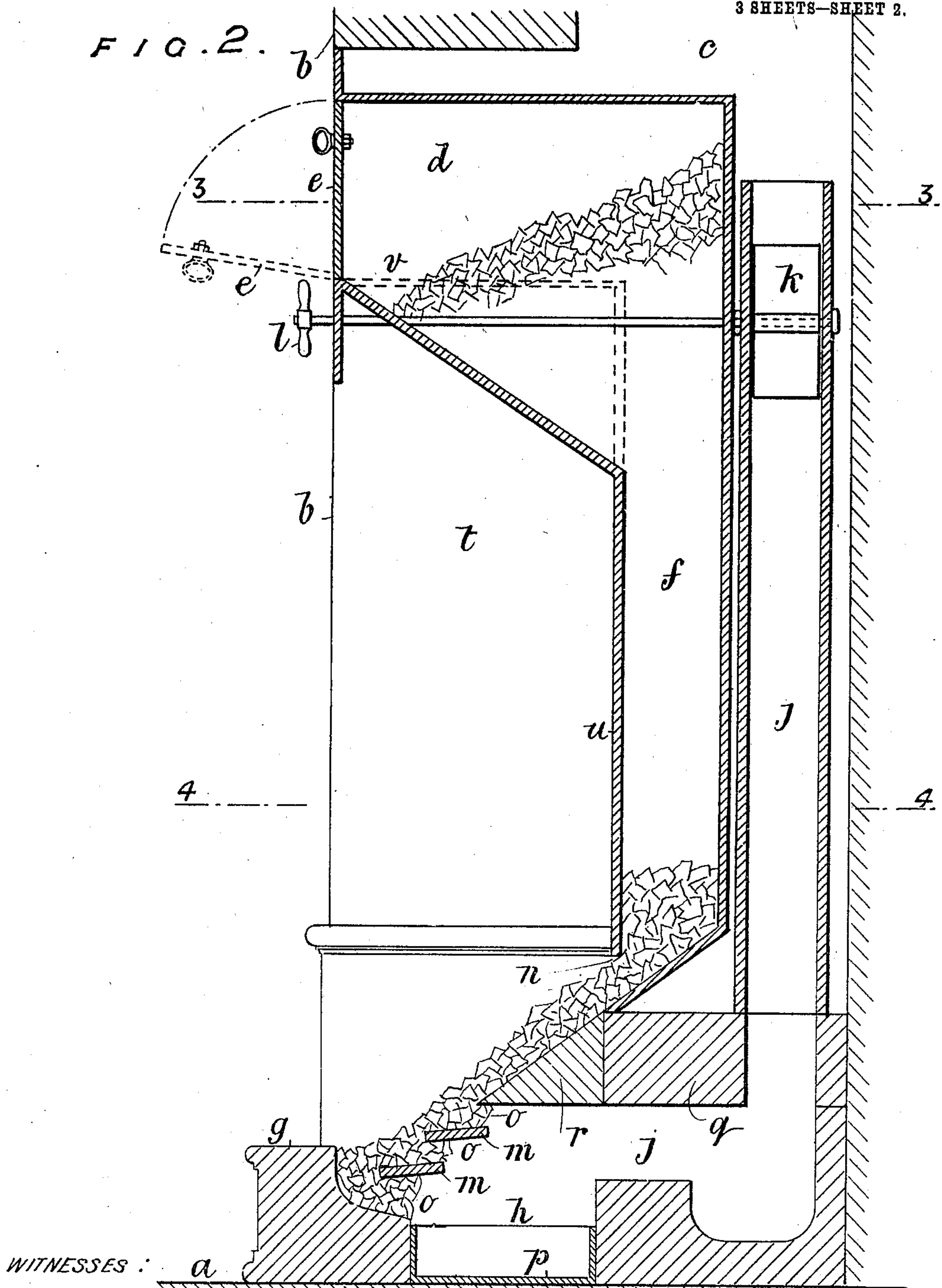
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3 SHEETS—SHEET 2.

FIG. 2.



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3 SHEETS—SHEET 3.

FIG. 3.

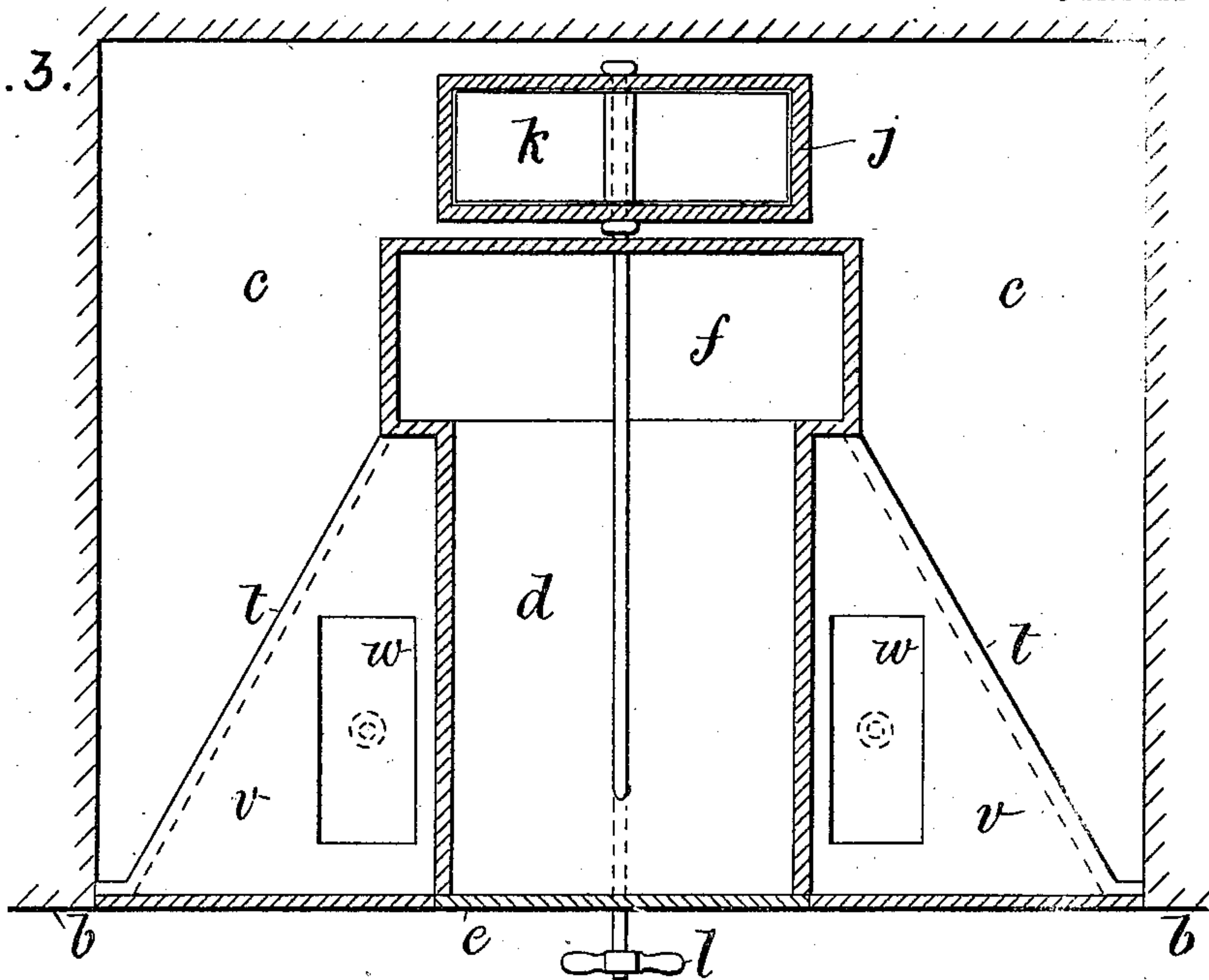
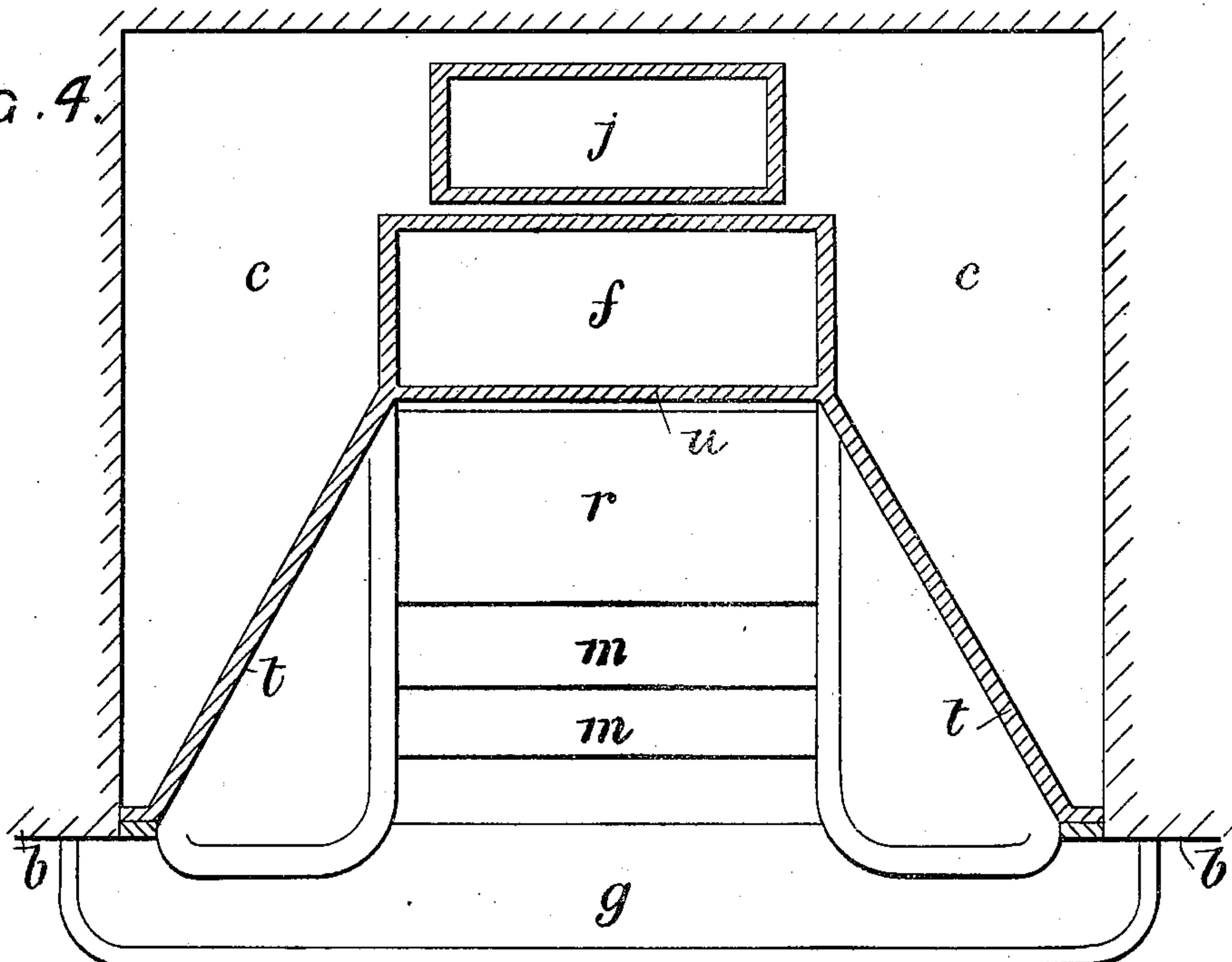


FIG. 4.



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HOWARD CRUNDEN CLEAVER, OF LONDON, ENGLAND.

OPEN FIREPLACE.

No. 810,719.

Specification of Letters Patent.

Patented Jan. 23, 1906.

Application filed November 5, 1904. Serial No. 231,467.

To all whom it may concern:

Be it known that I, HOWARD CRUNDEN CLEAVER, architect, a subject of the King of Great Britain, residing at 3 Eden street, London, N. W., England, have invented certain new and useful Improvements in Open Fireplaces, of which the following is a specification.

The object of my invention is to provide a fireplace wherein may be burned upon an open grate fuel (such as anthracite coal) which is not liable to cake in burning.

The fireplace of my invention consists, essentially, of a forwardly-inclined open grate or apertured screen over which the burning fuel descends by gravity, a combined hopper and chute for continuously and automatically supplying the fuel to the upper portion of the grate by gravity, a fence or kerb situated at the lower margin of the grate for limiting the descending movement of the fuel over the same, and a flue (or flues) controlled by a damper (or dampers) or other means leading from the space beneath the grate to the chimney.

The fireplace, which is adapted to be fitted to any ordinary domestic hearth and chimney-opening designed to receive an open grate or stove, would usually be provided with an ash-pit situated immediately beneath the grate and accessible by the removal of either the fire-grate or the kerb, or of both, and with a ventilation door or doors leading from the external open space over the grate into the flue or chimney for the purpose of regulating the draft without closing the damper and also of permitting the discharge of the products of combustion into the chimney while the fire is in process of extinction by the complete closure of the damper. The said door or doors serve, further, for ventilating the apartment directly into the chimney. It is to be observed that under normal conditions air from the apartment cannot reach the chimney save by passing through the incandescent fuel upon the grate.

The accompanying drawings, forming part of this specification, illustrate a preferred form of fireplace constructed according to my invention.

Figure 1 is a front perspective view of the fireplace, and Fig. 2 a central vertical section of the same. Figs. 3 and 4 are horizontal sections on lines 3 3 and 4 4, respectively, of Fig. 2.

a, Figs. 1 and 2, represents the level of the hearth, *b* the front of the chimney-breast, and *c* the chimney.

d is the fuel-hopper, which is situated in the upper part of the chimney-opening, access to the interior of the hopper for the purpose of charging the same being afforded by a door, as at *e*.

f is the chute which leads downward from the hopper *d*, so as to discharge fuel therefrom onto the upper portion of the inclined grate, and *g* is the fence or kerb, situated at the lower margin of the grate and resting, preferably, upon the hearth *a*.

h is the ash-pit, and *j* is the flue leading from the space immediately beneath and behind the grate rearward and upward into the chimney *c*.

k is a damper in the flue *j*, controlled by a handle *l*.

The chute *f* and flue *j* are preferably situated in such proximity to one another that the fuel descending through the chute will become warmed before reaching its point of delivery, and consequently the combustion of the fuel upon the grate will be accelerated.

The inclined grate consists, preferably, of a series of transversely-extending horizontal bars *m*, of flattened form in cross-section, arranged with their widest sides approximately horizontal and with their external or forwardly-presented edges disposed in a plane having a forward inclination, such that the fuel, which should be supplied in a coarsely-pulverized condition, (the fragments being, say, about the size of walnuts,) will on escaping from the mouth *n* of the chute *f* descend over the surface of the grate until arrested by the kerb *g*. The body of fuel thus spread upon the grate rests as a whole against the kerb *g*, each fragment of fuel supporting those immediately above it so that, as the fragments at a lower level become consumed, fresh fragments descend to replace them, while all the fuel consumed upon the grate is continuously and automatically replaced by fresh supplies escaping from the mouth *n* of the chute, the contents of which are supported by the uppermost layer or layers of fuel upon the inclined grate. The bars *m* are separated by interspaces *o*, the width of each bar relatively to the angle of inclination of the grate being, however, such that successive bars overlap one another, and consequently while the draft can pass freely

through the interspaces *o* to the flue *j*, carrying with it the lighter ash, the fuel passing downward over the grate cannot drop directly between the bars into the ash-pit *h*.

5 By the means described a self-feeding smokeless fire can be obtained on an open grate with fuel of the most refractory nature and may be maintained for an indefinite length of time by merely replenishing the
10 hopper with fuel at the necessary intervals.

The grate-bars *m* may be set in a frame adapted to be dropped into position in the fireplace, so as to be removable for the purpose of renewal and for affording access to
15 the ash-pit *h*, which may be provided with a removable pan or tray *p* to receive the ash and facilitate its withdrawal. The kerb *g* may be separately removable, so as to facilitate access to and the sweeping out of the ash-pit, or the kerb may be integral with the fire-grate, so as to be capable of being withdrawn as one therewith. The lower end of the
20 chute *f* may be supported by a transverse bearer *q*, of fire-brick, beneath or through which the lower portion of the flue *j* passes.
25

The series of grate-bars *m* instead of extending upward to the mouth *n* of the chute may be confined to the lower portion of the sloping surface over which the fuel passes on
30 leaving the chute, the upper portion of said surface being formed by a transverse bearer *r*, of fire-brick, which may be set into the same frame with the bars *m* so as to be removable along with the latter.

35 The flue *j* may be placed at the back of the chimney-space and immediately behind the chute *f*, which is preferably set back from the front *b* of the chimney-breast, so as to leave above the grate a coved space bounded later-
40 ally by the sides *t t* of the fireplace and at rear by the front plate *u* of the chute *f*, which extends from side to side of the fireplace. The bottom of the hopper *d* is of less width than the back plate *u* of the fireplace, the
45 top of the coved space beyond the sides of the hopper being closed by plates *v v*, (preferably horizontal,) wherein are provided ventilation-doors *w w*, which lead from the coved space direct into the chimney. By opening the
50 doors *w* more or less the draft passing through the fuel on the grate may be regulated without contracting the area of the flue *j* by means of the damper *k*. The doors *w* also serve as ventilators for the apartment and, further, as
55 means whereby when the fire is in process of extinction by the complete closure of the damper *k* the products of combustion then arising from the grate may be allowed to pass into the chimney *c*.

60 Although I have described above the preferred construction of grate, it is to be understood that I do not confine myself thereto, as the grate-bars might, for example, extend from top to bottom of the grate instead of
65 transversely thereof or might be replaced by

a plate of metal or slab of fire-brick set at the required inclination and apertured to give passage to the products of combustion.

It will be evident that more than one flue may be provided and that the flue or flues
70 may be led in other directions than the one indicated, so as, for example, to be made to serve for heating an oven or boiler.

The descent of the fuel in the chute may be regulated by means, for example, of a door
75 or damper, and in order to prevent the accumulation of gas or vapor within the chute and hopper the latter may be ventilated by an opening or openings communicating with the chimney.
80

It will be evident that the precise angle of inclination of the grate-surface may vary within certain limits. The inclination would, however, approximate to the angle of repose of the material, the condition essential to suc-
85 cess being that the angle shall be such that, on the one hand, the fuel will descend *pari passu* with its consumption on the grate and with the consequent removal of the support afforded to the upper fragments by those
90 whereon they rest and that, on the other hand, the fuel shall not be permitted to descend so rapidly as to overflow the kerb.

I claim--

1. The combination of a forwardly-in-
95 clined apertured fire-grate exposed as to its upper surface; walls bounding said grate laterally; a kerb or fence at the lower extremity of the grate for limiting the descent of fuel thereover; and a flue adapted to withdraw
100 the products of combustion from the space beneath the grate, substantially as specified.

2. The combination of a forwardly-in-
105 clined apertured fire-grate exposed as to its upper surface; walls bounding said grate laterally; a chute adapted to continuously deliver fuel by gravity to the upper extremity of the grate; a kerb or fence at the lower extremity of the grate for limiting the descent of fuel thereover; and a flue adapted to
110 withdraw the products of combustion from the space beneath the grate, substantially as specified.

3. The combination of a forwardly-in-
115 clined apertured fire-grate exposed as to its upper surface; walls bounding said grate laterally; a chute adapted to continuously deliver fuel by gravity to the upper extremity of the grate; a kerb or fence at the lower extremity of the grate for limiting the descent
120 of fuel thereover; a flue adapted to withdraw the products of combustion from the space beneath the grate; and a damper in said flue for regulating the draft, substantially as specified.
125

4. In an open fireplace, the combination of a forwardly-inclined apertured fire-grate exposed as to its upper surface and located at the lower part of the recess of a fireplace; a chute adapted to continuously deliver fuel by
130

gravity to the upper extremity of the grate; a kerb or fence at the lower extremity of the grate for limiting the descent of fuel thereover; a flue adapted to withdraw the products of combustion from the space beneath the grate; a damper in said flue for regulating the draft; and a ventilating-door in the top wall of the recess of the fireplace, adapted to afford access therefrom to the flue, substantially as specified.

5. An open fireplace adapted to be located in an opening of a chimney comprising a body having a recessed front, the top wall of which is provided with openings having closures therefor, a fuel-supply chute at the rear of its recessed front, a downwardly and outwardly inclined grate in the lower part of the recess of the fireplace and onto the upper rear portion of which the chute discharges, a kerb for limiting the descent of the fuel over the grate, and a flue leading from beneath and behind the grate to a chimney, substantially as described.

6. An open fireplace adapted to be located in an opening of a chimney, comprising a body having a recessed front, the top wall of which is provided with openings, closures for said openings, a hopper in the upper part of the body, a chute leading from the hop-

per and extending downward at the rear of the back of the said recessed front, a downwardly and outwardly inclined grate in the lower part of the recessed front of the fireplace and upon which the chute discharges, a kerb for limiting the descent of the fuel over the grate, and a flue leading from beneath and behind the grate and extending upwardly in rear of the chute, substantially as described.

7. An open fireplace, adapted to be inserted in an opening in a chimney, comprising a body having a recessed front, the top wall of said recess being provided with openings, doors for said openings, a hopper in the upper part of the body, the bottom of the hopper being of less width than the top of the recess of the body, a chute extending from the hopper downward in rear of the back wall of the recess of the body, a grate formed of transverse bars spaced apart and arranged in step form and upon which the chute discharges, and a flue leading from beneath the grate and extending upwardly in rear of the chute.

HOWARD CRUNDEN CLEAVER.

Witnesses:

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