2 Sheets—Sheet 1.

J. ADAIR.

FIRE-PLACE.

No. 192,046. Patented June 19, 1877.

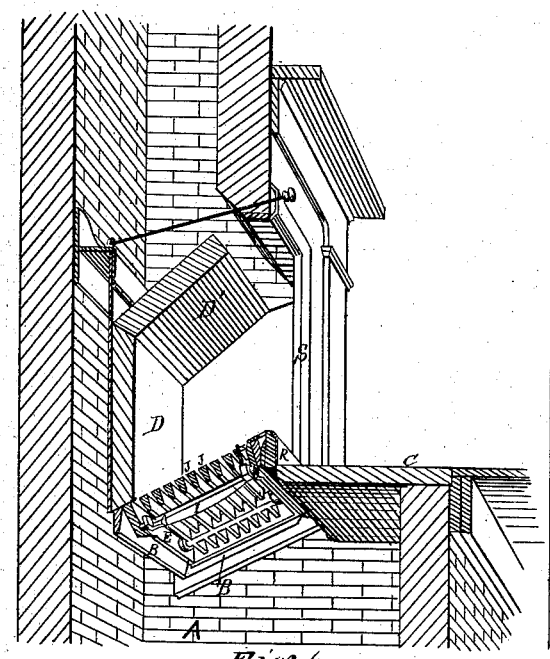

Fig. 1.

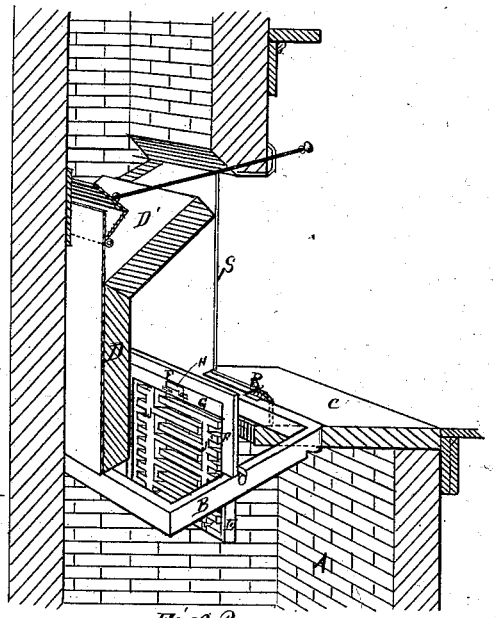

Fig. 2.

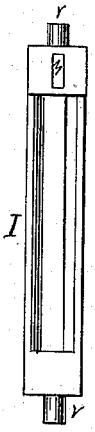

Fig. 6.

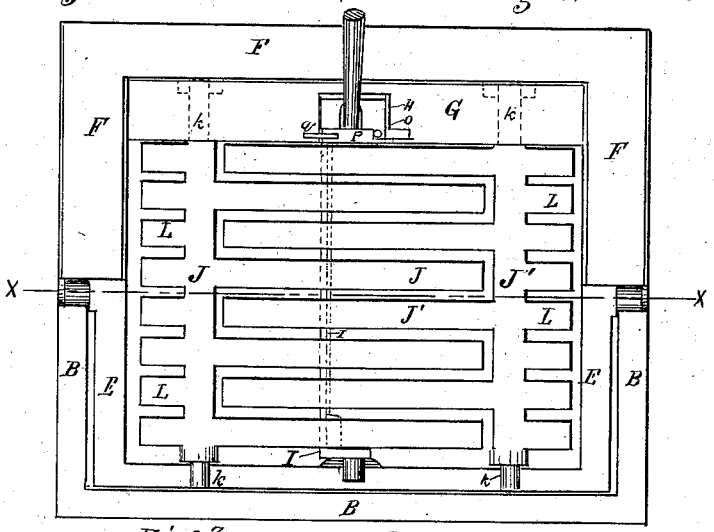

Fig. 3.

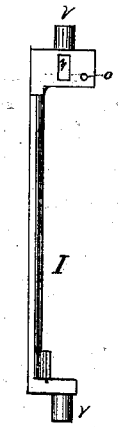

Fig. 5.

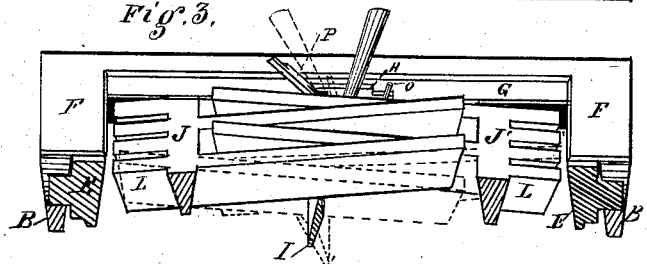

Fig. 4.

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2 Sheets—Sheet 2.

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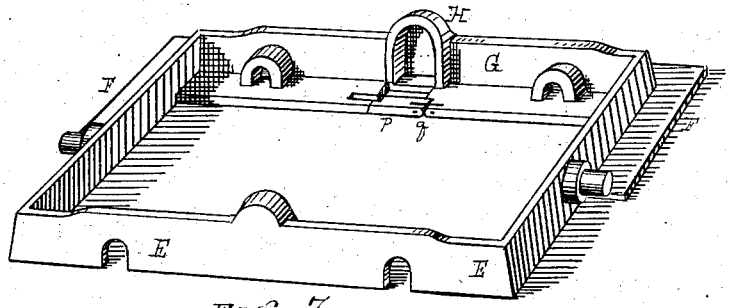

Fig. 7.

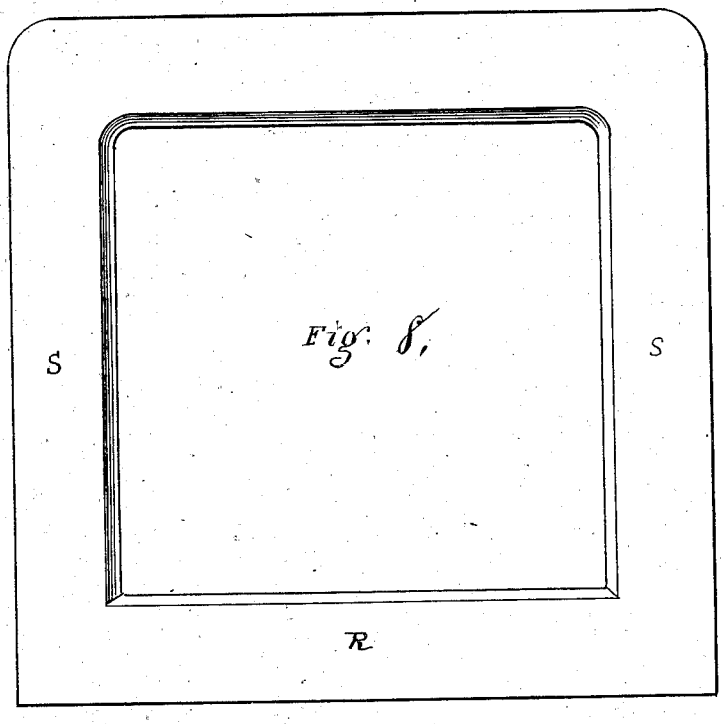

Fig. 8.

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UNITED STATES PATENT OFFICE.

JAMES ADAIR, OF ALEPPO TOWNSHIP, ALLEGHENY COUNTY, PA.

IMPROVEMENT IN FIRE-PLACES.

Specification forming part of Letters Patent No. **192,046**, dated June 19, 1877; application filed March 15, 1877.

To all whom it may concern:

Be it known that I, JAMES ADAIR, of Aleppo township, (Pittsburg P. O.,) in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Fire-Places, which improvement is fully set forth in the following specification and accompanying drawing, in which—

Figures 1 and 2 are vertical sections, in perspective, looking upward from the front and downward from the rear, respectively, showing a fire place provided with my improvements. Fig. 3 is a plan view of frames and grates. Fig. 4 is a section of same through the section-line *x x*, and Figs. 5 and 6 are plan views of the rocking-bar. Figs. 7 and 8 are enlarged views of detached parts, hereinafter described.

The object of my invention is to improve a fire-place having an ash-pit and a dust-flue damper, as described in patents granted to me July 6, 1875, and July 4, 1876, so that a low-down grate can be agitated and dumped by simple means, and so that the smoke, flame, and ashes shall, by the incoming air, be deflected or projected toward the rear of the fire-chamber, thereby protecting the room from smoke, highly heating the fire-tile, burning off unsightly soot, and increasing the radiation of heat.

Above an ordinary ash-pit, A, Figs. 1 and 2, freely supplied with air, a stationary metal frame, B, Figs. 1, 2, 3, and 4, rests in an inclined position, with its upper end tight upon the hearth-stone C, Figs. 1 and 2, which enters suitable notches in the sides or stringers of the frame, and with its lower end properly supported within the chimney to enable it to sustain the rear and roof tiles D D′, Figs. 1 and 2, and other weight which will rest upon it.

The top edge of the lower end may be flanged to afford a better bearing for the rear tile D, while the top edge of the upper end is slightly cut away at one point to admit the point of a poker.

On the top edges of the stringers or sides of the frame B, Figs. 2 and 3, but to the rear of the center of gravity, notches or bearings are made, in which turn trunnions carrying the flanged grate-frame E, Figs. 2, 3, and 4, which, at rest, Fig. 1, has the same inclination as the surrounding frame B, and which, at its upper end, within the flange F, Fig. 3, has a fore-plate, G, provided with a slot or poker-hole, H. This fore-plate G may be cast with the frame, or may be separate therefrom and hinged to the upper end thereof, whereby it would serve in lieu of the pawl hereinafter described, and would also serve as an escape-valve for any air it might be desired to pass under the grate, but not through the fuel.

In the upper and lower ends of this grate-frame E, Fig. 3, are notches or bearings, which carry a central rocking-bar, I, Fig. 5, and two right and left comb-shaped grates, J J′, Figs. 3 and 4, hung off their centers of gravity, the journals or gudgeons *k k*, Fig. 3, of which being but prolongations of the "backs" of the "combs." The teeth of one comb-grate lie between the teeth of the other, leaving an air-space throughout, and the teeth of both lie in, or nearly in, the same inclined plane, and directly upon the rocking-bar I, Figs. 1, 3, 4, which alone prevents the grates turning downward on their gudgeons *k k*, Fig. 3. A row of short teeth, or "stumps" rather, L, Fig. 3, extends along the back of the comb-grate on the side opposite the long teeth, although they may be dispensed with if desired, and the grate made like Fig. 3 in my patent of July 4, 1876. The rocking-bar I, Fig. 5, at its upper end, has a shoulder provided with a slot, M, to register at right angles with a central poker-hole, H, Figs. 3 and 4, in the fore-plate G of the grate-frame E, and is also provided with a pin or lug, O, to bear against a pawl, P, Figs. 3 and 4, working on a hinge, *q*, Fig. 3, at one side of the poker hole, so as to hold up the rocking-bar I, Figs. 3 and 5, and thereby keep the superimposed grates in the same plane.

In Fig. 6 is shown a double rocking-bar, which, when the fuel is free from slate, may be employed in place of the single rocking-bar, which is but the former with one side removed. The double rocking-bar, Fig. 6, communicates a more rapid jarring motion to the grates; but if slate or clinkers be present the grates are more apt to bind than if the single rocking-bar and the drop-motion be used.

For the purpose of hiding the heated and unsightly upper end of frame B, Fig. 2, and to prevent ashes blowing out between said

frame and the hearth-stone C, a bar, R, Fig. 1, connecting the ends or feet of the vertical mantel-frame S, Figs. 1 and 2, and which may be cast therewith, is placed in close contact with the hearth-stone, but so as to leave a space between itself and the upper end of the frame B, which space is packed with mortar, and becomes, to a certain degree, non-conducting.

This fire-place, being furnished with the damper and rod described in my patents before named, operates as follows: The damper being closed, and the pawl P, Fig. 3, bearing against the pin O, holding the rocking-bar I and grates J J′ at their proper level, the air enters between the teeth of the grates, and as the sides or faces of these teeth or bars are backwardly inclined, the air-jets carrying smoke and flame from the burning fuel are projected backward away from the room and against the rear and roof tiles, which are thereby raised to a higher heat than if the flame went straight up, as usual, while, for the same reason, the roof-tile need not be inclined so far forward as to endanger making a smoky chimney, and the grate can also be more of a "low-down" than is customary.

By releasing the pawl P, Fig. 4, the rocking-bar and superimposed grates, turning on their gudgeons, drop downward, as shown by the dotted lines in Fig. 4, when, by inserting a common poker through the poker-hole of the fore-plate of the grate-frame into the registering-slot of the rocking-bar, the latter can be rocked, and the grates resting thereon thereby agitated, the teeth of one grate passing those of the other with a sheering motion, which, from the original level, may be to a level below and return, or to a level above, as in Fig. 4, and return, or may be a combination of both movements; but I deem the drop-motion first named (shown by the dotted lines in Fig. 4) the safest and best. The raking being completed, the rocking-bar is turned to, and secured in, its original position.

By placing the poker under the flange of the grate-frame at the cut-away place on the stationary frame, the former, turning on its trunnions, Fig. 2, carrying grates and rocking-bar, can be dumped, which operation, as well as raking, can also be performed by upwardly-turning, as far as may be necessary, the grates on their gudgeons, using the poker, the grate-frame and rocking-bar remaining stationary.

Various modifications of this grate may be made within the scope of my invention. For instance, the comb-grate may have independent teeth, each turning on a common rod or journal, and short supplemental teeth, or stumps, rather, may be attached to the inner side of the grate-frame, with similar stumps on the comb-grate to pass between them, while a strengthening-bar near their points may be made to connect the under edges of the teeth, where fixed or loose yokes may be added, by bifurcating the teeth or otherwise, through which the rocking-bar can pass, and a positive down-and-up motion be thereby imparted to the grate.

In lieu of the rocking-bar a central stationary bar, lug, or stop, supporting the comb-grates, may be attached to the stationary frame; tilting the grate-frame would then agitate the grate. And, further, the sides or faces of the grate bars or teeth may be oblique to the plane of the grate, like the slats of a window-blind, instead of at right angles thereto. Finally, I would add that a rear-sloping perforated plate, lying upon the rocking-bar in place of the comb-grates, could be agitated, and would rearwardly project the incoming air.

I am aware that parallel bars crossing a central shaft and having a shearing or rocking motion have been employed in various ways for agitating grates, and that grate-bars have been arranged in the direction of their length, however oblique to the natural line of draft, but incapable of deflecting the incoming air.

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

1. A series of bars or equivalent grating of a fire-grate, extending transversely across from side to side of a fire-chamber, with their side faces oblique to the natural line of draft and sloping from front to rear, whereby the ascending flame, smoke, and ashes are, by the incoming air, deflected or projected obliquely from a vertical direction, substantially as described.

2. In combination with a fire-grate, a rocking-bar, single or double, having the journals *v v*, and having at one end a poker-slot, substantially as described.

3. In combination with a fire-grate, a rocking-bar, single or double, having the journals *v v*, and having at one end a poker-slot and stop-pin, substantially as described.

4. An inclined stationary frame, B, having a beveled front, and with its stringers notched or cut away to gain a bearing on the hearth-stone, substantially as described.

5. A flanged grate-frame hung on trunnions, having seats or bearings front and rear, for the gudgeons or journals of the comb-grates and rocking-bar, and with a fore-plate provided with a poker-hole, and a hinged pawl thereat, substantially as described.

6. A mantel-frame having its lower ends or feet connected by a cross-bar made in one piece therewith, in combination with a low-down grate, substantially as described.

7. The stationary frame B and the ornamenting and protecting cross-bar R at its front end, and a non-conducting packing-space between them, combined substantially as described.

8. The combination of the stationary frame, downwardly inclined from front to rear, and the grate-frame tilting thereon, the center of rotation extending from side to side of the fire-chamber, substantially as described.

9. The combination of a grate-frame, a rocking-bar, and a grate resting on the bar and

hinged at one side of the center line of the frame, within which it vibrates, substantially as described.

10. The combination of a rocking-bar and a grate resting thereon and pivoted off the center, substantially as described.

11. The combination of a rocking-bar, the comb-grates resting thereon, the grate-frame, and inclined stationary frame, substantially as described.

12. The rocking-bar I, carried wholly by the tilting grate-frame E, and accessible only through or over the grate frame, for the purpose of agitating the grate-bars, the combination being substantially as set forth.

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Witnesses:
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A. H. HOWE.