

United States Patent Office.

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Letters Patent No. 68,653, dated September 10, 1867.

FIRE-PLACE.

The Schedule referred to in these Letters Patent and making part of the same.

TO WHOM IT MAY CONCERN:

Be known that I, EDWARD Y. ROBBINS, of Cincinnati, in the county of Hamilton, and State of Ohio, have invented a new and useful Improvement in Fire-Places and Grates therefor; and I hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification.

In the following specification I use the word grate to indicate what is commonly called the "fire-basket," that is, the combination of bars which hold the fuel.

The nature of my improvement consists mainly in giving to the grate such shape that while the fuel is spread out into a very large and high vertical or front surface, with but little depth from the grate-bars backward to the brick fire-back, yet by giving a peculiar shape to the front of the grate, a mutual cross radiation is secured from one part of the front surface to another, by which the main front of the fuel is kept highly incandescent, and made to radiate much heat into the room; also, in so arranging the whole as to facilitate the cleaning of the grate, and to prevent ashes from flying into the room; also in utilizing the warmth of the brick fire-back behind in a healthful way.

Figure 1 is a section from front to back of a fire-place embodying my invention.

Figure 2 is a horizontal section at the line $x x$.

Figure 3 is a perspective view of one-half of my tipping canopy.

Figures 4 and 5 are a perspective view and a vertical section of a modification of my fire-place.

Figure 6, A, B, and C, represent further modifications thereof.

In general I make the main front of the grate D nearly in the shape of the inner surface of the section of a cylinder, the cylinder being either circular or elliptical, or otherwise eccentric, and the position of the cylinder being nearly or quite perpendicular to the horizon. In certain cases, as in warming churches and certain other rooms, it may be best to elevate the grate a considerable distance above the floor. In these cases, that the radiation may be more directly downward upon the floor, the grate should not only be curved into a concave shape in its horizontal sections, but also in its vertical sections, (see figs. 4 and 5,) that is, its front surface should be somewhat in the shape of the inner surface of the section of a sphere or of a spheroid; or several of the lower bars may be placed one above the other, and those still higher gradually brought forward, so that the front line of a vertical section of the grate shall run nearly perpendicular for some inches upward from the bottom, and then curve forward more and more to the top, so that from that part of the grate nearest to the floor the rays of heat will be thrown out nearly horizontally, while those from the upper parts will be thrown more and more downward upon the floor, as the relative altitude of each part requires, or the front of the grate may be made nearly in the form of the inner surface of a cone or of a wedge, (see B, fig. 6,) or of the inner surface of three or more sides of a cube, (see C, fig. 6.) The shape of the grate may be varied more or less from the mathematical exactness of the several shapes or figures above mentioned.

In warming very large rooms the grate may consist of a series of concavities or recesses of any of the above shapes placed side by side; or any similar shape may be used which shall produce the desired effect by substantially the same means, the object being so to arrange the different parts of the grate with regard to each other that the different parts of the main front of the fuel shall be placed so in opposition or inclination to each other that the cross radiation from one part of the front fire surface to another, as from x to y and from y to x , shall keep the front surface of the fuel brightly incandescent.

Another important purpose and effect of this shape of grate is that it forms a channel of draught for smoke and ashes entirely within the fire-place, and running entirely up the front of the grate from bottom to top, so that the smoke, and the dust which rise from falling ashes, and which must rise in front of the grate-bars whatever the shape of these bars and of the front of the grate may be, are not projected into the room, but having a channel and passage within and back of the plane of the jambs and arch of the mantel, rise up under and into the flue. Moreover the shape of this channel being concave or cylindrical, with the burning fuel on three sides of it, or rather forming three sides of it, is such, and the heat is such, as to create a strong draught which draws up the dust and smoke. A further advantage is that female dress is not so likely to be brought against or upon the fire, causing painful or fatal accidents, as with other grates. The brick fire-back O is so shaped

and arranged in reference to and in combination with the grate, that the depth of coal measured from the grate-bars backward perpendicular to the brick fire-back, shall be very small, say four, (4,) five, (5,) or six (6) inches, more or less. The grate is also made unusually high, and the coal is thus thrown or spread into a very large vertical or front surface, with little depth backward, so little that with the ordinary shape and altitude of grates the fuel would scarcely burn; yet by this peculiar shape, giving mutual radiations from one part of the front of the fuel to another, the front of the fire is kept bright. Thus, a given amount of fuel has a larger as well as a brighter front or radiating surface than the same quantity of fuel would have in other grates. This great height and shallow horizontal depth may be given whatever shape the front of the grate may have. Over the back part of the fire, and extending forward to within a few inches of the arch of mantel I place a canopy, E, either straight or concave below. On the front edge of this canopy may be placed a flange or rim, F, extending downward, so that the smoke and hot gases must not only come forward, but also descend somewhat under the dipping rim or flange before they finally ascend the chimney. The canopy, when made either straight or concave below, either with or without the dipping rim or flange, may be made to turn upon two pivots, G, at the ends, or other similar device, or a section of it may be made so to turn that when the fire is first kindled, or when the ashes are being cleaned out, the whole canopy, or the movable section or panel of it, may be tipped up behind, thus opening a more direct draught up the chimney. Behind the brick fire-back there may be a warm-air space, H, built if desired, and a passage of communication may be made between this air-space and the room by loosening the ordinary iron frame I, which immediately surrounds the free space, and setting it out a few inches from the general face of the mantel, filling up the space so left by open iron fret-work or other open device, J. The bottom K of the grate is cast separate from the front, and is fastened behind with a hook or hinge, L, and held up at the front ends to the front part of the grate by means of hooks or buttons M turning on rivets, or by pins; and when the grate is to be cleaned out these supports are turned or withdrawn and the front ends of the bottom of the grate allowed to drop, or the supports may be fixed, and the grate-bottom itself movable, so as to be released from these supports and to drop by being pushed back or shifted sidewise. The front bars N are bevelled, mainly on the upper side, so as to make the upper surfaces slope rapidly downward and forward to prevent the ashes from accumulating or lying upon them, and to permit a more unrestricted radiation outward and downward on to the floor of the room. The fender, and the frame which immediately surrounds the fire-space, and the entire front of the mantel, may, if desired, be made curved, so as to correspond in general shape to the shape of the grate itself.

I claim herein as new, and of my invention---

1. I claim making the general front of the grate concave throughout its height, so as to form a highly heated channel of draught for smoke and the dust of ashes, entirely within the fire-place and up through the entire height of the grate, and also to secure cross radiation for the purpose of keeping the front of the fire bright, substantially as set forth.

2. I claim a grate, composed of or containing a series of two or more such concavities or recesses.

3. I claim, in certain cases, constructing the grate concave in the front lines of its vertical as well of its horizontal sections, for the purpose of securing a greater amount of cross radiation, *i. e.*, up and down as well as from side to side, thus increasing the brilliancy and incandescence of the front of the fire, and causing it to radiate more heat into the room, substantially as above set forth.

4. In combination with a grate with its main front shaped into such a recess or recesses, I claim making the fire-back parallel or nearly parallel with the general front of the grate, substantially as above set forth.

5. In combination with a grate of the above shape, and set as above described, with shallow coal-space from the front bars backward to the brick fire-back, I claim the use of a canopy, either horizontal or arched, over the back part of the fire and coming forward to within a few inches of the arch of the fire-place or mantel.

In testimony of which invention I hereunto set my hand.

E. Y. ROBBINS.

Witnesses:

GEO. H. KNIGHT,
JAMES H. LAYMAN.