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C. C. LONGARD.
CENTRIPETAL FIRE GRATE.

(Application filed Apr. 9, 1898.)

(No Model.)

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CENTRIPETAL FIRE-GRATE.

SPECIFICATION forming part of Letters Patent No. 629,797, dated August 1, 1899.

Application filed April 9, 1898. Serial No. 677,108. (No model.)

To all whom it may concern:

Be it known that I, CLARENCE C. LONGARD, of Halifax, in the Province of Nova Scotia and Dominion of Canada, have invented a new and Improved Fire-Grate, (for which I have obtained a patent in the Dominion of Canada, No. 58,411, bearing date December 16, 1897,) of which the following is a full, clear, and exact description.

My invention relates to fire-grates for use in connection with heaters for hot-water and steam heating systems or with stoves and furnaces; and its object is to provide a new and improved mode by which the grate can be easily and effectively cleaned from ashes and clinkers without permitting of the escape of dust or of the loss of fuel.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a vertical section through the grate. Fig. 2 is a plan view of the same. Fig. 3 is a sectional view on the line xx of Fig. 1. Fig. 4 is a detail view of the center piece, partly in section.

A wall or other suitable inclosure A surrounds my invention. On the inner side of this wall or inclosure a fixed grate B is supported by suitable brackets attached to the inner surface of the wall. This grate is constructed with an opening C in the center, from which radiate a number of slots C'. The sides of each slot are parallel one with the other. These slots terminate at a solid periphery D and have between them a corresponding number of triangular grate-bars D', attached at their base to the solid periphery D and with their apexes at the circumference of the circular opening C in the center. The object and importance of having the sides of the slots parallel is to prevent ashes or clinkers from jamming in the slots when pushed toward the opening in the center by the operation of the revoluble grate, to be hereinafter described. The same object could be attained even more effectually by increasing the width of the slots as they approach the opening in the center, but to do so would increase the amount of dead iron in the grate, and I do not consider it necessary.

Above the fixed grate, but disconnected

from it, is placed a circular grate E, supported by and revolving on rollers F, journaled in suitable brackets F', which may be attached either to the inner surface of the inclosing wall A or to the fixed lower grate B. To prevent this grate lifting or rising when rotated, I provide a number of friction-rollers G, journaled in suitable housings G', attached to the walls of the inclosure. These friction-rollers are beveled to engage the beveled edge of the revolving grate and are given a slight incline upward and outward, as indicated. The periphery of the grate H is a solid flat ring of suitable width. In this revolving grate is placed an opening I, the boundary of which starts from a point a , immediately above the circumference of the opening in the fixed lower grate, and thence describes a curve with a constantly-increasing radius till it meets the inner circumference of the solid annular periphery H at a point b on the same radius with that from which it started, thence by the line of the radius to the point of starting, the boundary of the opening thus forming a "cam" with an inward thrust, beginning at the inner circumference of the periphery and disengaging at a point above the circumference of the opening C in the lower fixed grate. The shape of the opening could be varied; but the essential point to be retained in all shapes is the cam action of the boundary of the opening traversing the upper surface of the lower fixed grate in a curve gradually approaching the opening in the center of the lower grate. The portion of the upper grate not comprised in the peripheral ring H and in the opening just described is made up of segmental bars J, with corresponding openings J' between. The burning fuel rests upon these bars, inclosed by the wall of the fire-pot. When it is wished to clean the fire, the upper grate is rotated by the means hereinafter described. In a grate constructed as shown in the accompanying drawings the rotation should be from right to left in order to bring into operation the cam action of the boundary of the contained opening. Upon such rotation taking place such clinkers and ashes as do not pass through the segmental opening J' in the revolving grate will fall through the opening I in the same upon the bars of the lower grate,

over which they would be pushed by the revolution of the cam in a direction gradually approaching the opening C in the center. The finer ashes will pass through the openings C' between the bars of the lower grate, and such ashes and clinkers as may be too large to pass through these will be swept by the action of the cam toward the opening C in the center, through which they will ultimately pass into the ash-pit. I could obtain somewhat similar results by making the grate itself in the shape of a cam in place of the opening in the grate. In that case its operation would be in a direction the reverse of that just described—that is, the cam operating with an outward thrust would sweep toward the circumference in place of toward the center. I have found, however, by experiment that its operation in this manner is not so satisfactory as in the mode which I have adopted, as it has a much greater tendency to break up the mass of burning fuel, thus causing it to be wasted, and I therefore prefer the mode which I have adopted.

On the under side of the revolving grate E is formed a gear-wheel in mesh with a pinion K, secured on the inner side of a shaft K', journaled in a suitable bracket K², attached to the inclosing wall, the outer end of the said shaft carrying a crank-arm adapted to be taken hold of by the operator to turn the said shaft to rotate the grate E over the fixed grate. I make no claim in respect of the mode of rotating the grate, and any other suitable appliance to secure rotation could be adapted to my invention.

The opening C in the center of the fixed grate B is normally closed by a center piece L. This center piece consists of a standard c, weighted at its lower end d and having attached to its upper end a suitable head or block L', with movable fingers e e e, adapted to swing upwardly, but normally standing horizontal, as shown in Fig. 1. These fingers are pivoted upon a ring surrounding the head or block. I construct this head or block and attach to it this ring in the following manner: I use an upper and lower plate with a groove at the junction into which the ring fits, the plates slotted at their edges to receive the pivots of the fingers. I attach the fingers to the ring by slipping it through holes cast in the fingers for that purpose and then place it in the groove on the upper side of the lower plate. On this I place the upper plate, which is kept in position and the head or block also secured in place by a bolt passing through both plates and made fast to the top of the standard. The standard is slotted and pivoted to a lever M by a bolt across the slot. The lever passes under the fixed grate B and through a slot in the inclosing wall, to which it is attached by a universal joint M', and by

its means the center piece can be raised, lowered, and moved to either right or left. The weight at the bottom of the standard maintains it always in a vertical position, with the block or head consequently always horizontal.

The object of the center piece is to take the weight of the fuel and prevent its escape through the openings in the grate when the fire is being cleaned by rotating the upper grate. The normal position of the center piece is with the upper surface of its head flush with the under surface of the lower or fixed grate, as shown in Fig. 1, preventing the escape of fuel through the openings in the center of the grates. When it is wished to clean the fire, the center piece is raised, by means of the lever, to such a height that the under surface of the head is flush with the upper surface of the upper revolving grate, as shown by the dotted line, Fig. 1, thus sustaining the weight of the fuel in the fire-box and permitting of the free rotation of the revolving grate for the purpose of cleaning the fire in the manner already described, the ashes and clinkers passing under the head of the center piece and through the opening in the center of the lower fixed grate. In case of any clinker or other obstruction being too large to pass under the head the center piece can be lowered and moved to one side by the universal joint in the lever, thus leaving the opening entirely free. In case of any obstruction coming below the head of the center piece the pivoted fingers will swing upward, permitting the center piece to pass down freely. I provide two doors through the inclosing wall—one upper one N (for which a sheet of mica or other transparent substance can be substituted) for the purpose of inspecting the fire to ascertain when it is properly cleaned and a lower one N' for the removal of ashes from the ash-pit.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. In fire-grates the combination of a fixed lower grate having a central opening and radiating passages with parallel sides and a movable center piece on top of which is an upper revolving grate containing a cam-shaped opening constructed and operated and for the purposes substantially as described.

2. In fire-grates having a fixed lower grate with a central opening and a revolving upper grate a center piece with pivoted fingers attached to the head adapted to close the central opening constructed and for the purpose substantially as shown and described.

CLARENCE C. LONGARD.

Witnesses:

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