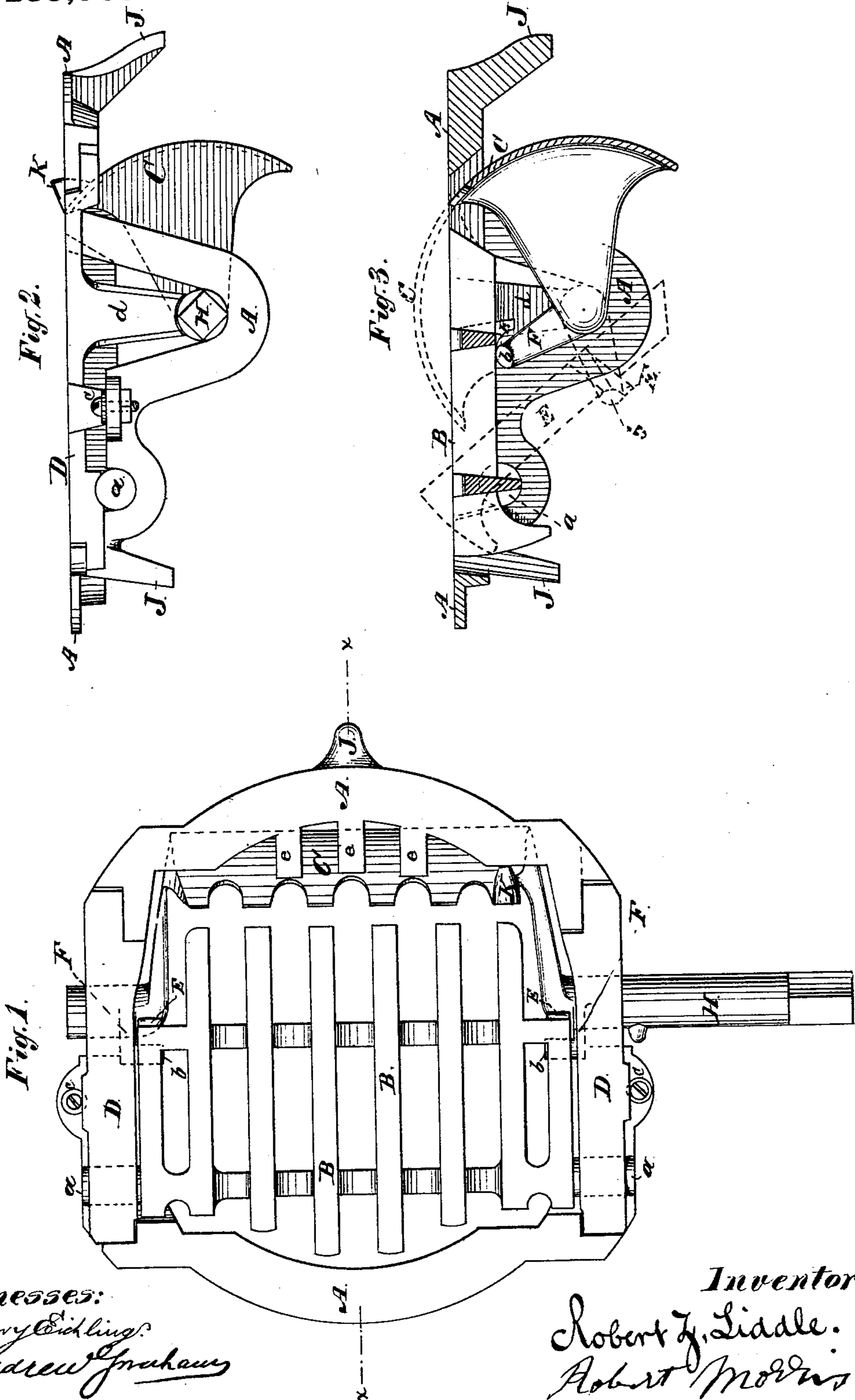


(No Model.)

R. Z. LIDDLE & R. MORRIS.
Stove Grate.

No. 233,939.

Patented Nov. 2, 1880.



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UNITED STATES PATENT OFFICE.

ROBERT Z. LIDDLE AND ROBERT MORRIS, OF ALBANY, NEW YORK, ASSIGN-
ORS TO JOHN S. PERRY, OF SAME PLACE.

STOVE-GRATE.

SPECIFICATION forming part of Letters Patent No. 233,939, dated November 2, 1880.

Application filed September 21, 1880. (No model.)

To all whom it may concern :

Be it known that we, ROBERT Z. LIDDLE and ROBERT MORRIS, of Albany, in the county of Albany and State of New York, have in-
5 vented a new and useful Improvement in Stove-Grates, of which the following is a specification.

This invention relates to the class of stove-grates known as "duplex" grates, or grates
10 provided with a cut-off, which is interposed between the main grate and the fuel in the fire-chamber while the main grate is being dumped; and the present improvement consists in the construction of the frame in which
15 the grate and cut-off are hung or mounted, and the combination with such frame of removable straps; also, in the combinations of devices by which the grate and cut-off are operated, as hereinafter described and claimed.

20 The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of the stove-grate containing the improvements. Fig. 2 is an end
25 elevation of the same; and Fig. 3 is a section through the line *xx* of Fig. 1, showing the parts beyond in elevation.

In the drawings, A represents the main part of the frame, in which the grate and cut-off are mounted, to which are attached supporting-
30 legs J. This frame may be of any desired contour to occupy the lower end of the fire-chamber of a stove or other heating structure. In the ends of this frame are depressions, which constitute the bearings for the journals of the grate and the cut-off, and these are preferably
35 formed by giving the frame the proper curves in casting, the depressions which are to receive the journal of the cut-off being sufficiently below the horizontal surface of the grate-bars to give the lever-arm F the desired purchase
40 to easily lift the grate.

D are end straps, provided with downward projections *d*, which, in connection with the depressions in the frame A, complete the bear-
45 ings for the journals of the cut-off. The ends of these straps are intershouldered with the frame A, as shown in Fig. 2, and are held in place and made easily removable by means of nut-screws *c*, as shown in Figs. 1 and 2, the
50 heads of the screws forcing the straps tightly against their bearings on the frame A.

The removable arrangement of the straps D

permits the grate or the cut-off, when they become burned out or broken, to be easily replaced without removing the frame from its position. 55

B is the main grate, and is provided with journals *a a*, which rest in the bearings formed by depressions and projections in the frame A and straps D, as before described. The outer bars of this grate are shorter than the others, 60 and are provided with a downwardly-projecting lug or hook, E, upon their ends, which, in connection with a similar laterally-projecting lug, *b*, on the ends of the lever-arms F, prevents the grate B from dropping too low or away from 65 the control of the lever F.

C is the cut-off or supplemental grate, and occupies the position shown in Figs. 1 and 2 when the main grate is horizontal. It is jour-
70 naled in the frame A, as before described, and one of the journals is extended outwardly to form the shank H, whose end is properly squared to receive a wrench.

F F are lever-arms attached to the journals of the cut-off, and forming an angle with the
75 same. On the ends of these lever-arms are lugs *b*, which act against the under side of the outer grate-bars, and when the grate B is dumped are brought in contact with the pro-
80 jections E.

K is a projection rising from the edge of the cut-off C, which, by striking against the frame A, limits the movement of the cut-off in that direction and brings the edge about flush with the grate-bars B. A forward and downward
85 projection on the frame A would accomplish the same result.

The edge of the cut-off is provided with a series of teeth, whose edges are thin, so that it will work its way readily through the cinders 90 or clinkers and separate them from the superimposed mass of fuel, and, if necessary, will cut or slice them.

The surface of the cut-off or grate C, with the exceptions of the edge depressions, which 95 form the teeth, is solid—that is, it is not arranged with alternate bars and open spaces, as is the grate B, so that when turned into the position shown by dotted lines in Fig. 3 it will not permit the superimposed fuel to pass 100 through it; but when in this position there will be left sufficient openings around its margin and between the bars of the dumped grate B and between the short bars *e e e*, attached

to the frame A, for the passage of air to the fuel. This feature makes this grate very convenient and desirable for stoves and ranges in which it is desired to use wood and coal interchangeably—*e. g.* coal in winter and wood in summer—coal requiring an open grate and wood a close grate for their most successful combustion.

For the use of the grate for burning wood, the cut-off C and the main grate B are brought into the position shown by dotted lines in Fig. 3, and are retained in that position.

The operation of the above-described mechanism, when used to slice the fire at the bottom of the fuel-chamber in order to remove cinders, clinkers, &c., is briefly as follows: The cut-off, being in position, as shown by the full lines in Fig. 3, is brought into the position shown by the dotted lines in same figure by partially turning the shank H. As this shank is turned the end of the lever-arm F, which supports the grate B, passes to a lower plane, and the grate B descends by its own weight and that of the fuel until it reaches the position shown by the dotted lines in Fig. 3, when its further descent is arrested by the contact of the lug E on the end bars of the grate with the lug *b* on the end of the lever-arm F. This permits the accumulated ashes and cinders to fall down the inclined grate, while the cut-off, by its continuous advance over the grate as it descends, will prevent the fire and superimposed fuel from falling. When the movement of the shank H is reversed the cut-off will be returned to its first position and the grate B will be lifted by the lug *b* on the lever-arm F acting upon the under side of the grate-bars.

The advantages of this grate are that it is very simple in its construction and cheaply made, requiring no special attachment to the stove, but can be set upon inwardly-projecting ledges or supports located so as to bring the grate into proper relation with the bottom of the fire-chamber. The means employed for changing the position of the grate and cut-off are simple and not liable to be broken or get

out of place or repair, and in this respect differ materially from the use of cog-wheels and other complicated and expensive devices which have heretofore been used. The easily-removable end straps, D, permit the grate or the cut-off to be readily replaced without the trouble of removing the frame from its place, and the solid surface of the cut-off perfectly adapts the grate to be used interchangeably and without alteration for burning wood or coal.

What is claimed as new is—

1. A cut-off or supplemental grate provided with a substantially solid or continuous surface, in combination with an open dumping-grate, so that when the cut-off is in position over the dumped grate there will be an air-space around its margin and between the bars of the dumped grate, whereby the compound grate is adapted to burn either coal or wood interchangeably, substantially as set forth.

2. In a duplex cut-off grate, a main frame in which are depressions for the journals of the main grate and the cut-off, in combination with removable straps secured to the main frame, substantially as and for the purpose set forth.

3. In a duplex cut-off grate, a lever-arm attached to the cut-off, in combination with the dumping-grate, substantially as and for the purpose set forth.

4. In a duplex cut-off grate, a lug, *b*, on the end of the lever-arm F, in combination with a lug, E, on the end of the grate-bars B, substantially as and for the purpose set forth.

5. In a duplex cut-off grate, the combination of the main grate B, the cut-off C, and the short bars *e e e*, attached to the frame A, substantially as and for the purpose set forth.

6. In a duplex cut-off grate, a stop, K, attached to the edge of the cut-off, in combination with the frame A, substantially as and for the purpose set forth.

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