(No Model.) 2 Sheets—Sheet 1.

E. CARD.

FIRE GRATE.

No. 306,218. Patented Oct. 7, 1884.

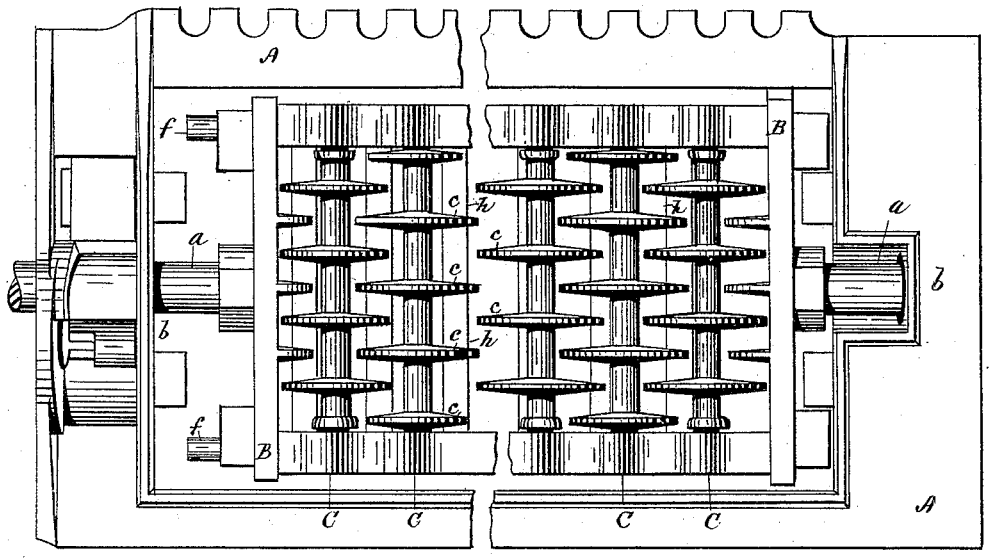

Fig. 1.

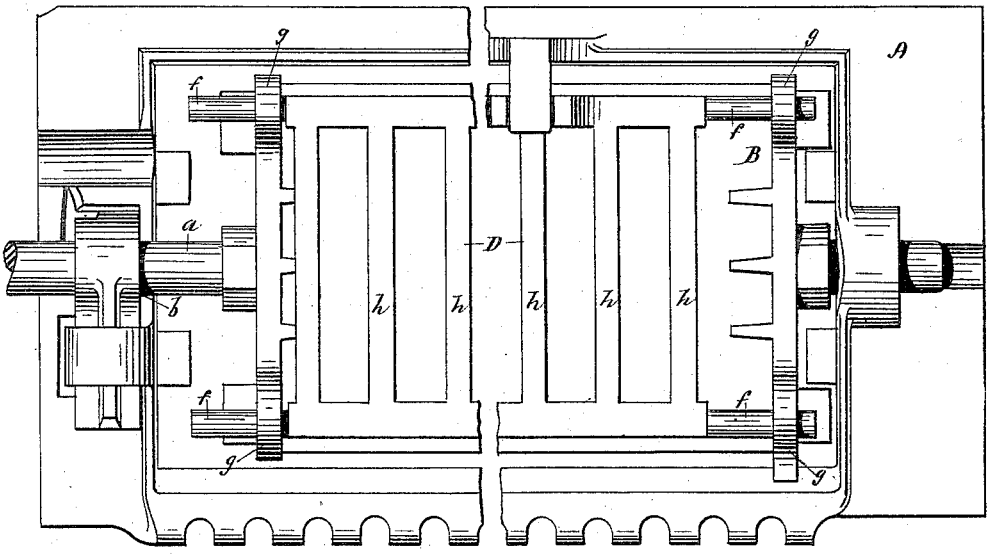

Fig. 2.

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S. J. Murphy.

INVENTOR:

Edward Card

(No Model.)

2 Sheets—Sheet 2.

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FIRE GRATE.

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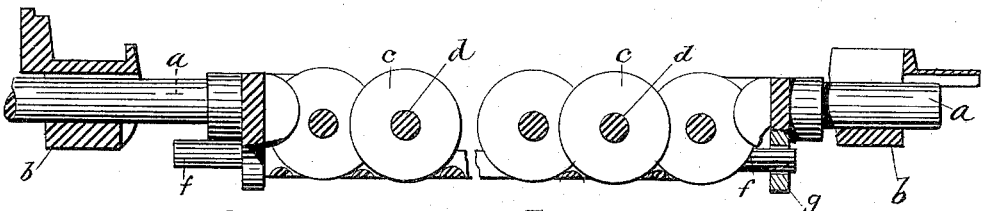

Fig. 3.

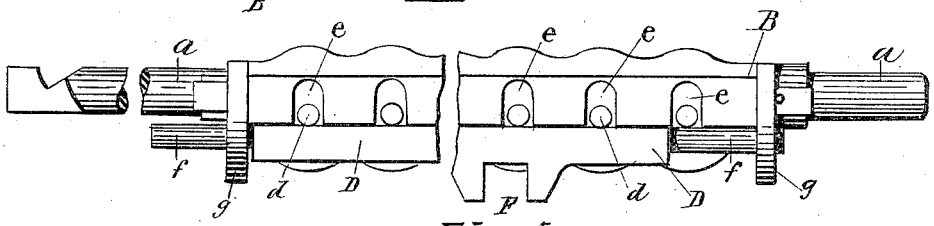

Fig. 4.

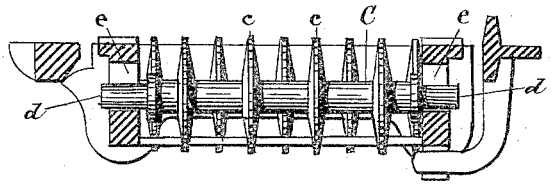

Fig. 5.

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UNITED STATES PATENT OFFICE.

EDWARD CARD, OF PAWTUCKET, RHODE ISLAND.

FIRE-GRATE.

SPECIFICATION forming part of Letters Patent No. 306,218, dated October 7, 1884.

Application filed December 21, 1883. (No model.)

To all whom it may concern:

Be it known that I, EDWARD CARD, of Pawtucket, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Fire-Grates; and I do hereby declare that the following specification, taken in connection with the drawings making a part of the same, is a full, clear, and exact description thereof.

Figure 1 is a top view of the grate proper. Fig. 2 represents an agitator which is combined with said grate. Figs. 3 and 4 are respectively a view in section and a side view. Fig. 5 is a transverse section showing two of the grate-bars.

The purpose of my invention is to construct a grate suitable for ranges, stoves, and furnaces generally, wherein the individual grate-bars shall be capable of having an up-and-down movement given to them in substantially vertical planes, for the purpose of agitating and breaking up the body of fuel which is supported in the fire-chamber by the grate-bars, and also to give a rotary movement to each bar at the same time, so as to grind the spent coal, slag, and ashes, to facilitate their easy discharge through the grate-bars.

In the drawings, A represents a stationary grate-frame of common construction, and which fits in the usual way the bottom of the fire-chamber or receptacle for the burning fuel.

B represents a tilting grate-frame, which is mounted in the surrounding frame A, and supported by pintles *a*, which rest in suitable journals, *b*, cast in the grate-frame, as represented at Figs. 1 and 2. The front one of these pintles extends through the casing of the stove, and is suitably squared, to allow of a handle to be applied thereto for the purpose of turning over the grate-frame B when it is desired to empty the fire-chamber of its contents, the said pintles *a* being located at the extremities of the central longitudinal axis of the grate-frame B. Thus far the construction is similar to stove-grates commonly in use. The grate-bars C are in this instance arranged transversely of the grate-frame B. Each bar is furnished with a series of circular disks, *c*, made integral with the bars, which may be arranged at equal distances apart, as shown at Figs. 1 and 5. These disks, however, are preferably so located on their respective bars that those upon any one of the bars will extend into the spaces between the disks upon the next adjoining bars, as clearly indicated at Fig. 1, and it is immaterial whether the disks on each bar are at uniform distances apart, so long as the relation of the disks on one bar to the next one in the series is such that upon the agitation of the bars in vertical planes, or upon the revolution of them on their axes, the disks will cut into or will grind the ashes or spent fuel resting upon the grate. Preferably each grate-bar has its ends extended so as to form a cylindrical shaft or axle, *d*, Fig. 4, and these cylindrical portions of the grate-bars enter elongated vertical slots *e*, formed in the sides of the grate-frame B, as shown at Fig. 4, so as to allow of a free movement up and down of such grate-bars in such slots.

The whole series of grate-bars C are kept in position in the grate-frame B by means of a supplemental grate-frame, D, (shown at Fig. 2,) and which serves as the agitator of the grate-bars. The relation of this supplemental grate-frame D to the series of grate-bars in the performance of its office of confining the ends of the grate-bars within their respective slots in the frame B is shown at Fig. 4. This supplemental grate-frame D is confined to the grate-frame B, so as to form a part thereof; but it is nevertheless capable of receiving a longitudinal sliding movement relatively to the grate-frame B; or, if the supplemental grate-frame D is fixed in position, the grate-frame B, with its series of grate-bars C, should be made capable of receiving a longitudinal sliding movement relatively thereto. In the present instance the supplemental grate-frame D is represented as the sliding member of the structure, which is composed of itself and the grate-frame B with its series of grate-bars, and it is combined with such grate-frame B by means of the longitudinally-extending rods *f*, Figs. 1 and 4, which work in guiding-holes made in ear-pieces *g*, Figs. 2 and 4, which depend from the under side of the four corners of the grate-frame B.

It is obvious from the foregoing that when the supplemental grate-frame D is in the position represented at Fig. 4 the axles of the grate-bars will rest upon the top surface of

the supplemental frame D, for the reason that the spaces between the bars *h* of such grate-frame, Figs. 1 and 2, are wide enough to allow a considerable segment of the disks to fall into them. When, however, the frame D is made to slide to and fro relatively to the grate-frame B, or when the frame B is made to slide relatively to the frame D, the effect will be to cause the whole series of loose grate-bars C to alternately rise and fall in vertical planes, and at the same time, if the bars have axle-formed ends, as shown, they will be rotated on their axes, and in the one case the thin edges of the disks *c* will cut like knives into the débris in the fire-chamber, and in the other case they will, in addition, be revolved on their axes, so as to exert a tendency to pulverize it by grinding.

F, Fig. 4, represents a socket in the supplemental frame D for the insertion of a handle, to enable a reciprocating movement to be given to the supplemental frame D.

It is apparent that the grate-bars may be arranged, if preferred, parallel with the longitudinal axis of the grate, instead of being arranged transversely with such axis, in which case the agitator should be correspondingly changed in position, so as to be vibrated to and fro in the direction of the transverse axis of the grate.

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

1. The improved grate consisting of a series of loose grate-bars constructed with cutters or slicers, a frame in which such grate-bars are mounted in keepers therein, so as to allow of their being alternately raised and lowered, and a supplemental grated frame or agitator, which latter frame and the supporting-frame of the grate-bars are movable relatively to each other to agitate the grate-bars having the cutters, substantially as specified.

2. The improved grate consisting of a series of loose grate-bars constructed with cutters or slicers and with axle ends to the bars, a frame in which such grate-bars are journaled, and a supplemental grated frame or agitator, which latter frame and the supporting-frame of the grate-bars are movable relatively to each other; to enable the bars and their slicers to be rotated for grinding the débris in the fire-chamber, substantially as described.

EDWARD CARD.

Witnesses:
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