(No Model.)

E. CARD.

GRATE.

No. 314,220. Patented Mar. 24, 1885.

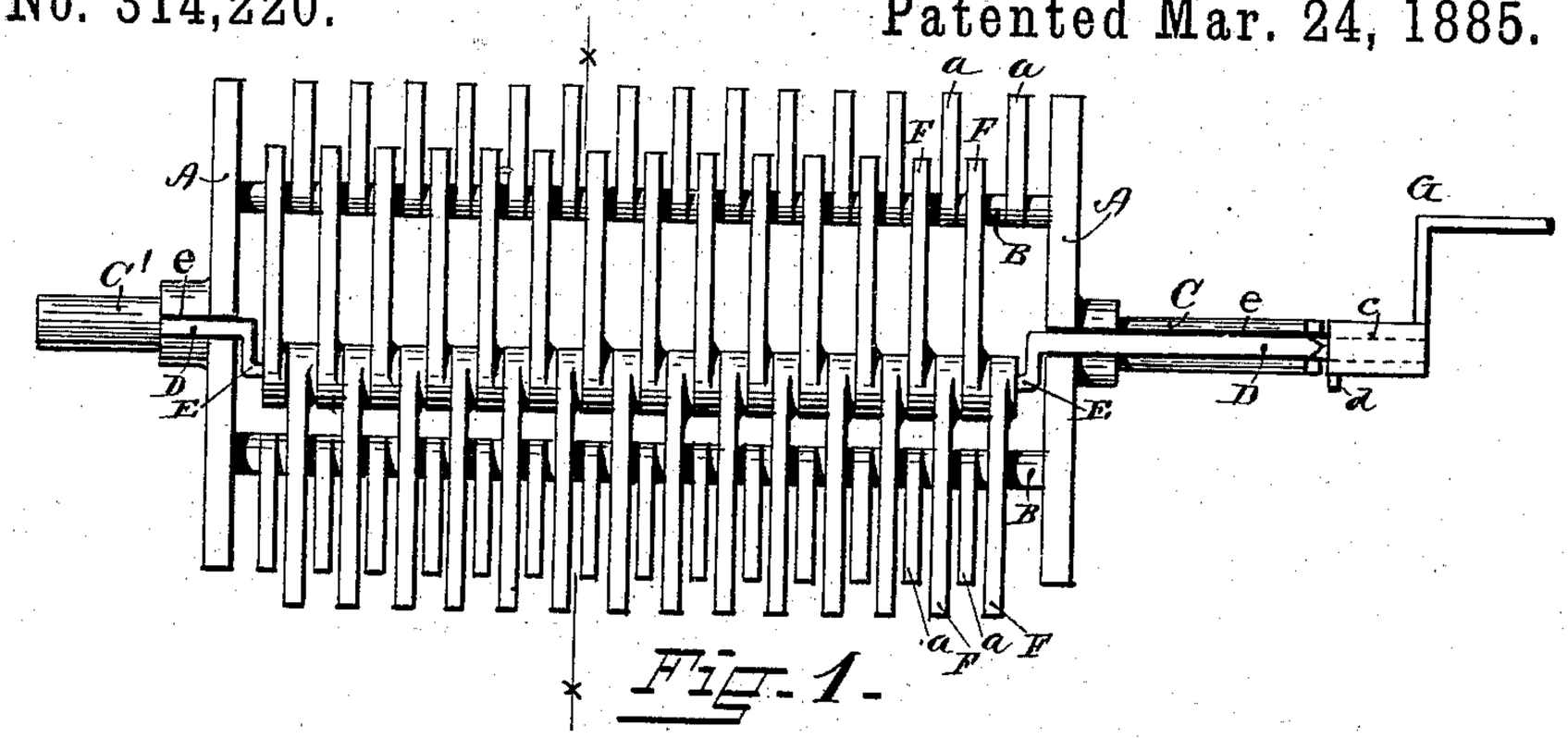

Fig. 1.

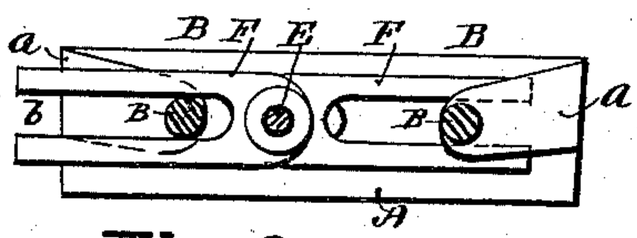

Fig. 2.

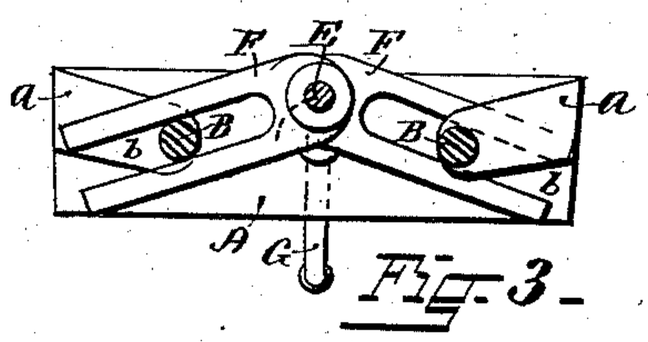

Fig. 3.

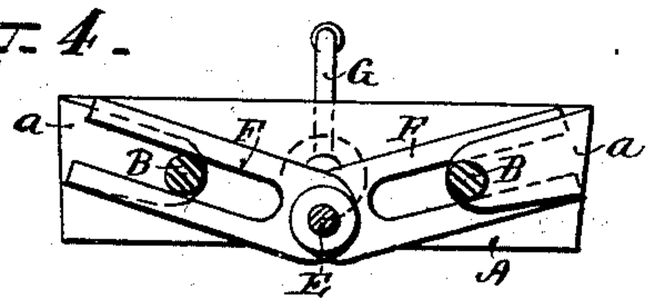

Fig. 4.

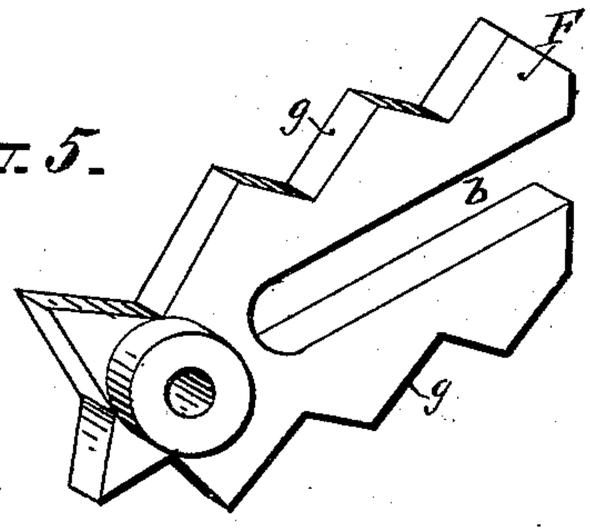

Fig. 5.

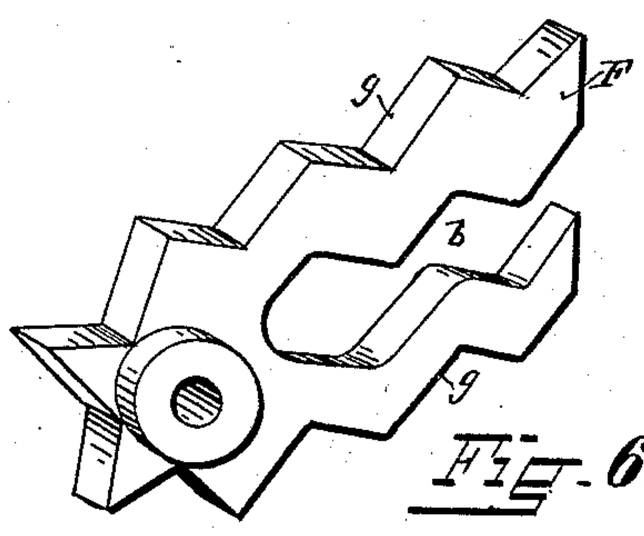

Fig. 6.

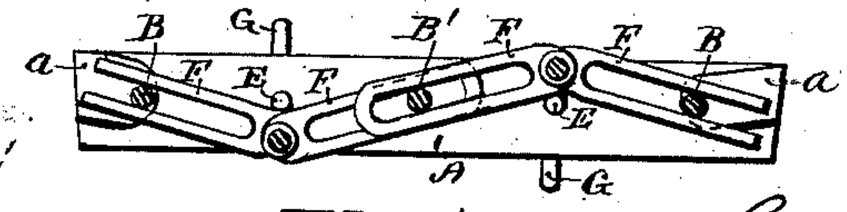

Fig. 7.

WITNESSES:

Socrates Schofield

John S. Lynch

INVENTOR:

Edward Card

UNITED STATES PATENT OFFICE.

EDWARD CARD, OF PAWTUCKET, RHODE ISLAND.

GRATE.

SPECIFICATION forming part of Letters Patent No. 314,220, dated March 24, 1885.

Application filed March 10, 1884. (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 an Improvement in Grates, of which the following is a specification.

My invention consists in the improved construction and mechanical operation of the grate-bars, as hereinafter fully set forth.

Figure 1 is a plan view of my improved grate in the form adapted for ordinary cooking-stoves. Fig. 2 represents a section taken in the line *x x* of Fig. 1. Fig. 3 represents a similar section with the operating-crank in a position at right angles to that of Fig. 2. Fig. 4 is a similar section taken when the operating-crank is in a position diametrically opposite to that shown in Fig. 3. Figs. 5 and 6 are perspective views showing modifications in the form of the grate-bars. Fig. 7 represents the transverse section of a double grate-bar of my improved construction.

In the accompanying drawings, A A are the opposite ends of a rigid frame, the side bars, B B, of which are made in cylindrical form, with outwardly-projecting ribs *a a a* arranged at suitable distances from each other. The trunnions C C′, which extend in opposite directions from the ends A A, are provided with a groove, *e*, upon their upper sides, adapted to receive the opposite extremities of the crank-shaft D, upon the crank portion E of which are loosely pivoted the individual grate-bars F F, arranged upon the crank E alternately in opposite directions. The bars F F are each preferably provided with an open slot, *b*, adapted to pass loosely over the cylindrical portion of the side.

In operating the grate for the purpose of agitating the coal and ashes in the fire-chamber of the stove the crank G, having a perforated hub, *c*, to the outer side of which is secured a pin, *d*, is applied to the squared outer end of the crank-shaft D, and the continued revolution of the crank in either direction will cause the bars to assume the several positions shown in the sectional Figs. 2, 3, and 4, with the consequent agitation and sifting of the coal.

In dumping the grate the crank G, when in a vertical position, is to be passed farther forward upon the squared portion of the shaft D, so that the pin *d* will enter a suitable receiving-notch made in the end of the trunnion C, by which means further rotation of the grate-crank E will be prevented, and thereafter the power applied to the crank will be utilized in turning the whole grate upon the trunnions C C′.

A modification of the grate-bars is shown in Figs. 5 and 6, the edges *g* of which are made in serrated form, in order to provide for increased agitation of the coal and ashes in the fire-chamber upon the proper rotation of the grate-crank E, and in addition thereto Fig. 6 shows a slot, *b*, made in corrugated form, whereby a further up-and-down movement will be imparted to the grate-bar upon the revolution of the grate-crank E by means of the removable crank G. The corrugated form of the slot *b* will allow the crank E to be placed and held in different positions, the inclines of the slot serving to prevent the unassisted horizontal movement of the grate-bars F upon the bars B.

In adapting my above-described improvement for the purpose of a boiler-grate I apply the individual grate-bars F F in two or more cranked sections, an example of which embodying two cranked sections is shown in Fig. 7, in which the intermediate bar, B′, is made cylindrical throughout, and is not provided with the ribs *a*, as in the bars B B. It may therefore be passed longitudinally through a closed slot, *b*, in the bar F, and the cranked sections of grate-bars may be agitated either separately or simultaneously, as desired.

The grate-bars F F may be reversed at any time, so that the previous lower edge of the bars will be at the upper side of the grate, thus greatly increasing the durability of the same.

In operating the fire-grate the inner or cranked end of the grate-bars will describe a circle in a vertical plane, while the outer ends of the same will have a simultaneous forward and backward movement with the cranked ends, combined with an opposite up-and-down movement, and by the combination of these movements in a grate-bar the desired rolling and shaking action upon the coals and ashes in the fire-chamber will be secured.

I am aware that crank-operated, serrated, and slotted grate-bars are shown in Patents of the United States Nos. 168,325, 170,306, and

178,030; but the bars therein shown and described are made continuous from one side of the grate to the other, and in each case the adjoining bars of the grate have an oppositely-directed reciprocating movement, whereas in my invention the adjoining grate-bars move in the same direction, and are not continuous from one side of the grate to the other.

I claim as my invention—

1. In a fire-grate, the combination of the grate-frame provided with trunnions, and having side bars provided with outwardly-projecting ribs, with the grate-bars arranged upon a crank and alternately embracing the ribbed side bars of the frame, substantially as described.

2. In a fire grate, the combination of the grate-bars, arranged alternately in opposite directions upon separate cranks, with an intermediate grate-supporting bar adapted to support the interlocked ends of the adjacent separately-cranked grate-bars, substantially as described.

3. In a fire grate, the combination of the side bars provided with outwardly-projecting ribs, the grate-bars arranged alternately in opposite directions upon separate cranks, with an intermediate grate-supporting bar adapted to support the interlocked ends of the adjacent separately-cranked grate-bars, substantially as described.

4. A grate-bar supported at one end upon a crank and at the opposite end by means of a stationary bar, and thus having a circular movement in a vertically-directed plane at the crank end of the grate-bar, with a corresponding forward and backward and an opposite up-and-down movement at the other end of the same, substantially as described.

5. In a fire-grate, the combination of the crank, with the grate-bars arranged alternately in opposite directions upon the same, and means for supporting the outer ends of the grate-bars, substantially as described.

EDWARD CARD.

Witnesses:

SOCRATES SCHOLFIELD,

ISRAEL PLUMMER.