F. STEELE.
Grate-Bar.

No. 216,708. Patented June 17, 1879.

Fig. 3.

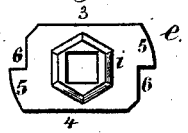


Fig. 1.

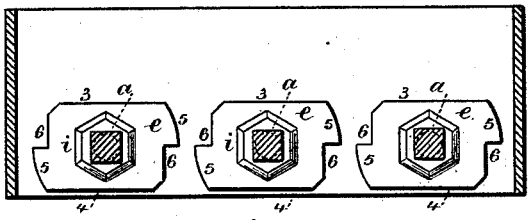
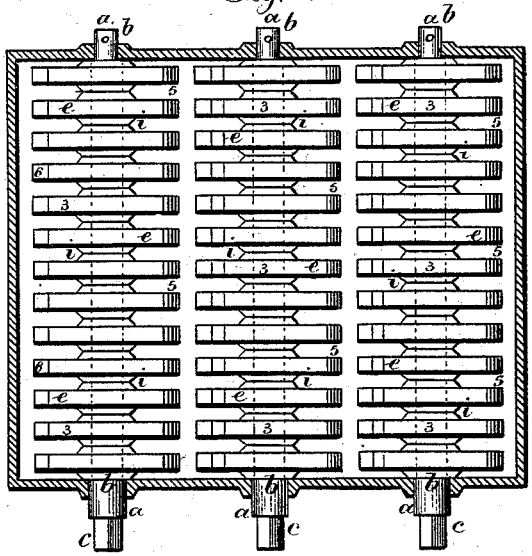


Fig. 2.



Witnesses
Chas. H. Smith
Geo. T. Pinckney

Inventor
Ferdinand Steele.
per Samuel W. Serrell
atty

UNITED STATES PATENT OFFICE.

FERDINAND STEELE, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN GRATE-BARS.

Specification forming part of Letters Patent No. **216,708**, dated June 17, 1879; application filed March 17, 1879.

To all whom it may concern:

Be it known that I, FERDINAND STEELE, of Brooklyn, in the State of New York, have invented an Improvement in Grate-Bars, of which the following is a specification.

Grate-bars have been made of cast-iron sections threaded upon wrought-iron bars, and such sections have had two surfaces that may be changed, so as to bring a different surface into contact with the fire, and in some instances the grate-bars have had three surfaces and been fitted so that they could be revolved for removing clinkers and ashes.

My invention is made for obtaining two flat grate-bar surfaces, either of which can be turned uppermost to receive the fire, and upon which the fire can be stirred or "sliced" in the usual manner. Said bars are made of separate sections, each of which has two parallel surfaces and two ends composed of arcs of circles and offsets or cams, that serve to break up clinkers and pass the same through the grate.

In the drawings, Figure 1 is a section of the grate, showing three lines of bars; and Fig. 2 is a plan of the same, partially in section.

The bars *a* are preferably of wrought-iron, and square sectionally. Where these bars are supported in bearings in the furnace they are to be cylindrical, as at *b*, and the projecting ends *c* are to be prismatic and adapted to receive a wrench or handle, by means of which they may be revolved; and these bars *a* may be geared together, so that all may be shaken or revolved at the same time. This, however, does not form any necessary part of my invention.

Upon the bars *a* there are grate-sections *e*, (shown separately in Fig. 3,) and each section has a hole through it to fit the shaft or bar *a*, so that the grate-sections may be threaded upon such bar *a*, or removed therefrom in case of injury to any one section.

Each section has two fire-surfaces, 3 and 4, that are parallel to each other, also rounding-end portions, 5, that are arcs of circles from the center of the bar *a*, and shoulders or cams at 6 6.

It will now be evident that when these grate-sections are threaded upon the bars *a* the surfaces 3 and 4 are in line and form a surface that is sufficiently flat for the use of the usual raking or slicing tools introduced to clear the fire of ashes.

The bars can be revolved so that either fire-surface 3 or 4 is uppermost, and if one surface is injured the other surface is available.

If the bars are turned so that the shoulders or cams 6 come into contact with clinkers or hard substances, the same will usually be broken and carried through the grate by the revolution of the bars.

If the obstruction is not easily broken the grate-bars can be revolved backwardly, because the curved portions 5 are arcs of circles from the axis of rotation, and do not move the fuel as they are revolved.

Each grate-section has a hub, *i*, that serves to keep one section at the proper distance from the next.

I claim as my invention—

The grate-bar herein described, composed of the sections *e*, each formed with two parallel surfaces, 3 4, round end portions 5, and shoulders 6, and threaded upon the bar *a*, constructed and arranged substantially as shown and set forth.

Signed by me this 10th day of March, A. D. 1879.

F. STEELE.

Witnesses:
GEO. T. PINCKNEY,
CHAS. H. SMITH.