J. F. PHELPS.

Grate.

No. 115,515. Patented May 30, 1871.

Fig. 1.

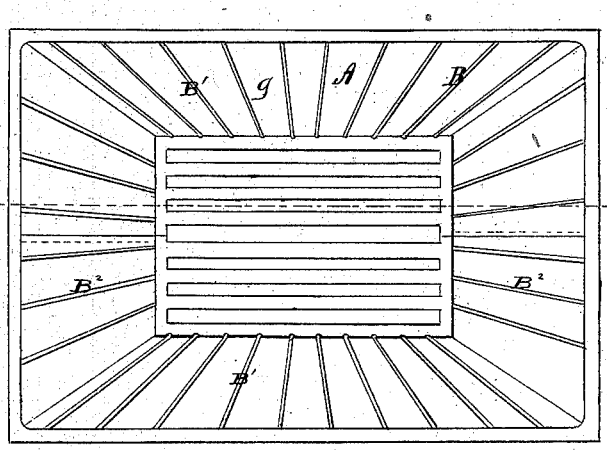


Fig. 2.

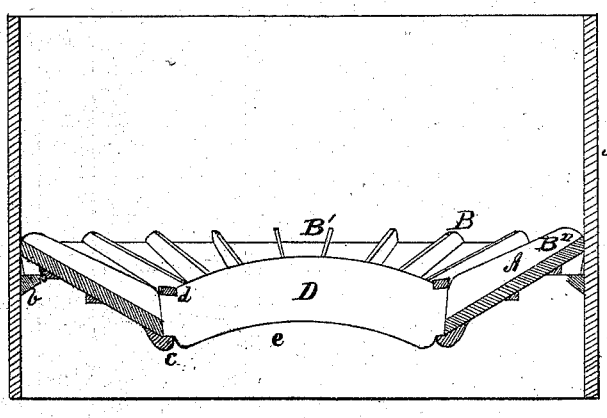
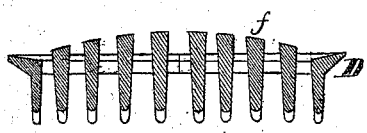


Fig. 3.



Witnesses.
Chas Kenyon
Villette Anderson

Inventor:
J. F. Phelps
Chipman, Howes & Atty's

UNITED STATES PATENT OFFICE.

JAMES FISHER PHELPS, OF HUNTSVILLE, ALABAMA.

IMPROVEMENT IN GRATES.

Specification forming part of Letters Patent No. 115,515, dated May 30, 1871.

To all whom it may concern:

Be it known that I, JAMES FISHER PHELPS, of Huntsville, in the county of Madison and State of Alabama, have invented a new and valuable Improvement in Grate-Bars; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawing making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawing is a top view of my grate. Fig. 2 is a central vertical longitudinal section of the same. Fig. 3 is a detail.

This invention relates to improvements in grates and grate-bars for burning fuel, especially wood, in furnaces of locomotive and other engines; and it consists in so constructing, placing, and arranging the plates and bars of the grate, as hereinafter fully described, that the ashes, when formed, will fall and slide into the ash-pan without obstructing the grate, and that the air and flame may pass freely under and through the burning fuel, the object being to expedite and facilitate the generation of the motive power, steam, in railroad, steam-boat, stationary, and other engines in which fuel is used for that purpose.

Referring to the accompanying drawing, the fire-box A′ is oblong, as shown, or of any suitable form, inside of which, on suitable ledges *b*, at a fitting distance from the bottom of the fire-box, rest the outside plates A of the grate. The plates A may be made in one piece or in sections, and, when in place, form an outside grate in the form of a hopper, adapted to the shape of the fire-box, which may be rectangular, as shown, or of some other suitable shape. The hopper of the grate formed by these plates has at its lower end an opening, *e*, in the form of a rectangle, as shown, or of any suitable shape, and is furnished thereat with ledges or supports *c*, upon which rests the inner grate D in said opening. Upon the upper slanting surface of the plates A are formed or placed the ribs or projections B, of suitable or sufficient height to admit the free passage of the ashes, flame, and air under the burning fuel resting upon them, and which converge, as shown, from the outer to the inner edge of the plates A so as to conduct the falling ashes toward and to the opening *e* over the ash-pan, and to form conduits *g* for the passage of the air, flame, and smoke under the burning fuel. The end ribs of the slanting plates A are lettered B^2 and the side ribs B^1. The inner grate D is formed of straight or curved bars *f*, as shown, connected by head-pieces *d*, and rests upon the supports *c* so that the openings between the bars *f* are opposite to the openings between the ribs B^2, thus allowing the ashes from the plate A to pass out without being thrown upon the inner grate D, and also admission of the air to the conduits from under it. The shape of the inner grate may be rectangular, as shown, or of any shape to adapt it to the shape of the opening *e*.

The width and length of the plates A, the height and distance apart of the ribs B, and also of the bars *f*, the slant of the plates A, and the dimensions of the inner grate D, as well as the shape of the fire-box A′ and the grates A and D, may be varied according to the kind of engine and the purpose for which the engine is to be used.

The advantages in the use of the above-described grate are dispatch and facility in producing the necessary heat to generate the steam as a motive power, great economy in fuel, and the freedom of the grate and fire-box from obstruction by ashes.

I claim as my invention—

1. The outer grate A, shaped to suit the shape of the fire-box A′, made in one piece or in sections, and fitted together so slanted as to be in the shape of a hopper, and having the converging ribs B and conduits *g*, substantially as and for the purposes set forth.

2. The inner grate D, formed of straight or curved bars *f*, so arranged and shaped as to be adapted to the opening *e* in the outer grate, so that the ends of the bars *f* shall be opposite to the ends of the ribs B^2, substantially as and for the purposes set forth.

3. The combination of the outer grate A with the inner grate B, both constructed and arranged substantially as and for the purposes set forth.

4. The combination of the fire-box A′, outer grate A, and inner grate D, all constructed and arranged substantially as and for the purposes set forth.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

JAMES FISHER PHELPS.

Witnesses:

L. H. SELLARS,

JOHN MYERS.