# A. RODGERS.

## Grate-Bars.

No. 155,756. Patented Oct. 6, 1874.

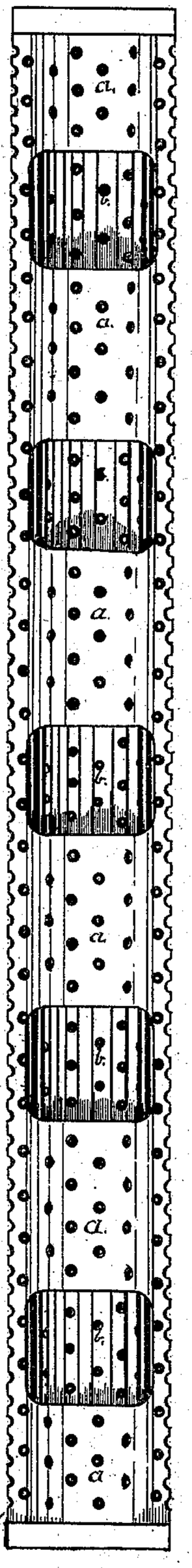



Fig. 1.

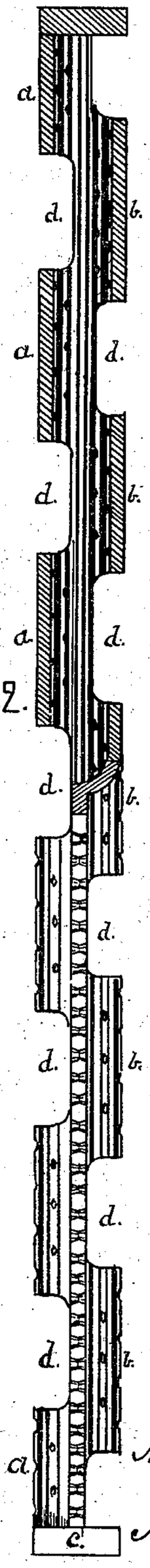
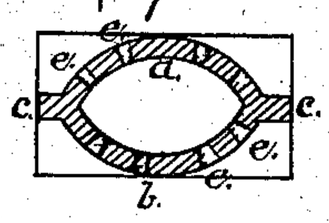



Fig. 2.

Fig. 3.

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# UNITED STATES PATENT OFFICE.

ALEXANDER RODGERS, OF MUSKEGON, MICHIGAN.

## IMPROVEMENT IN GRATE-BARS.

Specification forming part of Letters Patent No. **155,756**, dated October 6, 1874; application filed May 25, 1874.

*To all whom it may concern:*

Be it known that I, ALEXANDER RODGERS, of Muskegon, in the county of Muskegon and State of Michigan, have invented certain new and useful Improvements in Grate-Bars; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to that class of grate-bars used for the purpose of burning finely-divided fuel—such as small coal, spent tan-bark, sawdust, and the refuse of saw-mills and wood-working machinery in general—the object being to furnish a grate-bar which shall allow the passage of a large amount of air through it, be easily constructed, and of such form as will cause the air passing through it to keep all its parts so cool as to greatly increase its durability; and it consists in forming the bar in the shape of a perforated oval pipe, having alternate sections removed from its upper and lower sides, as will be hereinafter fully described, and then pointed out in the claims.

In the accompanying drawing similar letters of reference indicate corresponding parts in the different figures.

Figure 1 is a plan of the grate. Fig. 2 is a side view partly in section. Fig. 3 is a transverse section.

It will be seen upon an inspection of the drawing that the essential features in the construction of this grate consist of two semi-cylindrical parts, *a* and *b*, which are united by two side ribs, *c*. The parts *a b* are cut away in alternate sections, as shown at *d*. The portions removed being shorter than those which remain cause whichever side of the grate may be downward to present a shelf for the reception of the fuel, extending so far beneath the upper piece that the angle of inclination presented by the fuel as it falls upon the grate shall not be sufficient to carry it beyond the shelf so as to allow it to fall into the ash-pit. Both of these parts are perforated with orifices, *e*, as shown, which present their widest opening outward, by which method of construction they are prevented from becoming enlarged as the surface of the grate burns away, thus preventing the loss of fuel which occurs in the ordinary perforated grate, in which the holes for the admission of air are largest upon the under side.

This form of aperture must necessarily increase in size as the bar burns away, and soon becomes so large as to cause great waste of the fine fuel, which falling through the grate into the ash-pit becomes ignited and forms an element of destruction which soon renders them utterly useless.

The ribs *c c*, which unite the semi-cylindrical portions of the grate, are provided along their edges with semicircular recesses, which, when two of the grates are laid side by side, form circular openings, smallest in the center.

Although this grate is described as consisting of three parts, yet they are all united in one casting, the material which in the mold enters the recesses *d* forming sand supports for a central core, which shapes its interior.

It will be perceived that the openings *f* present a large surface of the fuel to the direct action of the air, which follows the course indicated by the arrows, thus furnishing the one thing most needed in all furnaces or grates constructed for the combustion of finely-comminuted substances, that being plenty of air.

In falling from the upper to the lower portion of the grate, the material will assume its most porous form, and therefore be in the best possible condition for burning. Whenever the grate becomes clogged its shape renders it easily cleaned by thrusting a bar through its interior, which effectually opens the air-passages throughout its whole length. Another point of great benefit is that the bar is reversible, and may be used either side up, thus causing its enduring properties to be greatly increased.

Having thus described my invention, I claim as new, and desire to secure by Letters Patent, the following:

1. A grate-bar, composed of the parts *a*, *b*, and *c*, and having open spaces, *d*, arranged as

shown, the bar being pierced with conical holes *e*, the base of the cone being upon the outer surface of the bar, as and for the purpose set forth.

2. The tubular grate-bar, having alternate sections *d* removed, as and for the purpose shown and described.

In testimony that I claim the foregoing as my own, I hereunto affix my signature in presence of two witnesses.

ALEXANDER RODGERS.

Witnesses:
E. McB. TIMONEY,
W. L. CALDWELL.