

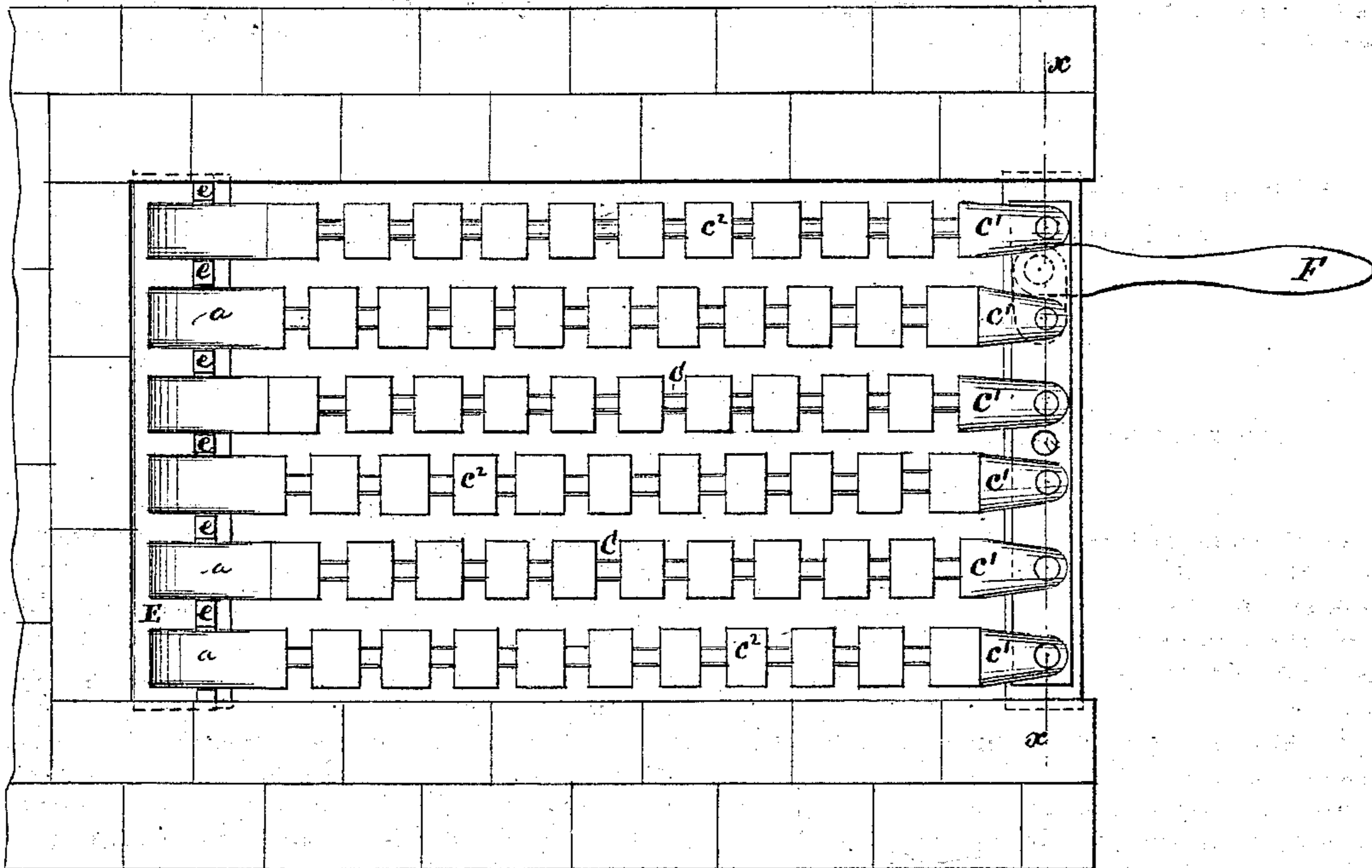
J. A. SINCLAIR.

Grate-Bars.

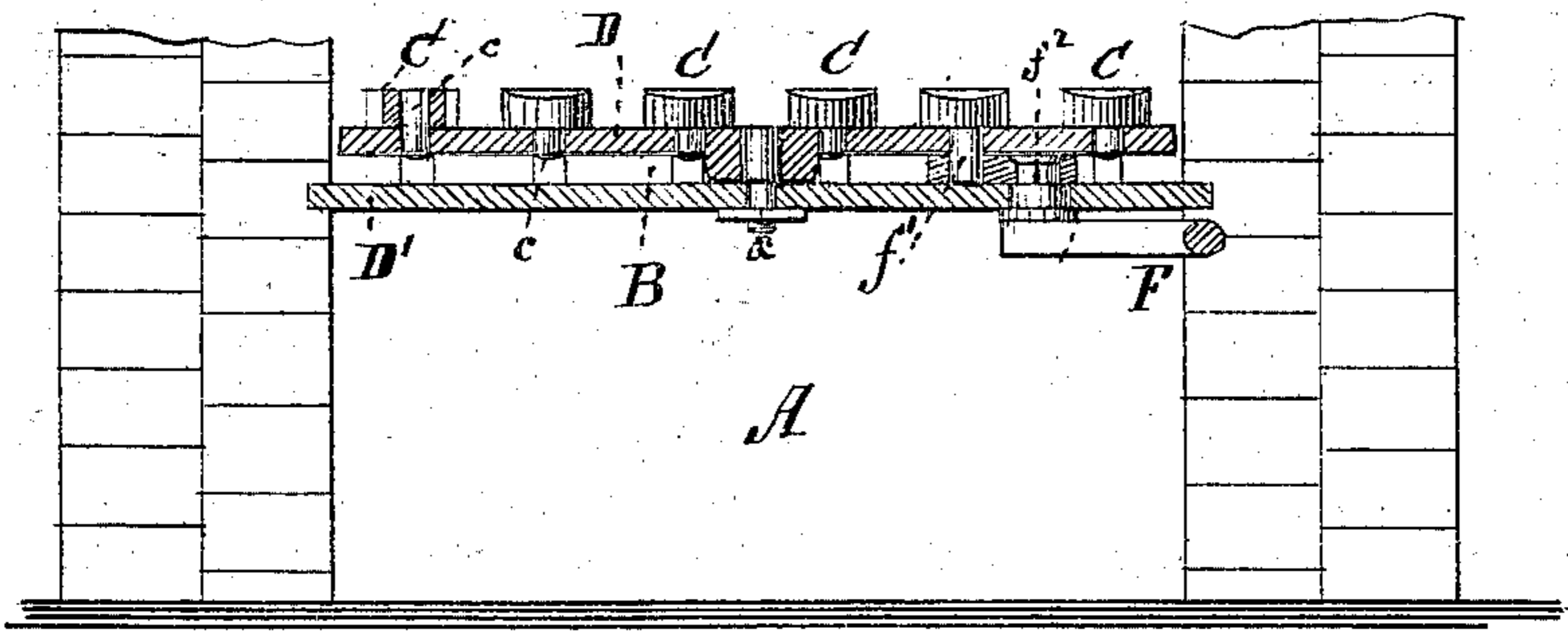
No. 135,447.

Patented Feb. 4, 1873.

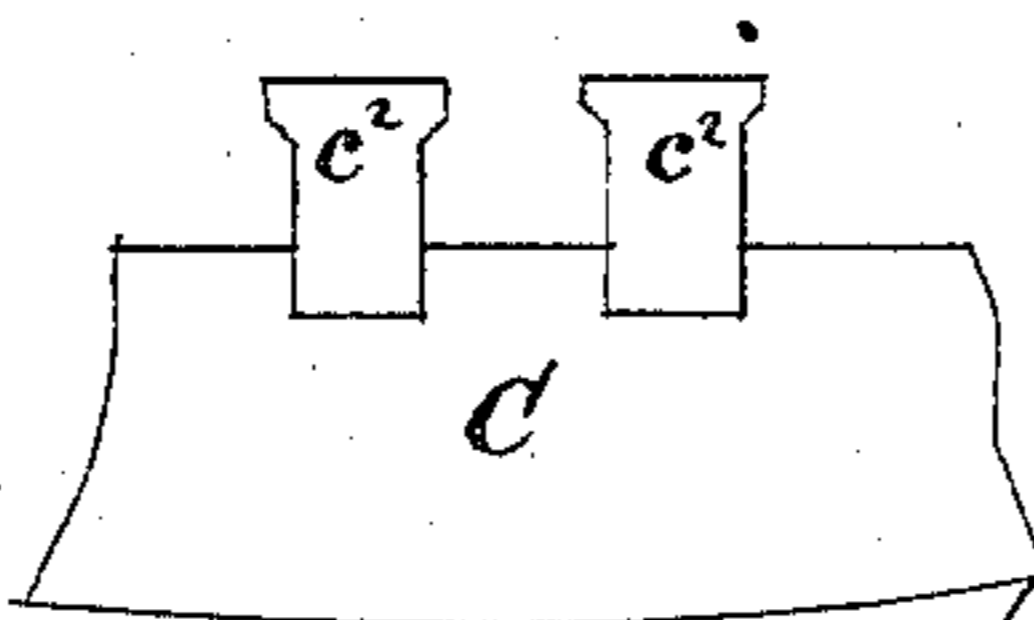
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



Witnesses:

W. Mathey.

John Kemmon

Inventor:

James A. Sinclair

PER

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# UNITED STATES PATENT OFFICE

JAMES A. SINCLAIR, OF BRIDGEPORT, ASSIGNOR TO HIMSELF AND  
MATTHEW C. McKEOWN, OF BARNESVILLE, OHIO.

## IMPROVEMENT IN GRATE-BARS.

Specification forming part of Letters Patent No. **135,447**, dated February 4, 1873.

*To all whom it may concern:*

Be it known that I, JAMES A. SINCLAIR, of Bridgeport, in the county of Belmont and State of Ohio, have invented an Improvement in Grates, of which the following is a specification:

The invention relates to improvement in the class of grates wherein the several bars composing the same are arranged to reciprocate in reverse directions alternately; and the object in view is to so construct and arrange the grate-bars and the devices for reciprocating the same as to secure the greatest economy of space vertically—so important in furnaces—with a minimum number of parts, so connected that removal or substitution may be effected easily and quickly.

Figure 1 is a top view; Fig. 2 is a vertical section through line *xx*, Fig. 1; and Fig. 3 is a detail view of the bar.

A represents an ash-box, and B the grate above it. C are the bars, having a vertical pin, *c*, on the under side of one end, and a projection, *c'*, on the other end. D is a cross-bar, pivoted at the middle to a support, D', and having a perforation for each grate-bar C. E is a plate or cross-bar, provided with guide-lugs *e* on the upper sides, between which slide the projecting ends *a* of grate-bars. F *f*<sup>1</sup> is a horizontally-movable lever, having its short arm *f*<sup>1</sup> at right angles to the long arm F in a different horizontal plane, and having the

two connected by a pivot, *f*<sup>2</sup>, which passes through support D'. The end of this short arm *f*<sup>1</sup> is pivoted, by means of a pin, *c*, of one of the grate-bars, to the swinging cross-bar D.

The operation is as follows: When the grate-bars C expand their length is simply increased, and their end projections *c'* caused to protrude a little further through the guides *e*, and vice versa. Again, when a deposit has gathered on the grate-bars, and each is individually moved in a lateral direction back and forward, no deposit is left, but they are thoroughly cleaned.

The grate-bars C are made with upwardly-projecting lugs C<sup>2</sup>, having intervals between them, and either cast with the bar or detachably bolted thereto. These lugs shield the bars from the intense heat, while they themselves can be readily replaced.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

The right-angled lever F *f*, the parallel bearing-bar D centrally pivoted at *a'*, and the grate-bars C pivoted at their front ends and sliding at their rear ends, all arranged as shown and described.

JAMES A. SINCLAIR.

Witnesses:

JOHN H. STAMP,  
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