(No Model.)

H. R. LUTHER.

GRATE.

No. 529,503. Patented Nov. 20, 1894.

Fig: 1.

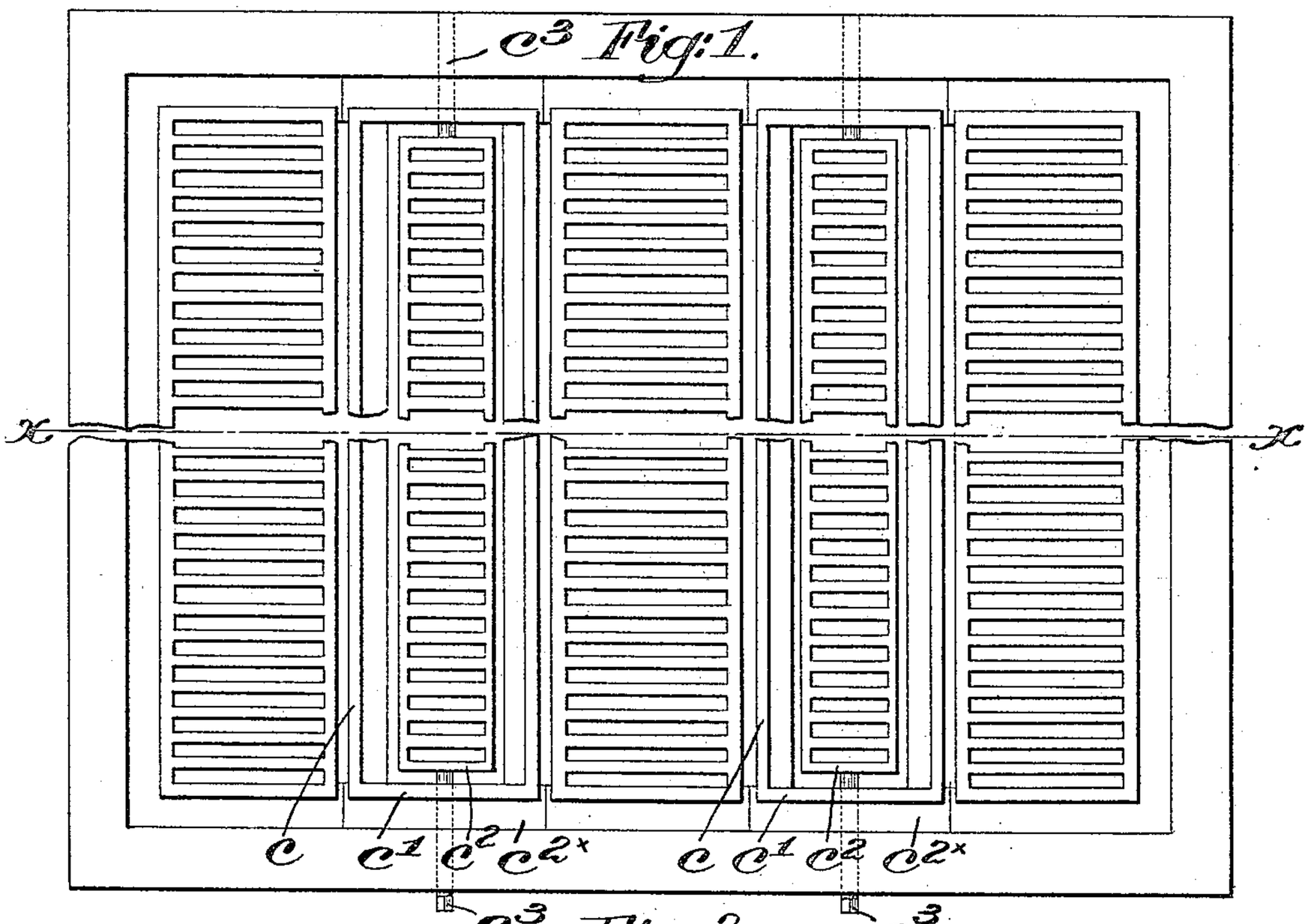
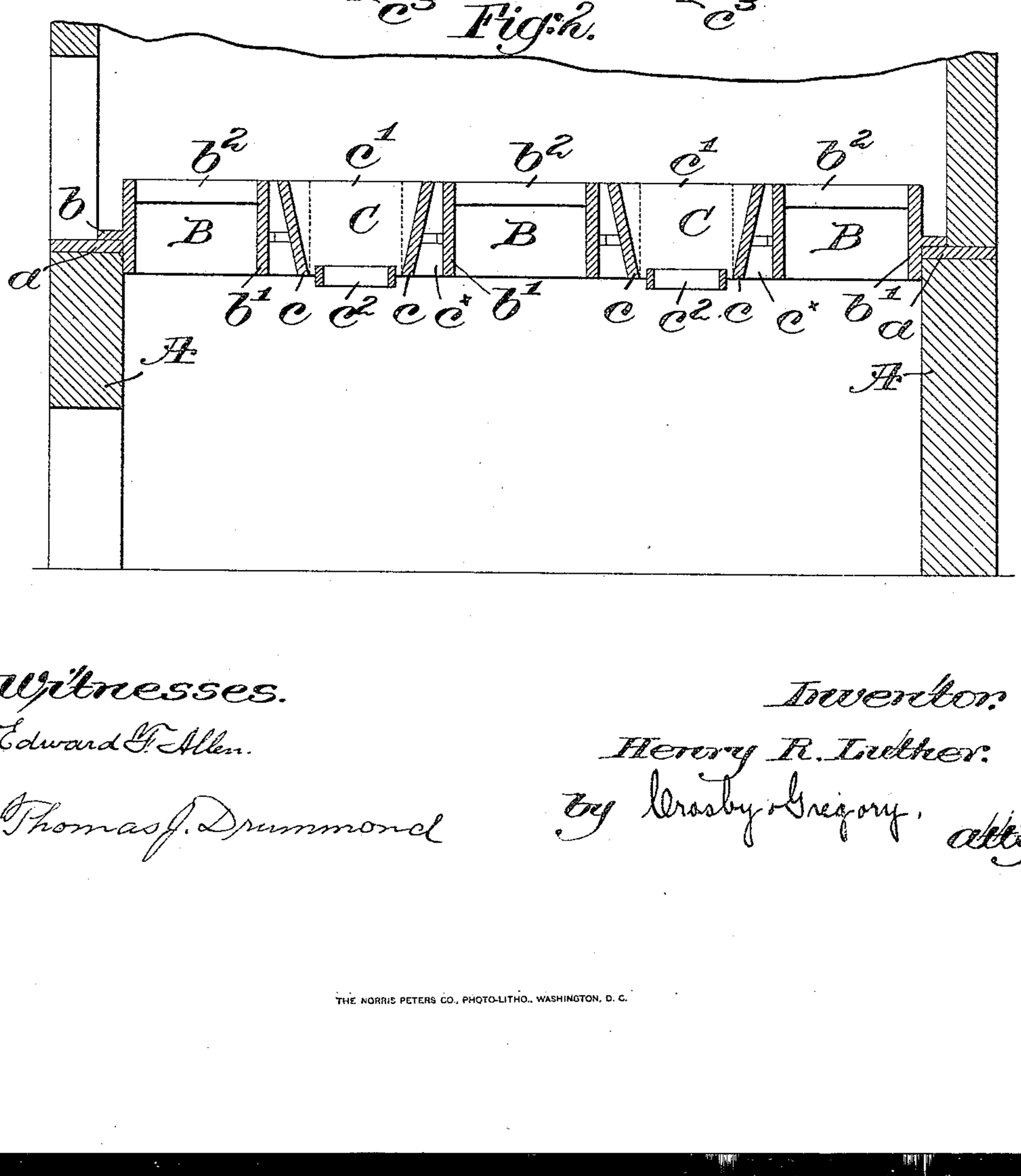


Fig: 2.



Witnesses.

Edward F. Allen.

Thomas J. Drummond

Inventor:

Henry R. Luther:

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UNITED STATES PATENT OFFICE.

HENRY R. LUTHER, OF CAMBRIDGE, MASSACHUSETTS.

GRATE.

SPECIFICATION forming part of Letters Patent No. 529,503, dated November 20, 1894.

Application filed March 15, 1894. Serial No. 503,808. (No model.)

To all whom it may concern:

Be it known that I, HENRY R. LUTHER, of Cambridge, county of Middlesex, State of Massachusetts, have invented an Improvement in Grates, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

United States Patent No. 485,684 shows a grate consisting of upper and lower grate surfaces, the lower grate surfaces being located at the bottoms of pockets in the upper grate surface, the imperforate side walls of the said pockets being vertical. In the use of grates of this type the hottest parts of the fire are always the thinnest parts upon or over the upper grate surface. In practice I have found that the air entering through the lower grate surfaces and passing upwardly through the fuel in the grate pockets, hugs the vertical sides of the latter and thereby creates a hot fire and intense heat near the tops of the pockets and in contact with the sides thereof, *i. e.*, the hot fire upon the upper grate surface has a tendency to creep down the sides of the pockets toward and following the course of the air rising through the latter and in contact with the sides of the pockets. This tendency of the hot parts of the fire to creep down the insides of the pockets sometimes burns the said sides, especially at or near their top edges.

This invention relates to grates of the above class and has for its object to construct the grate with its pockets, in such a manner as to avoid to a great extent at least, the burning out of the sides of the pockets.

In accordance with this invention, I construct a grate having the side walls of its pockets diverging toward the top, *i. e.*, the pockets are made wider at their tops than at their bottoms adjacent the lower grate surfaces. A twofold advantage results from this construction, first, the air entering the narrow bottoms of the pockets rises vertically therethrough so that by the time it reaches the upper parts of the pockets, near or at the level of the upper grate surfaces, and the hot parts of the fire thereupon, it is at a considerable distance inside of or away from the said sides, and if the fire tends to creep down following the course of such entering air, it will do so at such a distance from the sides of the pockets that the said sides are not liable to be burned thereby. The second advantage resulting from this improved construction is that a wider opening is provided between the diverging sides of the pockets and the sides of the upper grate sections in which the air may circulate to keep the sides of the pockets and sections at all times cool.

Figure 1, of the drawings represents in top or plan view, partially broken away, one form of grate embodying this invention; and Fig. 2, a cross section of the same taken on the dotted line x—x.

Referring to the drawings, in the construction selected by me to illustrate this invention, A, represents the inclosing or side walls of a usual furnace or combustion chamber provided with an inner ledge a, upon which rest the lips b of the upper grate sections B, each of which consists of the sides b' with the grate bars b^2 at their tops constituting the upper grate surface of the grate. Between the upper grate sections B are arranged the pockets C, parallel with and of substantially the same length as the sections B, each of said pockets consisting of the diverging side walls c, and preferably vertical ends c', which latter are provided with lips $c^{2\times}$ which rest upon the ledge a, and support the pockets. The lower grate surfaces c^2, are located at the bottoms of the pockets C, and as herein shown, are carried upon end pivots c^3 journaled in the ends of the pockets, one of the journals of each lower grate surface being extended through the front wall of the combustion chamber and squared to furnish means by which to rock the said surfaces on their pivots for shaking, dumping, &c.

By reference to Fig. 2, it will be seen that the pockets C are narrower at their bottoms adjacent the lower grates c^2, than at their tops adjacent the upper grates b^2, therefore the air which enters the bottoms of the pockets through the grates c^2 and which rises vertically through the fuel therein, as indicated by dotted lines, gradually works away from the side walls of the pockets owing to the diverging of the latter, so that by the time such entering air reaches the level of the hot-

ter parts of the fire upon the upper grates, it is so far removed from the sides of the pockets that there is no tendency for the fire to work down close to and in contact with such sides and to burn the latter. If the hot fire tends to work down into the pockets at all, it will do so by working toward the entering air, which, as described, is removed from the side walls of the pockets, and will thus draw the fire toward the centers of the pockets away from the side walls. The diverging side walls of the pockets also leave large inverted V-shaped openings $c^{\times}$ between the pockets and the side walls of the upper sections B in which the air may freely circulate to cool the sides of the pockets.

By pivoting the lower grate surfaces at their ends in the pockets C, working of the grates and their pivots moves the entire body of fuel in the pockets uniformly throughout the entire lengths of the latter, thereby keeping the fire in more uniform condition.

The several sections of upper grate surfaces together constitute in effect a single large upper grate surface in which are pocketed the individual lower grate surfaces.

This invention is not restricted to the particular construction of grate herein shown, for the same may be varied in many particulars without departing from the gist of the invention which consists in making the side walls of the pockets diverging to carry the entering air away from the sides and prevent burning, and to provide greater space between successive sections of the grates.

I claim—

1. The combination in a grate, of an upper grate surface, one or more pockets therein having side walls diverging from the bottoms of the pockets to the tops thereof, and a lower grate surface at the bottom of each of said pockets whereby the air entering the pockets through said lower grate surfaces rises vertically away from and out of contact with said side walls, substantially as described.

2. The combination in a grate, of an upper grate surface, one or more pockets therein open both top and bottom, the openings at the top being wider than the openings at the bottom, and a lower grate surface arranged in the bottom opening of each of said pockets whereby the air entering the pockets through said lower grate surfaces rises vertically away from and out of contact with said side walls, substantially as described.

3. The combination in a grate, of two or more upper grate sections having substantially vertical sides, and grate bars connecting the tops thereof, pocket sections arranged between said upper grate sections and having diverging side walls, and lower grate surfaces at the bottoms of said pockets, whereby inverted V-shaped openings are left between the diverging sides of the said pockets and the adjacent sides of the upper grate sections to cool the sides of said pockets, substantially as described.

4. In a grate the combination with a pocket section having diverging side walls, and a lower grate surface at the bottom of said pocket, of a substantially vertical wall outside said pocket section and separated therefrom to leave a ∧-shaped opening between it and the said diverging side walls of said pocket to cool the latter walls, and an upper grate surface at the top of said substantially vertical wall and outside the said pocket, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HENRY R. LUTHER.

Witnesses:
FREDERICK L. EMERY,
AUGUSTA E. DEAN.