(No Model.)

J. SMEAD.

FURNACE GRATE.

No. 324,421. Patented Aug. 18, 1885.

Fig. 1.

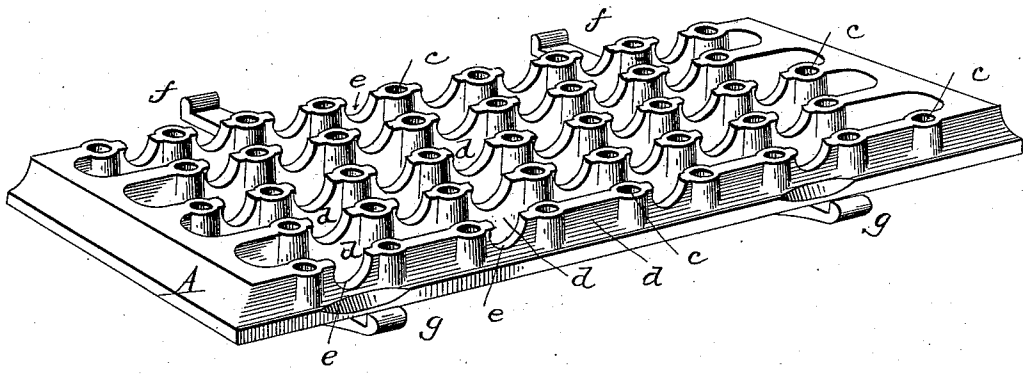


Fig. 2.

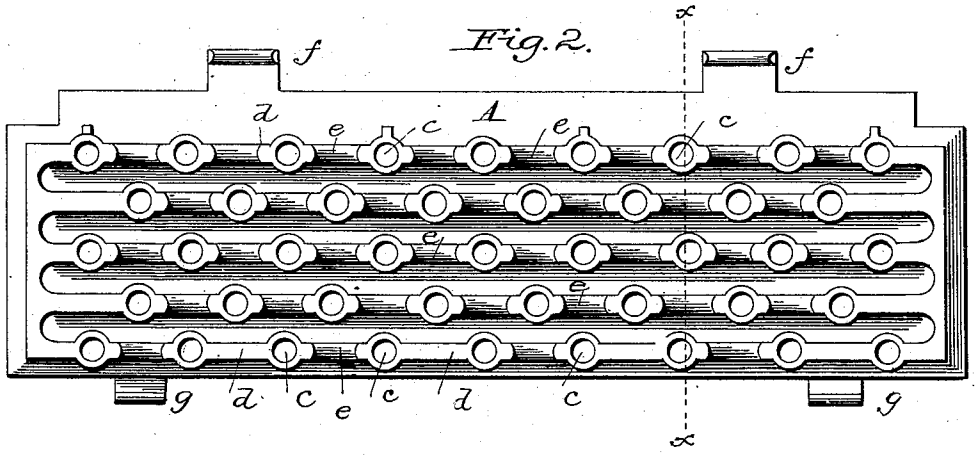
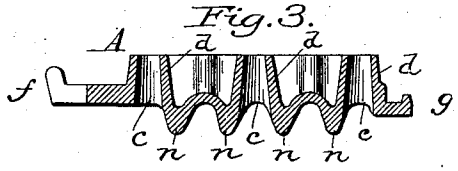


Fig. 3.



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UNITED STATES PATENT OFFICE.

JOHN SMEAD, OF TOLEDO, OHIO.

FURNACE-GRATE.

SPECIFICATION forming part of Letters Patent No. 324,421, dated August 18, 1885.

Application filed June 11, 1885. (No model.)

To all whom it may concern:

Be it known that I, JOHN SMEAD, of Toledo, in the county of Lucas and State of Ohio, have invented certain new and useful Improvements in Furnace-Grates, of which the following is a specification.

My invention relates to grates for furnaces; and it consists in a novel construction of the grate, as hereinafter more fully set forth.

Figure 1 is a perspective view of one section of a grate embodying my invention. Fig. 2 is a top plan view of the same, and Fig. 3 is a transverse section of the same on the line *x x* of Fig. 2.

My improved grate is designed more particularly for that class of heating-furnaces known as the "Ruttan" furnaces or air-warmers, which are designed for warming buildings, and in which, as a general rule, soft coal is used for fuel.

The grate is made usually of two sections or plates, A, divided centrally longitudinally, each section being made, preferably, though not necessarily, of the full length of the grate, one of said plates or sections being shown detached in Figs. 1 and 2. As shown, I make these plates with a series of longitudinal ribs, *d*, on their upper surface, these ribs *d* having recesses *e* formed in their upper edges at intervals, as shown in Figs. 1 and 2, between which recess in each rib there is formed an enlargement or boss, with a hole, *c*, extending vertically through it, the bosses with their holes *c* and the recesses *e* in the ribs *d* alternating in the line of the rib, as shown clearly in Figs. 1 and 2.

The number and size of the holes *c* may be more or less, as may be found expedient, but in any event should be sufficient to supply or permit the passage of the proper quantity of air to support combustion. In these Ruttan furnaces as usually constructed provision is made for introducing a portion of the air through perforated linings at the sides, and also over the top of the fuel when desired, for the purpose of mingling with the hot gases as they are given off from the burning fuel, for the purpose of more effectually consuming the gases and carbon and preventing the formation of the dense mass of black smoke produced by soft coal burned in the usual manner, and where that is the case the total area of the holes *c* need not be as great as will be required when all the air for combustion passes up through the grate.

The under side of these plates or sections are also provided with a series of longitudinal ribs, *n*, as shown in cross-section in Fig. 3, these ribs *n* extending from end to end, or nearly so, in unbroken lines, their function being to strengthen the plates and prevent them from sagging or warping.

Each section A is designed to rest on supports in the furnace at its front and rear ends, and on its outer edge it is provided with lugs *f*, more or less in number, to support it at the sides also. On their inner edges they are provided with lugs *g*, as shown in the several figures, these lugs having a hook or lip on their ends, so that when the sections are placed in position side by side these hooks will engage in holes *c* at the under side of the adjoining edges of each plate, thus locking them together and mutually supporting each other and holding them in line, so as to prevent either from sagging or bending below the other, as represented in Fig. 3. If more than two sections be used in any case, then the intermediate section or sections will be provided with these locking-lugs *g* on both edges, these lugs *g* of course being so located on the abutting edges as not to interfere with those on the adjoining section.

One great advantage of this construction is that the cavities between the ribs *d* on the upper surface of the grate may be filled with a layer of asbestus suitably prepared so as to adhere, and thus prevent the grate from being burnt out; and even if no such substance be applied the ashes will naturally fill these spaces and thus protect the grate to a considerable degree.

The holes *c* will of course be made sufficiently large to enable the ashes to pass through into the ash-pit below when raked with a poker or similar suitable implement.

It will be observed that the holes *c*, with their surrounding bosses, form, as it were, a series of vertical tubes, which will project upward into and among the coal resting on the grate, and that the air which passes upward through them will be considerably heated and

delivered in such condition and position as to readily mingle with the gases being given off by the mass of hot fuel surrounding and covering the same, thereby aiding to produce or insure a more perfect combustion.

While I have spoken of this grate as being more especially designed for use in the Ruttan furnaces, it is obvious that it may be used with other styles of furnaces also, it only being necessary to construct it of the proper length and width to fit the fire-chamber in which it is to be used, as will readily be understood by persons skilled in the art.

Having thus described my invention, what I claim is—

1. A grate for furnaces, consisting of one or more plates or sections, A, provided with a series of ribs or projections on its upper surface, with vertical holes extending through said plates and the ribs or projections thereon, substantially as shown and described.

2. The plate or section A, provided with the ribs *d*, having hole *c* formed therein and provided with the locking-lugs *g* on one edge, substantially as and for the purpose set forth.

3. A grate for furnaces, consisting of a plate, A, having a series of ribs, *d*, on its upper surface, with holes *c*, formed in and extending through said ribs and plate and having a series of strengthening-ribs formed on the under side of said plate, substantially as shown and described.

4. A grate consisting of a plate, A, having a series of ribs, *d*, or equivalent projections, formed on its upper surface, with holes *c* extending vertically through said projections and plate, and having cavities between said ribs or projections on the upper side of said plate for the reception of ashes or other protecting material, as set forth.

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