(No Model.)

2 Sheets—Sheet 1.

J. H. McILVAIN.

GRATE FOR FURNACES.

No. 263,712. Patented Sept. 5, 1882.

FIG. 1

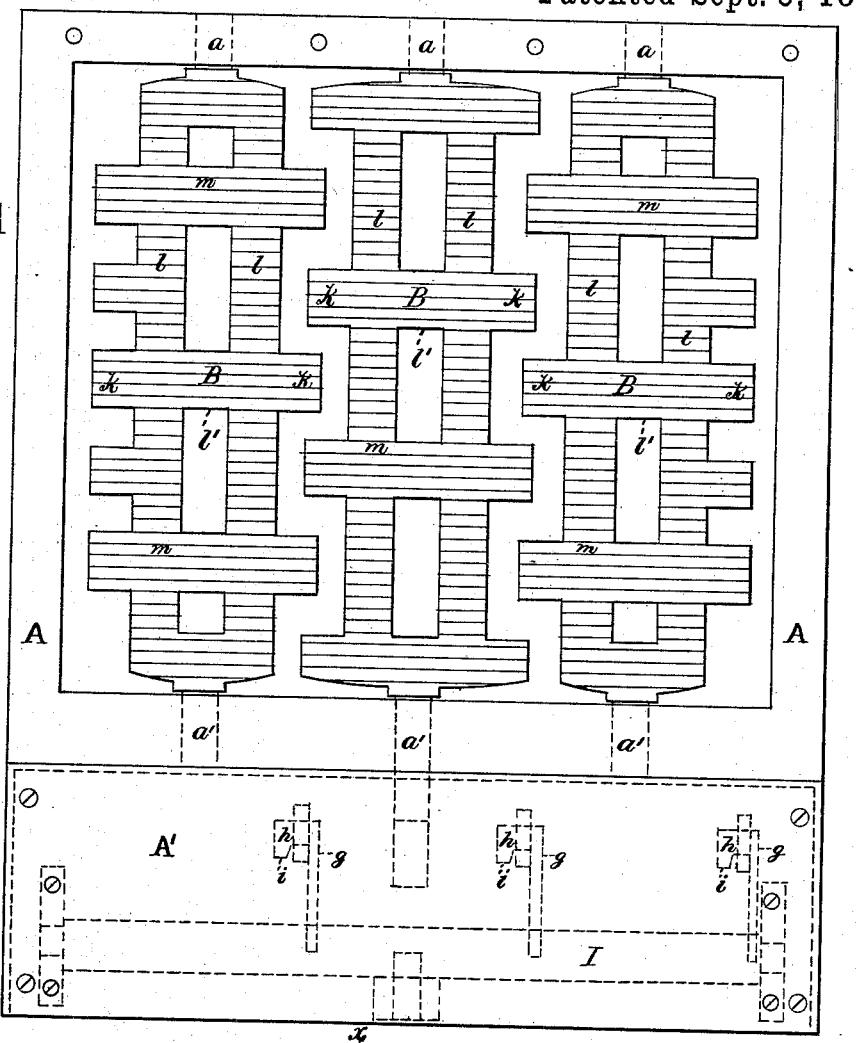
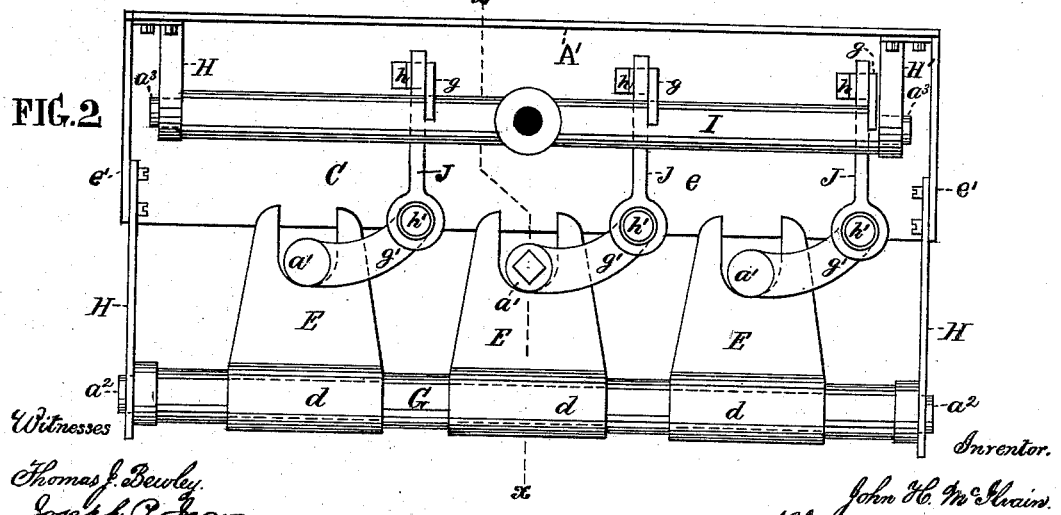


FIG. 2



Witnesses

Thomas J. Bewley.

Joseph P. Ingram.

Inventor.

John H. McIlvain.

per Stephen Nettick Att'y.

N. PETERS. Photo-Lithographer, Washington, D. C.

(No Model.)

2 Sheets—Sheet 2.

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GRATE FOR FURNACES.

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Patented Sept. 5, 1882.

FIG. 3

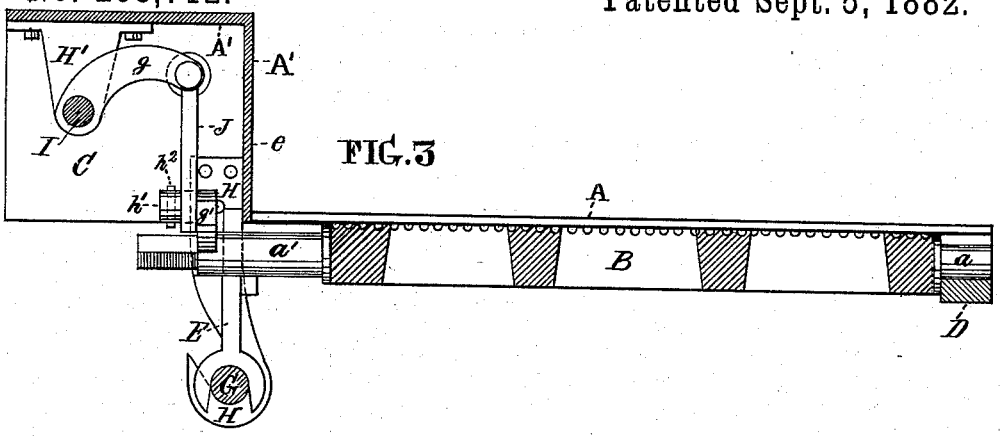


FIG. 4

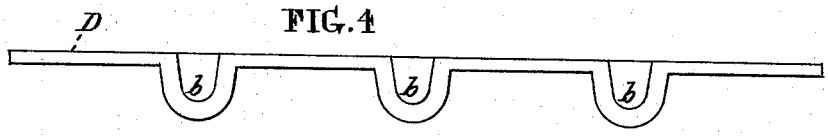


FIG. 5

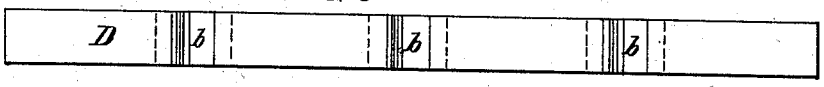


FIG. 6

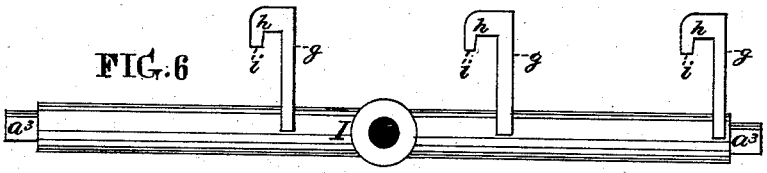


FIG. 7

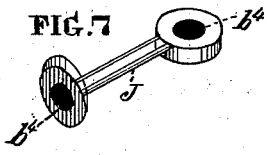


FIG. 8

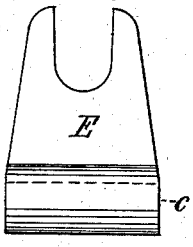


FIG. 9

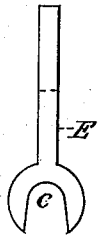


FIG. 10

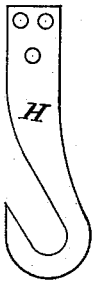
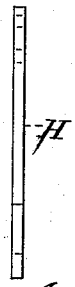


FIG. 11



Witnesses

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UNITED STATES PATENT OFFICE.

JOHN H. McILVAIN, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO JOSEPH B. BARTLETT AND CHARLES F. BARTLETT, OF SAME PLACE.

GRATE FOR FURNACES.

SPECIFICATION forming part of Letters Patent No. 263,712, dated September 5, 1882.

Application filed May 19, 1882. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. McILVAIN, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Improvement in Grates for Furnaces, Ranges, &c., of which the following is a specification.

My invention mainly consists of a combination of devices for shaking and dumping sectional grates of furnaces, ranges, &c. The devices are so constructed and arranged as to provide for the removal of any section of the grate without disturbing the other sections, when necessary. The construction and combination of the said devices and the other parts of my invention are so fully set forth in the body of the specification and particularized in the claims as to supersede the necessity of a description in this place.

In the accompanying drawings, which make a part of this specification, Figure 1 is a plan view of the sectional grate in connection with the plate A and parts attached. Fig. 2 is a front elevation of the same. Fig. 3, Sheet No. 2, is a vertical section at the broken line *x x* of Fig. 2. Fig. 4 is an edge elevation of the bearing-plate D. Fig. 5 is a top view of the same. Fig. 6 is a face view of the crank-shaft I. Fig. 7 is a perspective view of one of the connecting-rods J. Figs. 8 and 9 are a side and edge view of a detachable pedestal, E; Figs. 10 and 11, like views of one of the hangers H.

Like letters of reference in all the figures indicate the same parts.

A and A′ represent a bed-plate to which the sections B B B, which constitute the combined grate, and the devices for operating said sections are attached. Only three sections of the grate are shown in the drawings; but I design using any desirable number, according to the size of the fire-chamber. The part A is level, as represented, so as to bed on the brick-work; and the part A′ is elevated, so as to form the chamber C, for the arrangement and connection of the devices for operating the sections of the grate. The chamber C is open at its bottom, but is intended to be closed in front by means of a suitable door or doors. The grate-sections B have journals *a* at their rear ends, which have bearings *b* in the plate D, (shown in detail in Figs. 4 and 5,) the plate being confined to the under side of the plate A by means of screws or bolts. The front ends of the sections have journals *a′*, which have their bearings *b′* in the pedestals E E E, one of which is shown in detail in Fig. 8. The pedestals have circular grooves *c* in their lower ends, which rest on the diminished parts *d* of the horizontal shaft G. The pedestals are held in the vertical position by their upper ends resting against the upright plate *e* of the part A′ of the bed-plate, as seen in Fig. 3. The said shaft G has journals a^2, which have bearings b^2 in the hangers H H, which are confined by means of screws or bolts to the end plates, *e′*, of the part A^2 of the bed-plate. One of the hangers H is shown in detail in Figs. 10 and 11. The pedestals E are adapted to turn on the shaft G, whereby to swing the upper end forward and downward when it is desired to disconnect one of the grate-sections B without disturbing the other sections.

I is a crank-shaft. (Shown in detail in Fig. 6.) It has journals a^3 a^3, which have bearings b^3 b^3 in the hangers H′ H′, which are confined by means of screws or bolts to the under side of the part A′ of the bed-plate. This shaft has arms *g g g*, which are provided at their outer ends with pins *h h h*, which have connection with the pins *h′ h′ h′* of the arms *g′ g′ g′* of the front journals, *a′ a′ a′*, of the grate-sections B B B by means of the connecting-rods J J J, one of which is shown in detail in Fig. 7, in which it is seen that its bearings b^4 b^4 are at right angles to each other in adaptation to the right-angled position of the pins *h* and *h′* of the arms *g* and *g′*. The connecting-rods J are held in connection with the pins *h* by means of the hooks *i* of the pins, and they are held in connection with the pins *h′* by means of the slip-pins h^2.

The sections B B B, being all connected with the crank-shaft I, as above described, have a simultaneous movement by means of a lever connected with the said shaft, the lever fitting in the socket *j* of the shaft, so as to give a rocking movement to the shaft for shaking the sections of the grate for removing the ashes from the coal, or for dumping the sections for emptying the coal, or the lever may

be connected with the journal a' of the middle section B by means of a square socket in one end fitting the square end of the journal. By the movement of the lever a simultaneous movement may be given to all the sections, in consequence of their connection with the crank-shaft I, as above described.

The sections B of the grate are represented as having two longitudinal bars, l; but three or more may be used when the fire-place is wide, to avoid increasing the number of sections. The sections, at their outer edges, have fingers k, the fingers of one section being arranged between the fingers of the adjoining sections, in the usual manner, for dividing the spaces between the sections. To give lateral stiffness to the longitudinal bars l, there are cross-ties l', connected therewith, which are in line with the fingers k. The sections have cross-grooves m in their outer surface to prevent the heating of the grate, the air passing through the grooves throughout the whole extent of the grates, whereby the expansion of the bars is prevented.

I am aware that longitudinal grooves have been made in grate-bars, but they have not answered the purpose, as the grooves soon become filled up with ashes; but this difficulty is overcome by the cross-grooves, as in the shaking of the sections as they assume an inclined position the ashes slide out of them. The grooves, instead of being formed in the surface of the bars, may be made by means of cross-ribs on the surface.

The drawings represent the improvement connected with a square grate; but it will be understood that it is equally adapted to circular grates, or of any other form.

I claim as my invention—

1. The chamber C, in combination with the grates B, crank-shaft I, and intermediate mechanism for operating the grates, substantially as set forth.

2. The detachable pedestals E, in combination with the horizontal shaft G and front journals, a', of the grate-sections B, the pedestals being detachable, substantially as described, and for the purpose set forth.

3. The crank-shaft I, having arms g, provided with pins h, in combination with the grate-sections B, having arms g', provided with crank-pin h', by means of the connecting-rods J, whereby to operate all the sections of the grate simultaneously, substantially as described.

JOHN H. McILVAIN.

Witnesses:

THOMAS J. BEWLEY,

STEPHEN USTICK.