

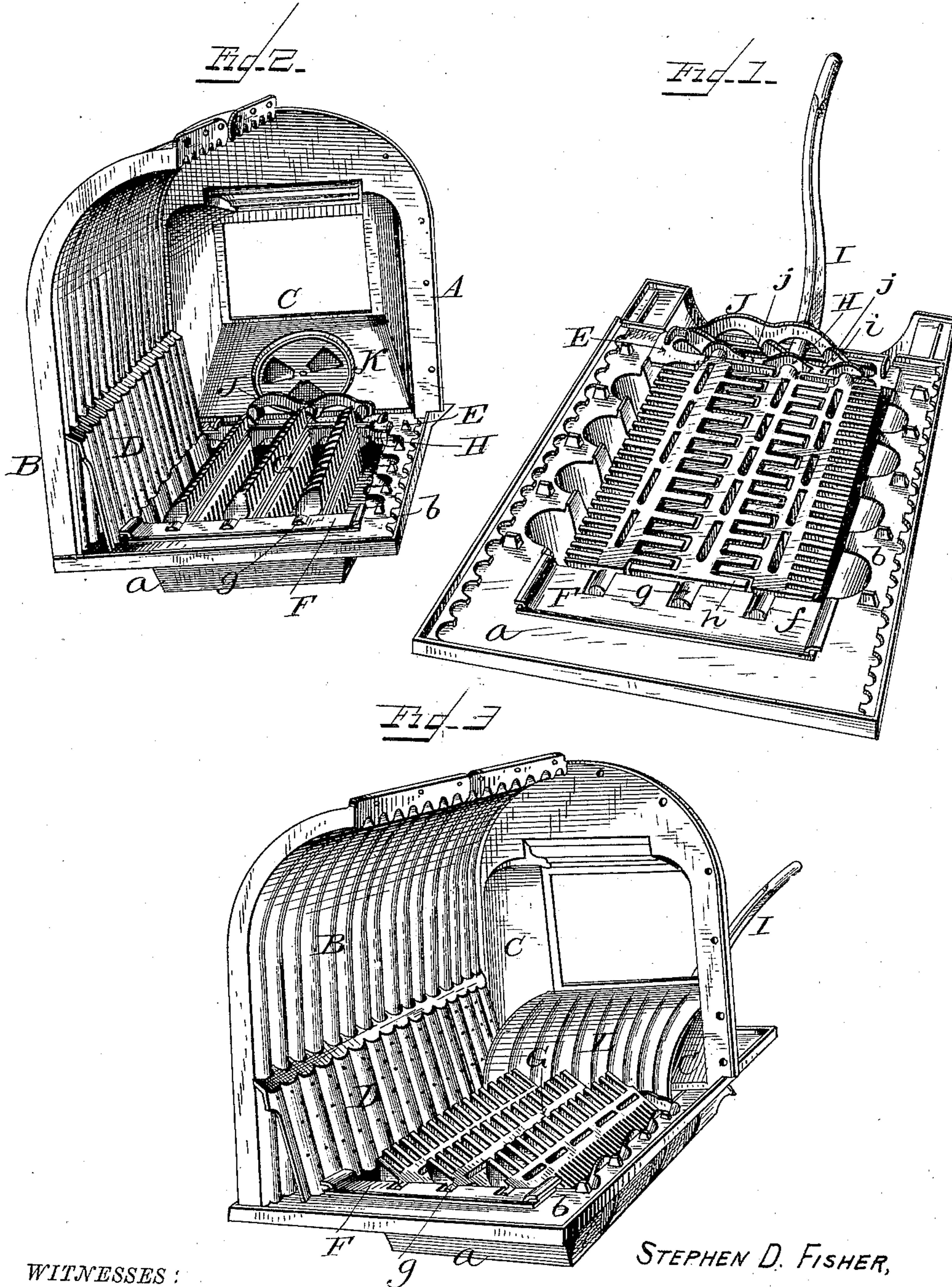
(No Model.)

2 Sheets—Sheet 1.

S. D. FISHER.
FURNACE GRATE.

No. 311,971.

Patented Feb. 10, 1885.



WITNESSES:
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Walter S. Dodge

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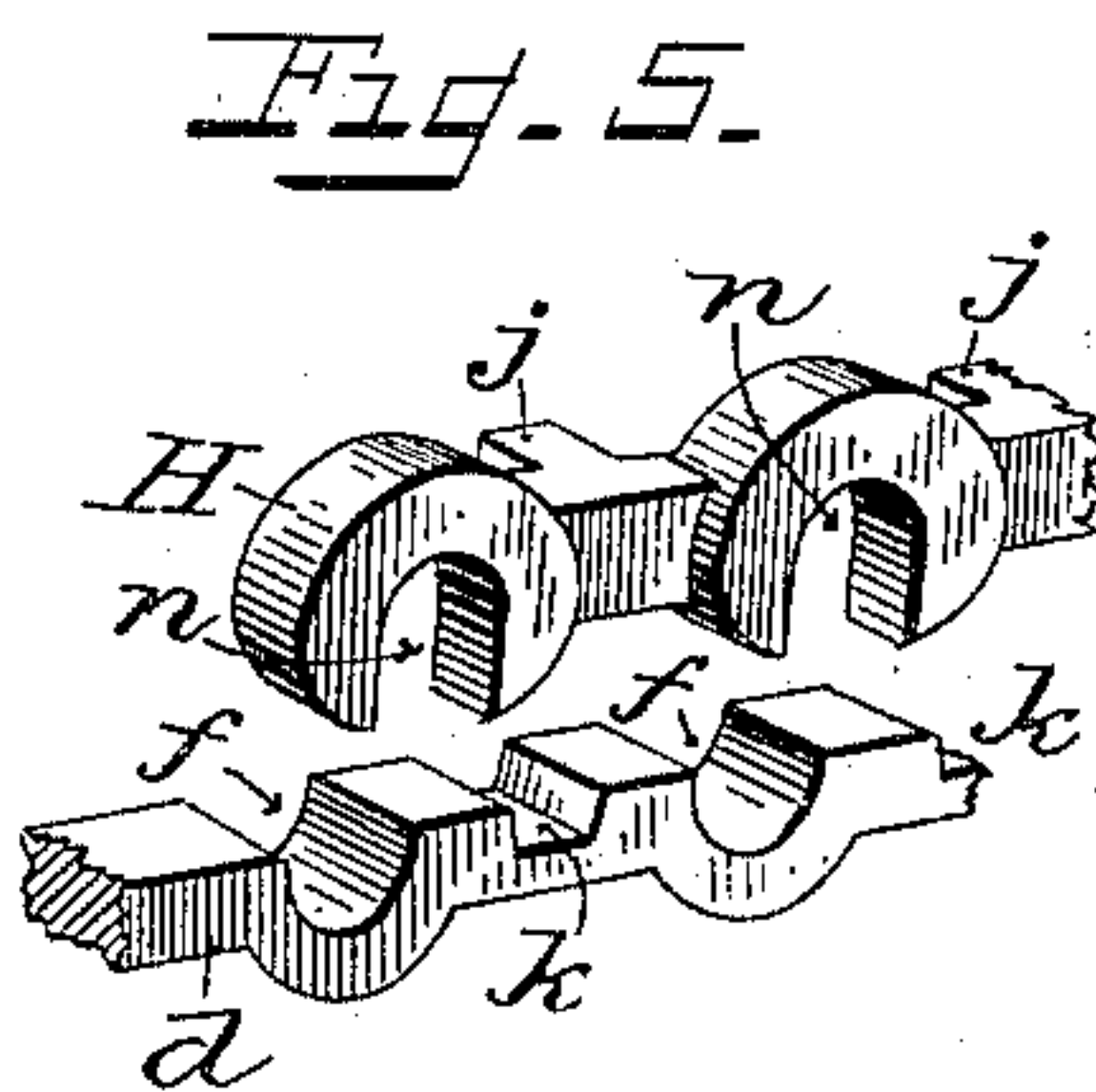
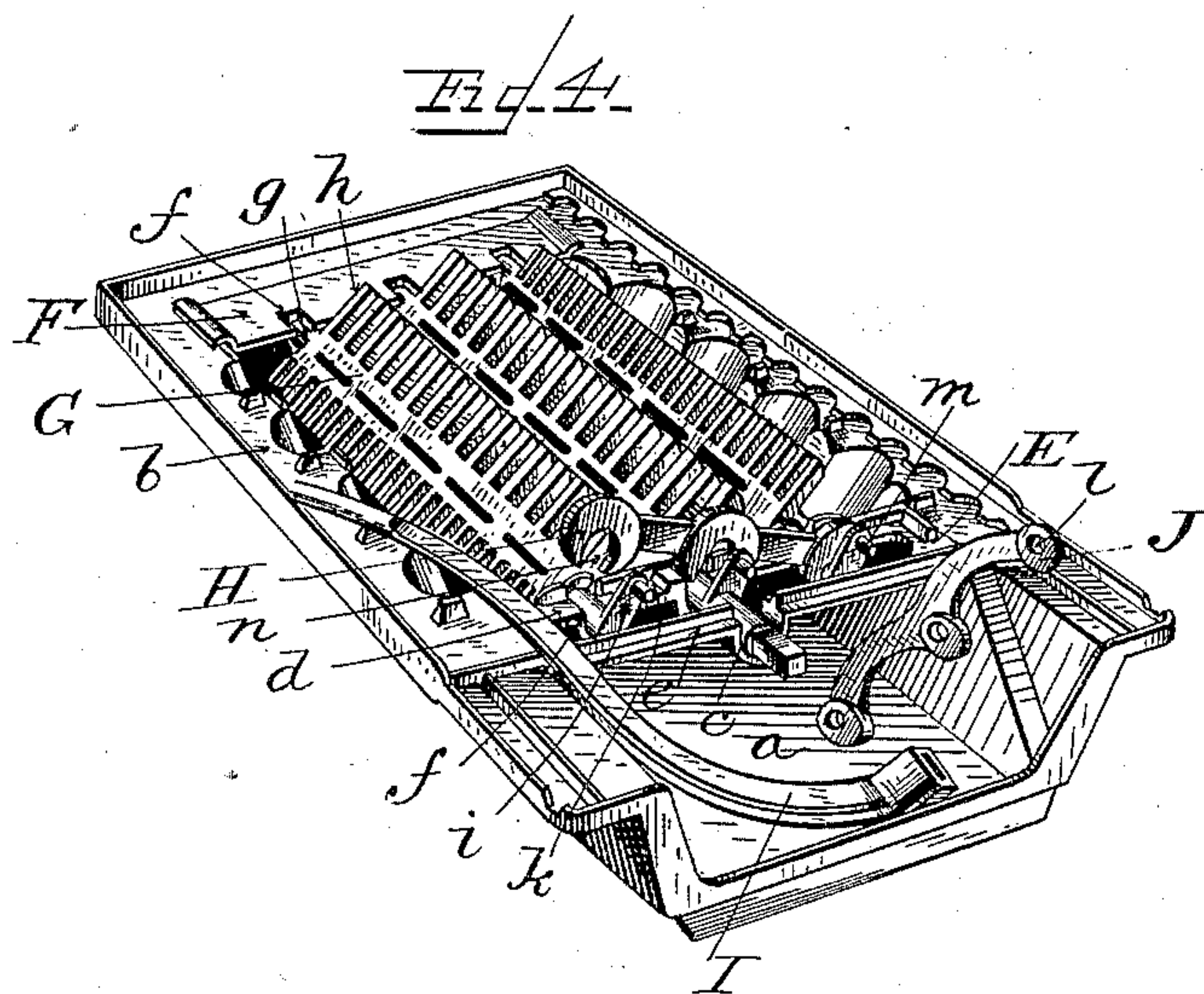
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UNITED STATES PATENT OFFICE.

STEPHEN D. FISHER, OF CHICAGO, ILLINOIS.

FURNACE-GRATE.

SPECIFICATION forming part of Letters Patent No. 311,971, dated February 10, 1885.

Application filed June 28, 1884. (No model.)

To all whom it may concern:

Be it known that I, STEPHEN D. FISHER, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvement in Furnace-Grates, of which the following is a specification.

This invention relates to heating-furnaces, and particularly to the construction and manner of mounting, securing, and operating the same, as hereinafter fully set forth.

In the drawings annexed, Figure 1 is a perspective view of the base of a furnace and the grate, looking from the rear end, the bars in their normal horizontal position; Fig. 2, a perspective view showing part of the body of the furnace and lining and the improved grate mounted and tipped therein; Fig. 3, a similar view, showing also the front hinging-plate; Fig. 4, a perspective view of the base of the furnace, showing the grate in position and rocked or tipped, the yoke partially raised from its normal position, the connecting-bar removed, and the lever or handle for operating the grate being shown in the foreground; and Fig. 5 is an enlarged detail view.

Rocking grates have hitherto been made in a variety of forms, and in some instances parallel fingered or toothed rocking bars have been connected by a bar so as to rock in unison. It is to this latter type of grates that the present improvements relate, the objects being to permit the ready removal of individual bars, the retention of the bars in proper position, and the protection of the connecting and operating mechanism from the heat of the fire. These objects I obtain by the following construction, the drawings showing the grate applied to the well-known Ruttan furnace, for which it is more especially designed.

A indicates the base or lower section of the furnace, containing the ash chamber or pan *a*, from which horizontal ledges *b* project outward from both sides and from the back, to support the sides B, ends C, and the lining D.

E indicates a cross-bar or support, having a front bar, *c*, and rear bar, *d*, the former provided with a semicircular seat or recess, *e*, and the latter with a series of like seats or recesses, *f*, corresponding in number with the number of grate-bars employed. Similar seats or bearings, *f*, are likewise formed in a rear

cross-bar, F, located at the back end of the grate or fire-box, as shown in all the figures of the drawings. These seats or recesses *f* are designed to receive and form bearings for journals or trunnions *g* of grate-bars G, each of which is formed with laterally-projecting fingers or teeth, *h*, as shown in the several figures, said teeth being made of segmental form, to permit a considerable rocking movement without allowing coals or cinders to fall between the bars and escape or lock the bars against movement.

It will be seen by referring to the drawings that each grate-bar has a longitudinal opening along its middle. This is a feature of importance in a rocking-bar grate, because there is always a tendency for ashes to accumulate along the middle line where such opening is not made. Reduction of weight and decrease in danger of melting down also follow the construction. The journals *g* at the forward end of the grate-bars are each furnished with crank-arms *i*, and are made of such length as to project beyond the inner bar of cross bar or support E, leaving a portion of the journal exposed in front of rear bar, *d*, as more fully shown in Fig. 4. The grate-bars G are placed with their journals *g* in the seats or bearings *f*, and moved forward until the shoulders of the forward journals abut against the cross-bar E, in which position they are retained by a yoke, H, having slotted bars *i*, to straddle the journals *f* and prevent the grate-bars from moving backward. By this arrangement the crank-arms *i* are kept always in alignment regardless of expansion or contraction of the grate-bars, and ample provision for such expansion and contraction can be made at the rear end of the grate-bars, where they are supported in cross-bar F. The yoke H is retained in place and held against shifting or tipping by lugs *j*, formed on the rear side thereof, and seated in recesses *k* in cross-bar E, as shown in Figs. 1, 4, and 5. The journal *g* of one of the grate-bars, preferably the middle one, is extended forward through and beyond recess or bearing *e* of cross-bar E, and is made of polygonal form to receive a shaker handle or lever, I, as usual.

The several grate-bars are connected and caused to rock or tip in unison by means of

a connecting-bar, J, arched as shown in Figs. 1, 2, and 4, and having eyes *l* to fit the crank-pins *m* of the crank-arms *i*. This bar is applied to the crank-pins *m* before the bars are crowded forward, and secured by yoke H, and is retained in place by the furnace-front K, which fits close up against the ends of the crank-pins and connecting-bar, as shown in Fig. 2, and renders nuts and keys unnecessary.

The working parts—that is to say, the journals, crank-arms, yoke, and connecting-bar—are all protected from the fire by the lining L, and are in the same way protected against coal-cinders or other matter that might clog there and interfere with their free operation.

The foregoing construction, besides being simple, cheap, and effective, is especially advantageous, in that it permits the grate-bars or any one or more thereof to be readily removed and renewed. To do this it is only necessary to raise up or remove the front lining, L, raise the yoke H, slide the grate-bar back until its crank-pin *m* is withdrawn from the connecting-bar J, when the bar can be raised at one end, dropped into the ash-pan, and withdrawn from the front of the furnace. By reversing the operation the new bar can be inserted.

The seats *f* of the cross-bar F are made deep enough to permit the grate-bar to slide back sufficiently to withdraw the crank-pin from the connecting-bar, and the rear journals are likewise prolonged to permit the bars to be drawn forward to the proper position to receive the yoke H.

Having thus described my invention, what I claim is—

1. In a furnace or heater, the combination of front and rear cross-bars, E F, provided with bearings *f f*, grate-bar G, having journals *g g* and crank-arms *i*, and a yoke, H, interposed between the crank-arms and the cross-bar E and straddling the journals, substantially as described and shown.

2. The combination of cross-bars E F, provided with bearings *f f* and with a furnace-front, grate-bars G, provided with journals *g g* and crank-arms *i*, having crank-pins *m*, and connecting-bar J, applied to the crank-pins and held thereon by the furnace-front, substantially as described and shown.

3. The combination of supports E F, provided with bearings or recesses *f f*, grate-bar G, having pins or studs *m*, yoke H, straddling the journals *g* between the crank-arms and the support E, the connecting-bar J, applied to the crank-pins *m*, and the furnace-front L, fitting close against the front of the connecting-bar J and serving to retain the same in place.

4. In combination with a furnace and with rocking grate-bars mounted therein, connecting and operating mechanism applied to said bars, an independent removable lining-plate interposed between the fire-box and said mechanism, to protect the latter from the fire, and a furnace-front outside of said mechanism and fitting closely against the same, to protect and retain it in place, all arranged substantially as shown, whereby access may be had to the operating mechanism by removing the lining.

5. In combination with front and rear supporting-bars, E F, having seats or journals *f*, the grate-bar G, having elongated bearings *g g*, whereby the bars are adapted to move lengthwise in their bearings, to permit them to be connected with or disconnected from the operating mechanism.

6. In combination with a grate-bar having elongated journals at its ends, and with arms *i*, projecting from the journals at one end, support E at the forward end, provided with seats *f f* and recesses *k k*, support F at the rear end, provided with elongated seats *f f*, and a movable yoke, H, interposed between the arms *i* and the support E, and provided with lugs *j*, adapted to fit the recesses *k*, as and for the purpose set forth.

7. In combination with a grate-bar having elongated journals at its ends, and with arms *i*, projecting from the journals at one end, supports E F, having seats *f f*, in which said journals can be moved lengthwise, and a movable yoke, H, straddling the journals and interposed between the arms *i* and support E, all substantially as described and shown.

STEPHEN D. FISHER.

Witnesses:

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ALFRED E. BARR.