(No Model.)

C. H. RADKE.

FURNACE GRATE.

No. 572,275. Patented Dec. 1, 1896.

Fig. 1.

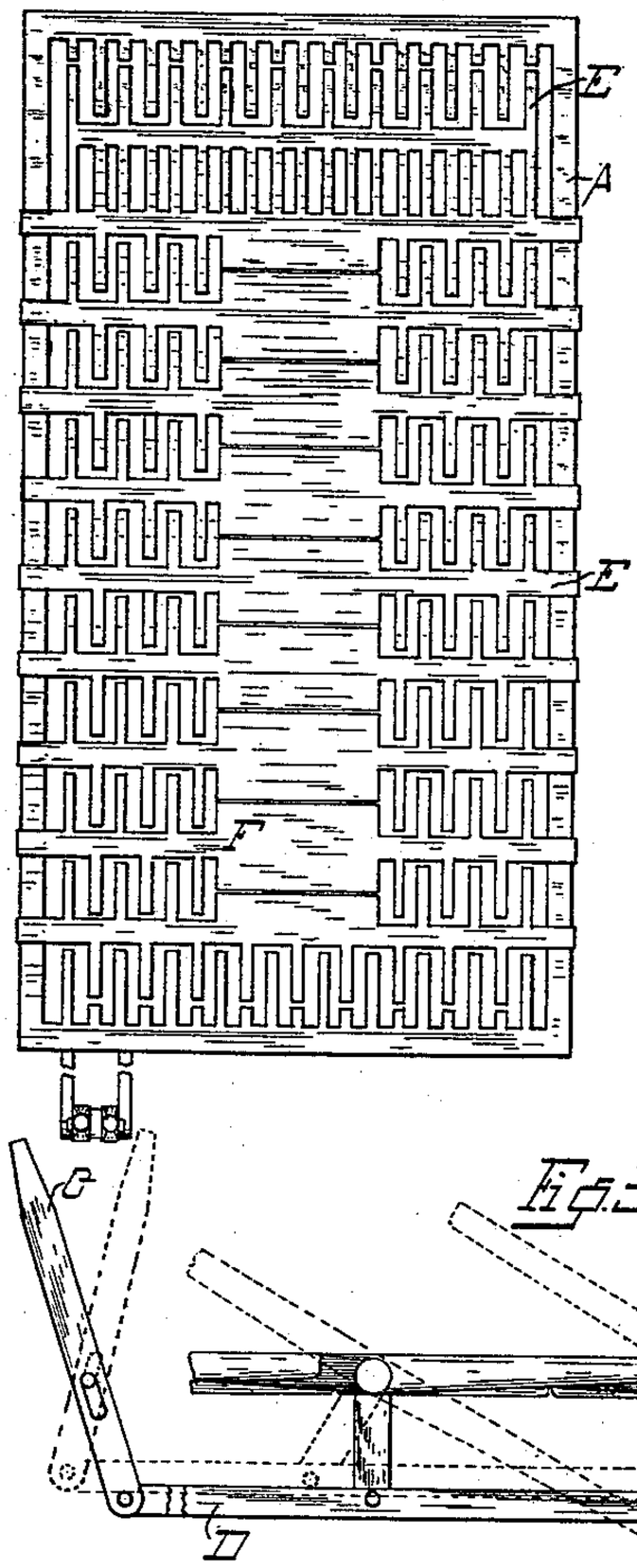


Fig. 2.

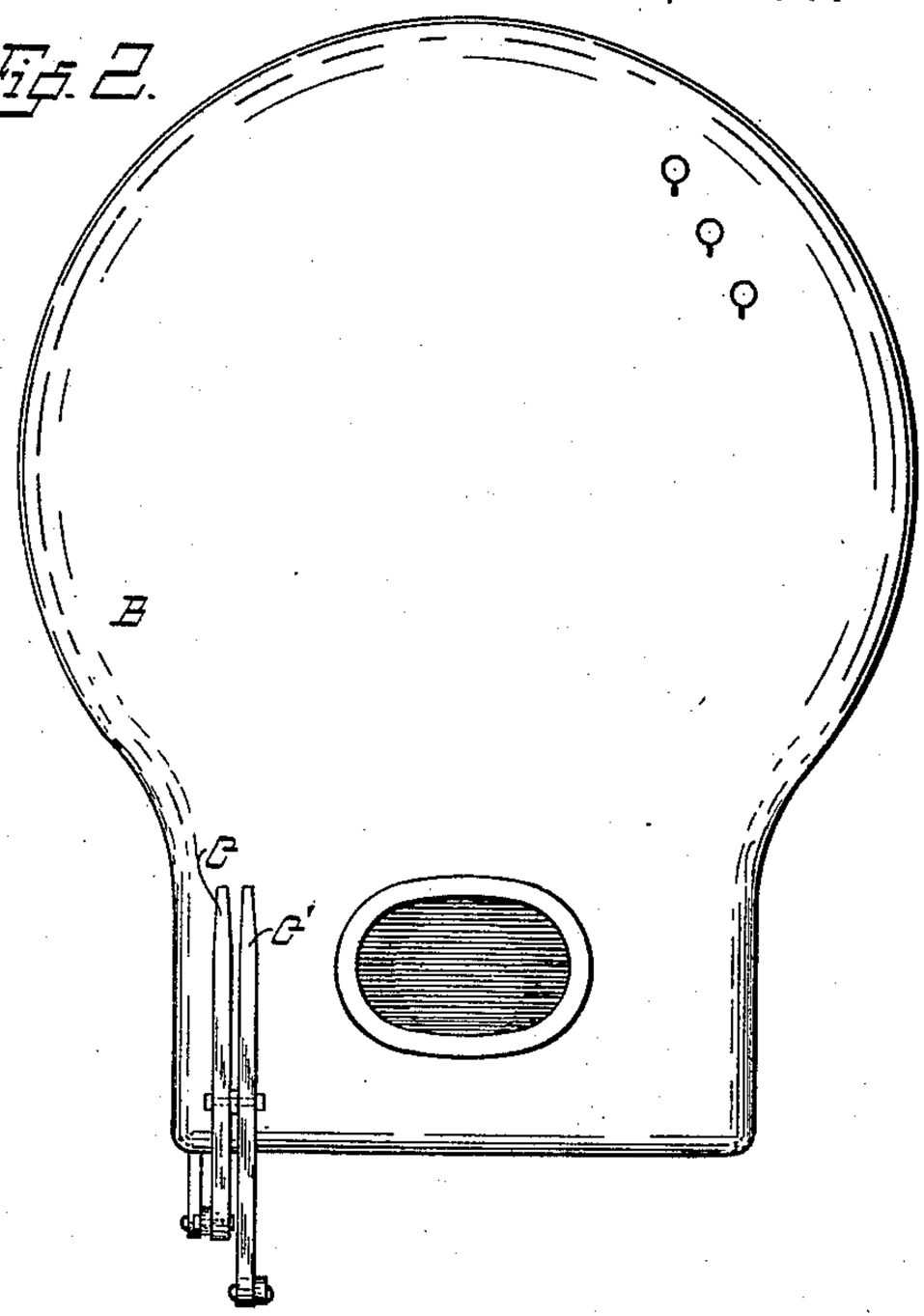
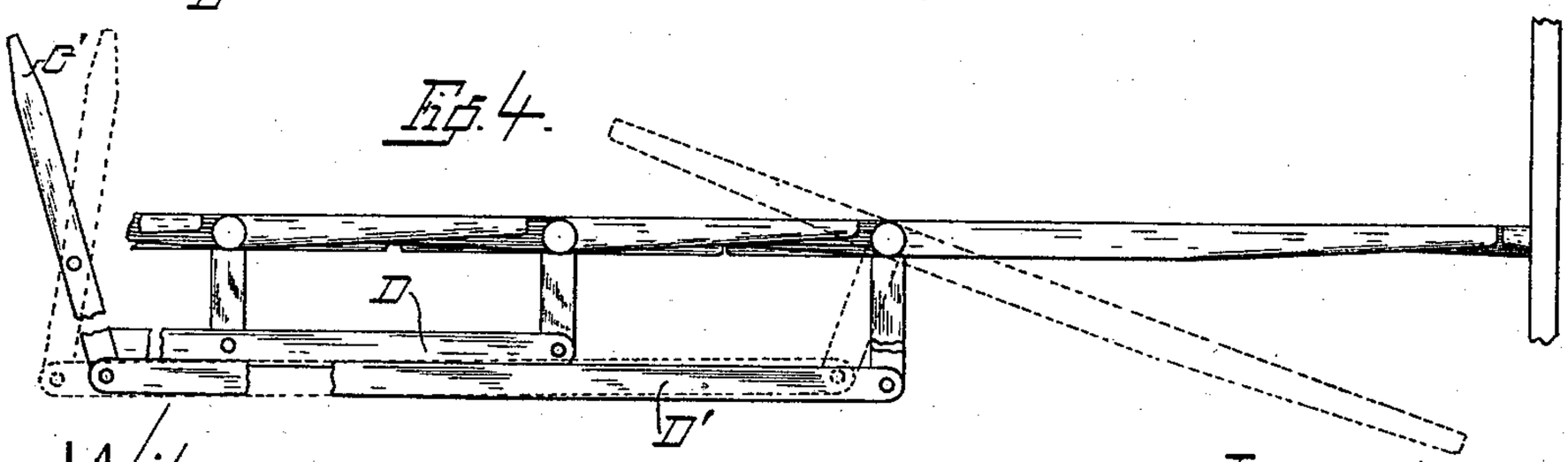


Fig. 3.

Fig. 4.



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UNITED STATES PATENT OFFICE.

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FURNACE-GRATE.

SPECIFICATION forming part of Letters Patent No. 572,275, dated December 1, 1896.

Application filed June 21, 1895. Serial No. 553,548. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. RADKE, a citizen of the United States, residing at Kaukauna, in the county of Outagamie and State of Wisconsin, have invented new and useful Improvements in Furnace-Grates, of which the following is a specification.

My invention relates to improvements in grates for fire-boxes of locomotive or other boilers having a strong artificial draft.

The objects of my invention are, first, to substitute a heated dead-air space for the body of non-heat-radiating fuel which ordinarily occupies the center of a fire-box; second, to limit the combustion to those parts of the fire-box where it is most efficient; third, to so concentrate the draft of air as to increase the rapidity of its movement, whereby a more rapid combustion is obtained.

In the drawings, Figure 1 is a top view of my improved grate. Fig. 2 is a rear view of the fire-box and boiler, showing the position of the shaking or dumping levers. Fig. 3 is a detail view in longitudinal section, showing the position of the grate-bars when in the act of dumping the grate. Fig. 4 is a similar view showing the grate-bars of the clinker-grate and with the intermediate grate-bars broken away.

Like parts are identified by the same reference-letters throughout the several views.

The grate-supporting frame A, the boiler B, shaking-levers C C′, and grate-connecting bars D D′ are all constructed substantially in the ordinary manner.

My improvements consist more especially in the construction of the grate-bars E E with a central closed surface F, as best shown in Fig. 1. The part F of each grate-bar E preferably occupies about one-third of its length and is of such width that the adjacent edges of the several parts F are in close proximity, thus forming an almost continuously-closed center which causes the draft of air to pass toward the right and left through the open spaces between the several grates. In feeding the furnace the coal is thrown to the sides, leaving the closed portion in the center without fuel, and this space is thus occupied by a column of hot air which greatly facilitates the combustion at the sides.

It will be observed that my invention is of special value when used in connection with the furnace of locomotive or other boilers having a strong artificial draft, as the fuel in such furnaces is never of considerable depth and can easily be prevented from accumulating in the central closed portion of the grate.

I am aware that in some instances it has been attempted to close portions of the sides or rear of ordinary furnace-grates for the purpose of limiting the combustion in certain portions of the fire-box, but so far as I am aware it has never before been attempted to close the center of the grate or to provide for an area of combustion surrounding a closed or dead space having no fuel.

In the operation of my invention it is essential, first, that the fuel be placed only upon the grated surface, and, second, that there be an artificial or forced draft, that is, a draft caused by forcing air through the furnace, as with a bellows or blower, or by rarefying the air in the smoke-stack or chimney, as with a suction-fan, or by the discharge of steam into the smoke-flue.

In the operation of a locomotive-engine it is customary to keep a depth of not more than two inches of fuel in the fire-box, reliance being had upon the strong artificial draft maintained by exhausting steam into the smoke-flue to maintain a rapid combustion. By the use of my invention the column of dead air above the closed surface greatly facilitates the combustion in the surrounding mass of fuel, and by tests made with locomotive-engines in practical use I have demonstrated that a substantially perfect combustion is attained, as evidenced by the almost total absence of smoke escaping from the stack and by the greatly-decreased amount of fuel necessary for a given amount of duty.

It is therefore evident that my invention differs from all other forms of grates with closed surfaces, both in the provision of a central closed surface surrounded by grating and in combining the grate with a furnace having a forced draft whereby a rapid combustion can be maintained with a shallow depth of coal upon the grated portion and none at all upon the closed portion of the grate.

Having thus described my invention, what

I claim as new, and desire to secure by Letters Patent, is—

1. A furnace-grate for locomotive or other furnaces having a strong draft adapted to maintain combustion in a shallow body of fuel, consisting in the combination of a central closed surface, adapted to remain uncovered by fuel, and surrounding open grating adapted to support a shallow body of fuel in a state of rapid combustion, substantially as described.

2. A furnace-grate for locomotive or other furnaces having a strong draft adapted to maintain combustion in a shallow body of fuel, consisting in the combination with the supporting-frame, of a series of open grate-bars, each provided with a closed or solid center F of sufficient width to substantially close the space between it and the corresponding portions of adjacent grate-bars substantially as described.

In testimony whereof I affix my signature in the presence of two witnesses.

CHARLES H. RADKE.

Witnesses:
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