

(No Model.)

W. P. THOMPSON.
FURNACE AND GRATE.

No. 335,658.

Patented Feb. 9, 1886.

Fig. 1.

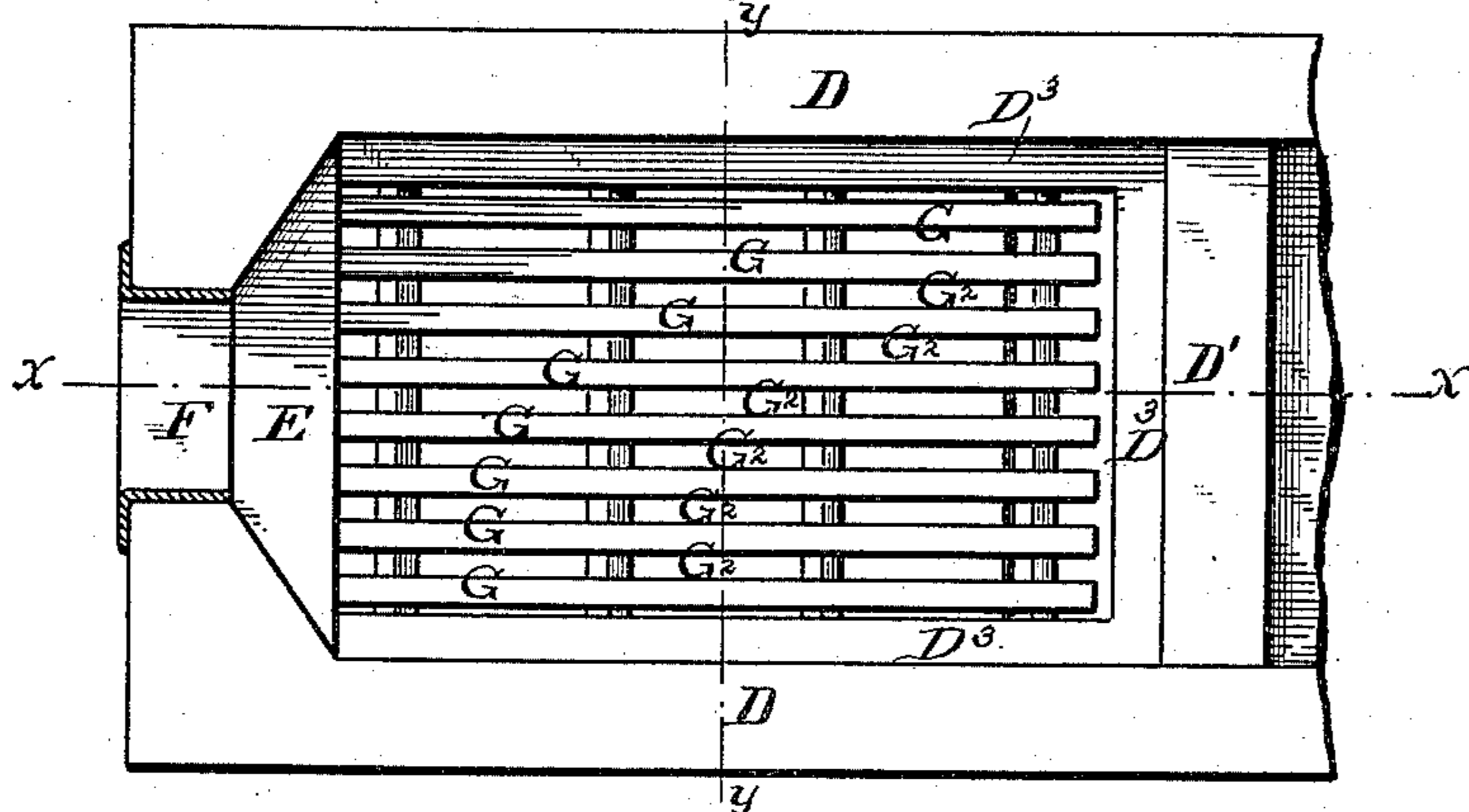


Fig. 2.

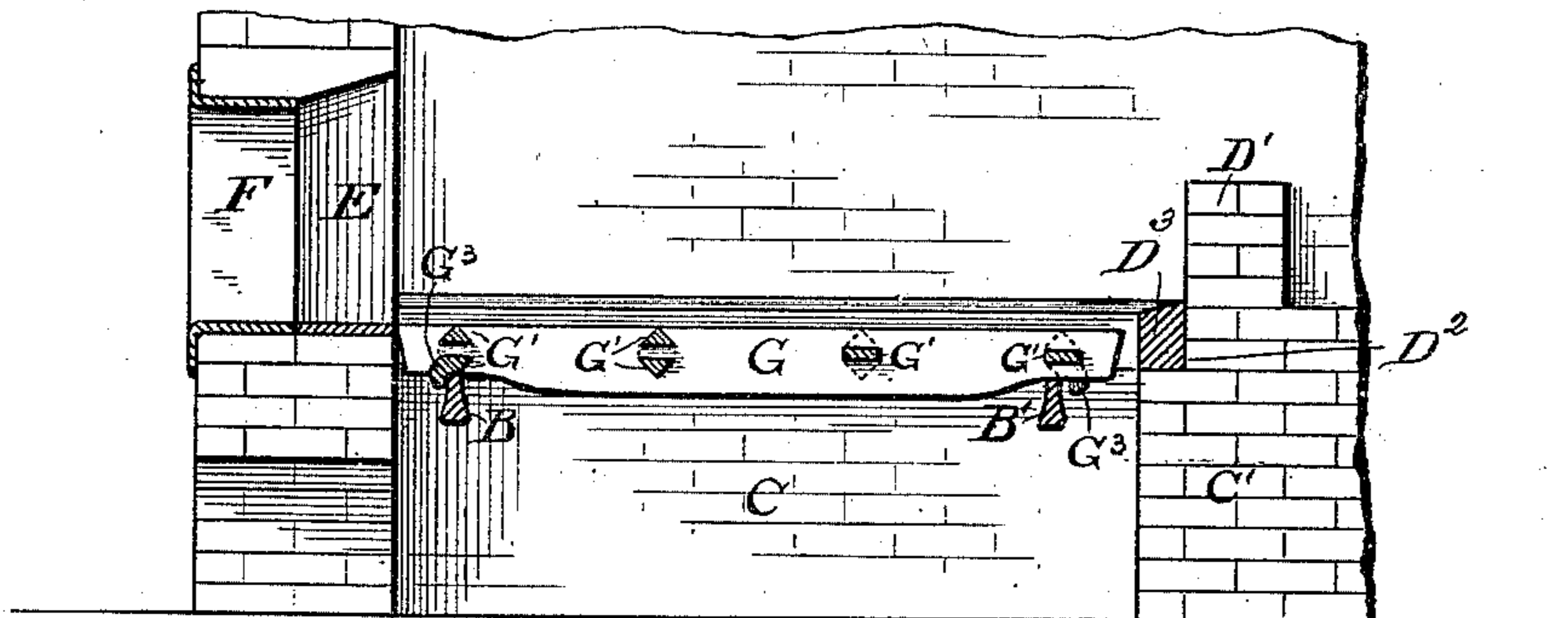


Fig. 3.

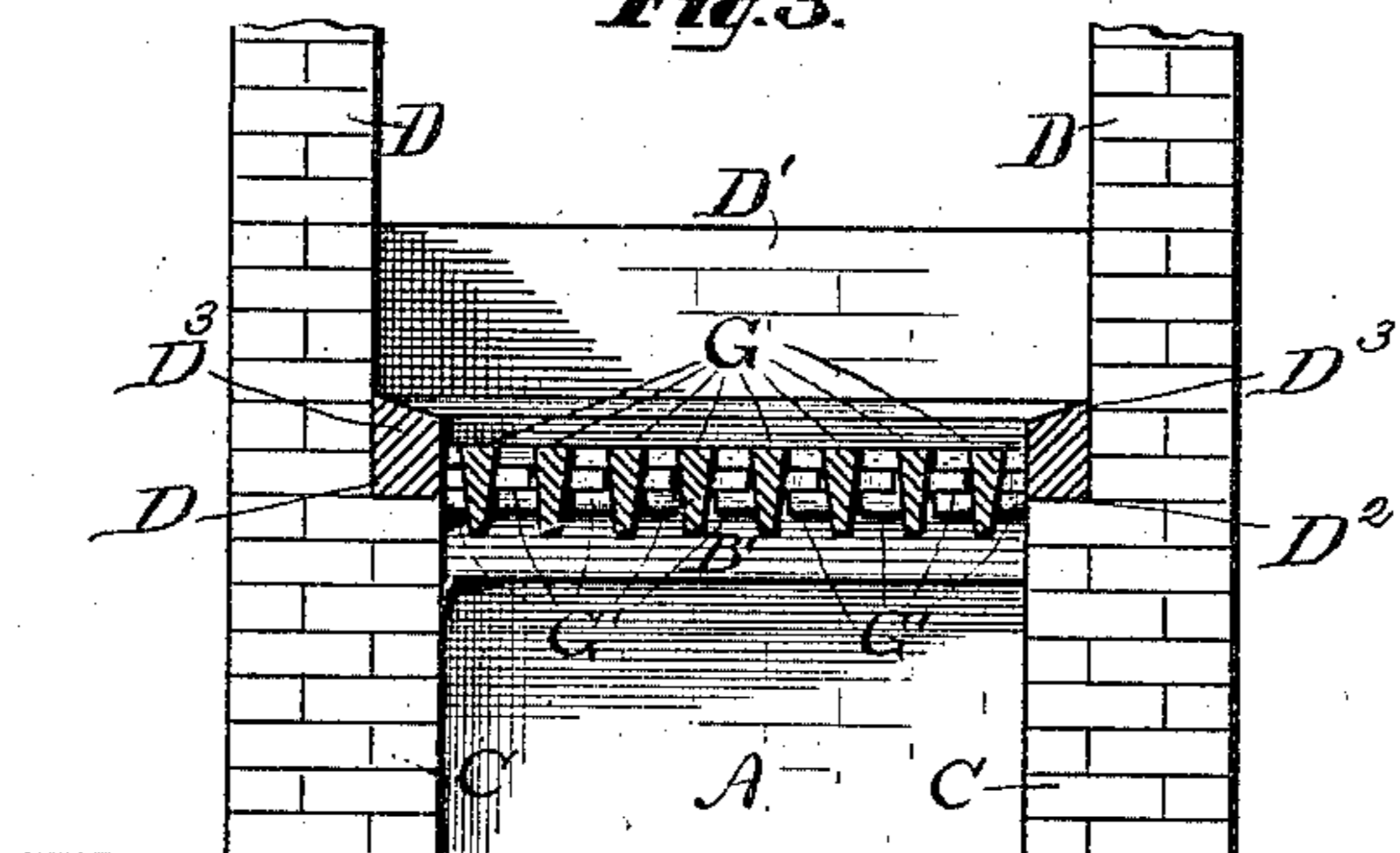


Fig. 4.

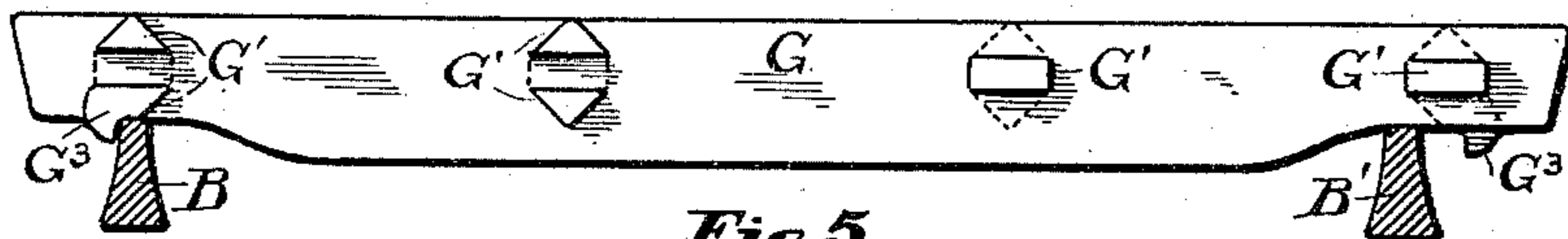
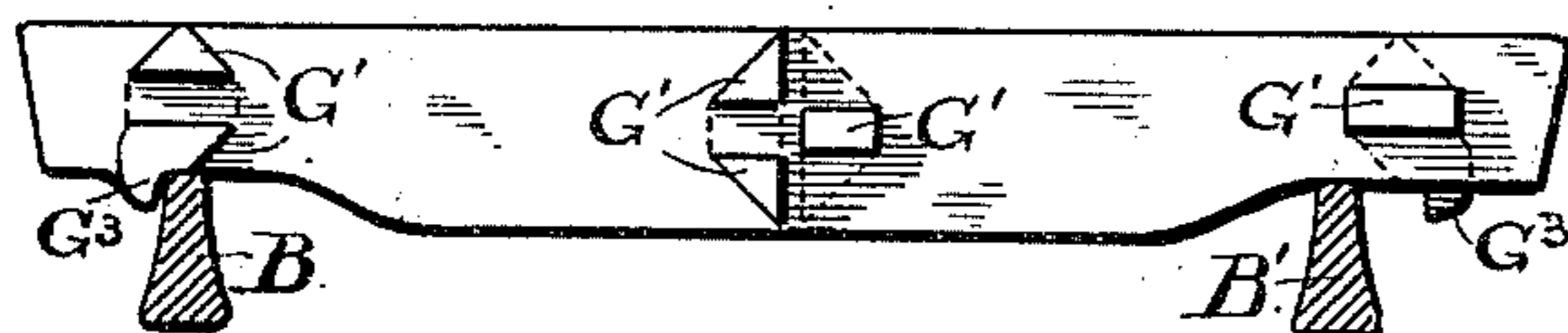


Fig. 5.



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FURNACE AND GRATE.

SPECIFICATION forming part of Letters Patent No. 335,658, dated February 9, 1886.

Application filed May 18, 1885. Serial No. 165,971. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM P. THOMPSON, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Furnaces and Grates Therefor; and I do hereby declare the following to be a sufficiently full, clear, and exact description thereof as to enable others skilled in the art to make and use the said invention.

This invention relates to furnaces and grates therefor for burning coal, and has for its object greater durability of the grates and furnace-lining, the avoidance of waste of fuel and greater convenience of the furnace in firing and cleaning the fires.

The nature of this invention consists in removable shoulders of fire-brick or other refractory material formed in the furnace around and somewhat above the sides or edges of the grate, a peculiar form of grate-bar and supporting-bar therefor, so combined as to preserve an even surface of the grate and the dead-plate and avoid any opening between the dead-plate and grate through which fuel might fall, or in which clinkers could become lodged or fastened, and incidentally the grate is made reversible, so that the rear and front ends are alike and can be used interchangeably, and the space which opens and closes by the contraction and expansion of the grate-bars is located at the rear of the grate, so that it may be covered by the clinkers, which, when broken, fall through the space without admitting any drafts of cold air to flow over the mass of fuel upon the grate.

I will now proceed to fully and particularly describe the mode of making and using the said invention, referring in so doing to the annexed drawings, in which—

Figure 1 shows a plan of a furnace containing this invention. Fig. 2 is a vertical central section in the plane indicated by the line $x x$ in Fig. 1. Fig. 3 is a vertical transverse section in the plane indicated by the line $y y$ in Fig. 1; and Figs. 4 and 5 show the enlarged side elevations of grate-bars and sections of the supporting or bearing bars.

The same letters of reference apply to the same parts in the several figures.

A represents the ash-pit.

B and B' represent the bearing-bars, having the preponderance of metal in their lower edge, and thin and narrow upon their upper edge. The sides of the bearing-bars are curved, so as to avoid any shoulders or ledges upon which clinkers, ashes, or cinders could lodge and impair the draft.

C and C are the side walls of the ash-pit.

C' is the rear wall of the ash-pit.

D and D are the side walls of the furnace.

D' is the rear or bridge wall of the furnace.

E is the dead-plate of the furnace.

F is the furnace-door.

G are the grate-bars, having interlocking projections G' formed on their sides, which permit the bars to slide upon each other lengthwise as they expand and contract differentially, but prevent the bars from falling or rising one above the other by warping, and also separate the bars, so as to leave air-spaces G² for draft between the bars.

G³ are hooks or projections formed on the under edge of each bar near each end, which, by engaging with the front edge of the bearing-bar B nearest to the dead-plate, hold the front ends of the grate-bars so close to the edge of the dead-plate E that fuel cannot drop between the bars G and the plate E.

The rear bearing-bar, B', is so placed that the hooks G³ near the rear end of the bar cannot touch it under any condition of expansion and contraction.

The bars G G are not symmetrical, but are shaped similarly upon opposite sides in the opposite halves of their length, so that they can be turned and used end for end in the furnace with like fitting and resulting effect.

The bars B and B' are built in the walls C of the ash-pit A at such height as to place the upper surface of the front ends of the grate-bars G level with the rear edge of the upper surface of the dead-plate E.

The sides and ends of the bars G are so beveled that anything entering between them or between them and the dead-plate E, ash-pit walls C C and C', or furnace-walls D D and D' falls readily through into the ash-pit, thus leaving the draft-spaces unobstructed.

The furnace is contracted on its two sides and at the bridge-wall. Below the level of the

grate-bars shoulders $D^2 D^2$ are formed, which support blocks of refractory material, (marked D^3), the upper surfaces of which blocks are slightly above or level with the surface of the
 5 grates and upon which surfaces a portion of the fuel is supported and receives a less supply of air than that over the grate-bars $G G$, so that the combustion of the fuel next to the walls $D D$ and D' is less rapid, and the heat
 10 therefore less intense at the walls than in the other parts of the furnace. The walls are thereby protected from injury by the adhesion of clinkers and removal thereof.

The walls of the furnace and ash-pit and
 15 the blocks D^3 are not built solidly and connected together, but with the blocks D^3 readily detachable and removable without cutting or otherwise impairing the furnace-walls.

The grate-bars being held so close to the
 20 dead-plate as to prevent the fuel falling through and admitting cold air from the ash-pit to pass over the fuel on the grate, the checking or impairing of combustion by such cold currents is avoided, the grate-bars can have
 25 ample space, thus avoiding the possibility of their jamming by endwise expansion, and the burning fuel and hot clinkers resting upon the shoulders D^2 , at the rear of the furnace, impart heat to the air flowing in at that
 30 point, and promote more thorough combustion of the inflammable gases over and beyond the fuel in the furnace. Small broken pieces of clinkers fall through the spaces between the grate-bars and the spaces between bars
 35 and the walls $C C$ and C' .

This furnace and grate in operation affords good combustion of gases, has a great durability of setting, is inexpensive to construct, durable in operation, and the walls or shoulders of the walls are readily repaired.
 40

I am aware that bars having interlocking tenons and mortises and interlocking dovetail

projections and corresponding cavities arranged to preserve the level of the bars have been used; also, that bars having hooks formed
 45 on under edge into which a cross-bar was introduced for a like purpose, none of these do I claim; but

What I do claim is—

1. A furnace having a chamber wider and
 50 larger than the ash-pit, having shoulders formed of removable blocks of refractory material contiguous to the grate-surface, with a grate formed of separate bars, each free to expand independently lengthwise and secured
 55 closely to the dead-plate, substantially as shown, and for the purpose set forth.

2. An improved reversible furnace-grate consisting of bars having upon their sides in one-half of their length on each side and from
 60 opposite ends lateral projections adapted to interlock with corresponding projections upon the opposing sides of the adjacent bars as set in a furnace, so that the lateral projections of any bar, when reversed in the direction of its
 65 length in relation to the other bars, will properly engage with the projections upon the other bars, substantially as and for the purpose set forth.

3. The combination of bearing-bars B and
 70 B , grate-bars $G G$, provided with projections G' , and hooks G^3 , with a dead-plate, E , arranged substantially as set forth and described.

4. In a furnace having a combustion-chamber wider and longer than the grate-surface,
 75 the combination of shoulders level with or slightly above the grate-surface, formed of removable blocks of refractory material, substantially as and for the purpose set forth.

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Witnesses:

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