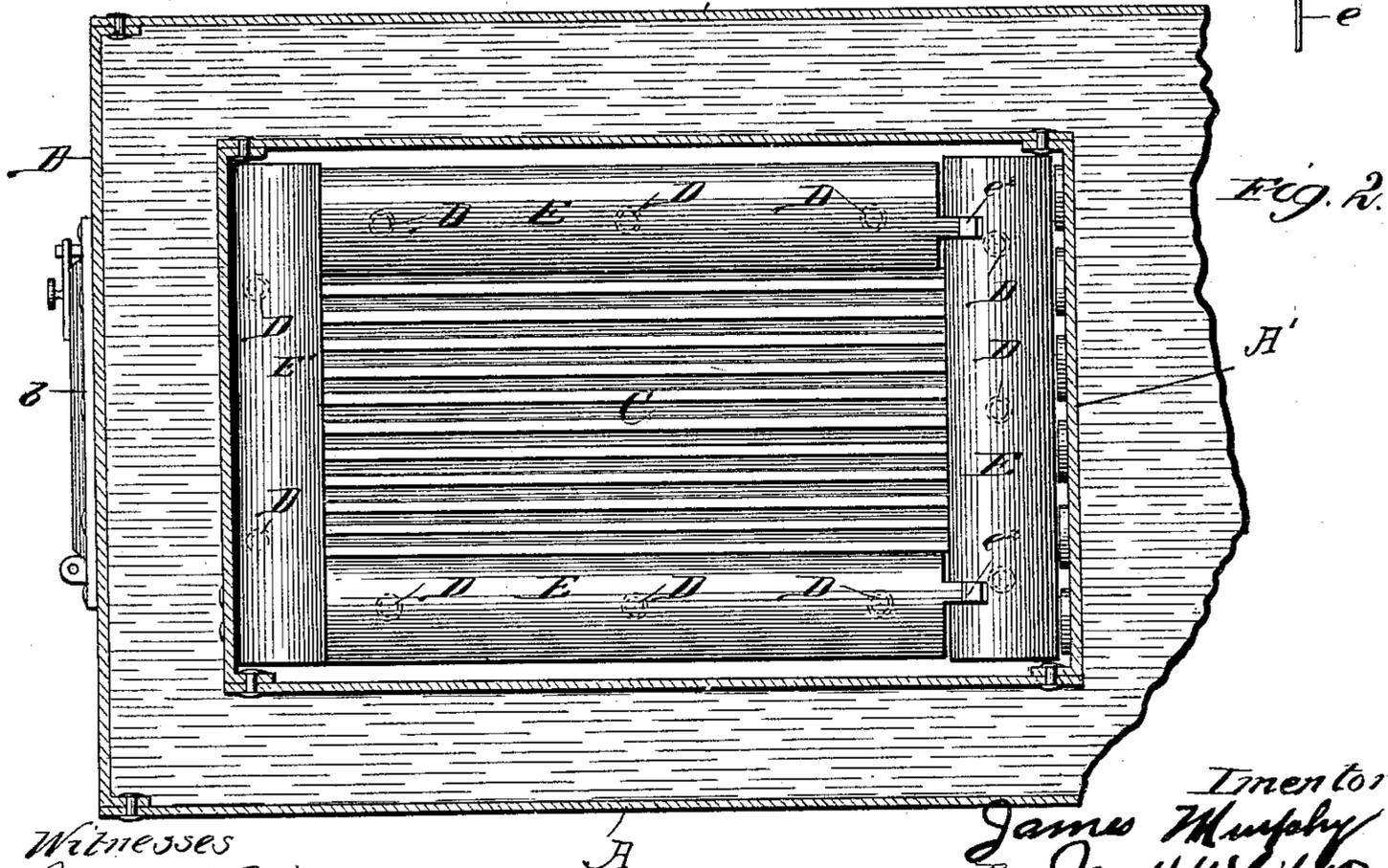
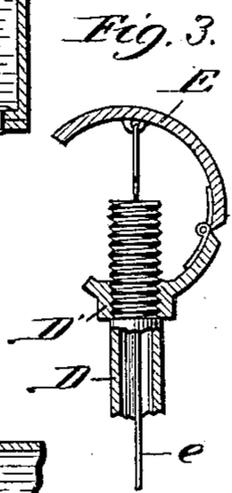
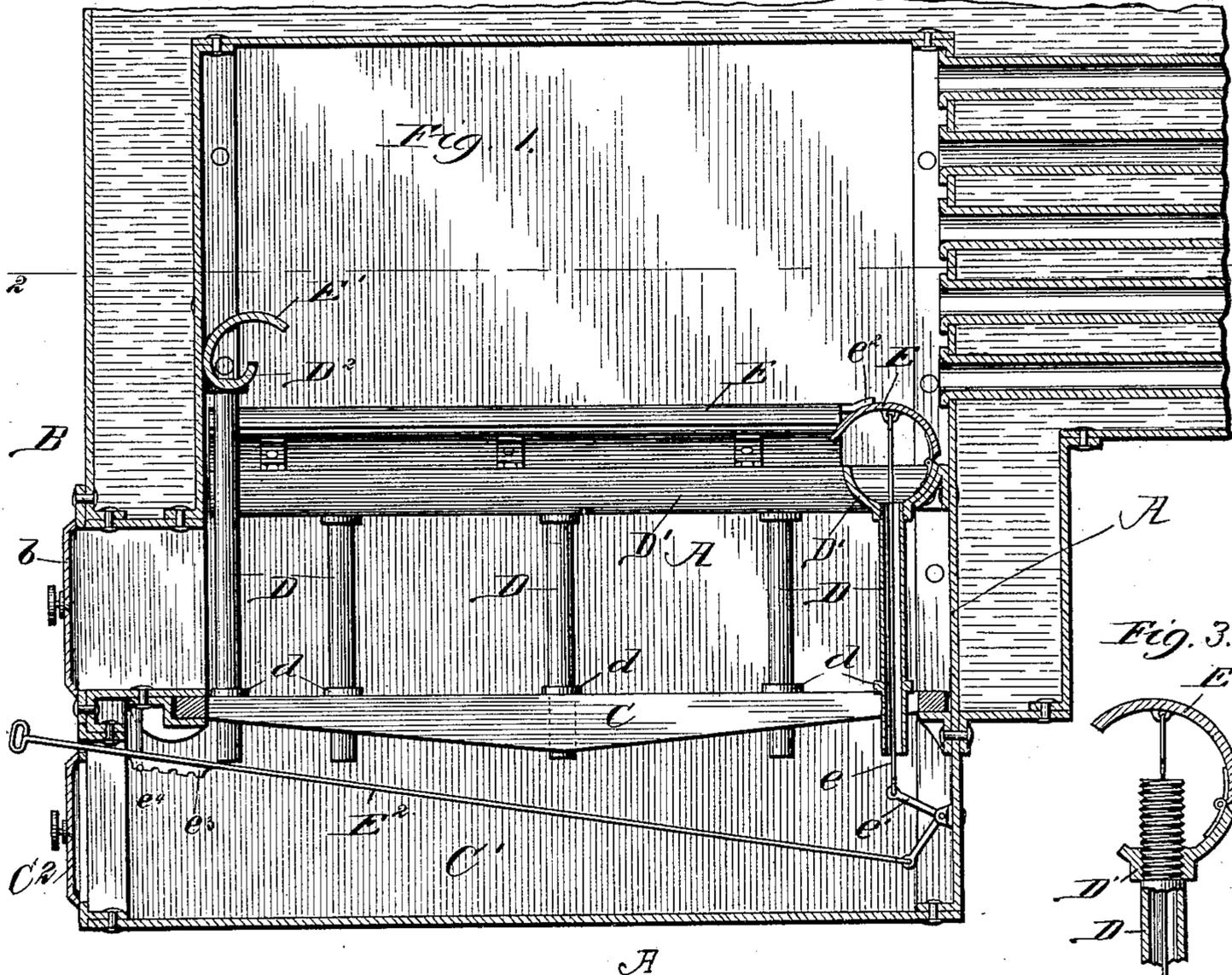


(No Model.)

J. MURPHY.  
FURNACE.

No. 452,414.

Patented May 19, 1891.



Witnesses  
Fredrick H. Mills.  
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Inventor:  
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# UNITED STATES PATENT OFFICE.

JAMES MURPHY, OF CHICAGO, ILLINOIS.

## FURNACE.

SPECIFICATION forming part of Letters Patent No. 452,414, dated May 19, 1891.

Application filed January 22, 1891. Serial No. 378,638. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES MURPHY, of Chicago, in the State of Illinois, have invented certain new and useful Improvements in Furnaces, of which the following is a specification.

My invention relates to furnaces generally and means therein for introducing air into the fire-box over the fuel; and one of the objects of my improvements is to provide suitable means for introducing air into the fire-box over the fuel in such manner that it will be heated previous to coming in contact with the fuel and gases of combustion.

Another of the objects of my improvements is to provide means for adapting the air-currents thus introduced to the height of the fire in the fire-box, as when it contains more or less fuel.

These objects I have attained by the means illustrated in the accompanying drawings, in which—

Figure 1 is a longitudinal vertical section through the front part of an ordinary steam-boiler, showing the fire-box and the application of my improvements thereto. Fig. 2 is a horizontal section taken on the line 2 2 of Fig. 1, and shows a plan view of the same. Fig. 3 is a detail showing a vertical section through one of the air-pipes as applied in modified form.

In the drawings, A designates the double sides of the boiler, with water-spaces between, forming the side walls of the fire-box. A' is the fire-wall at the rear of the fire-box. B is the front, and b the door for introducing fuel. C is the grate, and C' the ash-pit, with door C<sup>2</sup>. These parts are all of ordinary construction.

D designates the air-pipes. These pipes are secured at the upper ends in holes in a semi-tubular piece D'. One of these semi-tubular pieces is extended across the rear, one along each side, and one across the front of the fire-box, resting against the walls. They are supported by the air-pipes which pass between the grate-bars, the latter being recessed, if necessary, to make the space large enough between them at the points where the pipes come to permit them to pass through, and there being a lug or shoulder d on the pipes to prevent their falling through too far.

On the rear and sides I provide hinged deflectors E. These are hinged to the outer edge of the semi-tubular pieces D' and project inward over and beyond the inner edge of the same, so that the air coming up through the air-pipes will be deflected toward the center of the fire-box. By this means air from the ash-pit is taken up through the said air-pipes, heated on the way up, and discharged under the deflectors, and by them directed toward the center of the fire in such manner as to aid in more perfectly consuming the smoke and other inflammable gases of combustion.

The deflector E' and semi-tubular plate D<sup>2</sup> across the front are preferably made integral instead of being hinged together and placed a little higher than those at the sides and rear.

In the modification shown in Fig. 3 the piece D' is not extended up at the inner side so as to form a half-tube; but the pipe is carried up a little higher, so as to discharge the air-current near to the deflector, than in the case where the semi-tubular piece is used.

For the purpose of adjusting the deflectors, in order to regulate the air-currents passing up through said air-pipes to the height of the fire, I pivot a rod e to one of said hinged deflectors E, extend the same down through one of the air-pipes, connect it to a bell-crank e', and provide a hand-rod E<sup>2</sup> in connection with the bell-crank for operating the same. The other deflectors have a projection e<sup>2</sup>, which extends over and rests upon the one which is connected with the rod e, so that the raising or lowering of said rod will correspondingly raise or lower the inner edges of all of said hinged deflectors.

The rod E<sup>2</sup> is provided with a ratchet e<sup>3</sup>, which is adapted to a stationary bar or plate e<sup>4</sup> for setting and holding the deflectors at different points of elevation or depression, as desired.

I contemplate using the deflectors on all sides of the fire-box or on the two opposite sides only when a narrow fire-box is used.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The fire-box, in combination with air-pipes D, supported inside the fire-box and

having their lower open ends in communication with the air outside, the piece D', connected to the upper ends of said pipes and supported thereby, and the deflectors E, connected to the outer edge of piece D', extending over and inward beyond the same, and being curved downward at their inner edges, substantially as and for the purpose specified.

2. The fire-box, in combination with the air-pipes, the deflectors connected at the corners by means of projections  $e^2$ , so as to be raised or lowered together, a rod, as  $e$ , pivoted to one of said deflectors, extended through one of the

air-pipes, and connected with a bell-crank and hand-rod for operating the same, as specified. 15  
3. The fire-box, in combination with hinged deflectors E, air-pipes for introducing air into the fire-box under said deflectors, and rod and bell-crank connections for raising and lowering said deflectors, as and for the purpose 20 specified.

JAMES MURPHY.

Witnesses:

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