

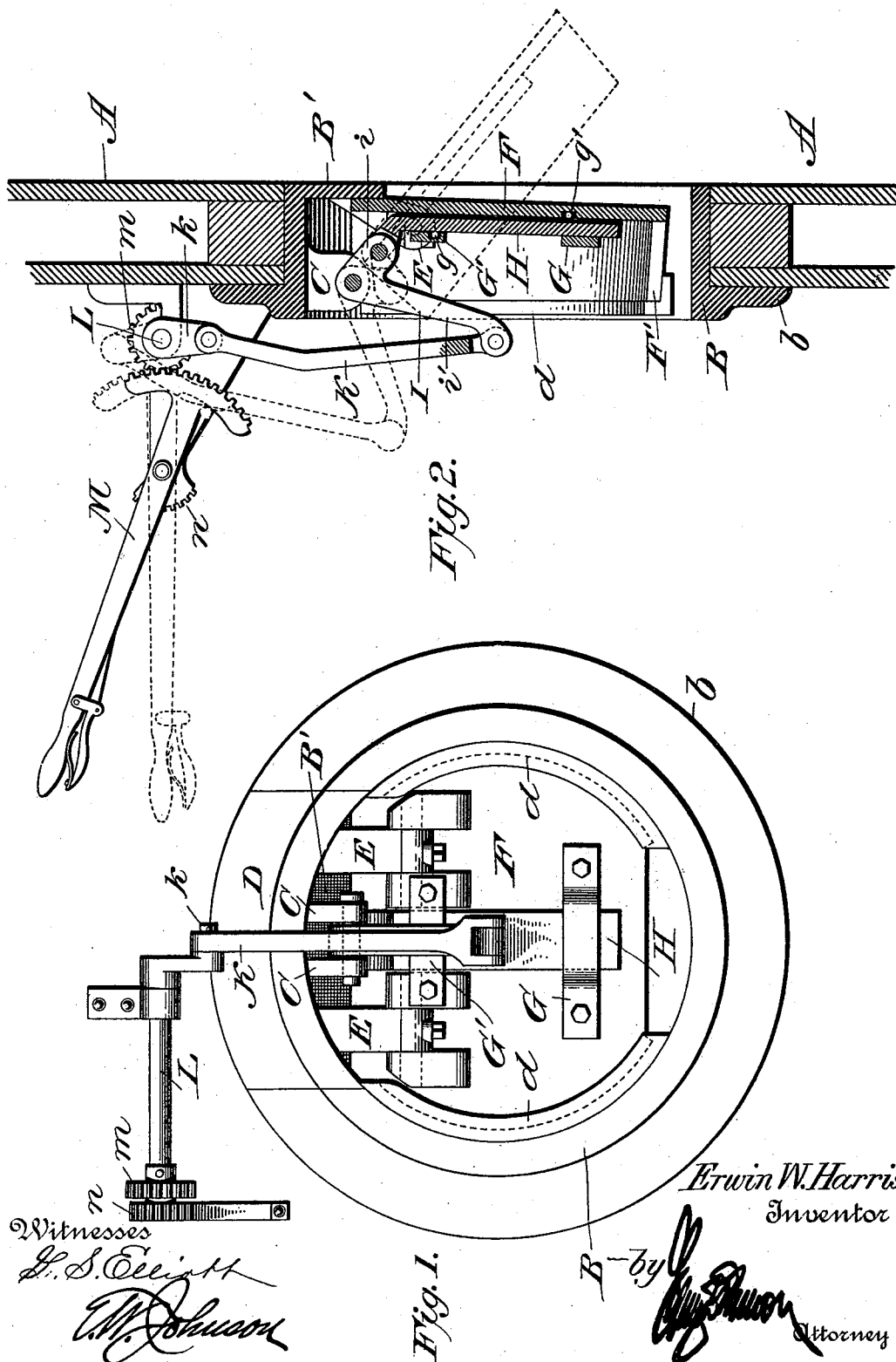
(No Model.)

2 Sheets—Sheet 1.

E. W. HARRIS.
FURNACE DOOR.

No. 510,786.

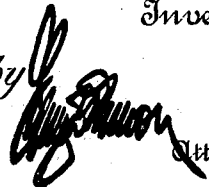
Patented Dec. 12, 1893.



Witnesses

L. S. Eeigst
W. Johnson

Erwin W. Harris
Inventor

By  Attorney

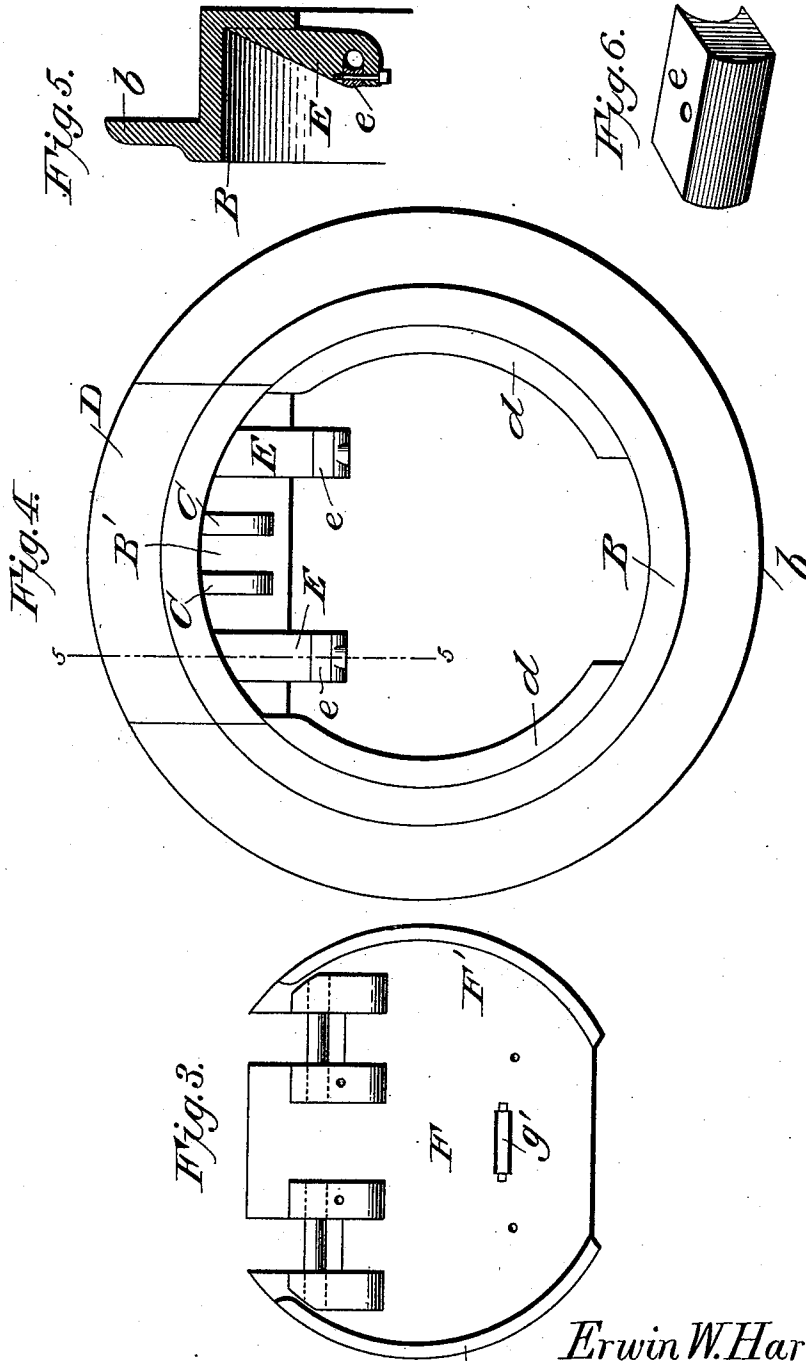
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2 Sheets—Sheet 2.

E. W. HARRIS.
FURNACE DOOR.

No. 510,786.

Patented Dec. 12, 1893.



Witnesses *L. S. Elliott*
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UNITED STATES PATENT OFFICE.

ERWIN W. HARRIS, OF PALISADE, NEVADA.

FURNACE-DOOR.

SPECIFICATION forming part of Letters Patent No. 510,786, dated December 12, 1893.

Application filed July 20, 1893. Serial No. 481,037. (No model.)

To all whom it may concern:

Be it known that I, ERWIN W. HARRIS, a citizen of the United States of America, residing at Palisade, in the county of Eureka and State of Nevada, have invented certain new and useful Improvements in Furnace-Doors; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in furnace-doors of that class which are attached to the fire-box of a furnace or steam-boiler and which are intended to direct the air admitted through the doorway down upon the fuel to assist in the combustion of the fuel and avoid chilling the boiler to the detriment of the steam producing capacity thereof.

The object of the invention is to provide a door of improved construction which may be adjusted at any desired angle so that the admission of the air to the fuel may be under the control of the engineer; and the invention consists in the construction and combination of the parts, as will be hereinafter fully set forth, and particularly pointed out in the claims.

In the accompanying drawings, forming part of this specification, Figure 1 is a front elevation of a furnace-door which is constructed in accordance with my invention. Fig. 2 is a vertical sectional view. Fig. 3 is a front elevation of the door detached from the frame. Fig. 4 is a view of the door frame. Fig. 5 is a sectional view on the line 5-5 of Fig. 4; and Fig. 6 is a perspective view of the filling block.

A designates the part of the fire-box of the furnace or boiler which surrounds the doorway, and within this doorway or opening is secured an annular ring or door-frame B having a flange *b* by means of which it is secured to the fire-box. The annular ring or door-frame is provided at its upper portion with a depending web *B'*, and in front of said web with depending lugs *C C* and *E E*.

For simplicity and ease of manufacture I prefer to make the door-frame A in two parts,

the upper part, D, being fitted to the other part and bolted or otherwise secured to the fire-box, and the part or section D is the one which is formed with the web and lugs hereinbefore referred to. The lower part of the door-frame is provided with inwardly projecting flanges or stops *d d*, the space between the lower ends of said flanges providing for a draft beneath the door, and it is against these flanges or stops that the door strikes when closed.

The depending lugs *E E*, hereinbefore referred to, which depend from the section D of the door-frame, support the door which is pivoted thereto, said lugs being pierced horizontally for the passage of the pivot pins which also pass through lugs formed on the upper end of the door. Instead of piercing the lugs *E E* the pivot pins may be passed into open-ended slots and retained therein by blocks *e*, as shown in Figs. 4 and 5.

F designates the swinging door which is supported as hereinbefore described and is provided with forwardly projecting flanges *F' F'* which are adapted to strike against the stops *d d* when the door is closed. The door is also provided with guide strips *G* and *G'*, which are bolted thereto, the upper guide-strip being provided with a recess in its rear wall for the reception of an anti-friction roller *g*, a similar roller, *g'*, being placed in a recess in the door in the rear of the strip *G*, and within these guide strips is placed a plate *H* the upper end of which is bent forwardly and is bifurcated to receive the short arm *i* of a bell-crank lever *L*, which is pivoted thereto and by which the door is operated. The bell-crank lever is pivoted to the door-frame between the depending lugs *C C*, and the long arm *i'* thereof is connected to the crank-arm *k* of the crank-shaft *L* by the connecting-rod *K*. The crank-shaft is journaled in bearings attached to the front wall of the fire-box adjacent to the doorway, and is provided with a pinion *m* with which meshes the teeth formed on a segment at the end of a lever *M*. The lever is pivoted to a bracket-arm attached to the fire-box, the end of said bracket-arm being formed with teeth *n* with which the ordinary catch-bar carried by the lever engages.

In operation it will be seen that when the

lever is released it may be manipulated to turn the crank-shaft which by the connecting-rod K will rock the bell-crank lever so as to either open or close the door.

5 A furnace-door constructed as hereinbefore described is located entirely within the doorway so that it is not subjected to the heat to such an extent as a door which is partially within the furnace and above the fire-box; 10 and when the door is opened to its full extent it will serve as a guide or deflector to deflect the air down upon the fuel and promote combustion. When the door is fully closed or swung to a vertical position there will be left 15 beneath the door an opening through which sufficient air can pass for keeping up the fire.

By making the door-frame in two parts the section D can be cast or formed with the depending lugs or supports for the bell-crank 20 lever and door, and the bearings are all located outside of the furnace box so that they can be lubricated and readily repaired.

Having thus described my invention, what I claim as new, and desire to secure by Letters 25 Patent, is—

1. A furnace door hung in a door frame and swung upon its hinges by a bell-crank lever pivoted to the door frame and attached to a plate in sliding engagement with the door, 30 substantially as shown.

2. In combination with a furnace door hung in a door frame and having a plate in sliding engagement therewith, of a bell crank lever pivoted to the door frame and attached to 35 said sliding plate, the bell-crank lever being

operated by a lever which engages a pinion on a crank-shaft connected to the bell crank lever, substantially as shown.

3. A furnace door comprising a frame and a section forming a part thereof, said section 40 having depending lugs or supports E E and C C, a door hinged to the lugs E E and having a plate in sliding engagement therewith, and a bell-crank lever fulcrumed between the lugs C C and attached to the sliding plate, 45 substantially as shown and for the purpose set forth.

4. In a furnace door, the combination of a frame having inwardly projecting flanges or stops *d d*, a door pivotally attached to the 50 door-frame and provided on its outer side with plates or guide-strips, a plate located between the guide-strips and side of the door, and a bell-crank lever pivoted to the door-frame the short arm thereof engaging with 55 the sliding plate, substantially as shown, and for the purpose set forth.

5. A furnace door hung in a frame substantially as shown and provided with guide-strips, a plate adapted to move beneath the guide- 60 strips, and anti-friction rollers or bearings adapted to bear upon opposite sides of the plate, substantially as shown, and for the purpose set forth.

In testimony whereof I affix my signature in 65 presence of two witnesses.

ERWIN W. HARRIS.

Witnesses:

J. B. RICE,

C. D. CONVERSE.