(No Model.)

F. H. BAILEY.

FIRE BOX.

No. 486,018. Patented Nov. 8, 1892.

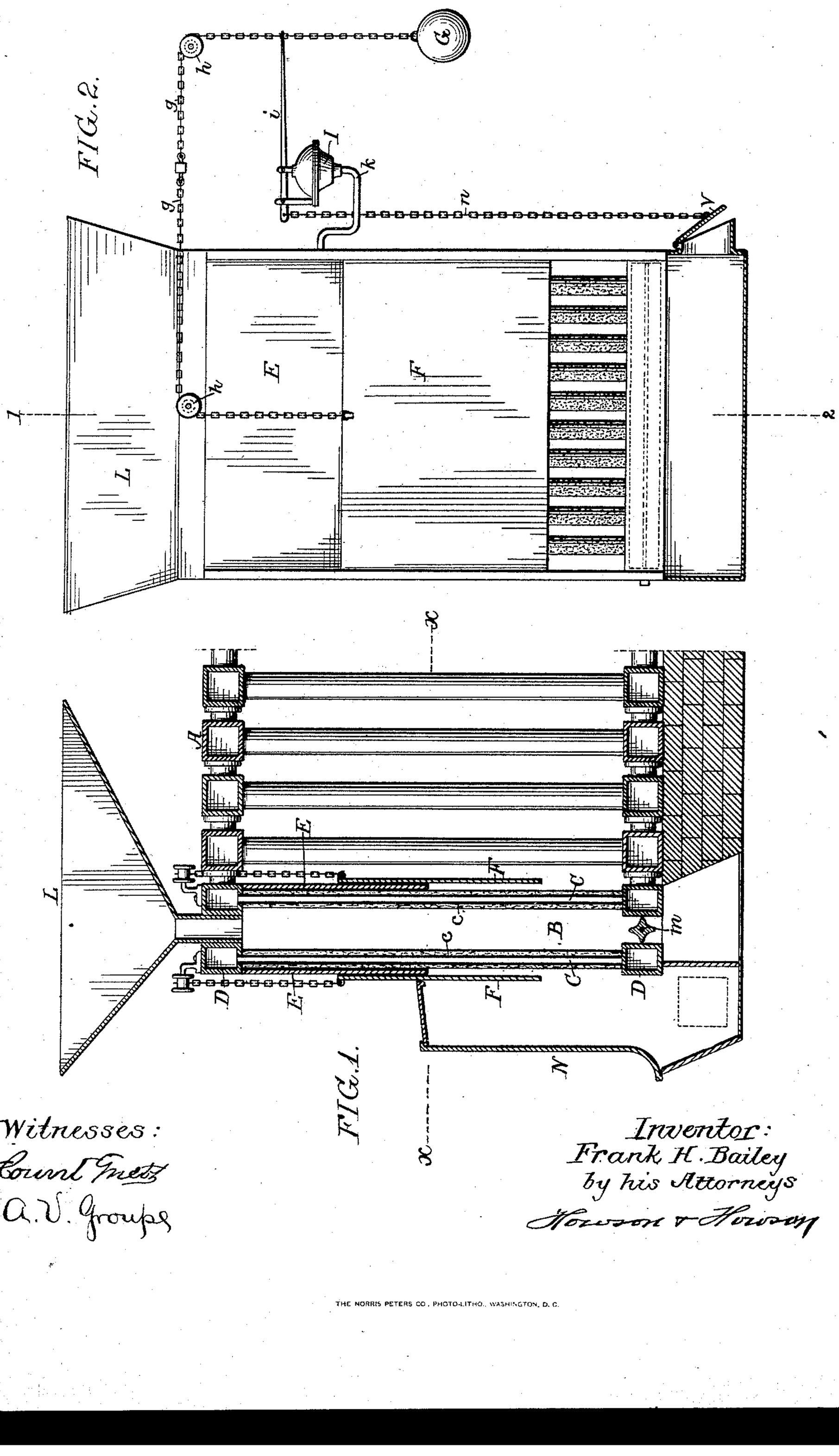

FIG. 1.

Witnesses:
Count Metz
A. V. Groups

Inventor:
Frank H. Bailey
by his Attorneys
Howson & Howson

UNITED STATES PATENT OFFICE.

FRANK H. BAILEY, OF WILKES-BARRÉ, PENNSYLVANIA.

FIRE-BOX.

SPECIFICATION forming part of Letters Patent No. 486,018, dated November 8, 1892.

Application filed February 12, 1892. Serial No. 421,255. (No model.)

To all whom it may concern:

Be it known that I, FRANK H. BAILEY, a citizen of the United States, and a resident of Wilkes-Barré, Luzerne county, Pennsylvania, have invented certain Improvements in Fire-Boxes, of which the following is a specification.

My invention relates to fire-boxes for boilers or heating-furnaces of any kind, its main object being to automatically regulate the amount of fuel exposed to combustion, as more fully set forth hereinafter.

In the accompanying drawings, Figure 1 is a sectional view on the line 1 2, Fig. 2, of a fire-box constructed in accordance with my invention; and Fig. 2 is a face view of the same partially in section.

The boiler A, Fig. 1, is constructed in any suitable manner, the form illustrated being one in which a series of vertical tubes connect upper and lower communicating headers. The fire-box B is inclosed by vertical grate-bars C, preferably covered with non-conducting material *c*, preferably asbestus, and being, if desired, hollow and communicating at the upper and lower ends with headers D in communication with the main body of the boiler, so that there will be a circulation of water and steam through the grate-bars, although this is not essential to prevent the burning or destruction of the grate-bars, inasmuch as said grate-bars are covered by the non-conducting material *c*, although if the non-conducting material be dispensed with the grate-bars may very properly form a part of the boiler.

The grate-bars are protected on either side and in front and rear by covering-plates E E, the covering-plates E on the front and rear extending from the top down to about the low-water line in the boiler, (which is represented at *x x* in Fig. 1,) and the amount of fuel in the fire-box exposed to the draft is governed by vertically-adjustable plates F F, situated at the front and rear of the fire-box, as illustrated, or at the front or at the rear alone, as desired, the higher the adjustment of the plates the greater the amount of fuel exposed to the draft.

The plates or doors F F are counterbalanced by a weight G, connected by chains *g*, passing over pulleys *h*, to the doors, and by moving the weights by hand or mechanically, or by having handles on the doors, they may be raised or lowered to expose a greater or less amount of fuel. I prefer, however, to provide for this adjustment automatically by connecting the chains to a lever *i* under the control of a diaphragm in a pressure-chamber I, connected by a pipe *k* to the steam-space of the boiler, so that as the pressure of steam varies the doors F will be opened to a greater or less extent, as required.

The fuel is introduced into a hopper L and the combustion-chamber is preferably kept filled with fuel, the clinkers being ground up and the residue discharged at the bottom of the fire-box by means of one or more suitably-shaped grate-bars *m*. Under a forced draft the front of the fire-box is inclosed by a casing N, and the amount of air admitted is governed automatically by a valve attached by a chain *n* to one end of the lever *i*, or, as shown in Fig. 2, a natural draft may also be regulated by connecting the valve V of the casing N to such lever *i*. It will thus be seen that as the steam-pressure falls the doors F will be raised and a greater or less amount of fuel exposed to the draft and consumed. The fuel above the edge of the door, being inclosed and not mingling with the oxygen, is gradually fed down as the residue is discharged by the rotating grate-bars *m*.

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

1. A fire-box for boilers, comprising a series of vertical grate-bars partially inclosed and adjustable gates or doors for exposing a greater or less amount of fuel in the fire-box.

2. The combination, in a fire-box, of a series of vertical grate-bars, a casing partially inclosed in the same, and vertically-adjustable doors for exposing a greater or less amount of fuel, substantially as specified.

3. The combination, in the fire-box, of a series of vertical grate-bars, a casing partially inclosed in the same, vertically-adjustable doors for exposing a greater or less amount of fuel, and a pressure-chamber connected to

the steam-space of the boiler and having a diaphragm operatively connected to said doors, substantially as specified.

4. The combination, in the fire-box, of the vertical grate-bars, a non-conducting covering for said grate-bars, adjustable doors for regulating the amount of fuel exposed, and a grate bar or bars at the bottom of the fire-box, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FRANK H. BAILEY.

Witnesses:
GEORGE T. KIRKENDALL,
THOS. H. ATHERTON.