(No Model.)

W. O. A. LOWE.

FURNACE.

No. 586,050. Patented July 6, 1897.

Fig. 1.

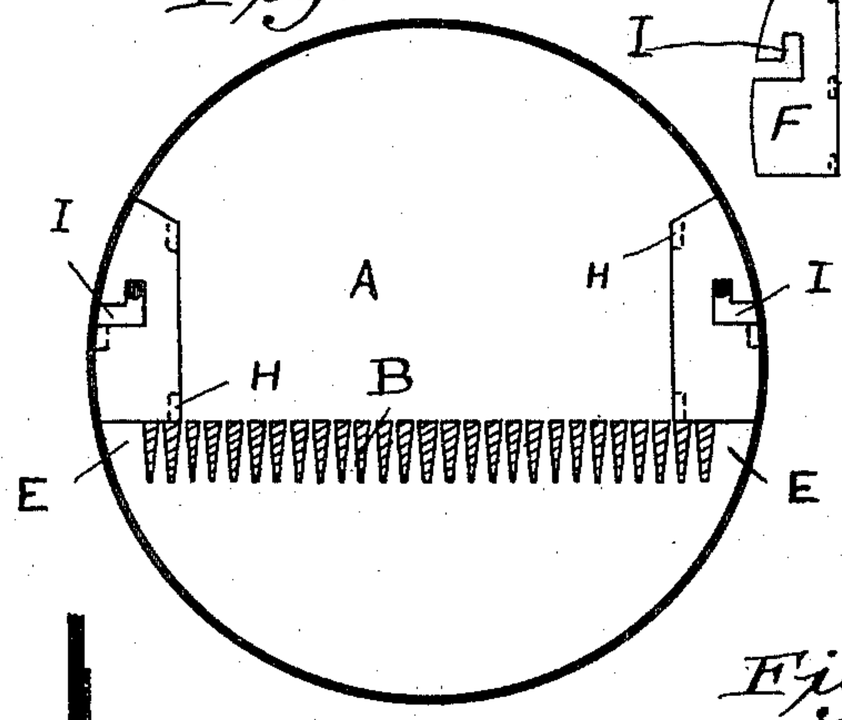


Fig. 3.

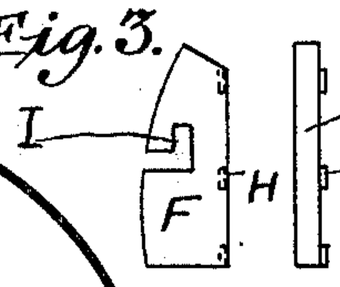


Fig. 5.

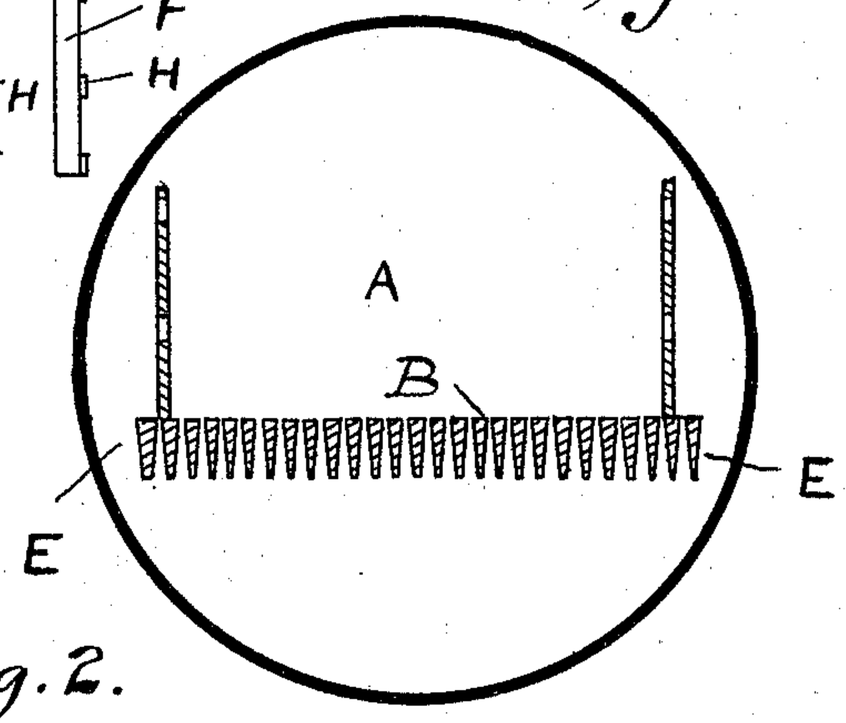


Fig. 2.

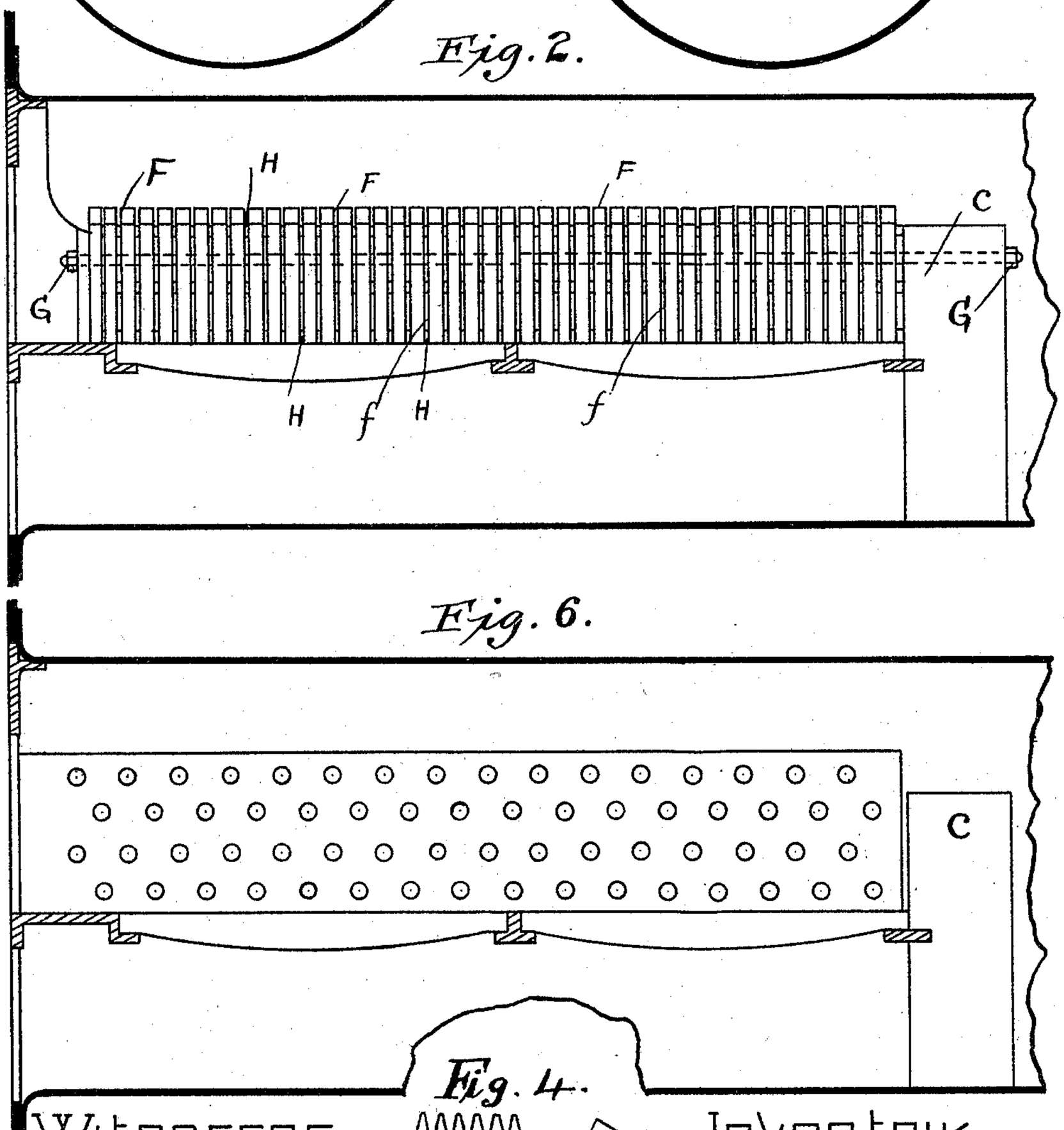


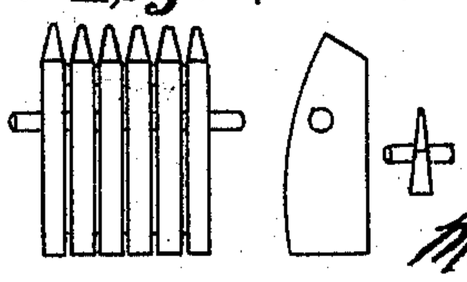
Fig. 6.

Fig. 4.

Witnesses

Carroll Devereaux.

R. H. Fenwick



Inventor

William O. A. Lowe

by his Attys

Munn Fenwick & Lawrence

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

WILHELM O. A. LOWE, OF LIVERPOOL, ENGLAND.

FURNACE.

SPECIFICATION forming part of Letters Patent No. 586,050, dated July 6, 1897.

Application filed January 18, 1897. Serial No. 619,654. (No model.)

To all whom it may concern:

Be it known that I, WILHELM OTTO AXEL LOWE, a subject of the Queen of Great Britain, residing at Liverpool, in the county of Lancaster, in the Kingdom of England, have invented certain new and useful Improvements in Furnaces, of which the following is a specification.

This invention relates to the furnaces of boilers for generating steam and other furnaces for heating purposes.

The object is to obtain more perfect combustion, economy of the fuel, and the prevention of smoke. Hitherto air for combustion has been admitted through the fire-bars and fuel or at the bridge, and in many cases a large portion of the gases has passed off unconsumed owing to there being an insufficient supply of air or from other cause, and hence the production of smoke.

By the present invention I form or provide openings or channels in the grate or grate-surface itself through which air is admitted to the fire. These openings or channels may be placed longitudinally at each side of the grate, and in some cases at the end or ends thereof, so that the incoming air may mingle with the effluent gases and supply the deficient oxygen that is necessary to complete the combustion. These openings or channels may be arranged in a variety of ways. Thus, for example, they may have iron plates, walls, wings, diaphragms, or nozzles for the purpose of delivering and distributing the air into and over the fire. The air-supply is admitted to the furnace by the influence of the natural draft induced by the fire and chimney, or, if preferred, artificial means may be employed for producing a forced current of air. A convenient way of forming the channels is to omit one or more lines of bars on each side of the grate and then arrange a series of vertical plates or diaphragms placed on edge in such a way that the air passing up through the grate will pass through the interstices between the plates into and over the fire, the plates being, if desired, sufficiently close together to prevent ashes lodging therein and choking up the outlets, or, if preferred, perforations may be provided or nozzles may be built into the grate with outlet ports or orifices, in either arrangement the air mingling with the flames and unconsumed gases.

In the drawings, Figure 1 is a cross-section through a boiler-furnace, showing my invention applied thereto; Fig. 2, a longitudinal section; Fig. 3, a detail view showing the grid-plates; Fig. 4, a detail view of slight modifications in the shape of the grid-plates; Fig. 5, a cross-section through a boiler-furnace, showing a slight modification; and Fig. 6, a longitudinal section.

In thus showing my apparatus applied to a single-flue boiler I do not wish at all to confine it thereto, as it is equally applicable to other furnaces.

In the figures, A is the furnace; B, the grate; C, the furnace-bridge; E, openings at each side of the grate; F, series of vertical plates or diaphragms forming grids placed on edge along each side of the grate with interstices or channels *f* between, out of which issues the air into and over the fire. The grid-plates F are bolted together and supported by bolts or bearers G and have lugs or washers H between the plates to retain them at a given distance apart. The plates are formed with the slots I, so that after the bolts are mounted in place the plates F can be hooked onto them and the bolts then tightened up.

The grids may be arranged at the back of the furnace as well as at the sides, if desired.

The mode of action is as follows: When the furnace is in operation, air is admitted through the channels E from the ash-pit and will pass through the interstices between the plates into and over the fire, the plates being sufficiently close together to prevent ashes lodging therein and choking up the outlets. The air thus admitted into and over the fire is thoroughly mixed with the effluent gases, the partly-consumed gases bursting into a bright gaseous flame, and complete combustion obtained without smoke. In charging the fire with fresh fuel, instead of the usual course of procedure adopted by stokers I, according to my invention, prefer to rake the fire immediately after charging it, the hydrogen assisting, in combination with the air induced, to ignite and burn the coal-smoke. Means may be provided, if desired, for regulating the supply of air, so that the air admission may be increased or decreased, according to the kind of coal used, and a greater or less supply of air admitted, as desired. The grid-

plates F may be of one thickness throughout, or they may be formed wedge-shaped, with taper channels between each wedge, the channels gradually tapering toward the front and terminating in narrow openings *f*, and thus by reason of the channels gradually contracting in area the air is relatively compressed in volume, which causes it to rush through the openings *f* with greatly-augmented force, and this rush of air, moreover, keeps the grids cool.

It is obvious that the plates forming the grid may be arranged horizontally, in either case causing the air to be delivered into and over the fire.

In the slight modification depicted in Figs. 5 and 6 the plates F are dispensed with and a perforated plate provided at each side of the furnace through which air is discharged into the fire, the air mingling with the flames and unconsumed gases.

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

1. In a furnace, the combination with a suitable grate, of side bearing bolts or rods, a series of separate detachable plates provided with bayonet-shaped slots in their rear edges whereby they are adapted to be detachably secured upon the said bearing-rods for forming side grids for the fireplace, spacing-lugs formed upon the said plates for holding them the proper distance apart so as to admit air to the sides and top of the fire, substantially as described.

2. In a furnace, the combination with a suitable grate, of side bearing bolts or rods, separate tapering plates, means for securing the said plates to the said bearing-rods for forming grids, the rear edges of the said plates being also made to conform to the inner surface of the fire-box whereby they are held in proper upright place when secured upon the bearing-rods, spacing-lugs formed upon the plates for holding them a suitable distance apart to admit air to the sides and top of the fire, substantially as described.

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

W. O. A. LOWE.

Witnesses:
G. C. DYMOND,
W. H. BEESTON.