(No Model.) 2 Sheets—Sheet 1.

C. H. CANDLER & J. WHITEHEAD.

STEAM GENERATOR FURNACE.

No. 258,371. Patented May 23, 1882.

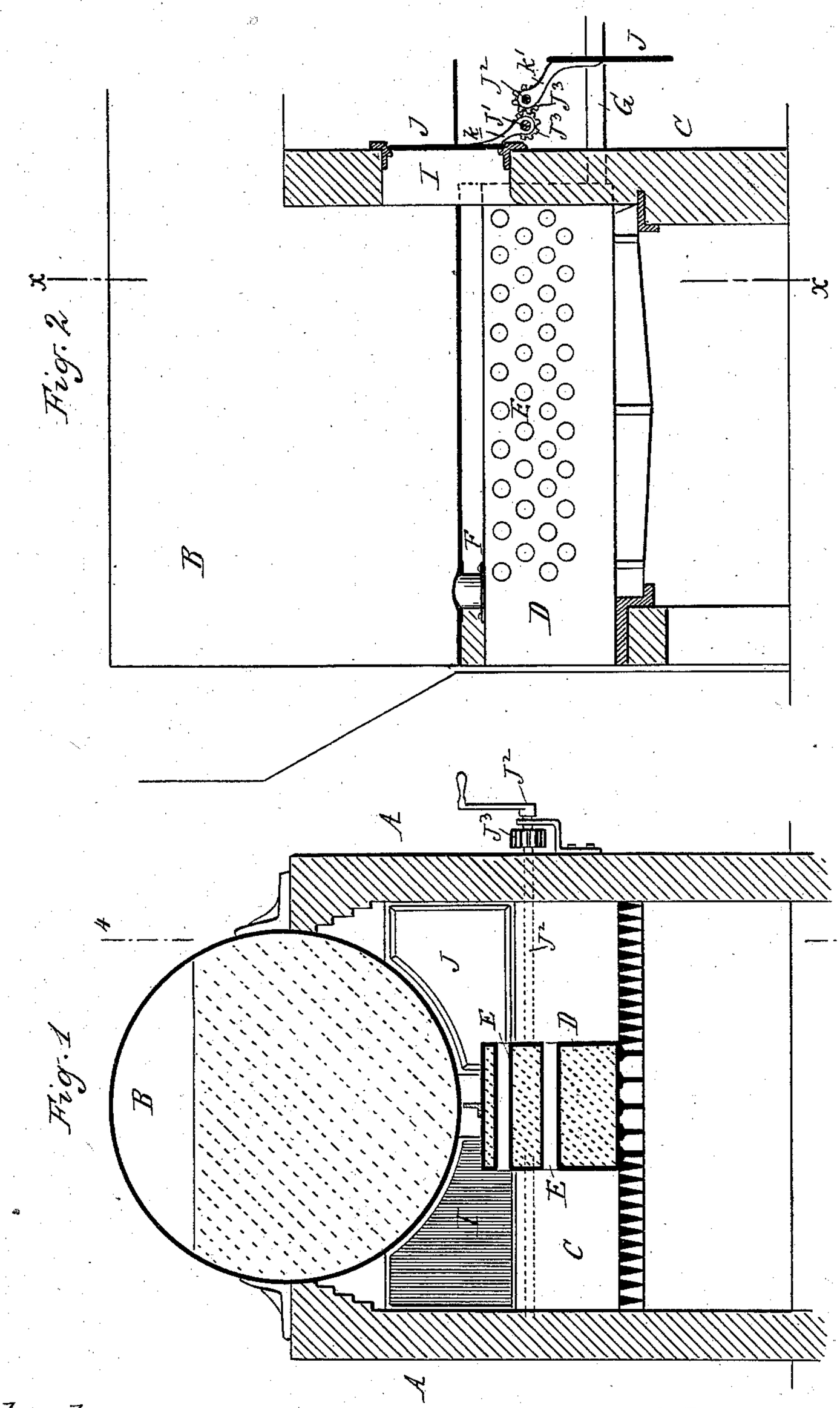

Fig. 2

Fig. 1

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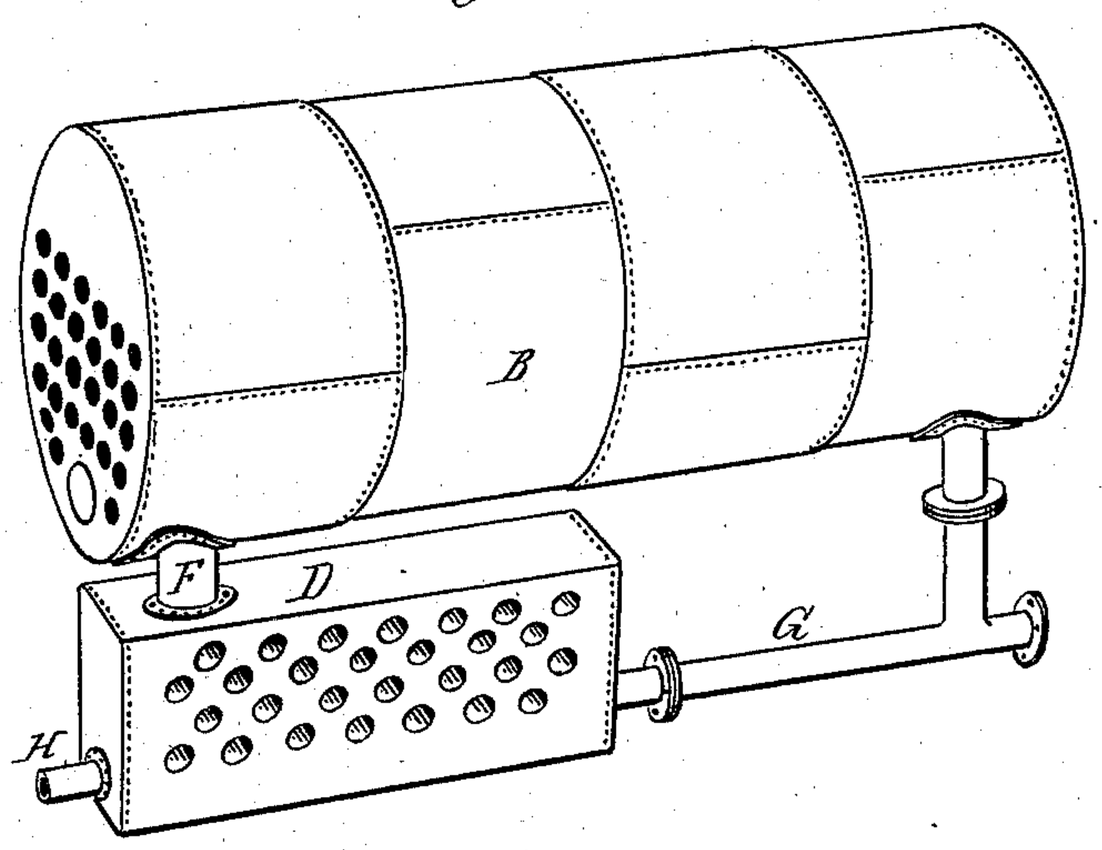
Fig. 3



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UNITED STATES PATENT OFFICE.

CLAUDE H. CANDLER AND JAMES WHITEHEAD, OF DETROIT, MICHIGAN.

STEAM-GENERATOR FURNACE.

SPECIFICATION forming part of Letters Patent No. 258,371, dated May 23, 1882.

Application filed November 1, 1881. (No model.)

To all whom it may concern:

Be it known that we, CLAUDE H. CANDLER and JAMES WHITEHEAD, of Detroit, in the county of Wayne and State of Michigan, have invented an Improvement in Steam-Generator Furnaces, of which the following is a specification.

The nature of this invention relates to certain new and useful improvements in furnaces for steam-generators, by means of which the consumption of gases from the burning coal will produce a large saving in fuel, the device employed for such purpose also forming the feed-water heater of the boiler.

The invention consists in the peculiar details of construction and operation and the combination of such details, as more fully hereinafter described.

Figure 1 is a cross-section of a steam-boiler and its furnace on a line immediately in front of the bridge-wall. Fig. 2 is a vertical longitudinal section on the line 4 4 in Fig. 1. Fig. 3 is a perspective of the boiler and its attachments, independent of the furnace and setting.

In the accompanying drawings, which form a part of this specification, A represents the furnace-walls, which form the setting for the boiler B. In the center of such furnace, with its rear end against the bridge-wall C, is a rectangular feed-water heater, D, the front of which forms a tight connection with the front of the furnace, or, in other words, such heater extends from the bridge-wall to the furnace-front. This heater divides the fire-chamber into two apartments, as shown, and the only connection between such apartments is by means of tubes extending laterally through the heater. The tubes are marked E. This heater is connected to the boiler by the vertical pipe F, and by the pipe G a connection is made near the rear end of such boiler, such connections, when the boiler is in operation, keeping up the necessary circulation of water from the heater into the boiler, and through such connection deposits in the boiler are carried into the bottom of the heater, whence they may be blown off at any time without the necessity of emptying the boiler, as is usually done when boilers are blown off.

H is a pipe, by means of which connection is made between the feed-pump and the heater. The bridge-wall is extended to the boiler and provided with an opening from each apartment of the furnace. These openings are marked I, and each one is provided with the damper J, arranged to be operated from outside the furnace-walls. The dampers J are secured by arms *k k'* to the parallel shafts J' J^2, one of which is set farther back than the other in order to allow the proper working of the pinions J^3 J^3, which are secured to them as represented in Fig. 2 of the drawings. Owing to the different positions of the two shafts in relation to the bridge-wall, the arm *k'* is made larger than the arm *k*, so that the dampers will be closed tight when raised.

The front of the furnace, which is not shown, is provided with a feed-door to each apartment of the fuel-chamber, and below such feed-doors and position of the grates with opening and doors for draft purposes and for clearing the ash-pit.

When this invention is in operation and fire is started the draft-doors in the furnace-front of course are opened and the dampers J are also opened. After the fire is started and needs replenishing with fuel, at which time, unless precautions to the contrary are taken, large quantities of unconsumed gases are discharged from the stack, the compartments of the furnace should not be replenished at the same time, but, for instance, the left-hand door should be opened and the damper J in that compartment closed and the damper in the right-hand apartment opened. The air which enters the left-hand feed-door at this time can only reach an outlet by passing through the tubes in the heater, where it becomes very highly heated, and is discharged upon incandescent coal in the right-hand chamber, and, mingling with the gases, enables the whole to be consumed, and of course the reverse of this operation is had in feeding the right-hand compartment.

By means of the setting appliances and operation as above described the only unconsumed gas or smoke which will be unconsumed will be thrown off at the first kindling of the fire, after which the device may be fed with fuel alternately, first one chamber and then the other, and the gases and smoke will be consumed, thereby effecting a large saving in fuel.

It will be obvious that our transversely-tubular feed-water heating bridge-wall may be

applied to many of the boiler-furnaces now in use by simply arranging for the boiler-connections.

We are aware that it is not new to employ a divided fire-box having a bridge-wall, around which the products of combustion may be directed from one compartment to the other at will by the use of proper dampers, and such construction is not sought to be covered in this application. Neither do we claim a masonry division-wall having transverse openings through which the products of combustion can be caused to pass from one side of the furnace to the other.

What we claim as new is—

The combination of the bridge-wall C, having openings I, with the combined division-wall and feed-water heater D, having connections F G H, and provided with transverse tubes E, the dampers J, the parallel shafts J′ J², the pinions J³, and the arms *k k′*, substantially as described.

CLAUDE H. CANDLER.

JAMES WHITEHEAD. his × mark

Witnesses:
H. S. SPRAGUE,
E. SCULLY.