No. 630,545. Patented Aug. 8, 1899.

# G. C. KITCHEN.

## BOILER FLUE CLEANING DEVICE.

(Application filed May 27, 1899.)

(No Model.) 2 Sheets—Sheet 1.

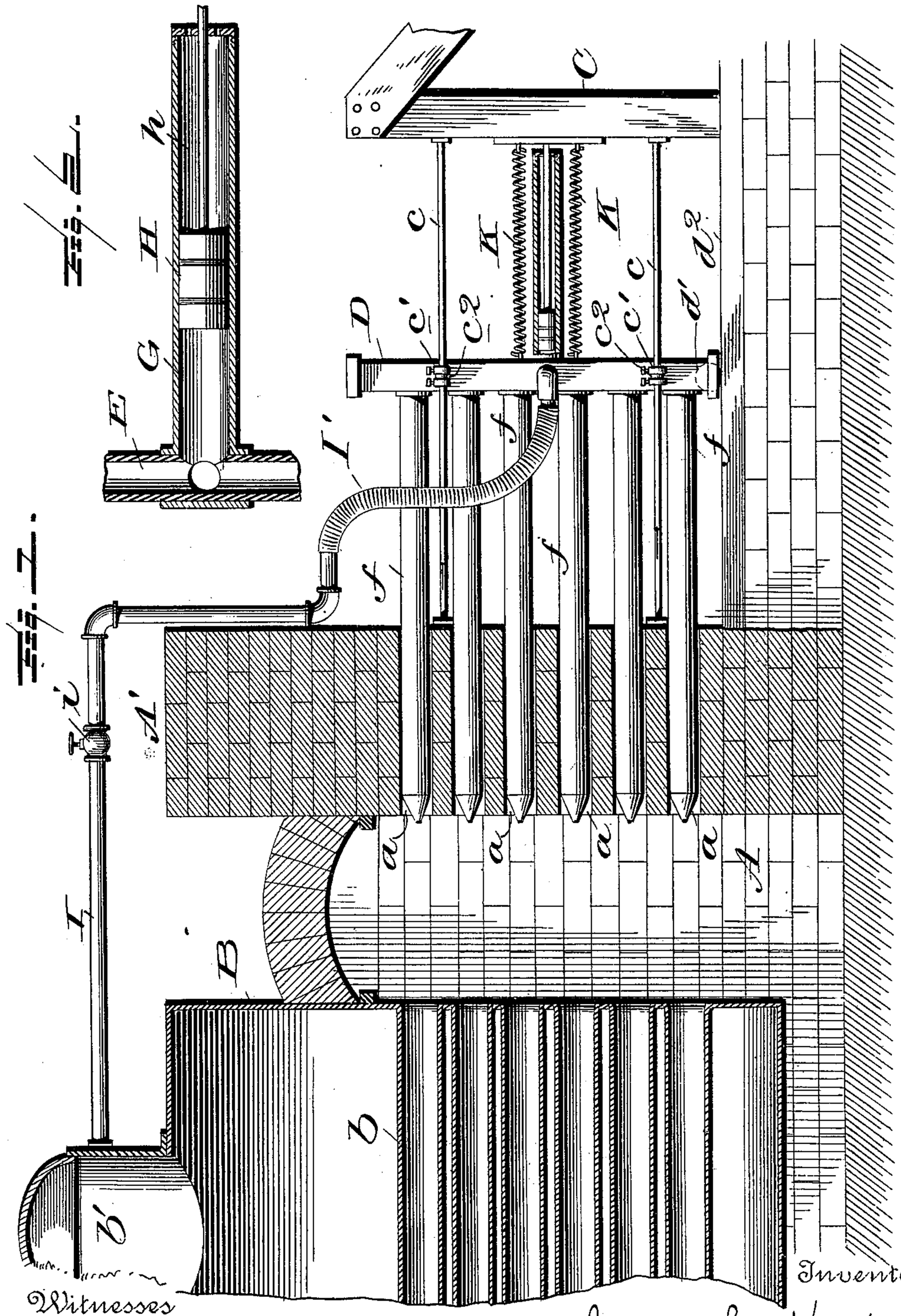


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Fig. 3.

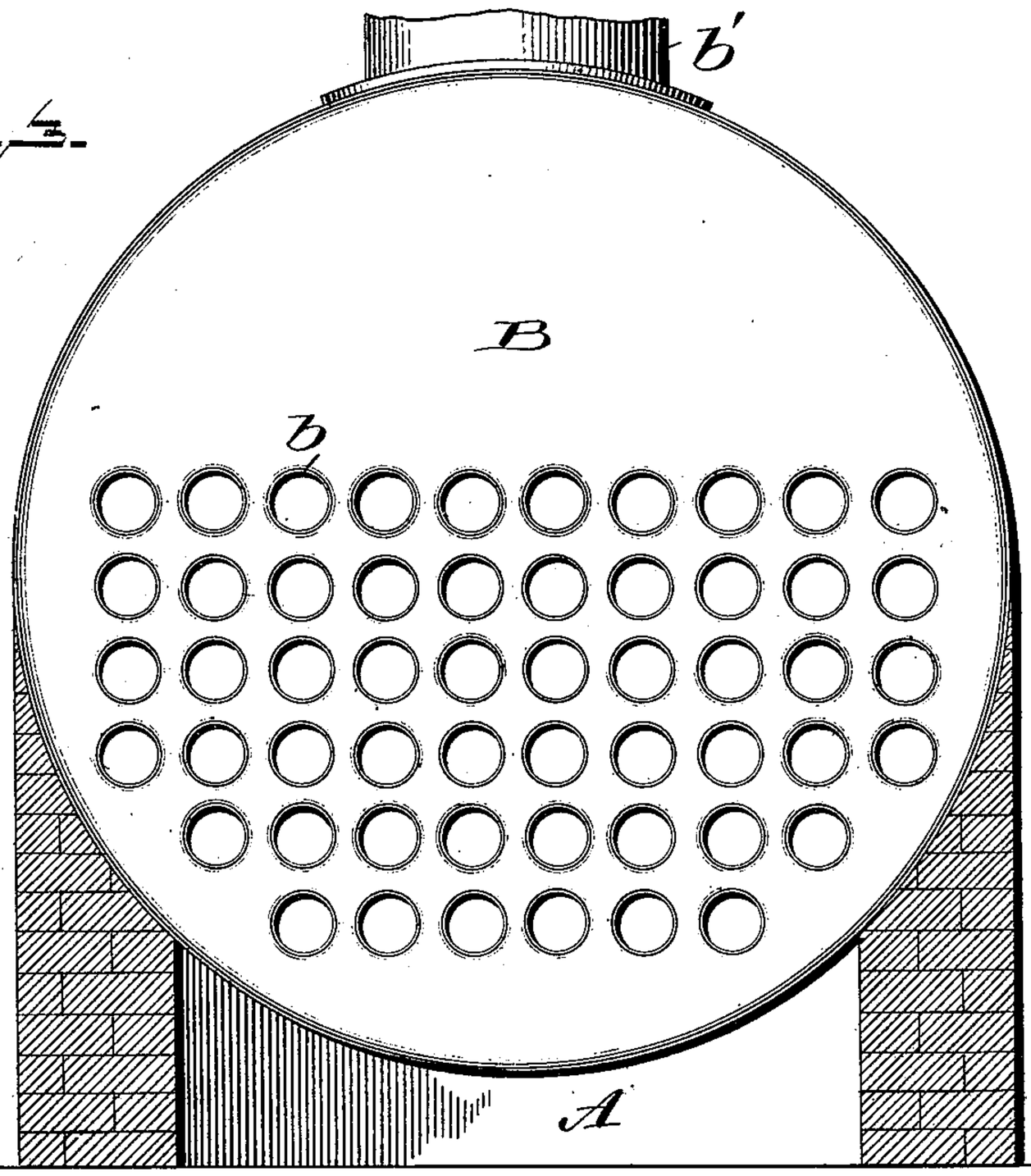
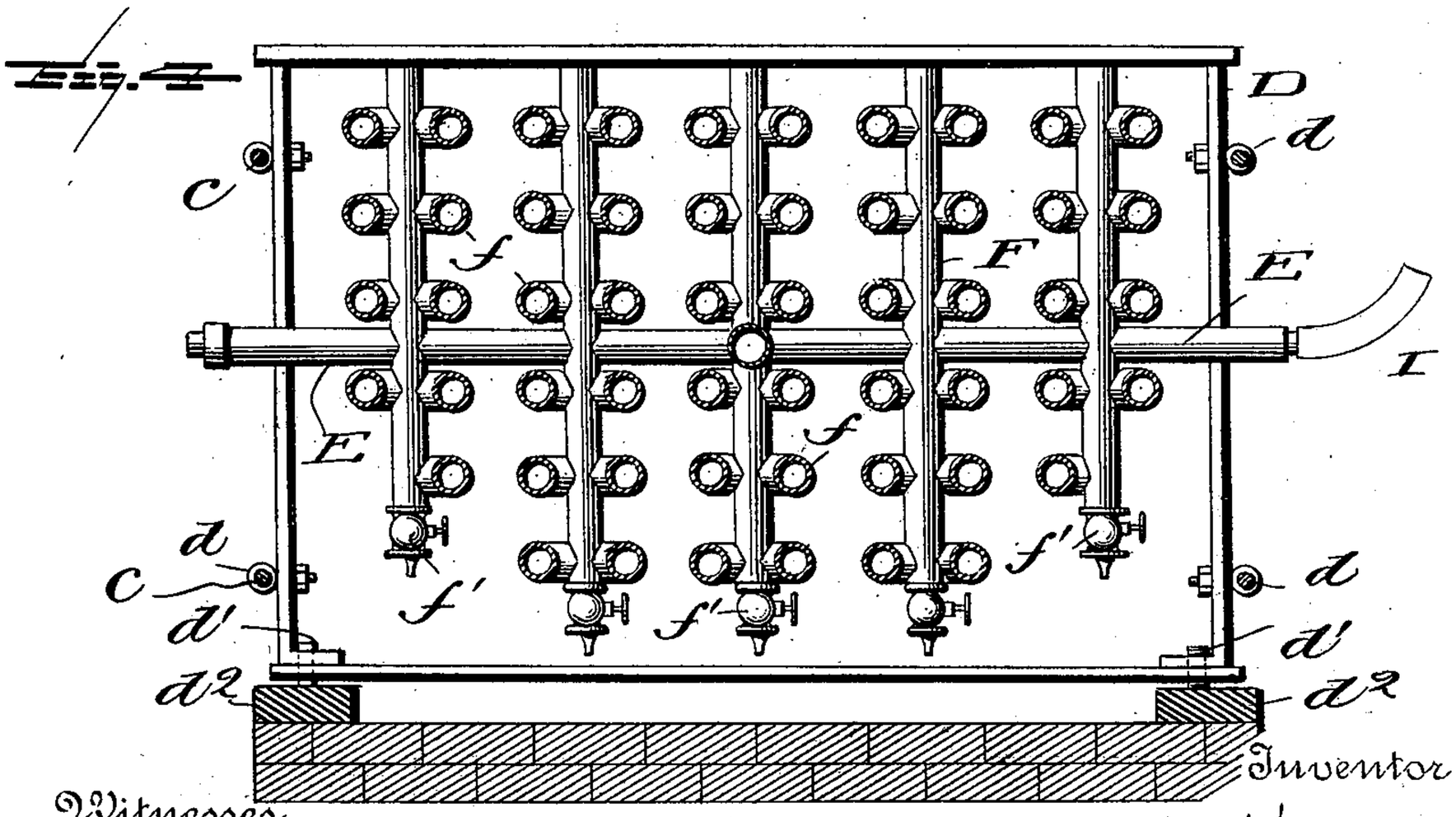



Fig. 4.

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# UNITED STATES PATENT OFFICE.

GEORGE C. KITCHEN, OF AUSTIN, TEXAS, ASSIGNOR OF TWO-THIRDS TO F. D. GLOVER, OF SAME PLACE.

## BOILER-FLUE-CLEANING DEVICE.

SPECIFICATION forming part of Letters Patent No. 630,545, dated August 8, 1899.

Application filed May 27, 1899. Serial No. 718,574. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE C. KITCHEN, a citizen of the United States, residing at Austin, in the county of Travis and State of Texas, have invented certain new and useful Improvements in Boiler-Flue-Cleaning Devices; 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.

My invention is an improvement in boiler-flue cleaners; and it consists in the novel features of construction and combinations of parts hereinafter fully described, reference being had to the accompanying drawings, which illustrate one form in which I have contemplated embodying my invention, and said invention is fully disclosed in the following description and claims.

Referring to the drawings, Figure 1 represents a sectional view of the rear end of a boiler-setting and boiler, showing my improved flue-cleaner applied thereto. Fig. 2 is a detail sectional view of a part of the apparatus. Fig. 3 represents an end view of the boiler, showing the arrangement of the flues; and Fig. 4 represents a transverse sectional view of my improved cleaner through the horizontal nozzles, showing the same arranged to clean all the flues of the boiler simultaneously.

In the drawings, A represents the furnace-setting, provided with a rear wall A′, and B represents a boiler, which is an ordinary fire-tube boiler provided with fire-tubes *b*, extending horizontally through the same.

C represents a supporting-frame which is located in rear of the rear wall A′ of the boiler-setting and is provided with a number of horizontal guide-rods *c*, four being shown in the present instance, (see Fig. 4,) which extend from the frame C to the said rear wall.

D represents a vertically-disposed sliding frame, which is preferably rectangular in form and is provided at each side with guides, in this instance in the form of eyebolts *d*, which engage the guide-rods *c* and guide the frame in its movements. I prefer to provide the lower end of the frame with suitable rollers *d*′, running upon sills or rails $b^2$ to facilitate the movements of the sliding frame. The sliding frame D is designed to carry a series of nozzles corresponding in number and arrangement with the flues of the boiler, which nozzles extend through a series of apertures in the rear wall A′ of the furnace-setting, each of said apertures corresponding to one of the flues of the boiler. In this instance I have shown the frame D provided with a horizontally-disposed supply-pipe E, to which are connected a series of vertical pipes F, each of which is provided with a series of horizontally-disposed nozzles *f*, terminating in tapering caps provided with discharge-apertures the diameters of which are considerably less than the diameters of the nozzles in rear of said apertures. These nozzles can conveniently be arranged for the most part in pairs on the vertical pipes F and may be connected thereto in any desired way, and I prefer to provide each of the vertical pipes F at its lower end with a cock *f*′ for drawing off the water of condensation when necessary.

The horizontal supply-pipe E is connected with a cylinder G, which extends rearwardly therefrom, as shown in Figs. 1 and 2, and in said cylinder is located a piston H, provided with a piston-rod *h*, which is secured rigidly to the supporting-framing C. The nozzles *f* extend through apertures *a* in the rear wall A′ of the boiler-setting.

I represents a steam-pipe connected at one end to the steam-dome *b*′ and extending to a point adjacent to the rear wall of the setting and provided with a cut-off valve *i*, which may be located at any desired point in said pipe. The pipe I is connected by a flexible pipe I′ with the horizontal supply-pipe E.

K K represent a series of springs having their forward ends connected to the sliding frame D and their rear ends connected to the framing C for the purpose of holding the sliding frame normally in its rearmost position. The rearward movement of the sliding frame D may be limited in any desired way, and in the present instance I have shown adjustable collars *c*′ on the guide-rods *c c*, each provided with a set-screw $c^2$, so that said collars may be adjusted in the desired position to engage the eyebolts *d* of the sliding frame and limit its rearward movement.

The operation of the apparatus is as follows: When it is desired to clean out the flues of the boiler, the valve *i* is opened and steam under considerable pressure is admitted

through the pipe I and flexible pipe I′ to the supply-pipe E. The back pressure of the steam, working against the piston H in the cylinder G, will force the sliding frame G, carrying the nozzles *f*, forward, so that said nozzles will be pushed into the rear ends of the boiler-flues, and the steam will be blown into said flues through the nozzles with such force as to remove therefrom all the soot, dust, &c. When the steam is cut off by closing the valve *i*, the springs K K will withdraw the frame D and the nozzles to their original position.

It is obvious that I may employ more than one of the cylinders G and pistons H, if necessary, and I may use other retracting means than the springs K for drawing back the sliding frame and nozzles, and in other ways I do not desire to be limited to the exact details of construction herein shown and described, as changes may be made therein without departing from the spirit of my invention.

When it is desired to introduce steam in the rear part of the furnace-setting for the purpose of increasing the draft of the furnace, the valve *i* can be opened so as to allow only a small quantity of steam to pass through the supply-pipe. The steam will then issue from the nozzles without having sufficient power to operate the sliding frame, and the steam will be injected through the fire-tubes to increase the draft. I have found that by injecting steam in this way at the rear end of the boiler-flues the production of smoke is practically obviated, the fuel being consumed smokelessly. Moreover, the draft of the furnace is so increased that the grate-surface may be reduced substantially one-third, and I am also enabled to use an inferior coal with this device and still obtain as good results as could be obtained from a better grade of coal without my approved apparatus.

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

1. A boiler-flue cleaner, comprising among its members, a frame movable toward and from the boiler, a series of nozzles carried by moving with said frame and adapted to be pushed into the boiler-flues, a steam-supply pipe for said nozzles and means operated by the pressure of the steam for moving said frame toward the boiler to push said nozzles into the tubes thereof, substantially as described.

2. A boiler-flue cleaner, comprising among its members a frame movable toward and from the boiler, a series of nozzles rigidly secured to the frame, a steam-supply pipe for said nozzles, means operated by the pressure of the steam for moving said frame toward the boiler to push said nozzles into the tubes thereof and a retracting device for said frame for withdrawing said nozzles from the boiler-tubes, substantially as described.

3. A boiler-flue cleaner comprising among its members, a movable frame, a series of steam-nozzles carried thereby, a supply-pipe for said nozzles, a cylinder and piston, the one secured to said sliding frame and the other to a stationary part, said cylinder communicating with the steam-supply pipe and retracting means connected with said sliding frame for holding said frame and nozzles normally out of operative position, substantially as described.

4. A boiler-flue cleaner comprising among its members, a sliding frame, a series of nozzles carried thereby, guides for said sliding frame, a steam-supply pipe for said nozzles a cylinder secured to said sliding frame, a piston in said cylinder connected to a stationary part, retracting devices for said sliding frame and stops for limiting the movement of said frame under the action of its retracting devices, substantially as described.

5. The combination with a boiler-setting provided with a series of apertures in its rear wall, of a boiler provided with a series of fire-tubes, each of the apertures in said rear wall being in line with one of said fire-tubes, a sliding frame in rear of said wall, a series of nozzles carried by said frame and extending into the apertures in said rear wall of the boiler-setting, a steam-supply pipe for said nozzle, a cylinder communicating with said steam-pipe and a piston in said cylinder, one of said parts being connected to the sliding frame and the other to a stationary part and retracting means for said sliding frame, substantially as described.

6. The combination with a boiler-setting provided with a series of apertures in its rear wall, of a boiler provided with a series of fire-tubes each of said apertures in said rear wall being in line with one of said fire-tubes, a series of nozzles engaging said apertures in said rear wall and extending within the furnace-setting, a cylinder and piston for forcing said nozzles longitudinally through said apertures into the rear ends of the fire-tubes, a retracting device for normally holding the said nozzles in their outer positions, a steam-supply pipe connected with said nozzles and said cylinder and a controlling-valve in said pipe, whereby said valve may be partially opened to allow steam to pass through said nozzles to increase the draft and prevent the formation of smoke, without overcoming the resistance of the retracting device, and whereby said valve may be operated to admit steam under sufficient pressure to operate said piston and cylinder and force said nozzles into said fire-tubes to clean said tubes, substantially as described.

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

GEORGE C. KITCHEN.

Witnesses:
JOHN D. JACKSON,
S. D. DE CORDOVA.