

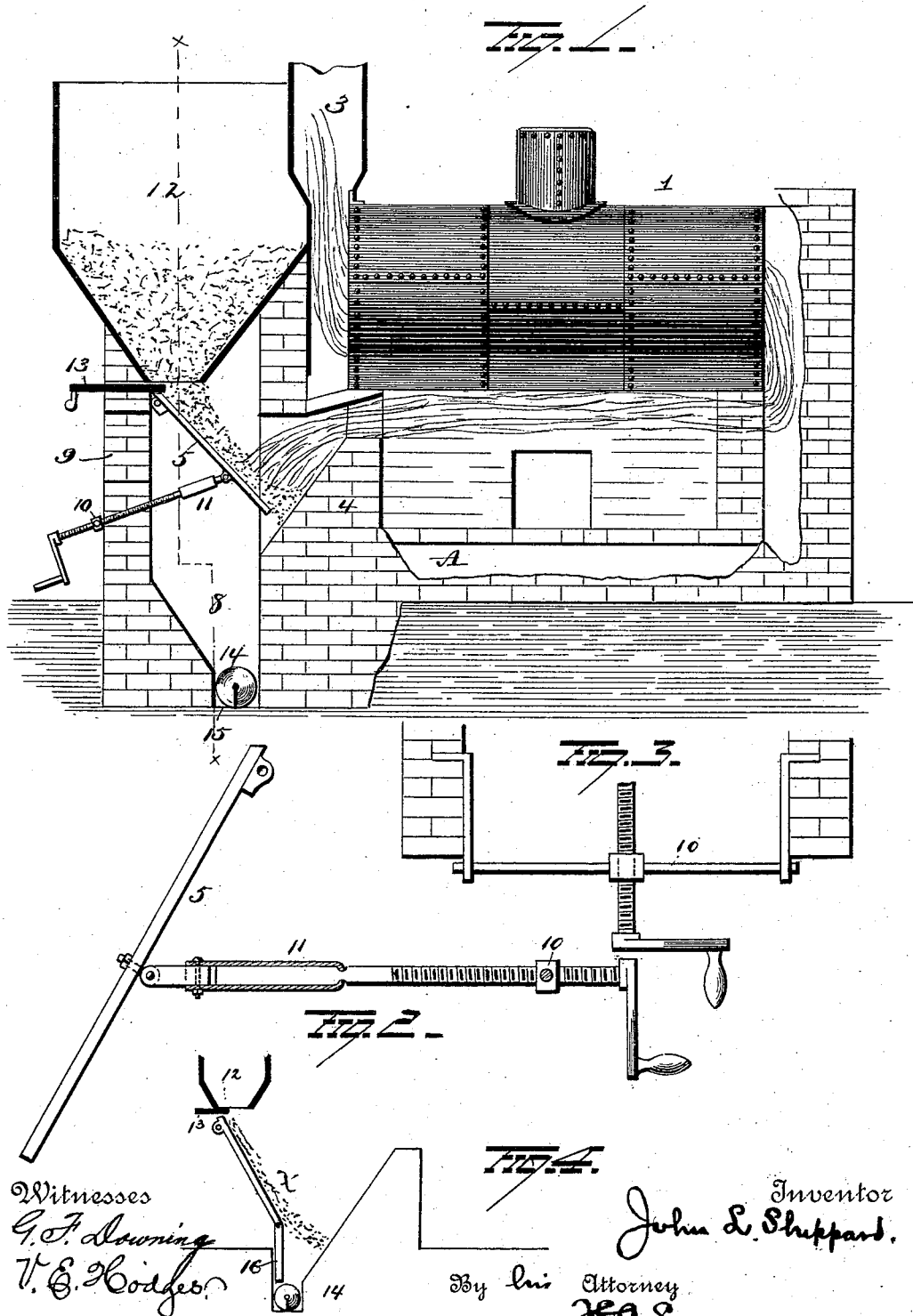
(No Model.)

2 Sheets—Sheet 1.

J. L. SHEPPARD.  
CHAFF BURNING FURNACE.

No. 420,971.

Patented Feb. 11, 1890.



Witnesses

G. F. Downing

V. E. Hodges

Inventor  
John L. Sheppard.

By his Attorney

H. A. Symmons.

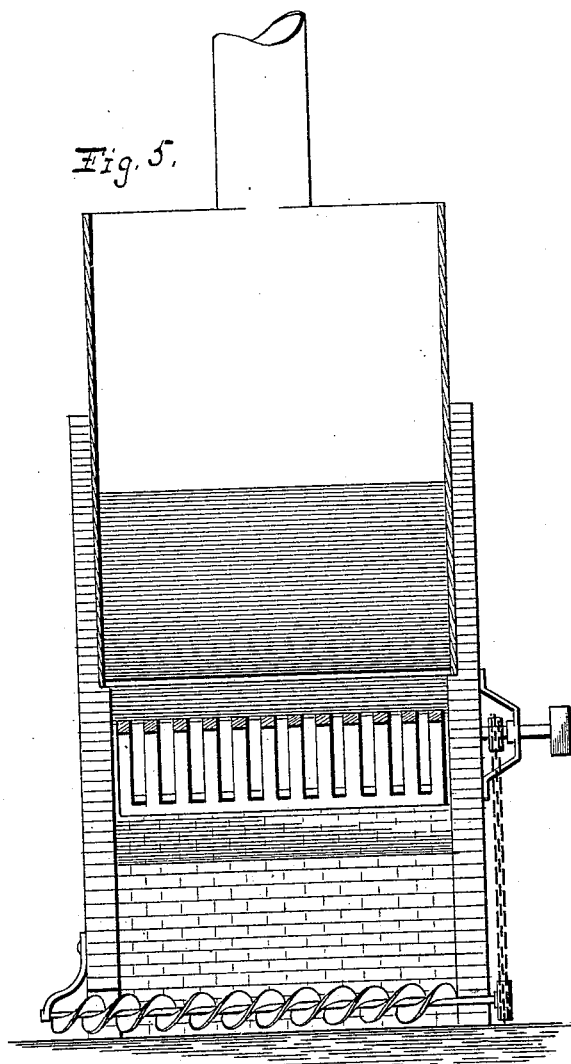
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S. H. Nottingham

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H. A. Symmes.

# UNITED STATES PATENT OFFICE.

JOHN L. SHEPPARD, OF CHARLESTON, SOUTH CAROLINA.

## CHAFF-BURNING FURNACE.

SPECIFICATION forming part of Letters Patent No. 420,971, dated February 11, 1890.

Application filed March 13, 1889. Serial No. 303,156. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN L. SHEPPARD, of Charleston, in the county of Charleston and State of South Carolina, have invented certain new and useful Improvements in Chaff-Burning Furnaces; 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 relates to an improvement in chaff-burning furnaces.

The object is to provide means for the automatic feed of fuel to a furnace, and for automatically removing the rapidly-accumulating ashes as they drop at the lower end of the grate; and to this end the invention consists in the employment of a screw conveyer in combination with an adjustable inclined grate, on which the chaff or other fuel is fed and burned; and, further, it consists in certain features of construction and combinations of parts, as will be hereinafter fully described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a longitudinal sectional view through the furnace. Figs. 2 and 3 are detached views of the grate and connected parts. Fig. 4 is a modification, and Fig. 5 is a view in section on line *xx* of Fig. 1.

A represents the wall of the furnace, and 1 a boiler therein. The latter is supported on a suitable base in the furnace, and spaces are left open around and through the boiler for the passage of products of combustion to the stack 3 in the forward end of the furnace. The forward side 4 of the bridge-wall is preferably inclined, and the grate 5 is pivoted along its forward edge at a point about on line with the bottom of the boiler, so as to extend forward to or nearly to the front side 4 of the bridge-wall and capable of being placed at different angles or inclinations. The bars of the grate are set close together, so that the fine chaff will not pass between them, but will pass downward and over them, while air is permitted to enter first through open doors or spaces 9 in the front wall, and thence through the grate to furnish the required draft.

The position of the grate may be regulated in various ways, and one approved manner

of accomplishing this is shown in Figs. 2 and 3, in which there is a yoke 10 fixed or pivoted to the wall of the furnace, and a screw extending through the yoke, its threads meshing with threads in the yoke. One end of this screw is provided with a crank, and the other end extends into a sleeve 11, which has a loose connection with the grate-bar. This sleeve is provided with a restricted free end, and said end by entering an annular recess in the screw permits the latter to turn therein. By turning the crank the screw is forced endwise in one direction or the other, so that the inclination of the grate is regulated. The object of changing the inclination of this grate is to increase or diminish the draft and feed. Within certain limits the free or lower edge of the grate is approximately the same distance from the inclined forward side 4 of the bridge-wall when its position is changed, so there is never any unnecessary space left for the ashes to pass.

A chaff-hopper 12 is stationed on top of the furnace directly over the upper end of the grate, and from this hopper a constant supply of fuel is kept up unless shut off or controlled by the slide 13 at the lower end of the hopper. Of course the supply is regulated by this slide as well as capable of being entirely cut off by it, and if but little fuel is necessary the slide is pushed partly in to such an extent as will accomplish the required result.

Below the lower end of the grate the ashes work their way by gravity, and a screw conveyer 14 is revolvably supported in the ash-pit 8, in order to conduct the refuse off which is necessarily accumulating with considerable rapidity. This may be made to rotate with suitable rapidity and by means of any suitable motor, so that the trough is kept freed from ashes just as rapidly as they drop into it, and thus the work of constantly shoveling out ashes by the fireman or engineer is dispensed with altogether. This conveyer is preferably located in the restricted bottom 15 of the ash-pit, and this pit may be filled with water.

It sometimes happens that chaff pours down from sections of the grate-bars and escapes unconsumed into the ash-pit 8. To avoid this, I have devised the construction shown in Fig. 4. In this modification X is intended to show

the course the chaff will take if it makes a run down (as it often does) on sections of the grate-bars. By adding a hinged piece 16 to the grate-bars, as shown, I compel this 5 chaff to lodge on a bed of red-hot ashes between foot of bars and bridge-wall, and thus it not only is prevented from escaping, but is quickly consumed. Another advantage of this construction is that the space between 10 the grate-bars and the bridge-wall is somewhat enlarged, and is formed into an ash-pit, which keeps the hot ashes inside the furnace proper, and thus utilizes all the heat which they throw off, most of which heat would be 15 lost if the ash-pit and bars are used as in ordinary furnaces.

By the employment of my furnace I not only utilize waste material, but also provide novel means for feeding and heating boiler- 20 furnaces and conveying off the ashes.

It is evident that slight changes might be resorted to in the form and arrangement of these several parts described without departing from the spirit and scope of my invention; 25 hence I do not wish to limit myself to the exact construction herein set forth; but,

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

30 1. In a furnace, the combination, with a furnace, boiler, base with an inclined bridge-wall, grate-bars, feed-hopper, and a slide for regulating the feed, of a pit beneath the lower end of the grate, and a screw conveyer for removing the ashes falling therein, substan- 35 tially as set forth.

2. In a furnace, the combination, with a grate and means for regulating the inclination of the grate, of a conveyer for automati-

cally removing the ashes falling from the 40 grate, substantially as set forth.

3. The combination, with a boiler, ash-pit, and hopper, of a grate made in hinged sections, and means for regulating the inclination of 45 the grate, substantially as set forth.

4. The combination, with a furnace-wall, boiler, and inclining bridge-wall, of an ash-pit at the lower end of the bridge-wall, a screw conveyer therein, a pivoted grate consisting of a pair of hinged sections, and a screw for 50 changing the inclination of the grate, substantially as set forth.

5. The combination, with a furnace, boiler, and bridge-wall, the latter being located under the front end of the boiler and having its 55 top, over which the products of combustion pass, inclined upwardly from front to rear, of an inclined grate, the lower end of which rests in close proximity to the inclined surface of the bridge-wall, whereby the latter 60 acts as a stop or abutment for the fuel on the grate, substantially as set forth.

6. The combination, with a furnace and boiler, of a bridge-wall having an inclined surface, a hopper, an inclined grate, and a 65 device for changing the inclination of the grate, the lower end of said grate resting in close proximity to the inclined surface of the bridge-wall, whereby the latter acts as a stop or abutment for the fuel on the grate, sub- 70 stantially as set forth.

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

JOHN L. SHEPPARD.

Witnesses:

J. C. DILLINGHAM,  
FRANK R. HOWARD.