C. I. HALL.

Straw-Burning Furnace.

No. 203,267. Patented May 7, 1878.

Fig. 1

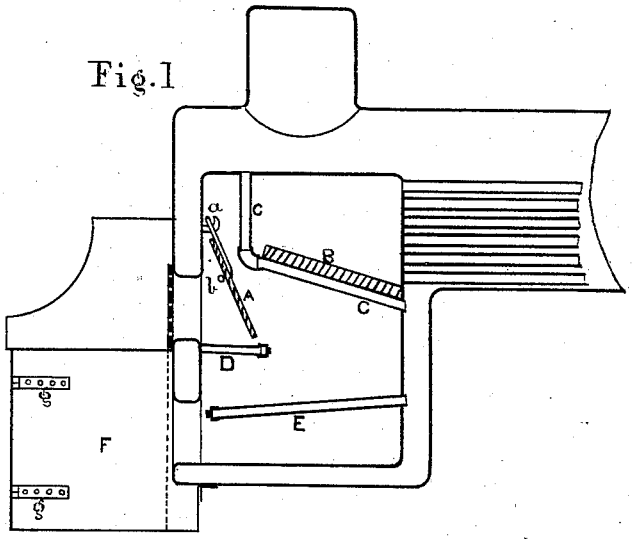


Fig. 2

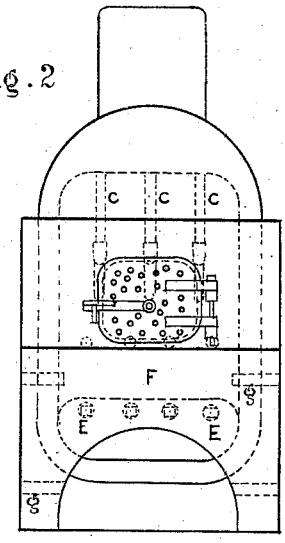


Fig. 4

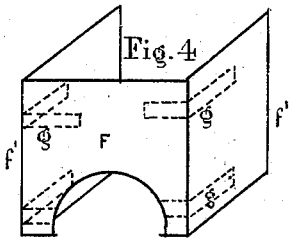


Fig. 3

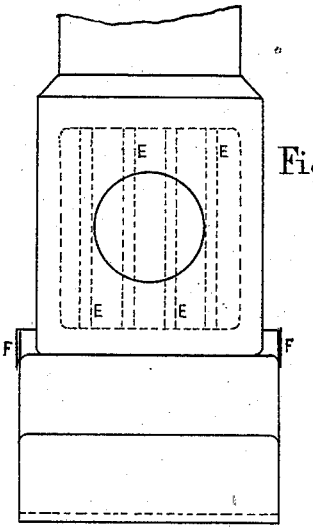
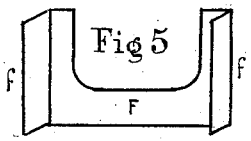


Fig 5



Attest

Jno Pardy.

Wm R. Bailey

Cofran I. Hall

Inventor

per George Pardy

Atty

UNITED STATES PATENT OFFICE.

COFRAN I. HALL, OF VALLEJO, CALIFORNIA.

IMPROVEMENT IN STRAW-BURNING FURNACES.

Specification forming part of Letters Patent No. **203,267**, dated May 7, 1878; application filed December 6, 1877.

To all whom it may concern:

Be it known that I, COFRAN I. HALL, of Vallejo, Solano county, California, have invented an Improved Straw-Burning Furnace for Steam-Boilers, of which the following is a specification:

This invention relates, first, to the arrangement of a swinging plate extending the entire width of the inside of the furnace, and set immediately above the fire-door, by which the air-current passing in through the perforations in the fire-door or doorway is deflected into the burning fuel, while, owing to the plate, which is allowed to swing upward as the straw fuel is pushed into the furnace, falling down again, and contracting the opening as the operation of feeding the fire is discontinued, the objection of maintaining a constantly wide opening, which would be necessary to accommodate the feeding of the fuel named, and through which excessive quantities of cold air would pass into the furnace, is, to a large extent, avoided, the said plate having the additional functions of preventing the small straw from being drawn by the draft over the edge of plate B, below described, and thence into the tubes, and also acts, in combination with the plate B, as a deflector of the heat and flame from the fire below.

Secondly, my invention relates to certain grates projecting inside the furnace, just below the fire-door, which grates operate to prevent the fuel from falling upon the fire nearest the ash-pit door, but guide it to fall upon the farthest end of the fire, so that the ashes may be raked out without disturbing the unconsumed fuel.

In the accompanying drawing, Figure 1 is a longitudinal sectional elevation of the furnace, showing my improvements applied thereto. Fig. 2 is a front view of the furnace with hopper and ash-pit screen in place. Fig. 3 is a plan of the same. Figs. 4 and 5 are detached details of my ash-pit screen.

In Fig. 1, A is the swinging plate, made the same width as the furnace. It depends from two or more hinges, *a*, of any suitable construction. The plate should be made of cast-iron, thick enough to withstand the heat, its upper end resting against the side of the furnace, and the stops *b*, screwed into the furnace-sheet, will serve to regulate the angle of inclination of the plate.

When at rest the plate leaves an opening at its lower edge sufficient for the passage of any air which may pass in through perforations in the fire-door or doorway. An adjustment of the inclination of the plate may be made by changing the position of the stops *b*.

It will be observed that one of the functions of this plate depends entirely upon its being made to swing back and forth; hence it will not be considered as an equivalent to those plates which simply rest immovable upon supports provided for them.

B, Fig. 1, is a plate in two pieces, made of cast-iron or any fire-proof material. It rests on the gas-pipe supports C, which are screwed into the crown-sheet and tube-sheet of the furnace just below the tubes, water circulating freely through these supports. This plate B is commonly known and used much upon locomotives. It assists combustion and keeps cold air from entering the tubes, besides protecting them from being choked with small straw by the action of the draft in the act of feeding.

D refers to my projecting grates, used particularly for straw fuel. As before suggested, these grates will prevent the fuel from falling on the fire until it is pushed forward beyond the burnt-out fuel. These grates are simply short pieces of gas-pipe screwed into the back sheet of the furnace, a plug or cap being fitted to the exposed end. Four or more of these grates may be applied, according to the width of the furnace.

E, Figs. 1, 2, 3, refers to the fire-grates upon which the fuel rests. These grates are simply lengths of gas-pipes screwed into the front sheet of the furnace. They should be inclined downward about two inches in their entire length, to insure the escape of the steam which may be formed within them. The ends of these pipes are closed by a cap screwed on in ordinary fashion, and by removing which the pipes may be cleaned of any sediment or scale accumulated within them.

F in all the figures of the drawing represents my improved folding ash-pit screen or housing. It is formed of two separate parts, *f f'*. *f* is a piece which fits closely around the fire-box of the boiler, having flanges bent for-

ward at the sides to enclasp the edges of the part *f'*. The part *f'* is made of three pieces joined together by the hinges *g g*. There is an opening, *h*, to give access to the ash-pit.

When the parts are set up in place there is no danger of the hot ashes communicating fire to any combustible material in close proximity to the boiler, and the effect of the wind, which might scatter the hot ashes among the dry stubble in the open field, is entirely neutralized.

Screens of this kind are improvements upon the old style in the matter of joining the parts together by the hinges *g g*, instead of making the whole in one piece or riveting the parts together.

The hopper G is of common construction, and needs no special description here.

What I claim as my invention, and desire to secure by Letters Patent, is as follows:

1. In combination with the fire-bed, the projecting bars or grates D, having wide spaces between them, so as not to obstruct the entrance of air through the perforated door or doorway into or deflect the fire immediately below them, when applied to straw-burning furnaces to prevent the fuel from falling on the fire-bed directly underneath, as and for the purpose herein described.

2. The plate A, when depending in front of the doorway from hinges attached above within the interior of the furnace, said plate acting in combination with the plates B and perforated fire-door or doorway, as and for the purpose herein described.

COFRAN I. HALL.

Witnesses:
GEO. PARDY,
JNO. PARDY.