

(No Model.)

A. HARDT.

FURNACE FOR BURNING FINE COAL.

No. 340,781.

Patented Apr. 27, 1886.

Fig. 1

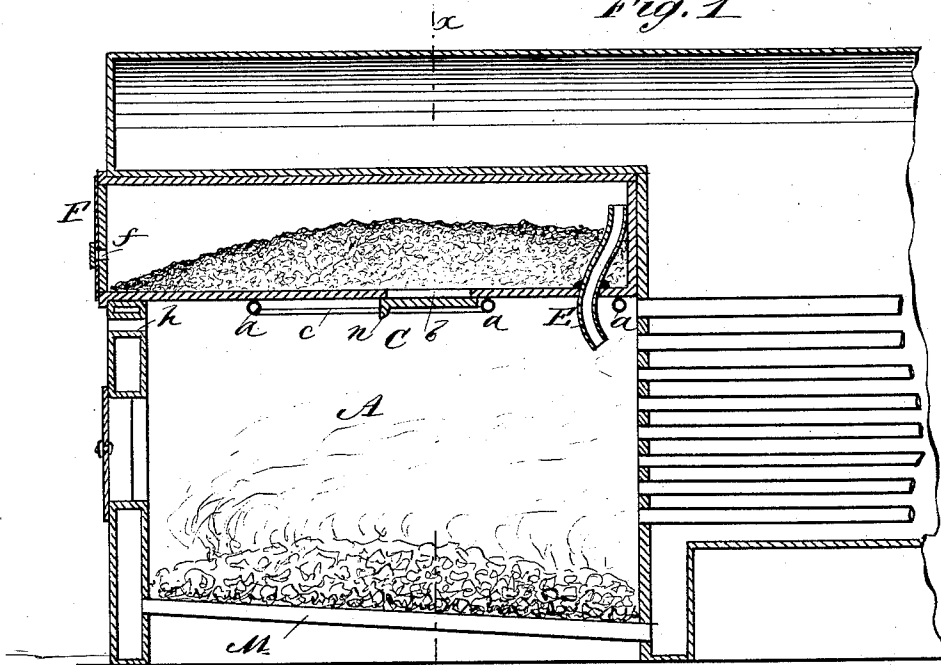


Fig. 2

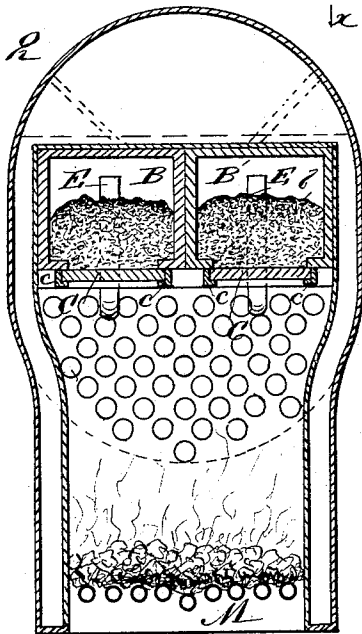
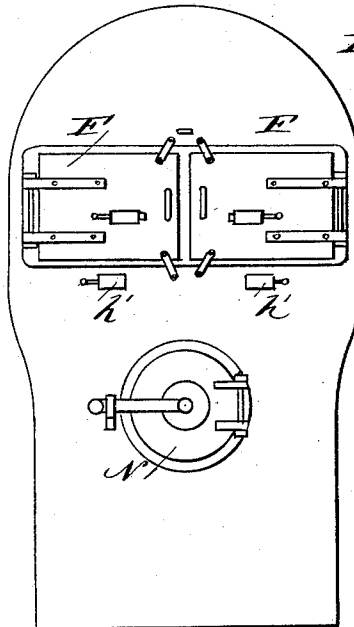


Fig. 3



WITNESSES:

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FURNACE FOR BURNING FINE COAL.

SPECIFICATION forming part of Letters Patent No. 310,781, dated April 27, 1886.

Application filed February 5, 1886. Serial No. 190,935. (No model.)

To all whom it may concern:

Be it known that I, ANTON HARDT, of Wellsborough, in the county of Tioga and State of Pennsylvania, have invented a new and useful Improvement in Furnaces for Burning Fine Coal, of which the following is a specification.

The object of my invention is to provide a furnace wherein soft (bituminous or semi-bituminous) coal screenings, commonly called "fine coal," "slack," or "culm," may be used either alone or in combination with hard (anthracite) coal-screenings or coke-screenings, whereby such screenings, which are generally considered as useless material, may be utilized for the purpose of generating heat, to be used in all sorts of manufacturing establishments, as well as in locomotives, &c.

Reference is to be had to the annexed drawings, forming part of this specification, in which Figure 1 is a longitudinal sectional view of a portion of my furnace for burning fine coal. Fig. 2 is a vertical sectional view taken on line *x x* in Fig. 1. Fig. 3 is a front elevation of the furnace.

Similar letters of reference indicate corresponding parts in the different figures of the drawings.

In constructing such a furnace as is illustrated in the drawings above referred to I provide an ordinary form of fire-box, A, above which I mount two retorts, B B', said retorts being made of fire-clay and being similar to those ordinarily employed in gas-works. The retorts B B' rest upon and are supported by the boiler-front and by water-pipes *a a*, as clearly shown in Fig. 1. In the bottom of each retort there is an opening, *b*, arranged to be closed by a slide, C, said slide being mounted in ways *c c*, and being made of fire-clay, while near the rear end of each retort there is a fire-clay tube, E, which extends upward within the retort to a point near its top, and downward within the fire-box A. Doors F F, provided with peep-holes *f f*, are arranged to close the forward open end of each of the retorts, and just below the retorts there are openings *h h*, closed by shutters *h' h'*, the fire-box being provided as usual with a door, N.

Such is the general construction of the furnace, which operates substantially in the manner to be now set forth. The fire is started in

the usual way on the grate M, and when the retorts B B' are sufficiently hot they are charged with fine coal. After time enough has elapsed to convert the fine coal or screenings to what I call "semi-coke," one of the slides C is drawn forward by means of an implement inserted through one of the openings *h*, and formed to engage with a lug, *n*, formed on the slide C. When the slide C is pulled forward, the material contained within the retort drops down upon the fire, being shoved and drawn to the opening, as will be readily understood. After one retort has been emptied it is again filled with fine coal, and as soon as required the second retort is emptied and then refilled, it being understood that the two retorts are used alternately—that is to say, while the coking process is going on in one retort the material in the other retort, which has been partially coked, is being fed to the fire-box. The gas that is driven out of the material placed in the retort passes through the tubes E E into the fire-box, where it ignites and furnishes additional heat.

Not only will a furnace constructed as described coke and burn slack and screenings, thereby utilizing a comparatively worthless fuel, but the loss of heat caused by opening the fire-box door is entirely avoided, and it will be readily understood that even if a portion of the material placed in the retorts should become too greatly heated and converted into coke there would be nothing lost, as the gases generated would all have been used as fuel in the fire-box. It will also be understood that if the supply of semi-coke from the retorts is not sufficient to supply any unexpected or extraordinary amount of heat, that additional fuel could be introduced to the fire-box in the ordinary way through the door N.

This furnace can readily be adapted to use upon railroads, stationary engines, puddling, welding, and heating furnaces.

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

1. The combination, with a fire-box or furnace, of a retort provided with charging and discharging openings having covers, and of a gas-discharge pipe, substantially as described.

2. The combination, with a fire-box, of a retort formed with an opening, *b*, and arranged

above said fire-box, a slide C, and a tube, E, substantially as described.

3. In a furnace, the combination, with a fire-box, of retorts arranged above the fire-box, and
5 formed with openings that are closed by movable slides, said retorts being provided with tubes, as E E, substantially as described.

4. In a furnace, the combination, with the fire-box, of retorts arranged above said fire-
10 box, and supported by water-pipes *a a*, a slide,

C, formed with a lug, *n*, and connecting pipes or tubes E E, substantially as described.

5. In a furnace, the combination, with a fire-box formed with an opening, *h*, of retorts B B', slides C, formed with lugs *n*, and pipes or
15 tubes E, substantially as described.

ANTON HARDT.

Witnesses:

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