A. L. SCHULTZ.

Feeding Fuel to Furnaces.

No. 205,428. **Patented June 25, 1878.**

Fig. 1.

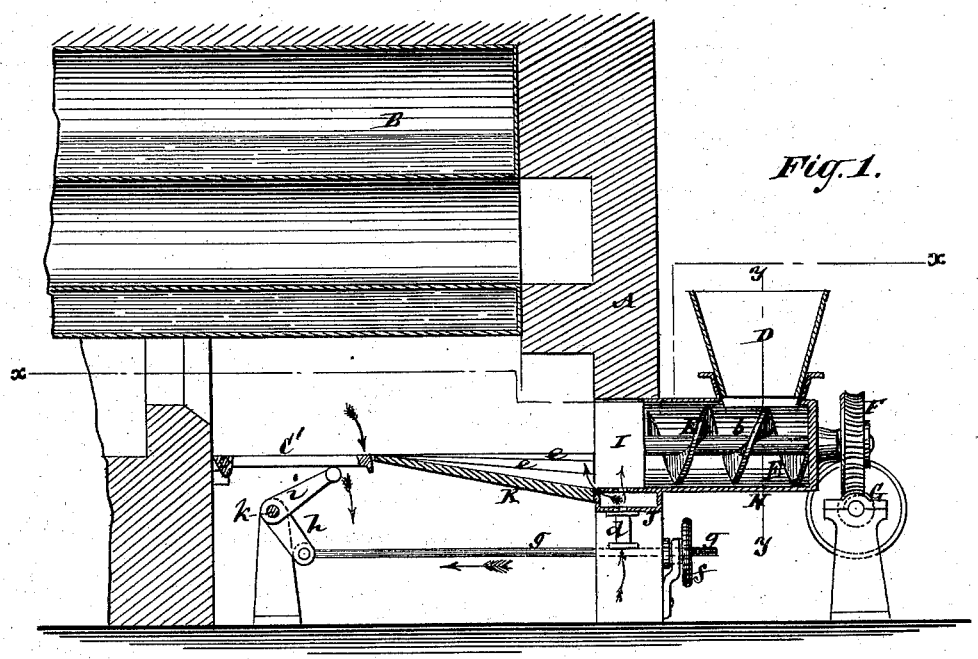


Fig. 2.

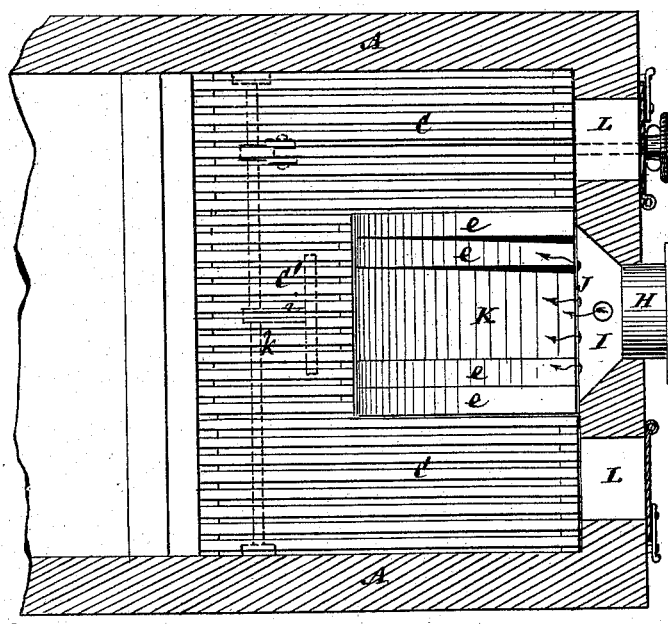
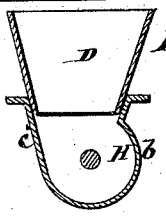


Fig. 3.



Witnesses

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AUGUST L. SCHULTZ, OF MEISSEN, ASSIGNOR TO BERNHARD RÖBER, OF DRESDEN, SAXONY.

IMPROVEMENT IN FEEDING FUEL TO FURNACES.

Specification forming part of Letters Patent No. **205,428**, dated June 25, 1878; application filed May 1, 1878.

To all whom it may concern:

Be it known that I, AUGUST LOUIS SCHULTZ, of Meissen, in the Kingdom of Saxony, have invented certain Improvements in Feeding Fuel to Furnaces, of which the following is a description, reference being had to the accompanying drawing, forming part of this specification.

This invention, which has for its object the more perfect and economical combustion of the fuel on the grates of fire-places and furnaces, relates to that description of the latter in which combustion is established and kept up by the feed of the fuel up to or beneath the burning mass, subject to a preliminary heating of the fresh fuel; and the invention consists in various novel constructions and combinations of parts or devices, whereby these results, also perfect distribution and other advantages, are obtained.

In the accompanying drawing, Figure 1 represents a vertical longitudinal section of a steam-boiler furnace constructed in accordance with my invention. Fig. 2 is a horizontal section of the same on the line *x x;* and Fig. 3 is a vertical section, on the line *y y*, through the supply-hopper and feeding-tube of the furnace.

A A represent the outside walls of a furnace of a steam-boiler, B, and C C′ the fire-bar portion of the grate. D is a fuel-supply-hopper, into which the coal or other fuel to be consumed on the grate is placed, and from which said fuel is conveyed, by a screw-conveyer, E, to the fire-bar portion of the grate, but not directly, as hereinafter described. Said screw-conveyer may be similar to other screw-conveyers for a like purpose, and may be rotated, either by hand or by power, through the intervention of a worm-wheel, F, and screw G, or by any other suitable means. Such screw-conveyer, however, is arranged to rotate within a feed tube or duct, H, of peculiar construction. Thus, said tube is of a close-fitting shape, conforming to the peripherical travel of the screw-conveyer on that side, *b*, of the tube toward which the upper portion of said conveyer rotates, but is of tangential form to the generally circular contour of the tube on the opposite side, *c*, of the latter, whereby the screw-conveyer is relieved from choking, and effects a free and easy delivery or passage of the fuel along the duct or tube H.

The inner end of the feed tube or duct H is arranged to communicate with a passage, I, preferably made of increasing width toward the grate, and the bottom of which is or may be formed of a hollow plate, J, having one or more perforations in its upper surface, also along its front upper edge, and is provided below with an inlet-nozzle, *d*, for an artificial air-blast, when an artificial blast is needed, as in puddling, melting, and other furnaces for metallurgic and other purposes requiring a high temperature. When a blast is used the air escaping from the hollow plate J is freely introduced to the fuel as it is fed or projected by the screw-conveyer through and out of the passage I, said air being distributed not only up into the moving body of fuel, but also into it in direction of its motion toward the grate. The perforated hollow plate J accordingly forms an air-blast distributer. The plate J may be prolonged or extended within the furnace any desired distance that may be required.

K is an inclined-plane portion of the grate, arranged at the front end of the latter, and sloping upwardly from the delivery end of the passage I toward the back of the grate. This inclined plane forms a feeding-trough for the fuel onto the fire-bars of the grate, and may be made up of bars arranged close to one another, or otherwise have its feeding-surface of a close construction. Said inclined trough rises at its back end to the level of the fire-bars, or thereabout, and is preferably formed with a series of steps, *e e*, at its sides, to secure its hold on the fuel and more perfect distribution of the fresh fuel under the burning mass, and onto or over the whole fire-bar surface of the grate.

On commencing to fire up, the screw-conveyer E is first operated to cover or nearly cover the whole grate with fuel; or the grate may be thus supplied through stoke-holes L L. The conveyer E is then set or continued in motion, and the fuel made to burn upon the whole surface of the grate, the green or fresh

fuel, as it is fed forward by the action of the conveyer and passes upwardly in its travel along the inclined trough K, lifting and driving before it the burning upper mass or layers of fuel toward the rear end and sides of the grate. By such action the fuel which is consumed is regularly replaced by fresh fuel without reducing the temperature of the furnace, the hot fuel being piled in a flat heap over the inclined trough, its stepped sides, and fire-bars of the grate, and as said heap is moved along, the upper mass of burning fuel is distributed in various directions, while the fresh fuel forces its way from the center portion of the heap upward and toward the fire-bar surface of the grate.

The upper surface of the fire-bars is preferably in line or nearly in line with the longitudinal axis of the conveyer E.

The stoke-holes L L, which are furnished with doors, are mainly for the purpose of removing the cinders or slag, and to pass the same onto or over either an opening and closing trap at the rear of the grate, or onto the rear portion C′ of the grate, which is hinged at its back and lowered or opened by means of a nut, *f*, screw-rod *g*, cranks *h i*, and a rock-shaft, *k*, or other suitable means, to pass off the slag when required.

I claim—

1. The combination, with the fire-bar portion of the grate, of an upwardly-inclining feeding-trough arranged to project within said portion of the grate and below the level of its fire-bars, substantially as and for the purposes specified.

2. The upwardly-inclining feeding-trough, constructed with a series of steps on either side of it, in combination with the fire-bars of the grate, arranged to meet on their upper surfaces the outer edges of the trough, essentially as described.

3. The combination, with the fire-bar portion C′ of the grate and upwardly-inclining feeding-trough K, arranged to project within said portion of the grate, of the hopper D, the screw-conveyer E, the feed tube or duct H, constructed to closely hug said conveyer on its one side *b*, and of a tangential construction on its opposite side *c*, and the passage I, substantially as specified.

4. The perforated air-blast distributer J, in combination with the passage I, the upwardly-inclined feeding-trough K, and the fire-bar portion of the grate, with which said trough communicates, essentially as described.

This specification signed by me this 29th day of December, 1877.

AUGUST LOUIS SCHULTZ.

Witnesses:

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