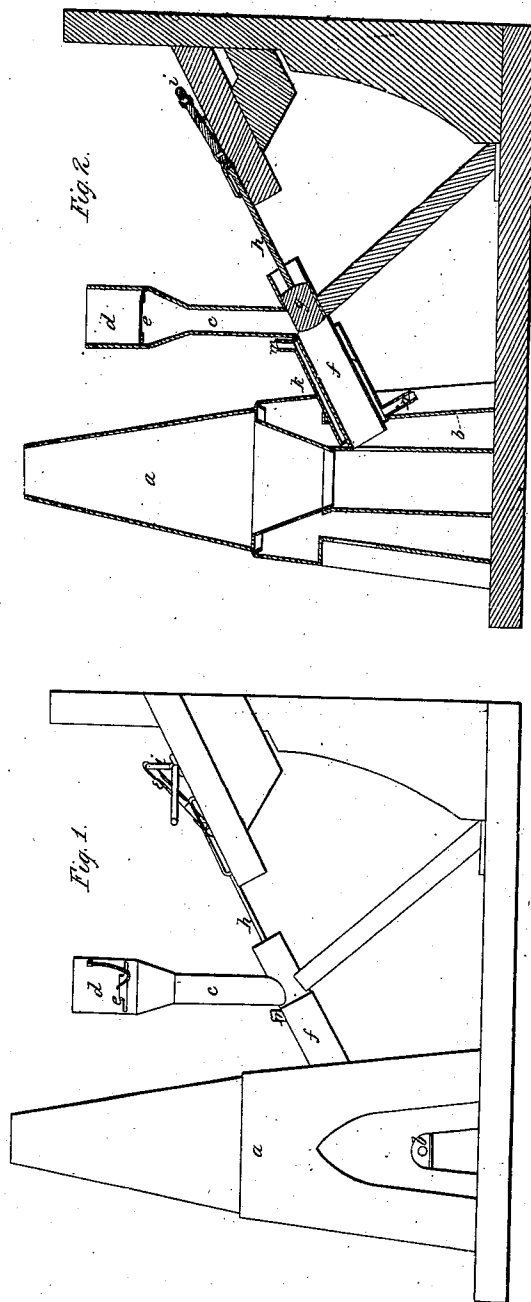


No. 4,527.

PATENTED MAY 16, 1846.

S. M. FALES.  
BLAST FURNACE.



# UNITED STATES PATENT OFFICE.

SQUIRE M. FALES, OF BALTIMORE, MARYLAND

## IMPROVEMENT IN FEEDING FURNACES.

Specification forming part of Letters Patent No. 4,527, dated May 16, 1846.

*To all whom it may concern:*

Be it known that I, SQUIRE M. FALES, of the city of Baltimore, in the county of Baltimore and State of Maryland, have invented a new and useful Improvement in the Method of Feeding Furnaces for Smelting, &c.; and I do hereby declare that the following is a full, clear, and exact description of the principle or character thereof which distinguishes it from all other things before known, and of the manner of making, constructing, and using the same, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is an elevation of a smelting-furnace with my improvements applied thereto, and Fig. 2 a vertical section of the same.

The same letters indicate like parts in all the figures.

In smelting and other furnaces for the reduction and working of iron the whole of the ore, flux, and fuel are generally introduced through the top of the stack, which is attended with much inconvenience, particularly when additional fuel is to be introduced, for instead of supplying the combustible where the greatest intensity of heat is required, it must be introduced above the charge and gradually settle down; and as it is deemed important frequently to add more flux or change its quality to suit the nature or condition of the ore, and to supply fine coal, mineral or vegetable, or both mixed, with the view to increase the intensity of the heat, and also to introduce the small lumps of ore, which, if introduced above, have a tendency to choke the draft, it has been suggested to employ for these purposes a tunnel by the side of and communicating with the lower part of the stack below the boshes, to deliver whatever may be desired a little above the tuyere; but this so far has failed, in consequence of the tendency to stop up the delivery-aperture of this tunnel or feeder, and hence fail in the supply. I effectually remove this difficulty by means of my improvement, which consists in making the feeding-tunnel with a lateral branch provided with a piston operated by some first mover; which, as it reciprocates, permits a portion of the charge to fall by its gravity from the vertical part of the feeder into the lateral branch, and then forces it into

the furnace. This effectually prevents the choking heretofore experienced and admits of an easy means of regulating the supply.

The accompanying drawings represent my improvement as applied to the common smelting-furnace or cupola, in which *a* is the stack, *b* the tuyere-holes for the introduction of the blast, and *c* the vertical portion of the feeding-tunnel, of sufficient capacity, if desired, to contain all the additional charge. The upper part, *d*, is provided with a valve or shutter, *e*, for the introduction of the extra charge, and to admit of closing the top to prevent the escape of any gases therefrom. The lower part communicates with an inclined tube, *f*, that leads into the furnace between the tuyeres and the boshes, and is adapted to the reception of a piston, *g*, which is connected by means of a rod, *h*, with a crank, *i*, on a shaft operated by some first mover. The length of the stroke of this piston should be sufficient to pass from under the aperture of the vertical part of the feeder, and force down into the furnace all that may have fallen into the inclined tube.

To prevent the injurious effect of the high temperature of the furnace on that portion of the tube nearest the furnace, it is surrounded by a jacket at *k*, with a space, *l*, for the circulation of water, which is admitted through the aperture *m* and discharged at *n*. The piston *g* is made hollow for a like purpose, and the water may be made to circulate through it by a siphon-tube; but any other mode of conducting the water to and from this hollow piston may be substituted.

That part of the feeder in which the piston works, instead of being inclined, may be horizontal, and the piston should be so connected with the driving machinery as to be under the control of the attendant to regulate the feeding, which may be effected either by means of cone-pulleys, a fast and loose pulley, or any other known mechanical device.

It will be evident that this mode of feeding can be applied to other furnaces—such as the puddling, the refinery, &c.—by simply adapting the form of the parts to the different construction of these; but I deem its application to the cupola or smelting furnace of the greatest importance.

I do not claim as my invention feeding fur-

naces through a feeding-tunnel simply, as this has been done; but

What I do claim as my invention, and desire to secure by Letters Patent, is—

The combination of the tube and piston for forcing in the coal, &c., in combination with the feeding-tunnel and furnace, as herein de-

scribed, whether the furnace be for smelting or for other purposes, as herein described.

SQUIRE M. FALES.

Witnesses:

CAS. M. KELLER.

A. P. BROWNE