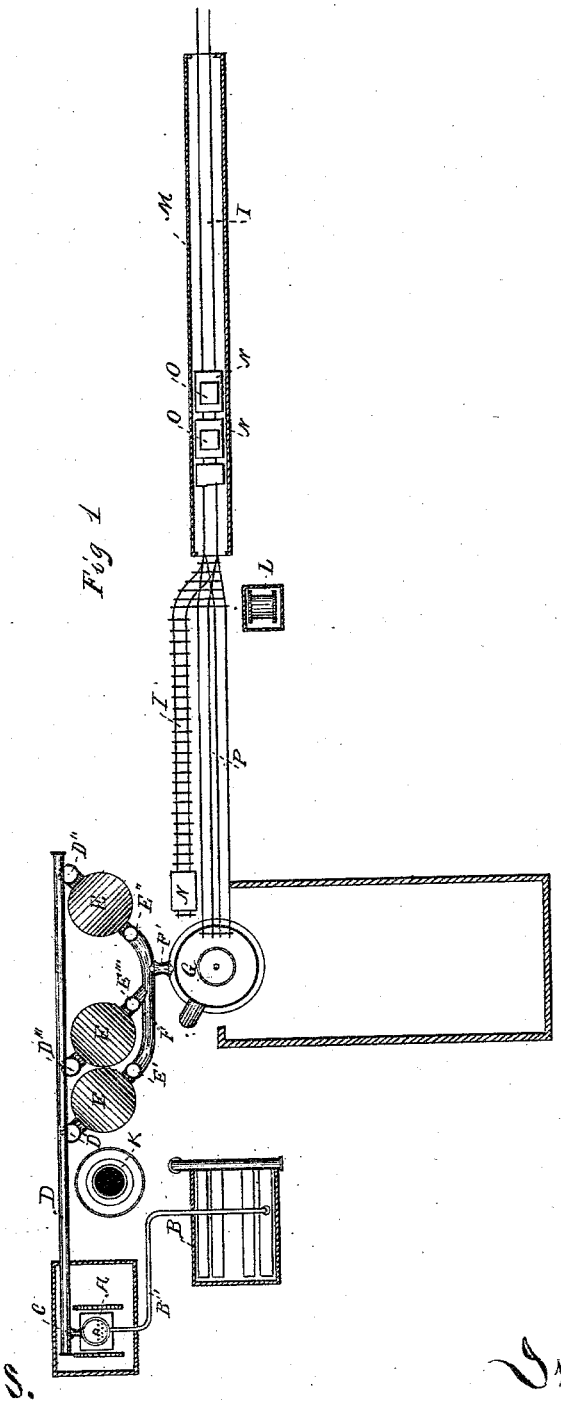
(No Model.) 2 Sheets—Sheet 1.

J. F. BENNETT.

METHOD OF AND APPARATUS FOR FEEDING STOCK TO BLAST FURNACES.

No. 303,206. Patented Aug. 5, 1884.

Fig 1



Witnesses.
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H. W. Stuckeley

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(No Model.) 2 Sheets—Sheet 2.

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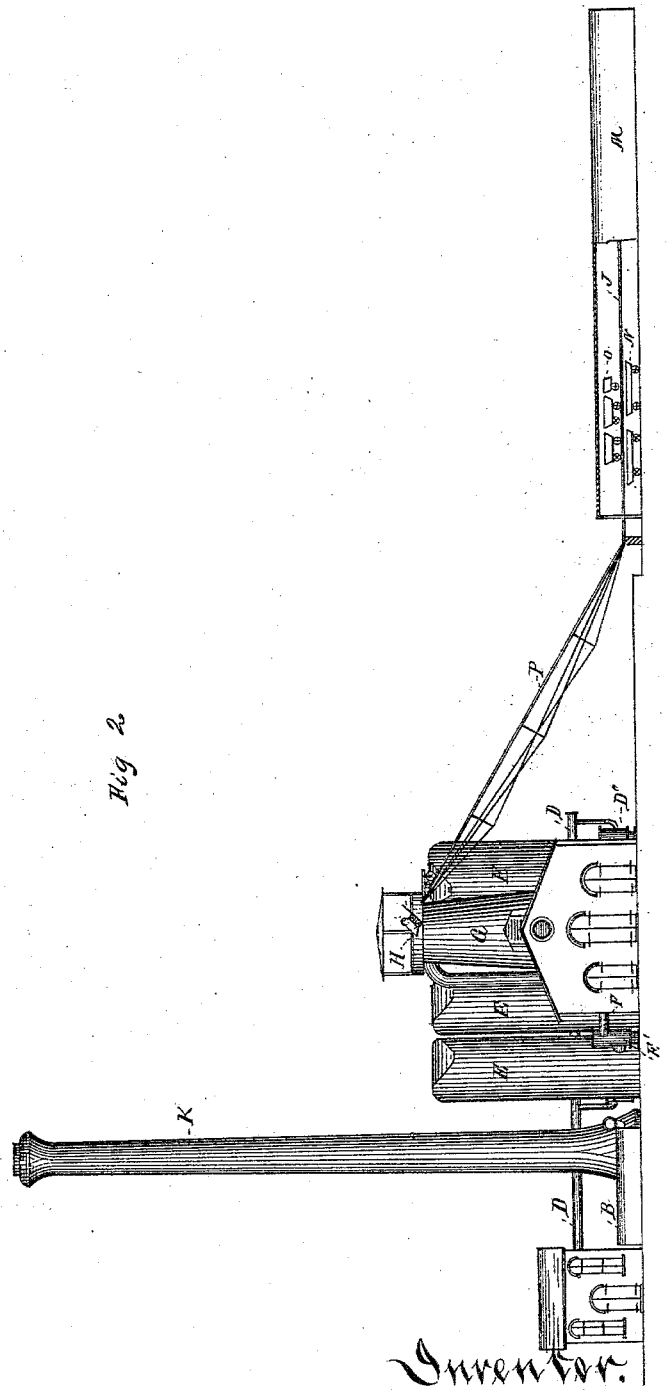
METHOD OF AND APPARATUS FOR FEEDING STOCK TO BLAST FURNACES.

No. 303,206. Patented Aug. 5, 1884.

Fig 2.



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UNITED STATES PATENT OFFICE.

JOHN F. BENNETT, OF PITTSBURG, PENNSYLVANIA.

METHOD OF AND APPARATUS FOR FEEDING STOCK TO BLAST-FURNACES.

SPECIFICATION forming part of Letters Patent No. 303,206, dated August 5, 1884.

Application filed September 24, 1883. (No model.)

To all whom it may concern:

Be it known that I, JOHN FRANCIS BENNETT, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Method of and Apparatus for Feeding Stock to Blast-Furnaces; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification.

My invention relates to apparatus for feeding stock to furnaces; and the objects of my improvements are, first, to warm the stock by the waste slag-heat economically; and, second, to accomplish this end with simplicity of plant. I attain these objects by the method hereinafter described, and the means illustrated in the accompanying drawings, in which—

Figure 1 represents a plan view of the plant used in the operation of my invention; and Fig. 2 is an elevation thereof, partly in section. Similar letters refer to corresponding parts throughout the views.

A is a blower operated by steam from boilers B through pipe B′. The compressed cold air is conducted by pipe C to the accumulator D, whence it is fed through pipes D′ D″ D‴ to the hot fire-brick ovens E E E, where the air is heated. Thence the air is conducted by pipes E′ E″ E‴ F F′ into the blast-furnace G.

H is a tilting platform, by which the fuel, conveyed in wagons O from the source, through hood M on the elevated track J and inclined track P, is fed to the top of the furnace G.

I is a ground-track, on which wagons N, containing slag from the furnace G, are conveyed to the hood M, where the heat voluntarily emitted therefrom is utilized in heating the fuel and expelling moisture therefrom.

K is the chimney, by which the products of combustion incapable of further utilization are discharged.

L is any suitable traction-engine, serving as a motor for the wagons N. O. It has connection with both sets of wagons, drawing wagons full of fuel up the incline and wagons full of slag into the hood.

M is an arched hood having doors at either end, which preferably open and close automatically. One track, I, is laid upon the floor for the slag-wagons N, and one elevated track, J, is provided, so that the wagons O shall be as near the top of the hood as possible, to secure all the heat. The slag-wagons are preferably made low, with wide boxes, holding the slag to a depth, approximately, of six inches, whereby the desirable extent of surface is exposed to the atmosphere and the slag readily cooled. The fuel-wagons are made rather deep. They enter where the slag-wagons leave, and conversely. The entrance and exit of the fuel-wagons may be made simultaneously with the exit and entrance of the slag-wagons. When an inclined track is undesirable, an elevator may be substituted therefor. The term "fuel" herein used includes the fluxes and ores.

By the employment of this process and apparatus for heating the furnace-stock, greater heat at the zone of fusion in the lower part of the furnace is attainable than heretofore, and consequently a greater yield of metal, other conditions being equal.

Among the advantages incident to previously heating the furnace-stock are that when operating with excessively-watered coke or wet ores and fluxes all but the hygroscopic water is expelled. With anthracite coal, not only is all but the hygroscopic moisture expelled, but also any carbo-hydrogen present, the expulsion of which in the furnace is a source of considerable loss of heat, and the coal is so gradually heated that when fed to the furnace it neither decrepitates nor packs. With block-coals—such as those of Ohio and Indiana—the carbo-hydrogen gases are expelled, and hence their efficiency in the furnace to that degree enhanced, while the gases evolved, averaging twelve per cent., may be collected in the hood, and thence readily conducted to a suitable gas-holder. The last case cited necessitates the use of double doors or other means of rendering the hood nearly air-tight.

It is apparent that other means than hot slag might be utilized to heat the stock; but I am not aware of any more economical.

Heretofore the waste slag-heat has been utilized in the volatilization of deleterious gases and in the warming of the stock preparatory to its charge to the furnace, so that upon reaching its sphere of action no time or heat need be wasted in the upper zone of the furnace, where both of these are vitally useful.

My invention consists in the novel means by which this end is more effectively attained, as specifically described in the claims.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In feeding blast and other furnaces during the smelting operation, the process herein described of heating the ore, fluxes, and coal preparatory to charging the furnace, which consists in placing the charge in a closed chamber containing the hot slag from the furnace, thereby heating the charge by means of the hot slag.

2. The combination of a blast-furnace with a chamber or hood capable of hermetic closure, having two tracks therein—one above the other—and means for running the cars of slag and those containing ore and fuel to and from said chamber and furnace.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

JOHN F. BENNETT.

Witnesses:

M. E. HARRISON,

ALEX. RANDOL.