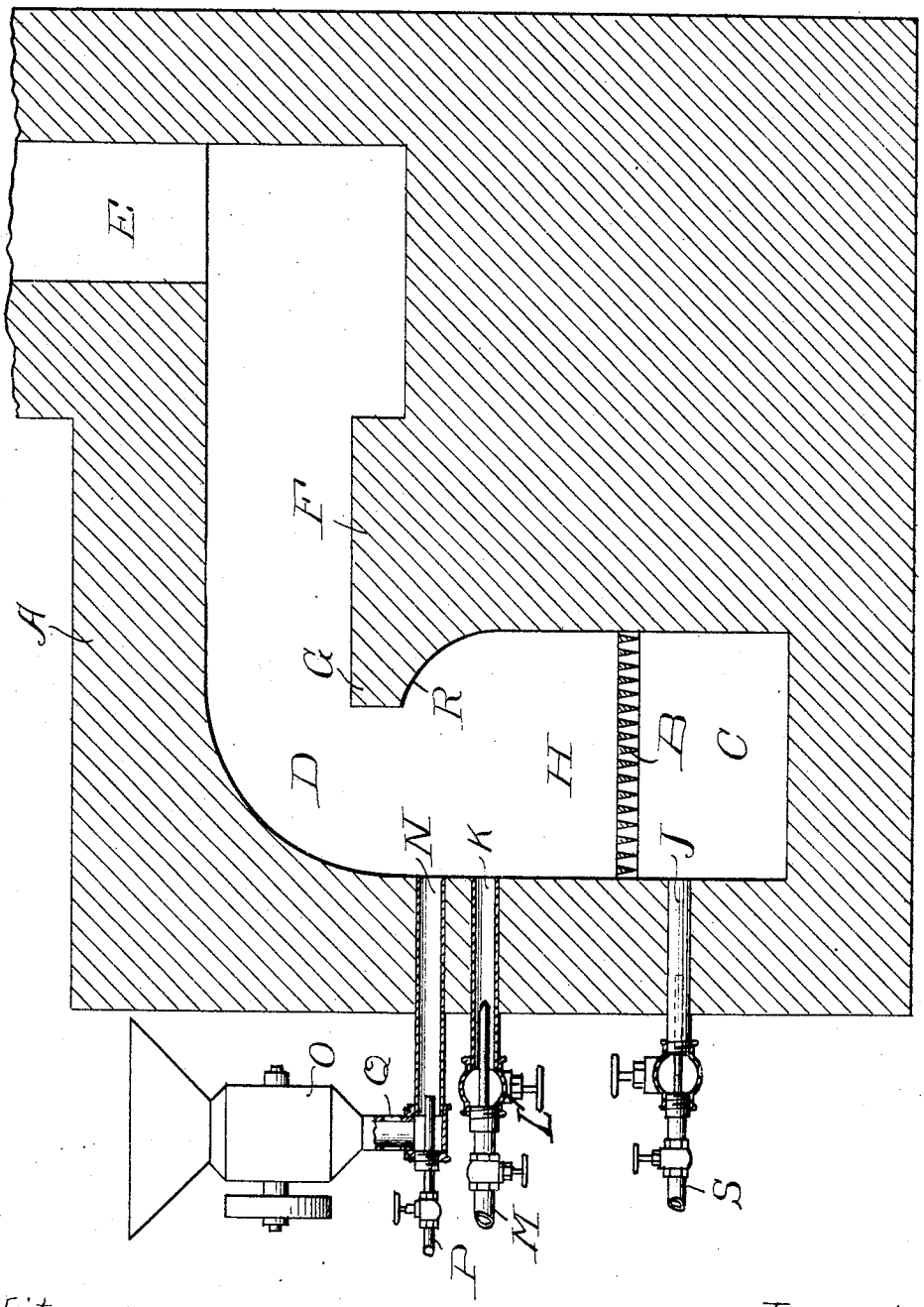
No. 785,991. PATENTED MAR. 28, 1905.

G. S. WELLES.

FURNACE.

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Witnesses:

E. F. Wilson

F. Schlotfeld

Inventor:

George S. Welles

By Rudolph Kuh Jr.

Attorney.

No. 785,991. Patented March 28, 1905.

UNITED STATES PATENT OFFICE.

GEORGE S. WELLES, OF CHICAGO, ILLINOIS.

FURNACE.

SPECIFICATION forming part of Letters Patent No. 785,991, dated March 28, 1905.

Application filed June 8, 1904. Serial No. 211,684.

To all whom it may concern:

Be it known that I, GEORGE S. WELLES, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Furnaces; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to a novel construction in a furnace, the object being to provide a device of this character particularly adapted for the consumption of coal in a finely-divided form; and it consists in the features of construction and combinations of parts hereinafter fully described and claimed.

The accompanying drawing, illustrating my invention, shows my furnace in central vertical longitudinal section.

The furnace A is provided with a grate B and ash-pit C, into which a valve-controlled pipe J discharges, which is connected with a source of supply of compressed air and with a source of supply of combustible fluid, preferably carbureted air, by means of the valve-controlled pipe S. Above said grate B is the firing-chamber H, into which a pipe K discharges, which is likewise connected with a source of supply of compressed air by means of a pipe L, extending at substantially right angles thereto and which is also controlled by a valve. A pipe M, controlled by a valve, communicates with said pipe K through a small pipe which is concentric with said pipe K and terminates inwardly of the end of the latter and forward of the connection of the latter with said pipe L, said pipe M being connected with a source of supply of a combustible fluid, such as gas, hydrocarbon, or carbureted air. Adjacent the point of connection of the pipe K with said chamber H a pipe N enters the latter, said pipe N being connected at its rear end with a vertical pipe connected with a source of supply of granulated coal, such as the mill O, said vertical pipe being provided with openings Q for the admission of air. A small valve-controlled pipe P enters said pipe N at its rear end and terminates at a point forward of the connection with said vertical pipe, said pipe P being disposed concentric with the pipe N and connected with a source of supply of compressed air.

The fire-chamber H is connected, by means of the flue or passage D, with the chimney-flue E and is contracted at its upper end by a projection G, the lower face of which is curved and is disposed directly opposite the mouth of the pipe N, so that the granulated coal introduced through the latter impinges against said wall R and is thereby deflected downwardly.

My said furnace is operated as follows: In starting a fire a suitable absorbent soaked with hydrocarbon or a suitable fuel is placed upon said grate B and ignited, air and combustible fluid being introduced through the pipe J to promote combustion. Air and combustible fluid are then introduced into the chamber H through the pipe K, the proportions of each being regulated by the valves to produce perfect combustion of the fluid and attain a high temperature. The supply of commingled air and combustible fluid is continued until the walls of the chamber H have attained a very high temperature. Commingled granulated coal and air is then introduced through the pipe N, the granulated coal being fed by the mill and drawn into the path of the jet of compressed air admitted through the pipe P by the injector-like action of the latter, a further supply of air being drawn in through the openings Q. The high temperature of the walls of the furnace serves to maintain in said chamber H heat sufficient to instantaneously free the volatile constituents from the fine particles of coal, thus reducing same to coke and igniting said volatile constituents and said coke. The coke particles strike the wall R and are deflected downwardly and rebound therefrom and are thus deposited upon the grate B, where they continue to burn, combustion thereof being maintained by the supply of compressed air admitted through the pipe J. The wall R further has the effect of causing the burning gases to be deflected downwardly and whirl in said chamber H, thus concentrating the heat in the latter. Upon introducing the supply of com-

mingled coal and air the supply of commingled combustible fluid and air is preferably gradually shut off, but may be continued if it is desired to produce a very intense heat. The downward deflection of the supply of fuel prevents the fine particles from being carried out of the fire-chamber and insures a substantially uniform temperature throughout the chamber H, from which the intensely hot products of combustion pass into the flue D; but by reason of the introduction with the fuel of sufficient air for its own combustion all possibility of the escape of any combustible gases from said chamber H is avoided, and as a result there can be no smoke.

By introducing below the grate a combustible fluid commingled with an excess of compressed air to supply sufficient oxygen for the combustion of the coke the efficiency of the furnace is greatly enhanced by reason of the fact that the air introduced is heated to a high temperature below its contact with the coke, thus intensifying the heat of the latter. Such fluid also insures ignition of the coke in case the same should fail to be ignited by the heat of the furnace. The supply of such combustible fluid below said grate is therefore preferably maintained.

The furnace illustrated is of a type adapted for forge-shops; but it will be understood that the same may be changed and varied to suit any other desired purpose without departing from the spirit of my invention.

I claim as my invention—

1. A furnace comprising a firing-chamber contracted at its upper end and communicating at said upper end with a flue leading to a chimney or the like, a grate in said firing-chamber, connection between said chamber and a source of supply of compressed air below said grate, connection between said chamber and a source of supply of commingled compressed air and combustible fluid above said grate, and connection between said chamber and a source of supply of commingled compressed air and finely-divided coal above said grate, and valves controlling all of said connections.

2. A furnace comprising a firing-chamber having a grate and connected below said grate with a source of supply of compressed air, connection between said firing-chamber above said grate with a source of supply of commingled compressed air and combustible fluid and with a source of supply of commingled compressed air and finely-divided coal, said connections being so disposed as to introduce said fuel horizontally into said firing-chamber from one side and impinge against the opposite wall thereof, said wall being so formed as to deflect the impinging flame downwardly, and valves controlling all of said connections.

3. A furnace comprising a firing-chamber, a grate in same, connection between said firing-chamber below and above said grate with a source of supply of commingled compressed air and combustible fluid, valves controlling said connections to regulate the relative proportions of combustible fluid and air admitted at each point, and connection between said firing-chamber above said grate and a source of supply of commingled compressed air and granulated coal.

4. A furnace comprising a firing-chamber having a grate and connected below said grate with a source of air, connections between said firing-chamber above said grate with a source of combustible fluid and with a source of finely-divided fuel, under pressure, a wall in said firing-chamber opposed to said fuel connection and against which said fuel impinges on introduction to the chamber, said wall being designed to deflect the impinging fuel toward the grate.

In testimony whereof I have signed my name in presence of two subscribing witnesses.

GEORGE S. WELLES.

Witnesses:
RUDOLPH WM. LOTZ,
F. SCHLOTFELD.