

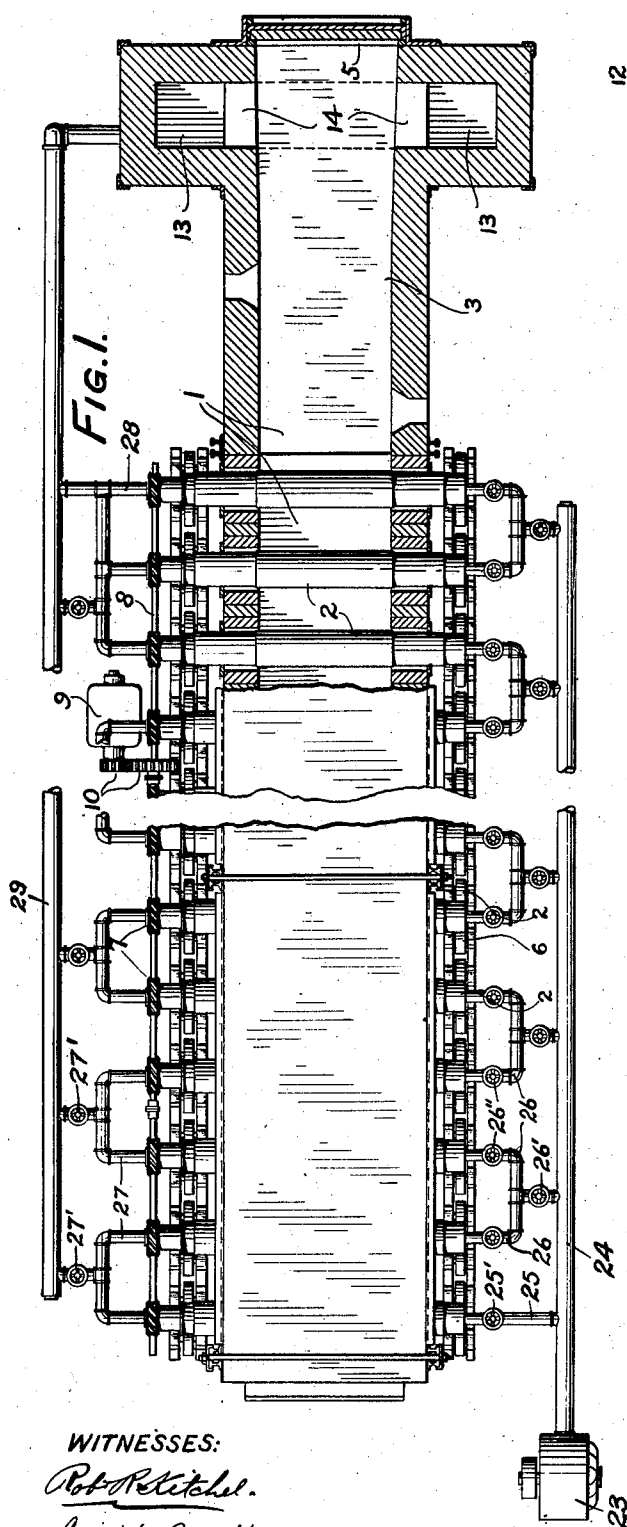
No. 857,285.

PATENTED JUNE 18, 1907.

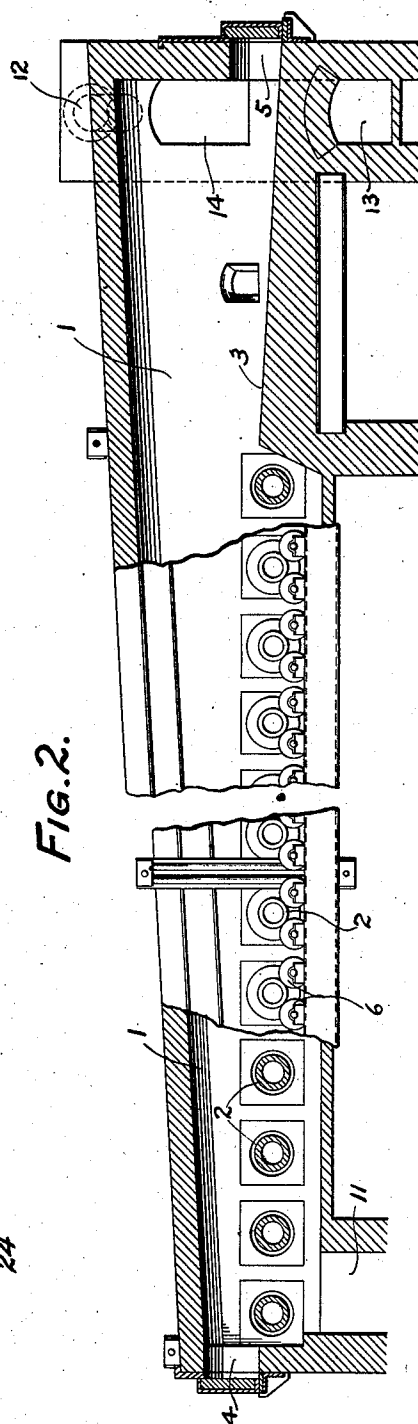
J. HUGHES.
HEATING FURNACE.

APPLICATION FILED JAN. 4, 1906.

2 SHEETS—SHEET 1.



WITNESSES:
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Louis H. Buck



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2 SHEETS—SHEET 2.

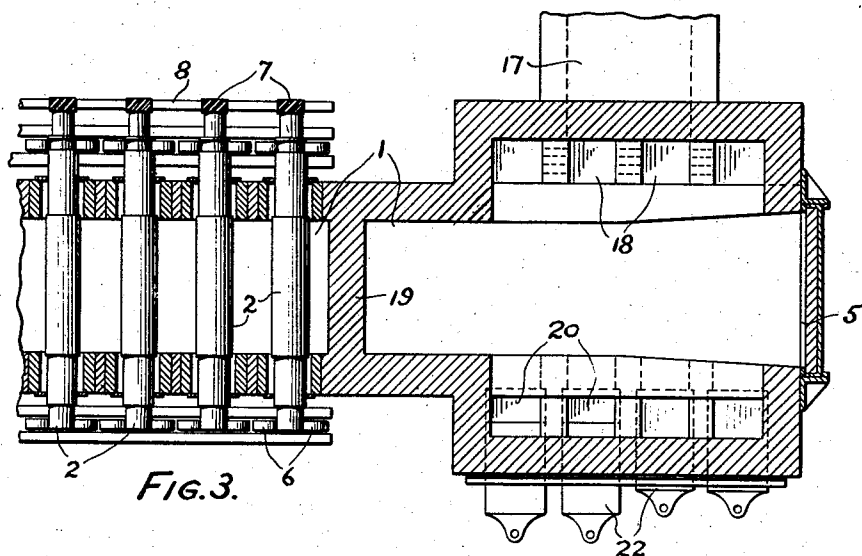


FIG. 3.

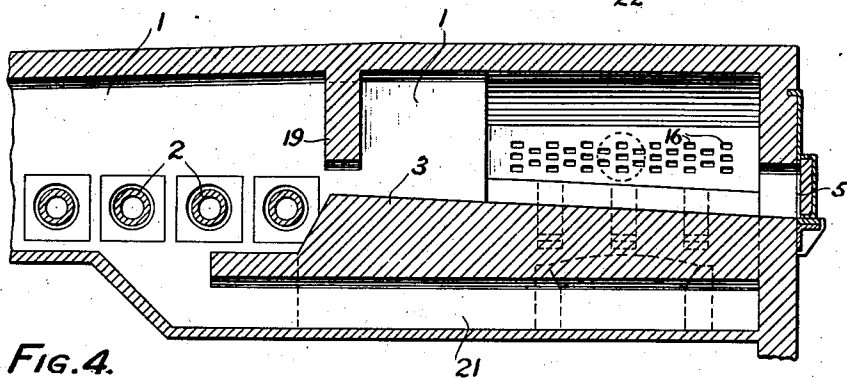


FIG. 4.

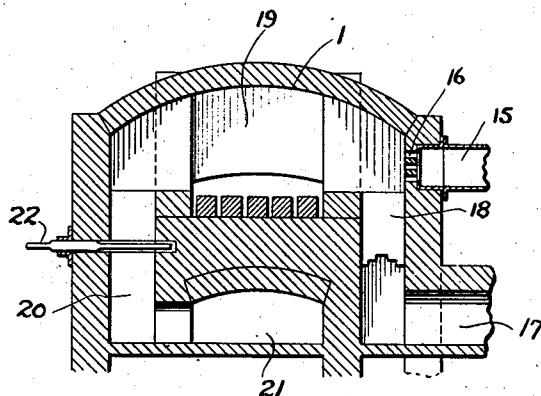


FIG. 5.

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UNITED STATES PATENT OFFICE.

JOHNSON HUGHES, OF WISSAHICKON, PENNSYLVANIA.

HEATING-FURNACE.

No. 857,285.

Specification of Letters Patent.

Patented June 18, 1907.

Application filed January 4, 1906. Serial No. 294,519.

To all whom it may concern:

Be it known that I, JOHNSON HUGHES, a citizen of the United States, residing at Wissahickon, in the county of Philadelphia and State of Pennsylvania, have invented certain Improvements in Heating-Furnaces, of which the following is a specification.

This invention relates to furnaces for heating ingots, billets or the like. Its leading characteristics are comprised in the use of a refractory bottom in the hottest part of the furnace combined with rolls in the parts of lower temperature, means for subjecting the materials to a gradually increasing temperature as they are passed over the rolls to the bottom and through the furnace so as to be uniformly heated on all sides, means for producing a high temperature in the part of the furnace containing the bottom where the materials can be subjected to the degree of heat desired before discharging them, and means for air cooling the rolls and carrying the air heated thereby to the combustion chamber.

In the accompanying drawings, Figure 1 is a plan view partially in section representing a form of the invention: Fig. 2 is a side elevation partially in section representing the same construction with the air cooling pipes omitted: Fig. 3 is a sectional plan view representing a modified construction of the end of the furnace through which the materials are discharged: Fig. 4 is a longitudinal sectional view and Fig. 5 is a transverse sectional view of the construction shown in Fig. 3.

As shown in the drawings, the furnace comprises the heating chamber 1 containing the hollow rolls 2 and the stationary bottom 3, usually formed of basic material, the chamber having the door 4 for the introduction of the materials, which are passed over the rolls and the bottom and discharged through the door 5 at the opposite end of the chamber.

The hollow rolls project through the side walls of the furnace, are mounted on roller bearings 6 outside of the walls, and are actuated through the worm gears 7 by a revolving shaft 8 driven by a motor 9 through the gear train 10.

The air and gas are introduced at the end of the heating chamber through which the materials are discharged and the products of combustion are carried through the chamber to the opposite end where they are discharged

through the passage 11, the flame and gases passing above and below the rolls on all sides of the materials so as to heat them uniformly.

In the construction shown in Figs. 1 and 2, the air carried through conduits 12 and the gas carried through the conduits 13 are admitted by the passages 14 above the bottom 3 and the products of combustion pass directly through the furnace chamber to the outlet 11.

In the construction shown in Figs. 3, 4 and 5, the air is admitted through the conduit 15 and ports 16 and the gas through the conduit 17 and ports 18. The flame produced thereby above the bottom 3 is baffled by an arch 19 so that the heated products of combustion are concentrated over the bottom, escaping under the arch and through downwardly extending passages 20 on the opposite side of the bottom from the fuel inlet passages to a passage 21 under the bottom, and thence through the furnace chamber to an outlet similar to the outlet 11 shown in Fig. 2. In order to regulate the flow of the flame through the auxiliary or subdivision of the heating chamber above the bottom, dampers 22 are placed so that they control the passages 20 and consequently the volume of flame passing therethrough.

While the rolls may be cooled in any desired manner, I prefer to blow cold air there-through and carry the heated air therefrom to the combustion chamber. To this end a blower 23 is connected by a main 24 with pipes 25 and 26 controlled by valves 25', 26', 26'' leading to the rolls 2, and leading from the rolls are the pipes 27 and 28 (controlled by valves 27') which discharge by the main 29 into the flue 13, the pipes and valves being disposed so that the air can be discharged directly from the rolls into the main or from any roll through any number of succeeding rolls in sequence before discharging into the main.

It will be understood that the billets, ingots or the like are heated to a moderate degree as they pass over the rolls and are raised to the final temperature desired as they are pushed over the stationary bottom by the succeeding materials on the rolls, or they may be allowed to lie upon the bottom until softened to the required degree, when they are discharged from the furnace.

Having described my invention, I claim:—

1. A heating furnace having a refractory bottom, rolls for carrying materials thereto,

means for passing a flame above said bottom
from a side thereof, means for passing a flame
below said bottom, and a passage for carry-
ing the heated products of combustion above
5 and below said rolls in contact with the mate-
rials in their progress to said refractory bot-
tom.

2. A heating furnace having a refractory
bottom throughout the discharging end there-
10 of, rolls for carrying materials from the inlet
end of said furnace to said bottom, means for
passing a flame above said bottom, means for
passing a flame below said bottom, and a

passage in which the heated products of com-
bustion join and through which the same are 15
carried above and below said rolls in contact
with the materials in their progress to said re-
fractory bottom.

In testimony whereof I have hereunto set
my hand this 2nd day of January, A. D. 20
1906, in the presence of the subscribing wit-
nesses.

JOHNSON HUGHES.

Witnesses:

ROBERT JAMES EARLEY,
UTLEY E. CRANE, Jr.