

No. 679,450.

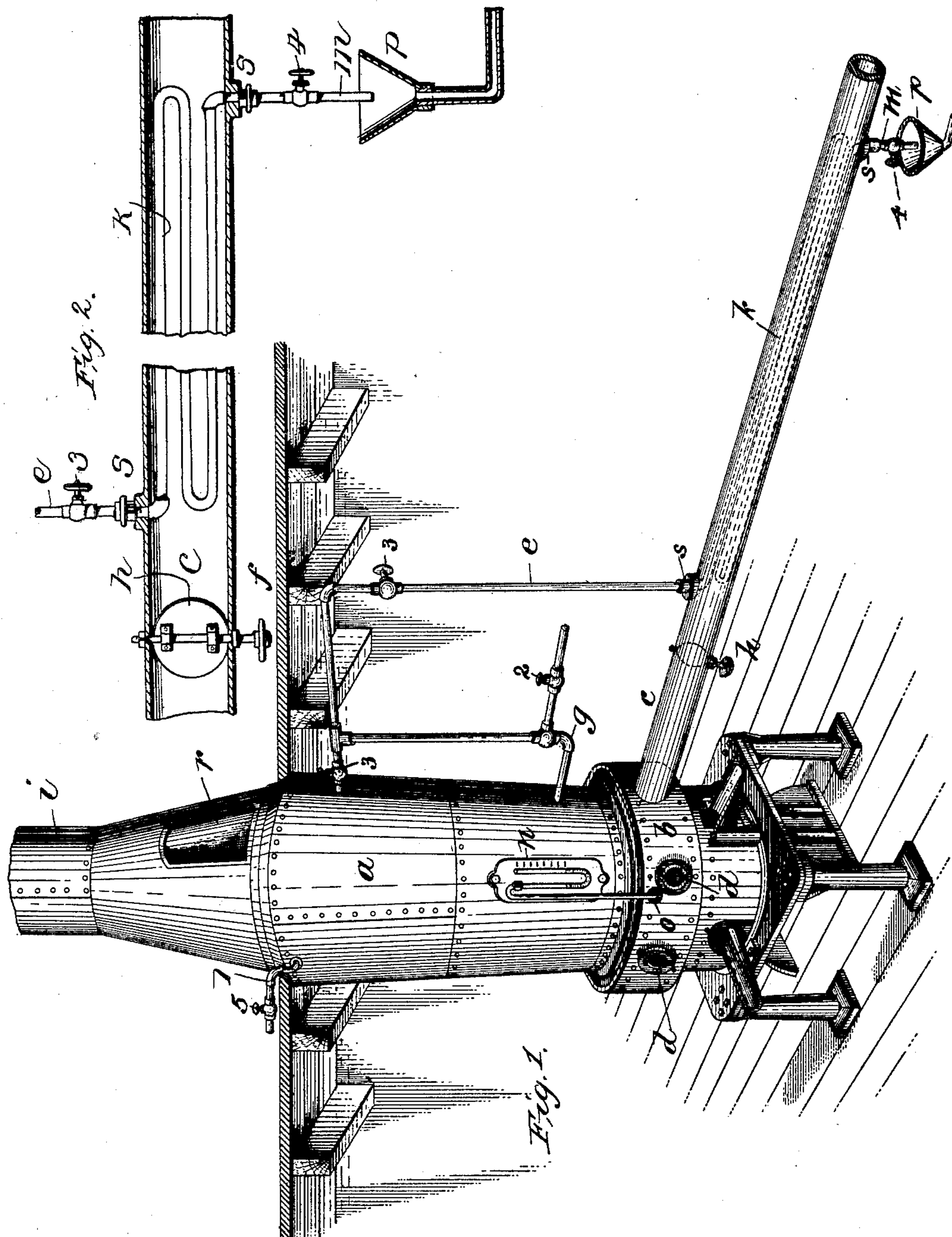
Patented July 30, 1901.

G. D. BURTON.

APPARATUS FOR HEATING FURNACE BLASTS.

(Application filed Jan. 28, 1901.)

(No Model.)



WITNESSES:

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APPARATUS FOR HEATING FURNACE-BLASTS.

SPECIFICATION forming part of Letters Patent No. 679,450, dated July 30, 1901.

Application filed January 28, 1901. Serial No. 45,038. (No model.)

To all whom it may concern:

Be it known that I, GEORGE D. BURTON, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Apparatus for Heating Furnace-Blasts, of which the following is a specification.

My invention consists in arranging and extending the hot-water pipe from the water-jacket of a smelting or melting furnace to the inside of the wind or blower pipe, through which is delivered a suitable air-blast, said air-blast being connected to the wind-box of the furnace. For the purpose of heating the said blast before it enters the wind-box and furnace I extend the discharge-pipe from the furnace-jacket to the blast-pipe and then to the inside of said blast pipe in the shape of a coil or any suitable form and cause the hot water from the water-jacket of the furnace to circulate through said pipe and coil for the purpose of heating the air-blast.

In the accompanying drawings, Figure 1 is a view in perspective of as much of the exterior of the furnace as is necessary to illustrate my invention. Fig. 2 is a section of the blower-pipe, showing the extended hot-water pipe from the water-jacket of the furnace inside of said blast or blower pipe.

Like letters and figures of reference mark the same parts wherever they occur in the various figures of the drawings.

Referring to the drawings by letters, *a* represents the furnace; *b*, the wind-box forming a part of said furnace; *c*, the blast or blower pipe; *d d*, the twyers; *e*, the extended hot-water pipe from the water-jacket of the furnace; *f*, the feed-floor; *g*, the inlet for delivering the cold water to the furnace; *h*, a damper for regulating pressure to the blast delivered to said furnace; *i*, the steam-exhaust pipe from said furnace; *k*, the coil from the extended hot-water pipe from the water-jacket within the blast or blower pipe; *m*, the outlet for the hot water after it has passed through the coil of pipe within the blower-pipe; *n*, the pressure-gage for denoting the amount of air or blast pressure delivered to said furnace; *o*, the pipe connecting the pressure-gage to the wind-box of said furnace; *p*, the funnel-shaped receiver into which the

heated water is delivered after it passes through the coil of pipe within the blast or blower pipe and is also used for conducting off the waste water.

r represents the feed-door through which the material to be smelted is fed to the furnace.

s s' represent the stuffing-boxes for making tight joints around the parts where the hot-water pipe is conducted to the blast or blower pipe.

A valve 2 represents means for controlling the delivery of cold water to said furnace. Valves 3 3' represent means for controlling the outlet of the heated water from said furnace. A valve 4 represents means for controlling the delivery of the heated water after it has passed through the coil of pipe within the blower or blast pipe. A valve 5 controls the exhaust-steam from the furnace through the exhaust-pipe *i*.

A commercial blower (not shown) of any usual construction or any other well-known means for creating a blast may be employed for furnishing an air-blast to the furnace.

It is well known that all blast-furnaces and smelters force into the wind-box by a blower cold air, which is transmitted from the wind-box to the furnace through the twyers. This cold blast entering the furnace has a tendency to chill the charge in the furnace and the fuel around the twyers and in a short time a ring of solid material above the twyers is formed all the way around the furnace, and as the progress of smelting continues the ring increases in size, thus diminishing the smelting capacity of the furnace. At certain intervals the charge in the furnace has to be run down for the purpose of allowing this ring to be barred off. In order to do this, it is necessary to diminish the charge in the furnace and the blast, thereby delaying smelting operations for several hours, at a detriment and expense to the smelting process. After this ring of metal has been barred off, the furnace is recharged, and the smelting operation continued, and another blast of cold air admitted to the furnace, and another ring is soon formed. To obviate this difficulty, I have placed a coil of pipe in the conducting blast-pipe and circulate the hot water from the water-jacket through this pipe, or I may

affix a tank, several feet in length, height, and breadth, around the wind or blower pipe leading to the wind-box, and into this tank around the blower or blast pipe the hot water
5 from the water-jacket of the smelter or furnace is conducted and circulated and allowed to overflow through a waste-pipe to any convenient point. This waste water comes into
10 this receiver from the water-jacket of the furnace at about 140° to 180° Fahrenheit and heats the wind or blast pipe the entire length within the box containing the heated water and portions extending either side of the box to a less temperature by radiation. The
15 cold blast passing through the blast-pipe is thereby heated by either method shown and goes into the furnace as a hot blast, thereby decreasing the amount of fuel required at least five per cent. and avoiding the liability
20 of chilling the charge, obviating the forming of a metal ring above the twyers, and doing away with the necessity of opening the twyers and removing any chilled portion of ore, coke, or other fuel that may fall in front thereof
25 and which has heretofore become cooled from the cold blast, as it is necessary at all times to have the twyers free from all obstruction on the internal walls of the furnace. The heating of the cold air by heating the pipe in
30 the conductor through which the air or blast passes and keeping the temperature even is a valuable feature, as the hot air will keep the parts that fall before the twyers from be-

coming chilled and also prevent the material above the twyers from chilling. This heating of the cold air is also a valuable feature in the saving of fuel and time and also obviates the forming of the metal ring above the twyers, and when it is considered that no extra expense or machinery is required to accomplish this further than the attaching of the pipe inside the blast-pipe and conducting the surplus water from the water-jacket thereto, the whole expense not exceeding twenty-five dollars, it will be readily seen
45 that it is a very simple and inexpensive device.

The apparatus is adapted to any water-jacket furnace, either for smelting or melting.
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I claim as my invention—

In a furnace, the combination of a wind-box, a blower-pipe connected therewith, a coiled pipe disposed in said blower-pipe, a water-jacket, a pipe connecting said water-jacket with said coiled pipe whereby the air-blast is heated by said coiled pipe in its passage to said furnace, and discharge means connected with said coiled pipe.
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In testimony that I claim the invention above set forth I affix my signature in presence of two witnesses.
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GEO. D. BURTON.

Witnesses:

E. F. PHILIPSON,
FRANK B. COX.