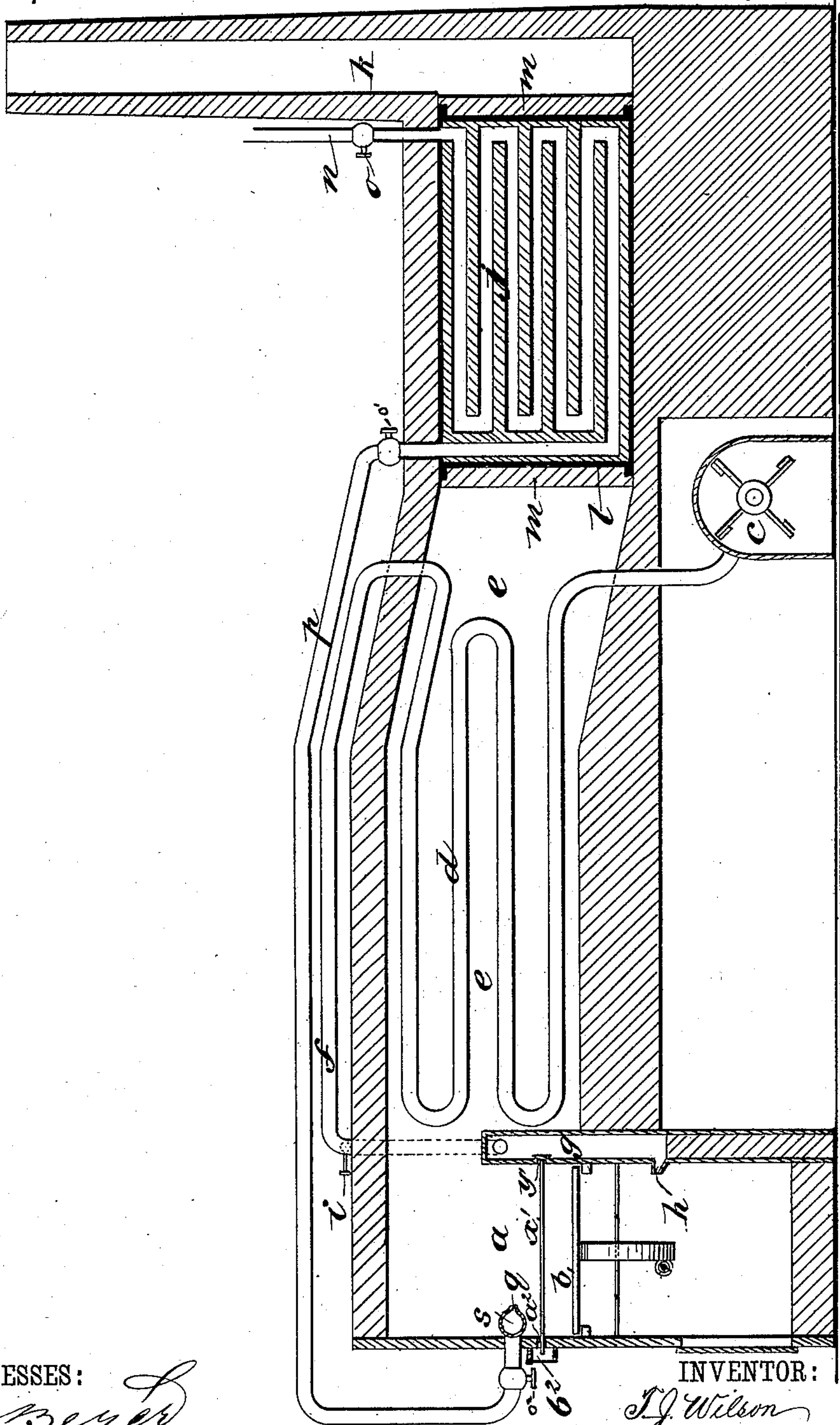


(No Model.)

T. J. WILSON.  
METALLURGIC FURNACE.

No. 300,181.

Patented June 10, 1884.



WITNESSES:

*Wm Beyer*  
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# UNITED STATES PATENT OFFICE.

THOMAS J. WILSON, OF AUBURN, NEW YORK.

## METALLURGIC FURNACE.

SPECIFICATION forming part of Letters Patent No. 300,181, dated June 10, 1884.

Application filed August 17, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, THOMAS J. WILSON, of Auburn, in the county of Cayuga and State of New York, have invented certain new and useful Improvements in Metallurgic and other Furnaces, of which the following is a full, clear, and exact description.

The object of my invention is to provide an improved construction of metallurgic furnace for heating or reheating blanks; and the invention consists in the construction and arrangement of parts, as will be hereinafter fully described and claimed, the object being to provide means for effecting large economy in the cost of fuel, as hereinafter fully described.

Reference is to be had to the accompanying drawing, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

The figure is a sectional elevation of a furnace provided with my improved hot-blast apparatus, decomposing apparatus, and a coal-burning grate.

In the present representation of my invention, *a* represents a furnace in which coal may be burned on a grate, *b*; or said grate may be removed and a gas-burner may be substituted. The hot-blast apparatus consists of the fan *c* or other approved blower, and the coil of heating-pipe *d*, said coil being arranged in the flue *e*, to be heated by the heat of the furnace passing along it, and having a discharge-pipe, *f*, passing outside of the wall of the flue and discharging into the hollow bridge-wall *g* between the furnace *a* and the flue *e*, to be further heated, and also to protect the bridge-wall from heat. From the lower part of the bridge-wall the hot air escapes through small slot-orifice *h* into the lower part of the furnace, where the air issues under the grate when a grate is used. Outside of the furnace-wall the pipe *f* is provided with a valve, *i*, for regulating the supply of air.

For decomposing the steam and utilizing the resulting gases for fuel, I arrange a superheating coil of fire-clay or other analogous material, consisting of a series of horizontal communicating flues, *f j*, which I call a "decomposer," in the flue *e* next to the smoke-chimney *k*, said coil being arranged in a fire-clay-lined metallic case, *l*, which also has an ex-

terior protecting-jacket, *m*, of similar material.

I have found by actual practice that a metal pipe exposed to a sufficient degree of heat to properly superheat the steam for decomposing it will in a very short time become oxidized and burst, while in my superheater formed of fire-clay and within a metal box lined and exteriorly coated with a similar material it cannot be so affected. This decomposer is arranged in the center of the flue *e*, so that it will be acted on at both sides and ends by the heat passing along the flue, to be highly heated for heating the steam passing through it sufficiently for decomposition. The steam enters said decomposer by the pipe *n*, connected with any boiler or other source of supply, and having a valve, *o*, near where said pipe connects with the decomposer, for regulating the same. I also employ two other valves, *o'* *o''*, in the pipe *p*, the former where the superheated steam leaves the superheater or decomposer through said pipe, and the latter near where said pipe enters the furnace-chamber *a*. By means of the valve *o'* the steam may be retained in the superheater until properly decomposed, and by the latter valve, *o''*, the supply of steam to the furnace-chamber may be regulated. From the decomposer the heated steam passes through the pipe *p*, which discharges into the furnace above the grate *b* through numerous jet-orifices, *q*, of a cross-pipe, *s*, extending from side to side of the furnace. Here the oxygen of the steam, uniting with the carbon of the incandescent coal, forms carbonic oxide, leaving the hydrogen of the steam free to burn with great intensity in combination with the oxygen of the incoming hot-blast. The carbonic oxide, at the same time taking up another measure of oxygen from the hot-blast, also burns in like manner with great intensity, and, together with the hydrogen of the steam, producing much greater heat than the coal alone is capable of.

The blanks to be heated are inserted through suitable openings in the chamber *a* above the fire-bed, where they will be subjected to the heat generated as above described. In some instances it is preferable to employ oil for supplying the carbon by which to complete the decomposing of the steam.



For discharging the clinker and ashes at the bottom of the grate without wasting the whole of the fire-bed, I employ a temporary grate consisting of bars  $x'$ , which I shove in through the front wall of the furnace, and also through the fire-bed into recesses at  $y'$  in the bridge-wall, whereon the upper portion of the fire will be supported and retained, while the rest of the fire and clinkers below may be discharged through the grate  $b$ . The opening at  $a^2$  through the front wall of the furnace is to be covered by a cap,  $b^2$ , to prevent the air from entering when the bars of the temporary grate are drawn out, which is done as soon as the grate  $b$  is readjusted.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. A furnace for heating blanks, consisting of the fire-chamber  $a$ , provided with a suitable grate and a horizontal flue, in combination with a fan or blower beneath said flue, and a pipe connected to said fan or blower, said pipe passing through the flue in serpentine form to the outside of the flue, and there provided with a regulating-valve,  $i$ , and into the flue again, where it communicates with the furnace-cham-

ber below the grate, substantially as set forth.

2. A furnace for heating blanks, consisting of the furnace-chamber, the grate, the hollow bridge-wall provided with openings  $h$  below the grate, and a horizontal flue in rear of said bridge-wall, in combination with the fan or blower beneath said flue, and a pipe passing from said fan or blower through the flue in serpentine form to the outside thereof, where it is provided with a regulating-valve,  $i$ , thence into the hollow bridge-wall, whereby the air, properly heated and regulated, may pass through the fuel to aid combustion, substantially as set forth.

3. The steam superheating or decomposing chamber formed of fire-clay or other analogous material  $j$ , consisting of a series of horizontal flues and surrounded by a metal case or box, said box being coated inside and out with fire-clay or other analogous material, whereby oxidizing is prevented, substantially as set forth.

THOMAS J. WILSON.

Witnesses:

JOHN H. VERPLANK,  
WM. J. BEECHAM.