W. STUBBLEBINE.

Puddling and Heating Furnace.

No. 223,962. Patented Jan. 27, 1880.

Fig 1

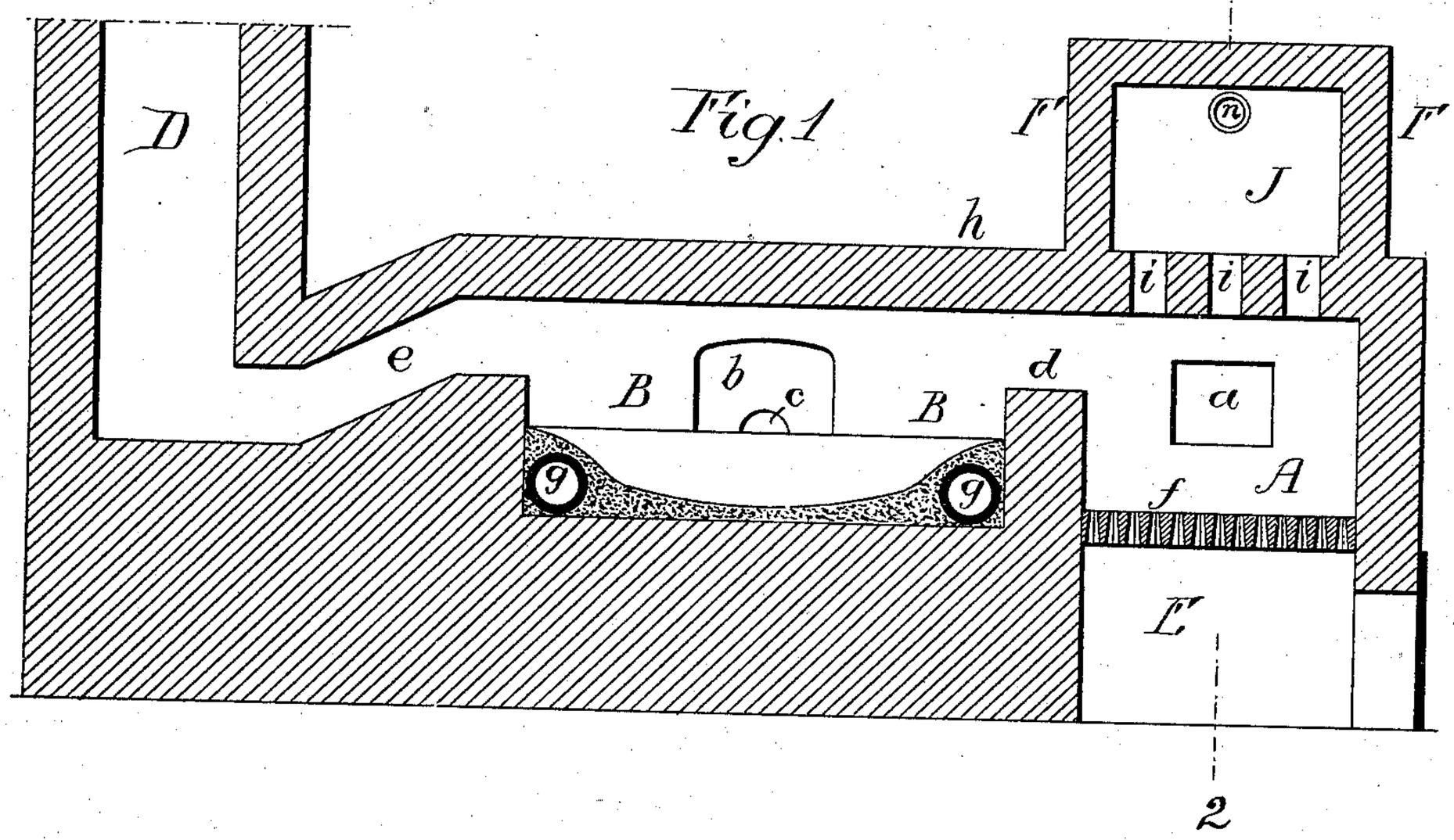
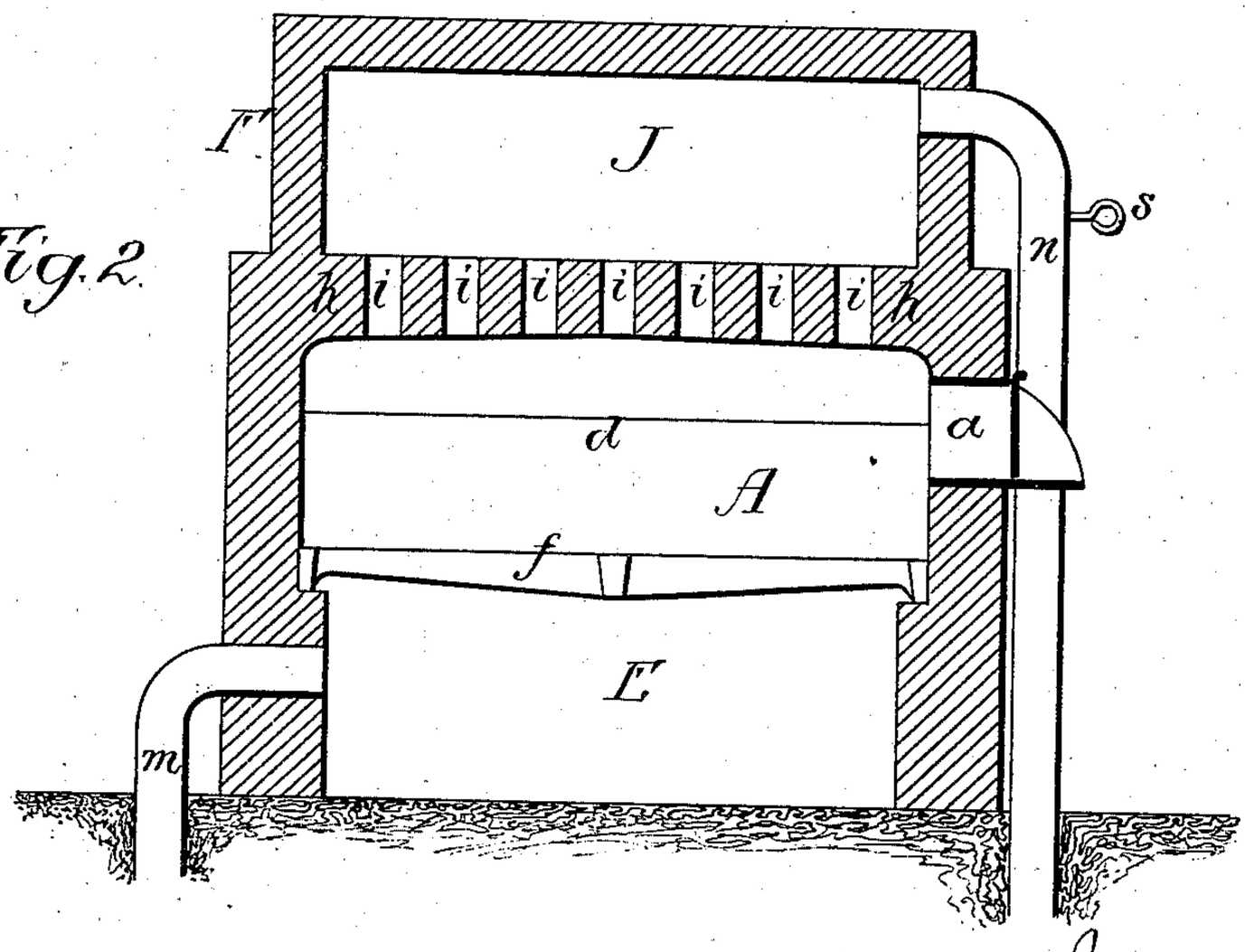


Fig. 2.



Witnesses
Henry Howson Jr.
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by his Attorneys
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UNITED STATES PATENT OFFICE.

WILLIAM STUBBLEBINE, OF BETHLEHEM, ASSIGNOR OF ONE-HALF OF HIS RIGHT TO BERNARD C. LAUTH, OF PHILADELPHIA, PA.

PUDDLING AND HEATING FURNACE.

SPECIFICATION forming part of Letters Patent No. 223,962, dated January 27, 1880.

Application filed November 12, 1879.

To all whom it may concern:

Be it known that I, WILLIAM STUBBLEBINE, of Bethlehem, Northampton county, Pennsylvania, have invented a new and useful Improvement in Heating and Puddling Furnaces, of which the following is a specification.

The object of my invention is to insure the maintenance of a uniform and high degree of heat in a puddling or heating furnace; and this object I attain by combining with the furnace a gas and air chamber located above the fire-chamber, and having direct communication therewith, the said gas and air chamber being provided with a valved blast-pipe, all as hereinafter more fully set forth.

In the accompanying drawings, Figure 1 is a longitudinal section of a puddling-furnace constructed for carrying out my invention, and Fig. 2 a transverse section on the line 1 2.

So far as the furnace proper is concerned it is similar to ordinary puddling-furnaces, A being the fire-chamber; B, the puddling-chamber; D, the chimney, which should be furnished at the top with the usual adjustable damper; E, the ash-pit; *a*, the feed-opening for the fuel; *b*, the working-opening; *d*, the bridge-wall; *f*, the grate; *e*, the flue leading to the chimney, and *g* the tubular chills surrounding the puddling-bed. The openings *a* and *b* are provided with the usual doors, that of the opening *b* having a working-hole, *c*.

On the roof *h* of the furnace, immediately over the fire-chamber A, is built a structure, F, inclosing a chamber, J, which communicates with the interior of the said fire-chamber through openings *i* in the roof *h*, said openings being sufficiently large and numerous to permit the free passage through them of gases from the fuel.

The usual blast-pipe *m* communicates with the ash-pit E of the furnace, and a blast-pipe, *n*, serves to introduce air into the chamber J, the flow of air through said pipe *n* being regulated by means of a valve or damper, *s*.

In working my improved furnace I introduce a very light blast into the ash-pit E instead of the usual heavy blast, the fuel being introduced into the fire-chamber A in small quantities and at frequent intervals, and the damper or valve *s* in the blast-pipe *n* being closed during and for a very short time after the introduction of each limited supply of fuel.

From the bituminous coal or wood employed as fuel in the class of furnaces to which my invention relates, volumes of volatile gases are evolved immediately after the fuel is thrown upon the fire. These gases are generated so rapidly and in such volume that their complete combustion cannot take place in ordinary furnaces, a large portion passing off through the chimney in the condition of smoke.

In my improved furnace, however, a portion of the gases evolved on each introduction of fresh fuel into the fire-chamber passes up through the openings *i* and is stored within the chamber J, from which, on the introduction of the blast from the pipe *n*, the gases, mixed with air, are gradually forced back into the fire-chamber, where the mixture is ignited and intensifies the heat in the puddling-chamber. By this means a uniform and high degree of heat is maintained within the puddling-chamber, thereby enabling me to effect a considerable saving in fuel, to work more heats than usual in a given time, and to produce from the same grade of pig-iron puddled iron of a quality much superior to that worked in an ordinary puddling-furnace.

The intervals between the firing operations and the amount of fuel introduced each time will depend upon the capacity of the chamber J and upon the condition of the metal in the puddling-chamber, the attendant being governed in the performance of the firing operation by the appearance and character of the ignited gases as they pass through the said puddling-chamber.

My invention is distinct from that class of furnaces in which the fire-chamber is surmounted by a blast-chamber communicating therewith through nozzles or passages for directing continuous jets of heated air into the furnace, for in my improvement the blast is cut off until the chamber J becomes filled with gases, and it is these gases, mixed with the air, which are gradually introduced into the furnace and consumed during the intervals be-

tween the introduction of the supplies of fuel.

Although I have shown and described my invention as applied to a puddling-furnace, it can be used in connection with heating-furnaces with equal advantage.

I claim as my invention—

The combination, with a puddling or heating furnace, of a gas and air chamber, F, located above the fire-chamber, having a direct communication therewith through openings *i* *i*, and having a valved blast-pipe, *n*, all substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM STUBBLEBINE.

Witnesses:
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GEO. ZIEGENFUSS.