

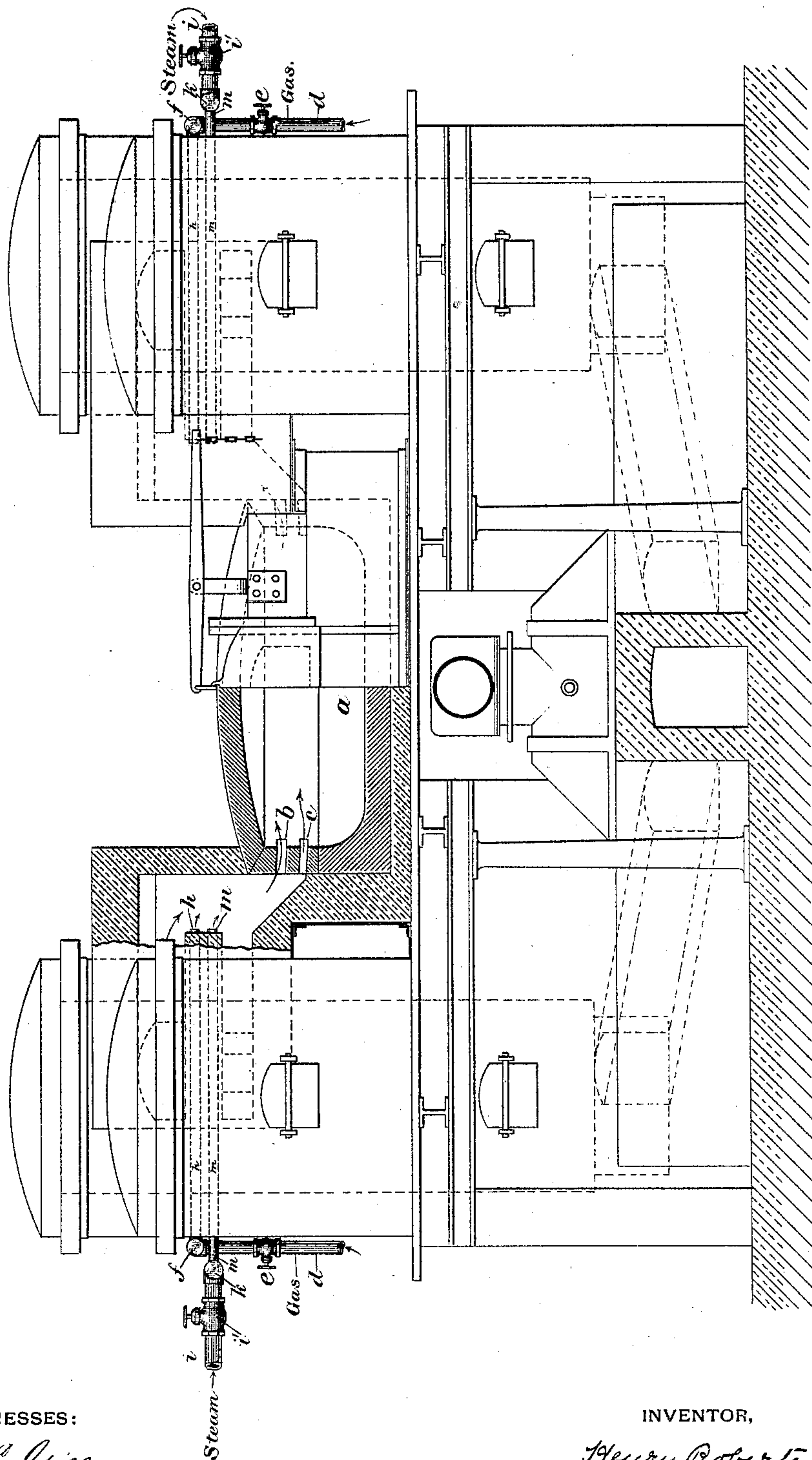
(No Model.)

H. ROBERTS.

ART OF PROTECTING THE INTERIOR WALLS OF FURNACES.

No. 398,450.

Patented Feb. 26, 1889.



WITNESSES:

H. L. Gill.
W. B. Corwin

INVENTOR,

Henry Roberts
by W. B. Bakerwell Sons
his Att'ys.

UNITED STATES PATENT OFFICE.

HENRY ROBERTS, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR OF ONE-HALF
TO GEORGE T. OLIVER, OF SAME PLACE.

ART OF PROTECTING THE INTERIOR WALLS OF FURNACES.

SPECIFICATION forming part of Letters Patent No. 398,450, dated February 26, 1889.

Application filed October 15, 1887. Serial No. 252,422. (No model.)

To all whom it may concern:

Be it known that I, HENRY ROBERTS, of
Pittsburg, in the county of Allegheny and
State of Pennsylvania, have invented a new
and useful Improvement in the Art of Pro-
tecting the Interior Walls of Furnaces; and I
do hereby declare the following to be a full,
clear, and exact description thereof.

In the use of natural gas in puddling, heat-
ing, and other similar furnaces the walls of
the furnace are constantly subjected to a cut-
ting flame, owing to an excess of air, which is
necessary to the complete combustion of the
gas, which rapidly burns away the walls and
necessitates frequent repairs to the furnace.
This injury to the walls of the furnace is
greatest at the bridge-wall or other parts of
the furnace against which the flame impinges,
and it constitutes one of the objectionable
features to the use of natural gas or manu-
factured gas, which, however, has many ad-
vantages over coal or the fuel formerly em-
ployed.

The object of my invention is to obviate
this evil and to prevent the cutting action of
the flame on the walls of furnaces, whereby
they may endure or last the time usual where
the old form of fuel is used; and it consists
in introducing into the furnace with the gas
and air of combustion a supply of steam,
which, while it permits combustion of the gas
without lessening the heat produced, forms
a cushion about the walls which protects them
from the cutting action of the flame. By
practical experience I have found that in this
way the walls may be fully protected and the
evil above described obviated.

Although my invention is especially advan-
tageous in connection with furnaces in which
natural gas is employed, it may also be ap-
plied to other furnaces using coal or manu-
factured gas as fuel for the same purpose of
protecting the walls of the furnace from the
cutting action of the flames.

To illustrate my invention, I show in the
accompanying drawing a heating-furnace
provided with regenerators, to which furnace
my invention is applicable. I do not, how-
ever, limit the scope of my invention to its

application to this or to any other particular
kind of furnace, since by proper modifications,
such as will suggest themselves to those skilled
in the art, the invention may be used with
other forms and kinds of furnaces for a like
purpose.

The drawing represents a front elevation,
partly in section, of a heating-furnace having
a bed, *a*, into which air and gas ports *b c* open
from channels leading from the regenerators,
which regenerators are provided with the
usual checker-work. The products of com-
bustion pass from the bed of the furnace to
the opposite regenerator, and thence to the
smoke or stack flue in the usual manner.
From time to time the currents are reversed,
so that the air may be caused to pass through
the heated checker-work. This reversal is
effected by reversing-valves of the ordinary
and usual construction, which, being well
known to those skilled in the art, need not
here be further described. At each end of
the furnace is a main gas-pipe, *d*, controlled
by a valve, *e*, and terminating in a distrib-
uting-pipe, *f*, which has any number of branch
pipes, *h*, desired, said branch pipes extending
through the walls and terminating at the rear
side of the ports *b c*. At each end of the fur-
nace there is a main steam-supply pipe, *i*, con-
trolled by a valve, *i'*, and terminating in a dis-
tributing-pipe, *k*, which has any number of
branch pipes, *m*, desired, which extend beside
the branch pipes *h* and terminate a little below
the latter. As thus constructed, the gas and
steam, when discharged from the pipes *h* and *m*,
mix with the hot air from the regenerators, and
all together pass to the bed *a* of the furnace, the
gas uniting and burning with the air, while
the steam, mingling with the products of com-
bustion, forms a cushion about the walls of the
furnace, and thereby protects them from the
cutting action of the flame.

Although I have shown and described a
certain construction and arrangement of gas
and steam pipes, I do not desire to limit my-
self to the same, as the arrangement may be
varied to suit the construction or kind of
furnace, the same purpose or object being
retained, which is to introduce live steam into

the furnace, so as to form a cushion about the walls where the flames are apt to impinge.

I am aware that steam has been used for the purpose of oxidizing iron and steel in
5 furnaces, and that it has, when superheated, been introduced in furnaces for the purpose of producing hydrogen, and I do not desire to claim the use of steam for either of these purposes; nor do I desire to claim introducing
10 steam into heating-furnaces for the purpose of preventing oxidation of iron or steel by forming a non-oxidizing bath about the metal, as this latter invention has been claimed by me in a separate application.

15 Having thus described my invention, what

I claim, and desire to secure by Letters Patent, is—

The improvement in the art of protecting furnaces against the cutting action of flame, especially of fluid fuel, consisting in surround- 20 ing or enveloping the flame with steam, which acts as a cushion between the flame and the walls of the furnace, substantially as described.

In testimony whereof I have hereunto set 25 my hand this 14th day of October, A. D. 1887.

HENRY ROBERTS.

Witnesses:

W. B. CORWIN,

JAMES K. BAKEWELL.