

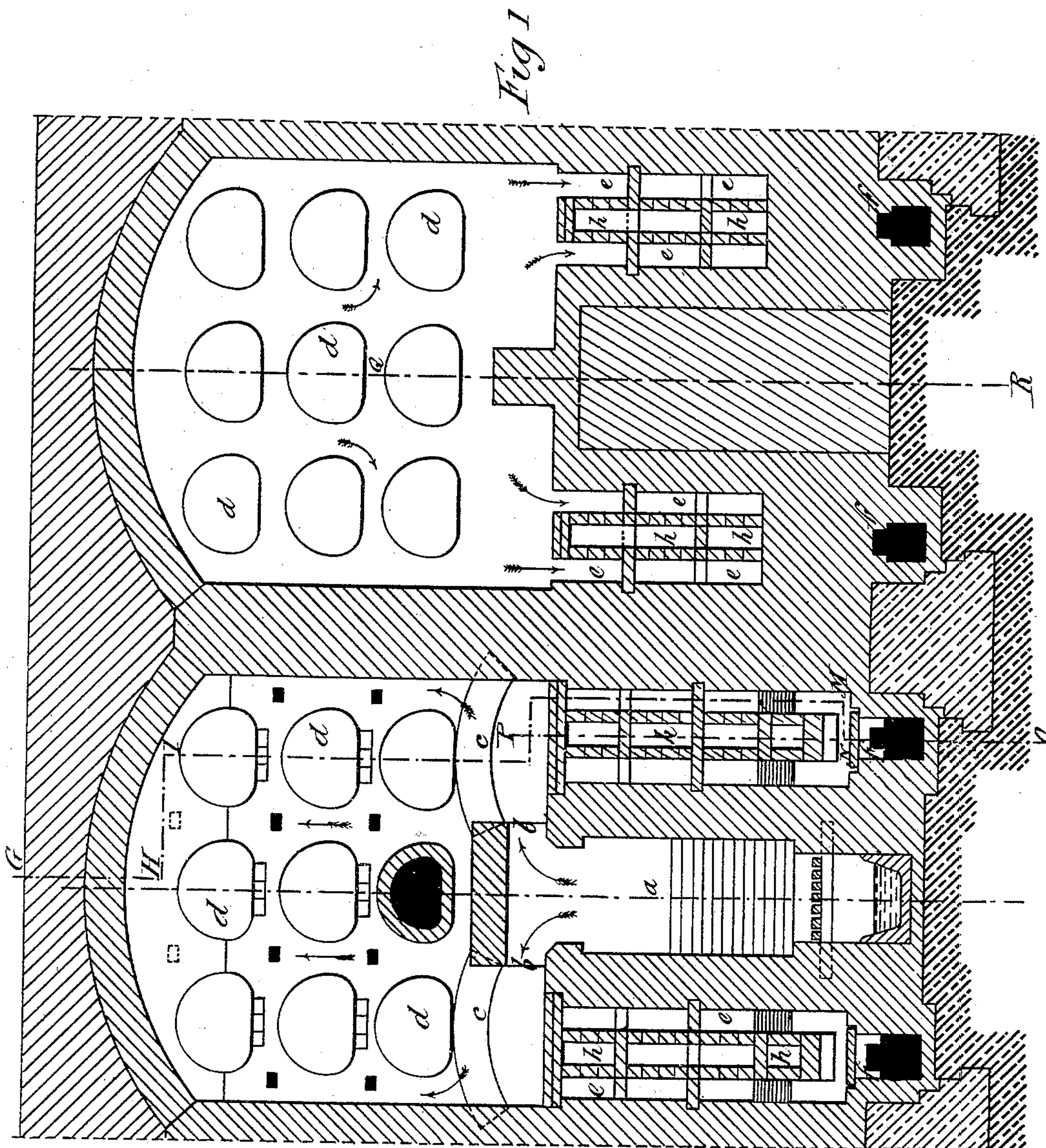
(No Model.)

3 Sheets—Sheet 1.

W. FOULIS.
REGENERATIVE GAS RETORT FURNACE.

No. 418,314.

Patented Dec. 31, 1889.



Witnesses:
O. Fred. Keller.
Thomas M. Rowsey.

Inventor:
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By C. S. Whitman
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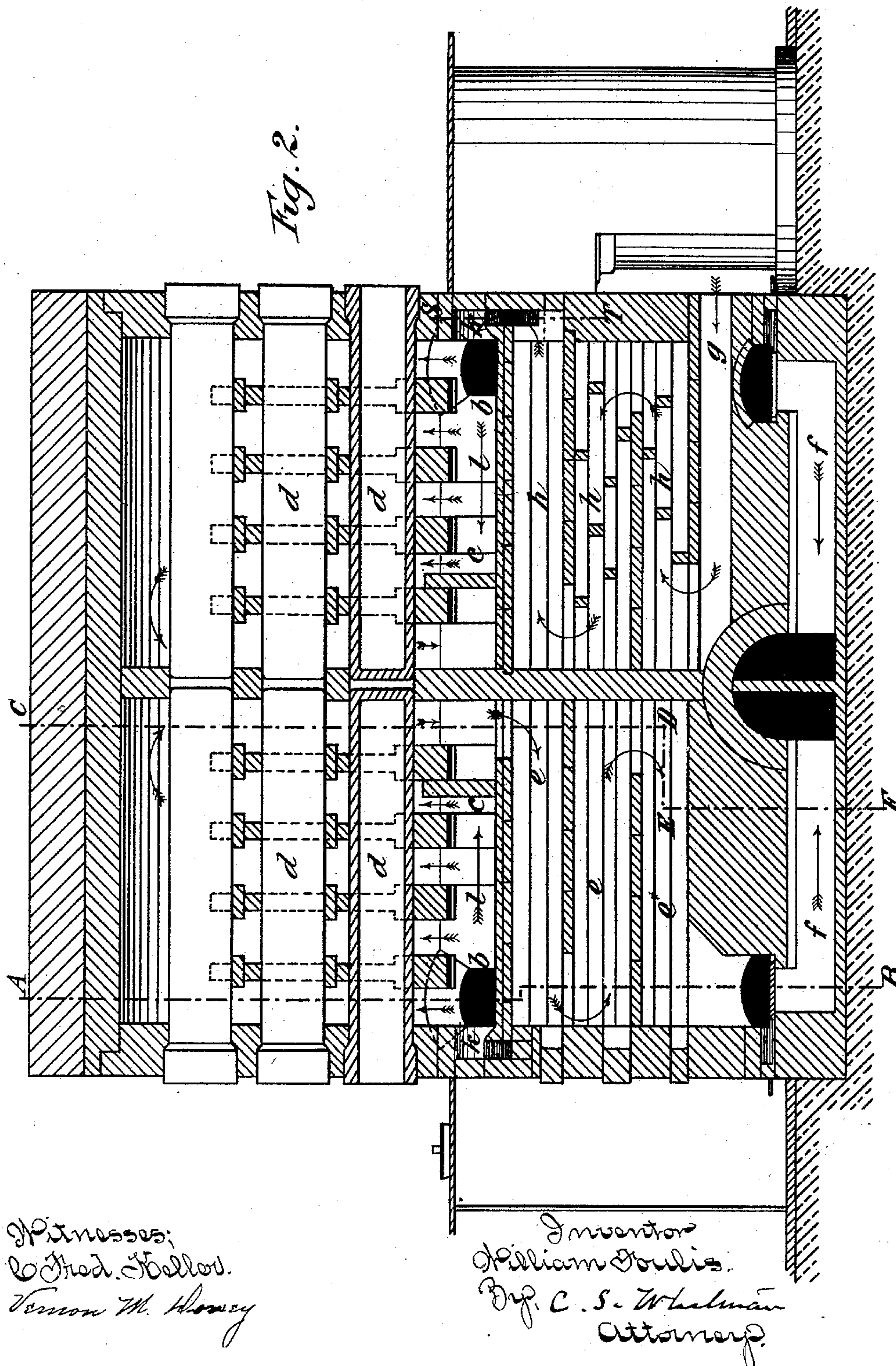
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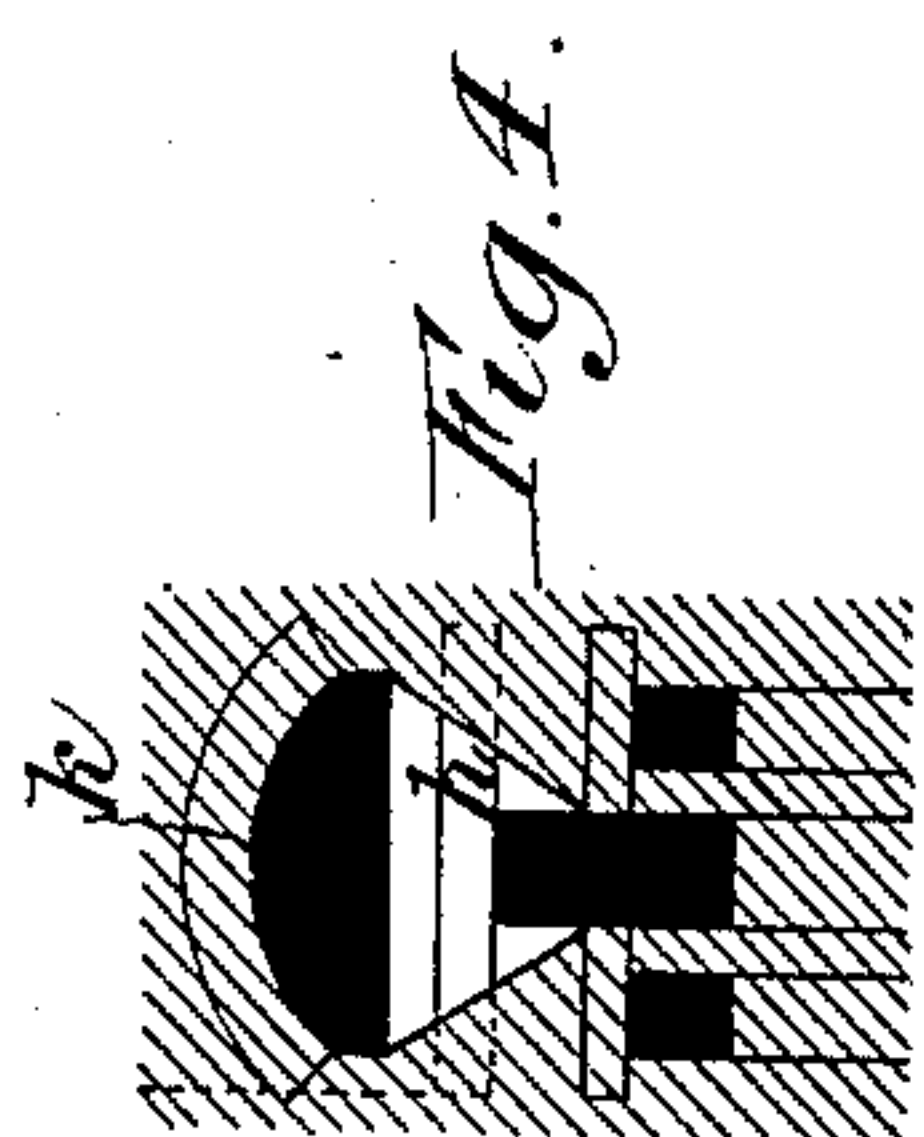
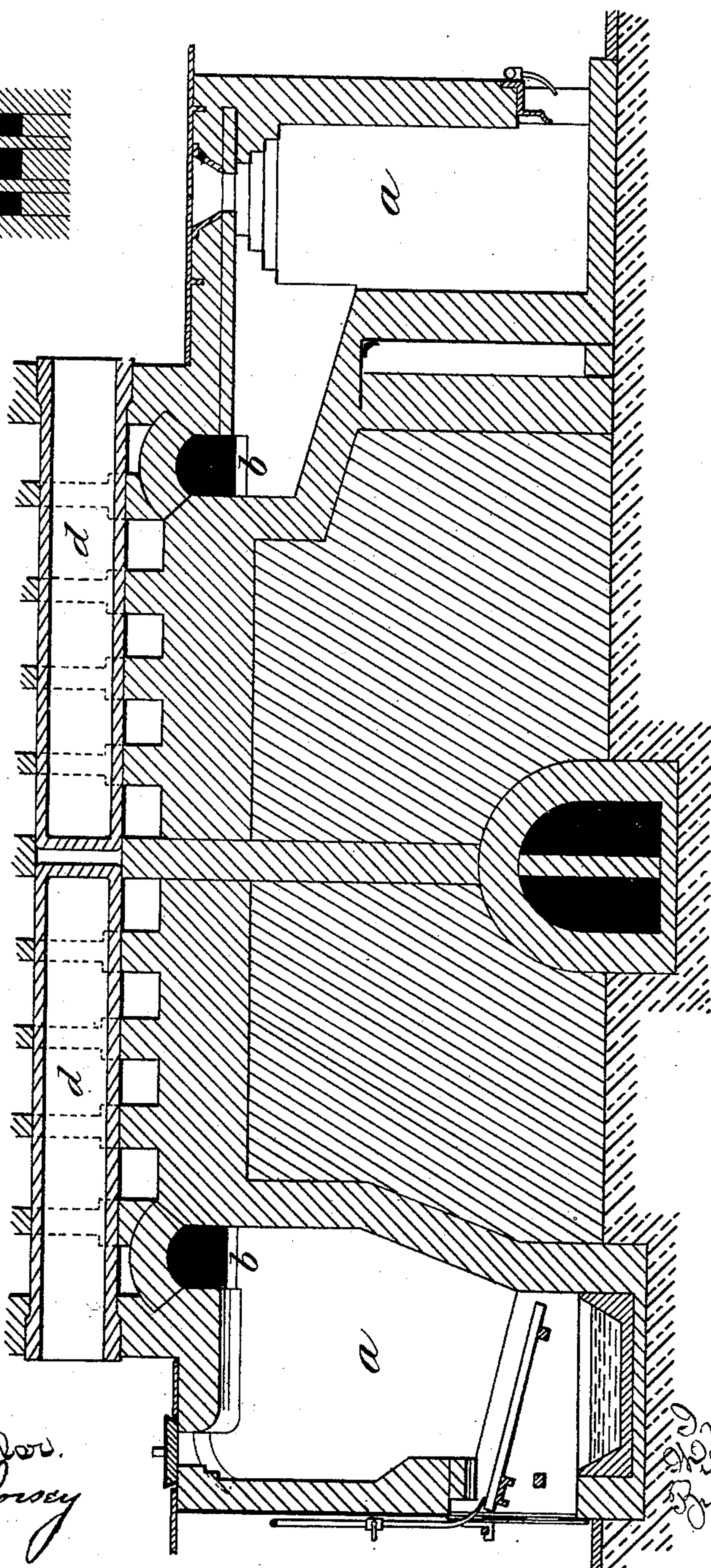


Fig. 3.



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UNITED STATES PATENT OFFICE.

WILLIAM FOULIS, OF GLASGOW, COUNTY OF LANARK, SCOTLAND, AS-
SIGNOR TO FREDERICK SIEMENS AND ALEXANDER SIEMENS, OF
LONDON, ENGLAND.

REGENERATIVE GAS-RETORT FURNACE.

SPECIFICATION forming part of Letters Patent No. 418,314, dated December 31, 1889.

Application filed February 3, 1888. Serial No. 262,948. (No model.) Patented in England June 19, 1886, No. 8,157.

To all whom it may concern:

Be it known that I, WILLIAM FOULIS, en-
gineer, of 42 Virginia Street, Glasgow, in the
county of Lanark, Scotland, have invented an
Improvement in Regenerative Gas-Retort
Furnaces, (for which Letters Patent have
been granted in Great Britain, No. 8,157, and
dated June 19, 1886,) of which the following
is a specification.

In regenerative gas-retort furnaces as they
are at present arranged combustible gas pro-
duced by partial combustion of fuel in a gas-
producer enters the combustion-chamber,
where it meets and burns with air heated by
its passage through flues arranged side by
side with those which carry off the waste pro-
ducts of combustion.

Usually the gas enters the combustion-
chamber in a horizontal direction and the hot
air rises vertically to meet it, so that the main
heat of the combustion is directed immedi-
ately upon the structure above, causing rapid
deterioration of the structure and producing
deposits and incrustations which seriously
interfere with the free passage of the gases
and render necessary frequent stoppage and
repairs.

The object of the present invention is to
remedy this evil in such furnaces, which is ef-
fected in the following manner: The hot-air
flues, instead of opening vertically into the
combustion-chamber, are continued beyond
the point where the gas enters it. They are
then directed upward to about the level of
the combustion-chamber and open with wid-
ened mouths into the flame-chamber, where
the air meets the gas and enters into combus-
tion with it. The gas and hot air being thus
made to meet on the same level as they are
moving horizontally, the flame, instead of be-
ing directed upward, impinging on the struc-
ture above, and causing intense local heat,
sweeps freely along the flame-chamber, deliv-
ering its heat uniformly over the furnace
without such local intensity as can damage
the structure. It is found, moreover, that by
thus permitting the flame to take a free course,
impinging as little as possible on any solid

obstacle, more perfect combustion and com-
plete evolution of heat are secured.

The accompanying drawings are vertical
sections showing this invention applied to a
regenerative gas-retort furnace, these sections
being taken on different planes, as follows:

Figure 1, in its left half, is a section on A
B, and in its right half on C D E F, of Fig 2,
which on its left half is a section on G H I K
L M N O and on its right G H I K P O of Fig.
1. Fig. 3 is a section on Q R of Fig. 1, and
Fig. 4 is a section on S T of Fig. 2.

The gas generated in the producer *a* passes
by the flues *b* into the combustion-chamber
c, where it meets with the supply of heated
air and burns. As indicated by the arrows,
the flame, which is mainly developed in the
chamber *c*, and the products of combustion
circulate between and around the retorts *d*,
and then the products descend along the zig-
zag channels *e* to the flues *f*, whence they pass
to the chimney-shaft. The air entering at *g*'
ascends the zigzag channels *h*, which are ar-
ranged between the channels *e*, and sepa-
rated from them by thin partitions, so that
the air in its ascent along the channels *h* be-
comes heated. The uppermost channel *h* is
extended beyond the mouth of the gas-flue *b*,
and an uptake from its end expands, as
shown in Fig. 4, to a wide mouth *k*, opening
into the combustion-chamber *c* at or about
the same level with the gas-flue *b*. Thus the
heated air directed across the stream of gas
mingles with it, supporting combustion and
producing a gentle flow of flame along the
chamber *c*, (indicated by the arrows *l*), the
flame and products thence diffusing them-
selves among the retorts.

Instead of a single mouth to the gas-flue *b*
and to the air-supply *k*, there may obviously
be several mouths, so as to subdivide the gas
and air into several streams directed either
obliquely across or parallel to one another,
so as to produce a flame traveling horizon-
tally along the combustion-chamber *c*.

I claim—

In a regenerative gas-furnace, a combustion-
chamber, the walls thereof provided with

horizontal air-passages and horizontal gas-passages opening into the said chamber in the same horizontal plane, near the bottom thereof, whereby the resultant flame is caused
5 to travel horizontally near the bottom of the chamber before rising, as and for the purpose described.

In testimony whereof I have signed my

name to this specification in the presence of two subscribing witnesses.

WILLIAM FOULIS.

Witnesses:

ST. JOHN V. DAY,

JOHN SIDDLE,

Both of 115 St. Vincent Street, Glasgow.