

(No Model.)

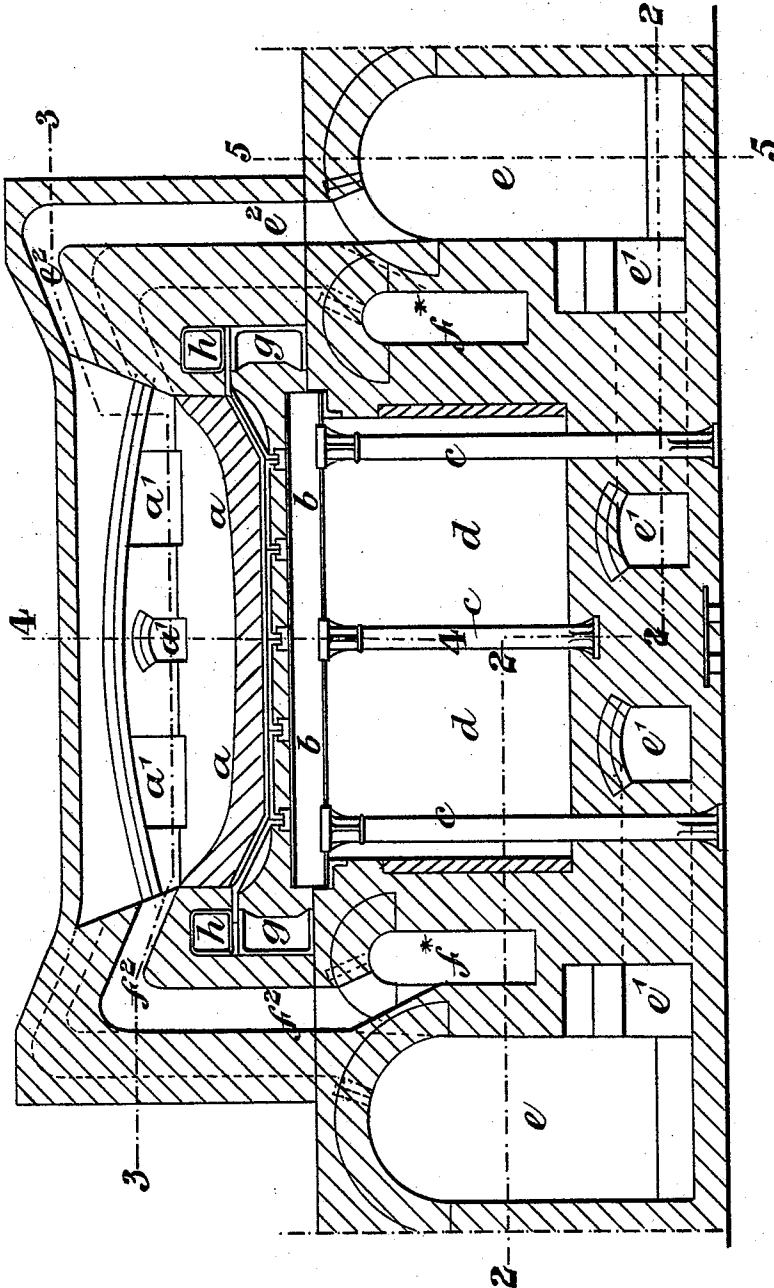
4 Sheets—Sheet 1.

M. MANNABERG.
STEEL SMELTING FURNACE.

No. 498,670.

Patented May 30, 1893.

FIG. 1.



Attest:
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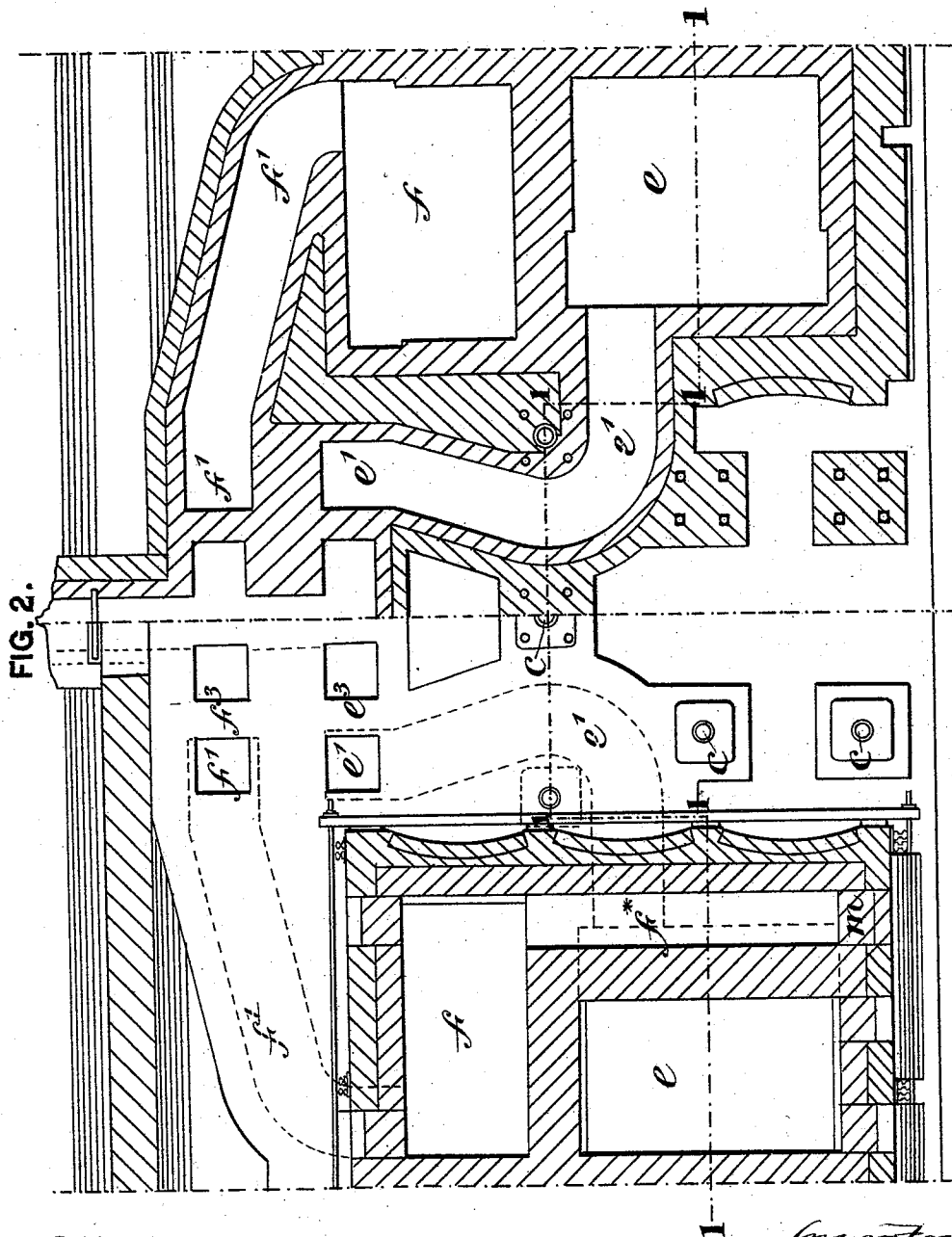
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M. MANNABERG.
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No. 498,670.

Patented May 30, 1893.



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(No Model.)

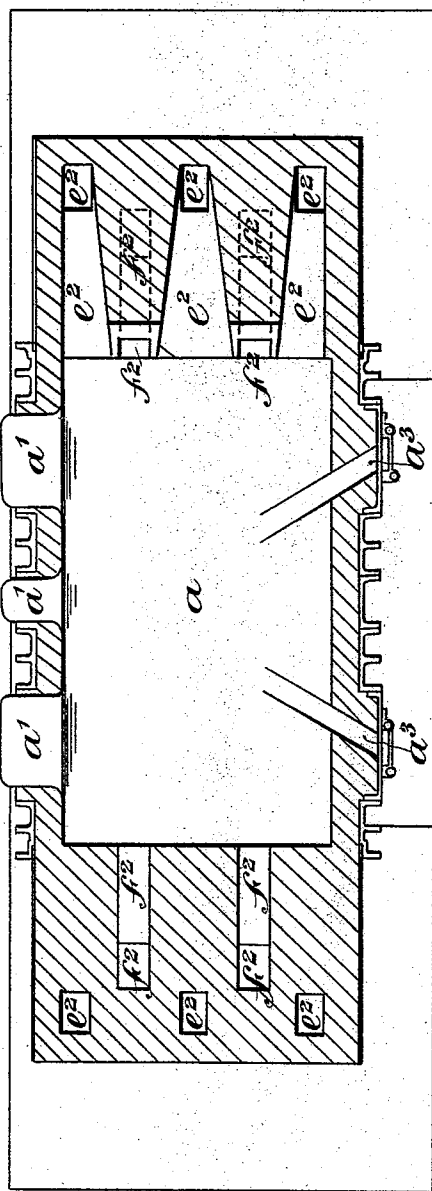
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M. MANNABERG.
STEEL SMELTING FURNACE.

No. 498,670.

Patented May 30, 1893.

FIG. 3.



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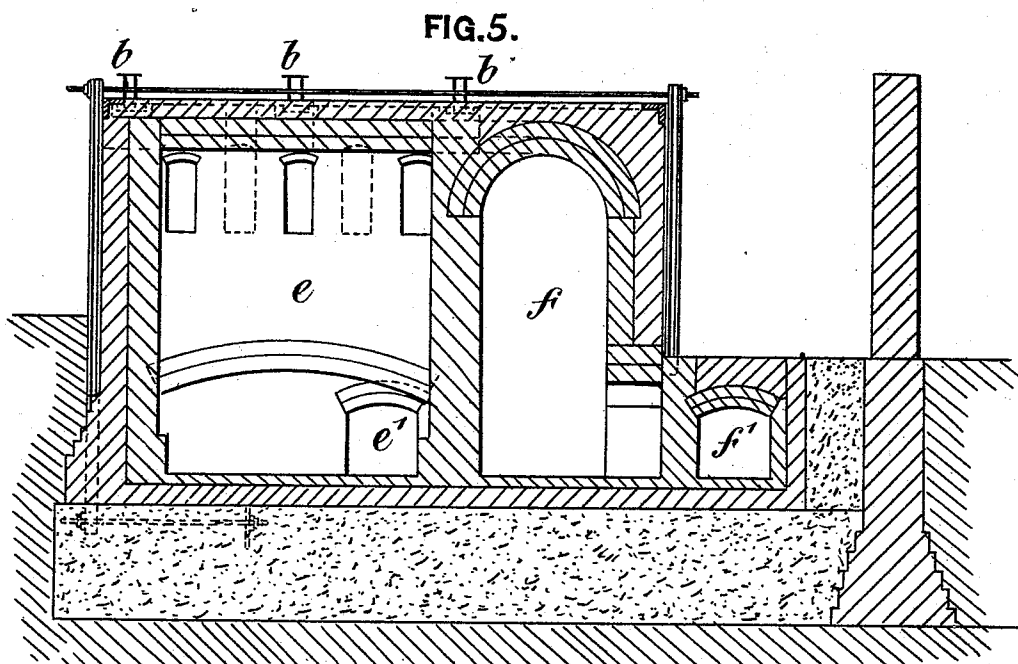
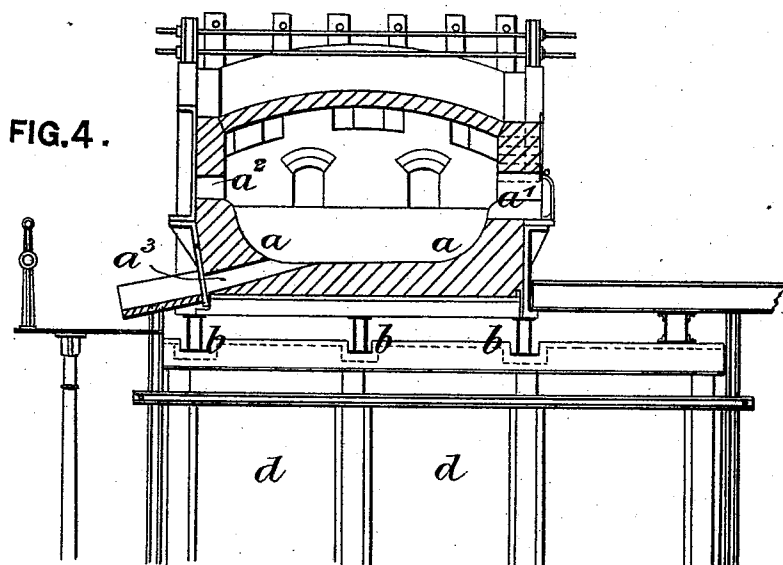
(No Model.)

4 Sheets—Sheet 4.

M. MANNABERG.
STEEL SMELTING FURNACE.

No. 498,670.

Patented May 30, 1893.



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UNITED STATES PATENT OFFICE.

MAXIMILIAN MANNABERG, OF FRODINGHAM, ENGLAND, ASSIGNOR TO THE
FRODINGHAM IRON AND STEEL COMPANY, OF SAME PLACE.

STEEL-SMELTING FURNACE.

SPECIFICATION forming part of Letters Patent No. 498,670, dated May 30, 1893.

Application filed June 2, 1892. Serial No. 435,306. (No model.)

To all whom it may concern:

Be it known that I, MAXIMILIAN MANNABERG, a subject of the Queen of Great Britain, residing at the Frodingham Iron and Steel Works, Frodingham, in the county of Lincoln, England, have invented certain new and useful Improvements in the Construction of Steel-Smelting Furnaces, of which the following is a specification.

10 The invention has for its object improvements in the construction of steel smelting furnaces of the class called regenerating furnaces, whereby the regenerators can be repaired without interfering with or injuring
15 the furnace, the furnace can expand and contract without injuring the regenerators, and the possibility of the air and gas mixing in their passage to the furnace is reduced to a minimum. For this purpose I support the
20 hearth of the furnace on girders carried by columns, instead of, as heretofore supporting it on brickwork above the roofs of the regenerators, and I build the air and gas regenerators and their inlet and outlet passages in
25 pairs on each side of the free space left underneath the furnace; the main air and gas regenerators and the channels leading into the same, occupy the lowest part of the brickwork, and the inlet channels are fitted with
30 valves as usual, whereby the direction of the air and gases can be reversed at will. The main gas regenerator is preferably arranged with its length at right angles with that of the main air regenerator, and the said main
35 gas regenerator communicates with a supplemental gas chamber or regenerator at a slightly higher level. This supplemental gas chamber receives all dirt, slag, &c., is free of chequer bricks, can very easily be cleaned, and protects in that way the main gas regenerator. The passages from the air and gas regenerators to the furnace are mainly vertical, they are parallel with each other, and they lead at their upper ends into short flues or
45 passages opening into the furnace and constructed at different levels. The bed of the furnace is at its sides supported also on girders carried by the brickwork, and immediately above such side girders, are cold air
50 tubes or channels. The bed of the furnace can be freely inspected from below, and the

air and gas flues being completely independent from and not crossing each other, as is generally the case, there is less probability of leakage from the one to the other, the partition wall of the regenerators is not weakened, and the brickwork is more easily built and repaired. 55

In order that my said invention may be more clearly understood and readily carried
60 into effect, I will proceed aided by the accompanying drawings, more fully to describe the same.

In the drawings, Figure 1 is a cross section drawn on the line 1—1 of Fig. 2 of a steel
65 smelting furnace constructed according to my invention. Fig. 2 is a horizontal section of the same drawn on the line 2—2 of Fig. 1. Fig. 3 is a horizontal section drawn on the line 3—3 of Fig. 1. Fig. 4 is a vertical section of parts
70 drawn on the line 4—4 of Fig. 1, and Fig. 5 is a vertical section of parts drawn on the line 5—5 of Fig. 1.

In all the figures like parts are indicated by similar letters of reference. 75

a is the hearth of the furnace, which I support on girders *b* carried by columns *c*, instead of, as heretofore, supporting it on brickwork above the roofs of the regenerators. *a'*
80 *a'* are the charging doors, and *a²* are openings for examining the wall on the charging side, and *a³* is the tapping hole. A free space *d* is left underneath the furnace bottom, and on each side of such free space I build the air and gas regenerators *e* and *f f^{*}* and their inlet
85 passages *e' f'* and outlet passages *e² f²* in pairs. The main air and gas regenerators *e f*, and the channels *e' f'* leading into the same, occupy the lowest part of the brickwork, and the inlet channels are fitted with valves *e³ f³*
90 as usual, whereby the direction of the air and gases can be reversed at will. The main gas regenerator *f* is preferably arranged with its length at right angles with that of the main air regenerator *e*, thereby obtaining a convenient arrangement, and the main gas
95 regenerator *f* communicates with the supplemental gas chamber or regenerator *f^{*}*, which latter is built at a slightly higher level and is easily cleaned through manhole *m*. The pas-
100 sages *e² f²* from the air and gas regenerators to the furnace are mainly vertical, they are par-

allel with each other, and the arrangement of the regenerators enables me to construct them in such way that they do not cross each other and do not weaken the partition walls of the
5 regenerators, and they terminate at the upper ends in short inclined flues or passages opening into the furnace and constructed at different levels. The bed *a* of the furnace is at its sides supported also on girders *g, g* carried by the brickwork, and immediately above
10 such side girders *g g* are cold air tubes or channels *h h*.

By the construction of furnace above described, the bed of the furnace can be freely
15 inspected from below, and the air and gas flues being completely independent from and not crossing each other, as is generally the case, there is less probability of leakage from the one to the other and the brickwork is
20 more easily built and repaired.

Having fully described my invention, what I desire to claim and secure by Letters Patent is—

In a smelting furnace, the combination of the bed supported on cross girders carried by 25 columns and side girders carried by the brickwork, a free space below the bed to allow inspection, the air and gas regenerators constructed in pairs and arranged below and on each side of the free space with their longest 30 horizontal axes extending at right angles to each other, a supplemental gas chamber arranged above each of the gas regenerators and in single blocks of brickwork on each side of the furnace, suitable flues or passages 35 communicating with the furnace and extending mainly in a vertical direction parallel with each other so as not to cross, and suitable cold air tubes above the supporting girders, substantially as set forth.

MAXIMILIAN MANNABERG.

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