

No. 638,034.

Patented Nov. 28, 1899.

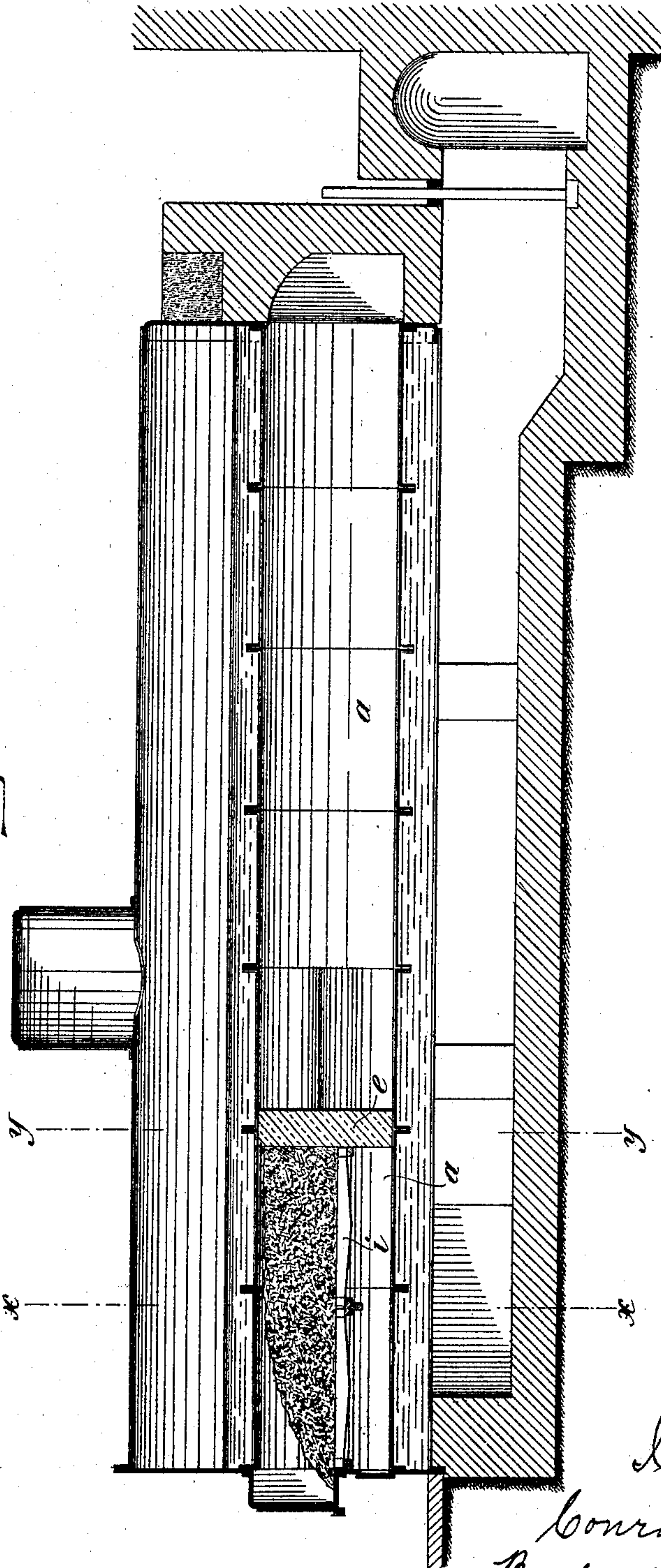
C. TIMMANN.
SMOKELESS FURNACE.

(Application filed July 25, 1899.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1



Witnesses:
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Inventor:
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By *[Signature]*
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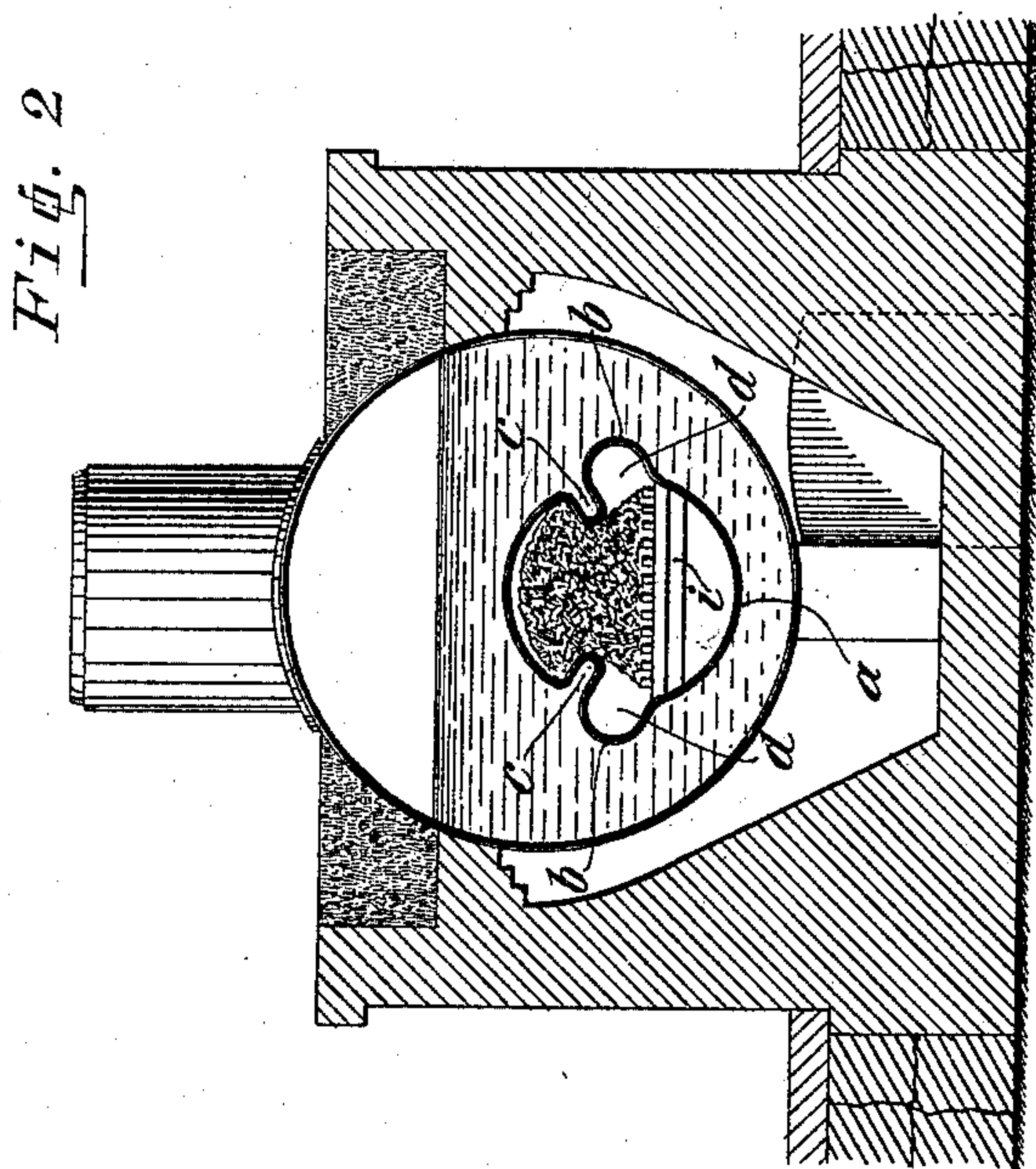
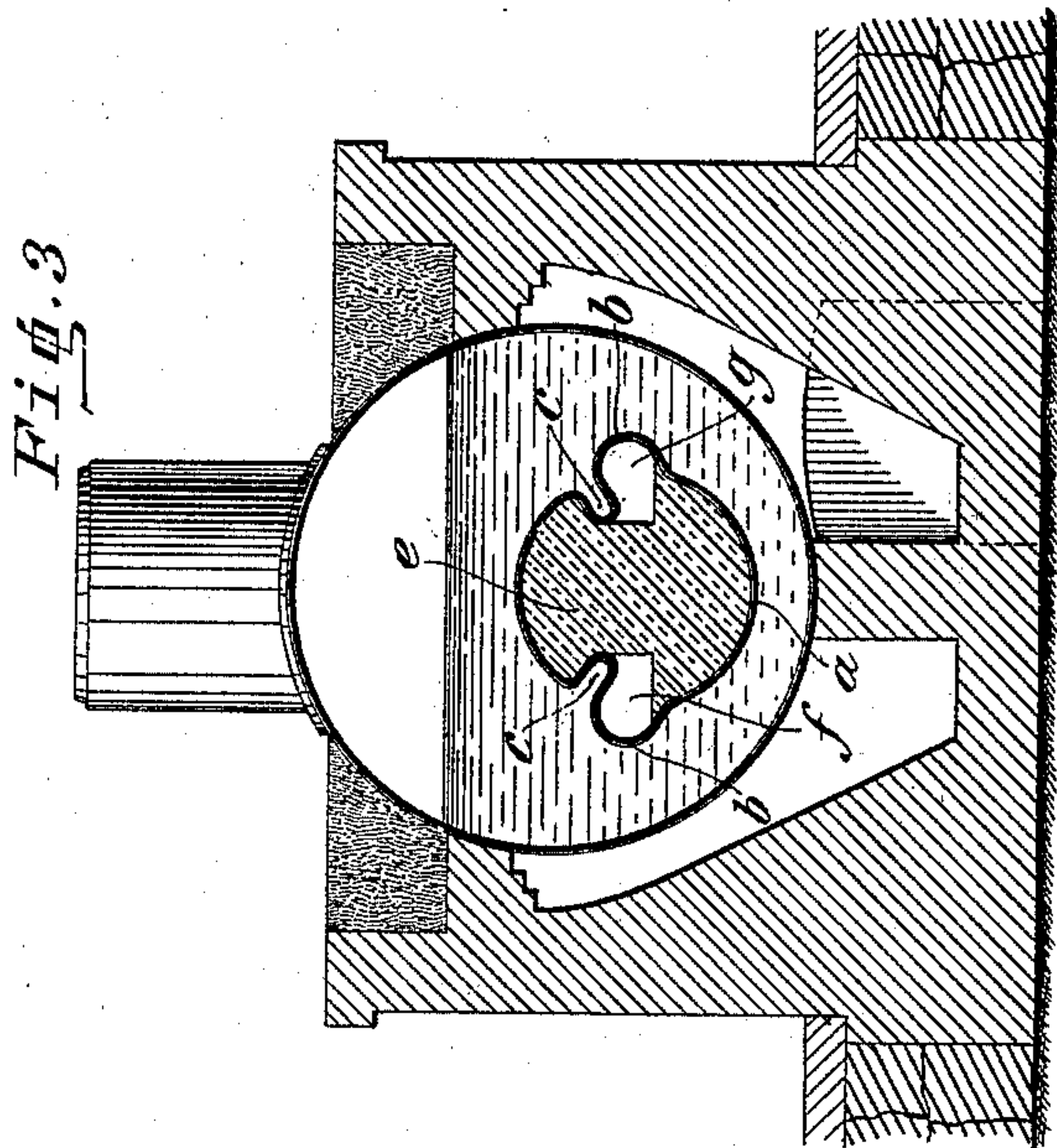
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2 Sheets—Sheet 2.



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UNITED STATES PATENT OFFICE.

CONRAD TIMMANN, OF HAMBURG, GERMANY.

SMOKELESS FURNACE.

SPECIFICATION forming part of Letters Patent No. 638,034, dated November 28, 1899.

Application filed July 25, 1899. Serial No. 725,040. (No model.)

To all whom it may concern:

Be it known that I, CONRAD TIMMANN, furniture remover, a subject of the Emperor of Germany, residing at Hoheluft-Chaussee 12, Hamburg, in the Empire of Germany, have invented certain new and useful Improvements in Smokeless Furnaces, of which the following is a full, clear, and exact description.

10 Furnaces wherein the burning of the coal occurs underneath on the grate in order that a rational combustion may be attained are attended with the disadvantage that as a result of their complicated construction the
15 performance of repairs entails considerable expense, and, furthermore, that the grate area is barely sufficient for the production of the required amount of steam, because a large portion of the coal fed thereto does not burn.
20 This invention relates to a direct-fired smokeless furnace wherein the combustion takes place on a grate, but which is exempt from the aforesaid disadvantages. This smokeless furnace enables combustion to go
25 on over the entire area of the grate, being suitable for any boiler, precluding burning out the top of the fire-box, and it is not retarded by the admission of cold air when the fire-door is opened, such air rather contributing to se-
30 cure a more perfect combustion of the gases.

In the drawings forming part of this specification, Figure 1 shows in longitudinal section the invention as applied to an ordinary type of boiler. Fig. 2 shows a cross-section
35 of same on the line *x x*, and Fig. 3 a similar cross-section on the line *y y*.

For the purposes of this invention the front portion of the flue *a* where the furnace is situated is formed at either side with longitudinally-extending pockets *b* and inwardly-projecting constrictions *c*. Firing up is effected, as in any ordinary furnace, by lighting
40 a fire on the grate *i*, situated below the center of the fire-box. This done coal is piled
45 up on the fire in such quantity that but a small space is left unoccupied at the top. This coal is laterally supported on the constrictions *c*, which also serve to shut off communication between the pockets and the
50 space above the layer of coal. The coals fall in a laterally-slanting direction below the

constrictions *c*, as shown in Fig. 2, the spaces *d* being left free through which the burning gases pass, air being supplied to the under side of the grate in order to maintain the
55 combustion of the fuel. The cold coals fed in at the top are first deprived of their gaseous constituents by distillation, whereupon the gas-free coal—*i. e.*, coked residue—falls
60 onto the grate *i* and burns without smoke. The glowing fire underneath the constrictions *c* throws out great heat, which is conducted to the rear part of the flue through the open-
ings *f* and *g* in the fire-bridge *e* above the grate, these apertures *f* and *g* being the only
65 passages through the fire-bridge, so that any smoke that may be formed above the coal is drawn along with the air entering at the open fire-door or through apertures in the same
70 through the fire on the grate and led along with the smokeless hot gases through the apertures *f* and *g* to the rear part of the boiler-flue. By this method of depriving the coal of its gaseous constituents more perfect com-
75 bustion is insured than can be attained in any other kind of furnace, and the fumes issuing from the chimney are quite free from black smoke.

The frequent attention required in other methods in order to ascertain whether more
80 coal is needed is here rendered superfluous, because the stoking-chamber is quite filled with coal. The grate being an ordinary flat grate, the furnace differs from the usual types only in the modified form of the fire-box and
85 fire-bridge.

The superiority of this furnace in point of simplicity is evident, and it can easily be demonstrated that it insures a perfectly
90 smokeless combustion, as it is only a question of the form of the fire-box. This method of firing can be applied to any type of boiler at little expense, which in view of the advantages accruing will be quickly repaid by the economy effected in the fuel.
95

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

1. The fire-box herein described constructed with a fire-grate *i* longitudinally-extending lateral pockets *b b* forming gas-conduits
100 *d, d* on either side above the grate and constrictions *c, c* forming a closed magazine-

chamber at top adapted to be disconnected from the conduits \bar{d} , \bar{d} by the mass of fuel on the grate as shown and explained.

2. The fire-box having a grate i longitudinally-extending lateral pockets b , b and constrictions c c forming gas-passages \bar{d} , \bar{d} ; in combination with a fire-bridge e , having apertures f , g , communicating with the gas-passages \bar{d} , \bar{d} , and a flue a , into which the

products of combustion are delivered, substantially as described.

In witness whereof I subscribe my signature in presence of two witnesses.

CONRAD TIMMANN.

Witnesses:

E. H. L. MUMMENHOFF,
GEO. LANDRÉ.