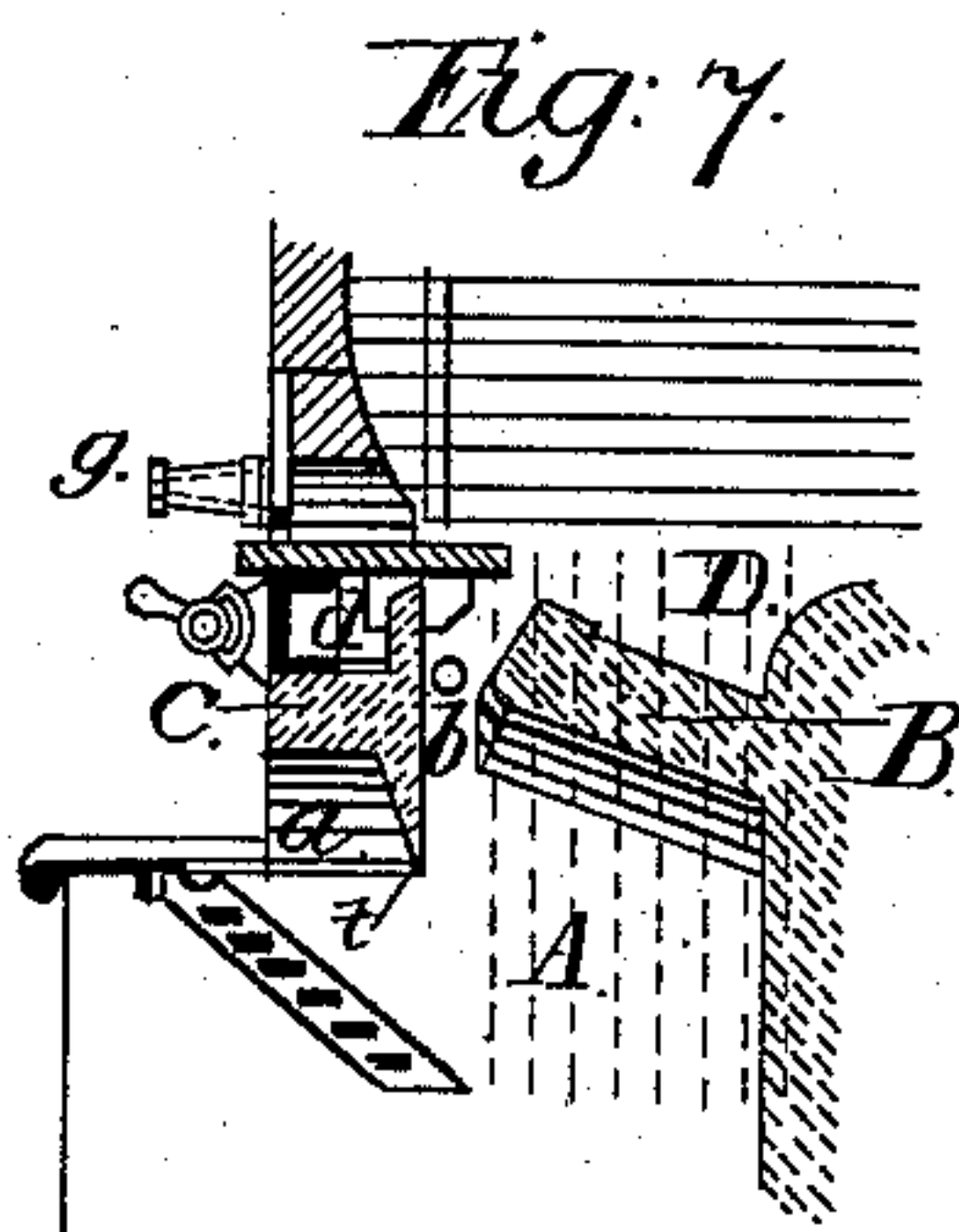
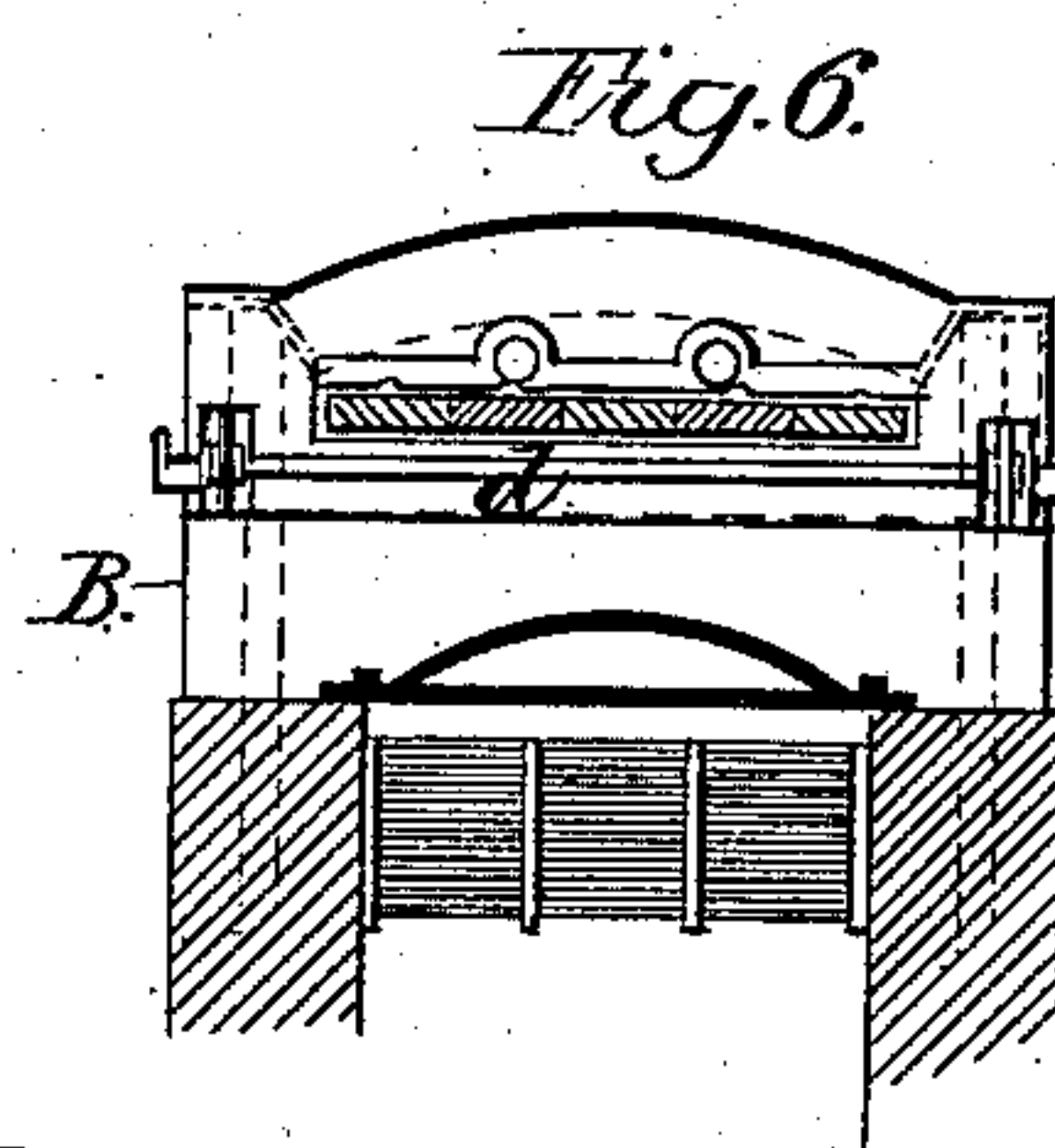
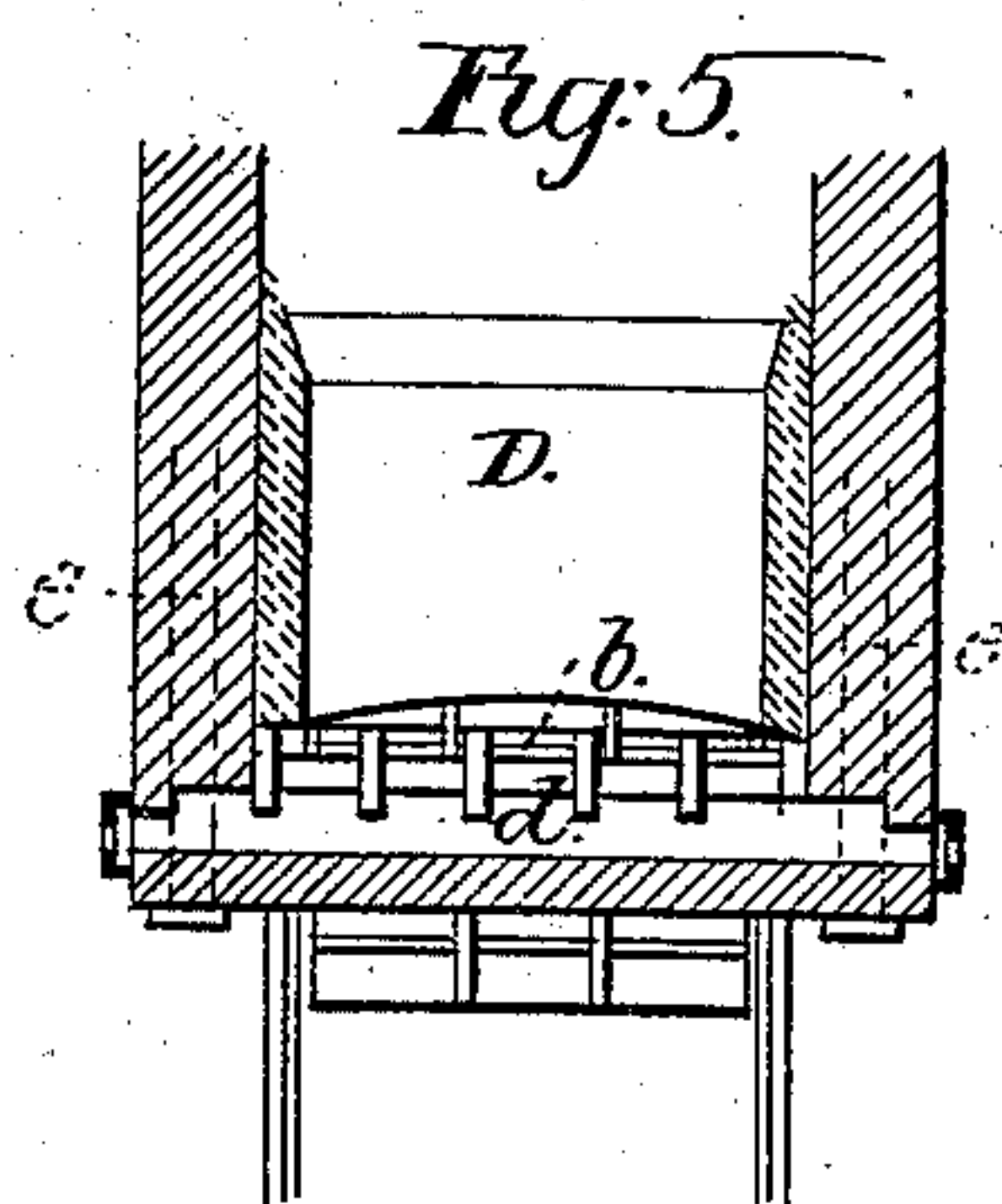
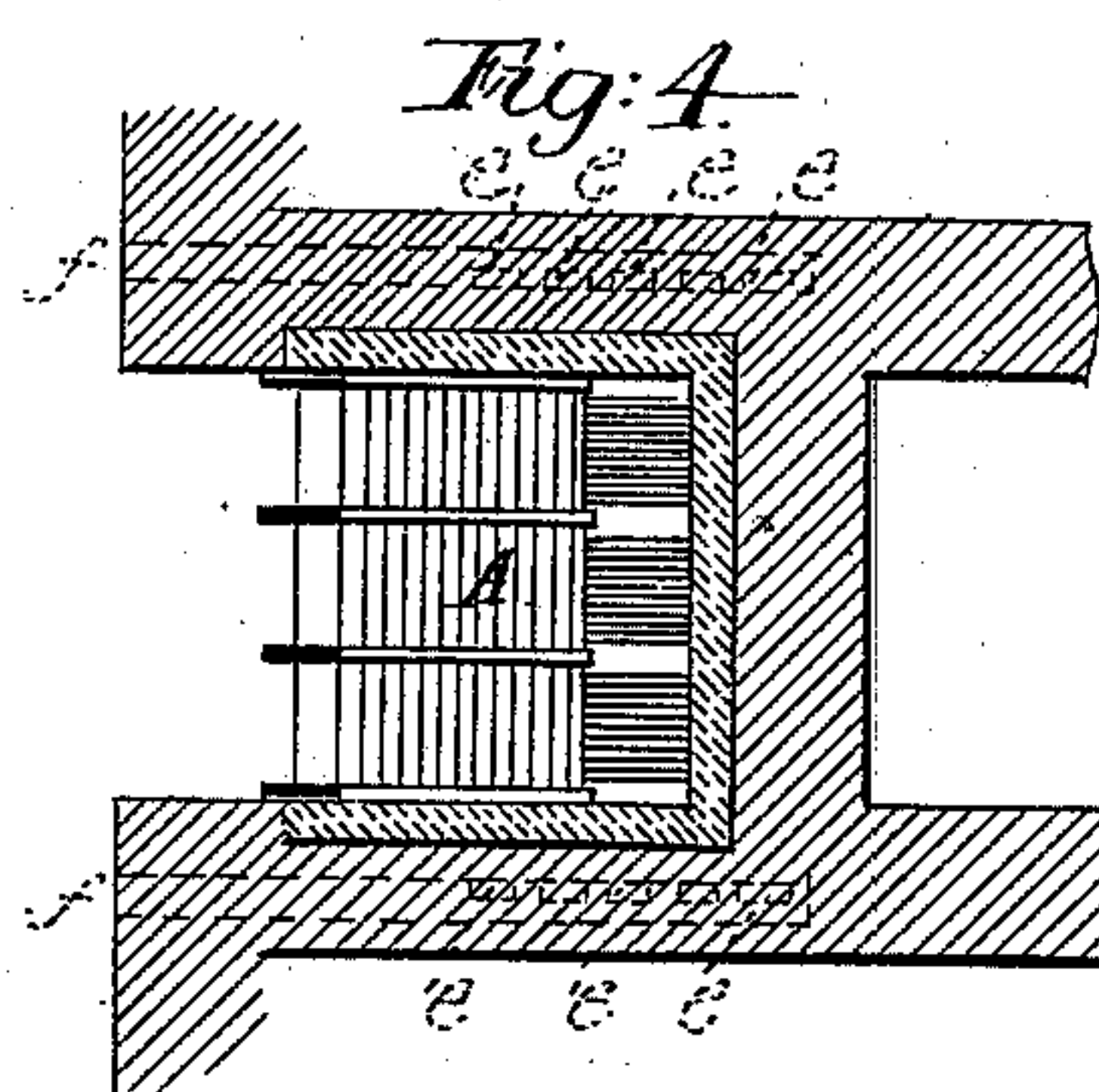
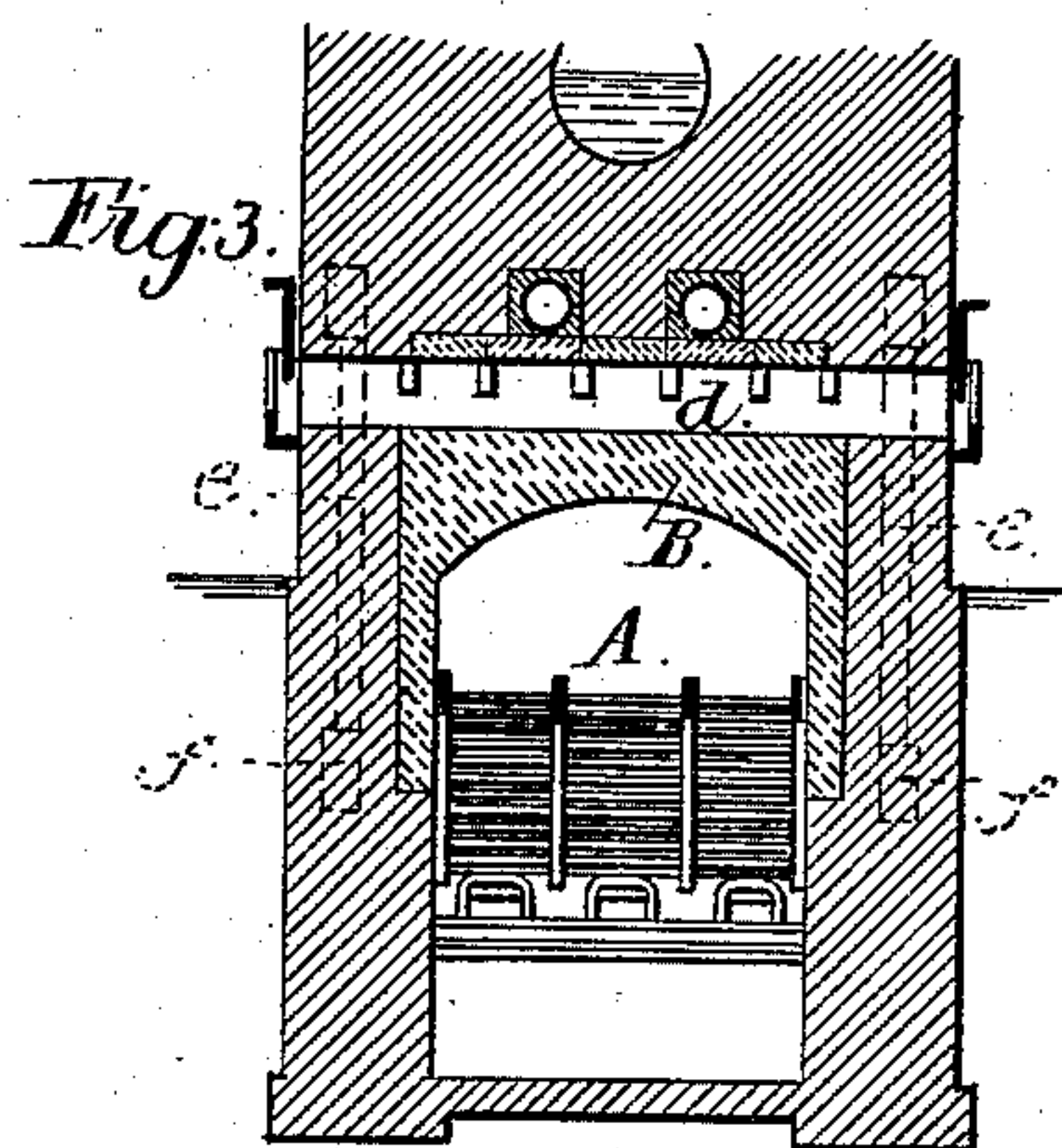
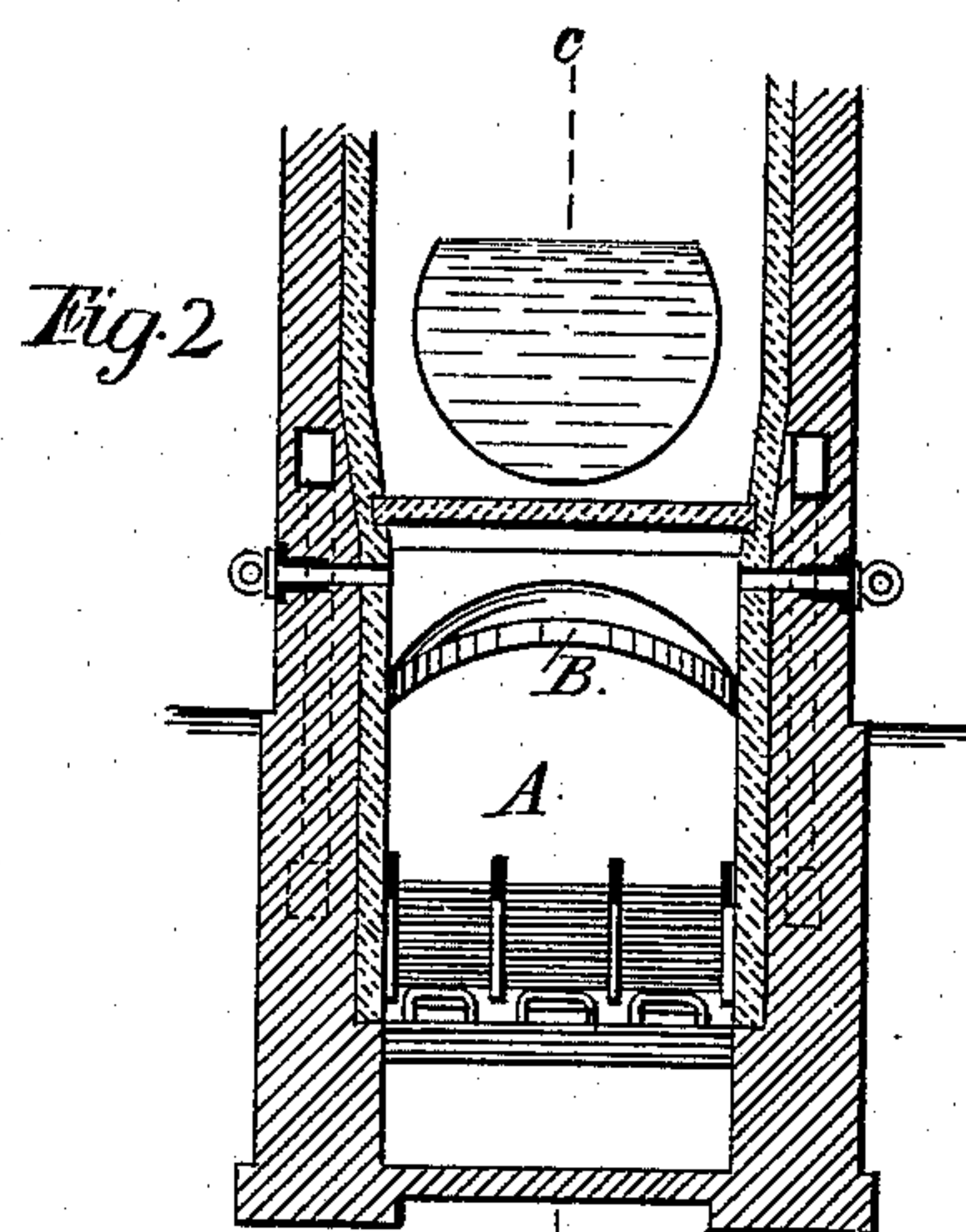
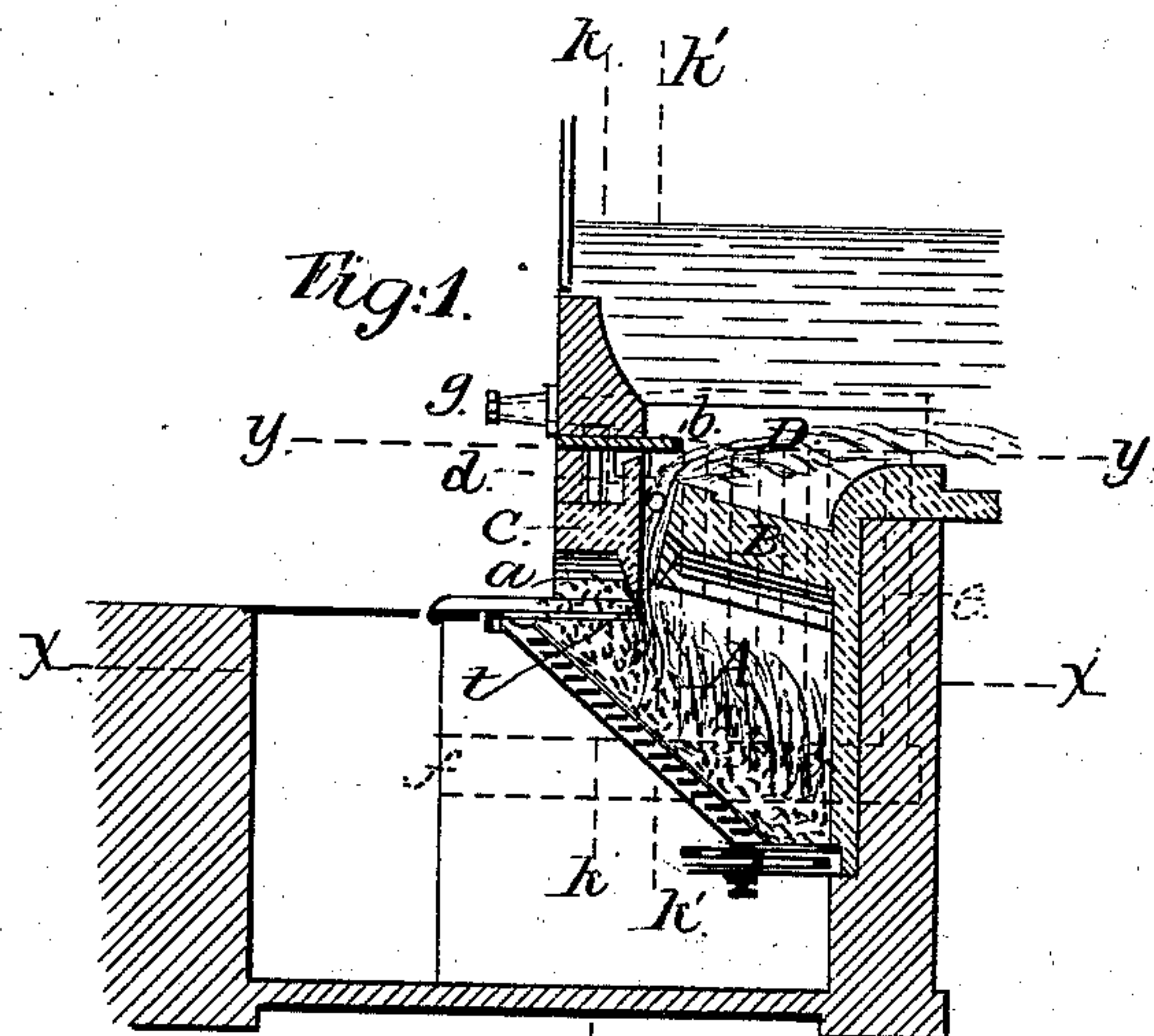


(No Model.)

F. SCHAFFER.  
Furnace.

**No. 235,904.**

**Patented Dec. 28, 1880.**



*Witnesses:*

Willy L. E. Schultz,  
John C. Tunbridge.

*Inventor:*

Friedrich Schaffer,  
by his attorney,  
A. Briesen.



# UNITED STATES PATENT OFFICE.

FRIEDRICH SCHAFFER, OF ROTHENBACH, PRUSSIA, GERMANY.

## FURNACE.

SPECIFICATION forming part of Letters Patent No. 235,904, dated December 28, 1880.

Application filed May 8, 1880. (No model.)

*To all whom it may concern:*

Be it known that I, FRIEDRICH SCHAFFER, of Rothenbach, Prussia, in the Empire of Germany, have invented a new and Improved Gas-Furnace, of which the following is a specification.

My invention relates to improvements in the construction of gas-burning furnaces.

The object of my invention is to arrange the furnace so as to effect a more perfect combustion of the gases of combustion, to fire the gases directly under the object to be heated, and to prevent the first flame produced by the gases from acting directly on the object to be heated.

The invention consists in arranging the furnace so that the gases will be led from the fire-chamber at a point close to the charging-door or stirring-place, and carried through a narrow slot in the arch or roof of the fire-chamber into direct contact with atmospheric air injected into the heat-flue to support the combustion of the said gases.

It also consists in arranging the arch of the fire-chamber with relation to the opening for the passage or escape of the gases so that the object to be heated is protected from direct contact with the first or cutting flame of the gases, and in other details of construction, which will be fully described hereinafter.

In the accompanying drawings, Figure 1 represents a longitudinal vertical section of my improved furnace, taken on line *c c* of Fig. 2; Fig. 2, a vertical cross-section taken on line *k k* of Fig. 1; Fig. 3, a vertical cross-section on line *k' k'* of Fig. 1; Fig. 4, a horizontal section on line *x x* of Fig. 1; Fig. 5, a similar section on line *y y* of Fig. 1. Fig. 6 represents a detailed vertical section on line *k' k'*, Fig. 1, looking outward. Fig. 7 is a detailed longitudinal vertical section of a modification of the furnace, taken on the line *c c*, Fig. 2, showing clearly the construction of the fire-chamber and air and gas flues.

Referring to the drawings, A represents the fire-chamber, having in this instance a stepped grate, so that the fuel will close up the door or stirring-hole *a*; but in case a square fire-chamber is employed, or other form which will not allow the fuel to be banked up so as to close the entrance, then doors must be employed for that purpose.

B represents the arch of the fire-chamber, and C the arch of the charging-door or feed-hole *a*. Between the arches B C, both of which have pendent lips *t*, and between said lips, is a transverse slit or opening, *b*, leading from the fire-chamber to the heat-flue D, under the object to be heated. The slit or opening *b*, it will be observed, is near the feed-hole *a*, so that the more volatile gases, which are generated near the entrance of the fire-chamber and before the fuel becomes fully ignited, can pass directly up through the said slit or opening; but the hot gases, which are generated at the back of the fire-chamber, are prevented from passing directly up into the heat-flue by the arch B, which, by obstructing their movement, causes the gases to accumulate, and also protects the object to be heated from the cutting or first flame, produced by the combustion of the fuel. The two kinds of gases produced in the fire-chamber—the illuminating and the heating gas—will pass up through the opening *b* nearly unmixed, and when they pass from the opening they come in contact with air from a cross trough or flue, *d*, in the side walls of a furnace over the arch C, Figs. 2 and 5, which air mingles with the gases and supports their combustion in the heat-flue D, directly under the object to be heated. The air, instead of being supplied from the trough or flue *d*, may enter through flues or passages *e f* (shown at dotted lines in Figs. 1 and 4) in the walls of the furnace. As the said walls of the flue *d* or *e* are made red-hot or glowing by the fire in the furnace, the air is highly heated before it is injected into the gases. The air flues or passages are to be furnished with suitable valves for regulating the supply of air to the gases, said valves to be conveniently arranged so as to be under the control of the attendant.

It is not generally necessary to use regenerators with this furnace; but, if desired, they may be connected with the furnace through the canals or flues *e f f*, as stated.

The use of a blast is not necessary; but if it is required to produce a very quick heat a blast may be applied. Ordinarily the firing needs only a moderate draft.

*g* are tubes placed through the front wall and leading into the heat-flue D, for inspecting the condition of the flame.

Any combustible material can be burned with good success—for example, slate-coal out of the coal-washings, containing sixty per cent. of ashes, (incombustible material,) and the matter washed out of coals, wet, as it comes from the basins. The production of dross is very small. The influence of the fire on the object heated can be moderated instantaneously if the flue for the introduction of air is entirely opened and the air is freely admitted in the charging-door over the fuel.

I claim—

In a furnace, the arch B over the fire-chamber, having pendent lip *t*, in combination with

the arch C above the feed-hole, said arches B C being directly separated by a transverse opening, *b*, which leads to the heat-flue, in combination with hot-air-supply flues placed within the heated walls of the furnace to conduct heated air to the gases of combustion in the flue D, substantially as herein shown and described.

This specification signed by me this 12th day of February, 1880.

FRIEDRICH SCHAFFER.

Witnesses:

LEOPOLD SACHS,  
THEODOR HEINRICH.