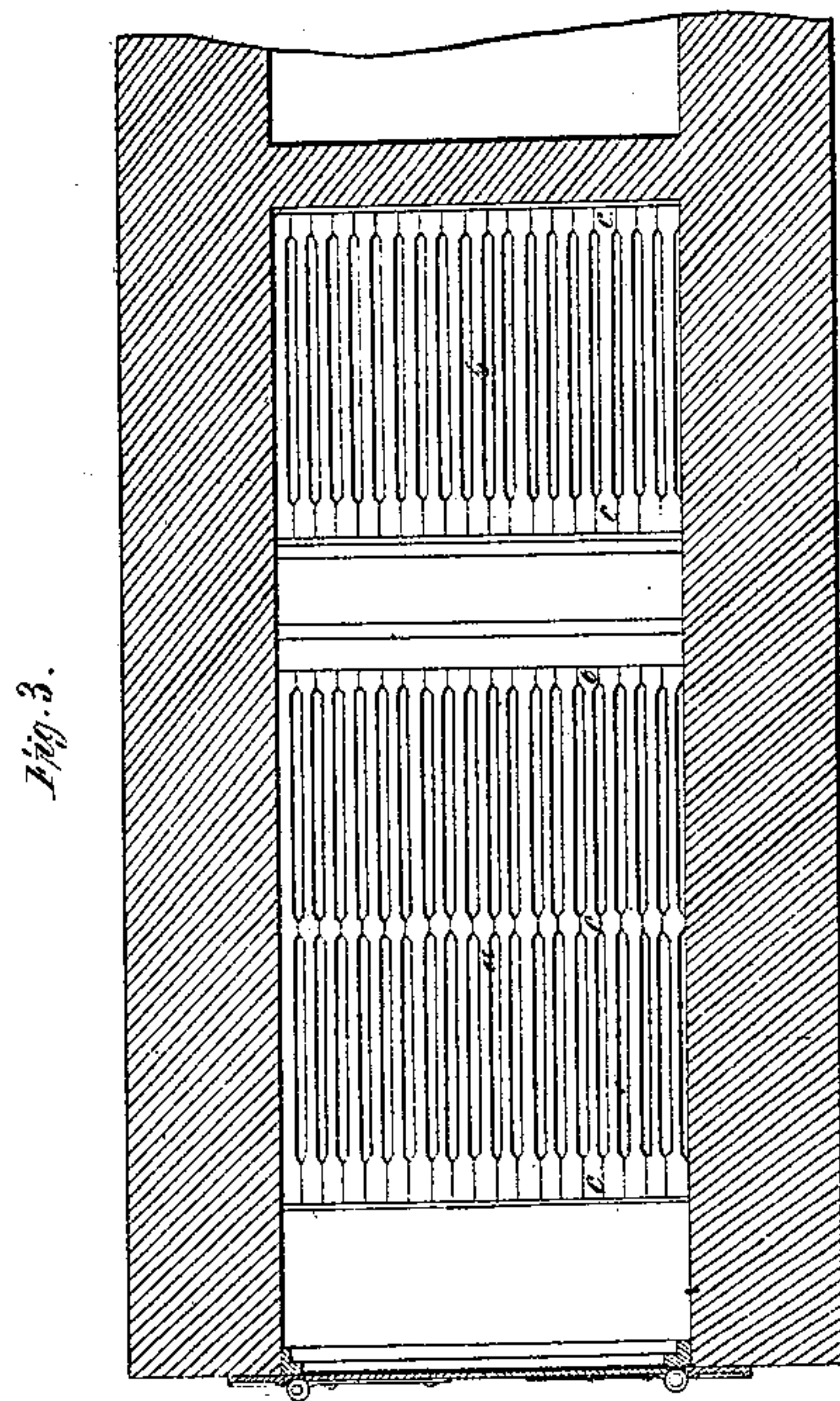
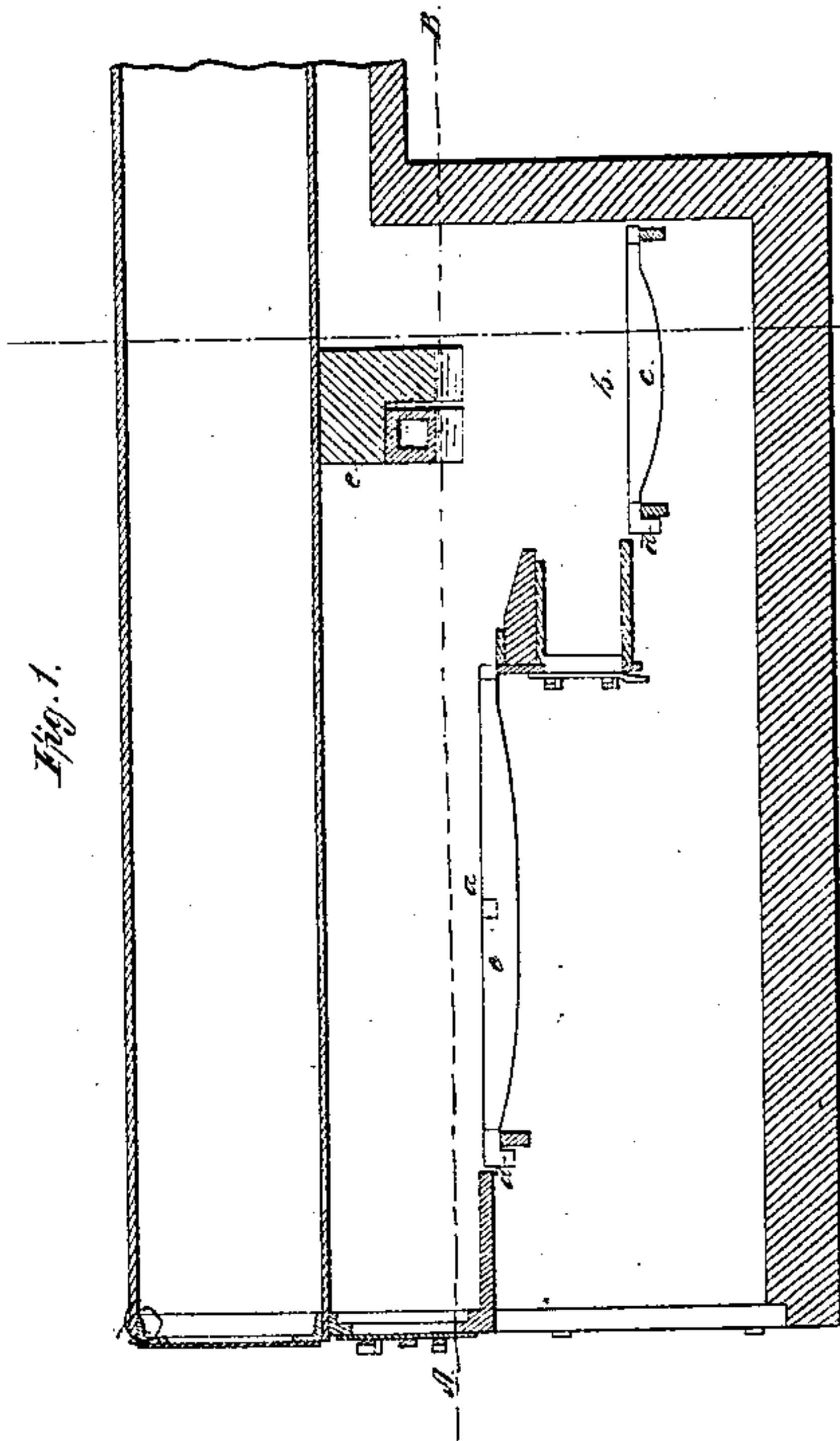
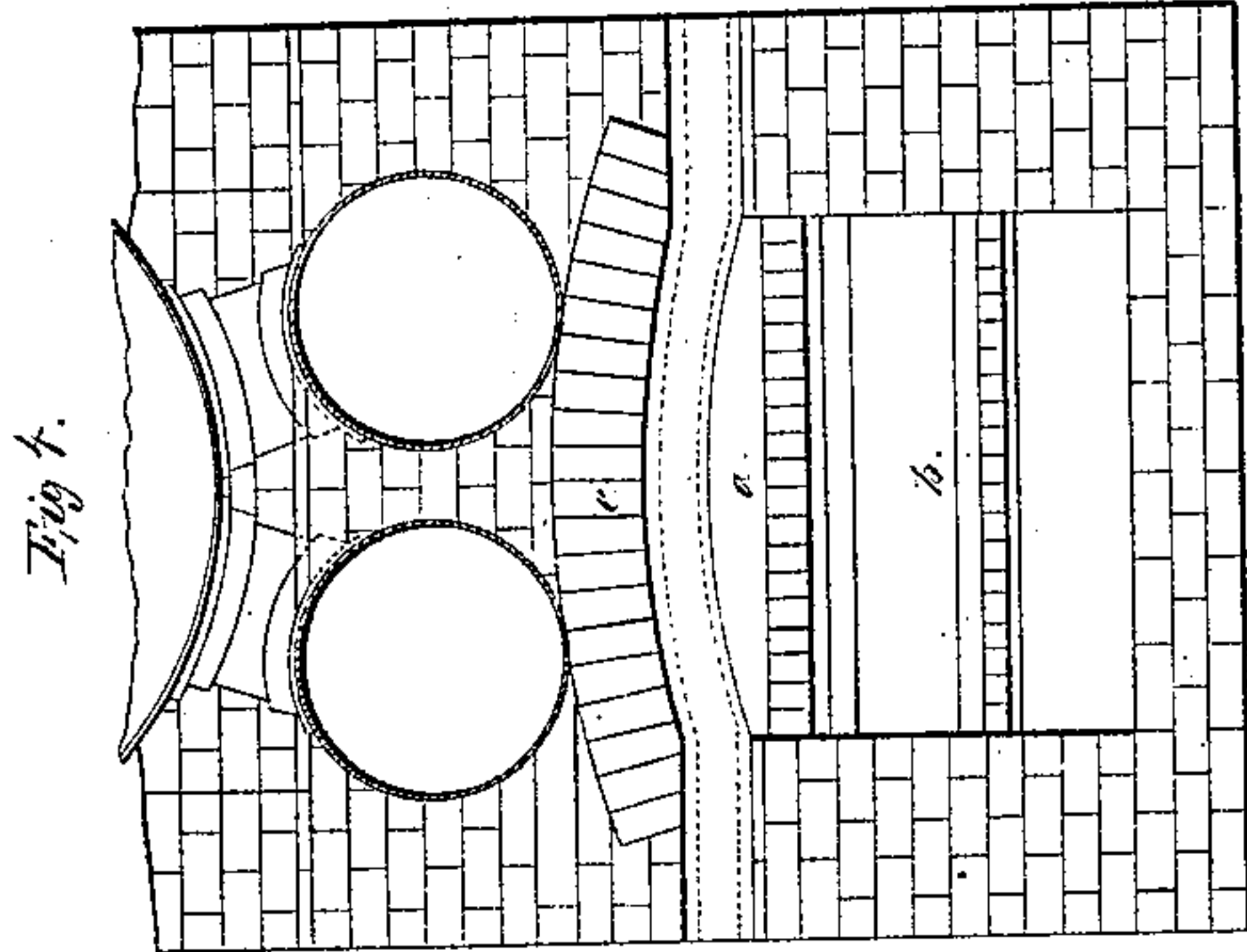
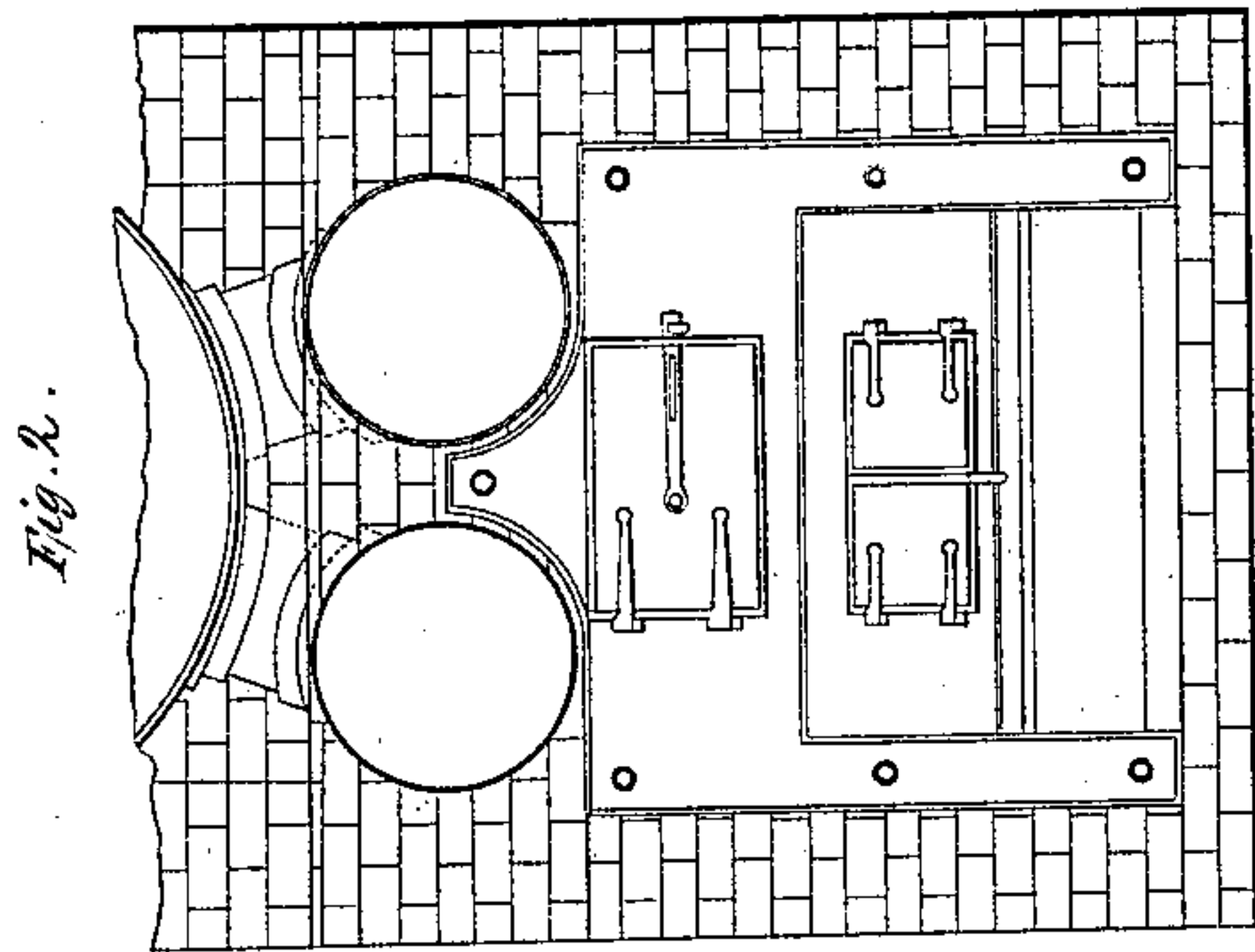


3 Sheets. Sheet 1.

N. F. B. de Chodzko,
Steam-Boiler Furnace.

N^o 38,885.

Patented June 16, 1863.



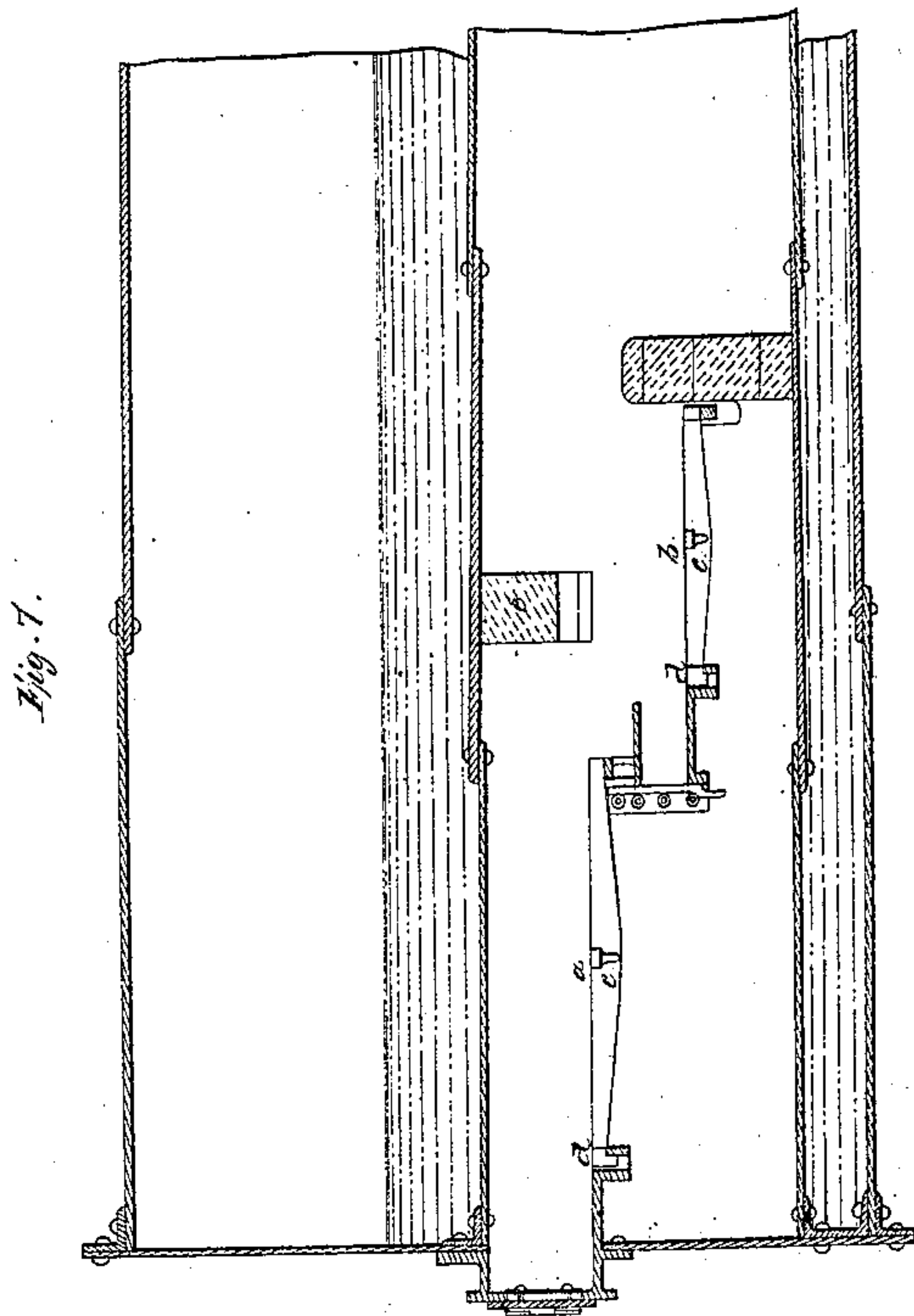
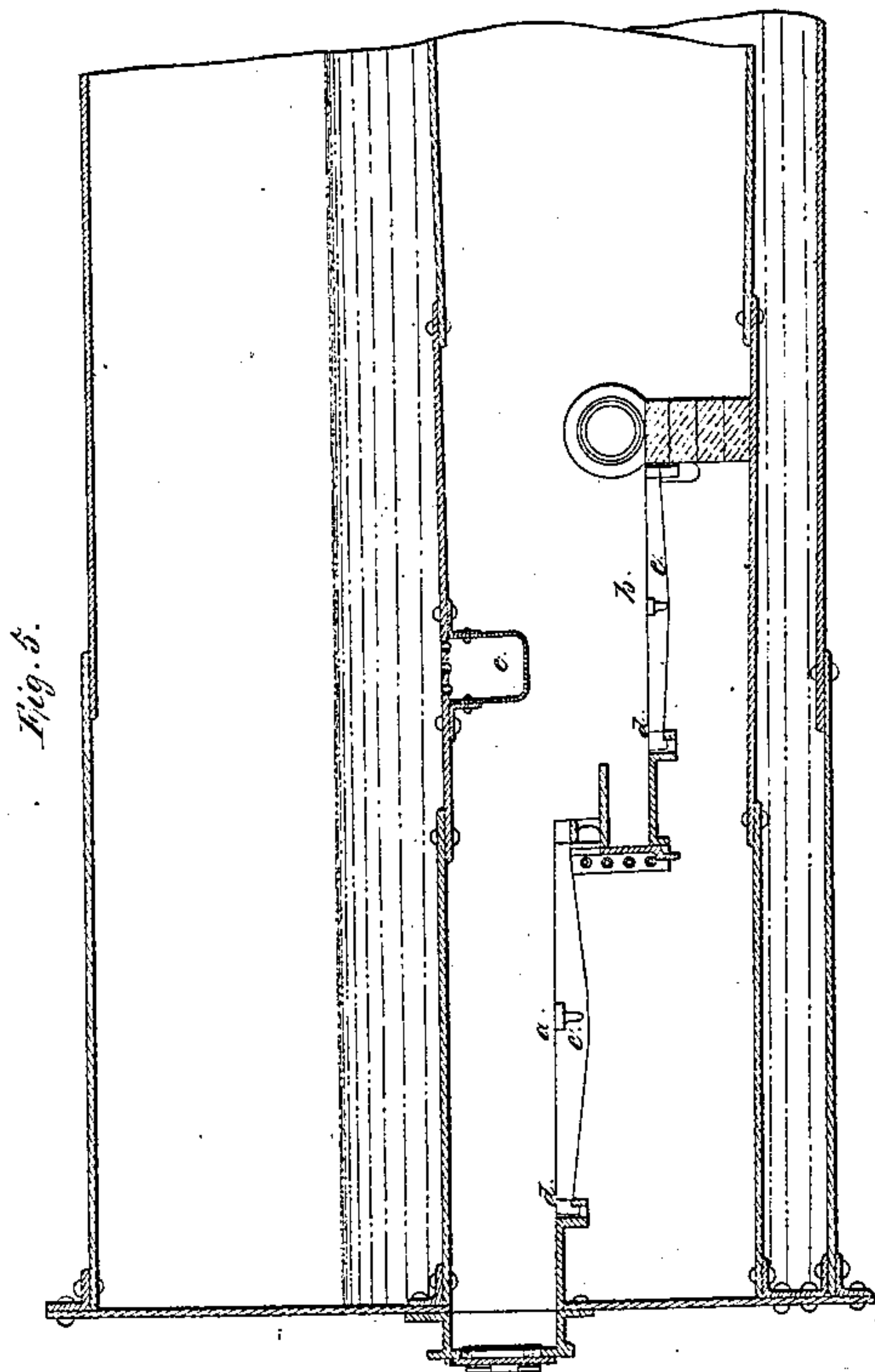
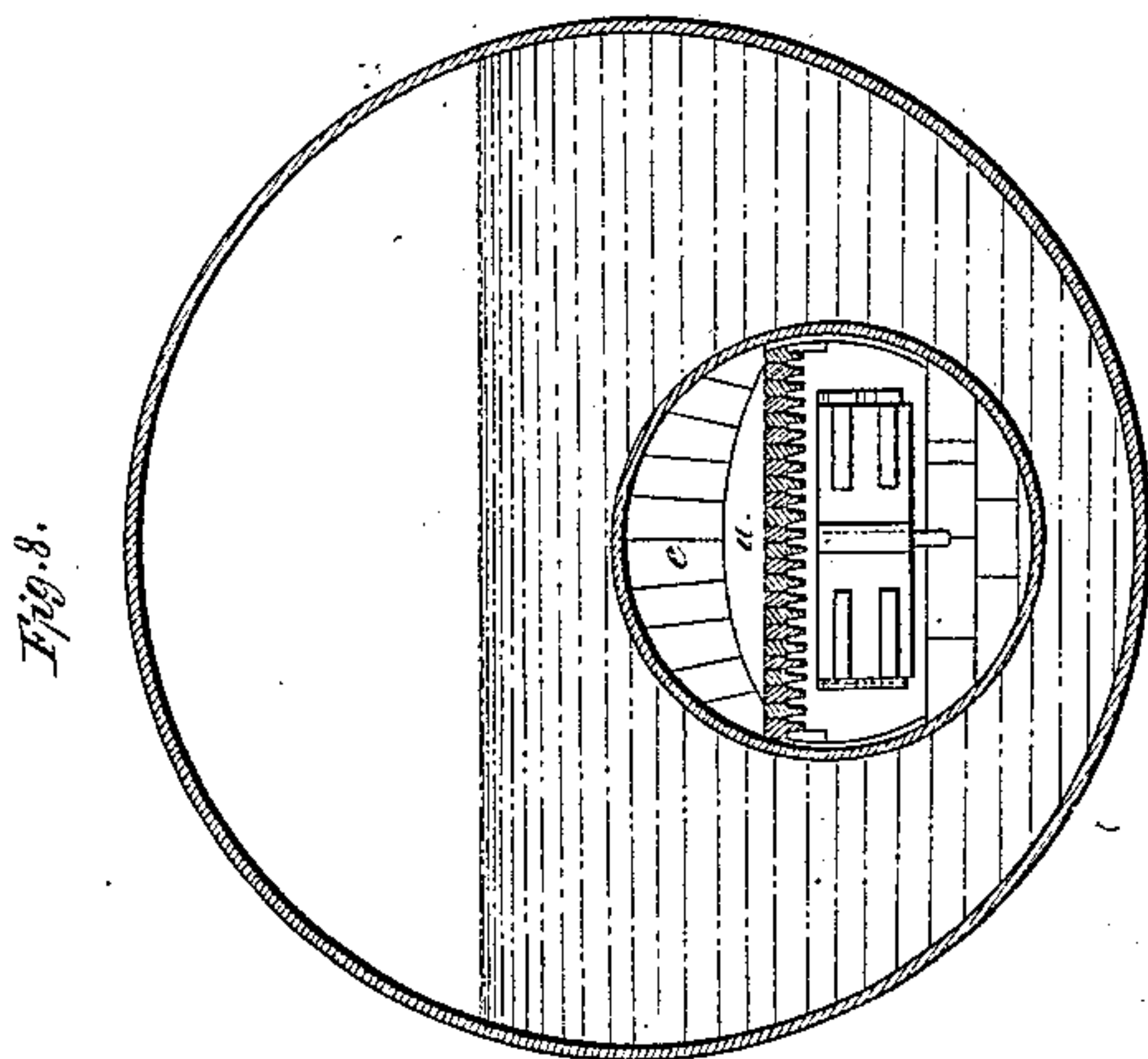
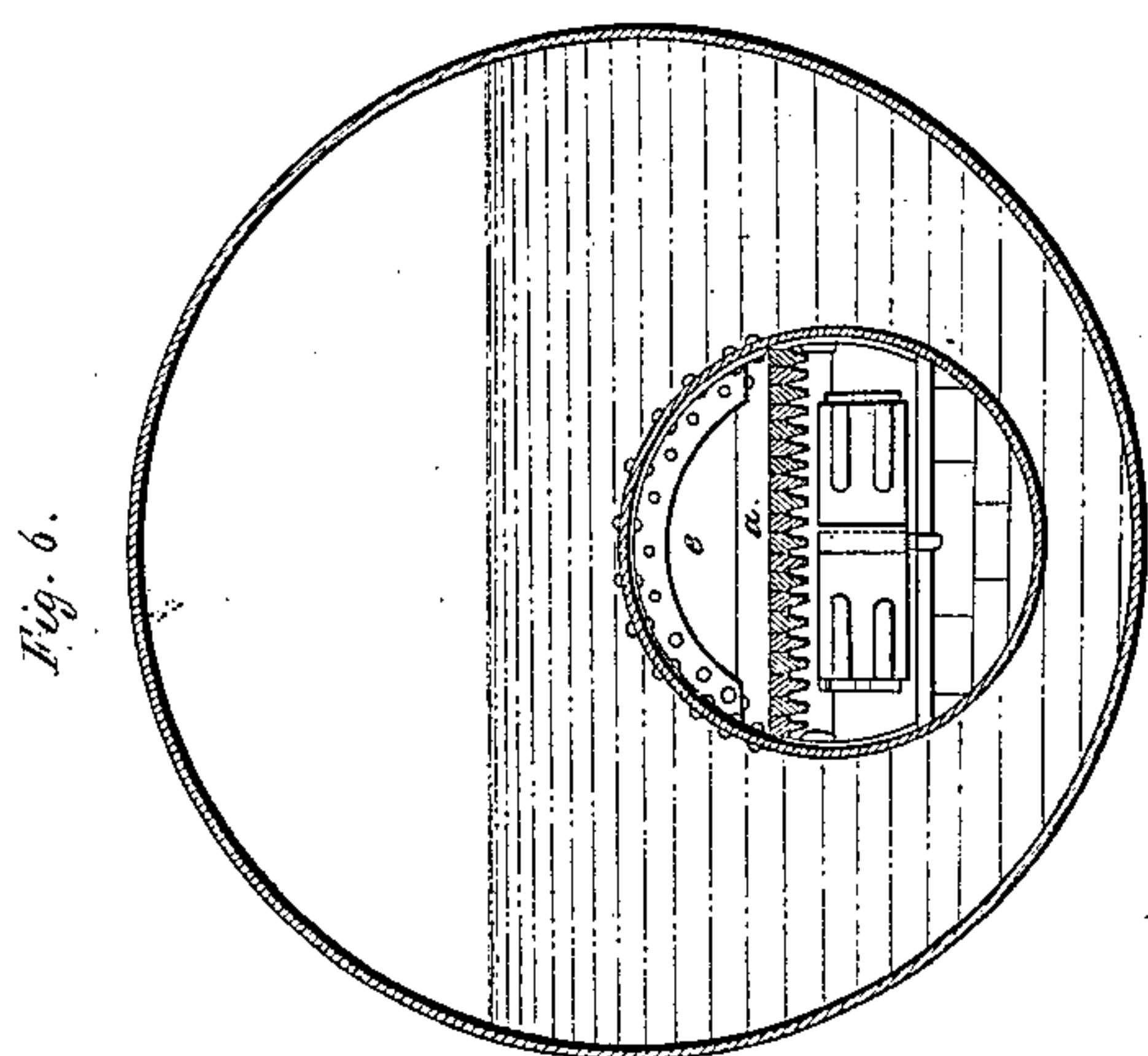
Witnesses:
John H. H. H.
James H. Bell

Inventor:
Napoleon Felix Bernier de Chodzko
By Sampson P. Moses

N. F. B. de Chodzko,
Steam-Boiler Furnace.

N^o 38,885.

Patented June 16, 1863.



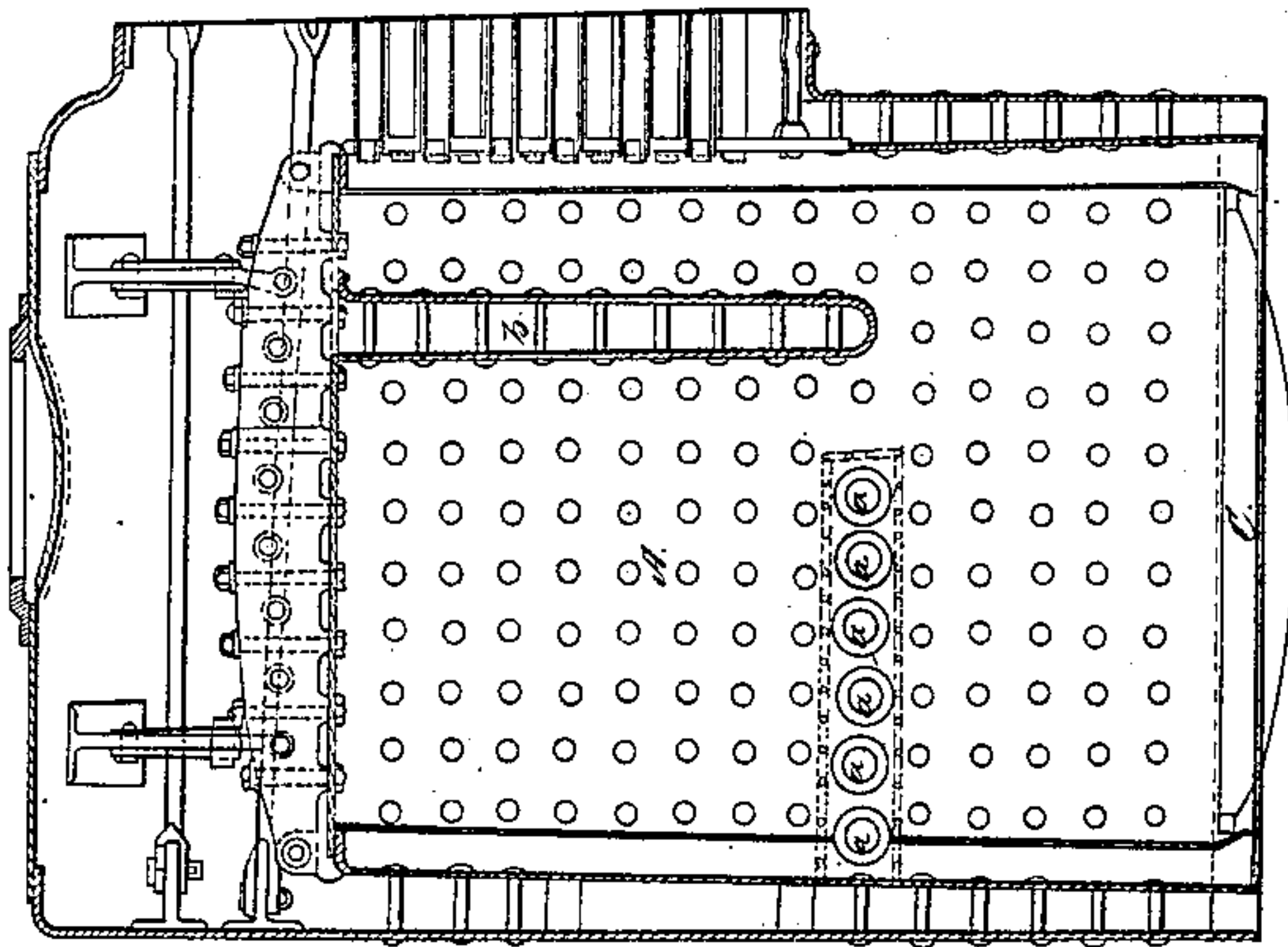
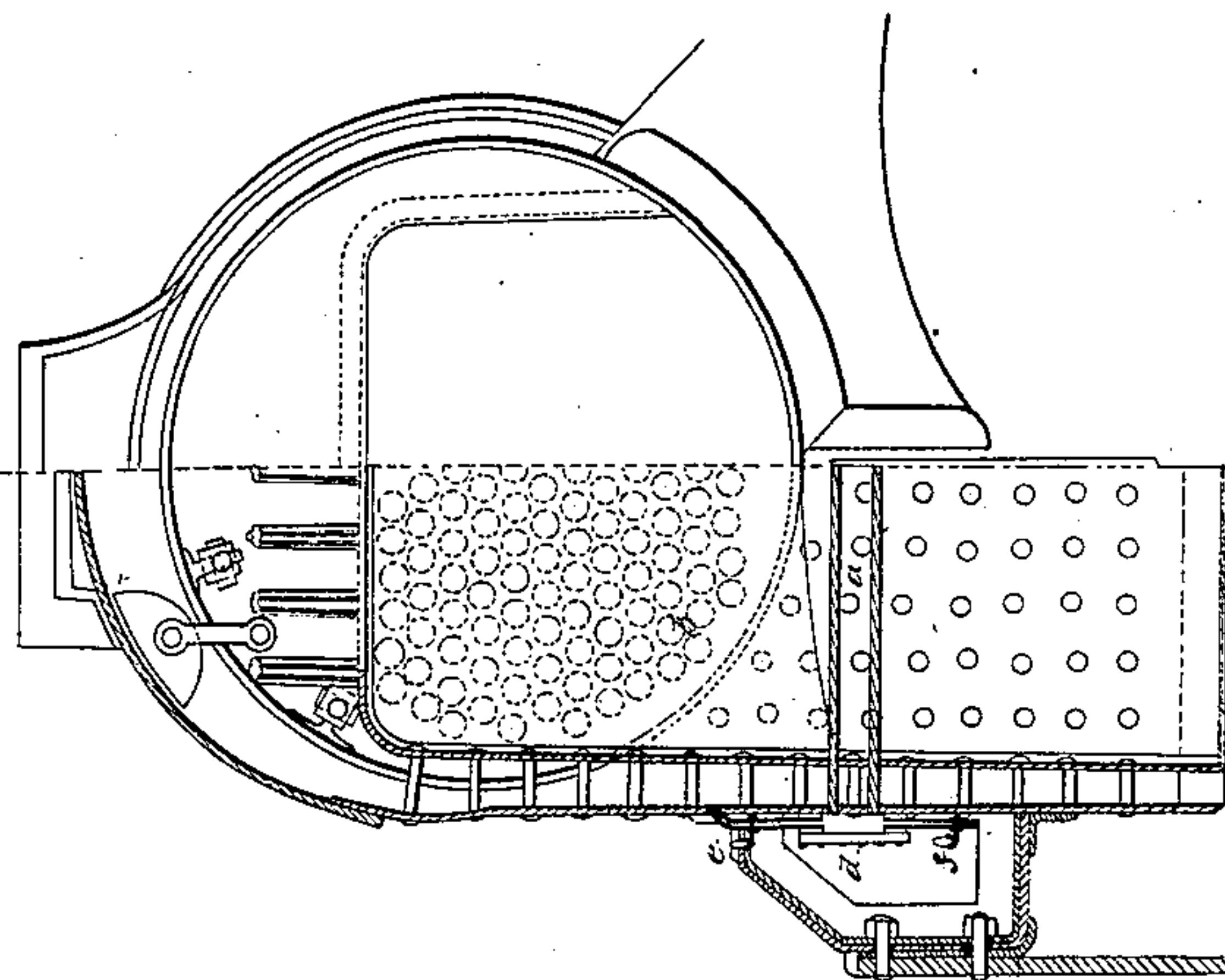
Witnesses:
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James H. Bell

Inventor:
Napoleon Felix Bonifacio de Chodzko
By Simpson P. Moore

N. F. B. de Chodzko, *3 Sheets. Sheet 3.*
Steam-Boiler Furnace.

N^o 38,885.

Patented June 16, 1863.



Witnesses:
John H. Smith
James R. Bell

Inventor:
Napoleon Felix Bernke de Chodzko
By Simpson & Morris

UNITED STATES PATENT OFFICE.

NAPOLÉON FÉLIX BORUKO DE CHODZKO, OF PARIS, FRANCE.

IMPROVEMENT IN FURNACES.

Specification forming part of Letters Patent No. 38,885, dated June 16, 1863.

To all whom it may concern:

Be it known that I, NAPOLÉON FÉLIX BORUKO DE CHODZKO, of the city of Paris, in the Empire of France, have invented a certain new and useful Improvement in Smoke or Gas Consuming Furnaces; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being made to the accompanying drawings, making a part of this specification, and to the figures and letters of reference marked thereon.

A purpose of said invention is the consumption of all ingredients or component parts or elements of smoke that under any circumstances can be consumed.

The ordinary furnace is divided into two compartments lengthwise, an upper and a lower one, each supplied with grate-bars in the usual manner from the front to the extreme back part, and with doors at the entrance of each compartment. The upper part is intended for feeding the fuel, and the lower for raking the cinders or coke so as to allow them to fall into the lower compartment. When necessary, openings are made in the brick-work of the furnace to allow the air to pass, which expands in the flues, and a vault being made in the interior of the furnace acts as a barrier to the overheated air between the vault and the grate-bars of the lower fire-place, which facilitates the combustion of the smoke or gas, forcing it to descend under the bridge and pass through the burning coke spread out upon the lower compartment. The fire is lit on the upper grate, and when the coal is reduced into coke it is pushed down by a rake or poker to fall on the lower grate-bars, always reserving a sufficient quantity of burning coke in the upper compartment to light the fresh coal introduced. When the lower compartment is sufficiently supplied with burning coke, the smoke-consuming process is perfect.

Figure 1, Sheet 1 of the drawings or illustrations, represents a longitudinal section of the interior of a furnace to which the smoke-consuming apparatus is applied. Fig. 2 represents an end elevation; Fig. 3, a sectional plan, and Fig. 4 a vertical section, of same. Fig. 5, Sheet 2, represents a longitudinal section of the fire-grate as applied in the internal tube of a boiler with a metal tube over the lower fire-grate to act as a deflector. Fig. 6 represents a cross-section; Fig. 7, a longitudinal section with deflector of fire-bricks or fire-lumps, and Fig. 8, a cross-section of same.

a are the upper fire-grates or compartments; *b*, the lower fire-grates or compartments; *c*, the fire-bars; *d*, the lug, projection, or hook of fire-bar, and *e* the smoke or gas deflector.

The furnace is divided into upper and lower fire-grates or compartments, supplied with grate-bars *c*, and with fire-doors at the front of the upper and lower fire-grates or compartments, respectively. The upper fire-grate, *a*, Sheets 1 and 2, receives the fuel in the usual manner, part of which fuel, when partially consumed—that is to say, reduced to a state of coke—is pushed into the lower fire-grate, *b*, sufficient fuel being left on the upper grate, *a*, to ignite the fresh fuel which is now to be supplied, and, when partially consumed, part is again pushed onto the lower grate, *b*, the operation being repeated as often as necessary. The fire-bars *c*, forming the fire-grates *a* and *b*, have lugs, projections, or hooks *d* at one end, which are let into corresponding holes or grooves in the cross-bars or head-plates, thus holding in place one end only of the fire-bar, the other end being only supported gives perfect freedom for expansion or contraction in the direction of its length. The smoke or gas deflector *e* over the lower fire-grate, *b*, serves to deflect the gases or smoke as it passes from the upper grate *a*, onto the surface of the heated coke on the lower grate, *b*, thus causing combustion of the gas or smoke before passing into the flues. This deflector may be composed of fire-bricks, fire-lumps, metal tubes, or hollow casings, which tubes may be connected with the boiler so as to assist in generating the steam, or may be made simply to allow a current of air or water to flow through.

Having thus described the nature of the said invention and the manner of applying the same, I wish it to be understood that I do not limit myself to the details herein set forth, as the same may be considerably modified without departing from the peculiar character thereof; but

What I do claim as my invention, and desire to secure by Letters Patent, is—

The combination of a furnace divided into upper and lower fire-grates with the deflector over the lower fire-grate, substantially as above set forth.

N. F. B. DE CHODZKO.

Witnesses:

JAMES W. BROOKS,
E. SHERMAN GOULD.