

C. D. SMITH.
Furnaces for Steam-Boilers.

No. 138,588.

Patented May 6, 1873.

Fig 1.

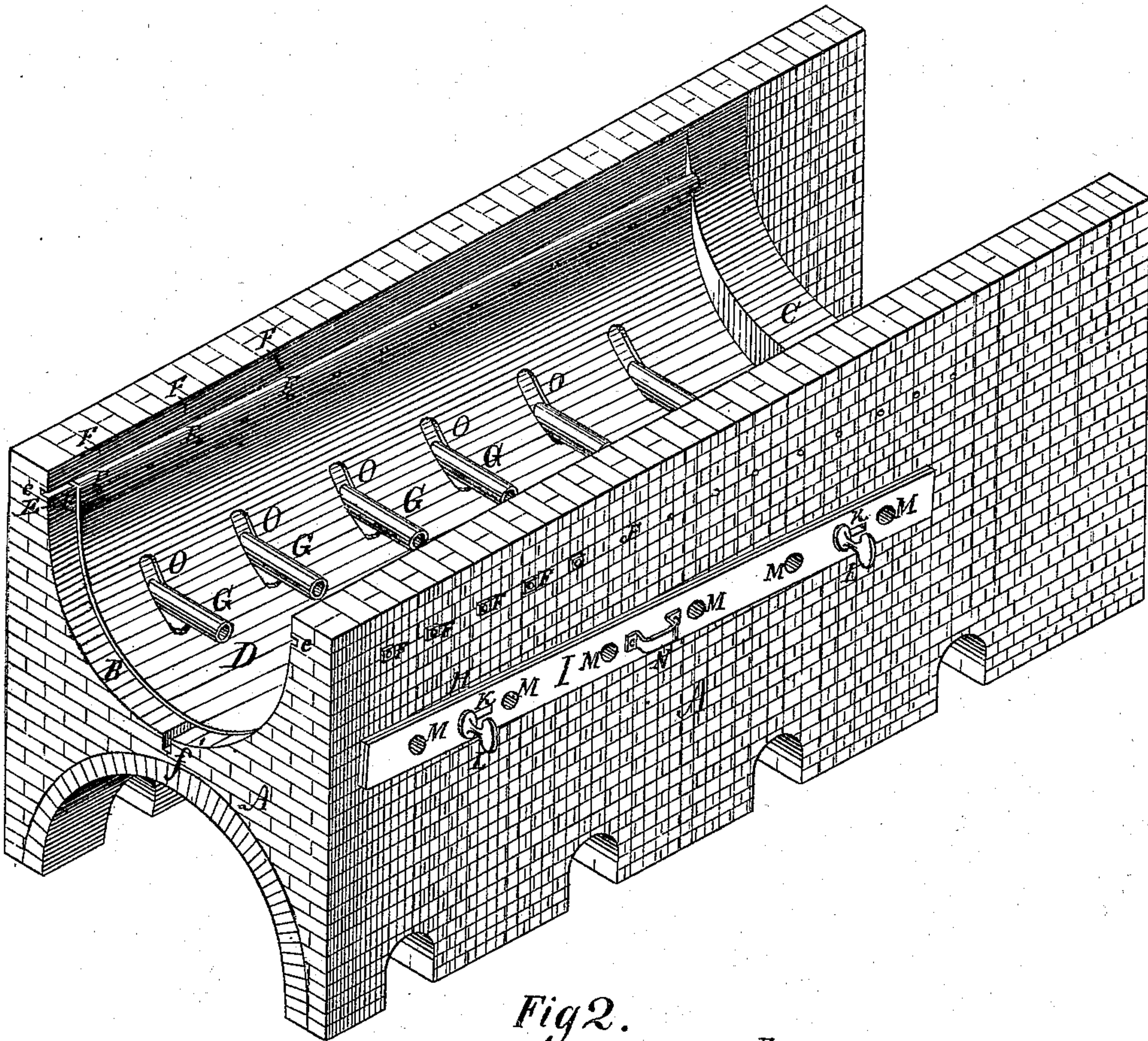
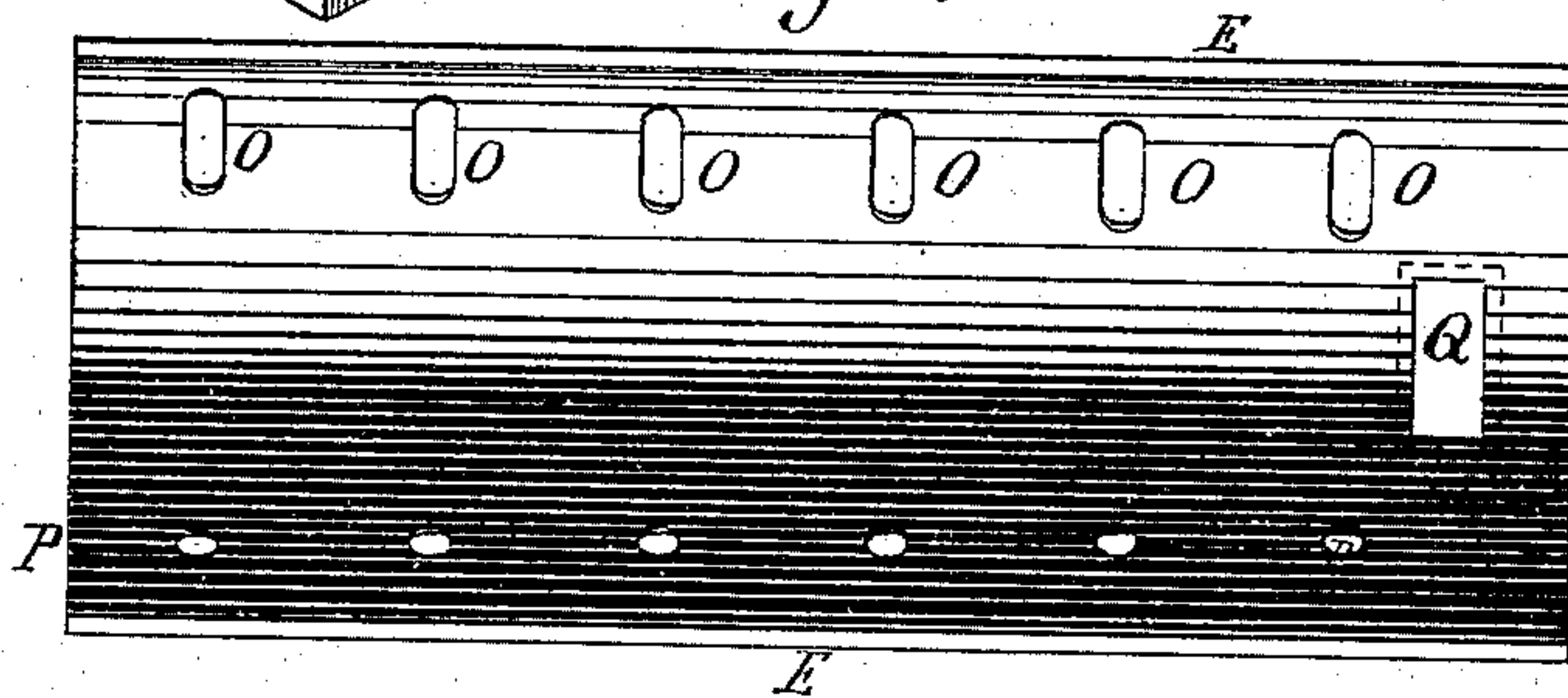


Fig 2.



Witnesses:
James G. Smith
Mort. M. Leggett.

Inventor:
Chas. D. Smith

C. D. SMITH.
Furnaces for Steam-Boilers.

No. 138,588.

Patented May 6, 1873.

Fig 3.

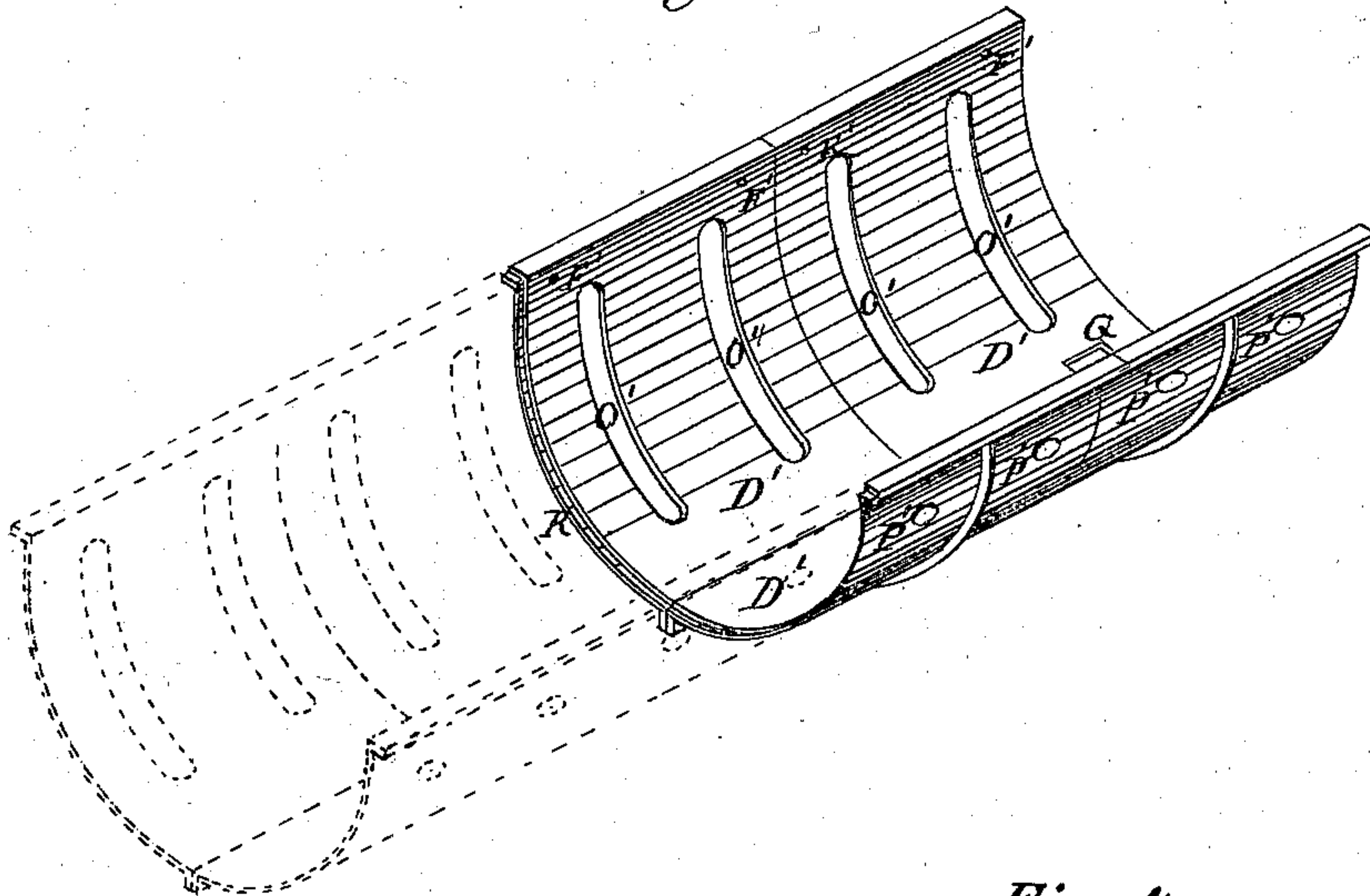


Fig 4.

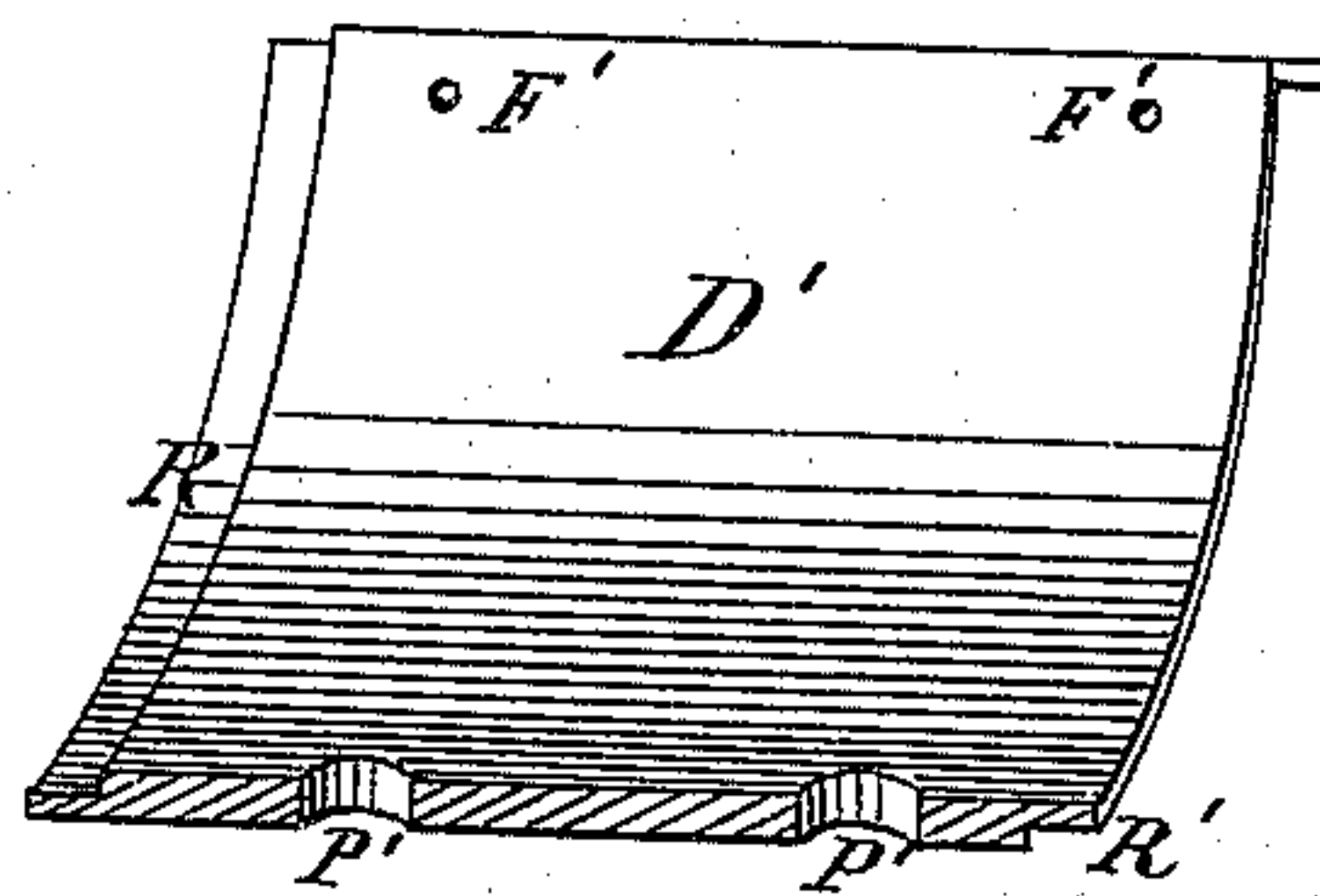


Fig 7.



Fig 5.

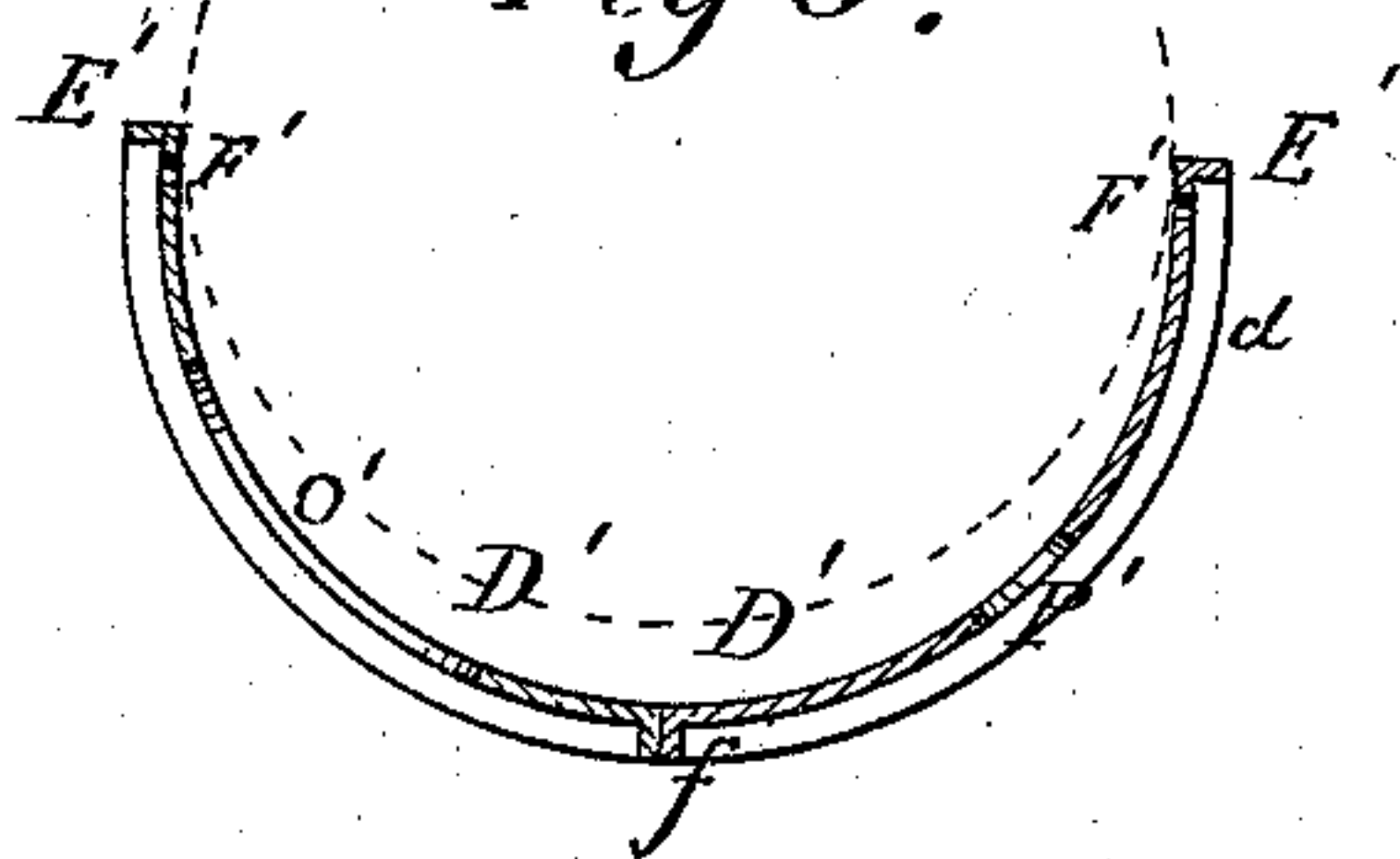


Fig 6.



Witnesses:
Jesse S. Turner
Mort. M. Leggett.

Inventor:
Chas. D. Smith

UNITED STATES PATENT OFFICE.

CHARLES D. SMITH, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN FURNACES FOR STEAM-BOILERS.

Specification forming part of Letters Patent No. **138,588**, dated May 6, 1873; application filed March 11, 1873.

To all whom it may concern:

Be it known that I, CHARLES D. SMITH, of Chicago, Illinois, have invented certain Improvements in Furnaces for Steam-Boilers, of which the following is a specification:

The first part of my invention relates to the improvement of combustion-chambers or ash-pits in furnaces for boilers by lining them with a substance of great radiating power, thereby throwing more heat toward the boiler and economizing fuel. The second and third parts relate to the regulation of draft of air which is introduced through the side walls of the furnace, which enables the operator to keep up an uninterrupted and perfect combustion of smoke and gases.

Figure 1 is a perspective view of a boiler-furnace improved with my radiator and draft-regulator. Fig. 2 is a top view of the radiator. Fig. 3 is a perspective view of a radiator composed of a number of plates. Fig. 4 is a longitudinal section of one of the plates of Fig. 3, showing the mode of jointing the same. Fig. 5 is a cross-section of the same plates. Fig. 6 is a cross-section of the radiator-plate, as shown in Fig. 1. Fig. 7 is a cap for closing the ash-hole.

A represents a furnace for a steam-boiler, made of brick, and having a semicircular flue or combustion-chamber, B, with fire-bridge C. A lining, D, made of iron or other metal, covers those parts of the chamber B which are exposed to the fire, and is kept in place by two angular flanges, E, which are inserted into the wall to the right and left; it may also be fastened by bolts F F. As the radiating power of iron or other metals is much greater than that of brick and cement, there is a great amount of heat gained, which brick and cement would absorb. As metals present a smoother surface than brick or cement, there is less friction to oppose the passage of gases, which otherwise would have to be enforced by larger fire.

The combustion or side draft is effected by tubes G G embedded in the walls A, and by preference fastened to a plate, H, upon which another plate, I, is fastened with the aid of slots K K and thumb-screws L L, in such a manner as to permit it to slide longitudinally,

for which purpose it is provided with a handle, N. The said plate I is also provided with holes corresponding in number, size, and distances with those of the tubes G G, so they may be all opened or shut together.

The tubes G G extend some distance into the combustion-chamber or flue B, thereby conducting fresh air where it is most needed—that is to say, in the central current. The radiator-plate D is provided with slots O O, or other suitable openings, P P, for the admission of the tubes G G; there is also an opening, Q, to drop soot and ashes through, for the purpose of cleaning.

For furnaces of large dimensions I propose to make the radiator of sections D' D', provided with flanges E', and f, to fit into a central groove, f', in the combustion-chamber of flue B.

To prevent any unequal settling of the sections D' I provide them with male and female steps R and R', to match and form a smooth joint.

I do not confine myself to the use of a sliding plate, I, for regulating the side draft through the tubes G G, because there are equivalent means to serve the same purpose, as, for instance, swinging or sliding doors, caps, valves, &c.

I claim as my invention—

1. A regulator or register for governing the amount of air necessary to be admitted into the flue, ash-pit, or combustion-chamber to insure good combustion of fuel, gas, and smoke, in combination with pipes or tubes, substantially as described.

2. The metallic lining of a furnace, ash-pit, or combustion-chamber, in combination with pipes for the admission of air between lining and boiler, constructed and arranged substantially as shown and described.

3. A metal lining resting directly upon the masonry of a boiler-furnace, ash-pit, or combustion-chamber beneath the boiler, arranged and constructed substantially as shown and described.

CHAS. D. SMITH.

Witnesses:

JAMES S. GRINNELL,
MORT. M. LEGGETT.