

J. COWAN.  
Heating-Buildings.

No. 157,275.

Patented Dec. 1, 1874.

Fig. 1.

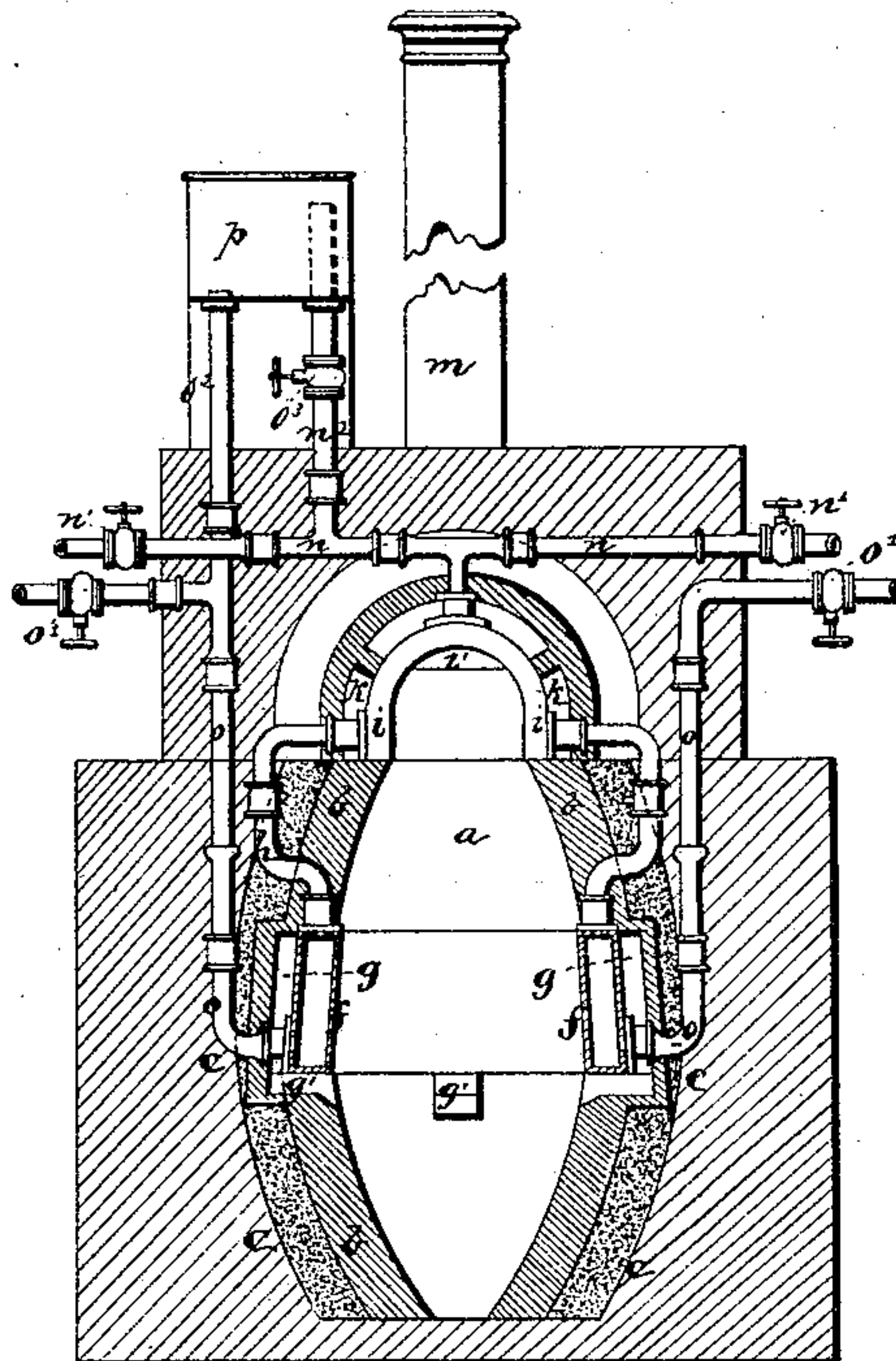
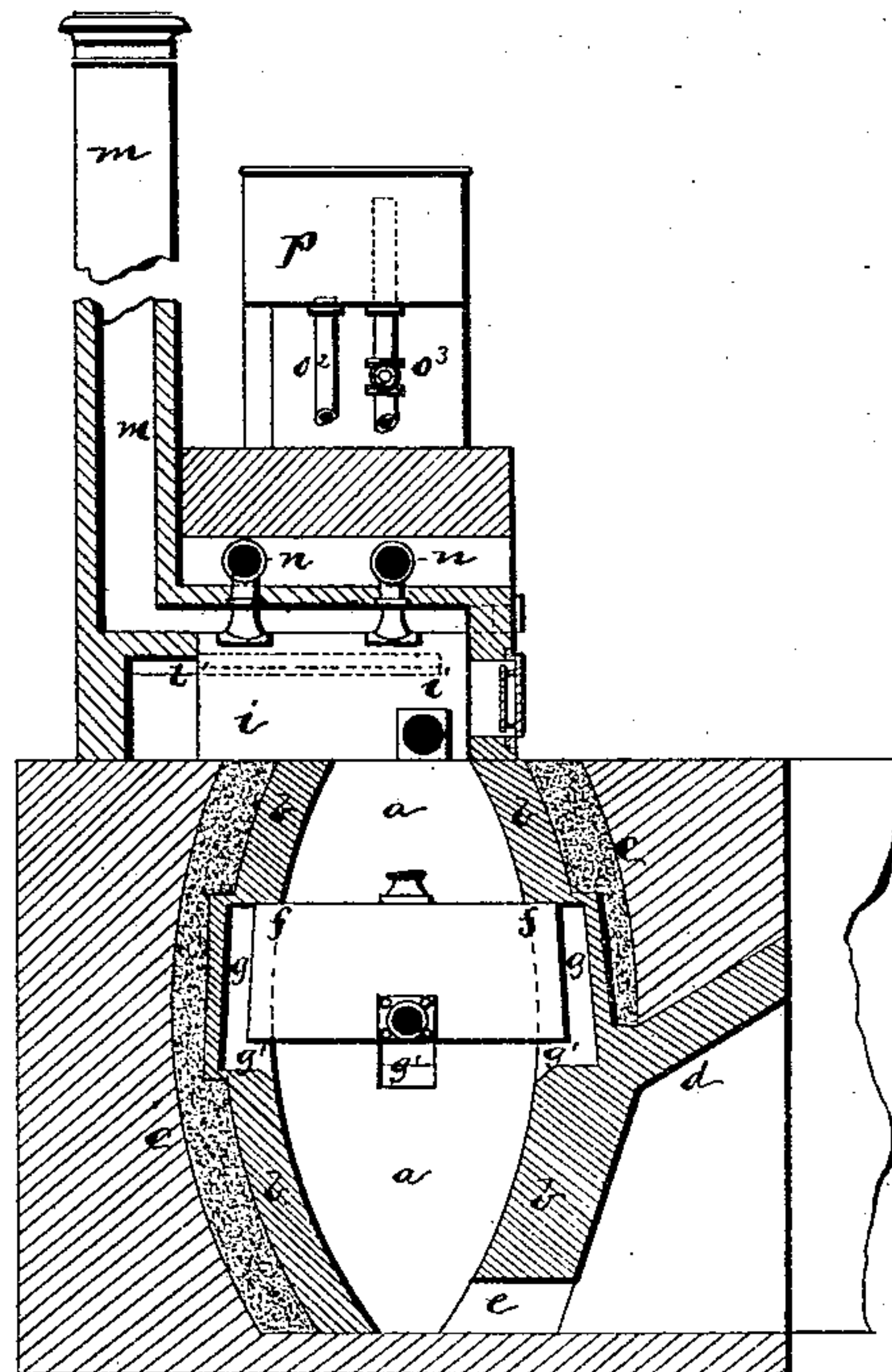


Fig. 2.



WITNESSES

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Attorneys.

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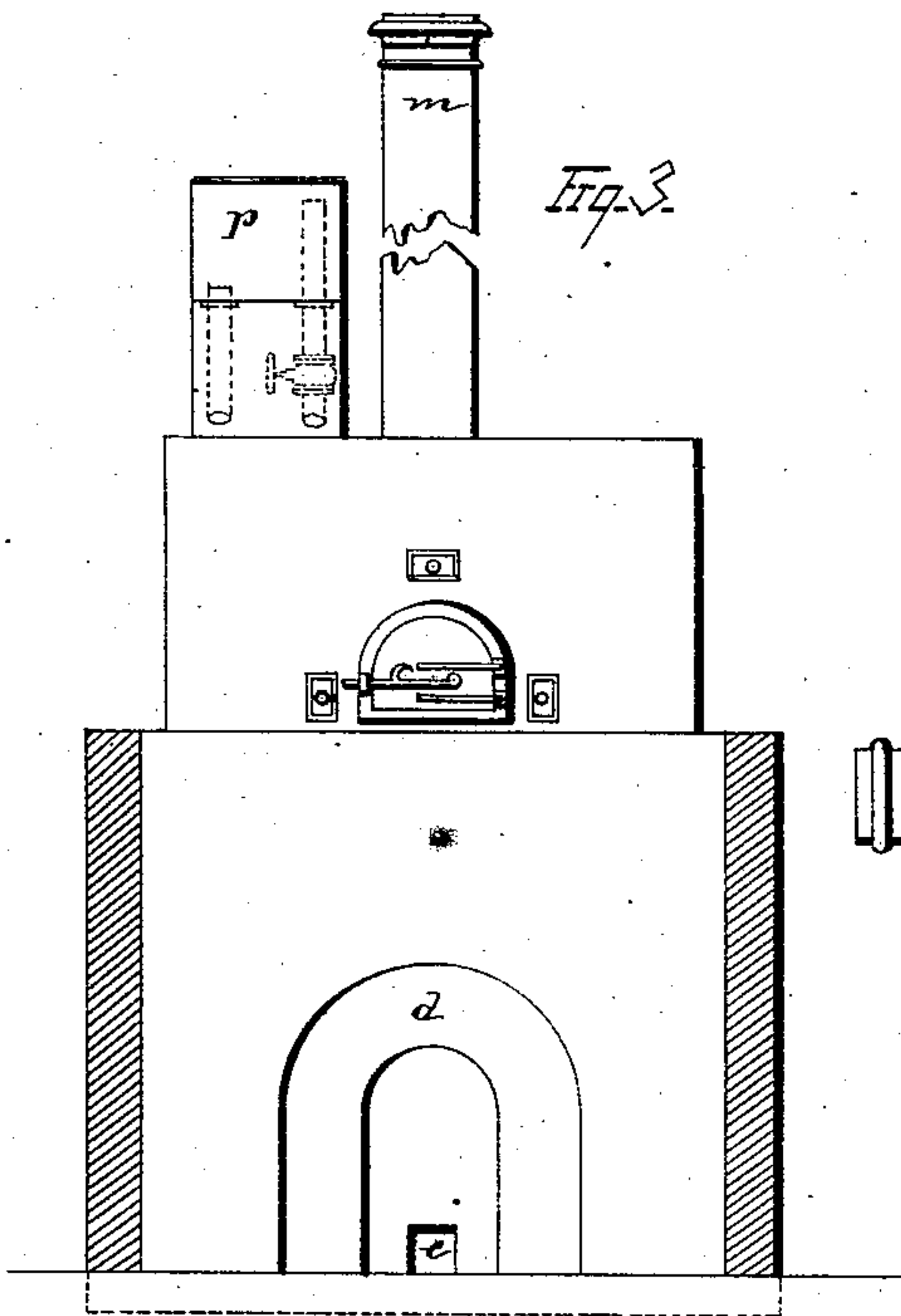


Fig. 3.

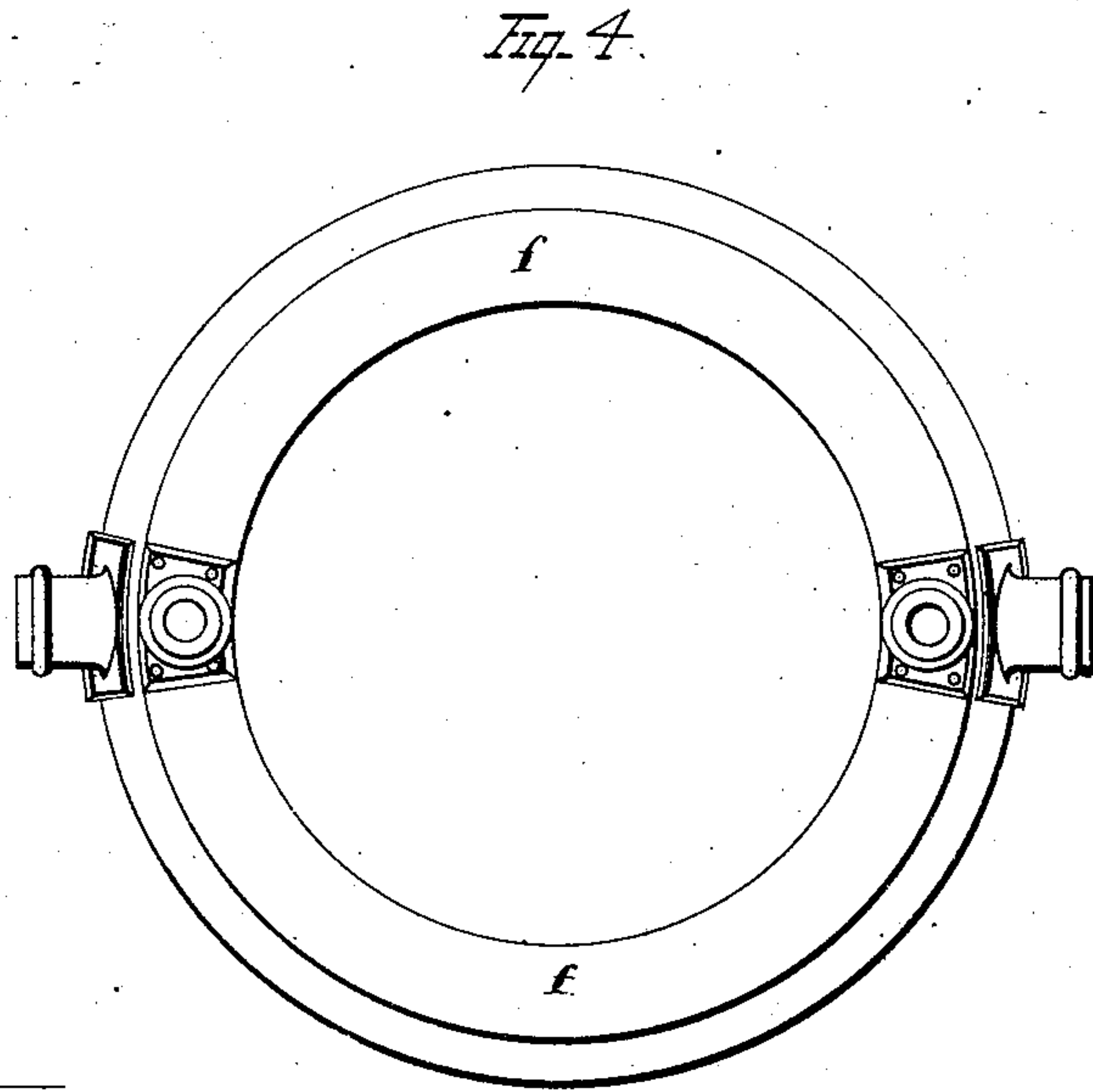


Fig. 4.

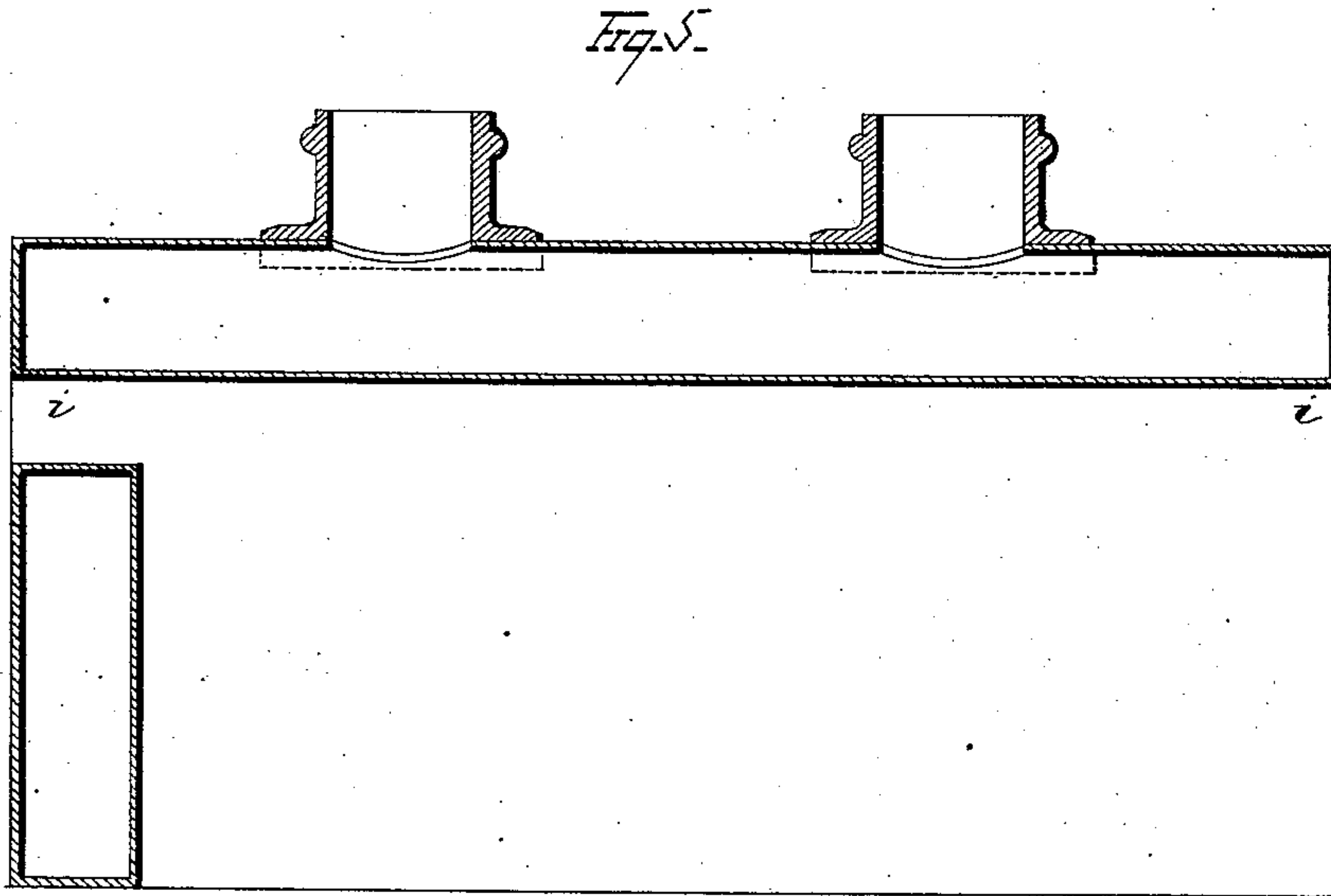


Fig. 5.

WITNESSES  
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# UNITED STATES PATENT OFFICE.

JOHN COWAN, OF DUBLIN, IRELAND.

## IMPROVEMENT IN HEATING BUILDINGS.

Specification forming part of Letters Patent No. **157,275**, dated December 1, 1874; application filed October 2, 1874.

*To all whom it may concern:*

Be it known that I, JOHN COWAN, of Dublin, Ireland, in the Kingdom of Great Britain, have invented a new and Improved Means of Heating Horticultural and other Buildings; and declare the following to be such a full, clear, and exact description thereof as will enable others skilled in the art to which my invention relates to make and use the same, reference being had to the accompanying specification and drawings.

The object of my invention is the heating of horticultural and any other building, and the manufacture of lime at the same time and by the same process.

In order to accomplish this object I construct a small limekiln after the most approved and scientific principle, in which I place a boiler, of conical or other suitable form, at a point in the kiln which is ascertained to be most favorable. This boiler forms part of the kiln for calcining the lime, the remaining part being composed of brick, stone, or other suitable material.

In order to assist the burning of the lime, the inside of the boiler may be built with fire-bricks or iron plates perforated to admit of the heat passing through to the boiler.

On the top of the limekiln I place a second boiler, of saddle or other convenient form, which completely envelops the mouth of the kiln, and thus utilizes the heat given off in the burning of the lime. I then connect the two boilers together by means of suitable pipes, so as to maintain a thorough circulation between the two boilers. I then conduct pipes from the boiler round the buildings which are to be heated, which pipes are connected to the bottom of lower boiler and the upper one. The heated water then passes out at the highest pipes and round the houses to be warmed, and returns by the lower ones, or vice versa. The mouth of the upper boiler is fitted with a door, by which the kiln is fed, and the boiler is inclosed with bricks or other suitable materials, forming flues, through which the smoke, gases, and other products of combustion are led from the kiln round the exterior of the boiler before escaping into the chimney.

In order that the manufacture of lime may

be carried on when the houses attached to my apparatus are not required to be heated, I place a tank or cistern at a convenient distance from the boiler. To this tank or cistern I connect two pipes, which lead the water from the boiler to the building to be heated, and back; then, by shutting the valves in the pipes leading to the building to be heated, and opening those in the pipes leading to the tank or cistern, a proper circulation is maintained in the boilers, and by this arrangement the building can be kept either cool or hot at pleasure, without interrupting the process of the manufacture of lime.

Figures 1 and 2 are vertical sections, and Fig. 3 is a front elevation, of the apparatus arranged according to my invention.

*a a* is the chamber of a limekiln. It is sunk in the ground, and is circular in horizontal section. *b* is the containing-wall of the chamber of a limekiln. It is built of fire-brick or stone, with a backing, *c*, of sand, and outside this there is a filling of rough broken stone or other materials arranged in a cubical form. *d* is an arched recess giving access to the drawing and lighting hole *e* at the foot of the chamber *a*. So far the kiln is similar to that described in specification of a former English patent granted to me, and dated the 11th day of February, in the present year, No. 500; but now I set in the wall *b* a boiler, *f*, which is shown also in plan at Fig. 4. This boiler is annular, and its inner circumference forms a portion of the side or wall of the chamber of the kiln. Behind the boiler *f* is an air-space, *g*, into which the heated products of combustion are able to pass by the openings *g* from the chamber of the kiln, and so to impart heat to the back of the boiler. The boiler *f* is connected by the pipes *h h* with the upper saddle-form boiler *i*, of which a longitudinal section is shown at Fig. 5. This boiler is set over the mouth of the kiln, as is described in the specification of my former patent. The kiln is fed at the arch-like opening at the front of the boiler, and doors are here provided, which at other times are closed. The heated products of combustion of the kiln rise beneath the boiler *i*, and pass out by the flue-passage *i*. They then enter the side flues *k*, and from thence pass over the top of the boiler. *n n*

are pipes, by which the hot water passes away from the boilers into the warming-pipes, which traverse the buildings to be heated, and the warming-pipes return into the pipes *o o*, which enter the boiler *f* near the bottom.

The size of the apparatus may be varied, and is competent to heat three thousand feet of four-inch piping.

When the heat is not required in the buildings it can be shut off without interfering with the lime-burning by closing the valves *n<sup>1</sup> n<sup>1</sup> o<sup>1</sup>* on the pipes *n* and *o*, respectively, and then the hot water from the boilers flows by the pipe *n<sup>2</sup>* into the cistern *p*, which is of a capacity to contain, say, one hundred gallons of water. The water returns from the cistern by a pipe, *o<sup>2</sup>*, into the pipe *o*, and so to the boilers. When the circulation is required to be through the warming-pipes the valve *o<sup>3</sup>* is closed.

I do not here lay any claim to the boiler located at the top of the kiln, in combination

with the kiln, as that feature is claimed in the application for Letters Patent filed by me for a similar invention, June 11, 1873.

Having thus described the nature of my said invention, and the manner in which it is to be performed, I claim—

1. The means for heating horticultural and other buildings, consisting in the combination, with a limekiln, of a boiler or boilers embraced within the walls of and forming a part of the kiln, and circulating-pipes leading therefrom to the apartments to be warmed, substantially as described.

2. The combination, with a limekiln, *a*, and boiler *f*, of the tank or cistern *p*, circulating-pipes *o*, and suitable valves for diverting the heat, substantially as and for the purposes set forth.

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Witnesses:

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C. L. REHN.