

D. SULLIVAN.

Steam-Boiler for Heating.

No. 126,163.

Patented April 30, 1872.

Fig. 1.

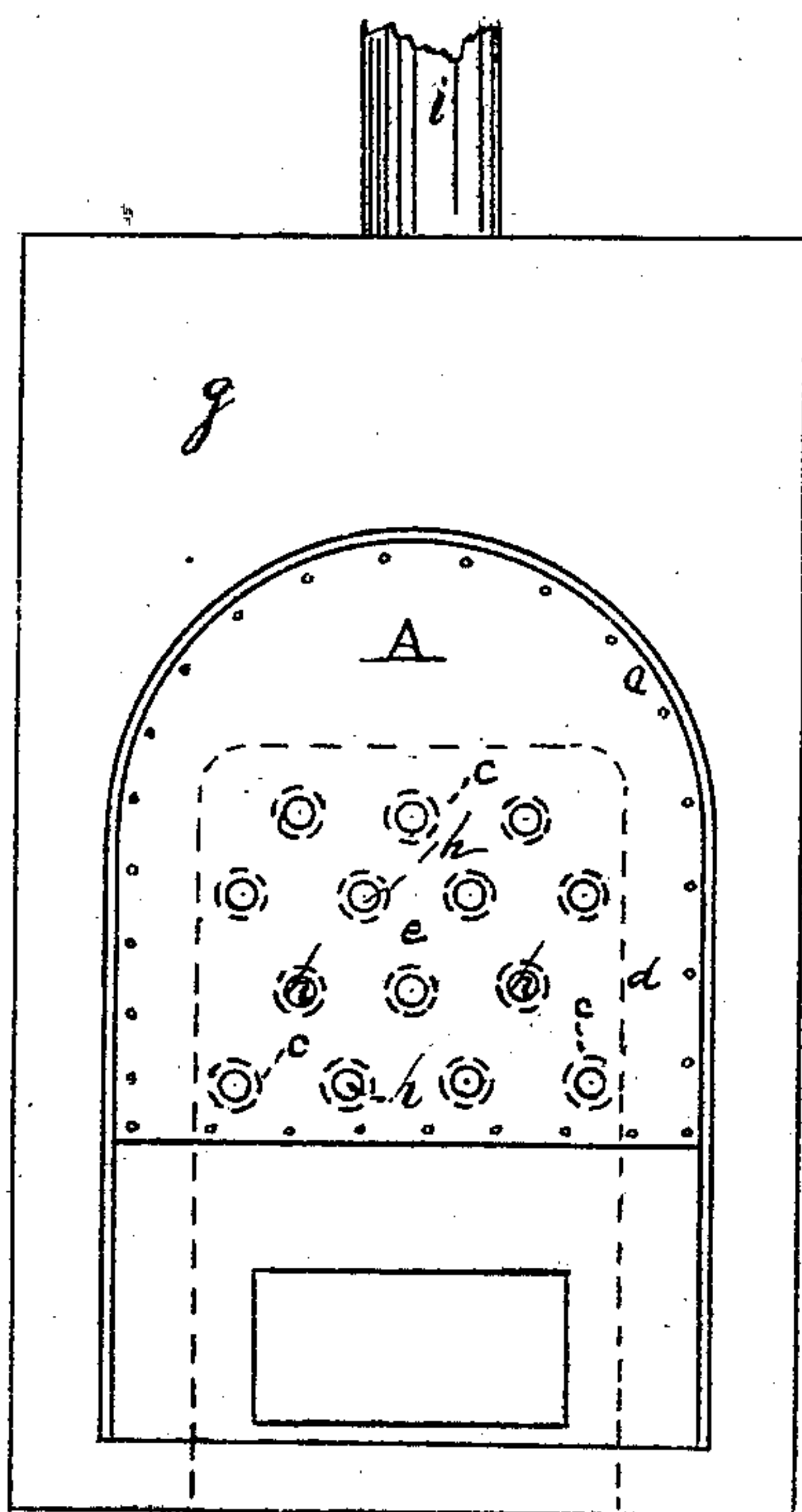
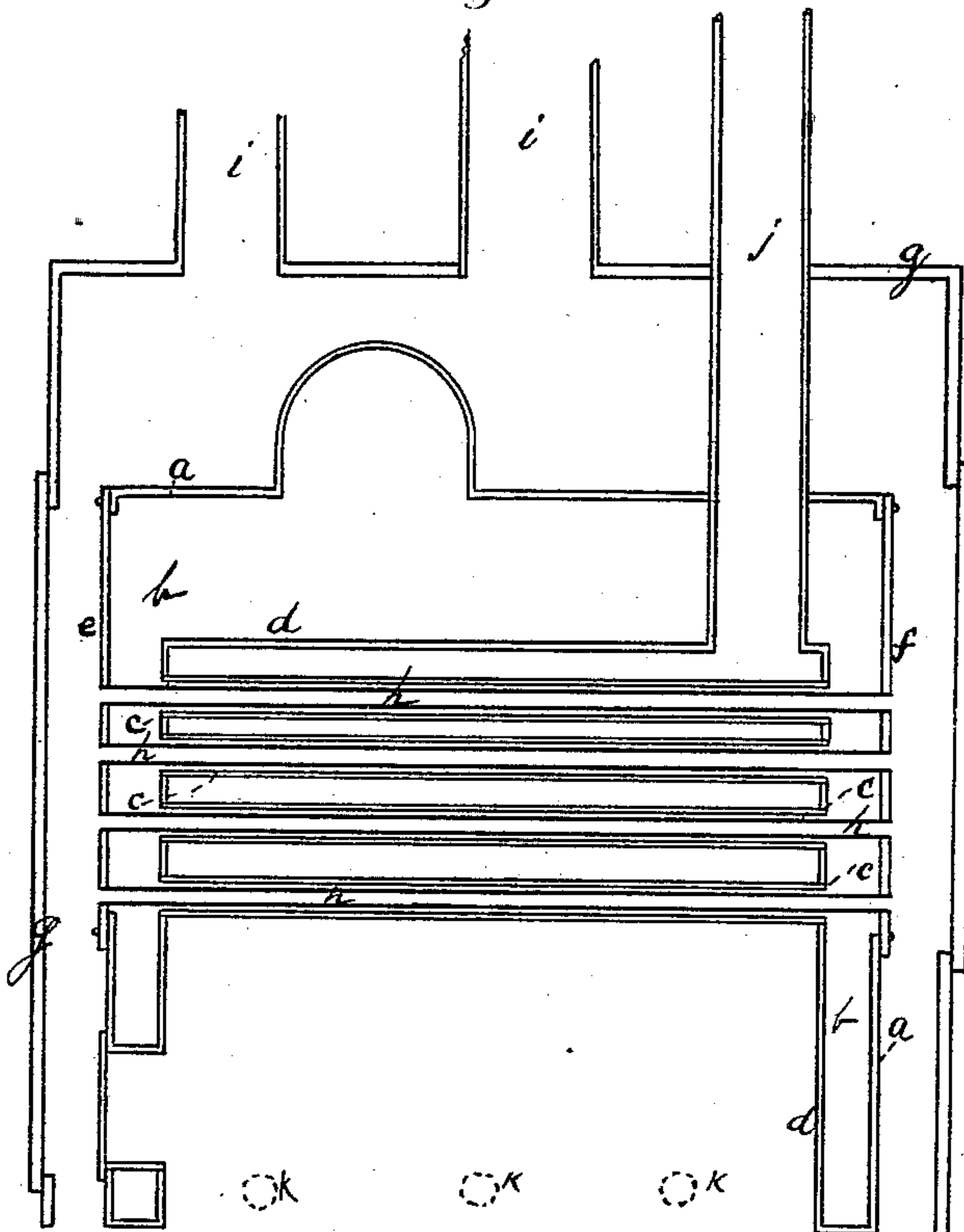


Fig. 2.



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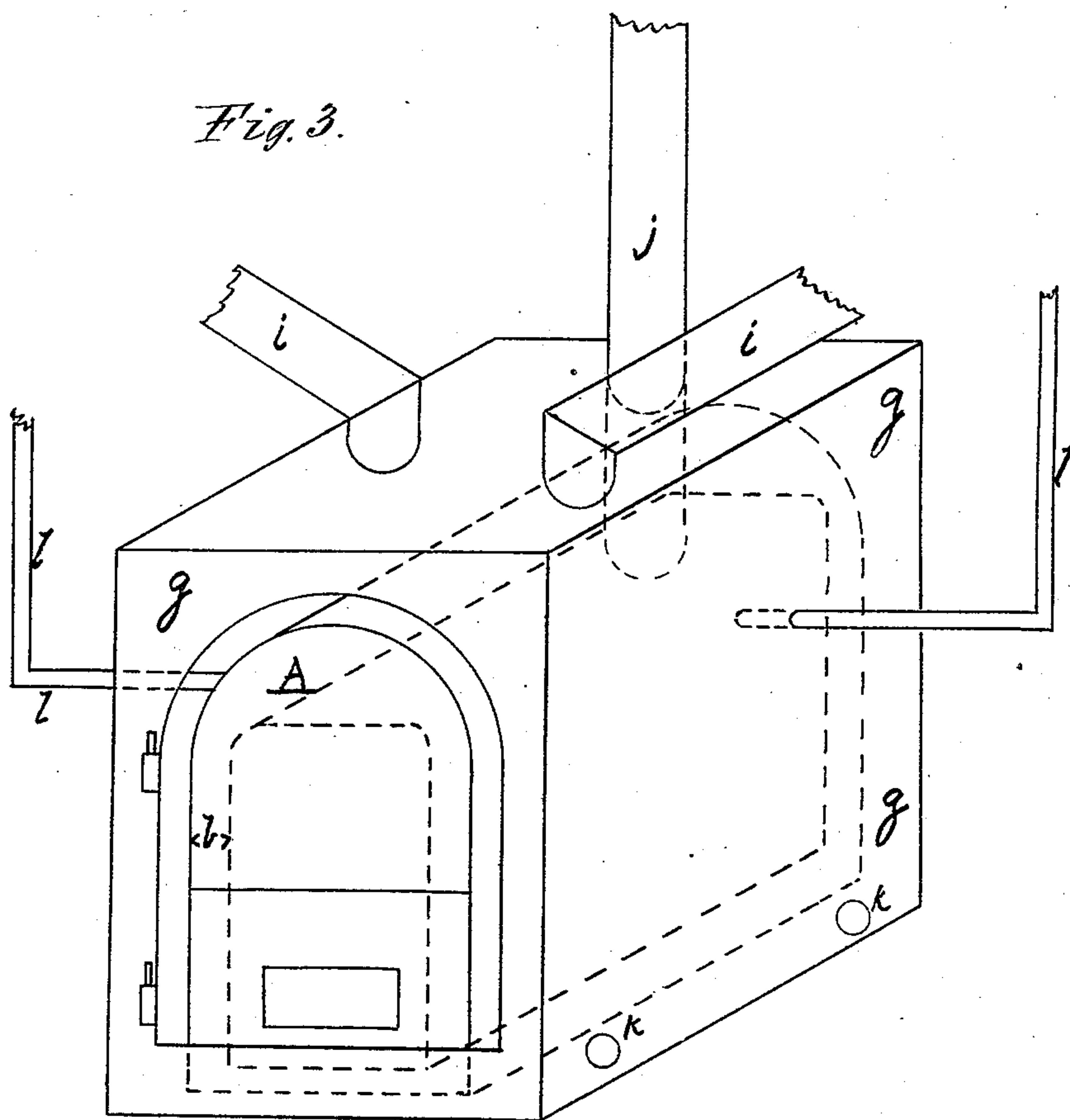
Inventor
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Steam-Boiler for Heating.

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UNITED STATES PATENT OFFICE.

DANIEL SULLIVAN, OF BANGOR, MAINE.

IMPROVEMENT IN STEAM-BOILERS FOR HEATING BY HOT AIR AND STEAM.

Specification forming part of Letters Patent No. 126,163, dated April 30, 1872.

To all whom it may concern:

Be it known that I, DANIEL SULLIVAN, of Bangor, in the county of Penobscot and State of Maine, have invented a new and useful Improvement in Steam-Boilers; and I hereby declare the following to be a full, clear, and exact description of the same, which will enable others to make and use my invention, reference being had to the accompanying drawing forming part of this specification, in which—

Figure 1 shows a face view of same; Fig. 2, a section; Fig. 3, Plate 2, a perspective view of my invention.

Same letters show like parts.

My invention is designed to increase the heating power of steam-boilers when applied to heating purposes, and is intended more particularly as an improvement on the boiler described in Patent No. 114,876, granted to me May 16, 1871, though it is capable of use in others of similar construction.

In the drawing, A shows the boiler; *a*, the outer cylinder or shell; *b*, the water-space; *c*, the water-tubes; *d*, the inner cylinder; and *e* and *f*, the removable front and back plates, as set forth in the patent above referred to, to which attention is called.

My invention aims at utilizing the caloric as well as the steam made by the boiler. For this purpose I surround the boiler A, which is provided with the usual pipes for conducting steam through the building, with a casing, *g*, leaving a space of a foot, more or less, between them. This casing may be constructed of brick, wood, or other convenient material, and provided with suitable openings for tending the boiler, admitting cool air, and conducting the same, when heated, to the apartments to be warmed, by steam-pipes connected with the boiler in the usual manner.

To increase the amount of hot air I provide air-tubes *h*, passing through the water-tubes *c*, through the water-space *b*, and secured, by means of thimbles or other suitable device, to the removable plates *e f*. These tubes *h* are enough smaller than the water-tubes *c* to permit the water and steam to surround them, and are open at both ends. The cool air, passing through them the whole length of the boiler, becomes heated, and its escape being prevented by the casing *g*, it rises through the

conductors *i* to the rooms to be warmed. Thus, the hot air, as well as the steam from the boiler being utilized, a much smaller boiler may be used, my invention enabling the halls or lower story of a house to be heated by hot air as if by an ordinary furnace, while the steam may be carried to the chambers. When the face or back plates of the boiler are to be removed for repairs, the thimbles may be driven out of the tubes *h* at one end, and they may then be drawn out.

j shows the smoke-stack of the boiler. The steam-pipes are of the kind ordinarily used in all steam boilers and heaters, and are shown at *l* in the drawing, Fig. 3, Plate 2.

I do not claim hot-air tubes running through water-spaces, as shown in the patent of G. F. Burkhardt October 10, 1871; neither do I claim air-tubes surrounded by a steam-pipe, as shown in the radiator patented by J. L. Winslow February 7, 1871; nor do I claim, broadly, air-tubes passing through a water-boiler, as seen in the patent of Hazen Mooers for a hot-air furnace. My invention differs from all these. It relates to that class of tubular boilers in which the tubes are filled with water, and is designed to enable buildings to be heated by both steam and hot air, used independently of each other, but both generated by the same heating apparatus.

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

1. The combination, in a tubular boiler substantially of the construction above described, of the water-tubes *c* and hot-air tubes *h* running through the same, and connecting with a hot-air space formed by a casing, *g*, surrounding the boiler proper, substantially as herein specified.

2. The combination of a steam-boiler, provided with the ordinary steam-pipes *l* for conducting the steam through the building, with an outer casing, *g*, and hot-air conductors, *i*, so arranged as to enable the steam generated by the boiler and the caloric from the fire to be used, independently of each other, for heating purposes, substantially as specified.

DANIEL SULLIVAN.

Witnesses:

WM. FRANKLIN SEAVEY,
JOHN WILLIAMS.