

No. 780,982.

PATENTED JAN. 31, 1905.

J. M. DASHIELL.  
FEED WATER HEATER.  
APPLICATION FILED OCT. 6, 1904.

2 SHEETS—SHEET 1.

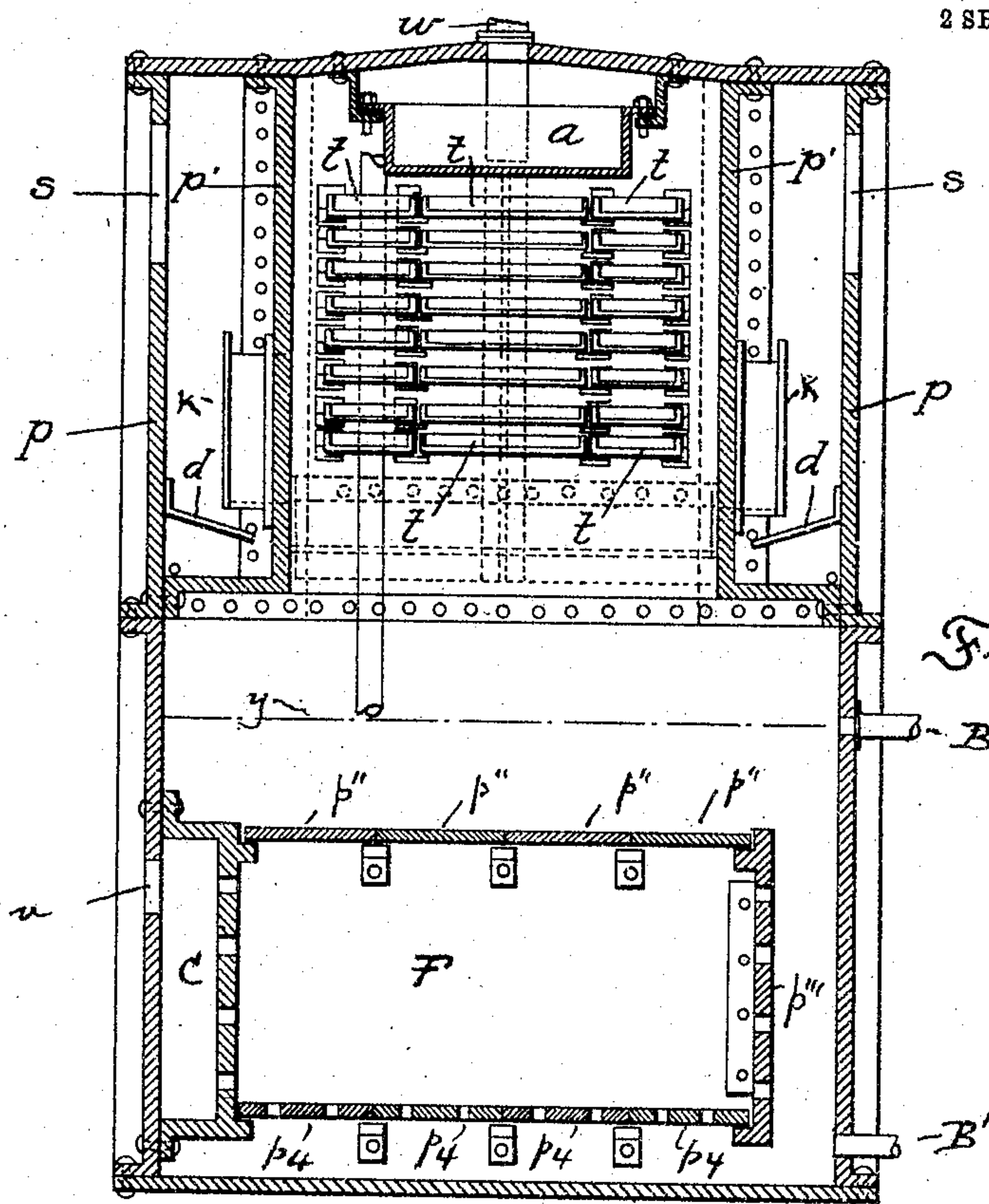


Fig. 1.

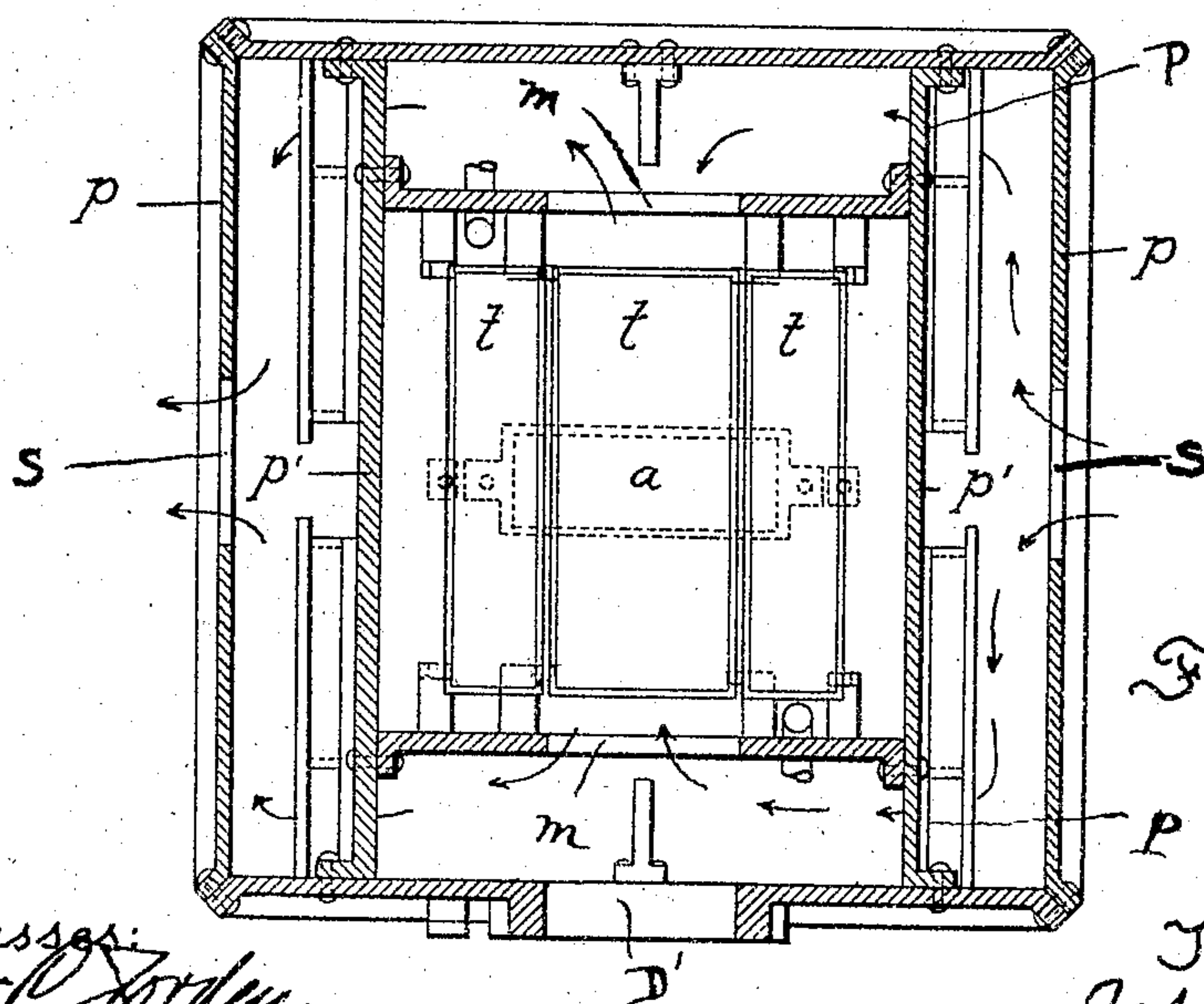


Fig. 2.

Witnesses:  
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Inventor:  
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2 SHEETS—SHEET 2.

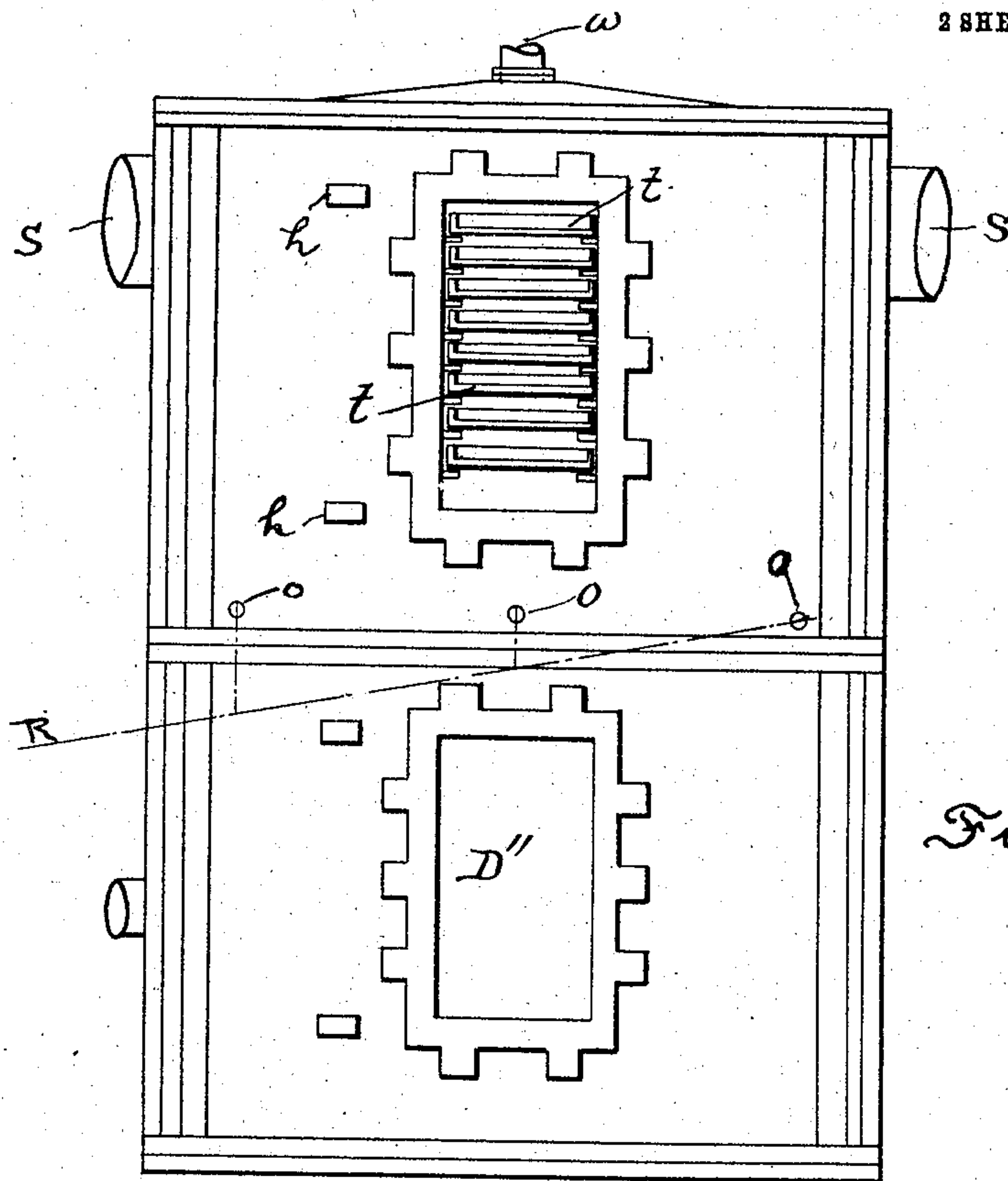


Fig. 3.

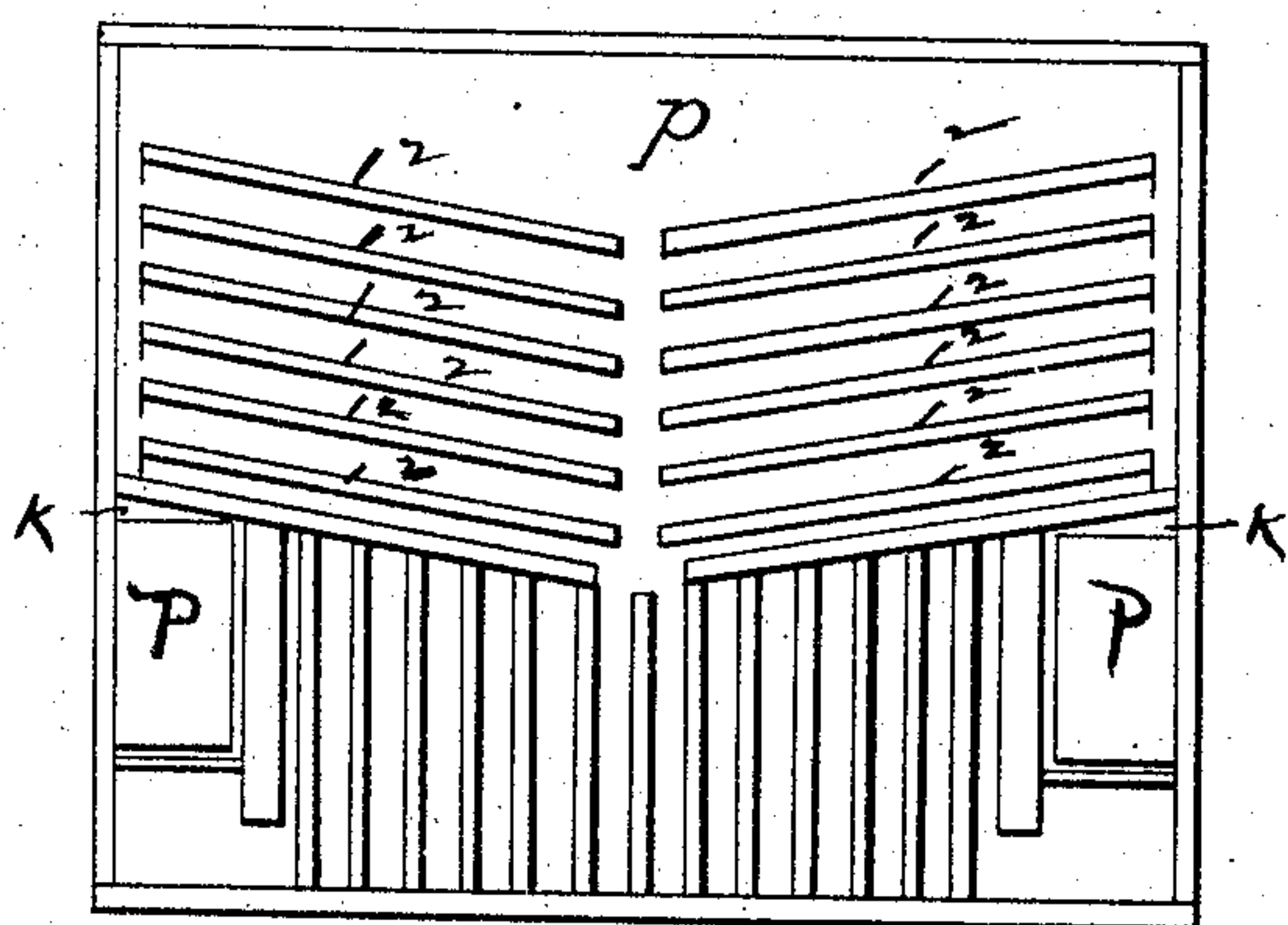


Fig. 4.

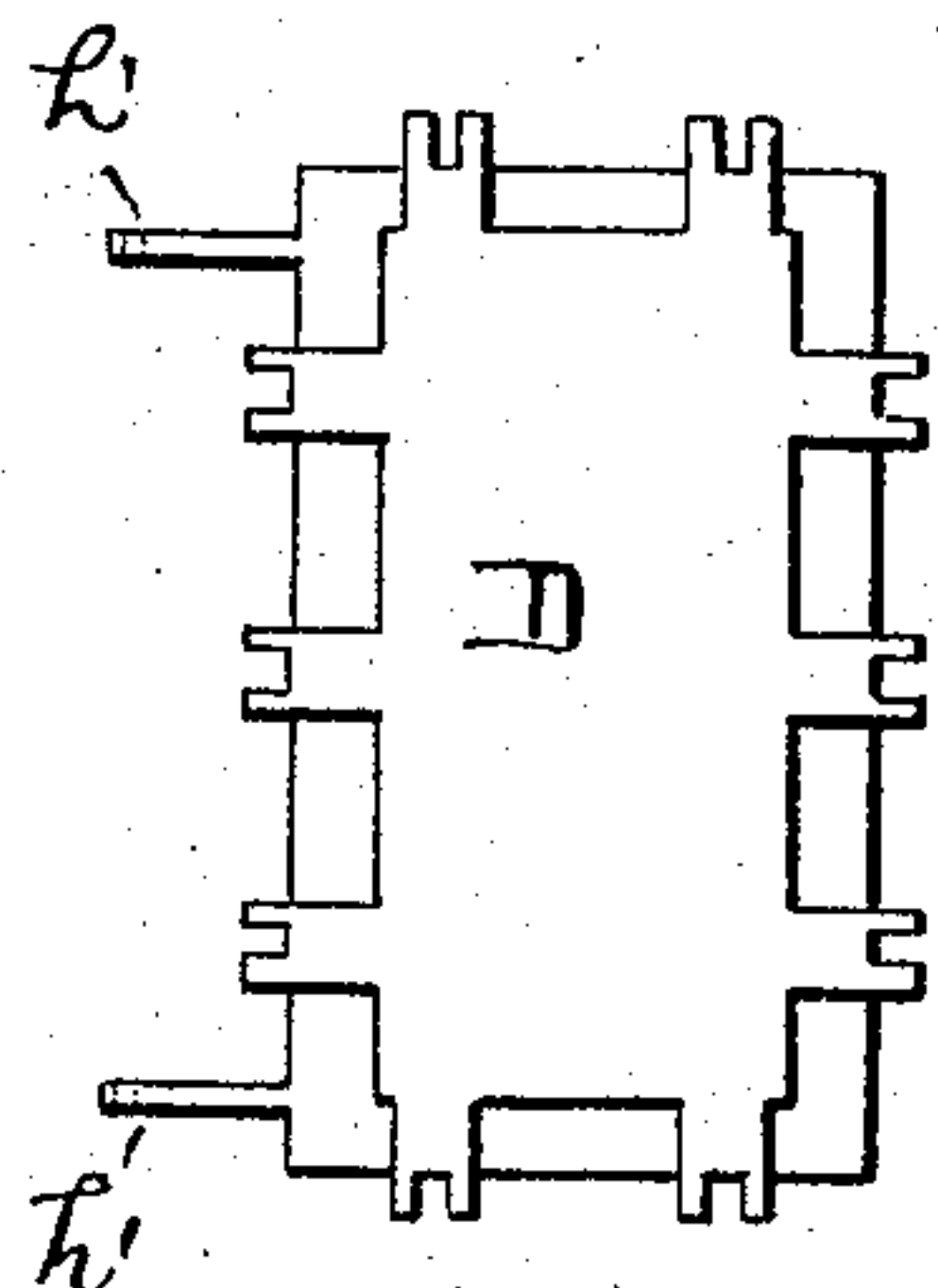


Fig. 5.

2 Witnesses:  
*W. L. Miller*  
*F. J. Russell*

Inventor:  
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## UNITED STATES PATENT OFFICE.

JULIUS M. DASHIELL, OF PHILADELPHIA, PENNSYLVANIA.

## FEED-WATER HEATER.

SPECIFICATION forming part of Letters Patent No. 780,982, dated January 31, 1905.

Application filed October 6, 1904. Serial No. 227,476.

*To all whom it may concern:*

Be it known that I, JULIUS M. DASHIELL, a citizen of the United States, residing at Philadelphia, Pennsylvania, have invented a new and useful Improvement in Feed-Water Heaters, of which the following is a specification.

My invention relates to that type of feed-water heaters which is known on the market as the "open" type—*i. e.*, in which the steam and cold water come in direct contact—and not to that type of heater in which the steam and water are separated by some metallic surface, such as pipes or tubes.

In the general form of open heaters all of the steam is carried through the heater, the cold water in the heater condensing only a certain amount of the steam, the surplus steam passing out of the heater for other uses. In other words, such heaters are a thoroughfare for all of the steam. There is another type of open heater, commonly known as the "dead-end" heater, in which there is no exit supplied on the heater for steam which has once entered same, the heater through the cold water contained therein drawing its supply of steam from the main line of piping, resulting in more or less "air-binding" in the heater.

The purpose of my invention is to eliminate as far as possible the objections which are found to exist with these types of open heaters and to furnish in one apparatus the feed-water heater which is incapable of becoming "air-bound" and which is not open to the objection of its being a thoroughfare for the steam.

Referring to the accompanying drawings, Figure 1 represents a vertical section of the heater. Fig. 2 represents a horizontal section of the heater. Fig. 3 represents a front elevation of the heater. Fig. 4 represents a side of the heating-chamber, and Fig. 5 is an elevation of the door through which access is had to the interior of the heater.

Similar characters refer to similar parts throughout the several views.

In the drawings, *p* is the outside casing, provided with steam-inlet and steam-outlet *s*. This outer casing is bolted to the top of the heater and also to the lower half of the heater,

as clearly shown in the drawings. Within this outer casing there is provided an inner chamber, which comprises the heating-chamber and is formed by the plates *p'*, which are also bolted to the top of the heater and to the outer casing, as shown in Figs. 1 and 2. A detail of this plate is shown in Fig. 4. It has cast on it ribs, as shown in Fig. 4, and is provided with ports or openings *P P*. These ports are provided with hoods *k*, as shown in Figs. 1 and 4. The object of these ribs, ports, and hoods will be fully understood in the description of the operation of the heater later on in this specification.

The top of the heater is made of plating, as shown, and provided with an opening for the reception of piping *w*, through which water is introduced into the heater. Suitably supported to the top of the heater and situated within the heating-chamber is a trough *a*, into which the water flows after entering the heater. This trough is situated above the heating-trays *t t*, which are supported within the heating-chamber in any suitable manner. In the drawings these trays are shown supported by angles bolted to the casing of the heating-chamber.

As seen in Fig. 2, the heating-chamber walls or plates adjacent to the steam-inlet and steam-outlet are provided with openings *m m*. These openings are slightly wider than the widest heating-tray, so that this largest of the three trays may be slipped out through the opening toward the front of the heater and through the door-opening *D'*. The remaining smaller trays may be then removed in the same manner in cases where it is desired to clean same. The openings *m m* and the opening *D'* are of the same width and have the same vertical dimensions, which latter is the distance from the top of the upper tray to the bottom of the port *P*.

I have shown on the drawings aprons *d*, bolted to the outer casing and extending along the walls of the inner casing immediately below the ports *P*. Their use will be explained later.

In Fig. 3 the heater is shown with the door *D* removed, so that the trays are visible.



There are lugs cast on the heater, to which the door D is properly hinged. These lugs are represented by *h*.

While my invention relates solely to the heating part of the heater, I have shown secured to the outer casing a suitable water and filter chamber. The dotted line *y* shows a high-water level, and B and B' show, respectively, the overflow and bottom drain from heater. Within the space F there is disposed a filter of any suitable material. The opening *u* is the pump-suction through which the water is drawn from the heater after passing through the filter by means of the pump which may supply the boiler. I have shown the filter provided with plates above and below suitably perforated. These plates are of such width that they may be removed from the heater through the opening D<sup>2</sup>.

C is a water-chamber adjacent to the pump-suction *u*.

I do not claim that my invention relates to any particular form of water chamber or filter, as I propose to use any well-known and most adaptable form of same to which I may be entitled, although I have shown the water-chamber just described.

The operation is as follows: The steam which is used for heating the water enters either one of the openings *s s* in the outer chamber, strikes the side *p'* of the inner or heating chamber, deposits its oil (if the steam used is exhaust-steam) upon the ribs 2, passes down and to each side of the plate *p'* through the ports P, thence around the casing of the inner chamber, and then out of the opposite opening in the outer casing, as shown by the arrows, Fig. 2. The cold water *w* after being conducted to the trough *a* overflows onto the trays *t t t* and thence to the water-chamber below. The cold water trickling over the trays draws into the heating-chamber only so much of the steam as can be condensed by that quantity of water. The surplus steam—*i. e.*, that which is not drawn into the heating-cham-

ber—passes by same and out of the heater, as shown by the arrows. It will thus be seen that there is no chance for air-binding in the heating-chamber and that the surplus steam cannot become saturated with water, as is the case where the heating-chamber is a thoroughfare for the steam.

After the exhaust-steam strikes the plate *p'* of the heating-chamber and deposits its oil on the ribs 2 the oil flows down into the receptacle formed by the plates of the inner and outer chamber and is drained off through openings *o o* and pipe R, as indicated in Fig. 3. The hood *h* is formed about the ports P in order that the steam in passage may not swash oil through the ports and carry same with it into the heating-chamber. The apron *a* is also provided to prevent the steam from licking up oil from the bottom of the chamber between the two casings.

I claim as my invention, and desire to secure by Letters Patent, the following:

A feed-water heater comprising a heating-chamber, an outer chamber entirely enveloping same and forming a passage for steam entirely around said heating-chamber, openings in the walls of the outer chamber for entrance and outlet of the steam and openings in the walls of the heating-chamber for the entrance of steam, a series of trays secured to the walls of the heating-chamber and disposed within said chamber, the walls of the heating-chamber being provided with means for separating the oil from the entering steam and suitable ports for the passage of the steam around the heating-chamber, all as described in specification.

In testimony whereof I have subscribed my name to this specification in the presence of two witnesses.

JULIUS M. DASHIELL.

Witnesses:

WM. L. JORDEN,  
F. J. RUSSELL.