

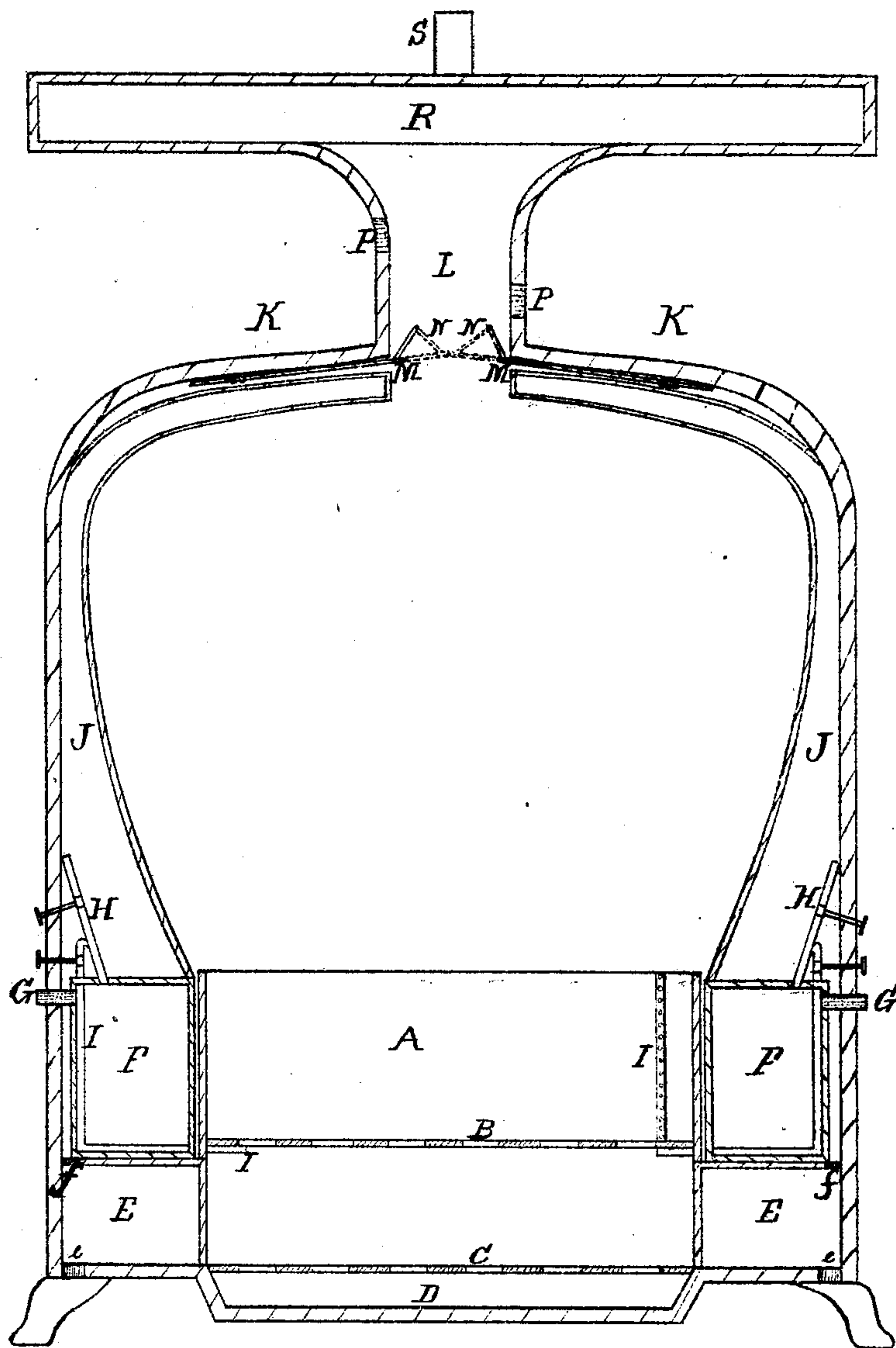
HENRY ZAHN.

Improvement in Heating Stoves.

No. 121,741.

Patented Dec. 12, 1871.

Fig. 1.



Witnesses:

Comr. Wright.  
Chas. A. Burt.

Inventor.

Henry Zahn,  
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Horace Binney, Esq.

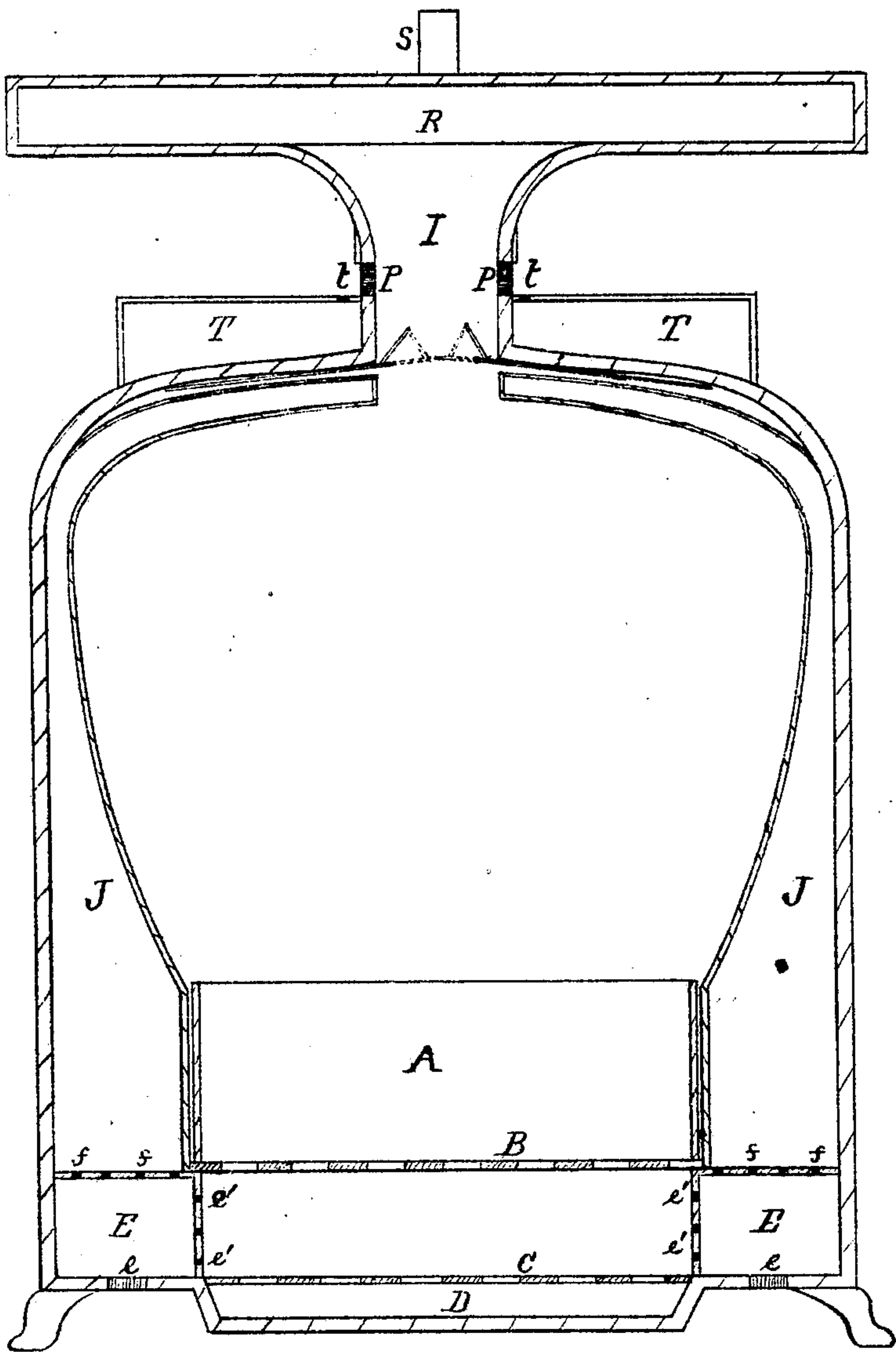
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Fig. 2.



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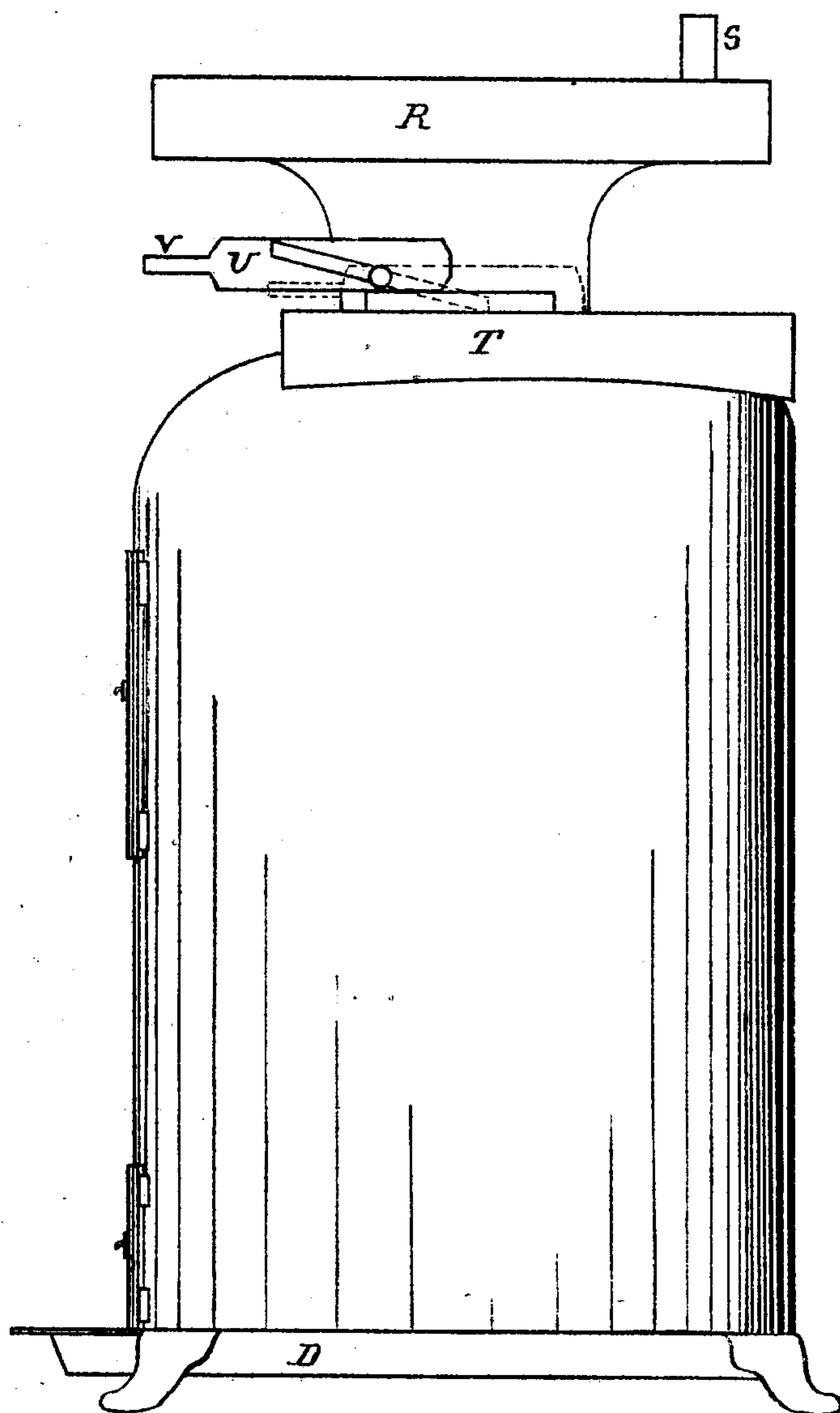
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Fig. 3.



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# UNITED STATES PATENT OFFICE.

HENRY ZAHN, OF PHILADELPHIA, PENNSYLVANIA.

## IMPROVEMENT IN HEATING-STOVES.

Specification forming part of Letters Patent No. 121,741, dated December 12, 1871.

*To all whom it may concern:*

Be it known that I, HENRY ZAHN, of the city and county of Philadelphia, in the State of Pennsylvania, have invented a new and useful Improvement in Furnaces and Stoves; and I do hereby declare the following to be a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use my improvement, reference being had to the accompanying drawing which forms a part of this specification, and in which—

Figure 1, Sheet 1, is a vertical section of my improvement; Fig. 2, Sheet 2, a vertical section of a modification thereof; and Fig. 3, Sheet 3, a side elevation of the last-named modification.

The same parts are denoted by the same letters in all the figures.

The nature of this invention consists in the arrangement hereinafter described of the parts of a stove or furnace whereby steam and air may be so admitted to the fire as to complete the combustion of the fuel.

A in the drawing represents the fire-chamber, upon the grate B of which the fire is made. C is the ash-grate, and D the ash-pan. E E are air-chambers, to which air is admitted through the apertures *e e*, and from which it escapes by the apertures *f f*. F F are boilers, provided with pipes G G, H H, and I I. G is a feed-pipe, through which the boiler is filled with water. H is a steam-pipe opening into the conduit J; and I is a steam-pipe opening under the fire-grate. There may be several of these pipes H and I attached to each boiler, and the pipes I may either terminate immediately under the grate-bars, as shown on the left-hand side of Fig. 1, or be carried up to the height of the fire-chambers and perforated, as shown on the right-hand side thereof. The pipes H and I may, if desired, be constructed with stop-cocks to regulate the steam-jets. The upper part of the conduits J J is curved, as shown in Fig. 1, so as nearly to correspond with the curve of the dome K, and the conduits open below the throat L of the furnace. M M are slides, connected to arms N N, so that by turning these arms (through the intervention of rods or in any convenient manner) the slides may be adjusted to open or close the throat L, and increase or diminish the draught, as may be desired. P P are apertures for the admission of air, one of which is higher than the

other. R is the radiator, and S the smoke-pipe opening into the chimney.

In the operation of this furnace, when steam has been generated in the boilers a jet escapes from each of the pipes I I into the fire, thereby intensifying the combustion. Another jet of steam escapes from each of the pipes H H and issues from the conduit J, intensifying the combustion in the upper part of the fire-chamber. The steam issuing from the conduits tends to drive the products of combustion down into the fire. The air which enters through the apertures P P contributes to this effect, driving both steam and products of combustion downward, and by making one of these apertures higher than the other the upper entering draught of cold air is caused to press on the lower draught, increasing the weight and force of the column by which the unconsumed products are returned to the fire to undergo more thorough combustion.

In the modification shown in Figs. 2 and 3 I dispense with the boilers F and construct the inner walls of the air-chambers E with perforations *e' e'*, through which the entering air passes under the grate-bars and upward into the fire. The air also passes up through the apertures *f f* into the conduits J J and mixes with the fire and products of combustion, thereby rendering the combustion more complete. Upon the dome I place a pan or boiler, T, constructed with perforations *t t*. The apertures P P may be on the same level and are provided with sliding covers U U, which may, if desired, be connected to a single handle, V, so that both apertures may be opened or closed simultaneously. The steam in this case issues from the perforations *t*, and, mixing with the draught of air, enters the throat of the furnace, where it not only forces the products of combustion down into the fire, but intensifies the combustion by supplying additional oxygen.

I do not confine my claim to the details of construction above shown and described, as they may obviously be varied without affecting the operation of the furnace. For example, the fan T, instead of being constructed as shown in Fig. 3, may extend completely around the furnace, and the boiler F may be constructed in like manner. The throat of the furnace may be round or polygonal, and may be made with any desired number of apertures or perforations, and these

closed and opened by a slide or other suitable means.

My invention may be applied to all sorts of furnaces, stoves, ranges, heaters, boilers for marine, stationary, or locomotive engines, &c.

If desired, steam may be admitted from the pan or boiler into a room so as to render the atmosphere moist.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. The apertures P P, arranged one above the other, and operating as described.

2. The arrangement of the radiator immediately above the throat of the furnace.

3. The combination, operating as described, of the boilers F, steam-pipes H, conduits J opening below the throat of the furnace, and apertures P' P above the said throat.

4. The dome-shaped conduits J, opening below and near the throat of the furnace and communicating with the external atmosphere, as shown and described.

5. The pan T, so arranged as to throw one or more jets of steam into the furnace above the throat.

Witnesses:

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