

J. FRIDLEY, Jr.
Hot-Air Furnaces.

No. 153,166.

Patented July 21, 1874.

Fig 1.

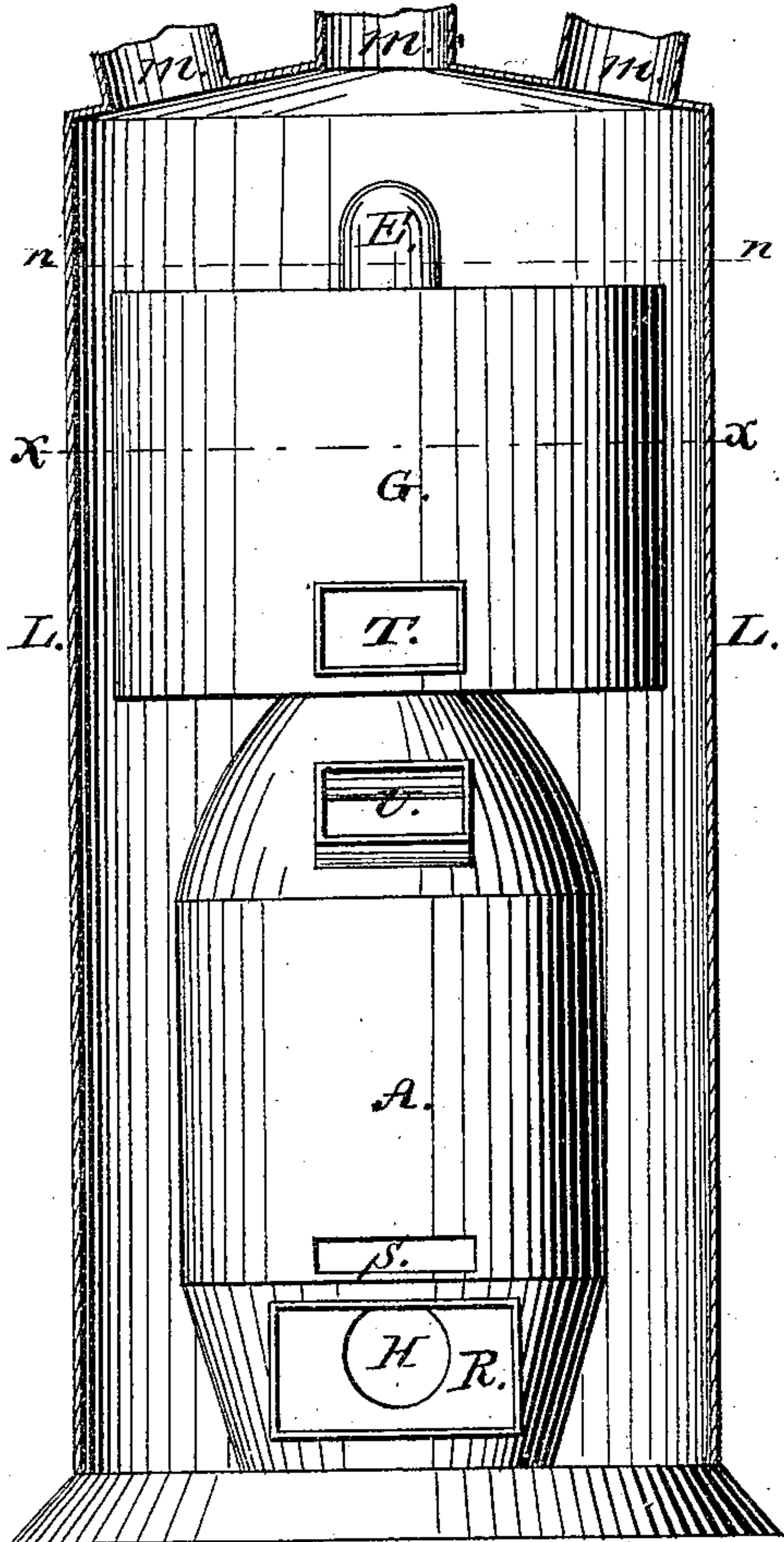


Fig 2.

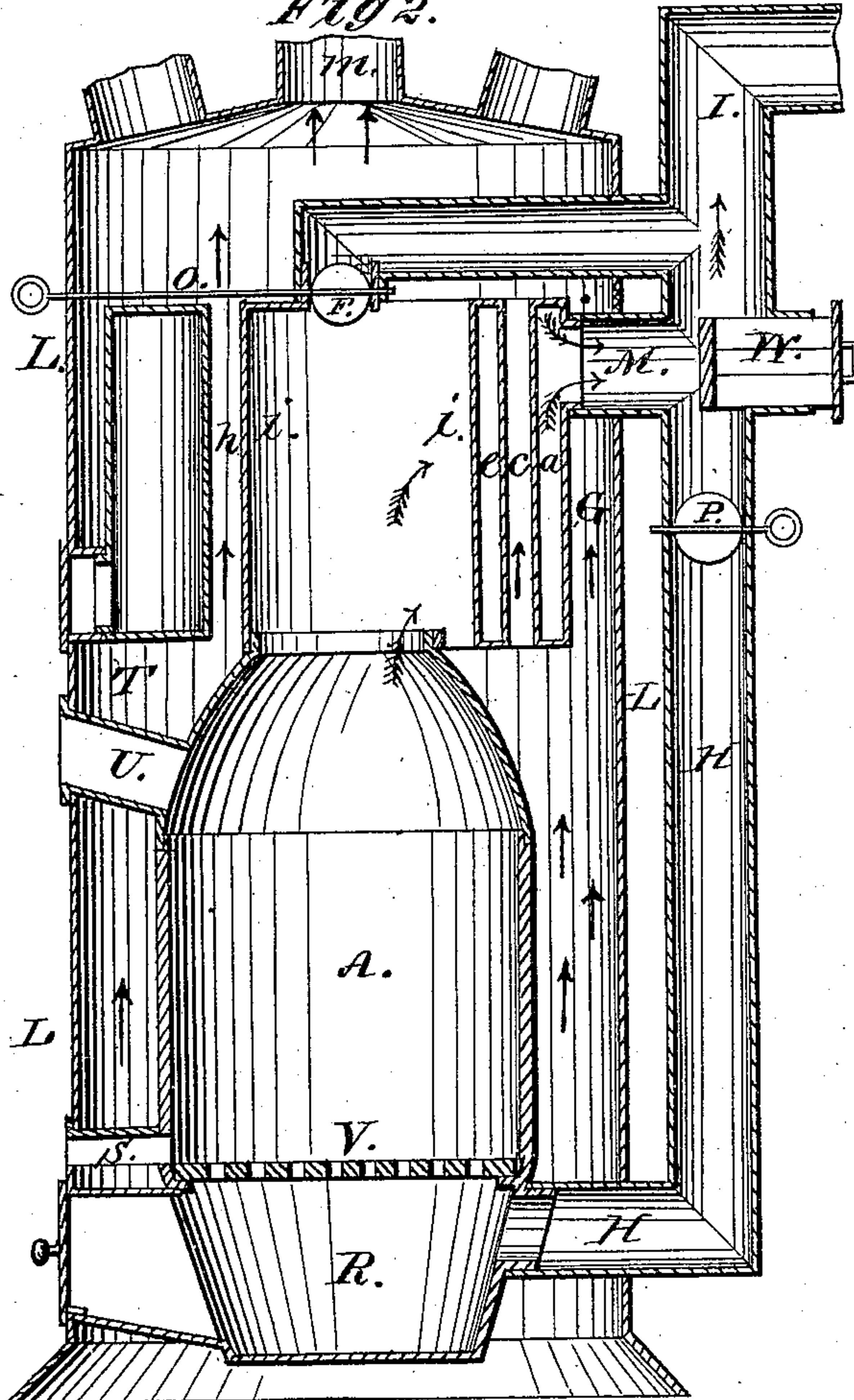


Fig 3.

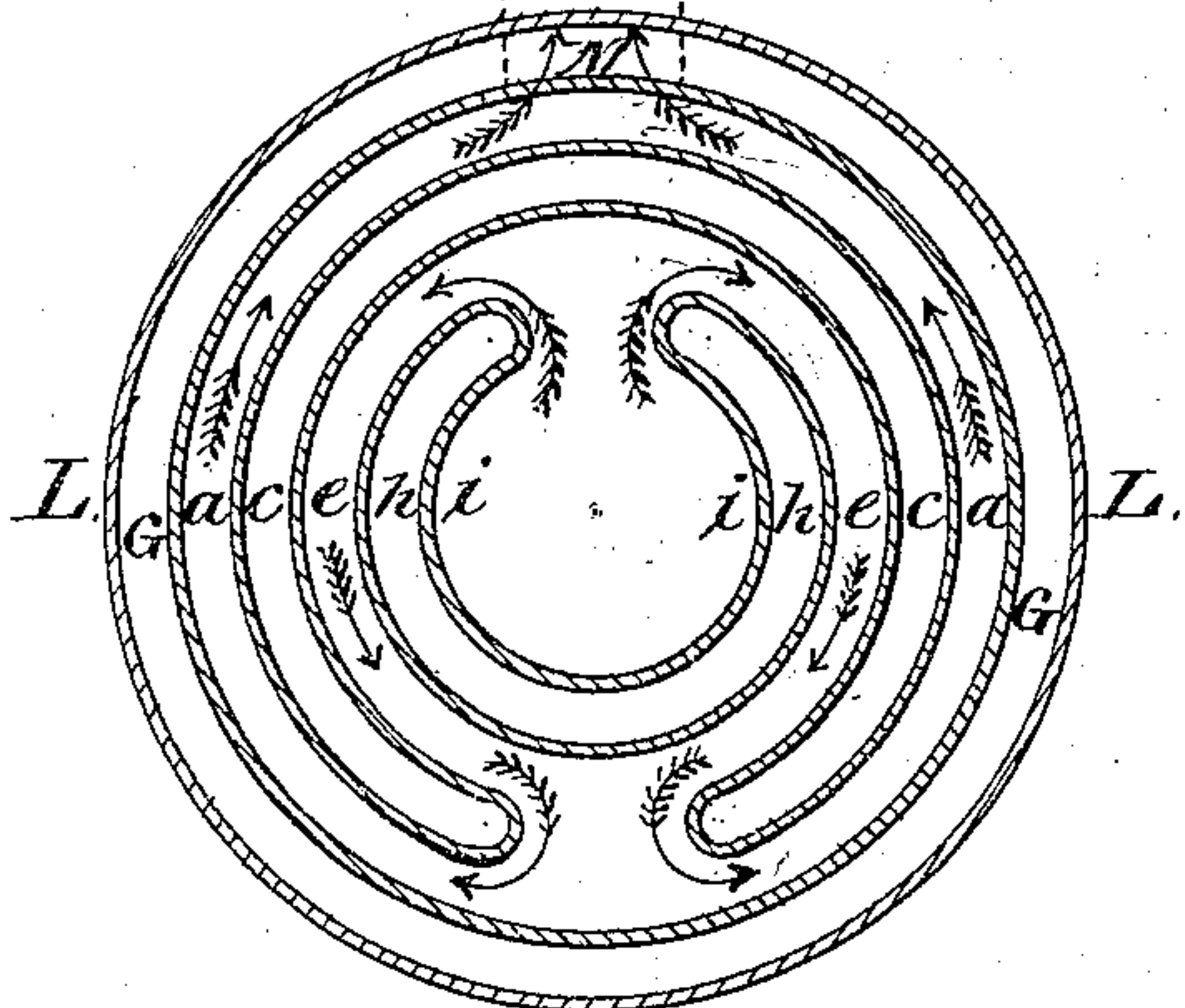
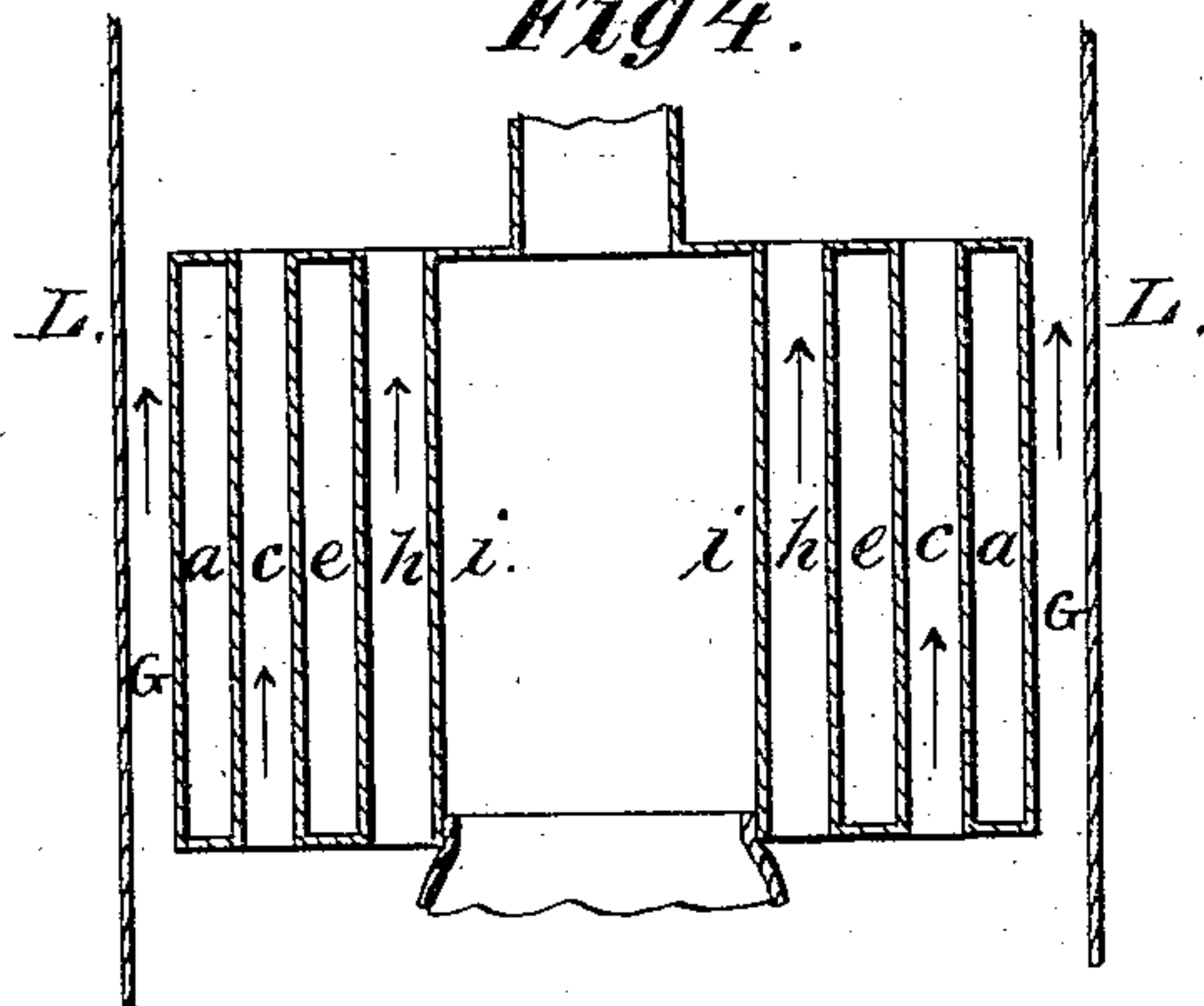


Fig 4.



Witnesses:

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Inventor:

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UNITED STATES PATENT OFFICE

JACOB FRIDLEY, JR., OF CARLISLE, PENNSYLVANIA.

IMPROVEMENT IN HOT-AIR FURNACES.

Specification forming part of Letters Patent No. 153,166, dated July 21, 1874; application filed April 2, 1874.

To all whom it may concern:

Be it known that I, JACOB FRIDLEY, Jr., of Carlisle, in the county of Cumberland and State of Pennsylvania, have invented certain Improvements in Hot-Air Furnace, to be known as the "Duplex Heater," of which the following is a specification:

The nature and object of my furnace is to combine simplicity of construction with a maximum utilization of heat; and to gain this object the combustible gases are twice reverberated, and made to traverse over a large surface of metal through reduplicate passages in the radiator.

Figure 1 is an elevation of my furnace. Fig. 2 is a vertical section through the middle of the same at right angles with the lines *n n* and *x x*. Fig. 3 is a transverse horizontal section of the radiator through the line *x x*, showing the interior walls of the radiator, and the reduplication of the passages for the products of combustion, and the open spaces for the hot air. Fig. 4 is a vertical section of the same, perpendicular to the line *n n*, showing the interior walls of the radiator in a vertical or perpendicular form.

The same letters refer to similar parts in the different drawings.

A is the fire-pot, which may be constructed in the usual manner, of cast-iron or fire-clay. *i i* is the combustion drum or cylinder of the radiator; U, the feeding-mouth of the furnace; S, the clinker-hole; V, the grate; R, the ash-pit. G is the radiator, provided with the cylinder *i i*, the closed passages *a a* and *e e*, for the combustible gases, the motion of the products of combustion being shown by plumed arrows, and the open spaces *e e* and *h h*, the motion of the heated air being shown by simple arrows. L L is the wall of the outside shell of the furnace, which forms the reservoir of hot air. H H is the dust-flue, provided with a damper, P. F is the damper to direct draft; W, the check-damper; o, the damper-rod to regulate the damper F, and T the clearing-hole of the radiator.

To set the furnace in operation, the fire is kindled in the pot A, keeping the damper F at first open until the fire is in a fair state of

combustion. The damper is then closed, and the combustible gases are reverberated twice, and forced to circulate, as shown by the plumed arrows, through the continuous duplicate passage *e e* and *a a* from the inner chamber or cylinder *i i*, and at last finding their exit at the opening M, (shown in Fig. 2,) completely heating all the walls of the radiator.

By means of this arrangement the hot gases do not merely ascend and find a direct exit at the top, like in most other hot-air furnaces, but they are obliged to revert and circulate twice in an almost horizontal manner before they are suffered to escape.

The cold air is drawn in at the bottom, and is partially heated by coming near the fire-pot in its ascent, and completely so by its passage through the open spaces *e e* and *h h* of the radiator and its outer shell G G, and is then, when thus properly heated, conducted to any desired part of the building through the openings *m m m*.

My radiator may be used in place of ordinary stoves for heating purposes as well as for hot-air furnaces.

I prefer the circular form, as described above; but I do not confine myself to this shape alone, as the radiator may be made elliptical, square, or polygonal, and be nearly or equally effective as a heating apparatus.

I do not claim a radiator of a furnace which consists of simple concentric drums, and in which the alternate chambers, through which the products of combustion pass, are independent or non-continuous, and do only communicate by a horizontal pipe, as in the gas-stove of Wm. I. Hays, No. 97,913.

I claim as my invention—

In a hot-air furnace or stove, the continuous closed flue *e e* and *a a*, for the circulation of the products of combustion, the said flue being continuous throughout from top to bottom, in combination with the complementary hot-air passages *e e* and *h h*, which have direct openings both at the top and bottom, substantially as set forth.

Witnesses: JACOB FRIDLEY, JR.

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EDGAR L. SHRYOCK.