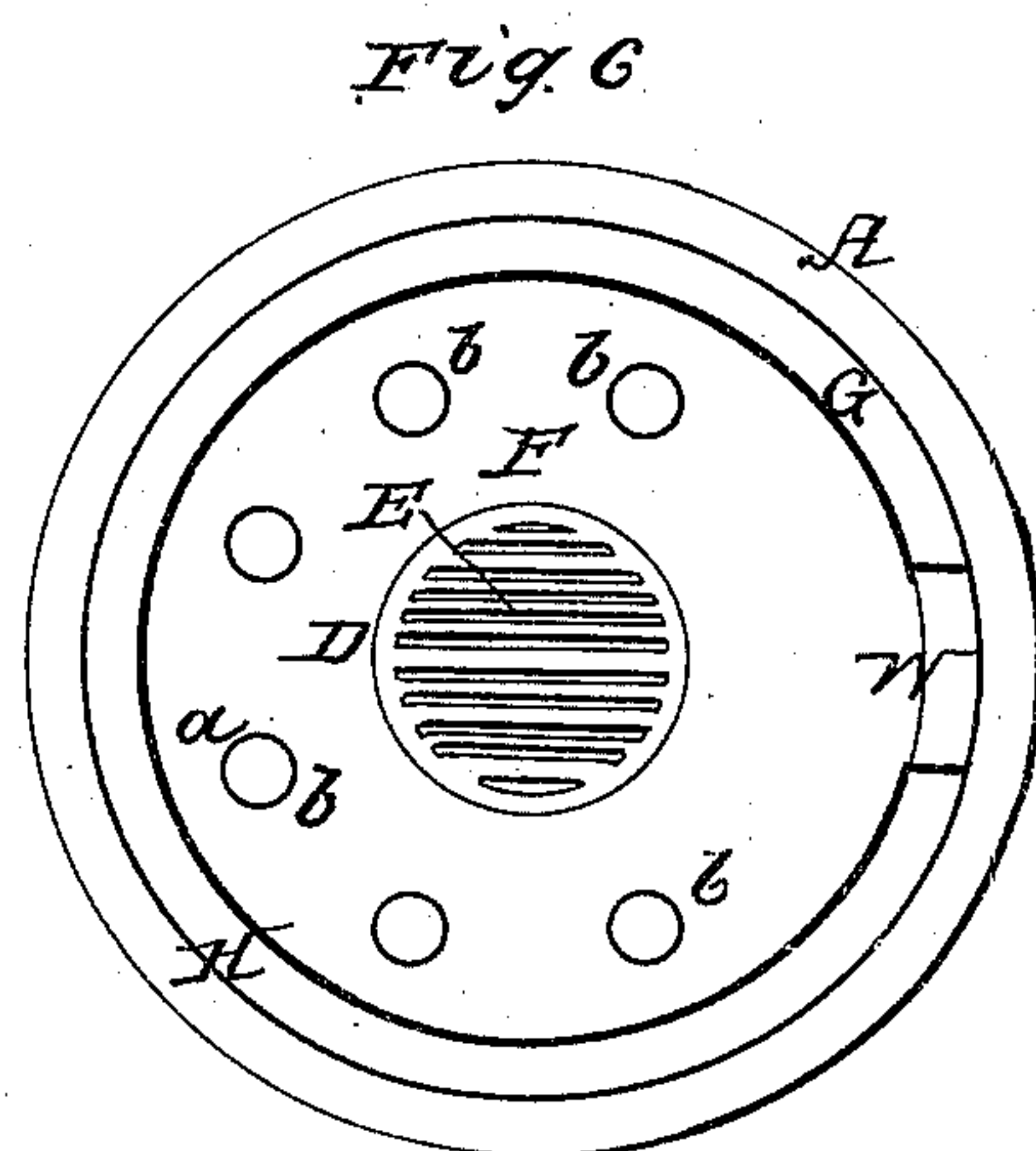
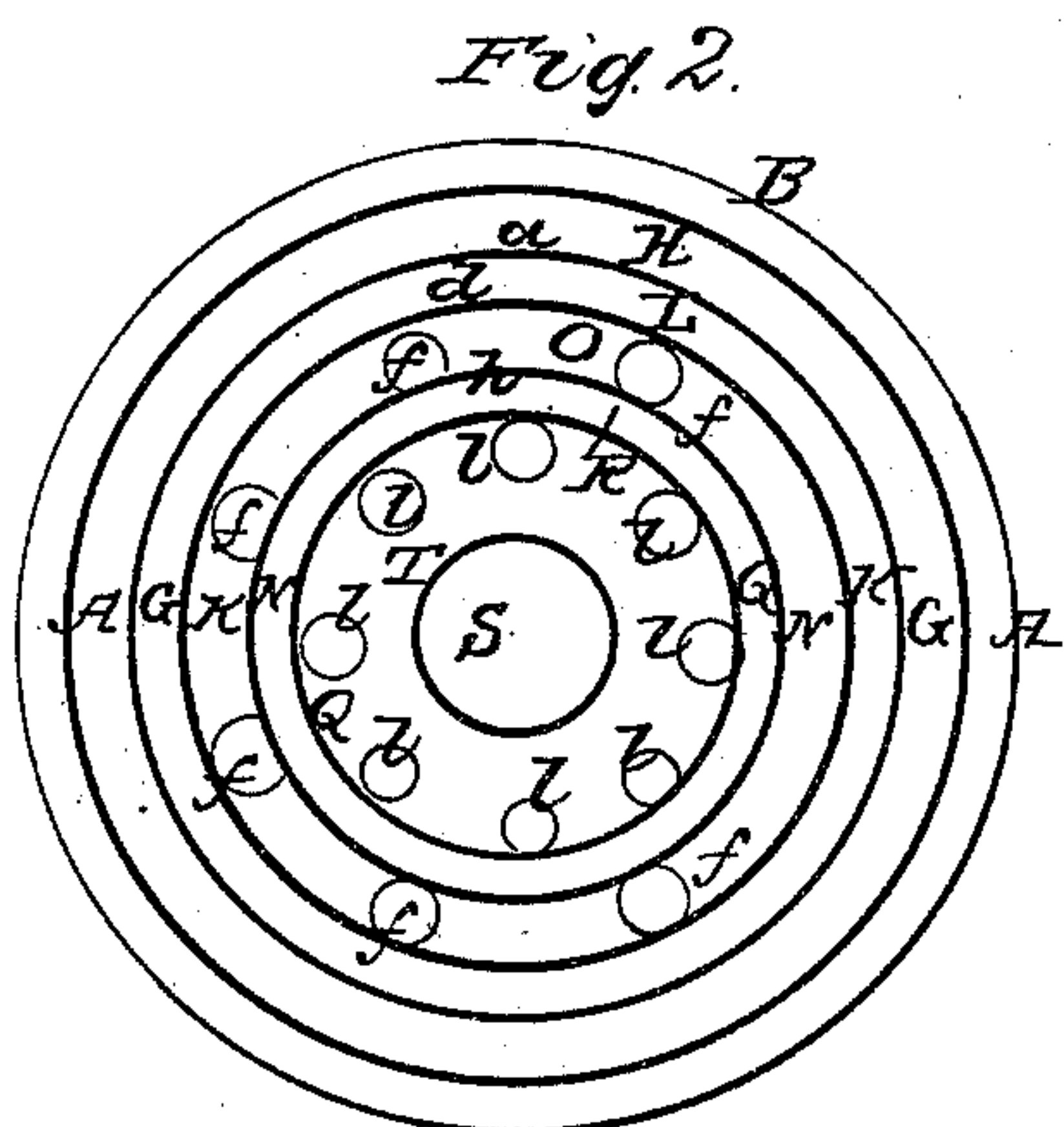
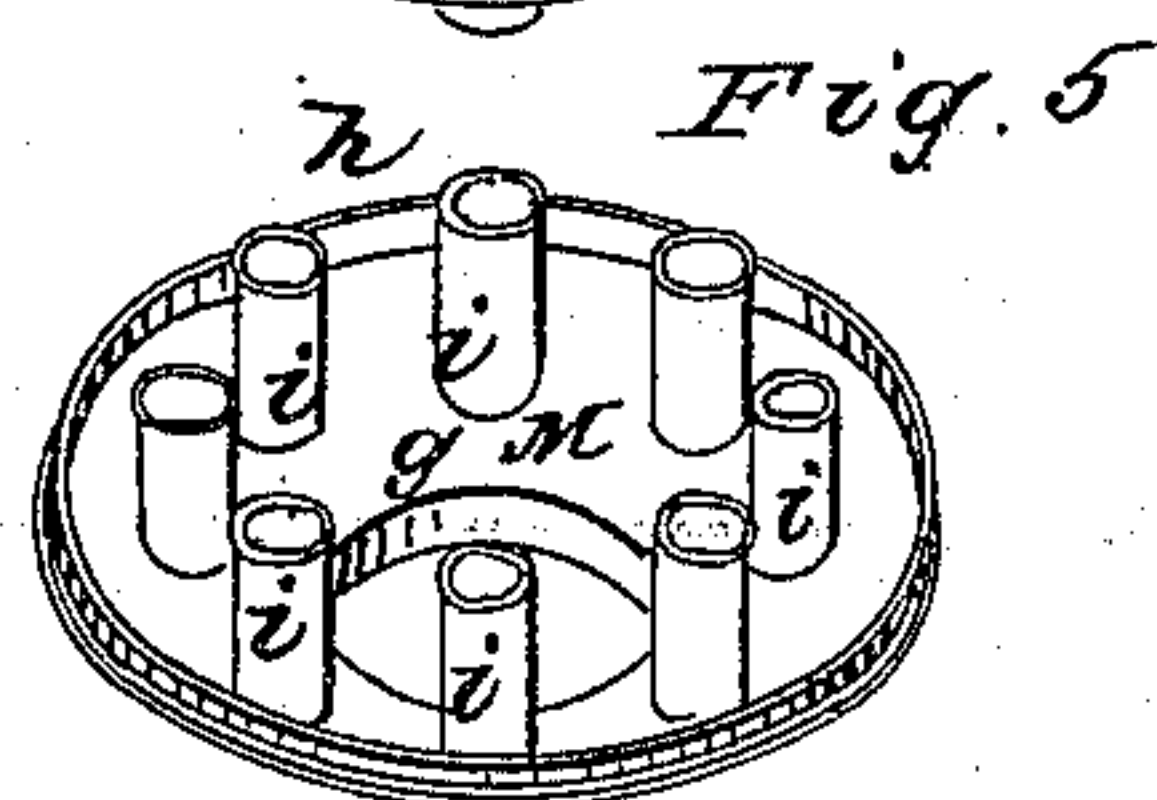
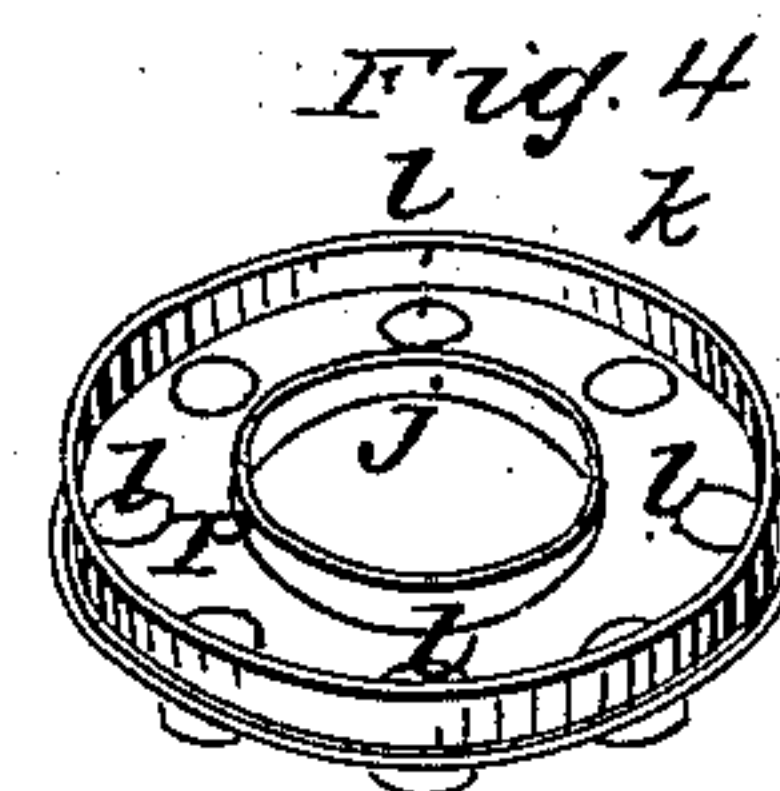
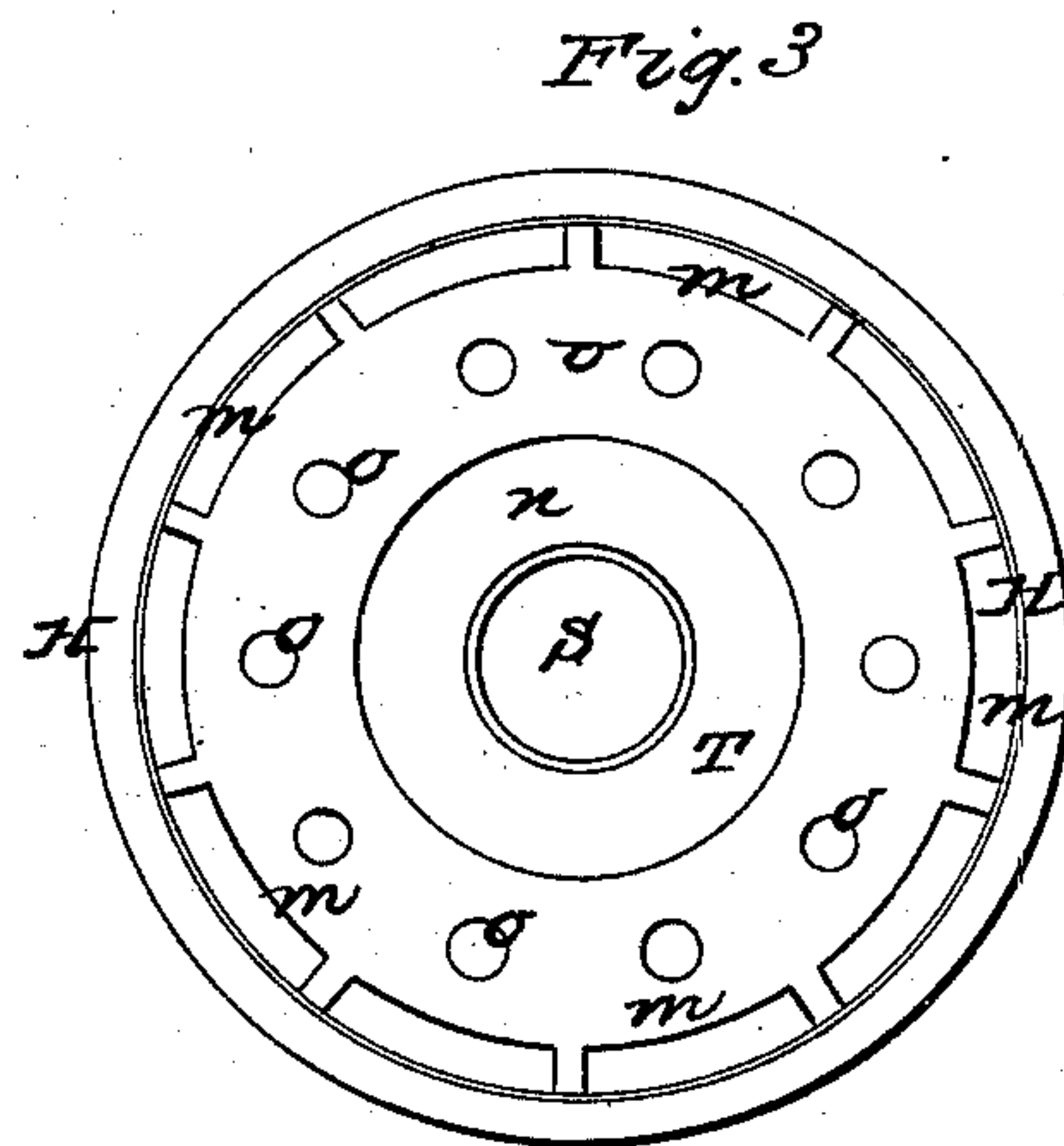
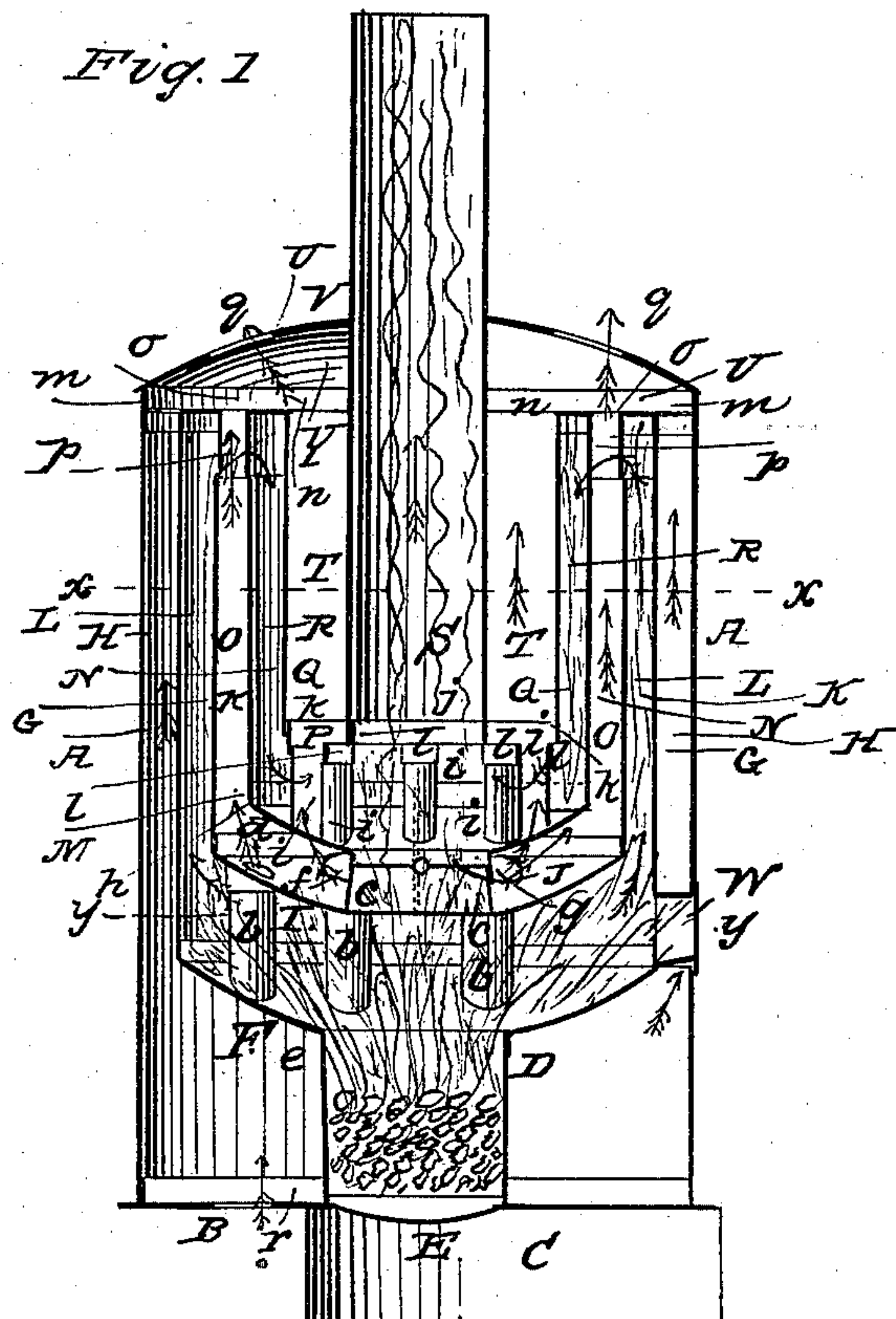


I. M. THATCHER.

Hot-Air Furnace.

No. 8,832.

Patented March 23, 1852.



UNITED STATES PATENT OFFICE.

I. M. THATCHER, OF LANSINGBURG, NEW YORK.

AIR-HEATING STOVE.

Specification forming part of Letters Patent No. 8,832, dated March 23, 1852; Reissued September 11, 1855, No. 327.

To all whom it may concern:

Be it known that I, I. M. THATCHER, of Lansingburg, in the county of Rensselaer and State of New York, have invented certain new and useful Improvements in Air-Heating Stoves; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of the specification, in which—

Figure 1 is a vertical section of one of my improved stoves taken through the center. Fig. 2 is a horizontal section of the same taken in the line *x, x* shown in Fig. 1. Fig. 3 is a plan or top view of the same having the cap removed. Figs. 4 and 5 are detached views of parts of the interior. Fig. 6 is a horizontal section taken through the line *y, y*, shown in Fig. 1.

Similar letters of reference indicate corresponding parts in each of the several figures.

My invention consists in the employment of a series of hollow cylinders or tubes of any suitable form arranged one within another above the fire box and around the chimney with a space all around between every two of them, certain of such spaces being connected at the top and bottom to form flues leading from the fire to the chimney, and the intermediate spaces between the first named spaces forming air passages through which and through smaller tubes passing through the flues the air passes to be heated; the connections between the several spaces are formed in such a manner as to cause the draft and ignited gases from the fire to ascend and descend through the spaces forming the flues and circulate through them all before reaching the chimney, but to allow the air to pass directly upward to the intermediate spaces and small tubes to chamber above them from which it is distributed. Certain contrivances are provided for the purpose of controlling the circulation or distribution of the air through the several spaces or passages through which it passes according to the degree of intensity of the heat at different points, so as to induce the greatest flow through those parts where the heat is most intense.

To enable others skilled in the art to make and use my invention I will proceed to describe fully its construction and operation.

A, is the outer casing of the stove which

consists of a cylinder of sheet metal, it is set up on a cast iron base plate B, below which is the ash pit C.

D, is the fire box which rests upon the plate B. E, is the grate. F, is an inverted circular dome of cast iron having an opening through its center surrounded by a rim *e*, which fits to the top of the firebox, and having also another rim *a*, which stands up from its outer edge; it has a number of small tubes *b, b*, standing up from it, ranging in a circle around the firebox; its form may be best understood by reference to Fig. 5, which represents a similar dome hereafter to be referred to. C, is a sheet iron cylinder fitting close over the rim *a*, and being supported by the dome F, the space between it and the outer casing A, forming an annular passage H, it reaches to the same height as A.

I, is an inverted dome of cast iron smaller than F; it has an opening through its center surrounded by a rim C, which extends upward in the form of a slightly conical tube, and has another rim *d*, extending upward around its outer edge; it has a series of short tubes *f, f*, extending downward from it which fit over the tubes *b, b*, of the dome F, and form passages through both domes, the tubes *b, b*, supporting the upper dome. J, is a damper or valve which is placed in the short tube C.

K, is a sheet iron cylinder fitting over the rim *d*, and being supported by the dome, it does not extend quite so high as G; the space between it and G, forms an annular passage L.

M, is an inverted dome similar to F, and represented detached in Fig. 5; it has an opening in its center surrounded by a rim G which fits over the short pipe *c*, on which it is supported; it has a rim *h*, which extends upward all around it and a series of tubes *i, i*, extending upward, ranging in a circle around its center.

N, is a sheet iron cylinder fitting on the rim *h*, and supported by the dome M, it extends upward to the same height as the cylinder K, and there is an annular space O, between the two.

P, whose form is most clearly shown in Fig. 4, is a circular plate of cast iron having an opening through its center surrounded by a rim J, forming the chimney seat; it has a rim *k*, extending upward around its outer edge, and has a number of short tubes *l, l*,

extending downward and fitting over the tubes *i, i*, forming passages through it and through the dome.

Q, is a sheet iron cylinder fitting and resting on the plate P, and running up to the same height as the cylinders A, and G; the space between it and N, forms an annular passage R.

S, is the chimney; between it and the cylinder Q, is an annular space T.

U, is a cast iron plate whose form is shown in plan Fig. 3, it fits down close to the cylinders A, G and Q and has openings *m, m*, communicating with H, an opening *n*, which communicates with T, and a series of openings *o, o*, which communicate by a series of small tubes *p, p*, with the space O, the top of the said space O, being covered and closed by a ring of metal so as to close all outlets except through the said tubes *o, o*.

V, is the cover of the stove, which fits to the outer casing A, or to the plate U; it is of dome shape and raised sufficiently above the plate U, to form a receiving and distributing chamber Y, for the heated air, the chimney S, passing through it; it is provided with openings *q, q*, through which the air is distributed.

W, is the fire door through which fuel is introduced to the fire box. *r*, (Fig. 1) represents one of a series of openings in the plate B, around the foot of the fire box, through which the air is admitted to be heated.

It will be understood by reference to Fig. 1; that when the damper J, is closed, the draft from the fire plays between the tubes *b, b*, ascends the annular flue L, and then passes between the tubes *p, p*, descends the annular flue R, and after passing between the tubes *i, i*, ascends the chimney S, its course throughout being indicated by arrows in the flues.

The air to be heated is supplied through the openings *r*, in the base plate, rising up to the inverted dome F, which spreads it and part of it ascends the outer passage H, and passes through the openings *m, m*, to the chamber Y, while the other ascends the tubes *b, b, f, f*, to the space between the inverted domes I, and M, where it is again divided, part of it passing up the passage O, and through the tubes *o, o*, to the chamber Y, and the remainder through the tubes *i, i*, and passage T, to the said chamber from which it passes off to the openings *q*, for use its ascent being shown by arrows in the passages; during its ascent it is brought into contact with an immense amount of heating surface, being divided in passing

through the main passages, H, O, T, into thin currents each of which except the outermost one passes between two surfaces which are exposed to the fire, and being divided by passing through the small tubes into still smaller currents each of which is entirely surrounded by the heat and ignited gases passing through the flues, a great amount of heat is also communicated to it in passing the inverted domes. The above described arrangement of cylinders may be continued with an increased number similarly connected, to form a greater number of air passages and flues if thought desirable; as many may be employed as will reduce the temperature in the chimney, so much that no advantage could be gained by further increase; instead of cylinders, tubes of polygonal, elliptic or other forms may be employed; and instead of domes F, I, M, P, frustums of cones may be used.

As the heat will have the greatest degree of intensity near the center of the stove, it is advantageous to induce a stronger current of air through those passages nearest it, than through those nearer the outside, this I accomplish by the following means. By making the sum of the areas of the tubes *b, b, f, f*, greater than that of the openings *m, m*, at the top of the passage H, and the sum of the areas of the passages O, T, much greater than that of H, I induce a strong current through *b, b, f, f*, where the heat is extremely intense which weakens that in H, and sends more air into the space above the dome I; again by making the sum of the areas of the tubes *i, i*, greater than that of the tubes *p, p*, or of the openings *o, o* and the area of T, greater than that of O, I induce a strong current through *i, i*, which weakens that through O, and strengthens that in T, thus the air has tendency to rush in stronger currents toward the center of the stove.

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

The combination of the inverted domes or frustums F, I, M, and plate P, with the short tubes *b, b, f, f, i, i, l, l*, connecting them, substantially in the manner herein described for the purpose of effecting the connection between the lower ends of the fire or draft flues and carrying the air through them to the spaces between the cylinders or tubes.

I. M. THATCHER.

Witnesses:

G. B. ALLEN,
JAS. DOUGREY.