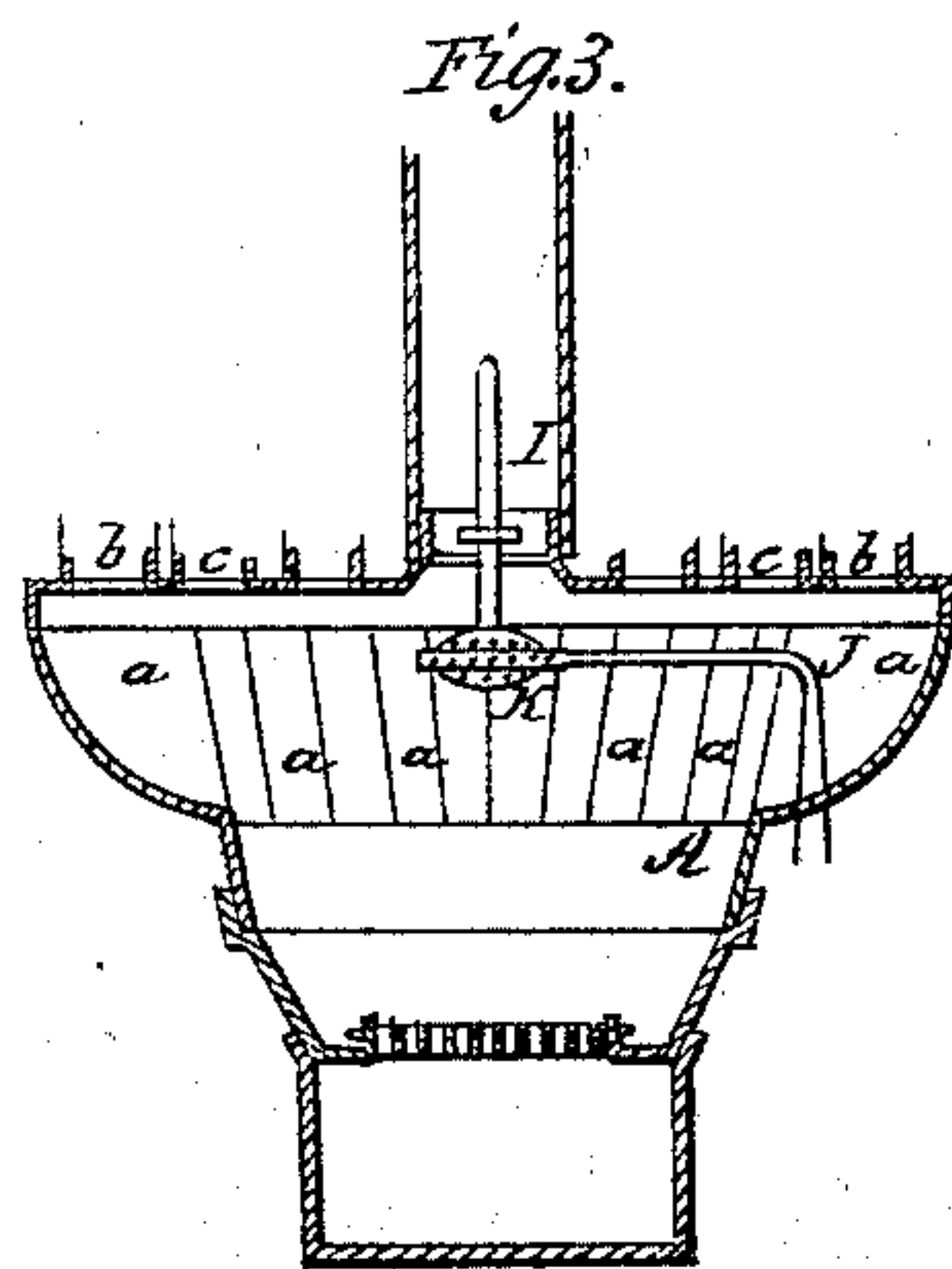
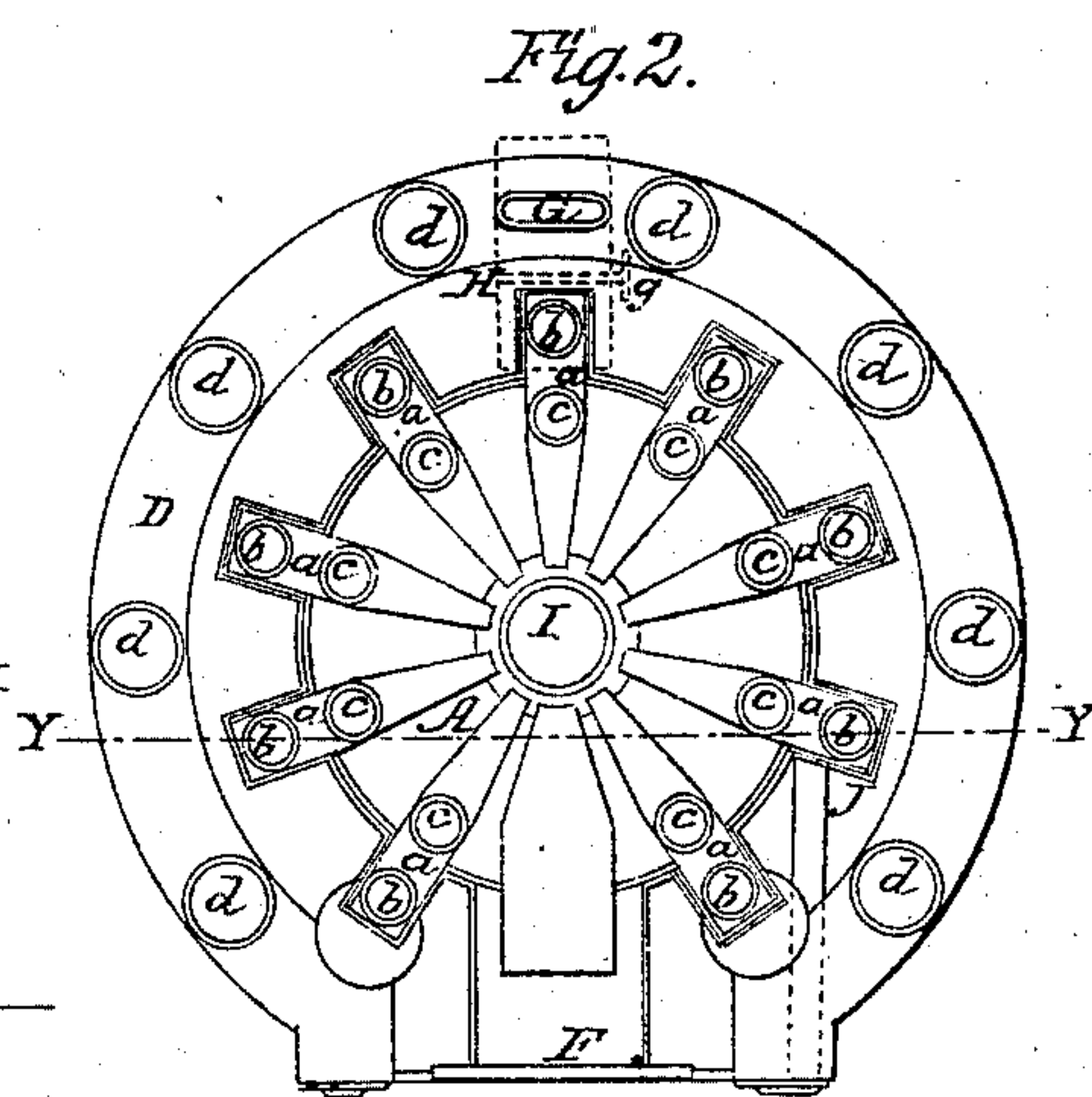
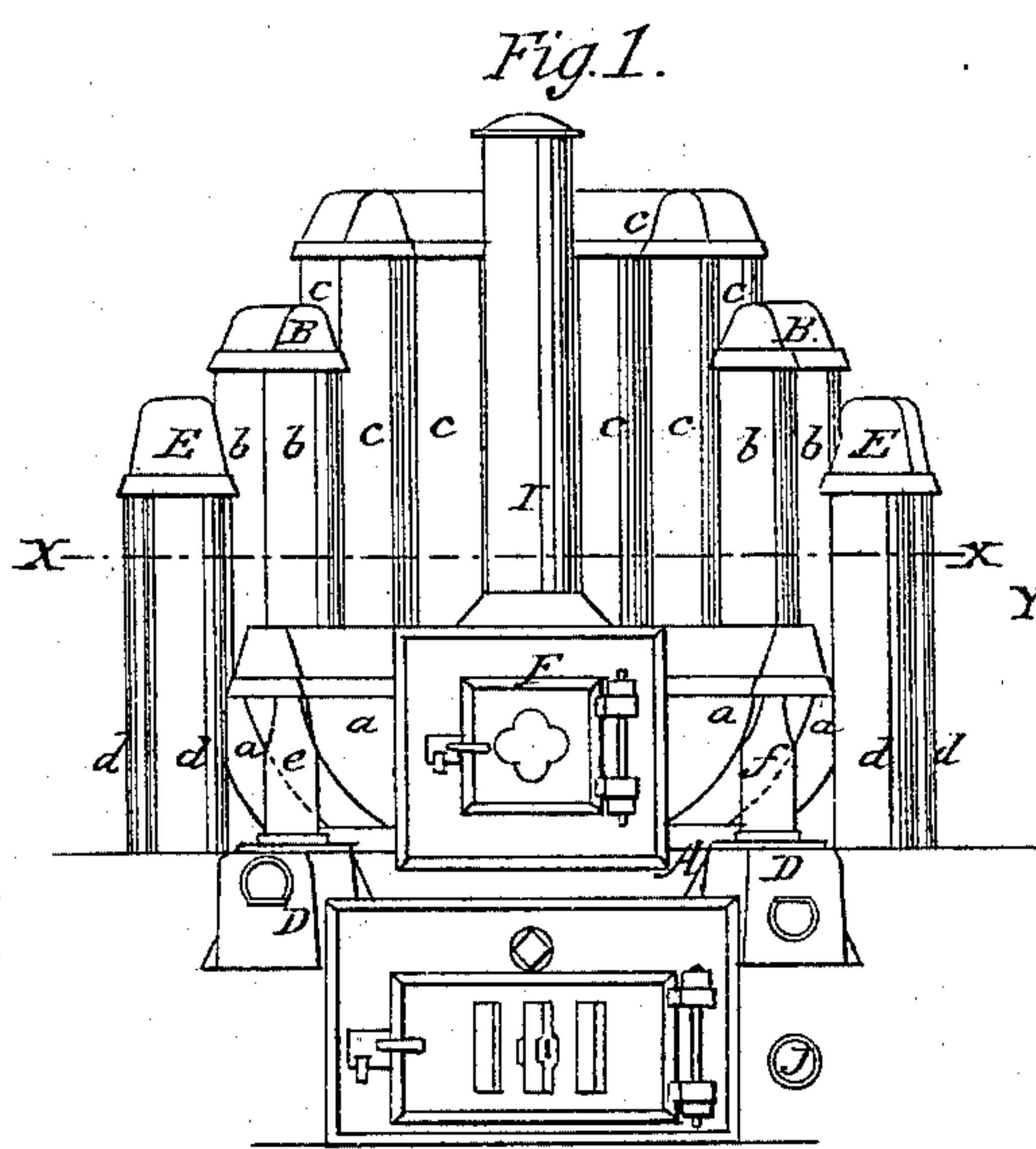


J. P. HAYES.
Hot-Air Furnace.

No. 10,962.

Patented May 23, 1854.



UNITED STATES PATENT OFFICE.

JOHN P. HAYES, OF PHILADELPHIA, PENNSYLVANIA.

HOT-AIR FURNACE.

Specification of Letters Patent No. 10,962, dated May 23, 1854.

To all whom it may concern:

Be it known that I, JOHN P. HAYES, of the city and county of Philadelphia and State of Pennsylvania, have invented a new and Improved Hot-Air Furnace; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1, is a front elevation of my improved furnace. Fig. 2, is a horizontal section of do. X, X, Fig. 1, being the plane of section. Fig. 3, is a vertical section of the fire chamber and ash pit; Y, Y, Fig. 2, indicates the plane of section.

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

The nature of my invention consists in a peculiar construction of the furnace, as will be presently shown and described in the body of the specification.

To enable others skilled in the art to fully understand and construct my invention, I will proceed to describe it.

A, represents a fire chamber, the lower part of which is of an inverted conical shape, the upper part has a series of radial chambers, (a), projecting outward a suitable distance from the body of the fire chamber, as shown more particularly in Fig. 2.

On the top of the fire chamber, are two rows of vertical hot air tubes, (b), (c) which communicate with the fire chamber, directly over the radial chambers, (a), see Fig. 2.

The rows of tubes, (b), (c), are placed in circular form, and their upper ends communicate with chambers or passages, B, C, see Fig. 1, B being the chamber of the outer row of tubes, (b), and C, the chamber of the inner row, (c).

D, Figs. 1 and 2, is a passage or chamber, which encompasses the fire chamber, a suitable space being between them. This passage or chamber, D, has also vertical hot air tubes, (d), upon it, and the upper ends of the tubes, (d), communicate with a chamber or passage, E, shown in Fig. 1.

The chamber or passage, E, at the upper ends of the tubes, (d), and the chamber, C, at the upper ends of the tubes, (c), are isolated, or do not communicate with any passage.

The passage or chamber, D, at the lower

ends of the tubes, (d), communicates with the fire chamber, A, through the tubes, (e), (f), one at each side of the door, F, of the fire chamber, as shown in Fig. 1, and by dotted lines in Fig. 2. At the back part of the chamber or passage, D, is the smoke pipe, shown in Fig. 2.

The back part of the chamber or passage B, communicates with the smoke pipe, G, by means of a short pipe, H, provided with a damper, (g), by which the connection may be cut off when desired, see dotted lines in Fig. 2.

I, is a hot air tube directly over the center of the fire chamber. This tube, I, is closed at the top, and does not communicate with any other passage or tube. See Fig. 1.

J, is a tube or pipe, which communicates with the atmosphere on the outer side of the furnace, see Figs. 1 and 2, and passes into the fire chamber, and terminates in a perforated bulb or chamber, K, which is at the upper part of the fire chamber, A, as shown in Fig. 3. The bulb or chamber, K, may be filled with turner's shavings, or something equivalent, to prevent a too rapid escape of air from the bulb or chamber, K.

When the fire is kindled in the fire chamber, A, the damper, (g), in the pipe, H, may be opened so as to allow a direct and strong draught from the fire chamber, for when the damper, (g), is opened, the smoke will pass up the tubes, (b) into the passage or chamber, B, and from thence through the pipe, H, and into the smoke pipe, G. After the fire is kindled, the damper should be closed, and the smoke or draught then passes down the tubes, (e), (f), into the passage or chamber, D, and up the smoke pipe, G, at the back of the chamber or passage, D.

When the damper, (g), is closed, the hot air rises in the tubes, (b), (c), (d), which are in fact, hot air chambers, and the temperature in the several rows of tubes, is equalized, by means of the chambers or passages, B, C, E, at their tops, because they form a communication at the tops of their respective tubes. Consequently the heat from the fire chamber is radiated by the tubes (b), (c), (d), and the chambers or passages, B, C, E, D, instead of passing off through the smoke pipe, G.

The fire chamber, A, will contain a gas or gases, the products of combustion, which will pass off through the smoke pipe if some provision is not made to ignite and burn

them. In order to effect this, I place the perforated bulb, K, at the upper part of the fire chamber, A. This bulb, owing to its connection with the pipe, J, ejects small
5 streams of atmospheric air into the fire chamber. A certain amount of oxygen is thereby brought in contact with the gas or gases, which cause them to ignite, and a proportional amount of heat obtained. It is
10 important that the bulb be placed at the upper part of the fire chamber, in order to effect a perfect combustion of the gas or gases as they naturally rise, and if the oxygen is admitted into the lower part of the
15 fire chamber, it will not be perfectly incorporated with said gas or gases, and a certain quantity will pass off unburned.

I do not claim admitting oxygen into the fire chamber, for the purpose of igniting the gas or gases therein, for several plans have
20 been devised, although not very successfully, for the same purpose; neither do I claim the rows of vertical hot air tubes, connected at their upper ends by passages or chambers.
25

What I claim, therefore, as new, and desire to secure by Letters Patent, is:—

I claim the general construction of the furnace as shown and described in the body of the specification.

JOHN P. HAYES.

Witnesses:

SAML. L. CLEMENT,
CASTNER JONES.