

(No Model.)

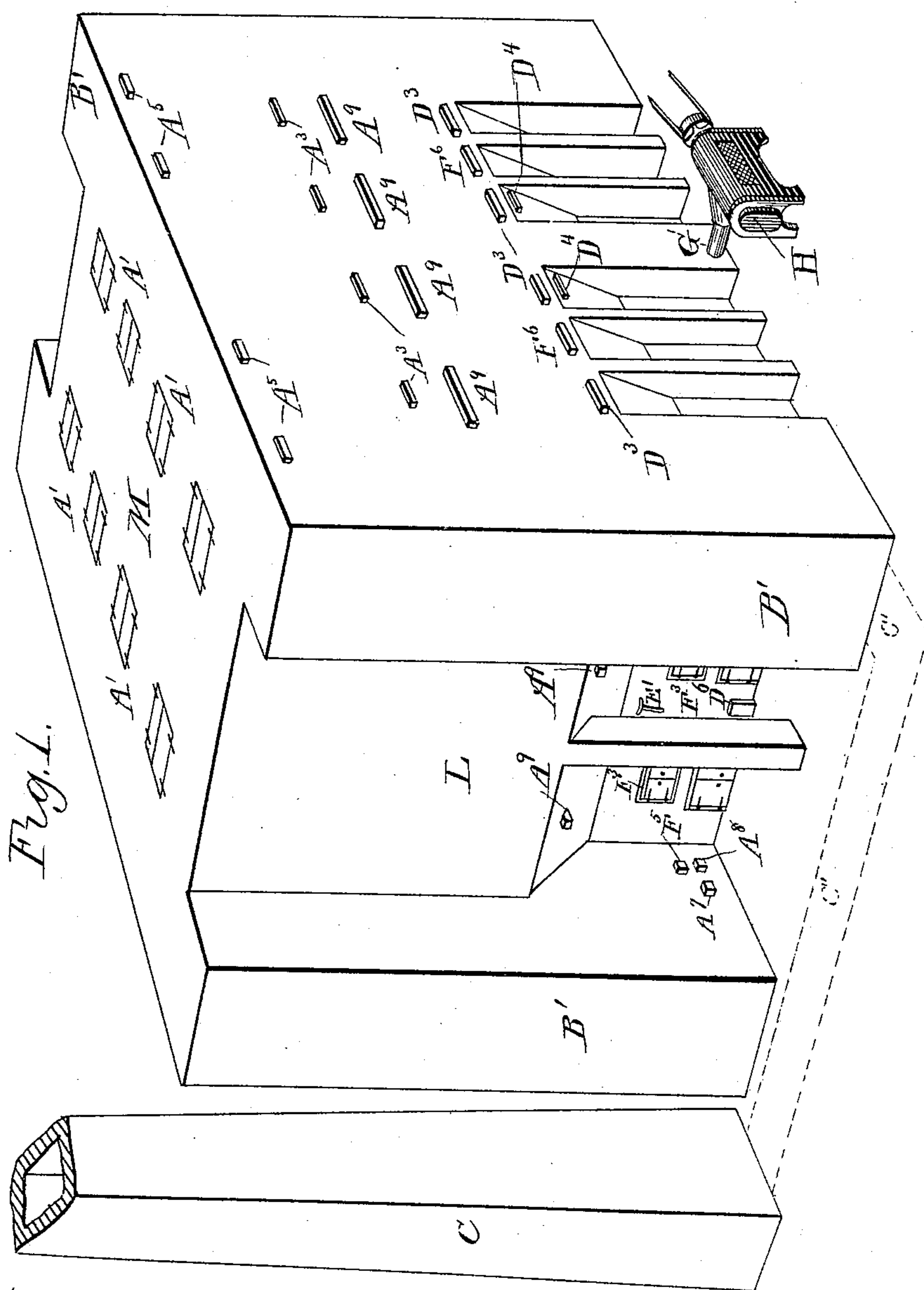
4 Sheets—Sheet 1.

A. VIVARTAS.

FURNACE FOR CREMATING GARBAGE.

No. 390,922.

Patented Oct. 9, 1888.



Witnesses,  
Adin B. Thayer.  
H. O. Vivartas.

Inventor,  
Alfred Nivartkas.

(No Model.)

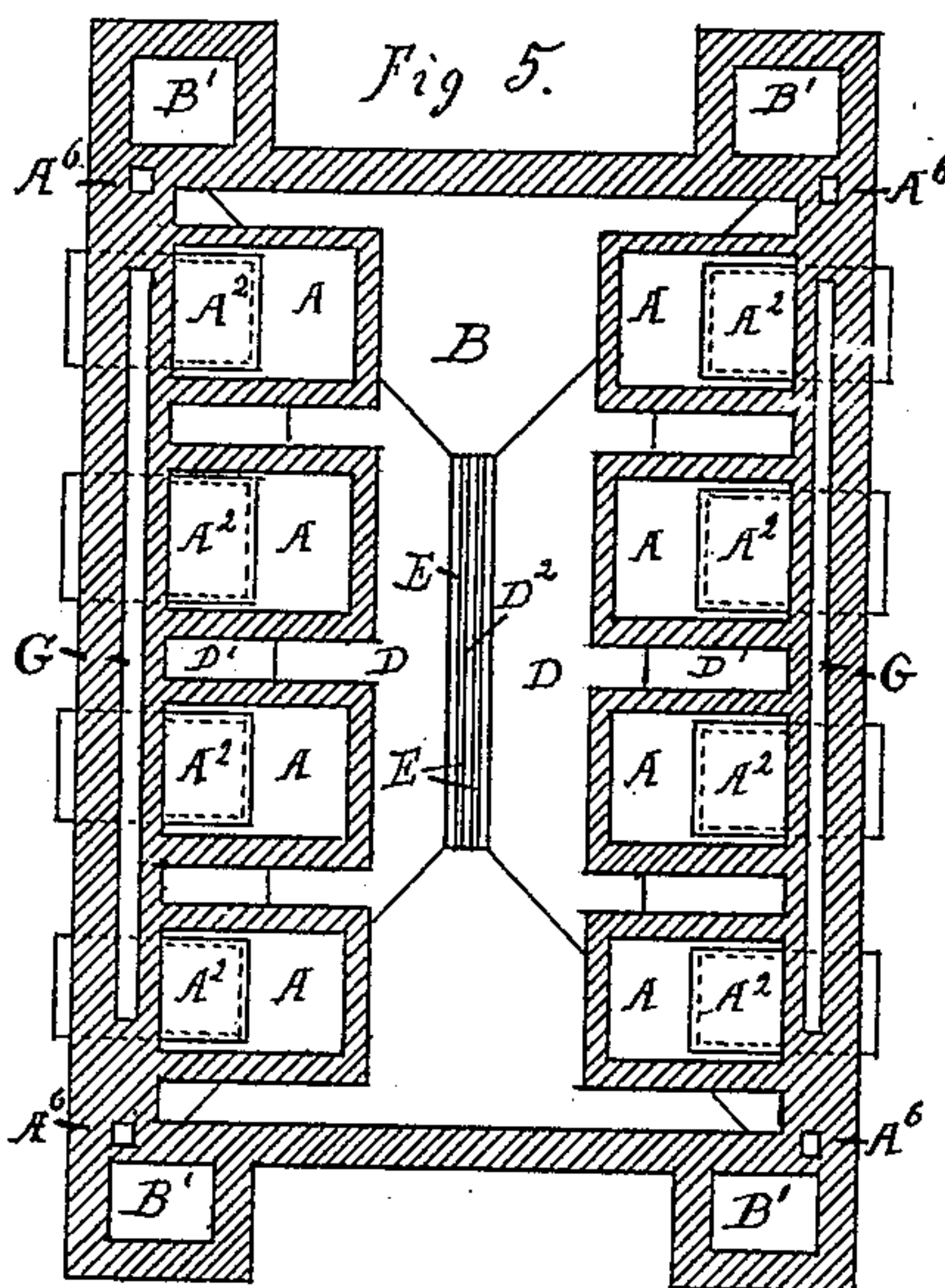
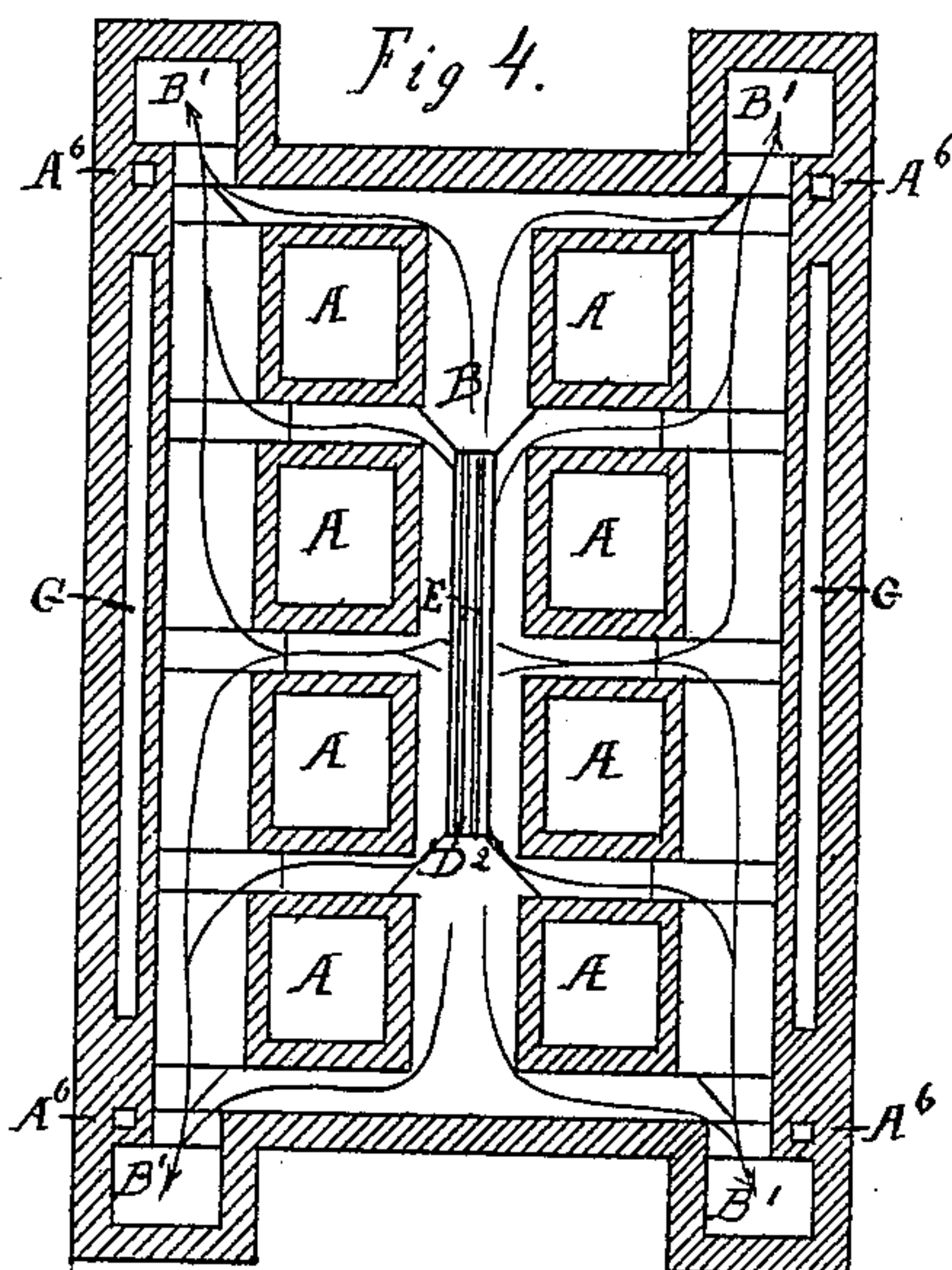
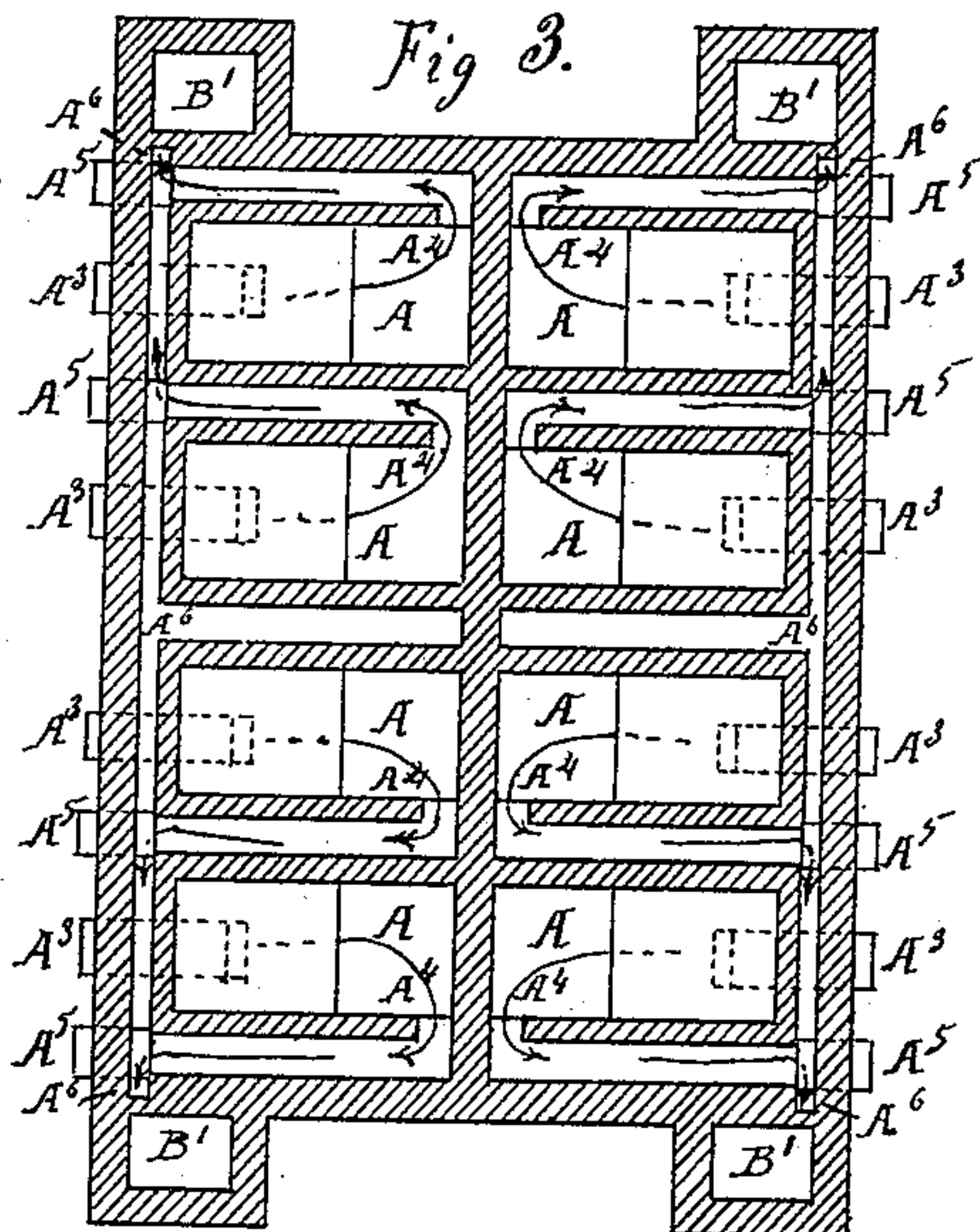
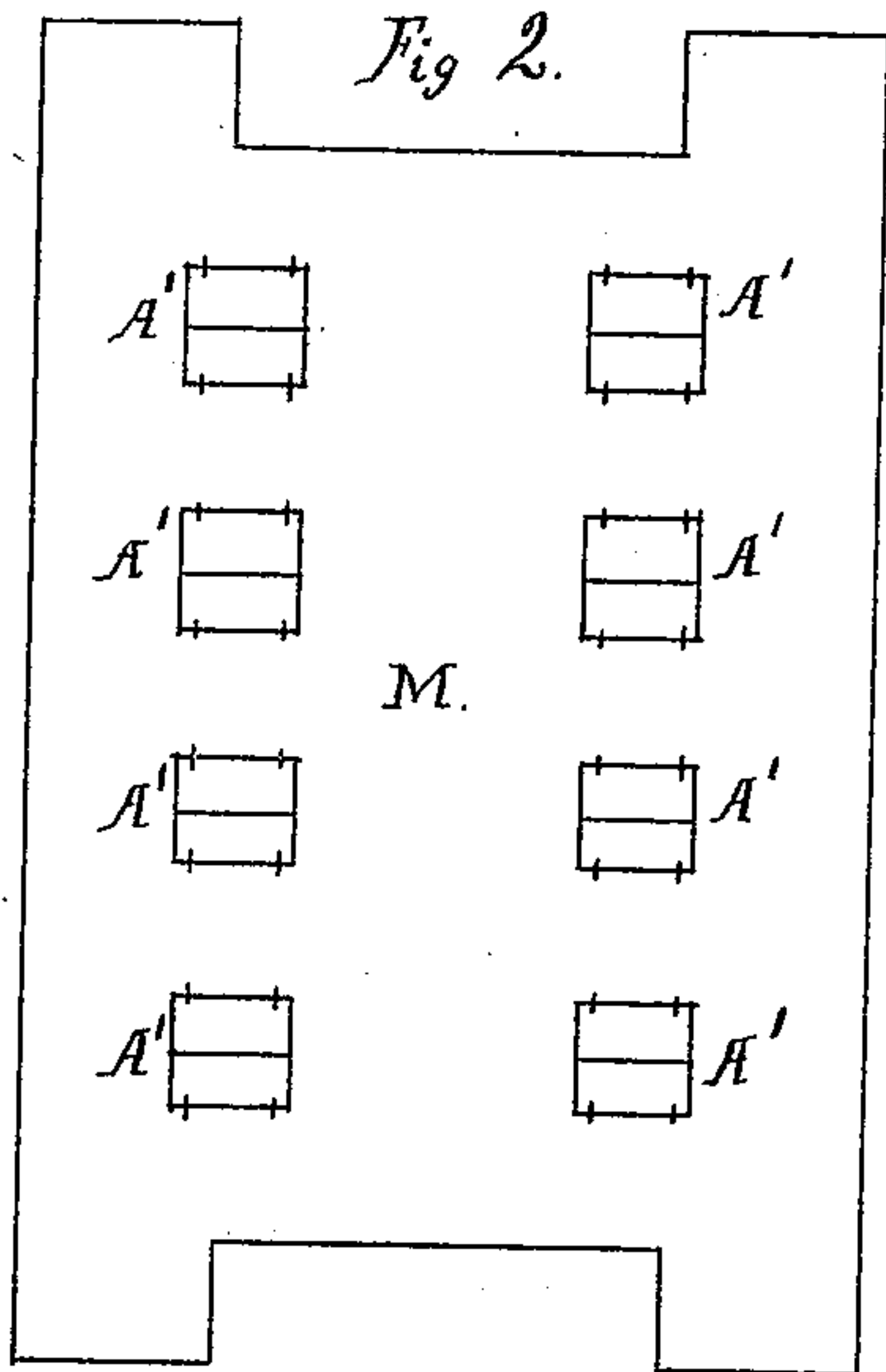
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WITNESSES.

*V. Looney.*  
*Edmund Vivarttas.*

INVENTOR.

*Aloha Vivarttas.*



(No Model.)

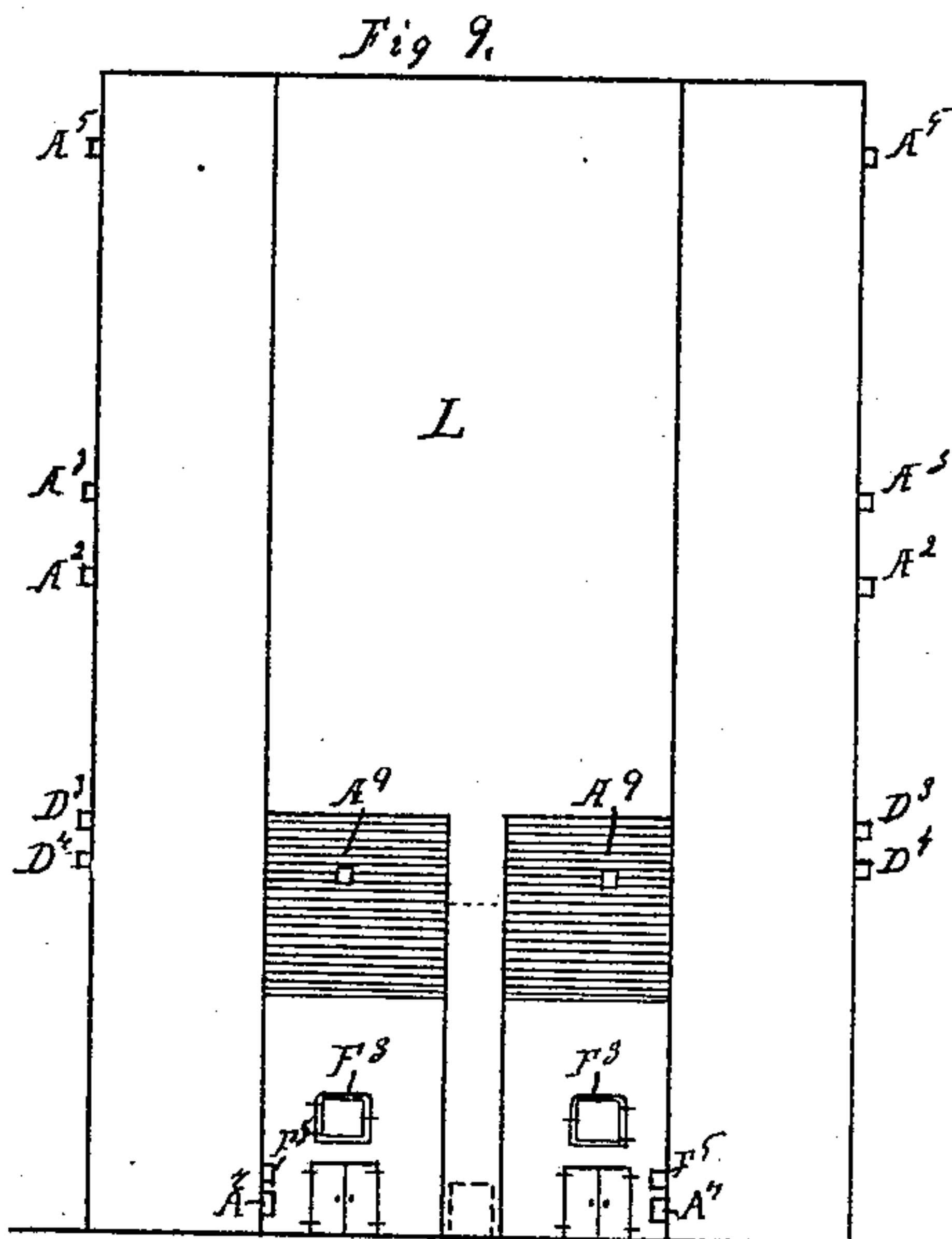
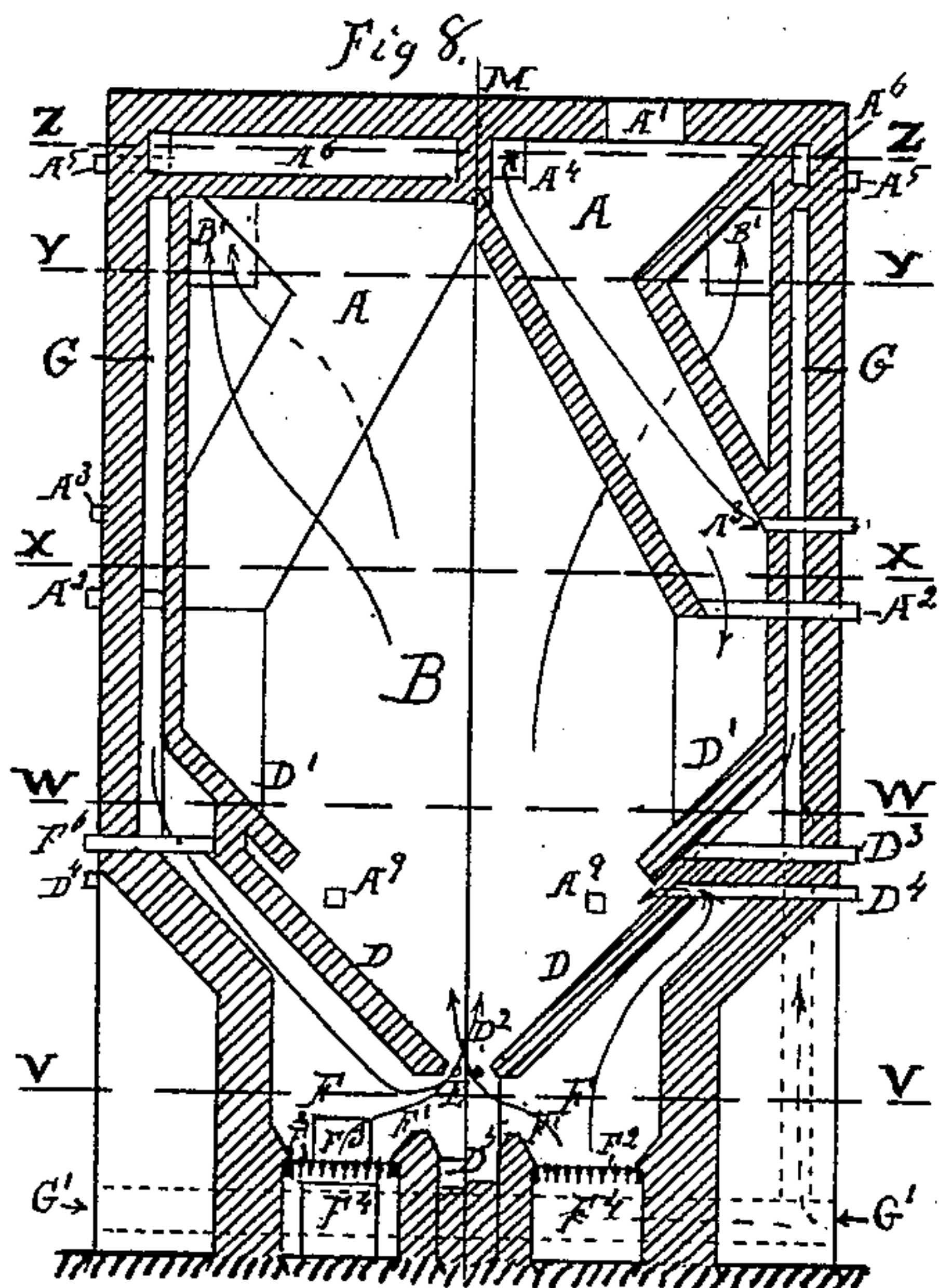
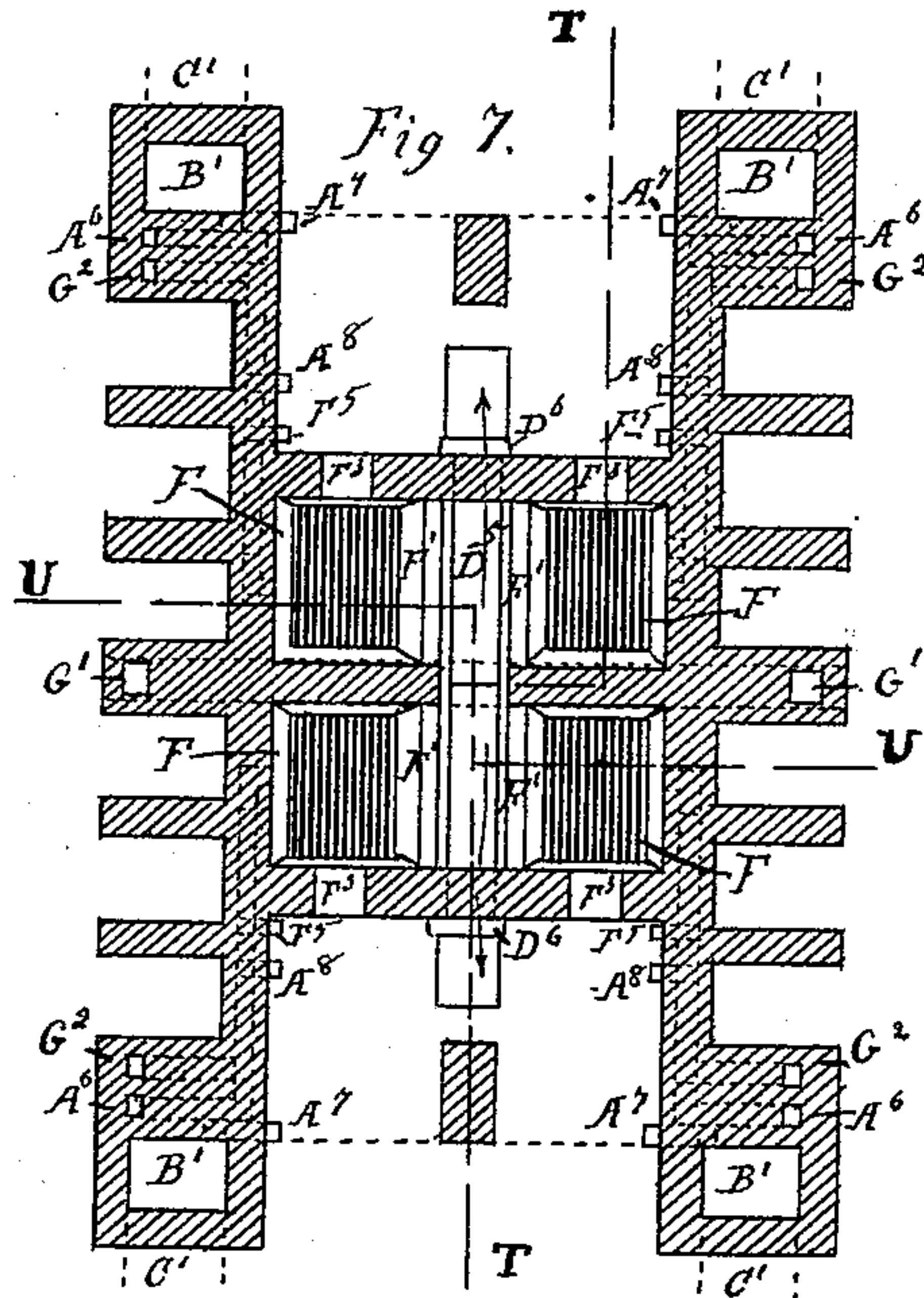
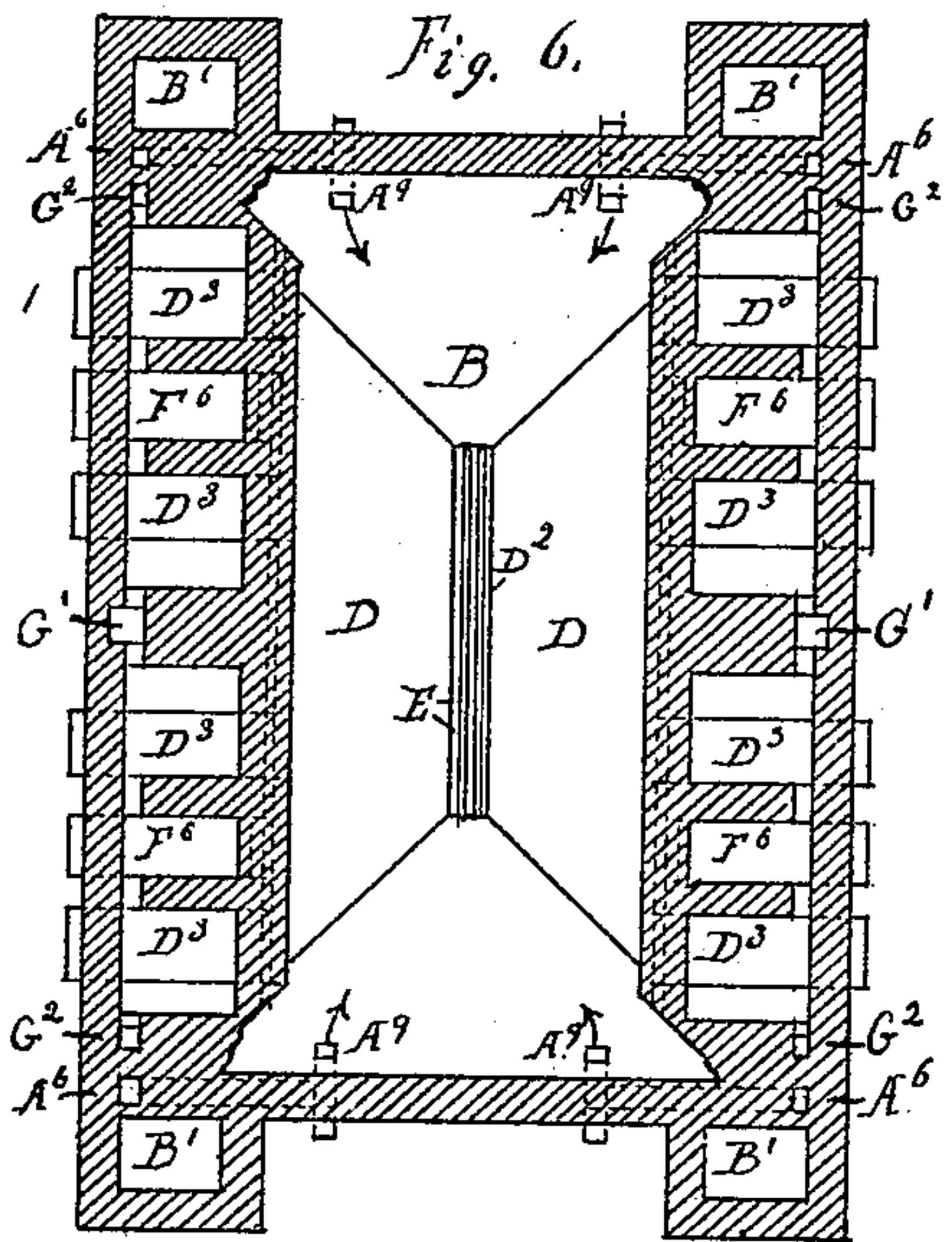
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WITNESSES.

H. Hooley.  
Eugene Vivarttas.

INVENTOR.

Aloha Vivarttas.

(No Model.)

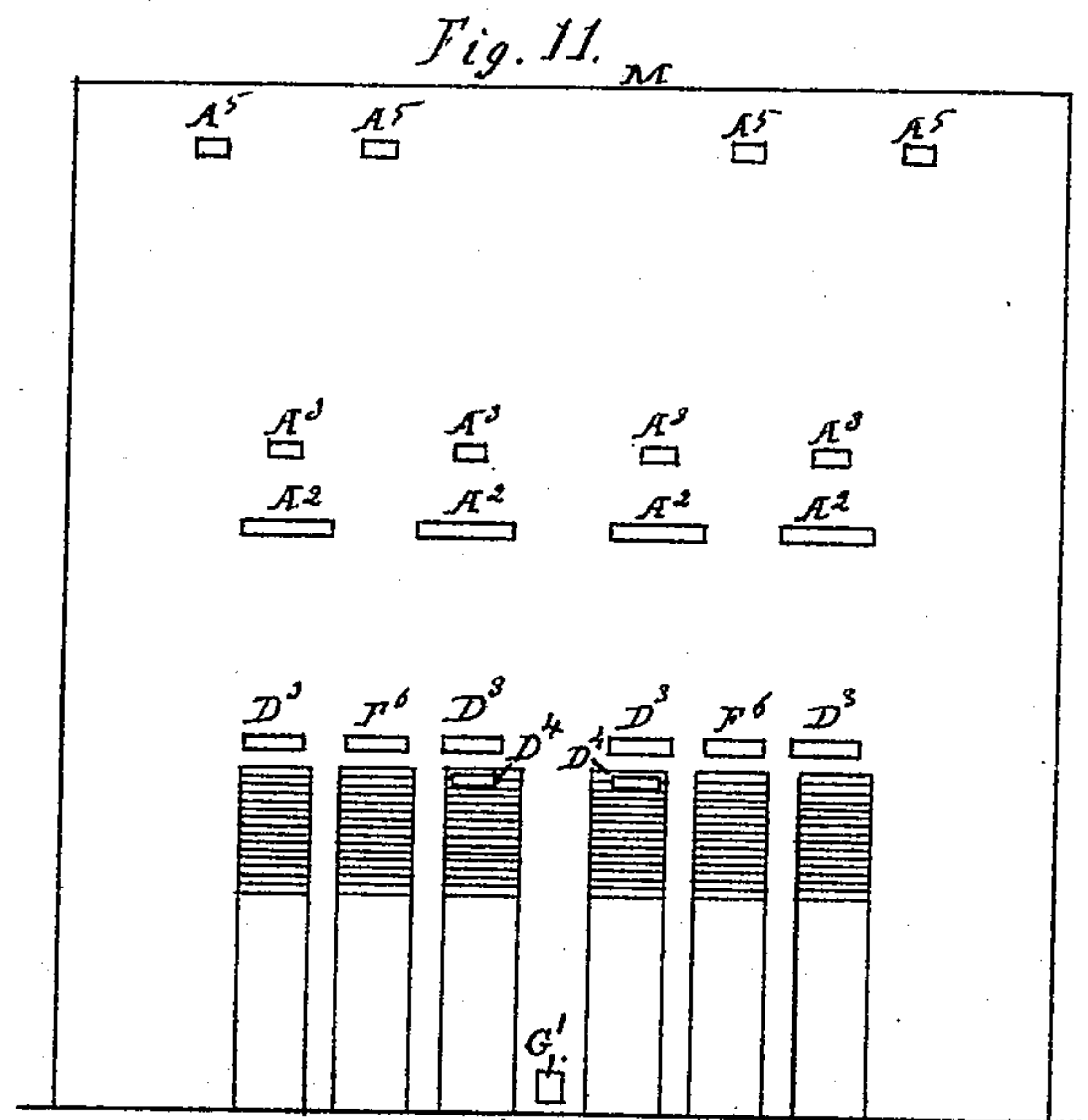
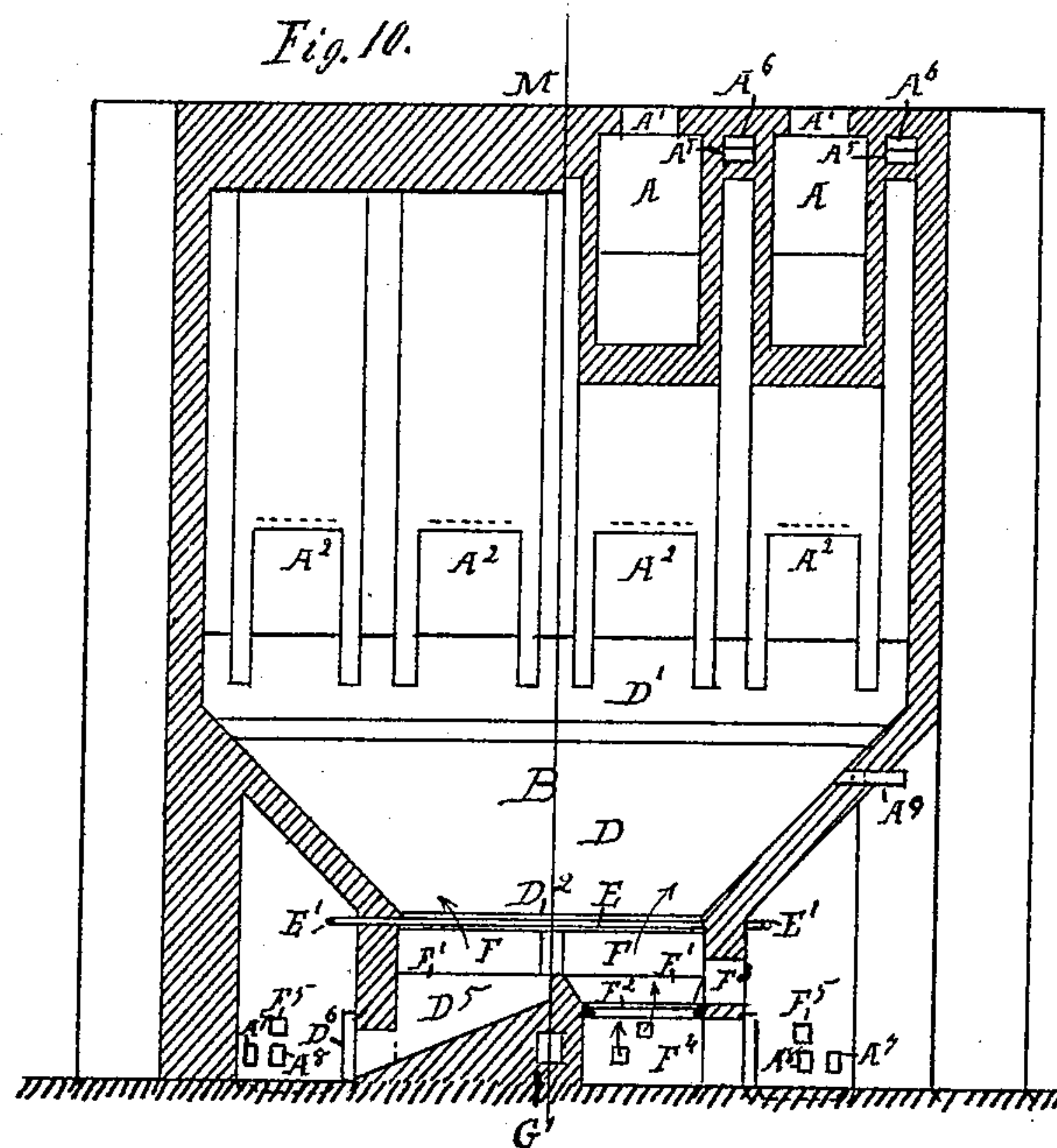
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WITNESSES.

V. Looney.  
Eugene Vivarttas.

INVENTOR.

Aloha Vivarttas.



# UNITED STATES PATENT OFFICE.

ALOHA VIVARTTAS, OF WEST HOBOKEN, NEW JERSEY, ASSIGNOR TO  
ELMER L. SERGENT, OF HARTWICK, NEW YORK.

## FURNACE FOR CREMATING GARBAGE.

SPECIFICATION forming part of Letters Patent No. 390,922, dated October 9, 1888.

Application filed February 3, 1888. Serial No. 262,945. (No model.)

*To all whom it may concern:*

Be it known that I, ALOHA VIVARTTAS, a citizen of the United States, and a resident of West Hoboken, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Furnaces for Cremating Garbage, of which the following is a specification.

In the process of purifying garbage or the street-sweepings, night-soil, stable-refuse, &c., of cities, as proposed by me, the garbage is first screened to separate the ashes, bits of metal, stone, or crockery from the vegetable and animal matters. These last, whether washed with water and squeezed between rolls, as is sometimes done, or simply screened, are dried in suitable ovens or chambers, from which they pass directly to the combustion-chamber, where they are consumed and reduced to inodorous and innocuous gases, which are discharged through the chimney to the upper air, leaving but a very small percentage of ashes.

My invention relates more particularly to the last—the process of drying and consuming the organic matters; and it consists of a furnace or crematory containing in itself the whole arrangement of drying and heating chambers, combustion-chamber and hearths, and auxiliary coal-furnaces for hastening and insuring the perfect and complete combustion of the garbage with the least expense and without manipulation further than to place it in the drying-cells, as herein set forth.

Of the accompanying drawings, Figure 1 is a perspective view of my furnace. Fig. 2 is a plan view of the top of furnace. Fig. 3 is a horizontal sectional view on line *z*, Fig. 8, taken through the dry-cells, combustion-chamber, and air-passages in the upper part of the furnace. Fig. 4 is a horizontal sectional view on line *y*, Fig. 8, taken through the dry-cells, combustion-chamber, and air-heating chamber. Fig. 5 is a horizontal sectional view on line *x*, Fig. 8, taken through the lower part of the dry-cells, the combustion and hot-air chambers, showing the gates at the bottom of the dry-cells. Fig. 6 is a horizontal sectional view on line *w*, Fig. 8, taken through the hot-air chamber, upper hearth, and combustion-chamber. Fig. 7 is a horizontal sectional view

on line *v*, Fig. 8, taken through the coal-furnaces below the throat of the combustion-chamber. Fig. 8 is a vertical sectional view on line *u*, Fig. 7, taken one half through combustion-chamber and coal-furnace, but between the dry-cells, the other half through the combustion-chamber, coal-furnace, and also through a dry-cell. Fig. 9 is an elevation of end of furnace. Fig. 10 is a vertical sectional view on line *t*, Fig. 7, taken one half through the combustion-chamber, coal-furnace, and dry-cells. Fig. 11 is an elevation of side of furnace.

The same letters refer to the same parts throughout.

I use one or more drying chambers or cells, A, so placed in the upper part of a combustion chamber or furnace, B, that the flames or gases in process of combustion therein shall have free passage around and between the cells A to the downtake B' of the combustion-chamber, from which they pass through flues C' to the chimney C.

The object and effect of leading the gases through the downtake B' is to retard the flow thereof, giving time and pressure to insure complete chemical reaction and destruction of all noxious qualities, for as under a forced draft fuel is completely consumed with only about two-thirds as much atmospheric air as is required for the same result with a natural draft or partial vacuum in the fire-space, so, also, will a forced draft or pressure in the furnace give more perfect results with better economy in burning the gases or solids discharged from the drying-chamber A than are attained by other methods. The drying-chambers A have an inlet or door, A', for supplying them with garbage when the doors A' are closed during the drying process.

In the lower part of A is an outlet-gate, A<sup>2</sup>, which is opened when the garbage is sufficiently dried, and, allowing it to drop to the combustion-chamber B, the gate A<sup>2</sup> is then closed and another charge supplied through A'. The chamber A is also supplied with a hot-air inlet and gate, A<sup>3</sup>, through which hot air is driven over and through the garbage, passing out at A<sup>4</sup> through the passages A<sup>6</sup>. The passage A<sup>6</sup> is provided with a gate, A<sup>5</sup>, which is closed to prevent the escape of the



gases when the door A' is opened to recharge the chamber A. The passage A<sup>6</sup> is provided with a connection and gate, A<sup>7</sup>, leading to the downtake B', and connection and gate A<sup>8</sup>, leading to the ash-pit F<sup>1</sup> under the coal-grate F<sup>2</sup>, also a connection and gate, A<sup>9</sup>, leading to the combustion-chamber B. The object of these gates and passages is to permit the air which has been driven through the chamber A, bringing away much fetid moisture and gases, to be delivered either to the combustion-chamber B, to the downtake B', or under the grate F<sup>2</sup>, as may be best suited to the various classes of material to be purified. It will be seen that by this arrangement the garbage while in the chamber A is subjected to great heat and also a current of hot air, which together have the effect of thoroughly drying the mass without in any way checking the fires in the chamber B, thus producing the most perfect results with the greatest economy of labor and fuel.

The hearth of the combustion-chamber B consists of a lower hearth, D, and upper hearth, D', both so made that the material from the drying-cells A will, by the action of gravity, spread itself and work across the hearths in a loose and comparatively thin mass, with a large surface exposed to the hot gases and flames contained in the chamber B. To increase this effect the upper hearth, D', is made to overhang the hearth D, so that in its passage across them the material may drop from D' to D, and at the same time be subject to a current of hot air by opening the gate D<sup>3</sup>, or to flames from the coal-furnace through the gate D<sup>4</sup>, as may be best suited to its nature. Another gate, F<sup>6</sup>, is also provided, through which heated air can be passed into the coal-furnace above the grate for the purpose of supplying sufficient oxygen through the throat D<sup>2</sup> of the hearth D to insure the perfect combustion of the matter on them.

The throat D<sup>2</sup> of the hearth D is provided with one or more grate-bars, consisting of tubes or hollow bars E, through which a current of water is passed to keep them cool. These bars E act as a grate, preventing the material from dropping through into the ash-pit D<sup>5</sup> before it has had time to burn. The ash-pit D<sup>5</sup> is made with a sloping bottom, as shown, which facilitates the removal of the ashes, and also causes any melted glass or other matter to run at once to the door D<sup>6</sup>, where it can be removed without interfering with the operation of the furnace. The ash-pit D<sup>5</sup> is located directly under the throat D<sup>2</sup>, and receives whatever of ash or residuum may come from the combustion-chamber B; but the coal-furnaces F are set back from the throat D<sup>2</sup> under the hearth D, where they can be better controlled and cleaned, and also so as to keep the ashes of the coal in the ash-pit F<sup>1</sup> separated from that of the garbage in D<sup>5</sup>, and where they can be removed without affecting the air-pressure in the chamber B.

The furnace F is provided with a bridge-

wall, F', grate F<sup>2</sup>, and door F<sup>3</sup>, which divides it, as described, from the ash-pit D<sup>5</sup>, and, being entirely distinct from the combustion-chamber, may use any suitable fuel.

For the purpose of heating the air and supplying it to the desired points, as described, suitable chambers, G, and passages G<sup>2</sup> are made in the walls of the furnace, as shown. Air is forced through these at the desired pressure by means of one or more blowers or blast-engines, H, connected with the passage G'. The blower H may be of any suitable style and located where convenient, and may be driven by steam or other power.

The furnace walls and gates, with the drying-chambers, hearths, &c., being made of fire-clay or other very refractory material, admit of the use of the very intense heat generated in the combustion-chamber B, in the drying-cells A, and air-heating chamber G, so that the air or gas, when admitted to the drying-chamber A or combustion-chamber B, may have a temperature far higher than could be used with metal pipes or valves, whereby a great gain is effected in the efficiency and economy of the whole operation, and the gases finally passed into the chimney C at as high a temperature as possible, causing them, by the reason of their great expansion, to rapidly seek the upper regions of the atmosphere of specific gravity equal to their own.

The form of my furnace admits of great variation. Also, the number of the drying-cells and coal-grates is not essential; but in practice I prefer to use several drying-chambers so located with reference to one combustion-chamber that they may be filled and emptied in regular rotation or alternation, keeping the operation in the combustion-chamber uniform and continuous for any length of time. For similar reasons I divide my auxiliary coal-fire into two or more grates, so that feeding coal or removing the ashes from any one of them has a minimum of effect on the operation in the combustion-chamber.

The chimney C is connected with the downtake B' by the flues C', and may be upon an independent foundation and serve for two or more furnaces or not, as may be preferred.

In Fig. 1 the furnace or crematory is shown at L, the garbage being delivered and dumped at M, where it may be brought either in carts or by special elevating machinery, as preferred. From M it is passed into the drying-chambers through the openings A', as required.

Having thus described the nature and uses of my invention, I claim—

1. In a furnace for cremating garbage, the drying-chamber A, having inlet with cover A' and outlet-gate A<sup>2</sup>, inlet-gate for air, A<sup>3</sup>, outlet A<sup>4</sup>, gates A<sup>5</sup>, passage A<sup>6</sup>, and gates A<sup>7</sup>, A<sup>8</sup>, and A<sup>9</sup>, in combination with the combustion-chamber B, furnace F, and air-heating chamber G, constructed and operated substantially as and for the purposes herein shown and described.

2. In a furnace for cremating garbage, the



air-heating chamber G, with inlet G', in combination with the drying-chamber A, gate A<sup>3</sup>, combustion-chamber B, gate D<sup>3</sup>, furnace F, gates F<sup>5</sup> F<sup>7</sup>, and blower H, constructed and operated substantially as and for the purposes herein shown and described.

Signed at New York, in the county of New

York and State of New York, this 2d day of February, A. D. 1888.

ALOHA VIVARTTAS.

Witnesses:

W. B. HOYT,  
BENJ. T. PETTY.