

R. H. GORDON, Jr.
FURNACE FOR STEAM-BOILER.

No. 170,948.

Patented Dec. 14, 1875.

FIG. 1.

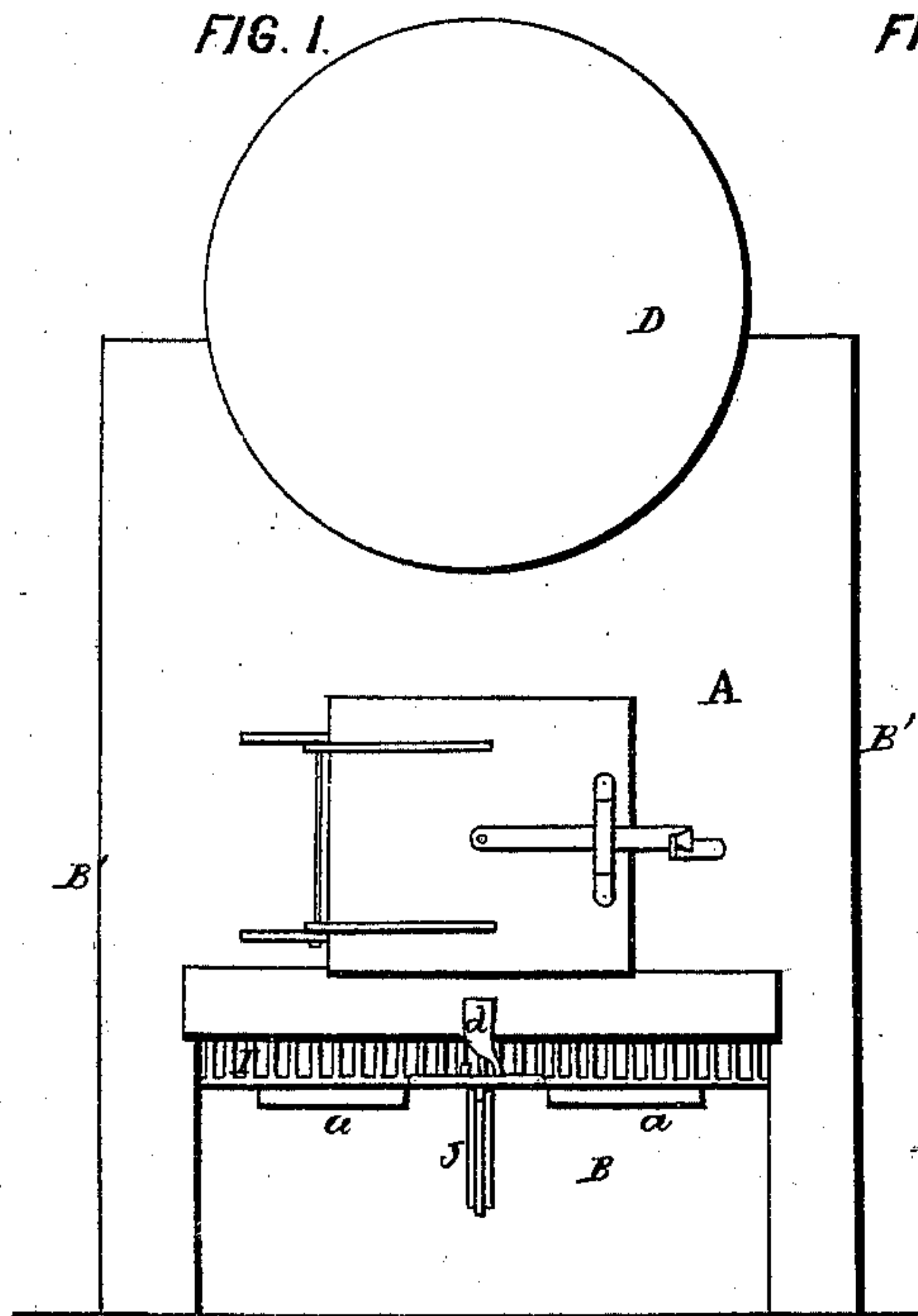


FIG. 2.

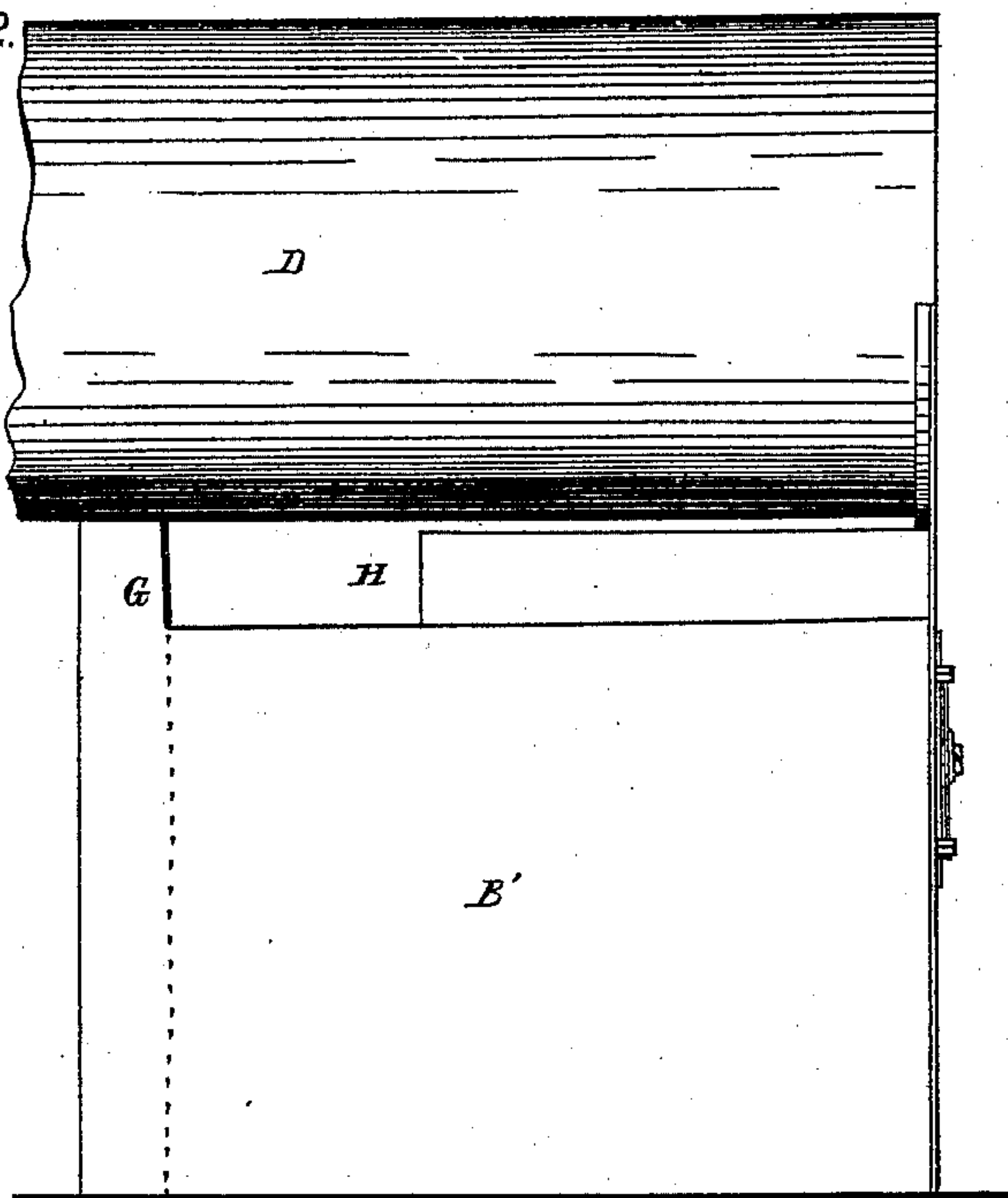


FIG. 3.

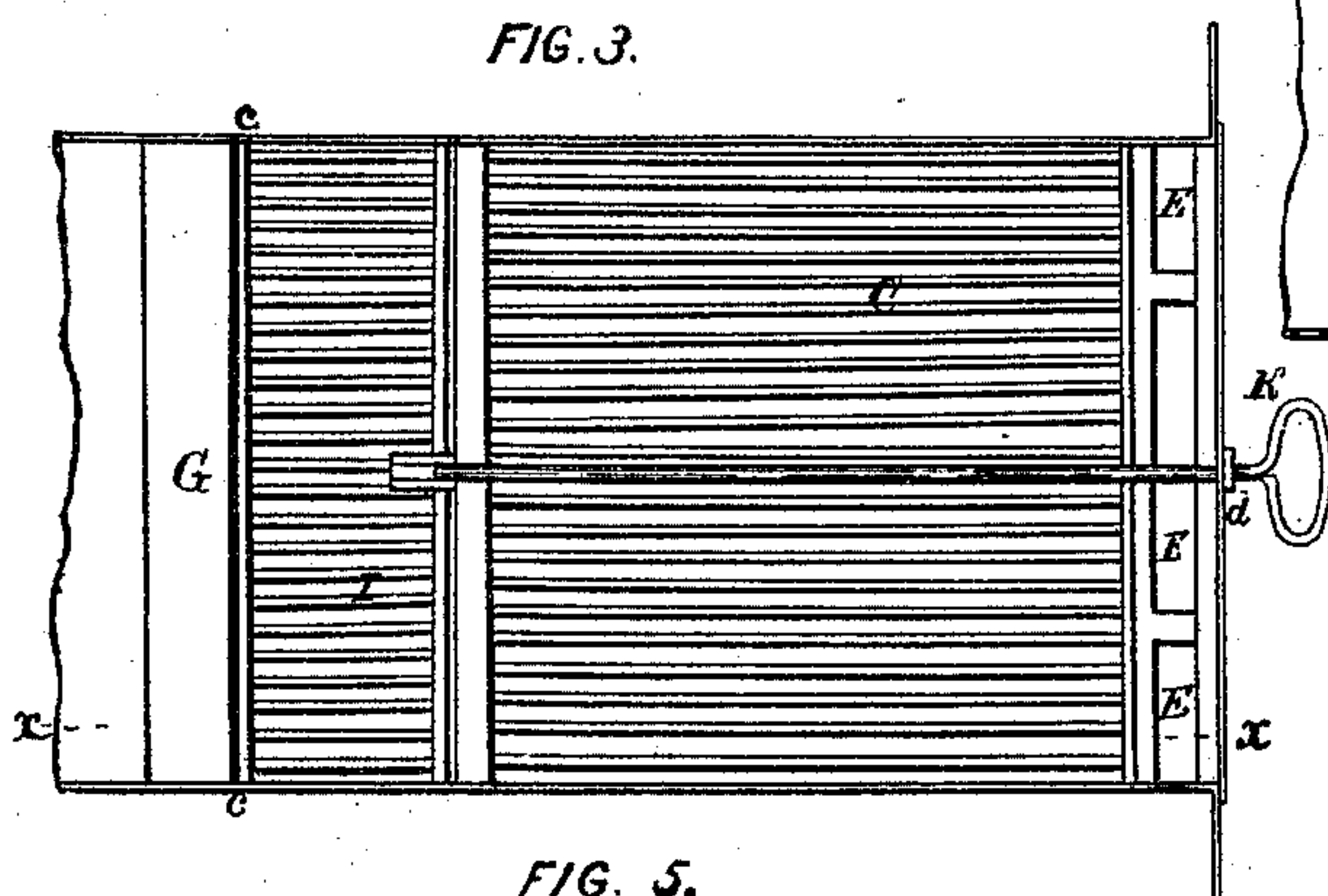


FIG. 5.

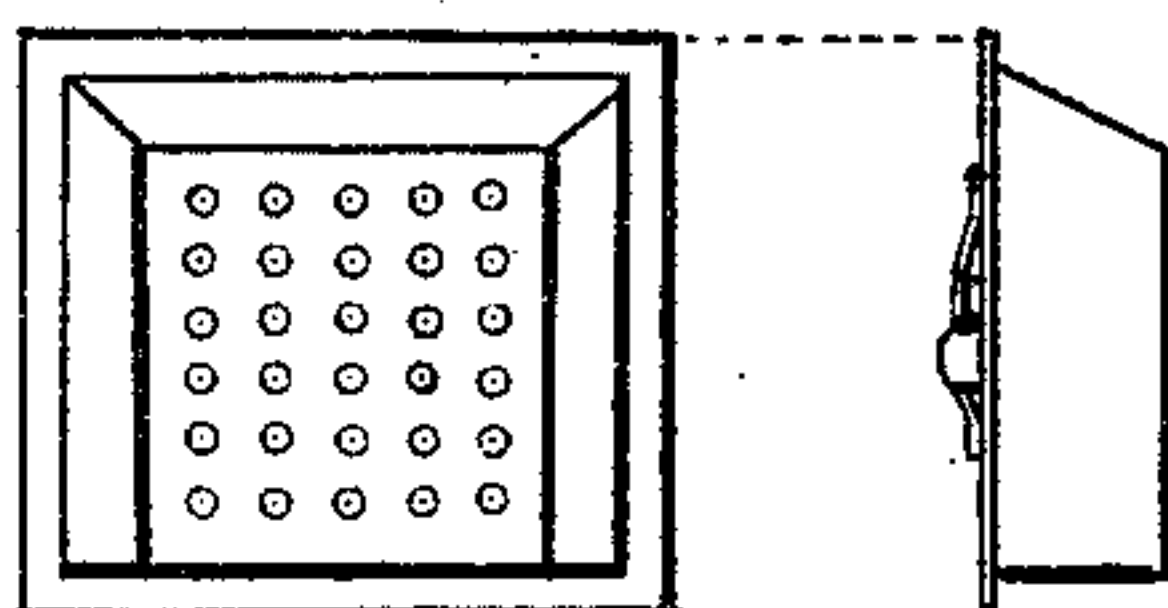
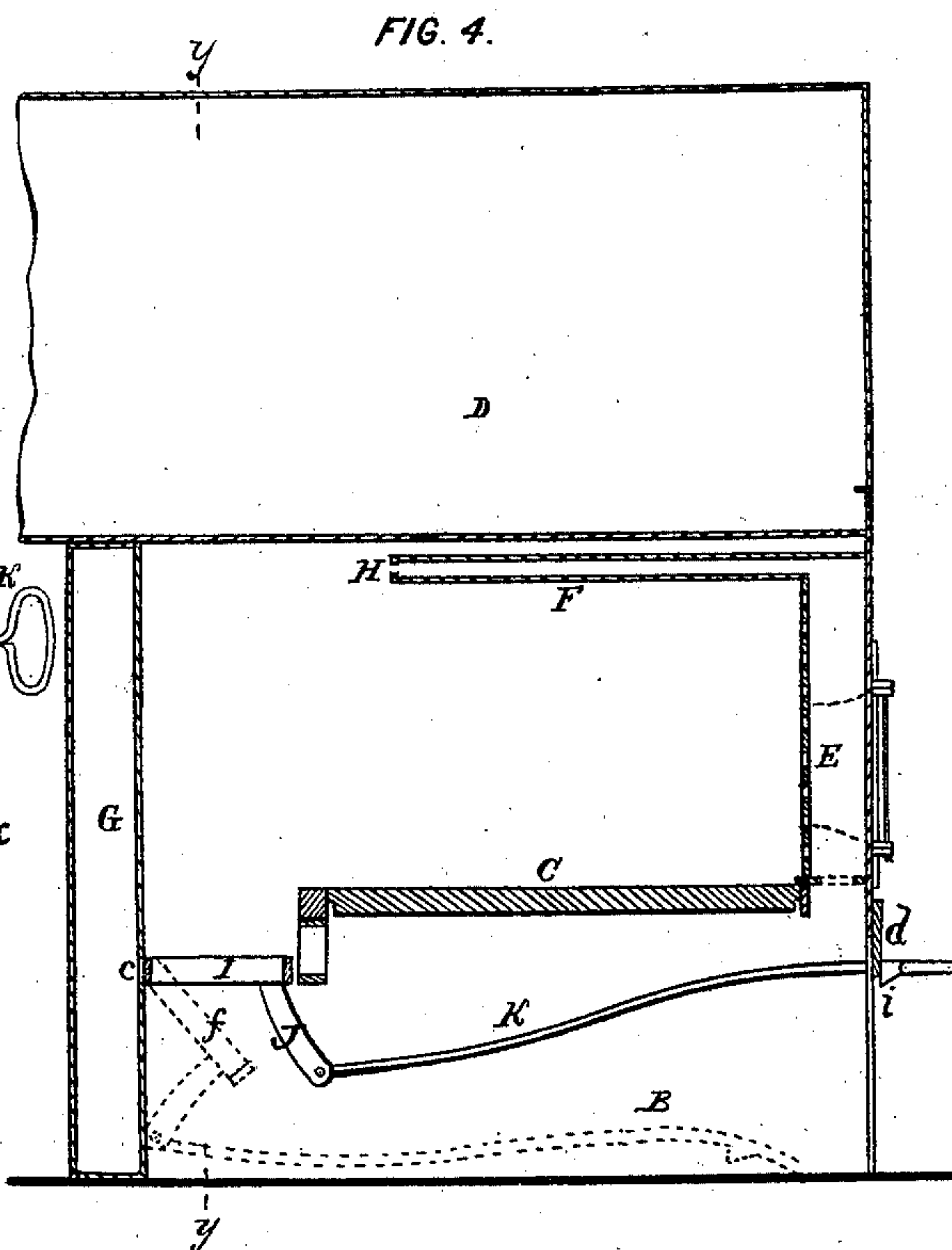


FIG. 4.



WITNESSES.

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FIG. 6.

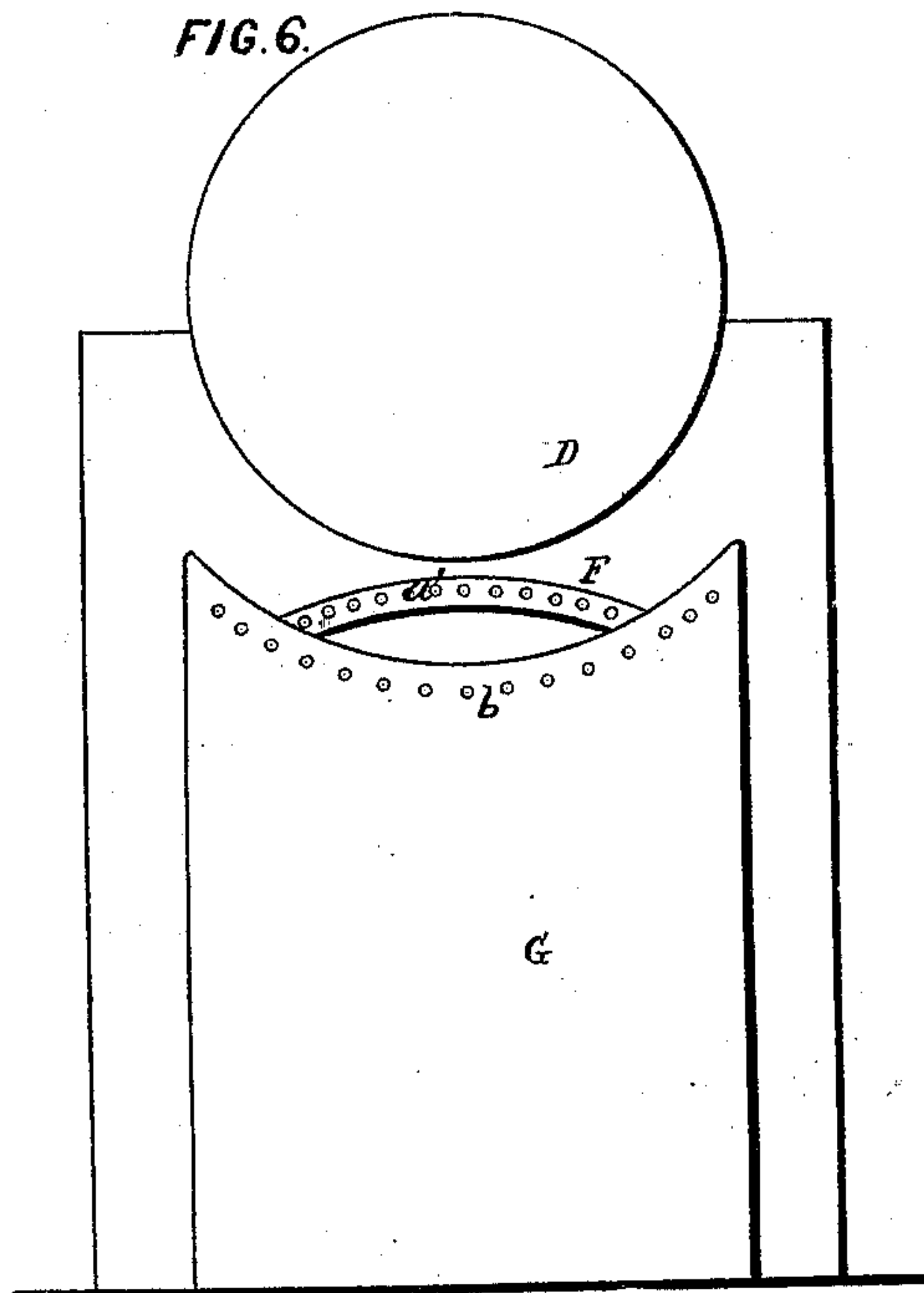
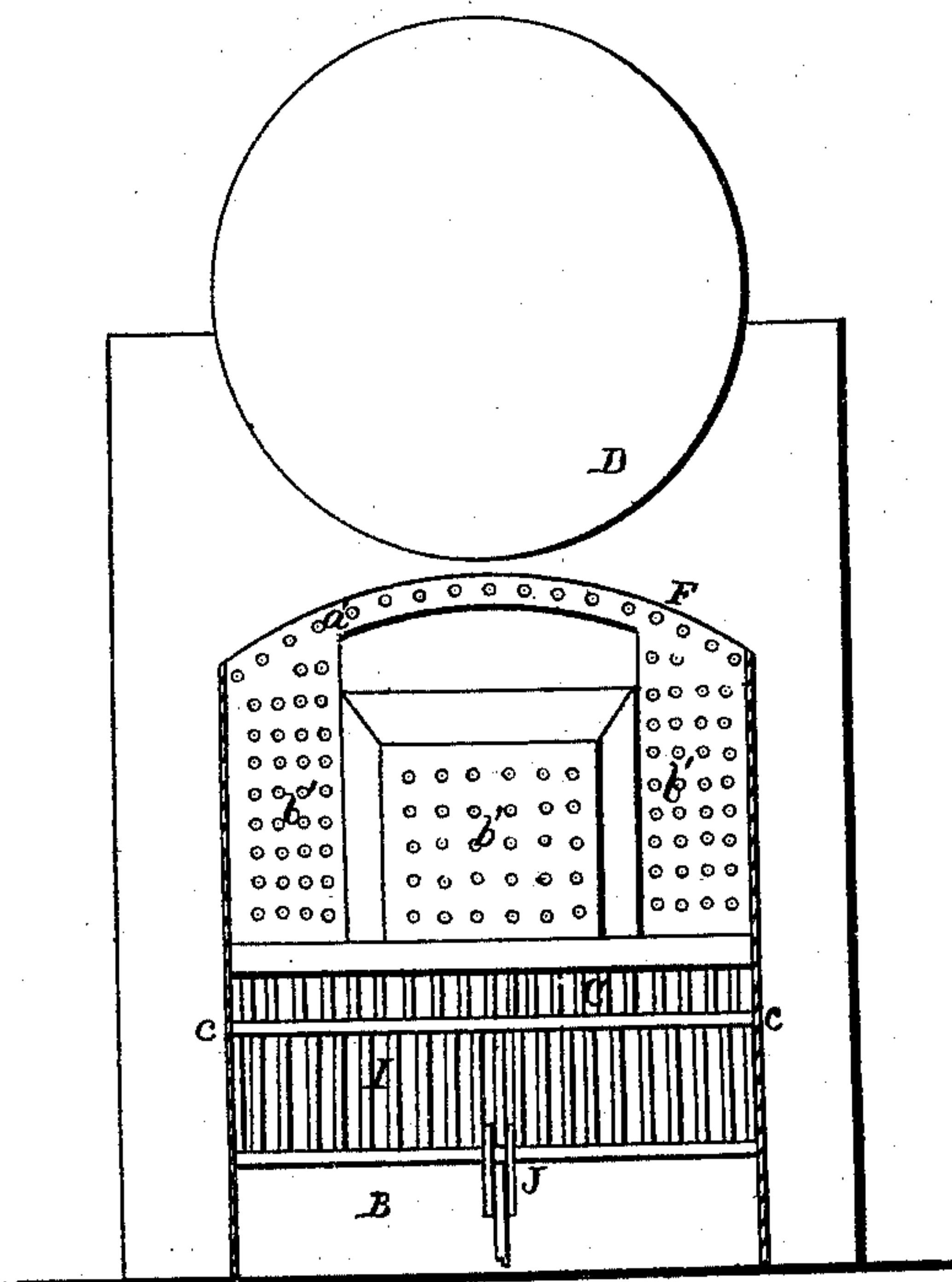


FIG. 7.



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UNITED STATES PATENT OFFICE.

RICHARD H. GORDON, JR., OF CLEVELAND, OHIO.

IMPROVEMENT IN FURNACES FOR STEAM-BOILERS.

Specification forming part of Letters Patent No. **170,948**, dated December 14, 1875; application filed April 19, 1875.

To all whom it may concern:

Be it known that I, RICHARD H. GORDON, Jr., of Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and Improved Furnace for Steam-Boilers, of which the following is a full and complete description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a front view of the furnace. Fig. 2 is a side view. Fig. 3 is a view of the under side. Fig. 4 is a longitudinal vertical section on line *x x* of Fig. 3. Fig. 5 is a detached view. Fig. 6 is a view of the rear end. Fig. 7 is a cross-section on line *y y* of Fig. 4.

Like letters of reference refer to like parts in the several views.

This invention relates to a furnace for steam-boilers, and has for its object an economy in the consumption of fuel, and a complete combustion of the gases eliminated therefrom. Its peculiar construction and arrangement are substantially as follows:

In the drawing, A represents the front of the furnace, B the ash-pit, C the grate, and D the boiler. The door and front wall of the fire-place are hollow, as will be seen at E, Figs. 3 and 4, which hollows open into the ash-pit, as will be seen in Fig. 3, while those in the front wall of the arch communicate at their upper ends with or open into the arch F of the fire-place, which is also hollow. G is the bridge-wall. Said wall is hollow, and opens into the ash-pit at *a a*, Fig. 1, and at the top along its back edge through perforations *b*, Fig. 6, into the horizontal flue, which leads the products of combustion to the uptake.

The rear end of the arch F is perforated with holes *a'*, Fig. 7, which, as will be observed, open over and toward the rear end of the fire-place. At the rear end of the fire-grate above referred to is arranged a dump-grate, I, hinged at the points *c* in the sides of the fire-place. To the arm J of the tilting-grate is attached a handle, K, reaching out to the front of the furnace and lodged in the hanger *d*, as will be seen in the drawings, Fig. 4. The inside wall of the front of the furnace and of the door are perforated with holes *b'*, as will be seen in Fig. 7.

In having the front of the furnace and its

door hollow and opening into the ash-pit, and also by having the inner wall perforated with holes, I am enabled to supply the fire with a draft of heated air directly in the front and at various distances upward from the surface of the fire, thereby causing the fuel to burn clearer, brighter, and stronger than if the draft were confined to the bottom of the fire by passing through the grates. The smoke and gas immediately over the bed of burning fuel are supplied with air, so that the most of them are consumed before passing over the bridge-wall, and as they ascend to pass over said wall, a further supply of heated air is given them from the hollow arch passing therefrom through the perforations *a'*. This subsidiary supply of air continues the consumption of the smoke at the rear of the fire-place directly in front of the bridge-wall. All the yet unconsumed smoke and gas, on passing over the wall, are again supplied with air issuing from the bridge-wall through the perforations. This third re-enforcement of air nearly, if not completely, causes the absolute consumption of all the smoke, &c., generated by the furnace, so that but little of any heat-producing element of the fuel is lost for want of sufficient air to support its combustion.

By means of the dump-grate I am enabled to remove all the clinkers and unburnable material that is too large to fall through the grate from the rear end of the fire-place. The clinkers, &c., can be worked back by the poker onto the dump-grate, and therefrom removed by dropping the grate, allowing the waste to slide therefrom into the ash-pit. By this means the fire can be kept in better condition than if the waste were raked to the front, to be removed by way of the door.

The grate is dumped by means of the handle K, which, for that purpose, is lifted from the hanger *d*, which will permit the front edge of the grate to fall down, as indicated by the dotted lines, Fig. 4. The grate is held up by the hook on the end of the handle, which, when caught on the hanger, as shown in Fig. 4, prevents the grate from dropping.

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

1. In a furnace for steam-boilers, the combination of a hollow arch-front and a hollow

horizontal perforated air-flue, through which a portion of the air for the support of the combustion of the fuel passes, the air-spaces in the arch-front communicating with the ash-pit at their lower ends, and with the hollow horizontal flue at their upper ends, substantially in the manner and for the purpose set forth.

2. The combination of the hollow perforated arch-front A, the hollow perforated door, and the arch F, the parts being constructed and arranged with reference to each other, substantially as set forth.

3. The combination of the hollow perforated bridge-wall G, and the perforated flue F, the perforations in the wall being so arranged as to supply air to the gases after they have passed that point and those in the arch-flue, so as to supply air to the same while they are passing over the incandescent fuel upon the grates, substantially as shown and described.

RICHARD H. GORDON, JR.

Witnesses:

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