

E. BOILEAU.
FURNACE.

Patented Nov. 10, 1885.

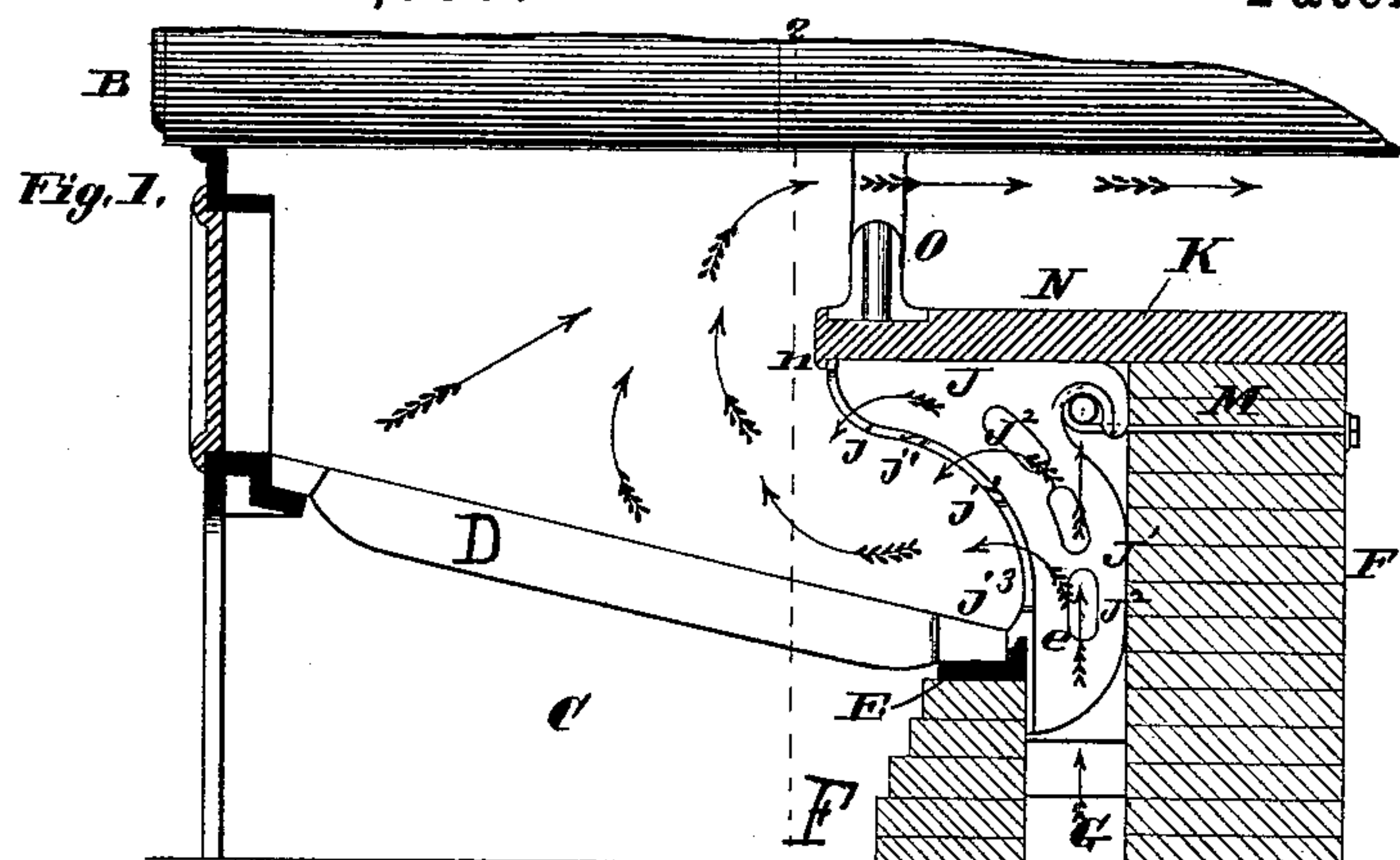


Fig. 4.

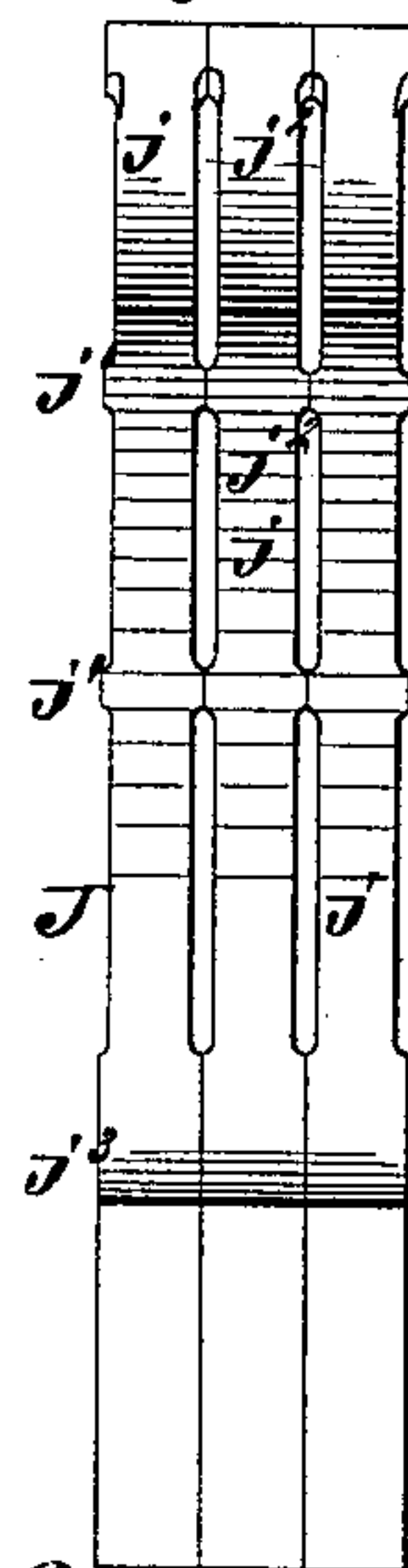


Fig. 5.

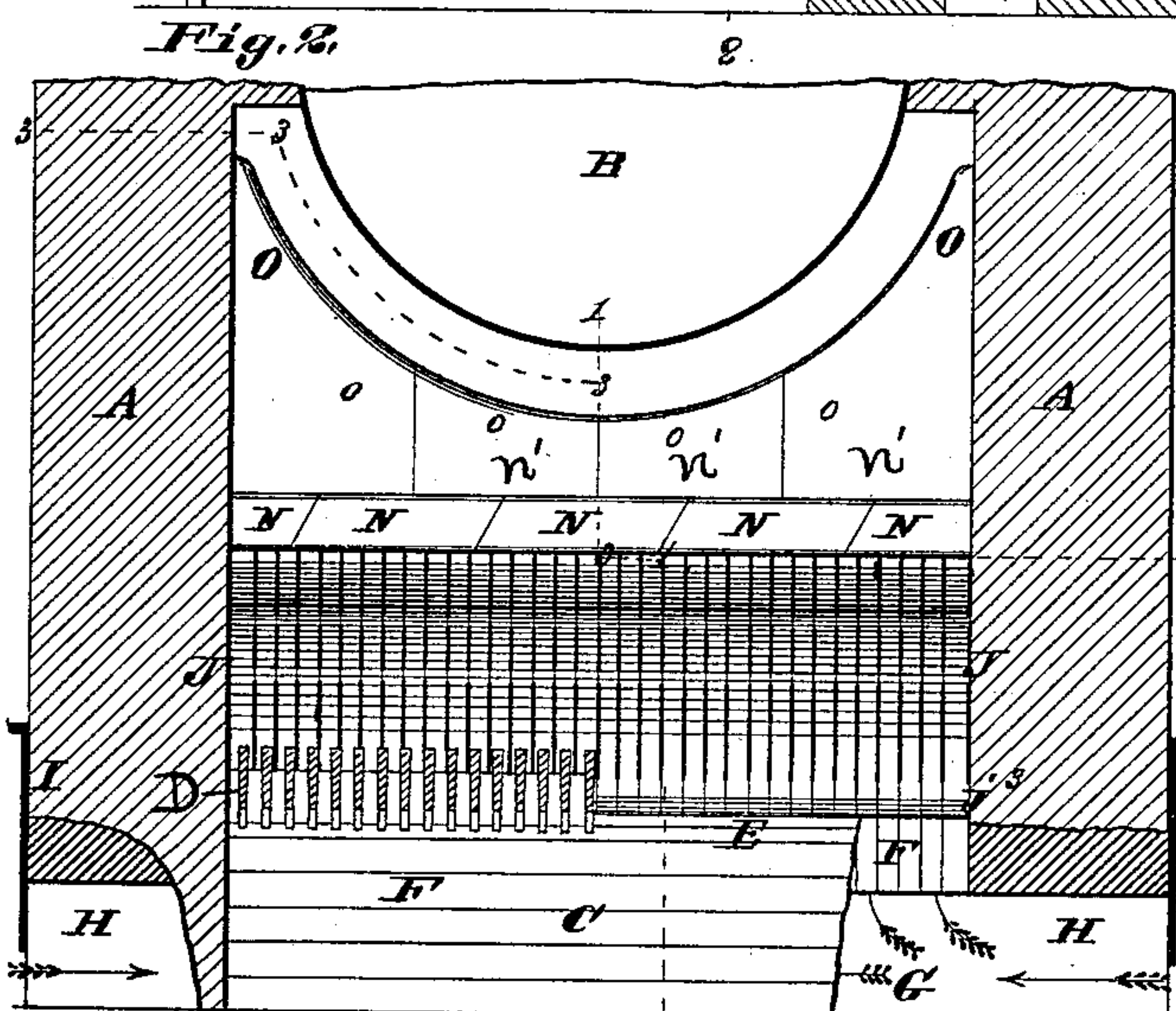
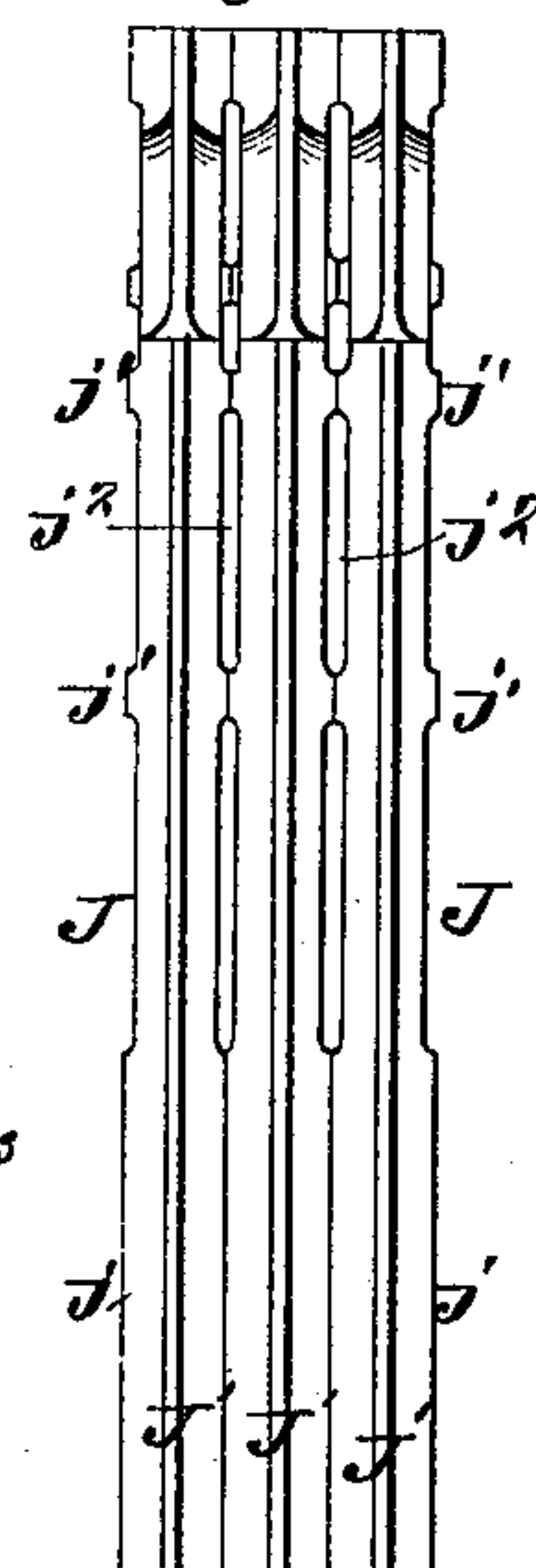


Fig. 6.

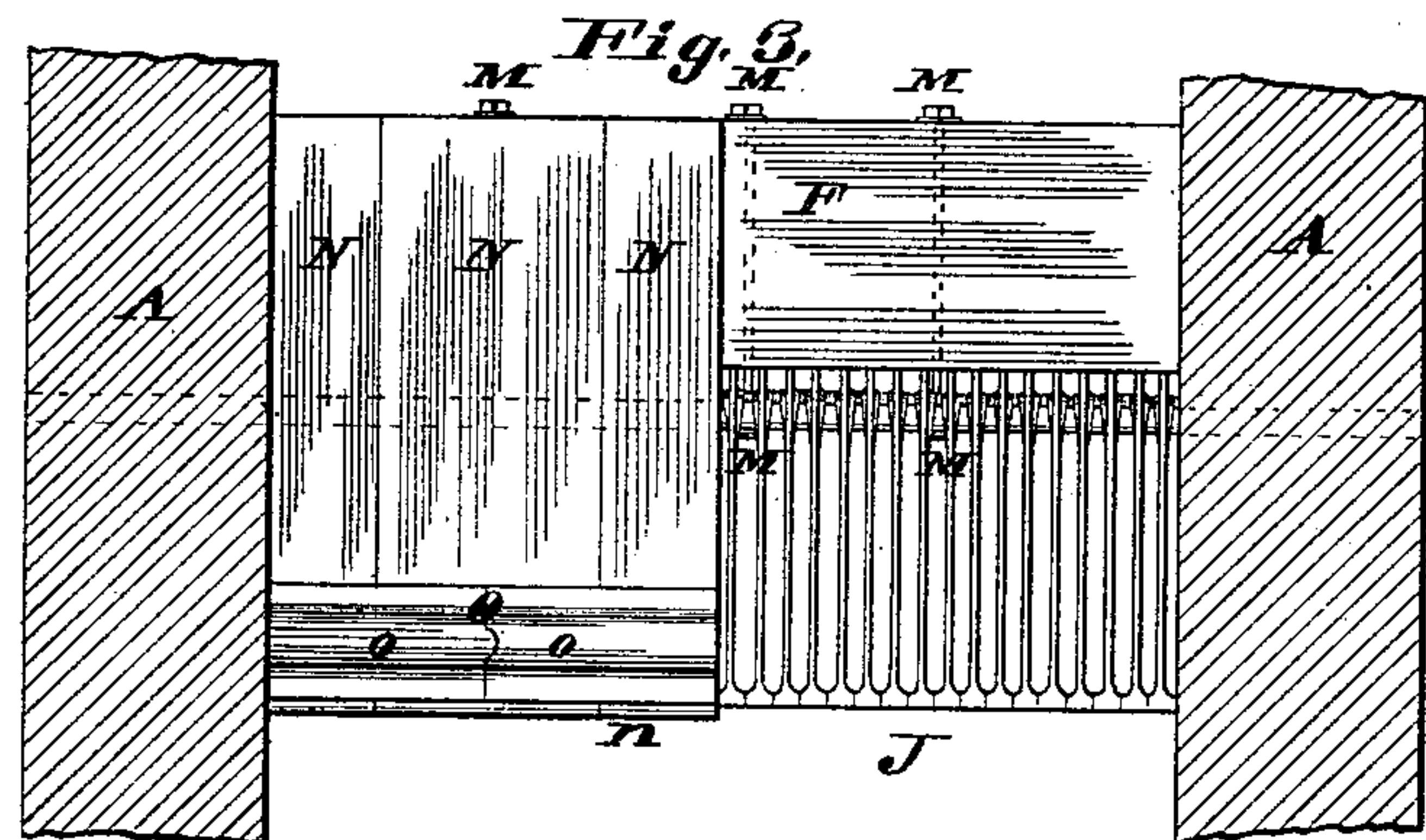
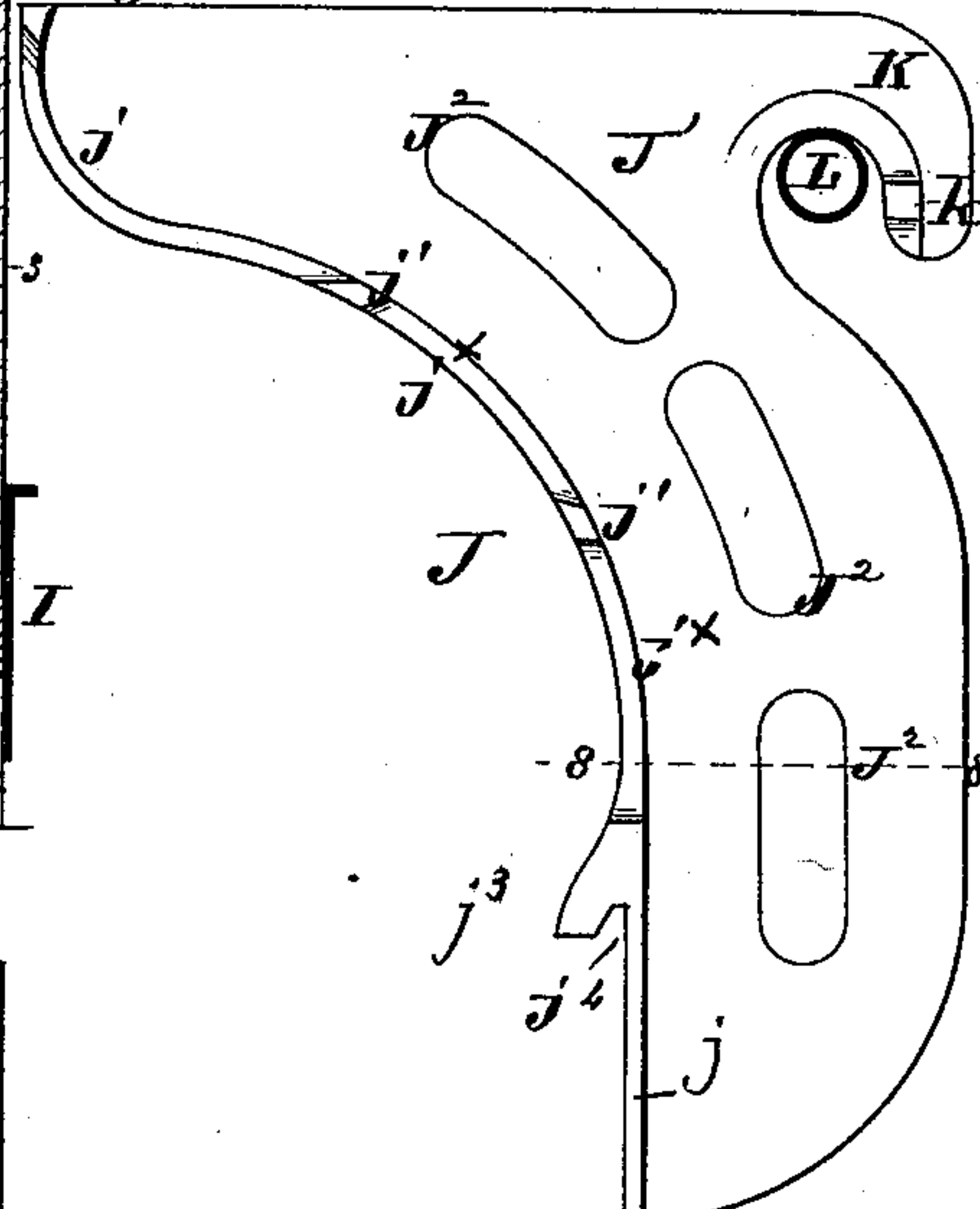


Fig. 7.

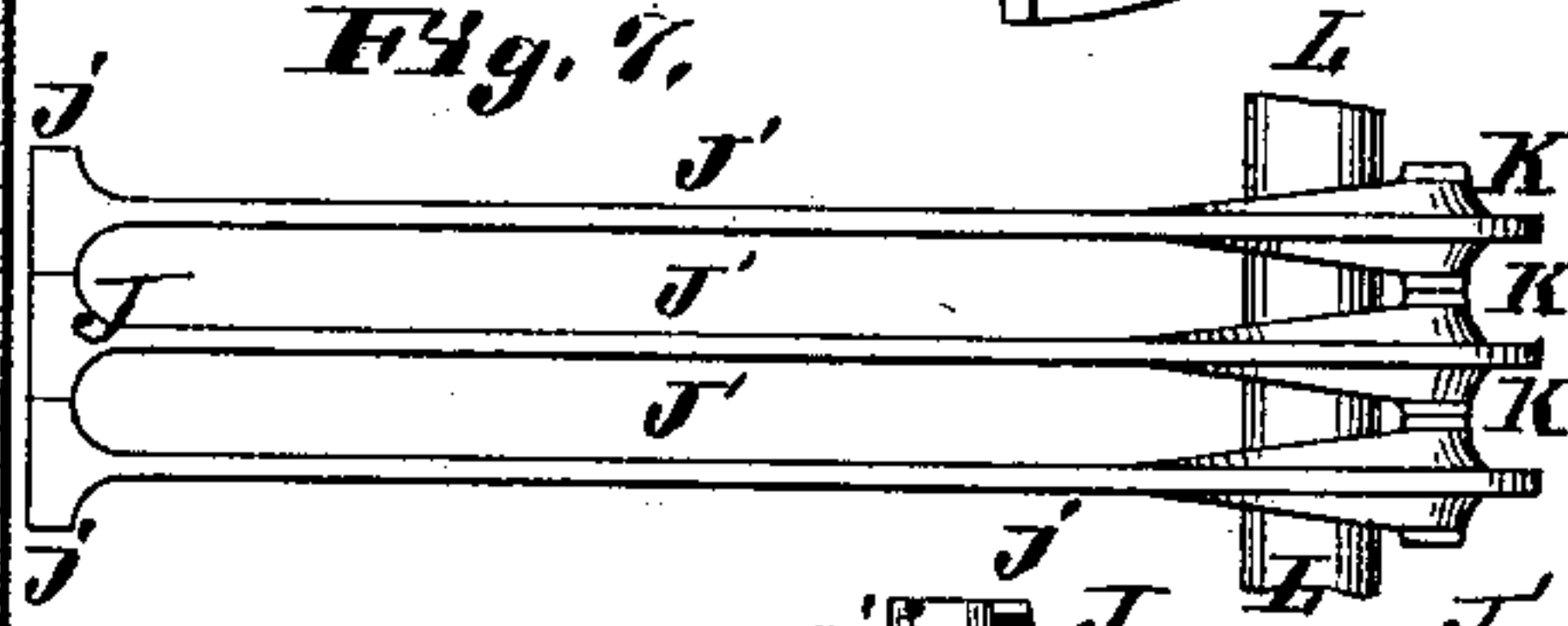
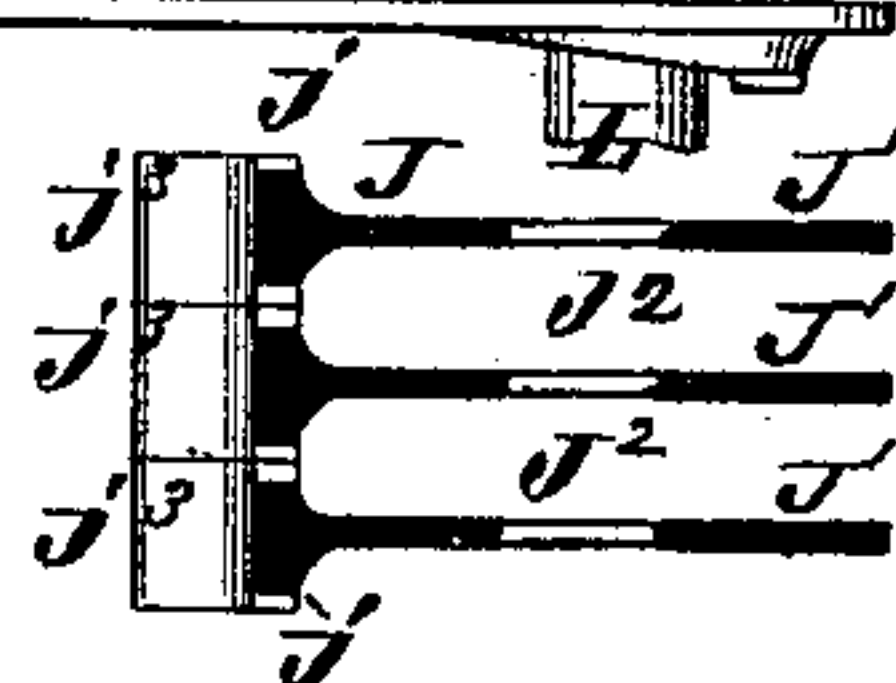


Fig. 8.



Attest:
Geo. L. Wheelock
Victor A. Lewis

Inventor;

Etienne Boileau
By Knight & Bro.

Atty.

UNITED STATES PATENT OFFICE.

ETIENNE BOILEAU, OF ST. LOUIS, MISSOURI.

FURNACE.

SPECIFICATION forming part of Letters Patent No. 329,997, dated November 10, 1885.

Application filed October 18, 1884. Serial No. 145,815. (No model.)

To all whom it may concern:

Be it known that I, ETIENNE BOILEAU, of the city of St. Louis, in the State of Missouri, have invented a certain new and useful Improvement in Furnaces, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

This is an improved device for supplying heated air to the furnace to cause more perfect combustion of the fuel, and the invention also applies to the general construction of the furnace.

The invention is shown and will be described as applied to a steam-boiler furnace; but I do not confine myself to this especial use.

Figure 1 is a longitudinal section of the furnace at 1 1, Fig. 2, showing part of a steam-boiler. Fig. 2 is a transverse section at 2 2, Fig. 1, with parts removed. Fig. 3 is a horizontal section at 3 3, Fig. 2. Fig. 4 is an enlarged face view of three of the upright grate-bars, and Fig. 5 is a back view of same. Fig. 6 is a side view of one of the upright grate-bars. Fig. 7 is a top view of three of these grate-bars. Fig. 8 is a horizontal section at 8 8, Fig. 6.

A A are the side walls of the furnace and boiler-setting. B is a steam-boiler, (the part immediately over the furnace and bridge-wall only being shown.) C is the ash-pit; D, the grate-bars; E, the rear grate-bearing bar, and F the bridge-wall.

The bridge-wall is made with a transverse chamber or passage, G, into which atmospheric air enters through one or more apertures, H, at the side or sides of the boiler-setting. At I are shown dampers to regulate or stop the admission of air through the apertures H. At the open top of the chamber G are the upright grate-bars J, their lower ends being shown descending into said chamber. These grate-bars have a broad thin web, J', having at the front edge a curved double flange, j, that projects over the rear part of the grate-bars D. The flanges of adjoining bars are made to meet at small points or distance-studs j', so as to mutually brace each other against transverse warping. Between the points of bearing j' are recesses j^x, providing

apertures j² for the passage of heated air into the furnace. A large surface of the bars is in contact with the air passing between them, so that the temperature of the bars is kept down, thus avoiding injury to the bars from excessive heat, at the same time the air passing from the chamber G to the furnace becomes highly heated. I make apertures J² in the bars to allow side circulation of the air. The apertures J² would be more useful where the air enters the chamber G from only one side than where it is allowed to enter from both sides, as shown.

The upright bars are each made with a foot, j³, which rests upon the bearing-bar E, the bar being made with a rib, e, on its upper side, which fits in a notch, j⁴, of the foot j³ of each upright bar, so as to prevent displacement.

K is a hook upon the rear side of each upright bar, which takes over a tubular bar, L, extending across the furnace and fixed in the side walls, A.

I prefer that the ends of the bar L shall be open to the atmosphere, so that the passage of air may keep down the temperature of the bar; but this is not essential. In fact, a solid bar may be used in place of the tubular bar L.

At M are hooks engaging the bar or pipe L and anchored in the bridge-wall F. The hooks K have side projections or distance-studs, k, which bear against each other, and thus give mutual support, preventing displacement.

N are cap-tiles, which extend over the top of the upright bars J and the bridge-wall F. I prefer to make these tiles with a downturned lip, n, which engages over the front upper corner of the bars J, and protects the corner from the direct heat of the fire. I also prefer to make the tiles N with beveled edges n', as seen in Fig. 2, so that they will tend to hold each other down in position, and yet any one of them can be removed without disturbance of the others, by lifting one edge first. These tiles are made of fire-clay. Upon the tiles N is a transverse wall, O, of tiles o, the top of the wall being concentric with the boiler, so as to equalize the current of the products of combustion across the whole width of the passage, (between the wall and the boiler.) The vertical edges of the tiles o, of which the wall O is composed, should be fit-

ted together with tongues and grooves, as shown in Fig. 3, so as to give mutual support. These tiles are made of fire-clay.

The grate-bars may be horizontal or inclined more or less.

The upright grate-bars have been described as placed at the back of the furnace. They can be applied to the sides also, if desired, or even to the front.

10 I claim—

1. A grate-bar for chambered furnace-walls, formed with a vertical portion for insertion in the chamber, a horizontal portion adapted to extend over the fire-chamber, and a hook
15 at the rear of the upper portion by which the bar is hung in place.

2. A grate-bar for chambered furnace-walls, formed with a vertical portion, a horizontal portion to extend over the fire-chamber, and
20 a double flange extending in front of the vertical portion and beneath the horizontal portion, and having recesses in its edges.

3. A grate-bar for chambered furnace-walls, formed with a broad thin web, J' , extending
25 vertically and horizontally over the fire-chamber, double flange j , extending in front of the vertical portion of the web, and beneath the horizontal portion thereof, recesses j^x in the edges of the flanges providing studs j'' , apertures J^2 in the web, foot j^3 , notch j^4 , and hook
30 K, having stud k .

4. The combination, with a furnace-wall having a chamber opening into the fire-chamber, of a series of grate-bars having vertical portions extending down into the chamber, 35 and horizontal portions extending over the fire-chamber, said bars having webs flanged at the edges next the fire-chamber.

5. The combination, with a chambered furnace-wall opening into the fire-chamber, of
40 the grate-bars having vertical portions occupying the chamber and horizontal portions extending over the fire-chamber, and the cap-tiles extending over the furnace-wall and over the horizontal portions of the grate-bars, sub- 45 stantially as set forth.

6. The combination of a furnace-wall having chamber G and bar extending across the chamber, and the grate-bars J, having hooks
50 K and feet j^3 , by which they are supported.

7. The combination, with the furnace bridge-wall and boiler, of the supplemental wall formed of removable interlocking upright and horizontal tiles, the upright tiles having their
55 tops conforming in shape to the portion of the boiler above, substantially as set forth.

ETIENNE BOILEAU.

Witnesses:

SAML. KNIGHT,

BENJN. A. KNIGHT.