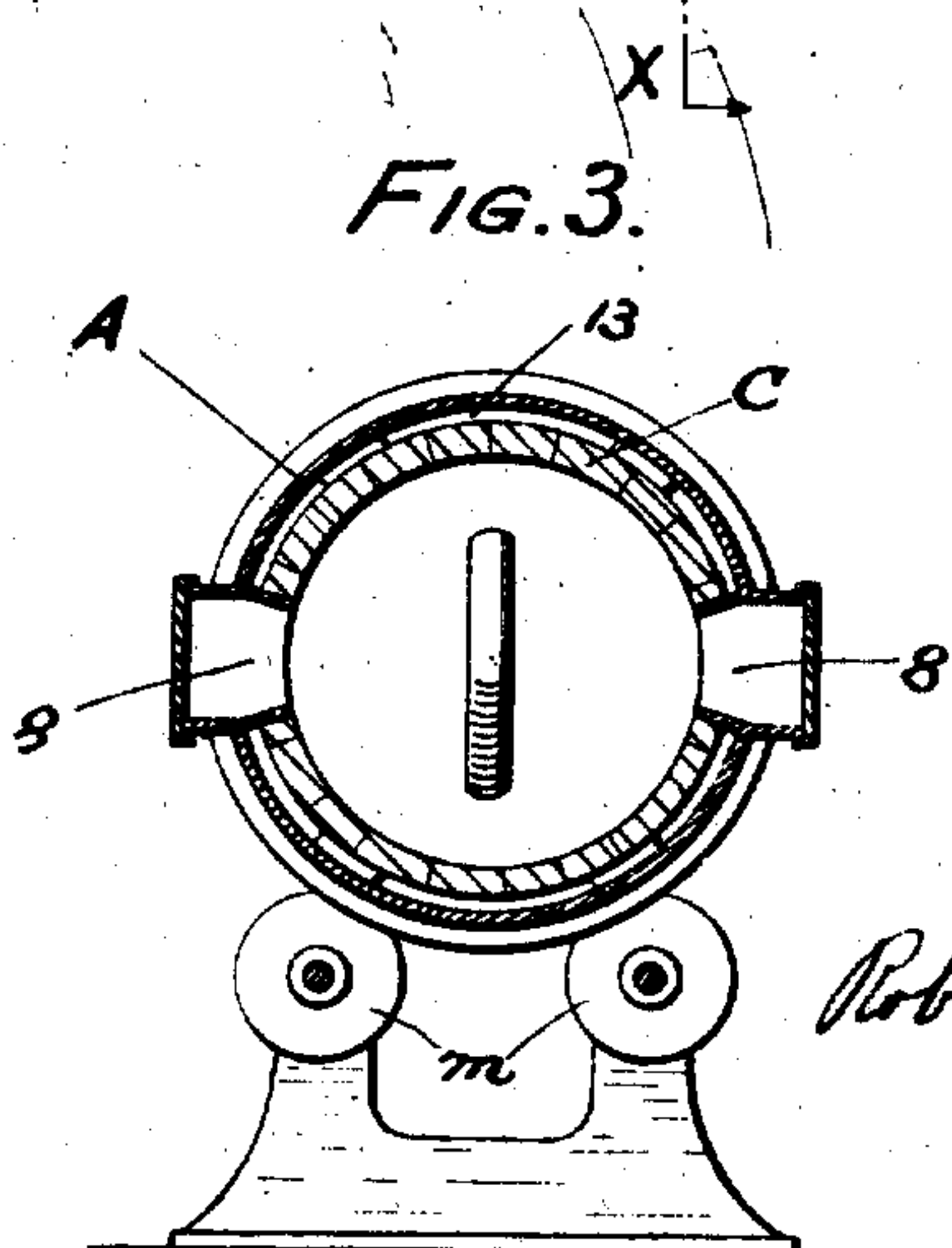
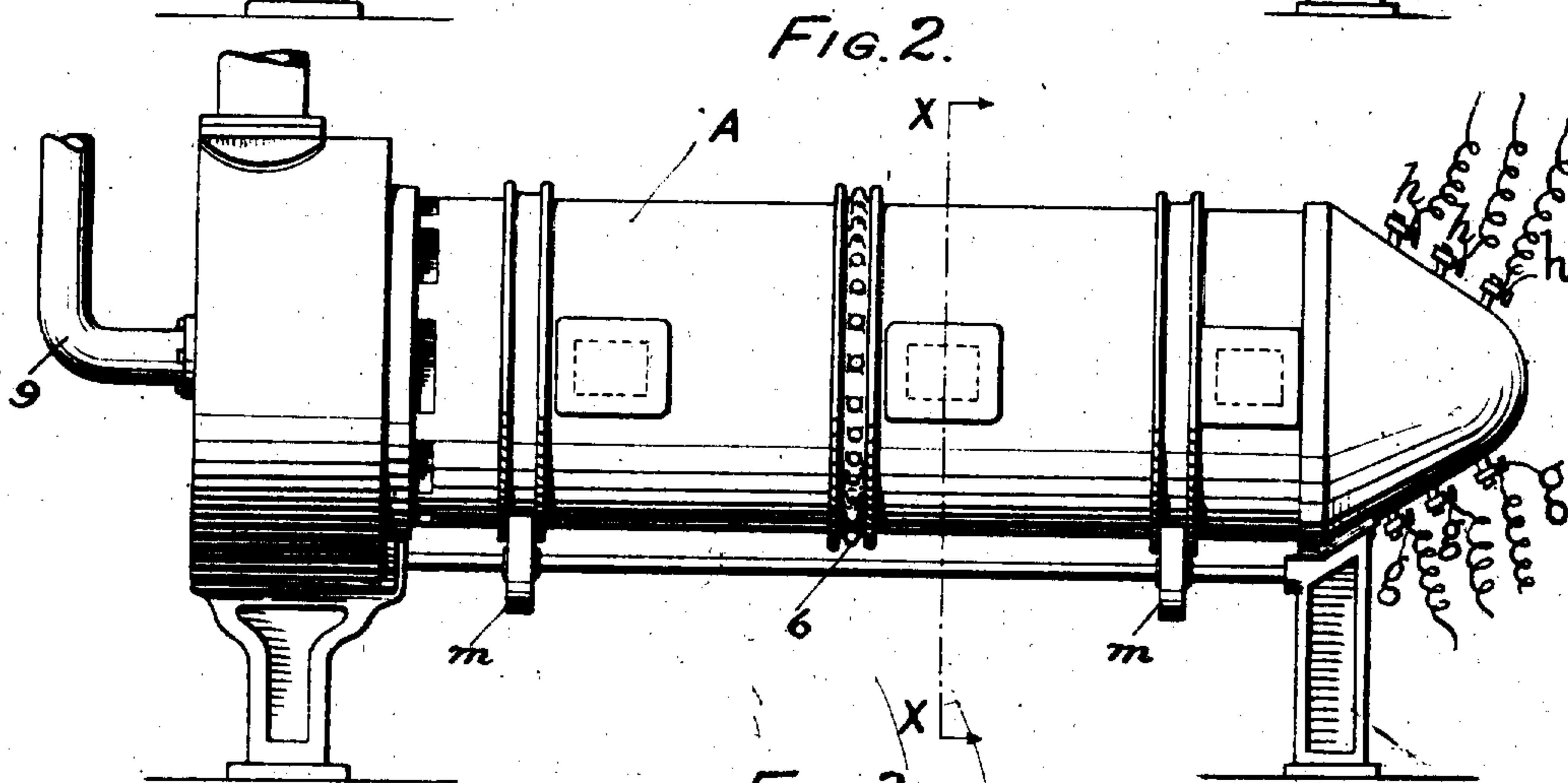
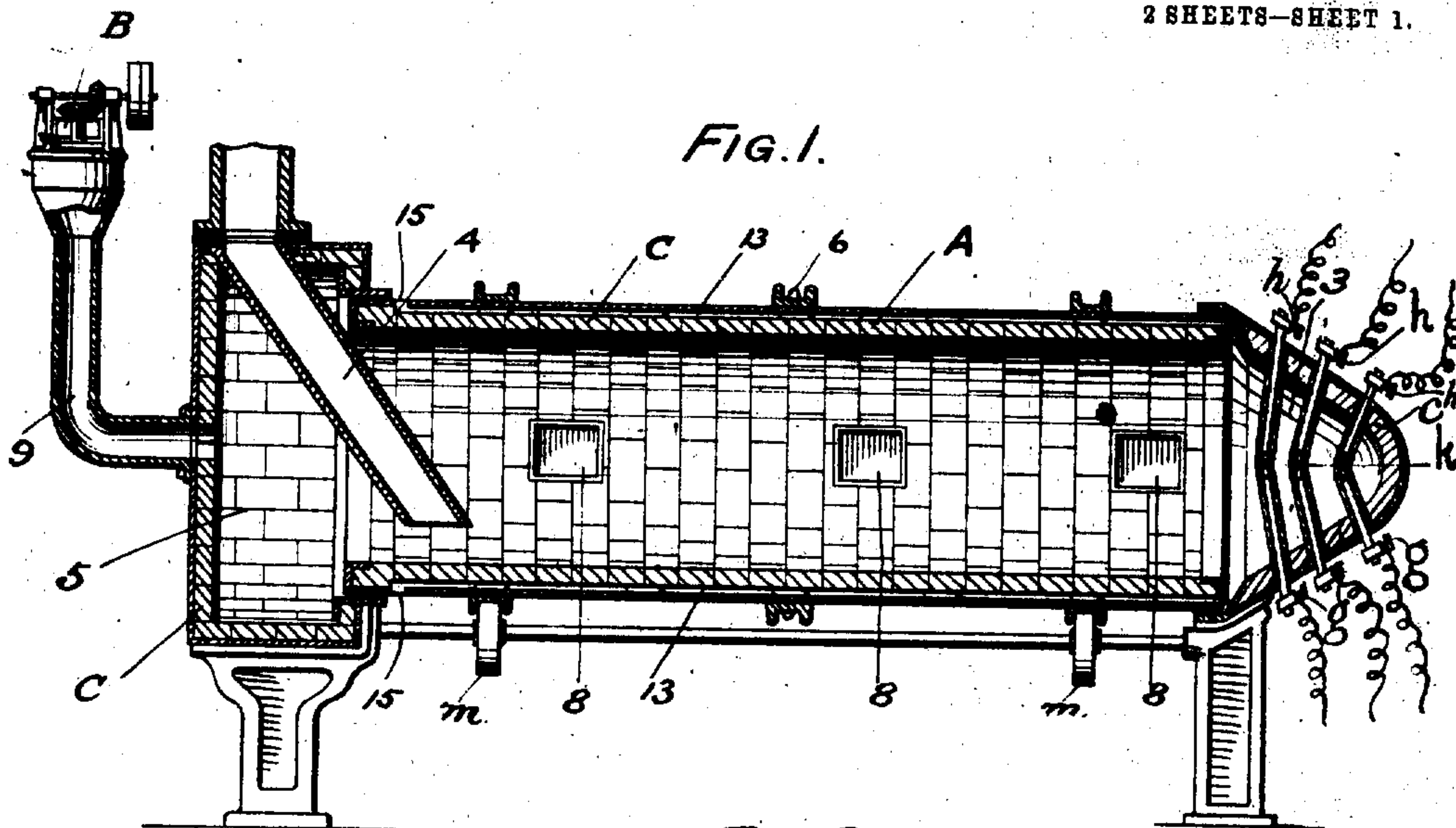


R. McKNIGHT,
ELECTRIC FURNACE.
APPLICATION FILED AUG. 28, 1906.

900,192.

Patented Oct. 6, 1908.

2 SHEETS—SHEET 1.



WITNESSES:

Elias Elvove
Walter Butler

INVENTOR
Robert McKnight

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Patented Oct. 6, 1908.

2 SHEETS—SHEET 2.

Fig. 1.

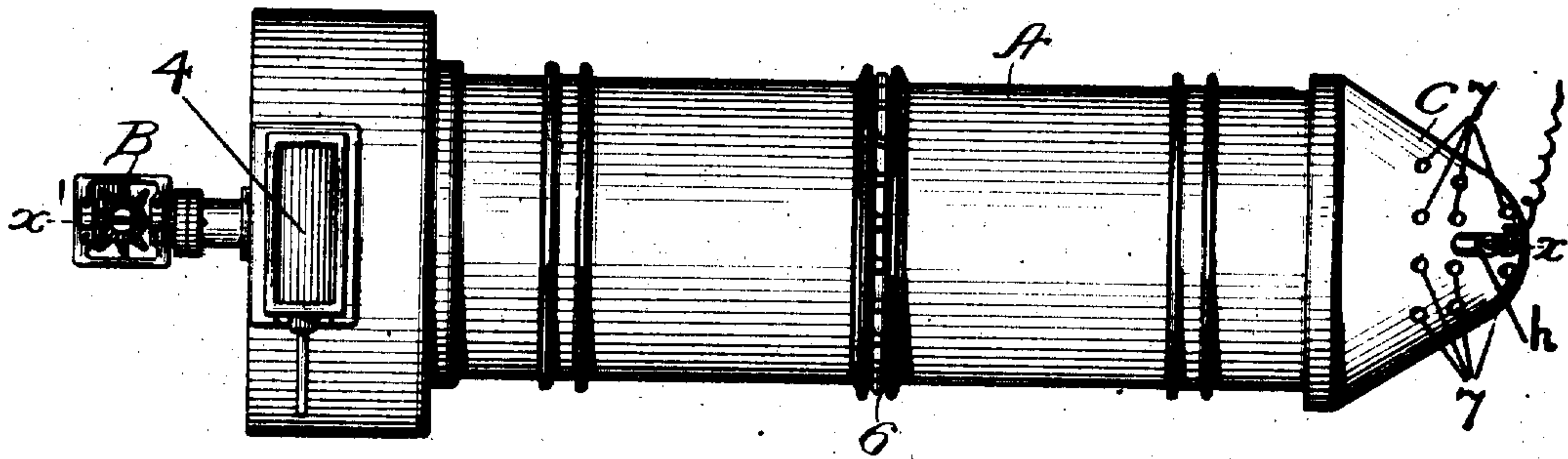
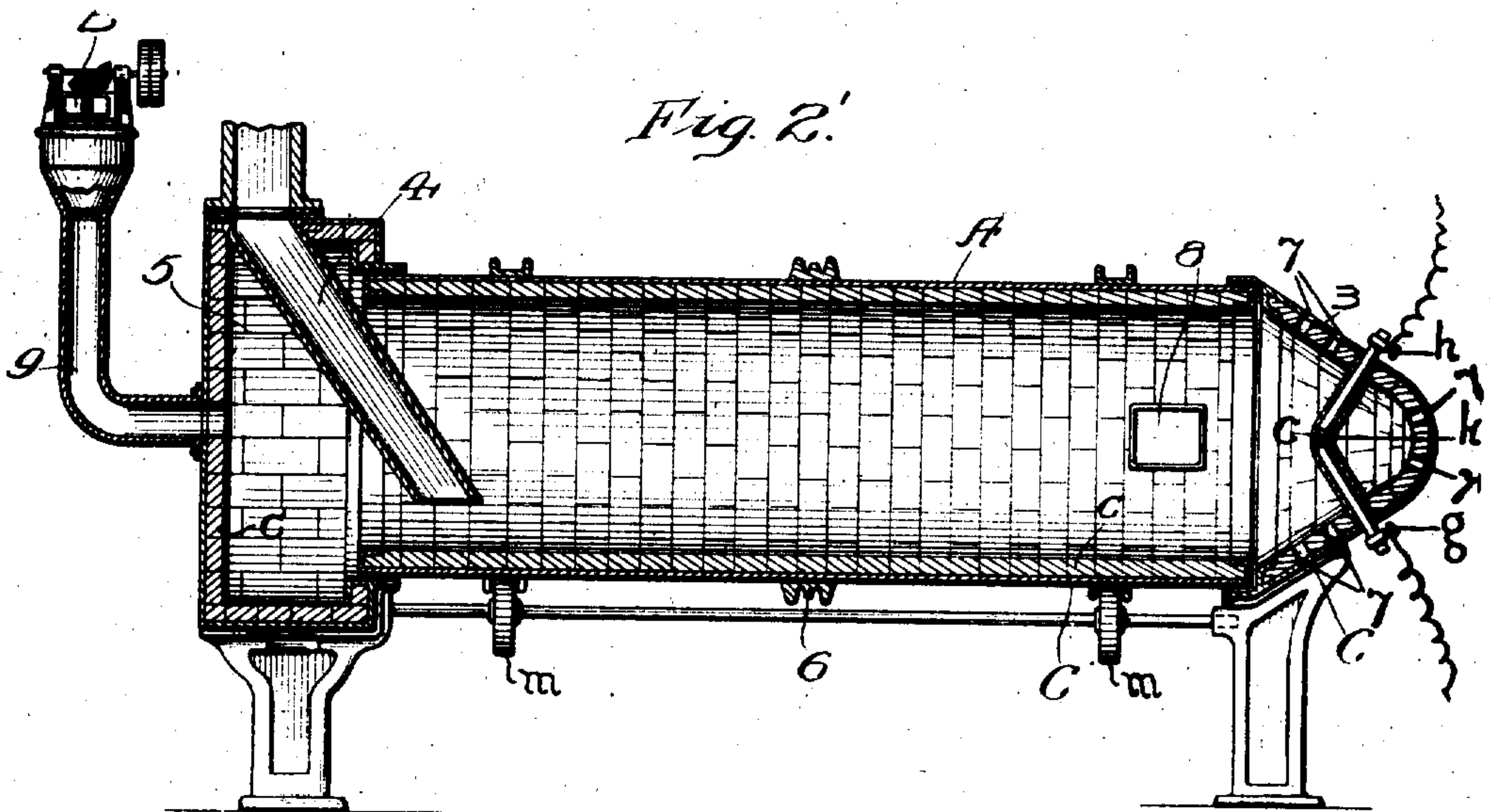


Fig. 2.



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UNITED STATES PATENT OFFICE.

ROBERT McKNIGHT, OF PITTSBURG, PENNSYLVANIA.

ELECTRIC FURNACE.

No. 900,192.

Specification of Letters Patent.

Patented Oct. 6, 1908.

Application filed August 28, 1906. Serial No. 332,403.

To all whom it may concern:

Be it known that I, ROBERT McKNIGHT, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented new and useful Improvements in Electrical Furnaces, of which the following is a specification.

My invention has relation to ore roasting furnaces.

I apply in my furnace a gaseous heat-carrier, such as air or steam, which is superheated by passing it through an electrically heated fire box. The furnace and fire box are lined with refracting material, such as a good variety of porcelain or fire brick, and preferably, the fire box is so shaped and placed and the source of heat therein is so situated that heat rays thereupon are projected substantially directly into the interior of the tubular furnace. The heated air or steam is moved through the fire box into the furnace either by pressure or suction. The latter is preferred.

Describing now in detail the best embodiment of my device of which I am at present aware: Figure 1 is a vertical section of my invented device, and Fig. 2 is a side elevation thereof. Fig. 3 is a cross section on line X—X. Fig. 1' is a plan view and Fig. 2' is a vertical section of a modified form of my invented device.

The body A of the furnace is of the revolving tubular character, and is supported and rotated in a suitable manner. In the drawings it rests upon rollers *m, m, m, m*, and is driven by a chain on the sprocket 6. At its opposite ends are the dust box 5 and the fire box 3. The body of the furnace slopes slightly so that the ore will travel along it. It fits into the dust box and the fire box reasonably closely. Each of these parts has a lining C of a substance that will reflect the heat, such as a good variety of porcelain or fire brick.

A chute 4 leads the ore into the furnace. A series of ports 8, 8, 8, discharge the ore. These are arranged along the cylindrical furnace body A. Any one or more of these ports may be selected as the discharge port or ports. They are so made preferably that a pocket is formed at each portion which the roasted ore is collected through any suitable valved door, not shown in the drawing, which does not allow the entered ore to escape back into the furnace, and from which the ore can

be removed without admitting much cold air into the furnace. The flues 13, 13 are placed between the fire-brick lining and the shell of the furnace, with inlet ports 15, 15. These flues lead to the fire-box. An electric arc or series of arcs is formed as between the electrodes *g, g, g* and *h, h, h*, in the drawing. These electrodes can be ordinary carbon electrodes and preferably are cased in the casing *k* which serves to protect them from contact with the air, and is of a suitable non-conductor of electricity, such as porcelain.

The fume escape pipe 9 serves to carry off the volatilized products of the roast. It preferably opens into the box 5. The exhaust fan B, serves to carry off these fumes from the furnace and at the same time to draw off the heated air or steam from the fire-box into and through the tubular furnace.

A modification of my invented device is shown in Figs. 1' and 2'. In this construction, the flues 13, 13, are omitted and the air admitted into the fire-box by the ports 7, 7, 7, 7, a single port 8, is used to discharge the roasted ore and the collecting pocket is dispensed with. A much cheaper and simpler and efficient device is thus produced, but one which I consider much less effective than my preferred form.

The furnace can be operated in various ways. The way in which I operate it in practice is as follows: I pass an electric current through the electrodes *g, g, g* and *h, h, h*, and heat thoroughly the fire-box, then I begin to pass the heated air or steam through the furnace until by its passage and by the heat reflected from the fire-box, as well as by the heat carried into the body of the furnace by the convection currents thus set up the furnace is thoroughly heated. I then pass the ore into the furnace and perform the roast, continuing the passage of the hot air or steam into the furnace, and collecting and condensing in the vapors drawn off, any valuable metallic fumes, while the residue which automatically discharges itself is allowed to fall into a suitable receptacle for further treatment, such as my device described in application for Letters Patent of Serial Number—3308—Aug. 16, 1906.

Having now described my invention, what I claim and desire to secure by Letters Patent is:

1. The combination with a rotating tubular furnace body, of an electrically heated

fire-box, placed at the end of said furnace body, and means for passing a draft through the fire-box into the furnace, substantially as described.

5 2. The combination with a rotating tubular furnace body of an electrically heated fire box having substantially a conoidal shape, placed at the end of the tubular furnace body, and means for passing a draft through the
10 fire-box into the furnace; substantially as described.

3. The combination, with a rotating tubular furnace body of a fire-box placed at the end thereof and provided with inlet flues for
15 admitting gaseous heat-carriers and with electrodes in juxtaposition to produce an

electric arc or series of arcs over between or near which these heat-carriers pass substantially as described.

4. The combination of a revolving furnace, 20 an electrically heated fire-box at the end thereof and a series of ore outlet ports, situated along the said revolving furnace and means for closing said ports, substantially as described.

25 In testimony whereof I affix my signature in presence of two witnesses.

ROBERT McKNIGHT.

Witnesses:

ELIAS ELVONE,

WALTER S. BUTLER.