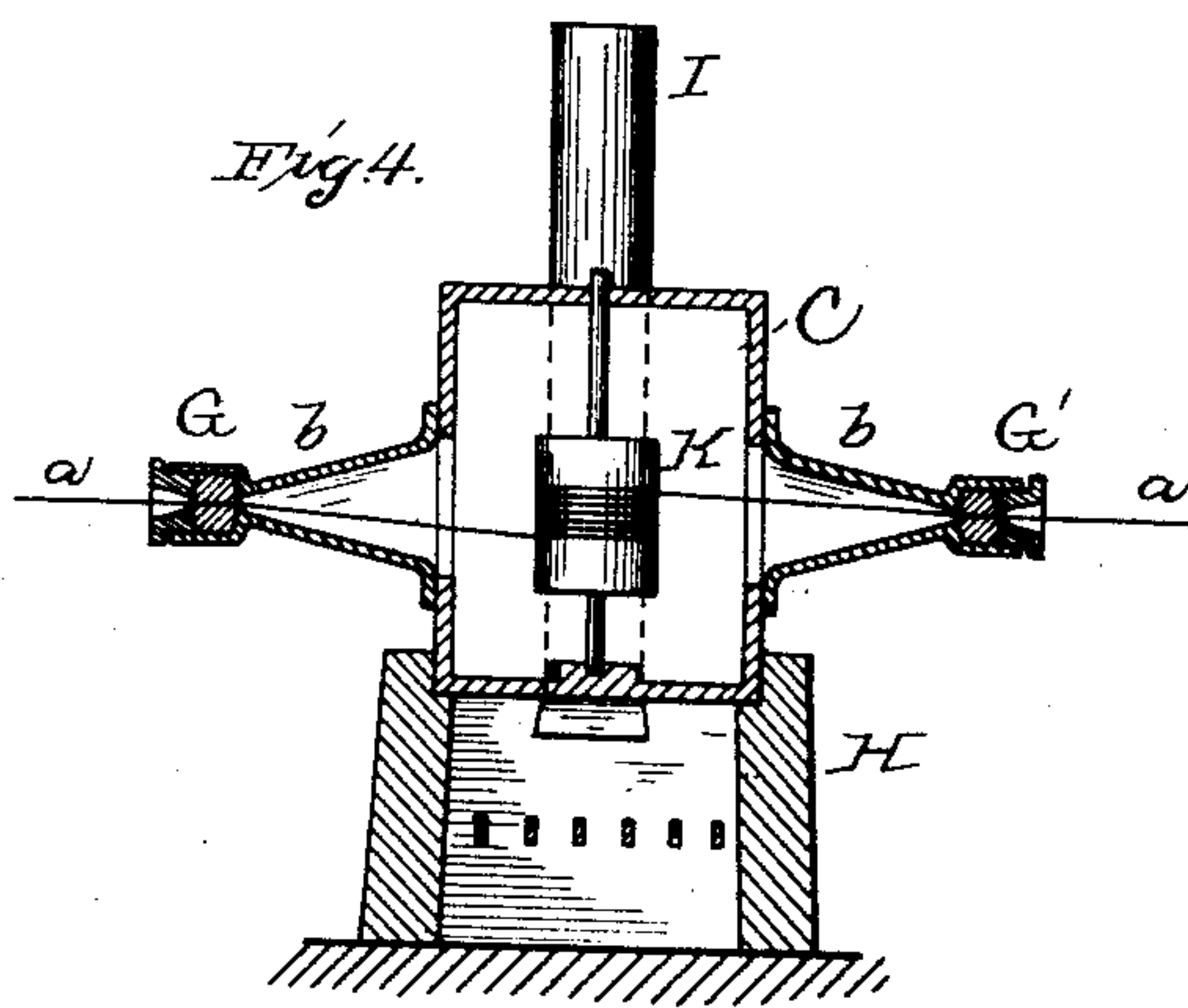
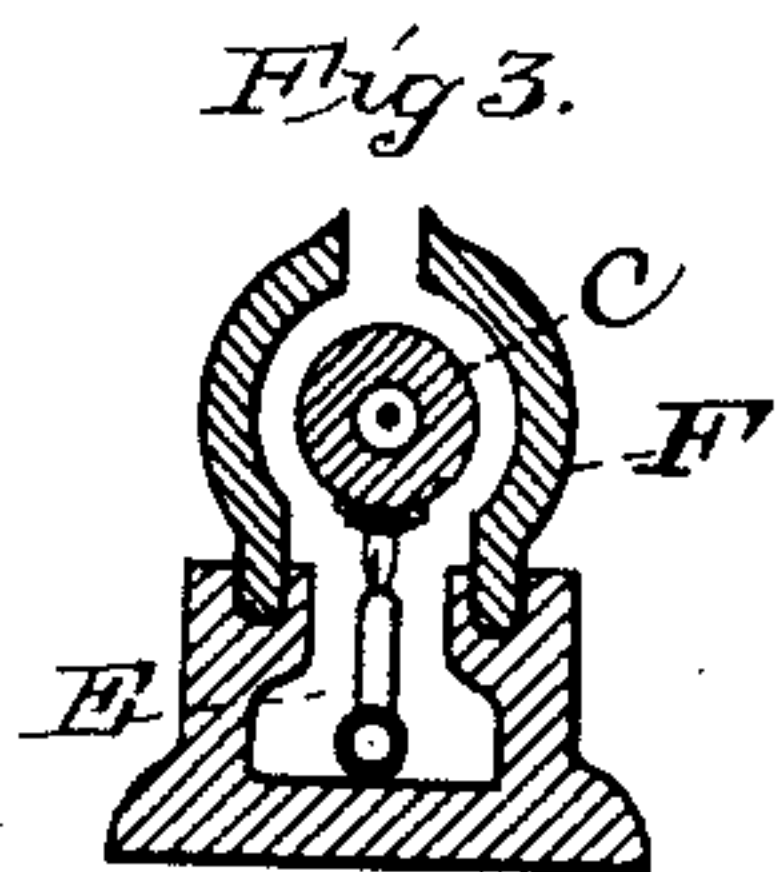
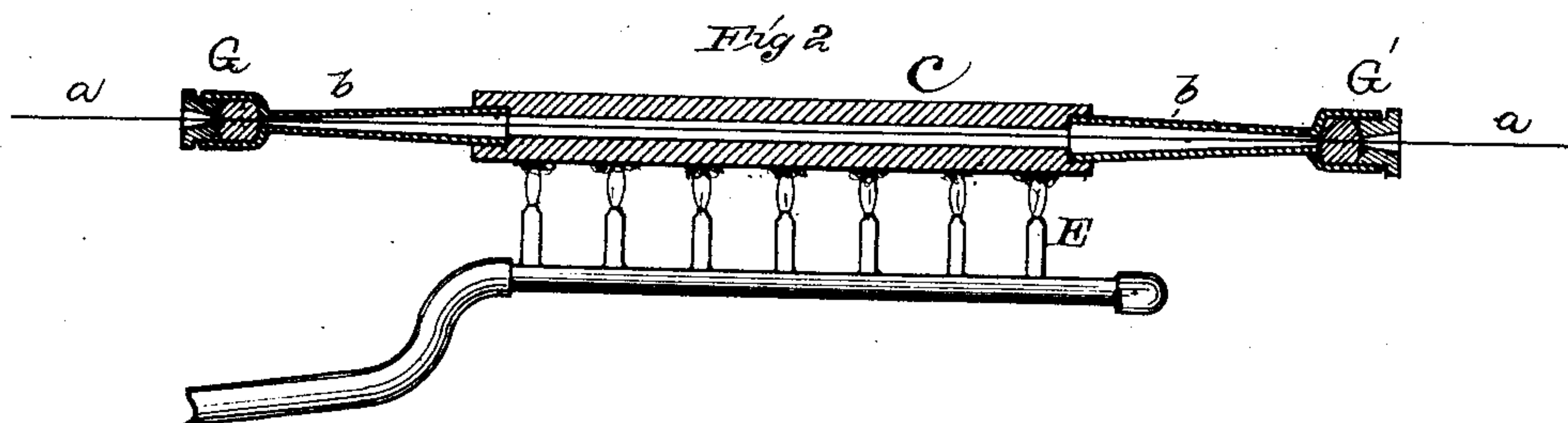
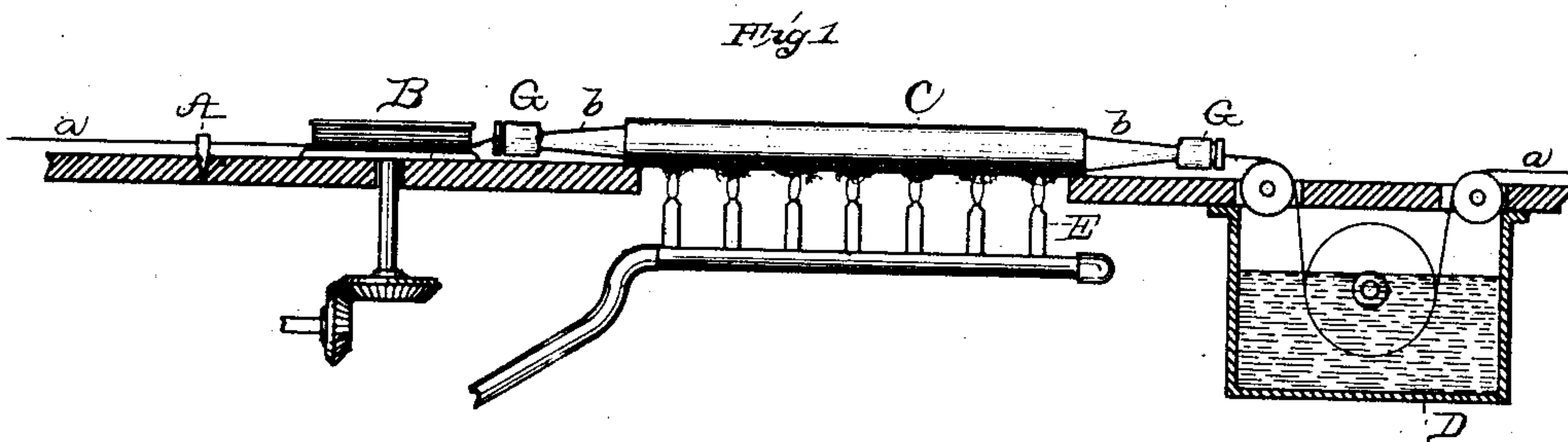


(No Model.)

T. A. EDISON.
METHOD OF AND APPARATUS FOR DRAWING WIRE.
No. 436,969. Patented Sept. 23, 1890.



ATTEST:
E. Rowland
A. W. Kiddle

INVENTOR:
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By *Rich. H. Dyer*
Att'y.

UNITED STATES PATENT OFFICE.

THOMAS A. EDISON, OF MENLO PARK, NEW JERSEY.

METHOD OF AND APPARATUS FOR DRAWING WIRE.

SPECIFICATION forming part of Letters Patent No. 436,969, dated September 23, 1890.

Application filed June 10, 1884. Serial No. 134,245. (No model.)

To all whom it may concern:

Be it known that I, THOMAS A. EDISON, of Menlo Park, in the county of Middlesex and State of New Jersey, have invented a new and useful Improvement in the Method of and Apparatus for Drawing Wire, of which the following is a specification.

The object I have in view is to make the operations of drawing wire and annealing it a continuous process, the result being a cheapening of the product and a saving in cost of manufacturing-plant.

This invention is an improvement upon the apparatus particularly set forth in my application, Serial No. 134,244, being designed to perform the method broadly claimed therein, and also includes an improvement upon that method. In that application an apparatus is particularly described in which the wire is drawn in succession through a number of die-plates and is heated at intermediate points by an electric current, and is also drawn through a suitable pickle to remove the surface oxide, these operations being performed simultaneously upon a continuous line of wire and successively upon different portions of it.

By my present invention I substitute for the connections with a source of electrical energy, which are used to heat the wire, chambers heated externally, through which the line of wire passes, the wire entering and leaving the chambers through suitable air-excluding stuffing-boxes. The oxygen within the chambers is quickly consumed, so that but little remains therein, leaving the wire surrounded by nitrogen, and hence the heating can be performed with but slight oxidation of the wire. These heating-chambers are preferably located between the drawing-wheels and pickling-reservoirs, and form part of the apparatus for performing the continuous process of drawing, annealing, and pickling covered by the application referred to. The chambers with stuffing-boxes are heated externally to anneal the wire; but it is evident that the wire may be heated within the chambers by connections with one or more dynamo-electric machines, as described in my application referred to, the inclosing chambers with stuffing-boxes preventing or retarding the oxidation of the wire.

In the accompanying drawings, forming a part hereof, Figure 1 is an elevation showing one of the series of parts of which the apparatus is composed; Fig. 2, a separate section of the heating-chamber on a larger scale; Fig. 3, a cross-section of such heating-chamber, and Fig. 4 a vertical section of a modified form of the heating-chamber.

A is a wire-drawing die; B, a drawing-wheel; C, the heating-chamber, and D a pickling-tub, all arranged in succession to act simultaneously upon the continuous line of wire *a*, and successively upon different parts of it. The entire apparatus is a multiplication of these parts, although it may be sufficient to have a heating-chamber and pickling-tub after every second or third drawing-die.

As shown in Figs. 1, 2, and 3, the heating-chamber C may be a tube of porcelain, nickel, or other material, metal, or composition capable of withstanding the high heat used. This tube is heated by gas-jets E, and a blast may be used, if desired, to increase the heat. The flames are directed around the tube by shields F, of fire-clay or other suitable material. The tube C has its ends extended beyond the heating-flames, forming hollow arms *b*, and these are provided with stuffing-boxes G G', having asbestos or other non-combustible packing. The heating-chamber may, however, be of the construction shown in Fig. 4. Here the chamber C is a closed cylindrical chamber, with a fire-box H below it and a flue I at the rear for carrying off the products of combustion. This chamber has hollow arms *b*, extending from opposite sides, provided with the stuffing-boxes G G'. A revolving drum K, within the chamber, has the wire passed around it one or more times for prolonging the time the wire is in the chamber.

What I claim is—

1. In the continuous process of drawing and annealing wire, the method herein described of heating the wire, consisting in passing it continuously through a heating-chamber from which the oxygen of the air is excluded wholly or principally, whereby the heating will be performed wholly or principally in the presence of nitrogen and oxidation will be prevented or retarded, substantially as set forth.

2. The combination, with a wire-drawing

die, of a heating-chamber in proximity therewith, so that a continuous length of wire may be drawn through said chamber and said die, said chamber having air-excluding stuffing-boxes through which the wire passes, substantially as set forth.

3. The combination, with a wire-drawing die, of an externally-heated chamber through which the wire is passed after leaving the die, substantially as set forth.

4. The combination of a wire-drawing die, a heating-chamber, a drawing-wheel, and a pickling-reservoir, substantially as set forth.

This specification signed and witnessed this 2d day of June, 1884.

THOS. A. EDISON.

Witnesses:

ALF. W. KIDDLE,
E. C. ROWLAND.