

(No Model.)

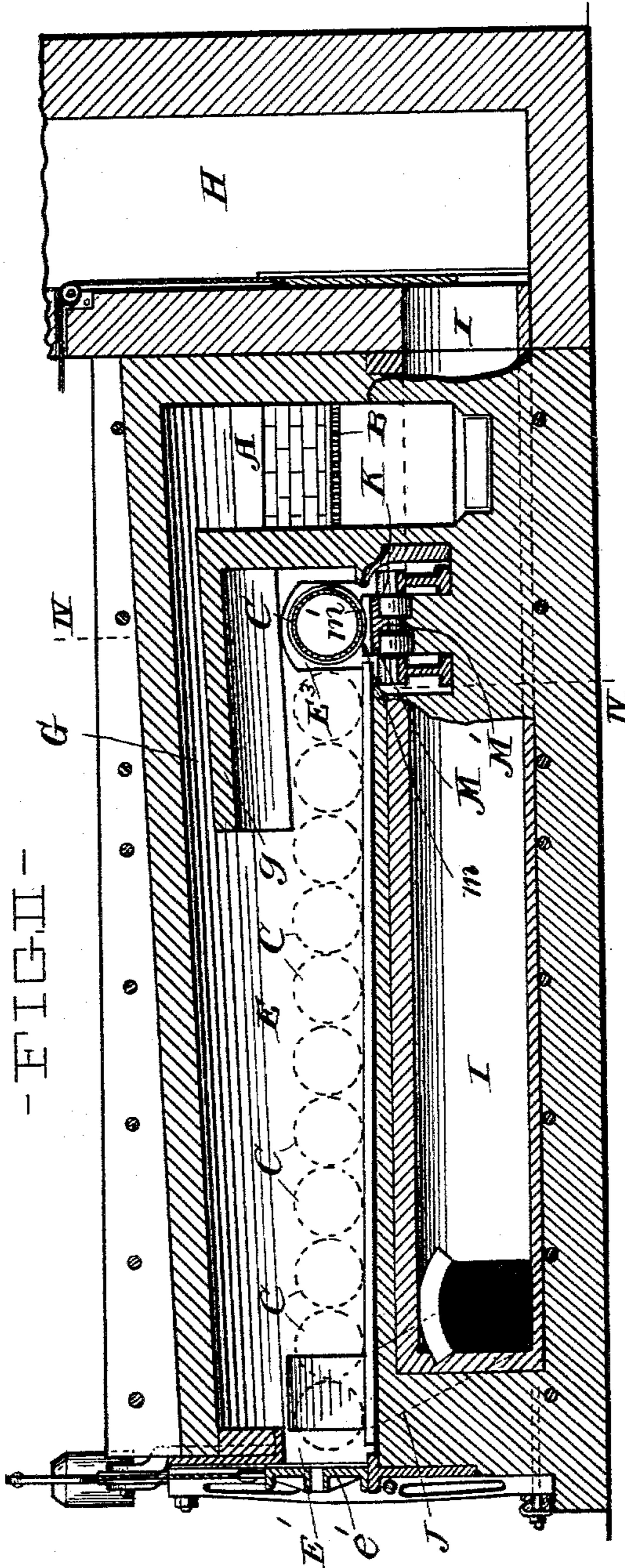
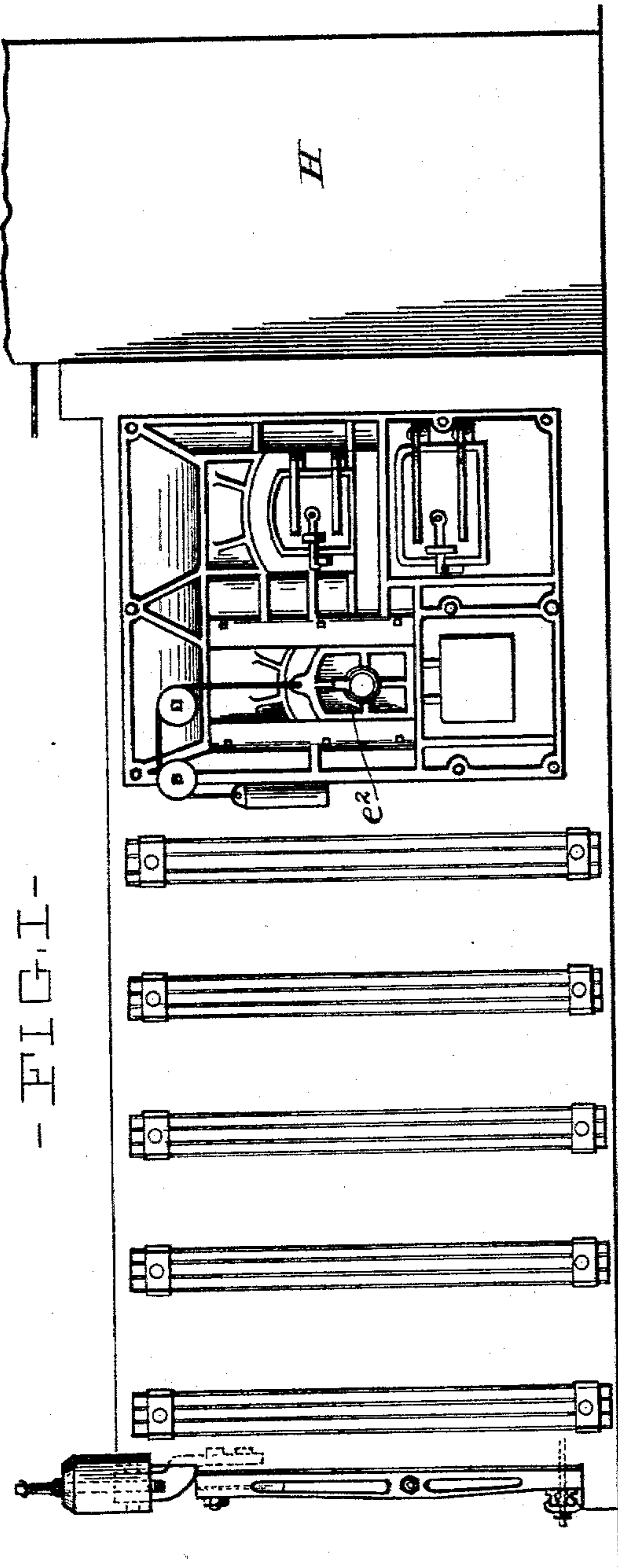
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S. A. SAGUE.

PLANT FOR ANNEALING METALLIC TUBES, WIRE, &c.

No. 584,166.

Patented June 8, 1897.



WITNESSES:

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Edw. E. Tilden

INVENTOR

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Lynch, Dorer & Donnell

ATTORNEYS

(No Model.)

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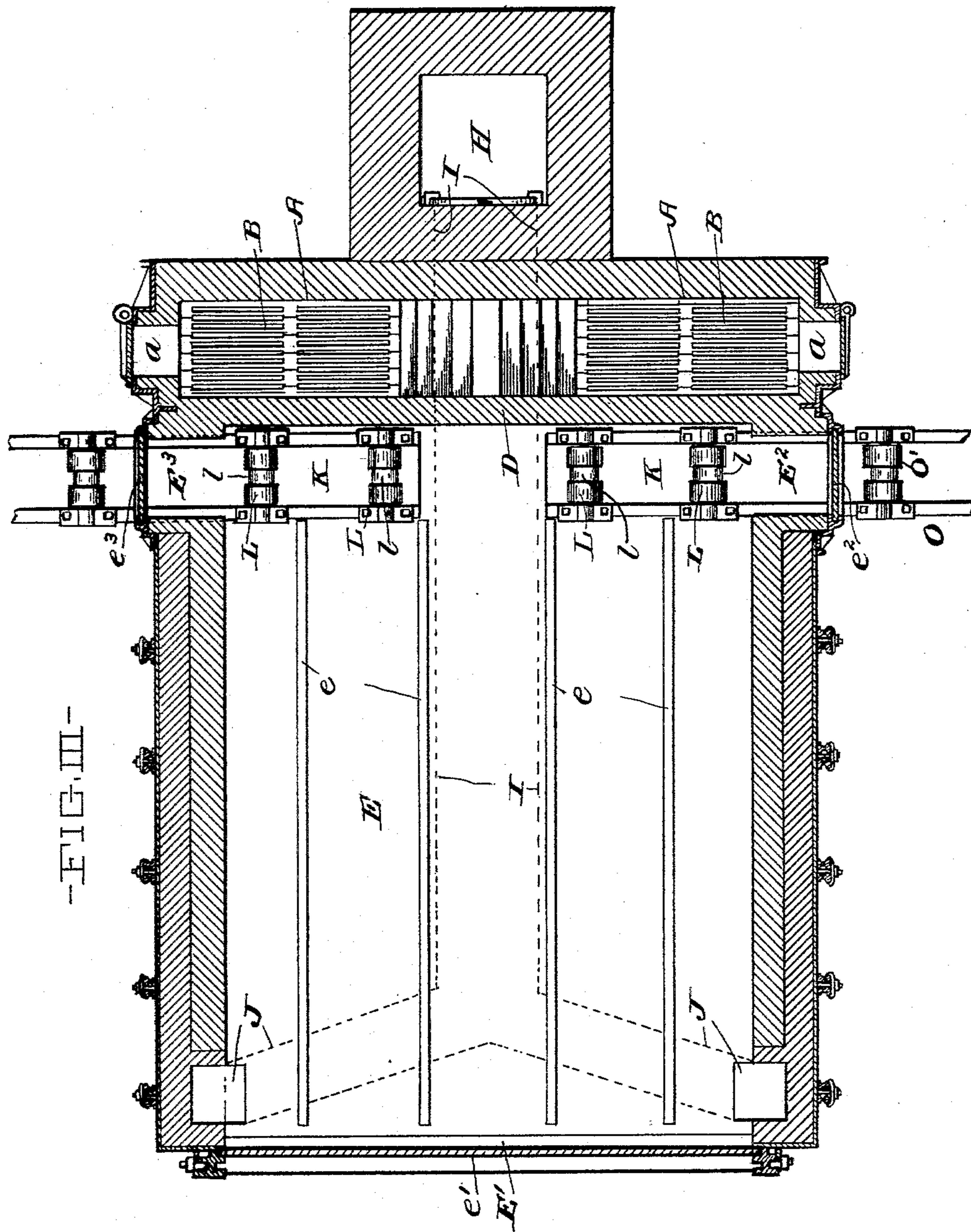


FIG. III—

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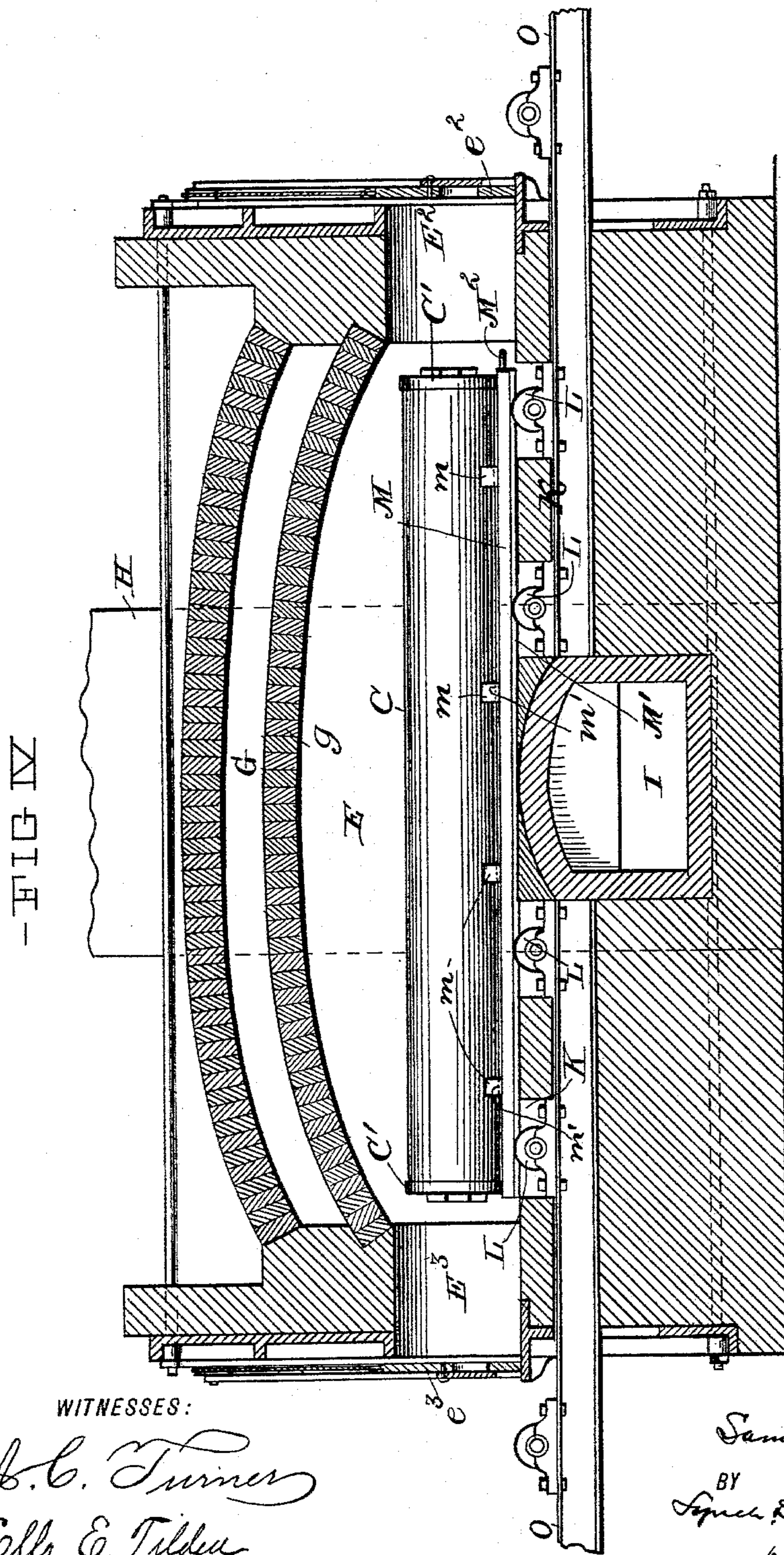
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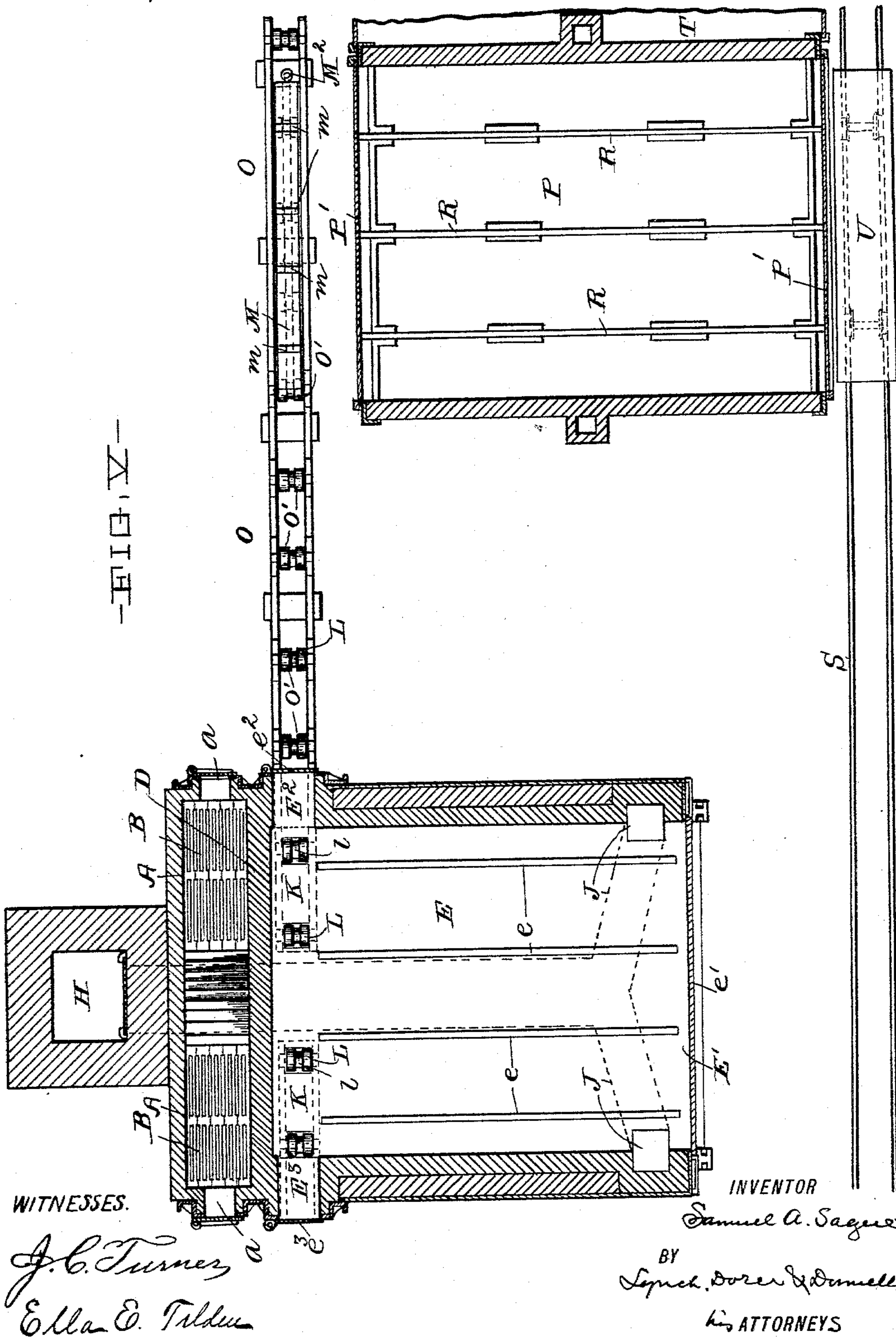
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UNITED STATES PATENT OFFICE.

SAMUEL A. SAGUE, OF CLEVELAND, OHIO.

PLANT FOR ANNEALING METALLIC TUBES, WIRE, &c.

SPECIFICATION forming part of Letters Patent No. 584,166, dated June 8, 1897.

Application filed January 22, 1897. Serial No. 620,295. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL A. SAGUE, of Cleveland, Cuyahoga county, Ohio, have invented certain new and useful Improvements in Plants for Annealing Metallic Tubes, Wire, &c.; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

My invention relates to improvements in plants for annealing metallic tubes, wire, &c.; and the invention pertains more especially to an improved construction of the oven or annealing-chamber of an annealing-furnace.

The primary object is to construct a furnace of the character indicated that has a large capacity, wherein the tubes or stock to be annealed is more uniformly treated and wherein the closed cylinders or containers containing the stock to be annealed are introduced into one end of the oven or annealing-chamber and are withdrawn at the other end of said chamber or oven after having been subjected to the heat within said oven or chamber the required length of time.

With this object in view, and to the end of attaining certain other advantages herein-after referred to, the invention consists in certain features of construction and combinations of parts hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure I is a side elevation of my improved annealing-furnace. Fig. II shows said furnace in elevation and in section and mostly in central vertical longitudinal section. Fig. III is a top plan of the furnace in horizontal section. Fig. IV is an end elevation, mostly in transverse section on line IV IV, Fig. II. In Fig. IV the parts are shown on a larger scale than in the first three figures. Fig. V is a top plan, mostly in horizontal section, of my improved annealing plant.

Referring to the first four figures of the drawings, A designates the combustion-chamber of the furnace. Said chamber extends transversely of the rear end of the furnace, and *a a* designate doorways leading to opposite ends of said chamber, respectively. The coke or fuel employed is introduced at these

doorways to the two grates B B, that form the bottoms of opposite ends of the combustion-chamber. A wall D separates the combustion-chamber from the annealing-chamber or oven E, into which the closed cylinders or containers that contain the stock to be annealed are subjected to the required heat. A forwardly and rearwardly extending flue G establishes open relation between the upper end of the combustion-chamber and the upper portion of chamber E. Said flue extends, preferably, from one side of the furnace to the opposite side and terminates at its forward end a suitable distance forward of wall D. The bottom of flue G is formed by the arch *g*, that extends forwardly from the upper end of wall D.

H represents the furnace stack or chimney that is located at the rear end of the furnace and is in open relation at its lower end with a flue I, arranged below chamber E and extending forwardly from the stack or chimney in under chamber E to near the forward extremity of said chamber, and two flues J J connect the forward end of flue I with opposite sides, respectively, of the forward end of chamber E. The products of combustion or heating agent passes, therefore, from the upper portion of the combustion-chamber through flue G, that is formed over arch *g*, thence is muffled or rolls about within chamber E, and thence passes through flues J J and I to the stack or chimney.

The annealing-chamber or oven E, at its forward end, is provided with a doorway E', through which the closed cylinders or containers that contain the stock that is to be annealed are placed upon several rails or bars *e*, arranged upon and at suitable intervals widthwise of the bottom or bed of said chamber E and extending longitudinally of said bottom from the latter's forward end to and in under arch *g* to the forward side of a track or path K, formed at the bottom and transversely of the rear end of said chamber. A suitably-operated door *e'* is provided for closing doorway E'. Chamber E is wide enough to accommodate a lateral introduction of said cylinders or containers. If the latter are twelve feet long, as they preferably are in annealing-tubes for use in the manufacture of bicycle-frames, &c., chamber E and door-

way E' should be about thirteen feet wide. In my improved furnace the said cylinders or containers are not removed through the doorway at which they are introduced, but, by fractional turns given them at suitable intervals during the heating process by means of any suitable tools or instruments introduced at doorway E', are rolled to the rear end of chamber E. Rails or bars *e* slightly decline rearwardly to facilitate the turning of the cylinders or containers. In dotted lines, Fig. II, eleven cylinders or containers C are shown upon said rails or bars *e*. The load-bearing surface of track or path K is formed, preferably, by any suitable number of suitably-supported rollers L, arranged longitudinally of chamber E and at suitable intervals widthwise of said chamber rearward of and below rails or bars *e*. A suitably-propelled cradle or trolley M is arranged to rest upon and travel over said rollers. Said trolley or cradle, when it is in position upon the rollers, extends widthwise of the rear end of chamber E and is preferably long enough to extend from one side of said chamber to the opposite side, as shown in Fig. IV. Said cradle or trolley, upon its upperside, has bars or raised portions *m* arranged transversely thereof with their upper surfaces flush, or approximately flush, with the upper surfaces of the adjacent or rear ends of rails or bars *e*. Each cylinder or retort C, after it has reached the rear ends of rails or bars *e*, is next rolled upon members *m* of the cradle or trolley, and said members *m* have their central portions recessed or cut away, as at *m'*, to form concave seats for and partially embrace the cylinder or container. Cradle or trolley M is preferably provided at one end with an eye M² for receiving the hook of a suitably-actuated hook-bearing cable (not shown) employed in actuating the laden cradle or trolley endwise through a doorway E², formed in one of the side walls—the right-hand side wall in the case illustrated—of the rear end of chamber E. Doorway E² is arranged, therefore, in line with the path of said trolley or cradle and has the dimensions required to accommodate the passage of the laden cradle or trolley endwise therethrough. A suitably-operated door *e*² is provided for closing said doorway E². The concave seats *m'*, formed in the upper side of the trolley or cradle, prevent lateral displacement of the cylinder or container when the latter is in position upon the cradle or trolley.

A cylinder or container C is shown in position upon the cradle or trolley in Figs. II and IV. This cylinder or container consists of a tube closed at the ends by removable caps or heads C'. The trolley or cradle upon its under surface is provided with a downwardly projecting or depending member M', that extends longitudinally of the cradle or trolley and, when the trolley is in position upon rollers L, into annular recesses *l*, formed in the central portions of the peripheral surfaces of

said rollers. The engagement of said depending member of the trolley or cradle with said recesses prevents lateral displacement of the trolley or cradle when the latter is upon or moved over the rollers.

By the construction hereinbefore described it will be observed that the cylinders or containers filled with the stock that is to be annealed are placed within chamber E, through doorway E² at the forward end of said chamber, upon the chamber's load-bearing surfaces *e*, and the rolling of the cylinders or containers thereupon adown or rearwardly upon said surfaces results in the uniform heating of every portion of the cylinders or containers and contents, and at the required intervals of time a cylinder or container is withdrawn upon the cradle or trolley through the rear doorway E², and after said cylinder or container has been transferred by said vehicle to the cooling-room hereinafter referred to said vehicle is again returned to the oven or chamber E for receiving another cylinder or container. Chamber E, at a point directly opposite doorway E², is provided, preferably, with another doorway E³, formed, as shown in Figs. III and IV, within the rear end of the opposite side wall (the left-hand side wall in the case illustrated) of said chamber. A suitably-operated door *e*³ is arranged to close said doorway E³, that accommodates the introduction of a tool, instrument, or apparatus (not shown) employed in assisting the movement of the cradle or trolley, should the latter from any cause move with difficulty upon the rollers in the withdrawal of the cylinder or container.

It will be observed that in my improved furnace a comparatively large number of cylinders or containers can be accommodated. Hence the furnace possesses not only the advantage of heating cylinders and contents more uniformly, but its capacity for doing work of the character indicated is much greater than that of annealing-furnaces heretofore devised.

It will also be observed that a track O, comprising rollers O', that correspond in construction with rollers L, is arranged to form an extension of track or path K, that comprises rollers L below the rear end of chamber E, and said track O leads to the receiving end of the cooling-room P, into which the heated cylinders or containers are placed and therein allowed to gradually cool, as required to complete the annealing process. The heated cylinder or container conveyed to the cooling-room upon track O by the cradle or trolley is, upon reaching the receiving end of said room, transferred laterally to and upon a track R, arranged within said room at right angles to track O. The discharging end of room P extends into suitable proximity to a track S, that is arranged parallel with track O and leads to the receiving end of chamber or oven E from the room T, in which the cylinders or containers are supplied with the stock that

requires annealing and in which the annealed stock or material is removed from the cylinders or containers. A truck U, mounted upon said track S, is employed for conveying the cylinders or containers from room T to the furnace and is also used for conveying the cylinders or containers from the discharging end of the cooling-room to the filling and emptying room. This arrangement of tracks, furnace, rooms, &c., within an annealing plant is convenient and economical.

Of course the receiving end and discharging end of cooling-room P are provided with suitably-operated doors P', that are vertically sliding in the case illustrated and are adapted to close the doorways leading to and from said room.

What I claim is—

1. In an annealing plant, a furnace having an oven or annealing-chamber wide enough to receive the closed cylinder or container laterally and provided with a doorway that leads to the forward end of said chamber and is wide enough to accommodate the introduction of the closed cylinder or container, a door for closing said doorway, a track or path arranged transversely of the bottom of the rear portion of said chamber, a cradle or trolley arranged to rest upon and move endwise of said track or path, a door formed in the rear portion of the furnace in line with the path of the trolley or cradle and having the dimensions required to accommodate the passage of the laden trolley or cradle therethrough, and a door for closing said last-mentioned doorway, substantially as and for the purpose set forth.

2. In an annealing plant, a furnace having an oven or annealing-chamber wide enough to receive the closed cylinder or container laterally, and provided with a doorway leading to the forward end of said chamber and wide enough to accommodate the lateral introduction of said cylinder or container, a door for closing said doorway, a track or path formed at the bottom and transversely of the rear portion of said chamber, a cradle or trolley arranged to rest upon and move endwise of said track or path, a doorway formed in one side of the rear portion of said chamber and having the arrangement and dimensions required to accommodate the passage of the laden trolley or cradle endwise therethrough, and a door for closing said last-mentioned doorway, substantially as and for the purpose set forth.

3. In an annealing plant, a furnace having an oven or annealing-chamber E wide enough to receive the closed cylinder or container laterally, and provided with a doorway E' leading to the forward end of said chamber and wide enough to accommodate the lateral introduction of said cylinder or container, a door for closing said doorway, a track or path formed at the bottom and transversely of the rear portion of said chamber, a cradle or trolley arranged to rest upon and move endwise

of said track or path, two doorways formed in opposite sides, respectively, of the rear portion of said chamber in line with the path of the trolley or cradle, and one of said last-mentioned doorways having the dimensions required to accommodate the passage of the laden trolley or cradle endwise therethrough, and doors for closing said two last-mentioned doorways, substantially as shown and described.

4. In an annealing plant, a furnace having an oven or annealing-chamber provided with a receiving-doorway at its forward end, a door for closing said doorway, a track formed at the bottom and transversely of the rear portion of said chamber and comprising rollers arranged longitudinally and at suitable intervals widthwise of the chamber, a cradle or trolley arranged to rest upon and move over said rollers, a doorway formed in one side of the rear portion of said chamber and having the arrangement and dimensions required to accommodate the passage of the laden trolley or cradle endwise therethrough, and a door for closing said last-mentioned doorway, substantially as and for the purpose set forth.

5. In an annealing plant, a furnace having an oven or annealing-chamber E wide enough to receive the closed cylinder or container laterally and provided with a doorway E' that leads to the forward end of said chamber and is wide enough to accommodate the lateral introduction of the cylinder or container, a door for closing said doorway, a track or path K formed at the bottom and transversely of the rear portion of said chamber and comprising a series of rollers arranged longitudinally and at suitable intervals widthwise of the chamber and having annular recesses in their peripheries, a cradle or trolley arranged to rest upon and move over said rollers and provided, upon its under side, with a depending member arranged to engage the aforesaid recesses, a doorway formed in one side of the rear portion of said chamber and having the arrangement and dimensions required to accommodate the passage of the laden trolley or cradle endwise therethrough, and a door for closing said last-mentioned doorway, substantially as and for the purpose set forth.

6. In an annealing plant, a furnace having an oven or annealing-chamber wide enough to receive the closed cylinder or container laterally and provided with a doorway E' that leads to the chamber's forward end and is wide enough to accommodate the lateral introduction of the cylinder or container, a door for closing said doorway, rails or members e raised above and arranged longitudinally of the bottom of the chamber, a track formed at the bottom and transversely of the rear portion of said chamber and comprising a series of rollers arranged longitudinally and at suitable intervals widthwise of the chamber, a cradle or trolley arranged to move endwise over said track, and having the raised portions or members m having recesses m' and

extending transversely of the cradle or trolley and arranged to receive the cylinder or container from the raised members or rails upon the aforesaid bottom, a doorway formed
 5 in one side of the rear portion of the chamber and having the arrangement and dimensions required to accommodate the passage of the laden trolley or cradle endwise therethrough, and a door for closing said last-mentioned
 10 doorway, substantially as shown, for the purpose specified.

7. In an annealing plant, the combination with the combustion-chamber of the furnace, the oven or annealing-chamber wide enough
 15 to receive the closed cylinder or container laterally, the wall separating said last-mentioned chamber from the combustion-chamber and extending forwardly a suitable distance and communicating with the oven or annealing-
 20 chamber at its forward end, the doorway E' leading to the forward end of the annealing-chamber and wide enough to accommodate the lateral introduction of the cylinder or container, the door for closing said doorway, and
 25 the passage-way or passage-ways for conducting the products of combustion or heating agent from the annealing-chamber's forward end: of a track or path formed at the bottom and transversely of the rear portion of the
 30 annealing-chamber below the aforesaid flue, a cradle or trolley arranged to move endwise of said track or path, a doorway formed in one side of the rear portion of the annealing-chamber and having the dimensions required
 35 to accommodate the passage of the laden trol-

ley or cradle endwise therethrough, and a door for closing said last-mentioned doorway, substantially as and for the purpose set forth.

8. In an annealing plant, the combination with a furnace having the oven or annealing-
 40 chamber provided with a receiving-doorway at one end, a door for closing said doorway, a track K formed at the bottom and transversely of the rear portion of said chamber, a cradle or trolley arranged to move endwise
 45 of said track, a doorway formed in one side of the rear portion of said chamber and having the arrangement and dimensions required to accommodate the passage of the laden trolley or cradle therethrough, and a door for clos-
 50 ing said last-mentioned doorway; of a track O arranged in line with the aforesaid track K, a track S leading to the receiving end of the furnace and arranged parallel, or approximately parallel, with the aforesaid track O,
 55 a vehicle U movable upon said last-mentioned track, a cooling-room P arranged between the said tracks O and S, and provided with a track arranged between and extending into suitable proximity to said tracks O and S, and
 60 the emptying and filling room T adjacent to the cooling-room, substantially as shown, for the purpose specified.

In testimony whereof I sign this specification, in the presence of two witnesses, this 19th
 65 day of January, 1897.

SAMUEL A. SAGUE.

Witnesses:

C. H. DORER,
 ELLA E. TILDEN.