



(No Model.)

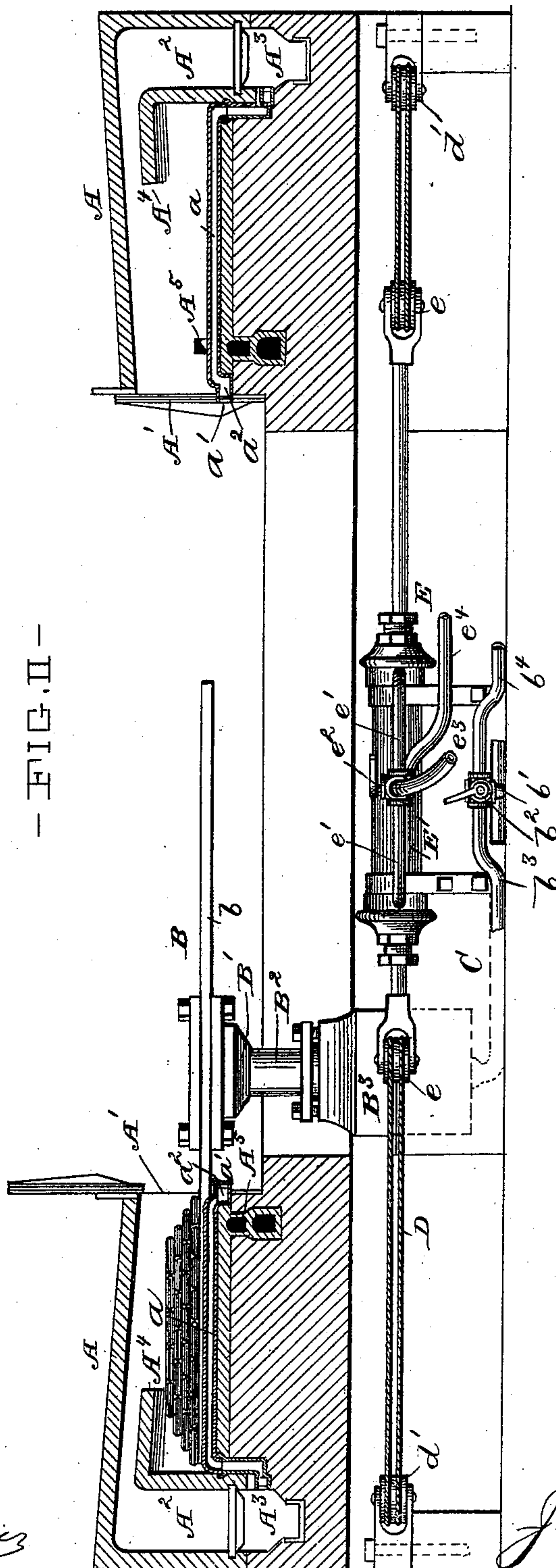
4 Sheets—Sheet 2.

J. WALDECK.

## APPARATUS FOR CHARGING ANNEALING FURNACES.

No. 539,658.

Patented May 21, 1895.



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**WITNESSES**

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(No Model.)

4 Sheets—Sheet 3.

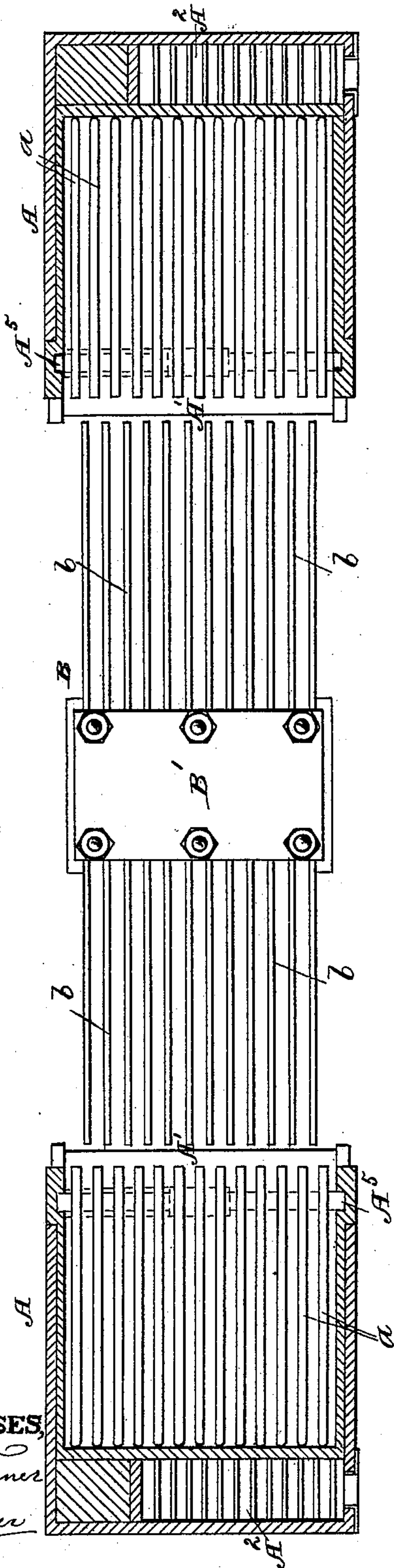
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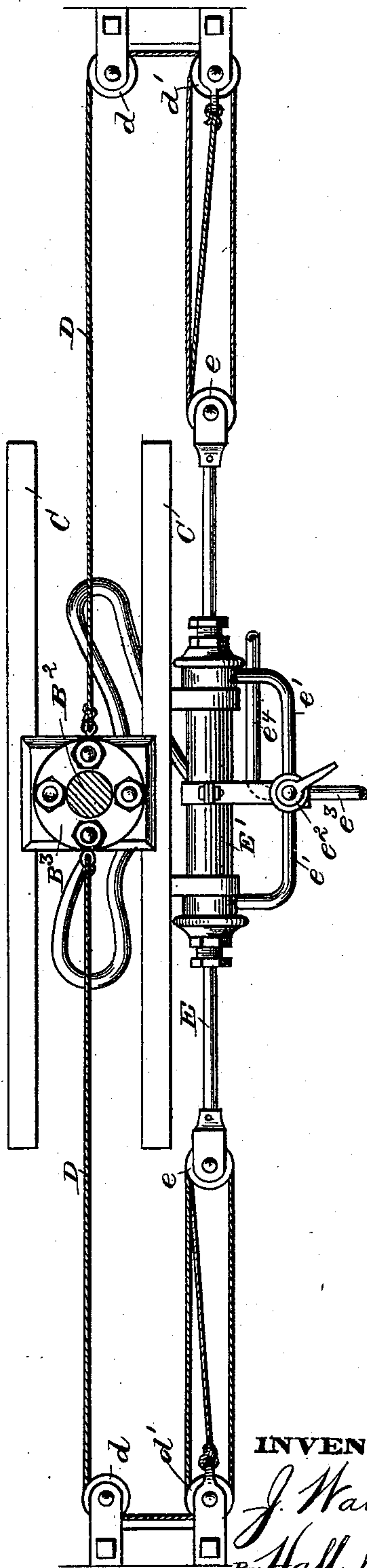
—FIG. III—



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—FIG. IV—



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(No Model.)

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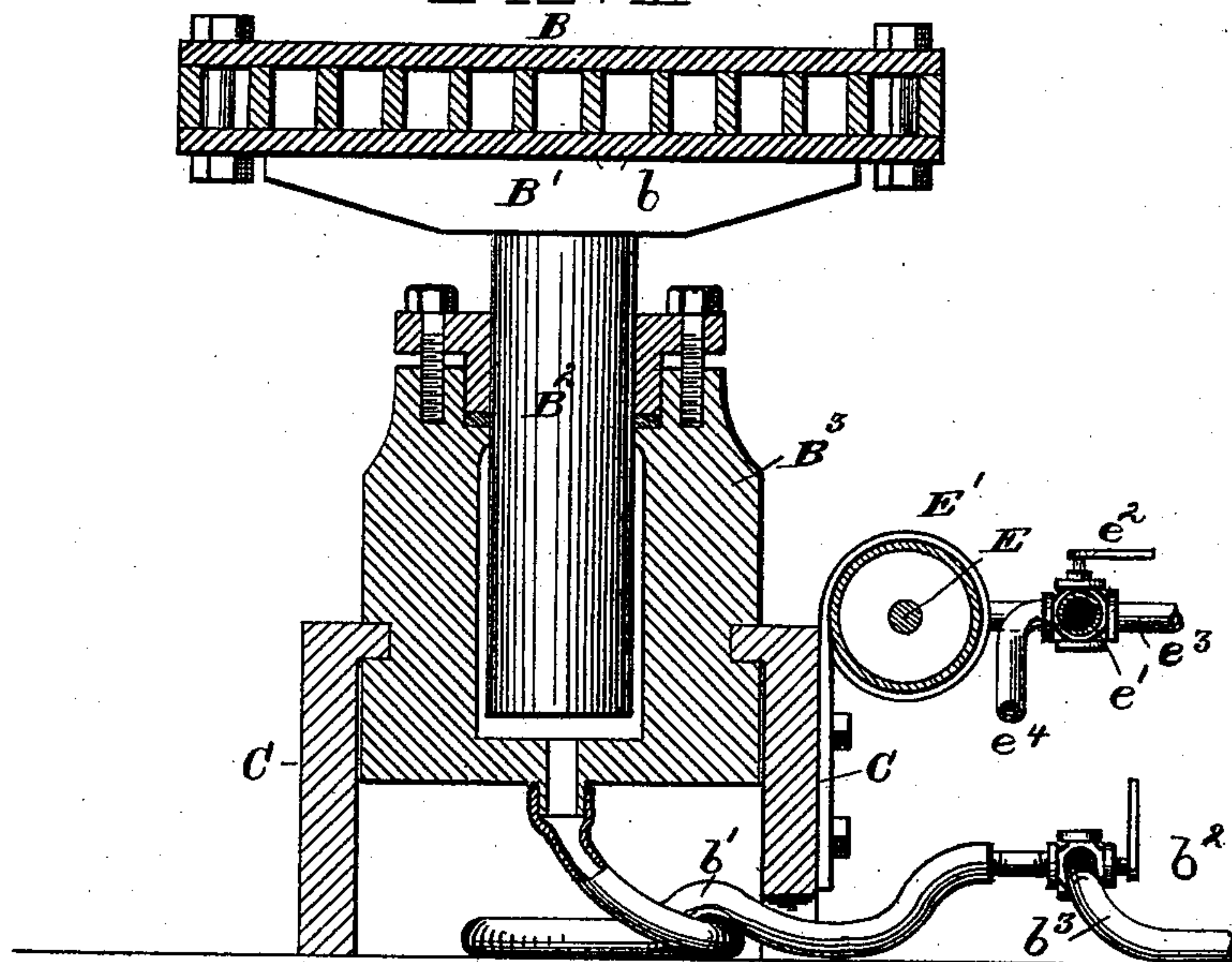
J. WALDECK.

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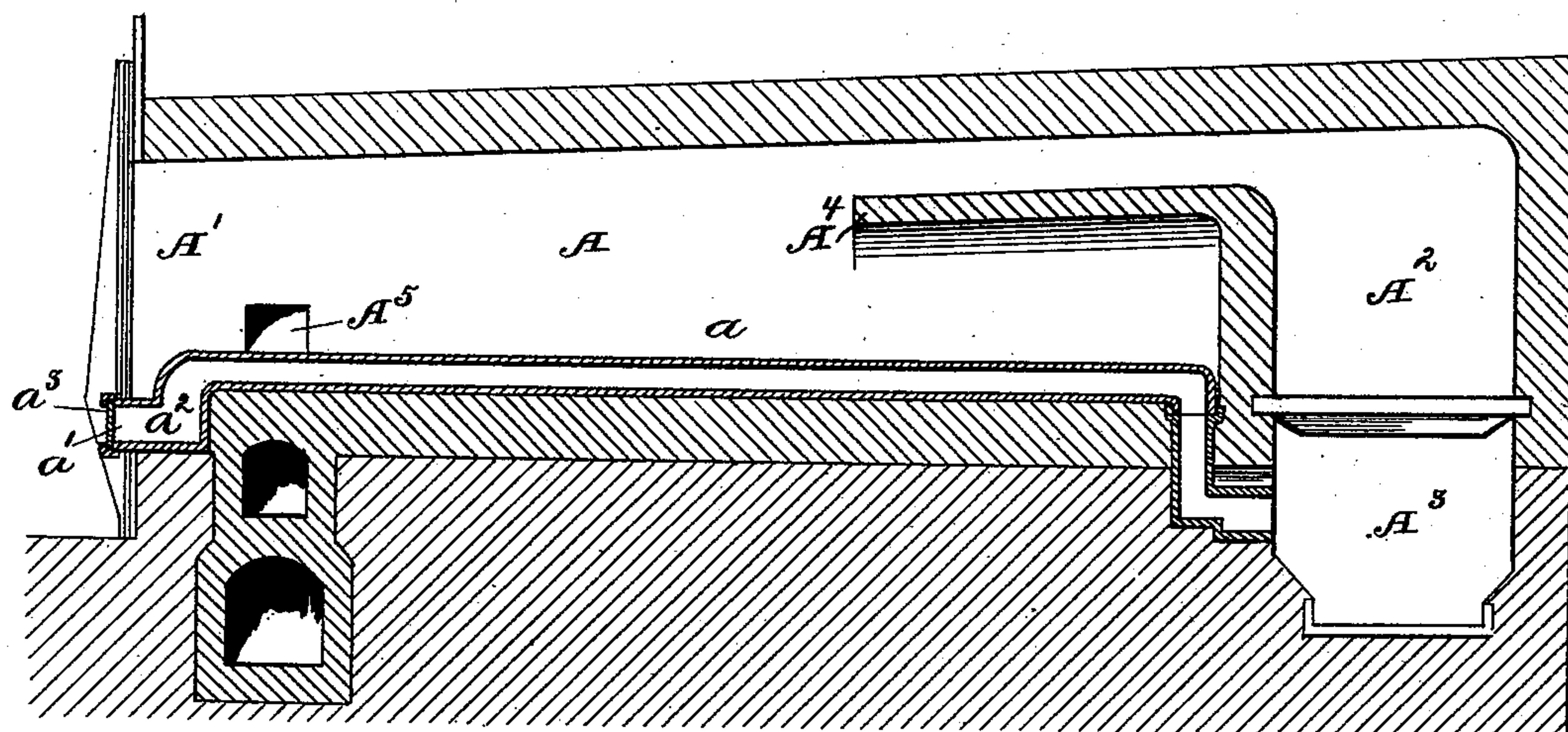
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- FIG. V -



- FIG. VI -



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# UNITED STATES PATENT OFFICE.

JOSEPH WALDECK, OF CLEVELAND, OHIO, ASSIGNOR OF TWO-FIFTHS TO  
JAMES BROWN, OF SAME PLACE.

## APPARATUS FOR CHARGING ANNEALING-FURNACES.

SPECIFICATION forming part of Letters Patent No. 539,658, dated May 21, 1895.

Application filed November 19, 1894, Serial No. 529,225. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH WALDECK, a citizen of the United States, and a resident of Cleveland, county of Cuyahoga, and State of Ohio, have invented certain new and useful Improvements in Devices for Charging and Drawing Wire Bundles into and from Annealing-Furnaces, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle, so as to distinguish it from other inventions.

The annexed drawings and the following description set forth in detail, one mechanical form embodying the invention; such detail construction being but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings, Figure I represents a vertical section of my improved device for charging and drawing wire bundles into and from annealing-furnaces; Fig. II, a similar section of the device, illustrating the charging and discharging platform as moved so as to discharge its load of bundles into one of the muffles or to remove a charge of bundles from the same; Fig. III, a top plan view of the device, illustrating the muffles in horizontal section; Fig. IV, a top plan view of the actuating mechanism of the device; Fig. V, a transverse vertical section, on an enlarged scale, of the sliding cylinder and of the charging and discharging platform; and Fig. VI an enlarged vertical section of the muffle.

Heretofore, in annealing wire during the process of drawing the same, it has been customary to charge the muffle or annealing furnace by throwing the bundles of wire into the same, through the open door of the muffle, and to draw the bundles from the muffle by means of hooks. In this manual charge and discharge it has been impossible to properly stack the bundles at the inner end of the muffle, whereby space in the muffle has been lost, and, on account of the length of time required for manually, either charging or drawing the muffle, a great deal of heat has been wasted, so that an unnecessary quantity of fuel as well as time has been consumed in again heating the muffle to its required degree of heat. It has been proposed to charge

and draw the bundles into and from annealing furnaces by means of a push mechanism, which would push the bundles in at one end of the furnace, and push the bundles out at the other end of the furnace. This is, however, not practicable, as a lateral push upon the red hot bundles of wire would have a tendency to flatten the coils into oval shape, and thus render them unfit to be placed upon the reel of a wire drawing machine. Therefore, to successfully charge and draw bundles into and out of annealing furnaces, it is necessary to provide a device which will carry the bundles into the furnace and deposit them therein, and which will again raise the bundles from off the floor of the furnace and carry them out of the furnace without dragging or pushing them.

The annealing furnaces or muffles A, are preferably arranged with their charging doors, A', opposite each other, and each of said muffles is provided with the usual fire place A<sup>2</sup>, having an ash pit, A<sup>3</sup>; with the usual arch A<sup>4</sup>, and with the usual outlet flues A<sup>5</sup>. The muffles may be of any suitable or desired construction, and the most commonly used form is here illustrated. Instead of the usual, solid rails arranged upon the floor of the furnace for the bundles to rest upon, hollow rails, a, are provided. The forward ends of said rails communicate with the outer air through openings, a', in a transverse air box, a<sup>2</sup>, which openings are controlled by a damper, a<sup>3</sup>. The rear ends of the hollow rails communicate with the ash pit, below the grate of the fire place. The current of cold air, which will thus be created through the rails, will keep the latter cool, and will prevent warping of the rails, which would obstruct the free operation of the charging and drawing device. Other cooling fluids may be employed; but I consider air as the most suitable and most easily controlled cooling medium in this connection, as the fire in the fire place will generate the air currents through the rails, and the volume of current and the degree of cooling may be easily controlled by the damper.

A longitudinal pit is formed between the two muffles, extending from beneath the door of one muffle to the door of the opposite muffle, and a carrier, consisting of a platform, B, is provided, which covers the opening of the



pit and may normally rest flush with the floor of the annealing house, as illustrated in Fig. I. The platform is composed of longitudinal rails,  $b$ , arranged at such relative positions and distances, that they may register with the spaces between the rails of the muffles and may be slid in between said latter rails when the platform is raised. The rails are secured at their middles to a head,  $B'$ , of a hydrostatic plunger,  $B^2$ , packed to slide in a hydrostatic cylinder,  $B^3$ . Said cylinder slides in horizontal ways,  $C$ , which are longitudinally arranged in the pit in such manner that the cylinder may be slid upon the ways to bring either half of the rail platform into the corresponding muffle, with its parallel rails sliding between the parallel rails of the muffle. Ropes,  $D$ , are secured to opposite sides of the cylinder, and pass around stationary guide pulleys,  $d$ , at the ends of the ways, and around stationary pulleys,  $d'$ , arranged to one side of said guide pulleys, and around movable pulleys,  $e$ , upon the opposite ends of a piston rod,  $E$ , the piston of which is movable within a hydrostatic cylinder,  $E'$ , arranged parallel with and to one side of the ways. The inlet and outlet of the actuating fluid to the ends of the cylinder, for the purpose of forcing the piston and rod to either end, is controlled through distributing channels,  $e'$ , by means of a four-way cock,  $e^2$ , or by similar fluid controlling means. The inlet for the actuating fluid is indicated by  $e^3$ , and the outlet by  $e^4$ .

The hydrostatic cylinder  $B^3$ , which controls the vertical movements of the platform, has a flexible tube,  $b'$ , connected to its lower end, for the admission and exhaust of the actuating fluid. Said tube extends from a two-way cock,  $b^2$ , having an inlet pipe,  $b^3$ , and an outlet pipe,  $b^4$ , which cock controls the admission and exhaust of the actuating fluid for the vertical cylinder, and thus controls the raising and lowering of the platform.

In describing the operation of the device, the platform will be considered as having its normal position when level with the floor of the annealing house and in position over the pit between the muffles, such as illustrated in Fig. I of the drawings. The wire bundles are conveyed to and from the platform upon the "buggies" or trucks usually employed in rolling mills and wire mills. From the buggies the wire bundles are piled upon the end of the rail platform opposite an empty muffle, in a pile of such dimensions that it may pass into the muffle. The platform is now raised to such a height,—by the vertical cylinder,—that the upper surface of the platform will be above the upper surface of the rail floor of the muffle. The vertical cylinder and the platform is now slid upon the ways so as to bring the rails of the platform between the rails of the muffle floor, and to bring the charge within the muffle,—such operation being performed by the horizontal cylinder and after the muffle door has been opened. The

platform is now slightly lowered to deposit the pile of bundles upon the muffle floor, whereupon the platform is again withdrawn from the muffle by the horizontal cylinder mechanism, leaving the charge of wire bundles in the muffle. When the charge is to be again withdrawn, the platform is again moved into the muffle with the upper surface of its rails below the surface of the floor rails, so that the platform rails may unobstructedly pass under the bundles. The platform is then raised to lift the charge of bundles from the floor rails, upon the platform rails. The platform is then withdrawn, when the annealed wire bundles may be removed from that half of the platform, while a charge of bundles may be loaded upon the other half of the platform for charging the opposite muffle.

By means of this charging and drawing device, the labor and time required for throwing the separate bundles into the muffle and for drawing the separate bundles out of the muffle, is done away with, as well as the loss of heat from the muffle and consequent loss of time, caused by keeping the door of the muffle open while throwing the separate bundles into the latter or drawing them out of the same. The bundles may be easily and quickly loaded upon the platform, in a pile equal to the greatest capacity of the muffle, and in a perfect and even pile, when they may be charged into the muffle in a short space of time, without loss of heat, and be again drawn from the muffle, likewise in a short space of time and without loss of heat, whereupon the bundles may conveniently be loaded upon buggies from the platform.

As it will not be necessary to throw the bundles into the muffle, the latter may be made much deeper than where the bundles are thrown into the muffle, and as the door of the muffle is required to be opened for but a short time while the latter is charged or drawn, irrespective of the size of the charge, the muffle may be made of any capacity consistent with possibilities for heating it and with the structural practicability of the muffle and platform and its operating gear.

The drawings illustrate ordinary handles upon the controlling cocks of the vertical and horizontal hydrostatic cylinders, but it is evident that suitable connections may be made, either to the cocks or to the cylinders, whereby the admission and exhaust of the actuating fluid, to and from the cylinders, may be controlled at a distance from the cylinders. While the term "hydrostatic cylinders" might appear to only mean cylinders charged with water or other liquid under pressure; yet, it is evident that the term may embrace cylinders using steam, compressed air, or any other fluid as well.

Other modes of applying the principles of my invention may be employed for the mode herein explained. Change may therefore be made as regards the mechanism thus dis-



closed, provided the principles of construction set forth respectively in the following claims are employed:

5 I therefore particularly point out and distinctly claim as my invention—

1. In a device for charging and drawing wire bundles into and out of annealing furnaces, the combination of a muffle having longitudinal rails upon its bottom, ways extending toward the charging opening of the muffle, a vertical hydrostatic cylinder sliding upon said ways, a plunger in said cylinder, means for controlling the fluid for said cylinder, a platform composed of parallel rails adapted to enter between the bottom rails of the furnace and supported upon the plunger, a hydrostatic cylinder, a piston in said cylinder, and having piston rods projecting through both cylinder heads, means for controlling the liquid at both ends of the cylinder, and ropes connected to the piston rods and to opposite sides of the vertical hydraulic cylinder and suitably guided to move the latter to opposite ends of the ways, substantially as set forth.

2. In a device for charging and drawing wire bundles into and out of annealing furnaces, the combination of two opposed muffles having longitudinal rails upon their bottoms, ways extending from the charging opening of one muffle to the charging opening of the other

muffle, a vertical hydrostatic cylinder sliding upon said ways, a plunger in said cylinder, means for controlling the fluid for said cylinder, a platform consisting of parallel rails adapted to enter between the bottom rails of the muffles and supported at its middle upon the plunger so as to enter either muffle, a hydrostatic cylinder having means for controlling the fluid at both ends, a piston having piston rods projecting through both cylinder heads, and ropes connected to the piston rods to opposite sides of the vertical cylinder and guided at the ends of the ways, substantially as set forth.

3. In an annealing furnace, the combination with the heating chamber, and fire place, of longitudinal hollow rails in the bottom of the heating chamber, having at one end openings to the outer air at the front of the furnace and at the other end openings beneath the grate of the fire place, and dampers for the front openings, substantially as set forth.

In testimony that I claim the foregoing to be my invention I have hereunto set my hand this 17th day of November, A. D. 1894.

JOSEPH WALDECK.

Witnesses:

WM. SECTUR,  
J. C. TURNER.