

(No Model.)

E. CLIFTON.

OVEN FOR TEMPERING WIRE, &c.

No. 356,350.

Patented Jan. 18, 1887.

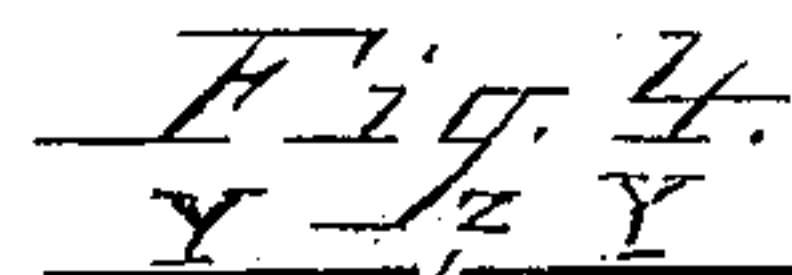
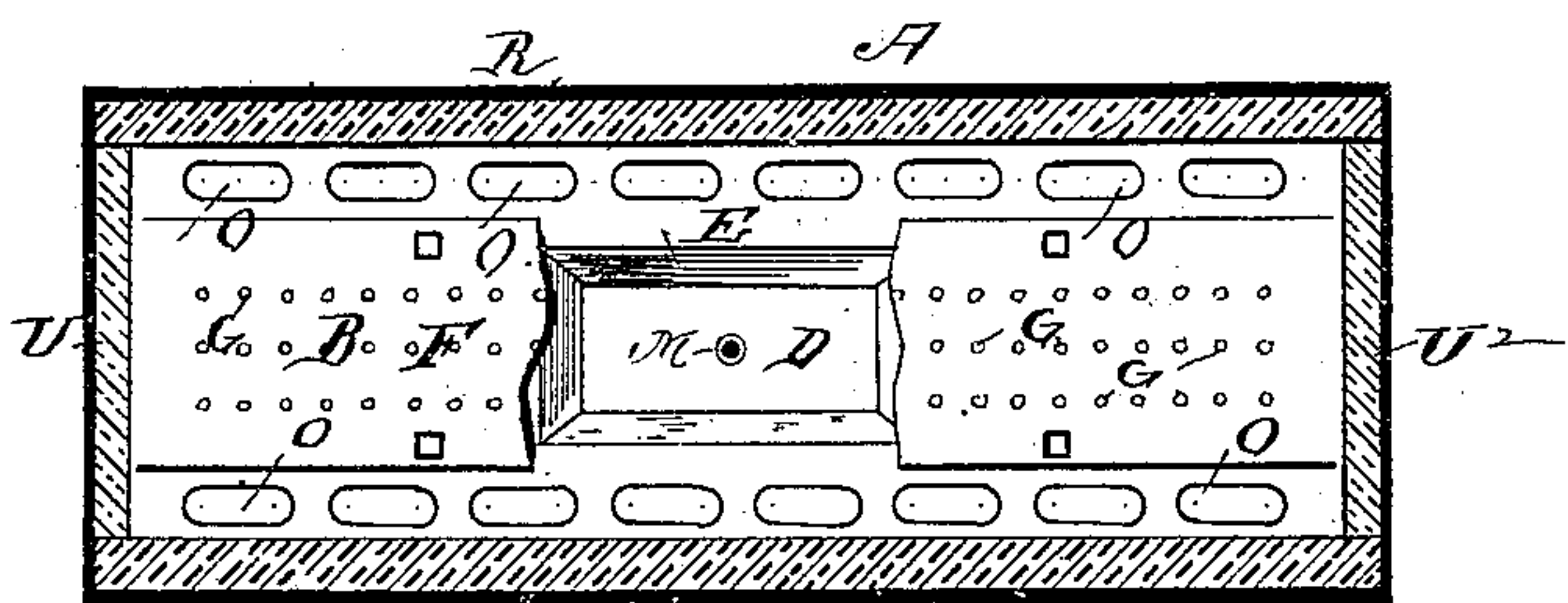
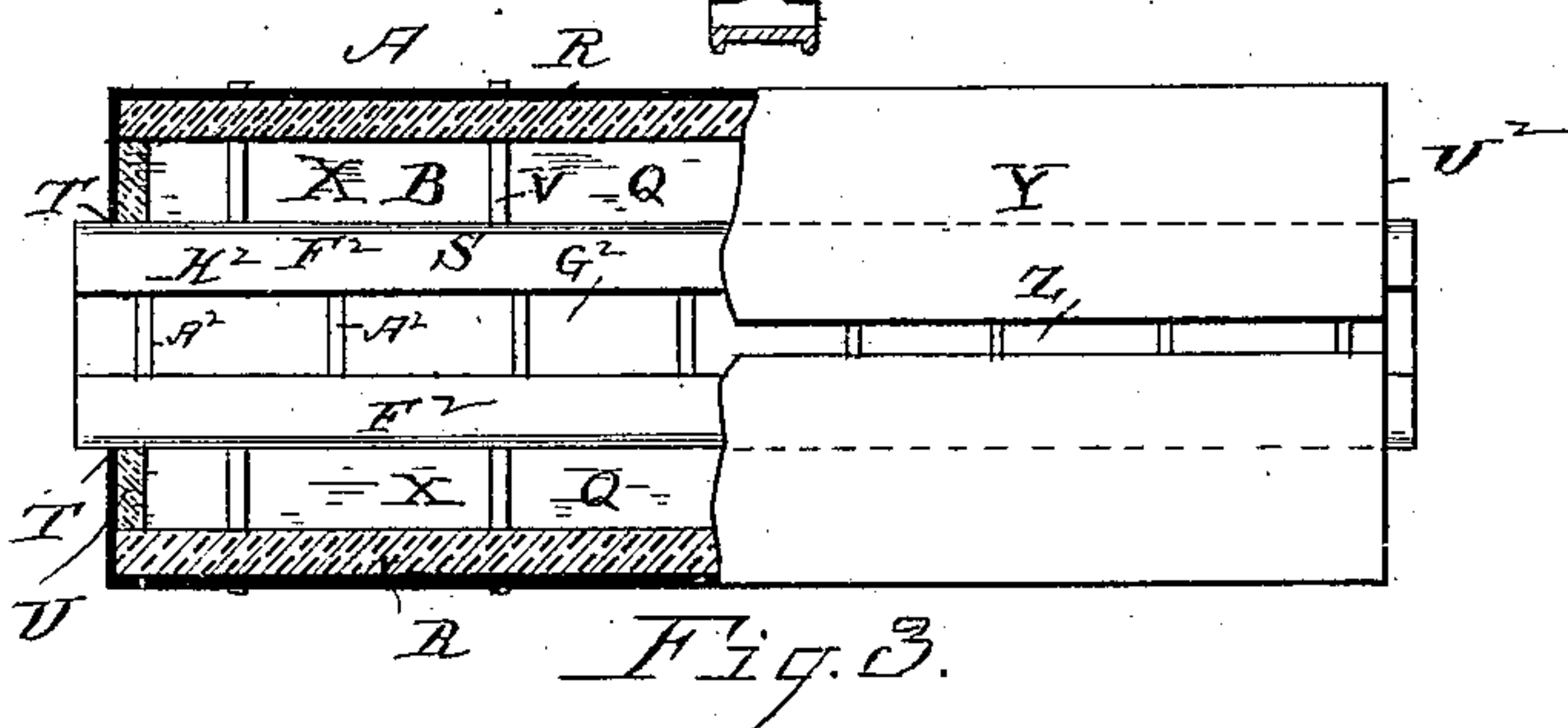
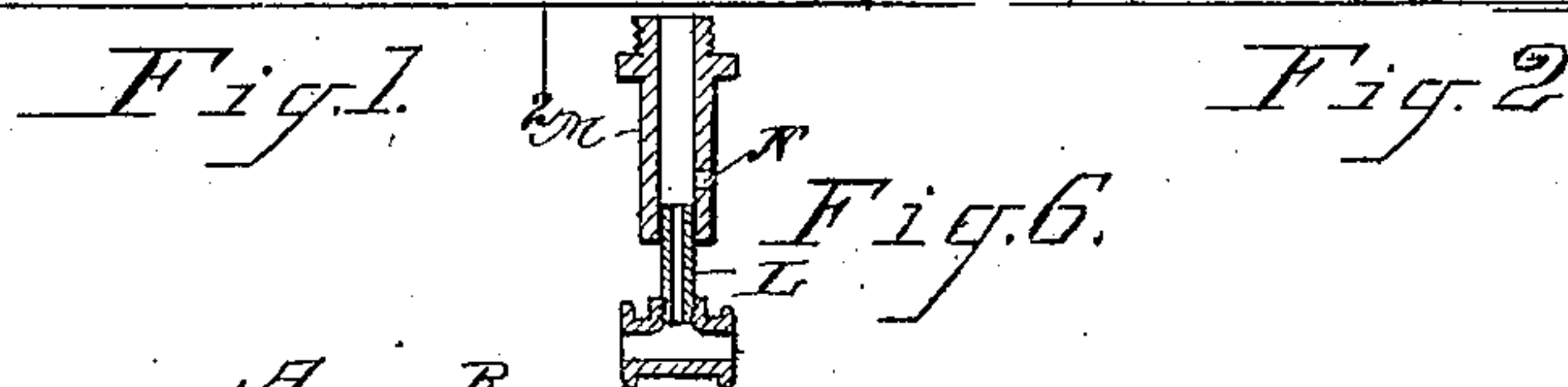
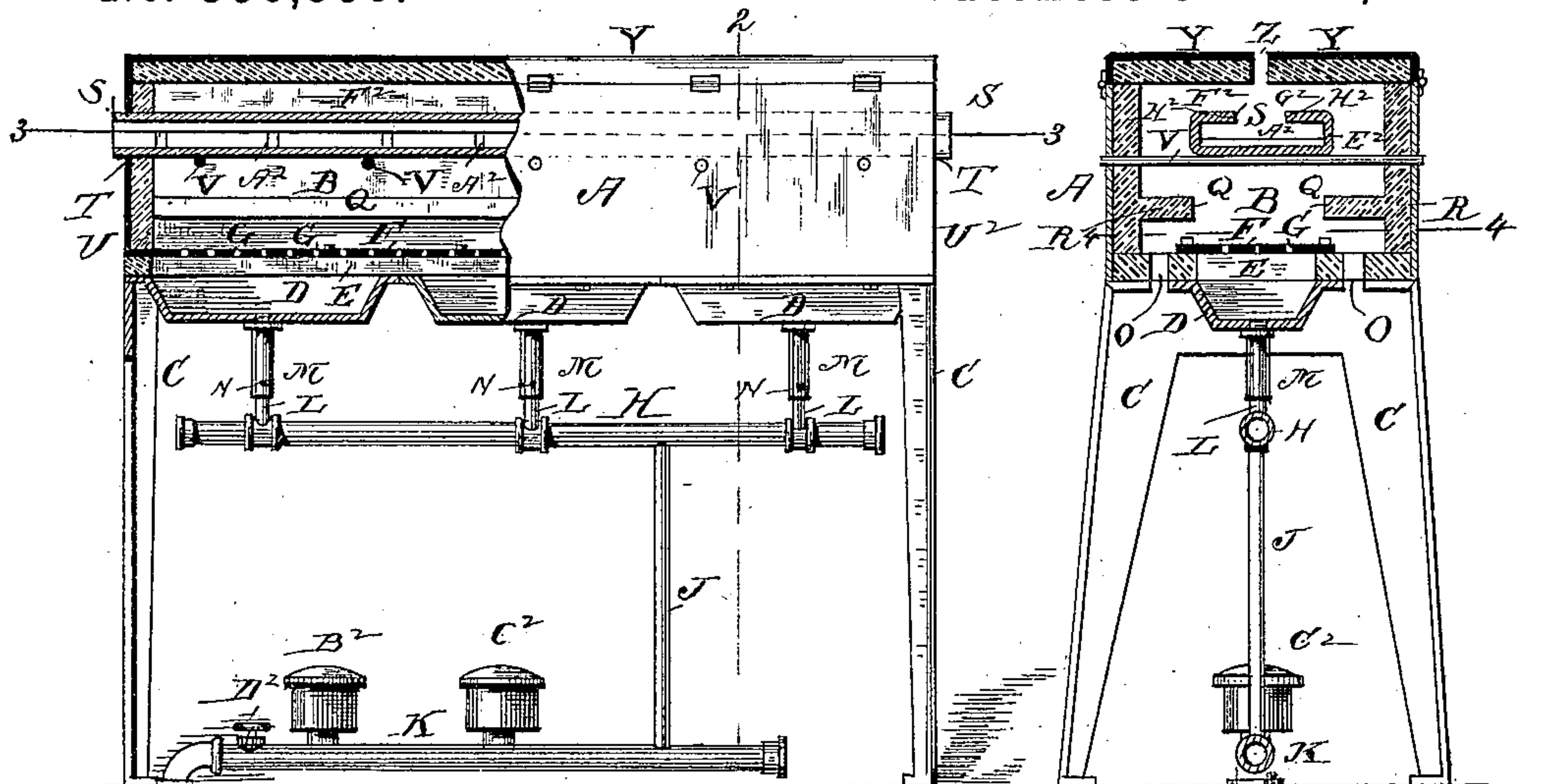
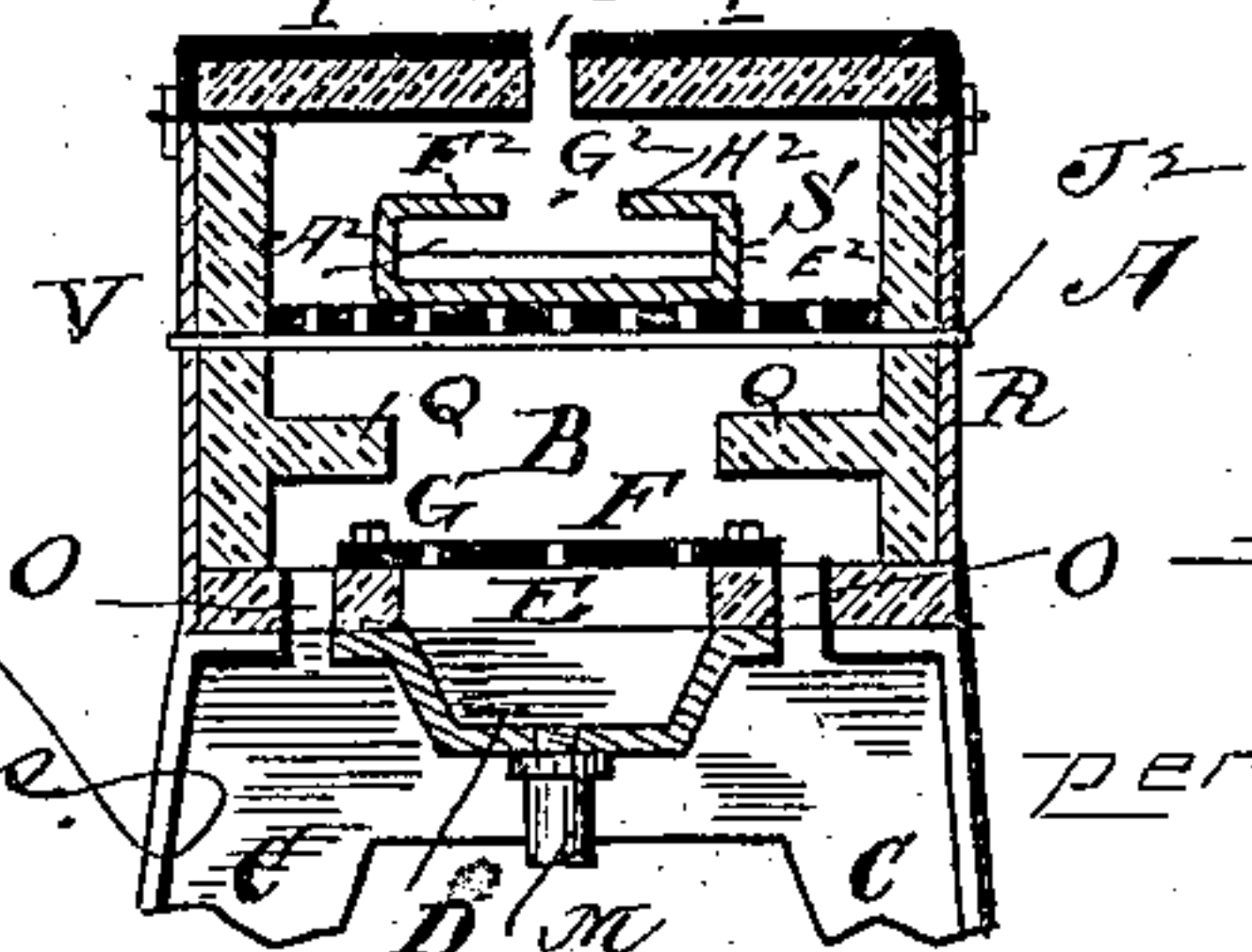


Fig. 5.

Witnesses

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EDWARD CLIFTON, OF LOWELL, MASSACHUSETTS.

OVEN FOR TEMPERING WIRE, &c.

SPECIFICATION forming part of Letters Patent No. 356,350, dated January 18, 1887.

Application filed May 11, 1885. Serial No. 165,120. (No model.)

To all whom it may concern:

Be it known that I, EDWARD CLIFTON, of Lowell, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Ovens for Tempering Wire, &c., of which the following is a full, clear, and exact description.

These improvements in ovens are more particularly designed for heating steel wire in the process of hardening and tempering the same, and it will be hereinafter described with particular reference thereto; but, as will appear from said description, it is applicable to the heating of other metals and articles, and therefore, while it will be particularly described in relation to heating of steel wire, it is distinctly to be understood that it is not intended in any way to limit it thereto.

This invention, in substance, consists in an oven for heating steel wire, &c., in the process of tempering the same, which is suitably adapted to be heated, preferably, by the combustion of hydrogen gas and air, and which has an opening at each end for the passage of wire, &c., into, through, and out of the oven; of a horizontal shelf and shelves located therein; of the construction and arrangement of said shelf and shelves relative to each other and to the side walls of and the combustion and heating-chamber of the oven; of openings for the passage of air into the combustion-chamber of the oven; of the construction of the top of the oven for being opened and closed and to facilitate the insertion in and removal of wires, &c., from the oven without requiring the top to be opened, and of the combination of gas-pressure regulators with the gas-supply pipe, all substantially as and severally for the purposes hereinafter fully described.

In the accompanying drawings, forming a part of this specification, the present improvements in tempering-ovens are illustrated.

Figure 1 is a side elevation of the oven, shown as broken away at one end, and at such end in longitudinal vertical section. Fig. 2 is a transverse vertical section on line 2 2, Fig. 1. Fig. 3 is a plan view, at one end broken away, and in horizontal section on line 3 3, Fig. 1. Fig. 4 is a horizontal and longitudinal section on line 4 4, Fig. 2. Fig. 5 is a transverse vertical section, same as Fig. 2,

illustrating a modification, to be hereinafter described. Fig. 6 is an enlarged view in detail, hereinafter referred to.

In the drawings, A represents an oven of a rectangular box shape, and having a combustion-chamber, B.

The oven A and its combustion-chamber B, except as to the features of this invention, as hereinafter stated, are made as usual. The oven is horizontal, and at each corner it is supported by a leg, C.

D D are series of separate pans, located in the same horizontal plane at the bottom of the oven, and all opening at their upper side to a common space, E, closed on all of its sides, and at its top covered with a plate, F, having a series of perforations, G, making communication between the inclosure of the pans D and the combustion-chamber B.

H is a horizontal pipe, connected by a vertical pipe, J, to a gas supply pipe, K.

The horizontal gas-pipe H is provided along its length with a series of vertical nipples, L, each entered into a separate vertical pipe, M, screwed into the bottom of the pans D, one to each pan, and making communication between the chambers of the pans and the gas-pipe H.

N, Fig. 6, is an air-hole in one side of each vertical pipe M, and just above the nipple L. By the combination of gas-nipples L and air-holes N, above described, gas and air are entered into the chamber of the pans and below the perforated top F, common to all of said pans, and therein commingling they pass through the perforations G of said top into the combustion-chamber B of the oven, to be therein consumed or burned.

O are a series of apertures through the bottom or floor P of the combustion-chamber of the oven and at each side of the pans D. These apertures O are for the admission of air to the combustion-chamber.

Q Q are horizontal projections from each side wall, R, of the oven. These projections Q extend toward the center line of the combustion-chamber B, and they are located above the air apertures or ports O of the combustion-chamber, with an open space between them, and they project a little beyond but above the perforated top F of the air and gas pans or chambers D.

S is a shelf, which extends horizontally

through the upper part of the combustion-chamber of the oven and from end to end, and through and in line with and in continuation of an opening, T, in each end wall, U U², of the oven. This shelf S within the oven is surrounded on all sides by the combustion-chamber B thereof, and at intermediate points of its length it is supported on fixed cross bars V of the oven, and at and along each of its sides, and between the opposite side walls R of the oven an open space, X, Fig. 3, is left, thus making communication between the part of the combustion-chamber which is above and the part thereof which is below said shelf.

Y Y are two covers, closing the top of the oven A. Each cover Y is hinged at and along its side to a side wall of the oven, and the two are of such a width that when closed a slit or opening, Z, will be left between their opposite edges and lengthwise of the oven.

The shelf S, along its length and at intermediate points, is preferably provided with cross-bars A² of suitable material, to act as supports to the wires which in the use of the oven are to be run through it from end to end, passing over the top and within the width of the shelf. The wires enter the oven at the opening T in its forward end wall, U, and pass out of the oven at the opening T in the other end or rear wall, U², and in so passing through they are heated from the heat within the oven generated from the combustion of hydrogen gas, and which is going on more particularly in the combustion-chamber proper of the oven, and which is below said shelf S. The shelf S guards and protects the wires from direct contact with and impingement of the flames of combustion, while at the same time the heated vapors and air are free to circulate about and around the upper portion of the oven, through which the wires are moving, and also about and around the so-moving wires, and this heating of the wires is to be such as to produce the desired temper in them.

The air inlets or ports O, at and along the sides of the gas and air commingling pan-chambers D, supply air to the combustion going on in the combustion-chamber, and the side horizontal projections, Q, above said air inlets, act to deflect the air entering at said inlets toward the longitudinal central portion of the oven, and thus to concentrate the flames of combustion the more directly against the under surface of the shelf, from which, spreading out sidewise, they then pass, in the form more of heated vapor than of flame, at and along the sides of the shelf into the upper portion of the oven.

B² and C² are two gas-regulators, of any of the ordinary or other suitable construction, to regulate the pressure of gas, and as the construction thereof for such purpose forms no part of the present invention, it is not deemed necessary to herein particularly describe or illustrate it in the drawings. These gas-regulators B² C² are both connected to the supply-pipe K, common to the several nipples L, and

provided with a closing and opening valve or stop-cock, D², of any suitable or ordinary construction. The gas-regulators are between said valve D² and the vertical pipe J, which makes connection with said supply-pipe K and the gas-nipples L, hereinbefore referred to. These gas-regulators are used for the purpose of insuring uniformity of pressure in the gas delivered at the gas-nipples L for combustion in the oven, whatever may be the pressure of the gas-supply, and however the same may vary from time to time, and which pressure, as is well known, does vary greatly as the quantity of gas consumed by the various users drawing from the same supply varies, and from the custom, in the supply of gas, of having the pressure of the supply greater at night or at certain hours of the day than at others. The regulator C², the nearer to the oven, is adjusted closely to the pressure of gas desired, and the other regulator, B², to a pressure above said desired pressure, and thus between the two the pressure of gas delivered to the combustion-chamber is maintained at all times at a practically uniform pressure.

The shelf S, as particularly shown in the drawings, has a wall, E², at each side, both projecting above the top of the shelf, and each is returned horizontally, as at F², toward the center longitudinal line of the shelf, leaving an open longitudinal slit, G, between the opposite edges H² of the so-retained portions F². Again, the support of the shelf may be through a perforated plate, J², Fig. 5, resting upon the cross-bars V, in lieu of directly through and upon said cross-bars, and by resting directly on said plate J², as shown, or indirectly, with interposed supporting-blocks. (Not shown.)

The side walls, E², of the shelf S obviously increase the protection of the wires against direct impingement or contact of the flames of combustion, and the returning portions F² again add their mite in this relation, and together they secure an improved evenness in the diffusion of the heated vapors about the wires in the oven.

As the top of the oven is closed by sectional covers Y Y, with a longitudinal slit, Z, between their opposite edges, the oven can be most readily opened, and when closed said longitudinal slit allows wires to be inserted in and removed from the oven without requiring either the oven to be opened or the wires to be drawn or run through the oven from end to end thereof.

Although this invention has been described particularly in relation to steel wire, it is applicable as well to other articles, and so is not to be limited in that regard.

Having thus described my invention, I claim—

1. In an oven for heating wire, &c., to temper it, suitably adapted in its lower portion for combustion and thereby to be heated, and having an opening, T, at each end, a horizontal shelf, S, which extends from end to end and partially across the width of the oven, and

thereby divides the oven into upper and lower compartments, and which has along the whole length of each of its sides an upright wall or projection, E², the whole forming a trough in communication at each end with said end openings for the passage of the wire to be heated, and on its upper side only, in open communication with the openings X along and between the side walls of the shelf and of the oven, and also with the upper compartment, but otherwise closed to the lower compartment of the oven, substantially as described, for the purpose specified.

2. In an oven for heating wire, &c., to temper it, suitably adapted in its lower portion for combustion and thereby to be heated, and having an opening, T, at each end, a horizontal shelf, S, which extends from end to end and partially across the width of the oven, and thereby divides the oven into upper and lower compartments, and which has along the whole length of each of its sides an upright wall or projection, E², each having a horizontal extension, F², projecting toward each other, with an opening, G², between them, the whole forming a trough, partially closed on its upper side, in communication at each end with said end openings, T, for the passage of the wire, &c., to be heated, and on its upper side, at its said opening G², between its said horizontal extensions F², in open communication with the upper compartment of the oven, in turn in open communication with the lower compartment of the oven at and along the openings between the side walls of the shelf and the side walls of the oven, but otherwise closed to said lower compartment, substantially as described, for the purpose specified.

3. The combination, with an oven for heating wire, &c., to temper it, suitably adapted in its lower portion for combustion and thereby to be heated, and having openings T at each end, and a horizontal shelf, S, which extends from

end to end and partially across the width of the oven, and thereby divides the oven into upper and lower compartments, in communication with each other only at the openings T along the sides of the shelf and between them and the side walls of the oven, of fenders Q, which project horizontally from the side walls and extend along the length of the oven from end to end thereof below said shelf and have an open space between them, substantially as described, for the purpose specified.

4. An oven for heating wire, &c., to temper it, having two covers, Y, to close it at its top, except at a longitudinal slit or opening, and each hinged at and along the side walls of the oven, substantially as described, for the purpose specified.

5. In an oven for heating wire, &c., to temper it, having an opening, T, at each end, the combination, with chambers or pans D, which have a perforated top and are located in the lower portion of the oven, and are adapted for the entrance and commingling of hydrogen gas and air to pass therefrom through the perforations of their said top into the chambers above to be there consumed, of two horizontal shelves, S J², both located above said perforated top of said pans D, the one, S, above the other, J², and both extending along the whole length, and the one, S, partially and the other, J², wholly across the width of the oven, with an opening along each side of the upper shelf, S, and between said sides and the side walls of the oven and perforations in the lower shelf, J², substantially as described, for the purpose specified.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

EDWARD CLIFTON.

Witnesses:

WM. S. BELLOWS,

ALBERT W. BROWN.