

No. 632,836.

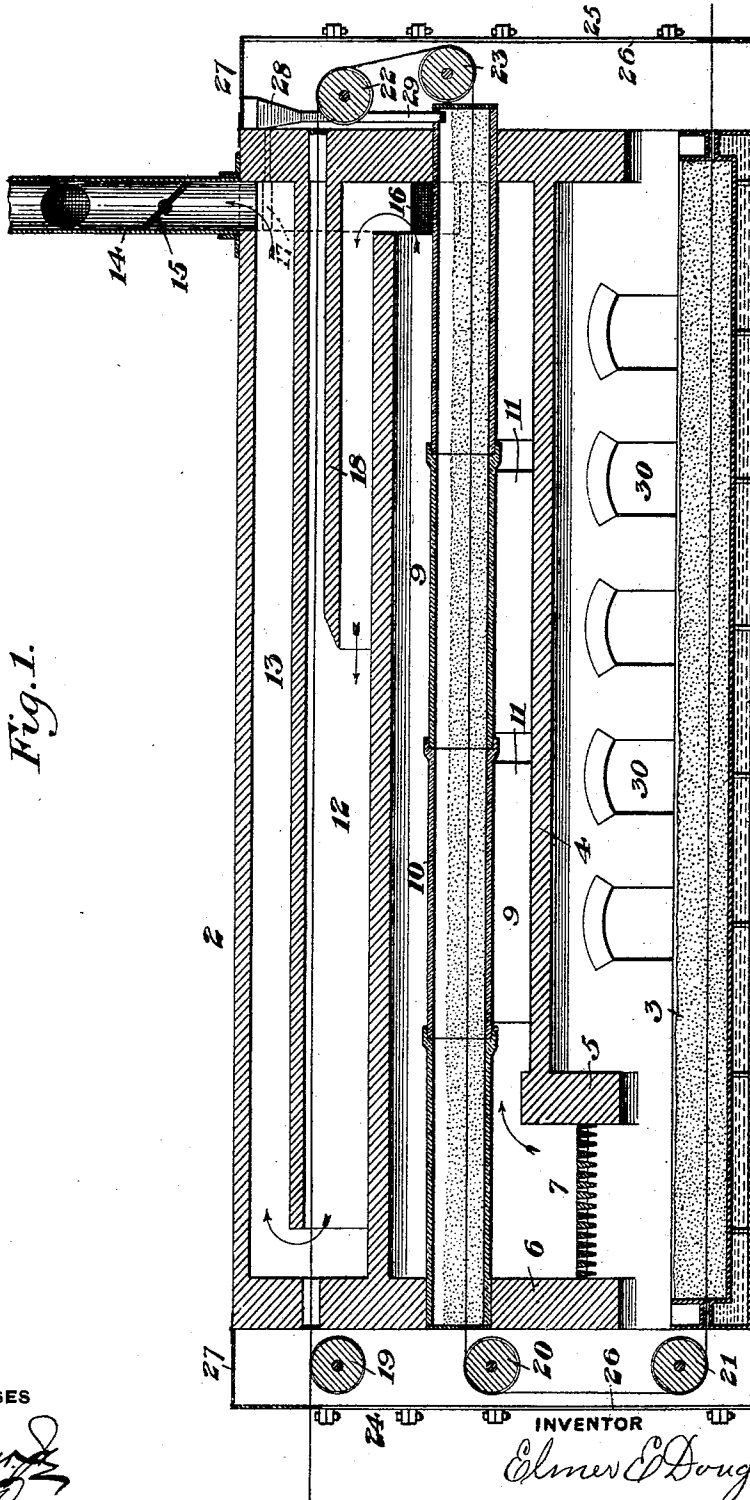
Patented Sept. 12, 1899.

E. E. DOUGLASS.
WIRE ANNEALING FURNACE.

(Application filed Mar. 9, 1899.)

(No Model.)

2 Sheets—Sheet 1.



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Fig. 3.

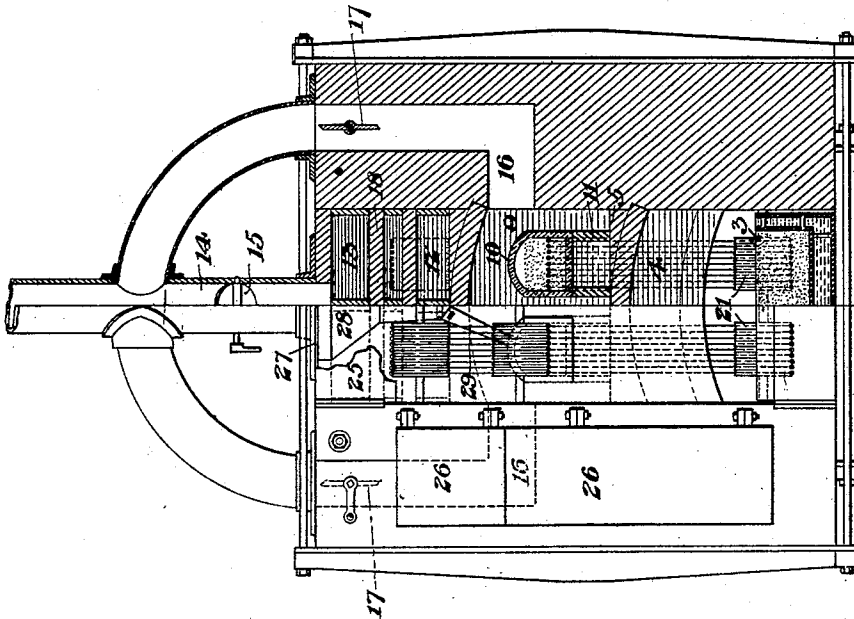
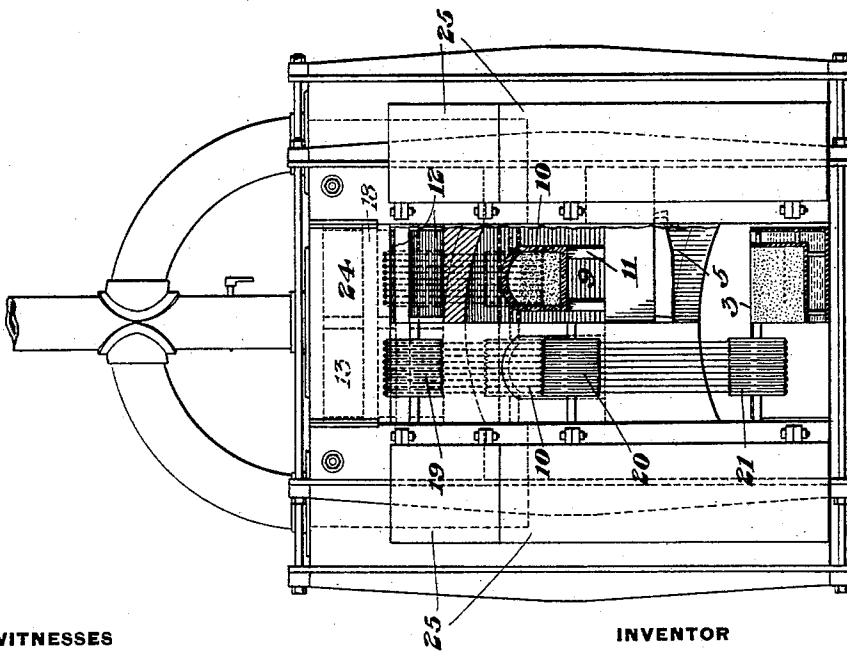


Fig. 2.



WITNESSES

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ELMER E. DOUGLASS, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO JOHN SWINBANK, OF SAME PLACE.

WIRE-ANNEALING FURNACE.

SPECIFICATION forming part of Letters Patent No. 632,836, dated September 12, 1899.

Application filed March 9, 1899. Serial No. 708,349. (No model.)

To all whom it may concern:

Be it known that I, ELMER E. DOUGLASS, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Wire-Annealing Furnaces, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a longitudinal vertical section of my improved annealing-furnace. Fig. 2 is a front elevation of the same with the casing-doors open and the furnace partly broken away in the right-hand portion; and Fig. 3 is a rear elevation of the same with the doors open, the right-hand half being shown in section.

My invention relates to that class of annealing-ovens where wire or other flexible material is continuously annealed by drawing it therethrough; and its object is to cheapen and facilitate the annealing of the wire and prevent its scaling after the annealing operation.

In the drawings, 2 represents a furnace of general rectangular form, in the base of which is located a water-jacketed sand-box 3, having holes in its ends through which the series of wires are drawn. This pan or box is filled with sea-sand or similar material to a point above the level of the wires therein, and the sand is maintained at the proper temperature by the water-jacket, which is provided with suitable inlet and offtake pipes, whereby the flow of water therethrough is controlled. This sand-box is located in a central chamber having a roof 4, which extends from the bridge-wall 5 back to the rear end of the furnace. Between the bridge-wall 5 and the front wall 6 is located the grate 7, which may be supplied with fuel through side doors 8. Instead of a grate with solid fuel, gases or liquid fuel may of course be supplied at this point. Through the combustion-chamber 9 above the roof 4 extend retorts 10, of which I have shown two, though there may be any desired number. These retorts are supported upon suitable distance-blocks 11 and extend through the end walls of the furnace, the closed ends of the retorts being provided with holes through which the series of wires pass. A flue 12 communicates

with the rear end of the combustion-chamber 9, and the flue 12 connects at its front end with another flue 13 above it, which latter flue leads to the offtake 14, provided with damper 15. Branch flues 16 also lead from opposite sides of the rear end of the combustion-chamber and extend into the offtake 14, these flues being provided with valves or dampers 17, so that, if desired, by closing valve 15 and opening valves 17 the products of combustion may be taken directly to the stack without first passing through the flues 12 and 13. A shield or intermediate wall 18 extends from the rear wall of the furnace forwardly within the flue 12, and in the ends of this flue are provided the holes for the wires, these being above the level of the shield which protects the wire from contact with the products as they emerge from the end of the combustion-chamber. A series of sheaves or pulleys 19, 20, and 21 are supported in suitable bearings at the front end of the furnace with their surfaces in alinement with the holes for the wires passing into the flue 12, the retorts 10, and the sand-box 3, respectively, and similar pulleys 22 and 23 are supported in the rear of the furnace to receive the wire passing from the flue 12 and direct it into the retorts 10. Vertical casings 24 and 25 inclose the pulleys at the ends of the furnace, each casing being provided with suitable doors 26 to allow access to the pulleys. The upper ends of these casings may be closed by suitable doors 27.

To feed the sand, gravel, or other material used in the retorts, I provide a rear hopper 28, from which valve-controlled branches 29 lead to the rear end of these retorts, and to give access to the sand-box in the bottom of the furnace I provide other side ports 30, which give a free circulation of cooling air above the said bed.

The operation of the device is as follows: The retorts being filled with sand or suitable material and the water-cooled pan being filled with sand above the level of the wires the wires are continuously fed to and over the pulleys 19, thence through the upper portion of the flue 12 downwardly over the pulleys 22 and 23, forwardly through the retorts, and thence down over pulleys 20 and 21, and through the sand-box, at the rear end of which

the wires are led out to suitable reels. The wires are started through the furnace by inserting hooked rods and pulling the end through at the proper place. The wires as they
 5 pass through the flue 12 in contact with the products of combustion are preheated thereby and thence pass through the closed retorts wherein they are annealed. By passing the wires through the sand-box after anneal-
 10 ing they are prevented from scaling by direct contact with the air, and any scale which may have formed is also removed by the abrading action of the sand. If the wire is raised to too high a temperature in flue 12, the products
 15 may be taken directly to the stack through the branch flues 16.

The advantages of my invention will be apparent to those skilled in the art. The wire being first brought into contact with the prod-
 20 ucts of combustion is thereby raised in temperature to prepare it for the annealing operation and then passes through the annealing retorts, after which it passes through the sand-box and is kept out of contact with the
 25 air until the temperature is lowered to a point where it will not scale. The temperature of the sand-box is kept at the desired point by the cooling water-jacket, and the wire is thus quickly and easily annealed without scaling.
 30 Many changes may be made in the form and arrangement of the flues, the retorts, and the sand-box without departing from my invention, since

I claim—

35 1. A continuous annealing-furnace, having a closed retort, and supports arranged to lead the wire through a flue in contact with the products of combustion, and thence through the retort; substantially as described.

40 2. A continuous annealing-furnace, having a closed retort within the combustion-cham-

ber, a flue leading from the combustion-chamber, and pulleys over which the wires pass through the flue, and thence through the retort, substantially as described. 45

3. A continuous annealing-furnace having a pan provided with granular material, means for passing the wire through the material, and a cooling-jacket for the pan; substantially as described. 50

4. A continuous annealing-furnace, having a furnace-chamber and longitudinal heating-passages, a pan located in its bottom below the furnace-chamber, and containing granular material, and supports arranged to lead
 55 the wire back and forth through the heating-passages, and thence through the granular material in the pan; substantially as described.

5. A continuous annealing-furnace, having 60 a closed retort within a combustion-chamber, a flue extending from the combustion-chamber and thence to the stack means for passing the wire through the flue, and thence through the retort, and branch flues leading directly
 65 from the combustion-chamber to the stack; substantially as described.

6. A continuous annealing-furnace, having a combustion-chamber, a closed retort within said chamber, a longitudinal flue extending
 70 from the combustion-chamber, and thence to the stack, a water-cooled sand-box, and pulleys arranged to lead the wires in succession through the flue, the annealing retort, and the sand-box; substantially as described. 75

In testimony whereof I have hereunto set my hand.

ELMER E. DOUGLASS.

Witnesses:

M. S. MURPHY;
 G. B. BLEMMING.