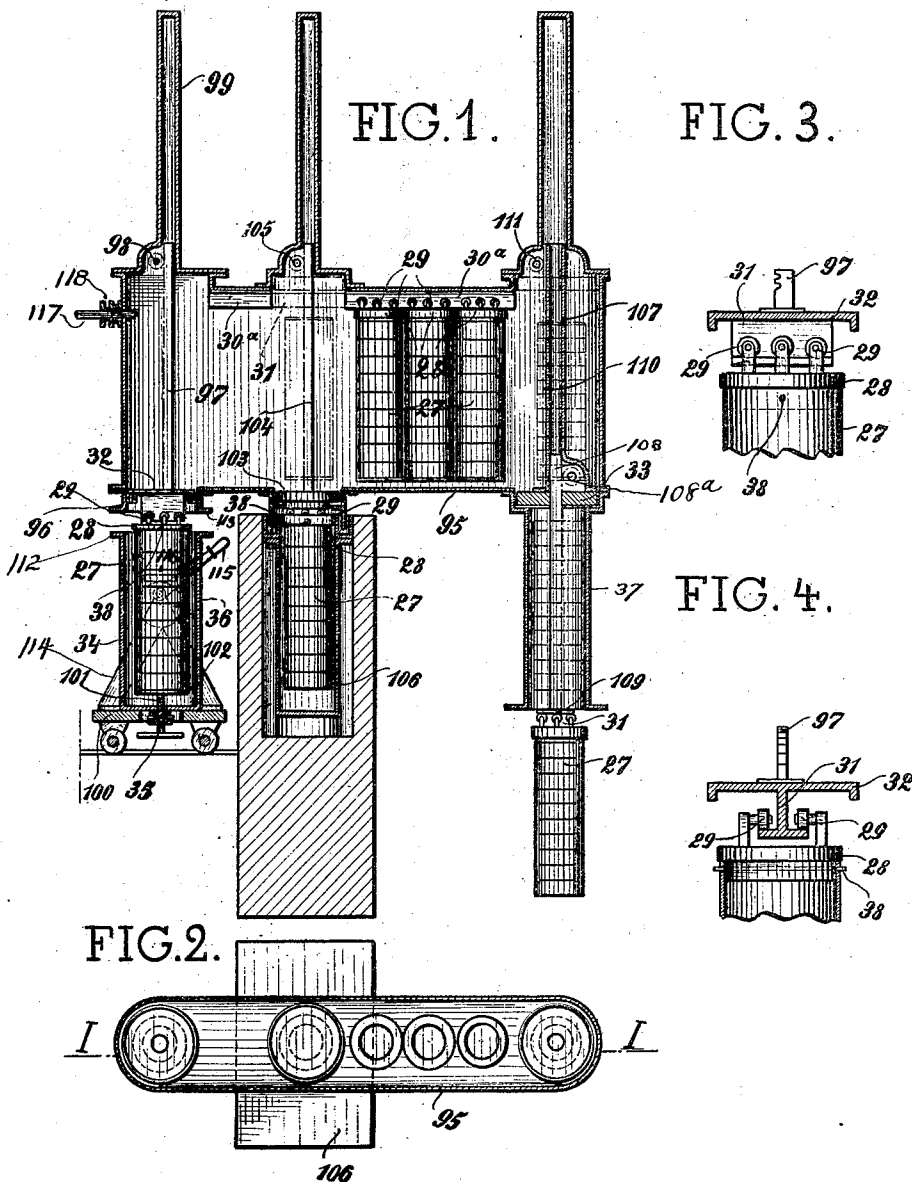


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 ANNEALING APPARATUS.
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1,073,235.

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ANNEALING APPARATUS.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, HERMANN HILLEBRAND, JR., a citizen of Germany, residing at Werdohl, in Westphalia, Germany, have invented a new and useful Annealing Apparatus, of which the following is a specification.

This invention relates to a novel apparatus for annealing metal articles in a quick, reliable and effective manner.

This application is a division of a co-pending patent application for an annealing apparatus, filed by me June 19th, 1912, under Serial No. 704,495.

In the accompanying drawing: Figure 1 is a vertical section on line 1-1, Fig. 2, through an annealing apparatus embodying my invention; Fig. 2 a horizontal section through the cooling chambers; Fig. 3 a detail section of the piston and of part of the vessel supported thereby, and Fig. 4 a similar section taken at right angles to Fig. 3.

My improved annealing furnace consists essentially of a cooling chamber 95, the ingress and egress openings of which are adapted to be respectively closed against the atmosphere by a pair of independently movable pistons 32 and 33. The flange of piston 32 is made to normally bear against a packing ring in a groove 96. The piston 32 can be moved up and down by means of a rack 97 and a pinion 98 meshing therewith, a closed tube 99 on the casing 95 surrounding the rack 97 for preventing the light neutral gas that fills casing 95 from escaping. A carriage 100 adapted to support a box or container 34 open at the top and closed at the bottom is provided with means for raising the box 34 through a short height and pressing its upper flange 112 against the corresponding flange 113 of the casing 95. The said raising means are shown to consist of two parallel triangular standards 114 located at both sides of the box 34, two handles 115 pivoted at the upper ends of the standards and two eccentrics 36 rigidly connected with the handles. The eccentrics are adapted to bear from below against two opposite lugs 116 on the box for moving the latter upward. A screw-spindle 101 passes through a stuffing-box in the bottom of the box 34 and can be turned by means of a hand-wheel 35 for moving up and down a supporting disk 102. A fresh charge, for example a column of superposed

vessels 27 charged with the wares and connected with a head-plate or charge carrier 28 by means of a cross pin 38, is introduced into the box 34 and placed on the supporting disk 102. After wheeling the charged carriage 100 near to the piston 32, the hand-wheel 35 is so adjusted as to raise rollers 29 which are pivoted to head-plate 28 above the level of a rail 31 depending from piston 32. Then the carriage 100 is further pushed sidewise until all the rollers 29, 29 are moved above the rail 31, after which the supporting disk 102 is moved downward by means of the hand-wheel 35, so that the fresh charge now depends from piston 32. Next the box 34 is pressed upward in the manner described for producing a gas-tight joint between the box 34 and the casing 95 and by means of suitable valves (not shown) provided on the box 34, the air is expelled from the box and replaced by a neutral gas, whereupon the pinion 98 is operated for raising the piston 32 with the depending charge into the casing 95.

By suitable push rods 117 extending through stuffing boxes 118 into casing 95, the rollers 29, 29 of the head-plate 28 are shifted from the rail 31 of the piston 32 to the overhead rail 30^a of the cooling chamber 95, whereupon the piston 32 is again lowered to shut off casing 95 from the atmosphere and the box 34 is lowered and moved away with the carriage 100 for receiving a fresh charge. When a piston 103 which is located intermediate pistons 32, 33 occupies its highest position, the rollers 29 on the head-plate 28 carrying the fresh charge can be shifted from the rail 30^a to a rail 31 of the piston 103, whereupon the latter is lowered by means of a rack 104 and a pinion 105 for inserting the charge into the annealing pot 106 which is received within an annealing oven and shutting off the pot from the cooling chamber. After the annealing operation has been completed, the piston 103 is again raised and the annealed charge is shifted to the other part of the rail 30^a within cooling chamber 95, while a fresh charge is moved beneath piston 103. The annealed charge is allowed to cool off in chamber 95.

The short tube 37 depending from the casing 95 at its right end, is recessed at its upper end for the reception of a packing ring, against which the piston 33 is made to normally bear. The piston 33 is rigidly

connected with a tube 107, in which a rod 108 is longitudinally guided. This rod carries at its lower end a rail 109, and may be moved up and down from without by being formed as a rack that is engaged by a pinion 108^a. The tube 107 is provided with a rack 110, which meshes with a pinion 111, whereby the piston 33 may be moved up and down. It is obvious, that when both the piston 33 and the rail 109 occupy their highest position, the cooled annealed charge can be shifted from the rail 30^a to the rail 109, after which first the piston 33 is lowered to shut off the cooling chamber, whereupon the charge is, by means of the rod 108, lowered through the tube 37 and is then taken off.

I claim:

1. An annealing furnace provided with a cooling chamber having an ingress opening, a piston adapted to close said opening, a charge sustaining support depending from the piston, a container, means for raising the container into contact with the cooling chamber around the ingress opening, a charge carrier within the container, and means for elevating said carrier into engagement with the charge sustaining support.

2. An annealing furnace provided with a cooling chamber, having an ingress opening and an egress opening, an annealing pot communicating with the chamber intermediate said openings, a piston adapted to close the inlet opening, a second piston adapted to close the egress opening, means for suspending a charge from the first named pis-

ton, means for suspending the charge within the cooling chamber, means for conveying the charge from the cooling chamber into and out of the annealing pot, and means movable independently of the second named piston for delivering the charge from the egress opening.

3. An annealing furnace provided with an ingress opening and an egress opening, a piston adapted to close the ingress opening, a second piston adapted to close the egress opening, said second piston being provided with an upwardly extending tube, an independently movable rod encompassed by the tube, and a charge sustaining support depending from said rod.

4. An annealing furnace provided with a cooling chamber having an ingress opening and an egress opening, an annealing pot communicating with said chamber intermediate said openings, a first piston adapted to close the ingress opening, a second piston adapted to close the mouth of the annealing pot, a third piston adapted to close the egress opening, charge sustaining supports on the first and second named pistons, overhead charge sustaining supports within the cooling chamber, a tube extending upwardly from the third named piston, an independently movable rod encompassed by said tube, and a charge sustaining support depending from said rod.

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Witnesses:

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