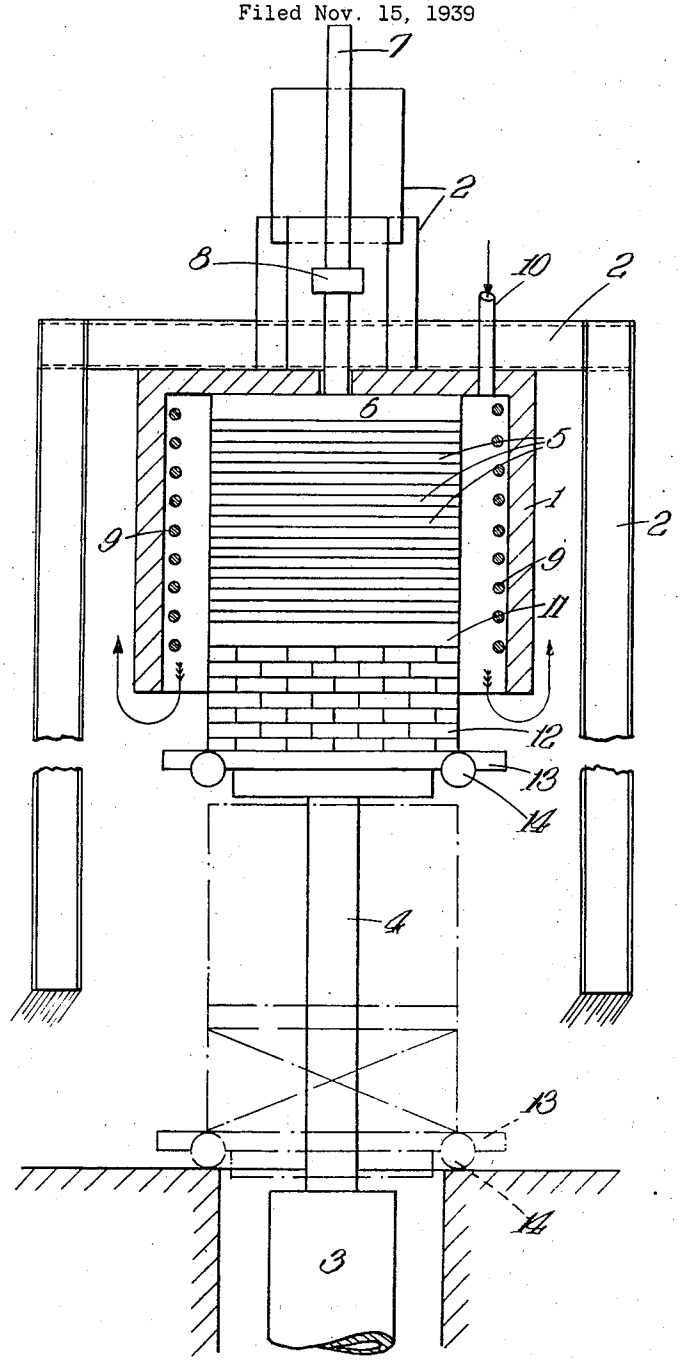
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FURNACE FOR HEAT TREATMENT UNDER HIGH PRESSURE

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INVENTOR
ELLIS MILLER

Rackenbach & Hirschman
ATTORNEYS

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FURNACE FOR HEAT TREATMENT UNDER HIGH PRESSURE

Ellis Miller, Brussels; Belgium

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For plating, in particular, and also for welding, it is necessary to perform the heat treatment not only under high pressure but also in an atmosphere devoid of oxygen, and the object of the present invention is to provide a furnace in which these conditions can be fulfilled completely.

According to the present invention a furnace is charged with a gas inert to the material to be treated and has a furnace chamber of the bell type carried by a supporting frame so that the charge of material may be introduced thereinto from below, preferably by means of an hydraulic hoist, and subjected to a high pressure.

Preferably the chamber has therein a movable upper press plate so that the charge of material can be compressed to some extent as soon as it enters the furnace, in order to expel any air that may still be present between its constituent elements.

One form of furnace accordance with this invention is illustrated diagrammatically in sectional elevation in the accompanying drawing.

As shown, 1 is a well insulated furnace chamber of the bell type, which is securely attached to a supporting frame 2 and therefore always remains stationary. The supporting frame 2 is a substantial structure, within the ground plan of which is arranged an hydraulic press cylinder 3 having a ram 4, so that pressure may be exerted on the material 5 under treatment, by said ram and taken up by the head of the bell 1. A press plate 6 of refractory steel inside the bell 1 provides an abutment surface and is carried by a rod 7 which passes through the head of the bell. Adjustably secured to the rod 7 is a collar 8 which, when the ram 4 is lowered, permits the plate 6 to take up a position about half way down the furnace chamber 1, in which position it is therefore maintained at the furnace temperature. The furnace chamber 1 which is heated electrically by coils 9 and is provided with an inlet 10 for an inert gas functions in the following manner:

1. A deoxidising gas (usually ordinary coal gas) is admitted into the furnace chamber through the gas supply pipe 10, and displaces the air present in the furnace chamber, downwards and into the open.

2. The heating coils 9 arranged inside the four walls of the bell 1 are connected with the source of electric current and thus enable the furnace chamber to be heated to the desired temperature.

3. A plate 11, of refractory chromium steel is placed on a base 12 of refractory material set up on a support 13 fitted with wheels 14. This plate, because of its better heat conductivity than the base 12, insures more rapid and uniform heating of the lower portion of a charge of relatively poor heat conductivity.

4. The material 5 to be heated is arranged on the plate 11 and is then moved into position under the middle of the furnace chamber 1.

5. The press 3, 4 is now set in operation, thereby causing the ram 4 to raise the support 13 and charge of material 5 into the furnace chamber 1, the top press plate 6 being carried upward at the same time, and press the charge against the head of the furnace.

6. When the heat treatment is completed, the pressure in the cylinder 3 is released and the support 13 and charge 5 lowered so that they may be moved aside to make way to a fresh support and charge, which may be waiting and may be at once raised into the furnace, which is still at working temperature—and so on. A protective gas—which, for certain purposes, may be 5% hydrogen and 95% nitrogen, since there is no risk of explosion—may be introduced continuously into the furnace, from above, through the pipe 10.

I claim:

1. A furnace comprising a furnace chamber of bell type, a supporting frame by which said furnace chamber is carried, a movable support for introducing into said chamber from beneath the same a charge of material to be treated and for lowering it from said chamber, a movable plate adjacent the top of the chamber, means for subjecting the charge on said support to high pressure exerted upwardly through said support, and means for charging said chamber with a gas which is inert to the material to be treated.

2. A furnace comprising a furnace chamber of bell type, a supporting frame by which said furnace chamber is carried, a hoist, said hoist being adapted to introduce upwardly into said chamber a charge of material to be treated and to lower said charge from said chamber, said furnace having an abutment surface opposite the hoist, the stroke of said hoist being such that the charge is forced at high pressure against the abutment surface when the charge is lifted into the chamber, and means for charging said chamber with a gas which is inert to the material to be treated.

3. A furnace comprising a furnace chamber of bell type, a supporting frame by which said furnace chamber is carried and held against upward displacement, an hydraulic hoist, said hydraulic hoist being adapted to introduce upwardly into

said chamber a charge of material to be treated and to lower said charge from said chamber, said furnace having an abutment surface opposite the hoist, the stroke of said hoist being such that the charge is forced at high pressure against the abutment surface when the charge is lifted into the chamber, and means for charging said chamber with a gas which is inert to the material to be treated.

4. A furnace comprising a furnace chamber of bell type, means for supplying heat to the interior of said chamber, a supporting frame by which said furnace chamber is carried and held against upward displacement, an hydraulic hoist, said hydraulic hoist being adapted to introduce upwardly into said chamber a charge of material to be treated and to lower the charge from said chamber, means for charging said chamber with a gas which is inert to the material to be treated, a support fitted with wheels and bearing refractory material on which said charge may be placed, the stroke of said hydraulic hoist being such that the charge is subjected to high pressure against the top of said chamber, a movable upper press plate mounted in said furnace chamber by means of a rod slidable through the top of said chamber, and a collar on said rod adapted to engage said top when the charge is lowered and to support said movable upper press plate at a predetermined level within the heating zone of said chamber.

5. A furnace as claimed in claim 1 having a movable upper press plate slidably mounted in said furnace chamber, and means for limiting the downward movement of such plate and for supporting said plate at a predetermined level within the heating zone of said chamber when the charge is lowered, whereby the high temperature of said plate is maintained until it is engaged by the next charge.

6. A furnace comprising a furnace chamber of bell type, means for supplying heat to the interior of said chamber, a supporting frame by which said furnace chamber is carried and held against upward displacement, an hydraulic hoist, said hydraulic hoist being adapted to introduce upwardly into said chamber a charge of material to be treated and to lower the charge from said chamber, means for charging said chamber with a gas which is inert to the material to be treated, and a support fitted with wheels and bearing refractory material on which said charge may be placed, the stroke of said hydraulic hoist being such that the charge is subjected to high pressure against the top of said chamber.

ELLIS MILLER.