Title (en)

METHOD AND INDUSTRIAL FURNACE FOR USE OF A PROTECTIVE GAS AS A HEATING GAS

Title (de)

VERFAHREN UND INDUSTRIEOFEN ZUR NUTZUNG EINES ANFALLENDEN SCHUTZGASES ALS HEIZGAS

Title (fr)

PROCÉDÉ ET FOUR INDUSTRIEL POUR L'EXPLOITATION D'UN GAZ PROTECTEUR UTILISÉ COMME GAZ DE CHAUFFAGE

Publication

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Application

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Priority

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Abstract (en)

The method of applying a resulting combustible protective gas as heating gas for a first burner (3.1) in an industrial furnace operated by the heating gas and the protective gas for heat treatment of materials, is claimed. The furnace comprises a second burner (3.2) used as a heating gas burner and a burn-up spot. The first burner is operated before the second burner for heating the industrial furnace. The second burner is switched-on and operated when a power of the first burner required for reaching a temperature reference value of the industrial furnace is fallen below. The method of applying a resulting combustible protective gas as heating gas for a first burner (3.1) in an industrial furnace operated by the heating gas and the protective gas for heat treatment of materials, is claimed. The furnace comprises a second burner (3.2) used as a heating gas burner and a burn-up spot. The first burner is operated before the second burner for heating the industrial furnace. The second burner is switched-on and operated when a power of the first burner required for reaching a temperature reference value of the industrial furnace is fallen below. The second burner is not operated and switched off when the temperature reference value is reached. A third burner (3.3) operated with the heating gas is used as security pilot burners for the first burner. An UV-probe (3.4) is used for monitoring the first burner. The first burner of the combustible protective gas is supplied by frequency controlled fans. The power of the first burner is reduced by an air control flap (6.1) as throttle valve in a feed line for air during increasing the temperature over the temperature reference value. The protective gas is exhausted over the burn-up spot of the industrial furnace with increasing pressure. The first burner is switched off with a defined maximum value of pressure. The burn-up spot is opened at an inlet lock, and the pressure is reduced, where the first burner is again switched on with a need for power in the industrial furnace. The method further comprises: providing gas start and burner start in a high temperature furnace by a control- and a regulating unit for feeding the heating gas over the feed line for the heating gas; providing the gas start and the burner start in a preheating furnace/pre-oxidation furnace by the second control unit in which the start routine automatically proceeds; feeding the protective gas into the heated high temperature furnace by the control- and regulating unit; and setting the first burner as protective gas burners for the preheating furnace/pre-oxidation furnace, where the gas start is triggered at a first control unit of a gas inlet path to which an automatic start routine proceeds with a tightness control in the feed line over a second control unit to release the supply of the heating gas. The second and third burners are controlled by the heating gas so that provision is ensured with the heating gas. The preheating furnace/pre-oxidation furnace is rinsed over the feed line for the air of the burners having oven volumes with the air. The tightness control is performed by a tightness control unit at the feed line for the heating gas. The doors are opened as well as the second and third burners are restarted. The preheating furnace/pre-oxidation furnace is driven by the second Burner on an operation temperature. The third burner is operated until the preheating furnace/pre-oxidation furnace is again switched off, where: a main valve of the feed line for the combustible protective gas for the first burner is closed; a shutoff valve of the burn-up spot is opened; and an exhaust gas burner of the burn-up spot is restarted before starting a fumigation system. The fumigation of the high temperature furnace is closed when a pressure state adjusted over an overpressure flap of the burn-up spot is reached and a desired atmosphere is adjusted into the furnace. The protective gas is used for operating the first burner. The industrial furnace determines: burn-up at the burn-up spot; a discharge volume of the combustible protective gas; a check valve over a weight load; and/or the overpressure flap of the burn-up spot. A furnace pressure is set, where the continuous aeration of the high temperature furnace is detected with the combustible protection gas of the first burner. The furnace pressure of the high temperature furnace is used as controlled variable for the first burner. The pressure of the fan is adjusted for performing the tightness control before the main valve of the feed line for the protective gas. The industrial furnace is configured for controlling and regulating: the gas start and the burner start in the high temperature furnace; the gas start and the burner start belonging to the preheating furnace/pre-oxidation furnace; the aeration of the high temperature furnace; the adjustment of the first burner as the protective gas burners for the preheating furnace/pre-oxidation furnace; the first burner as the protective gas burners; the operation of the first burner; and/or the switch off of the first burner. An independent claim is included for an industrial furnace for applying a resulting combustible protective gas as heating gas for a first burner.

Abstract (de)

Zur Erhöhung des energetischen Wirkungsgrades in einem mittels Heizgas und Schutzgas betriebenen Industrieofen (1) zur Wärmebehandlung von Werkstoffen wird zur Beheizung ein erster Brenner (3.1) vorrangig vor einem zweiten Brenner (1.2) betrieben, der zweite Brenner (3.2) dann zugeschaltet und betrieben, wenn eine zum Erreichen eines Temperatur-Sollwertes des Industrieofens (1) erforderliche Leistung des ersten Brenners (3.1) unterschritten ist, und der zweite Brenner (3.2) dann abgeschaltet und nicht betrieben, wenn der Temperatur-Sollwert erreicht ist (Fig. 2).

IPC 8 full level

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CPC (source: EP US)

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Citation (applicant)

- DE 102008020449 A1 20091015 - HUSSLEIN MANFRED [DE]
- EP 0282715 A2 19880921 - JUNKER GMBH O [DE]
- DE 3432952 C2 19940922 - LINDE AG [DE]
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