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DEVELOPMENT AND RESEARCH OF PHASIC MODE OF HEATING FOR THERMAL WELLS

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Thermal wells are assigned for annealing of bars of high-alloy steels, providing the elimination of internal tensions in a metal at a cast and cooling in moulds.

In accordance with a primary project thermal wells had the subhearch hearths and special channels for recirculation of fuel burning products. In the process of exploitation of wells unsatisfactory firmness of bottom, resulting in the protracted outages, related to repair is educed. In this connection instead of the subhearch hearths with recirculation of products of burning in the distance a 2000 mm from the level of bottom was set four burners of type «pipe in a pipe». At a reconstruction looked the substantial change of character of heat exchange in swept volume of well. It is set that at the increase of mass of load from 15 to 20-30 t and reduction of duration of outages of wells quality of heating of metal gets worse.

At the study of distribution of temperature on the height of well in its working chamber placed a measuring sound with flexible sensors (by chromel-alumel termoelements), placed in its in the distance a 430 mm from each other.

It is set that for all executed annealing fixed identical conformity to law of change for temperature in control points.

Rational incineration of fuel in the working chamber of thermal wells is possible by organization of its initial combustion at the coefficient of primary air expense ($\alpha_1 < 1.0$ and subsequent reheat of mixture of products of the incomplete burning directly in a gas stream.

The analysis of temperature conditions of primary incineration of fuel and subsequent reheat of fuels of constituents was executed on the basis of composition of heat balances for every stage of the mode of heating, got in work [1].

It is set that at a after-burning with the use of aspiration of atmospheric air more substantial increase of temperature takes place on the second stage of burning of fuel, because to the moment of after-burning there is the sufficient heating of air at its interfusion with warming gases.

At annealing it is fixed a decline in a temperature in overhead part of working chamber due to the decrease of temperature of burning in a torch, and its increase - in a lower part, near bottom due to the after-burning of products of the incomplete burning. As far as heating of load of bars and laying of working chamber there is observed of equalization for field of temperature in the vertical section of well.

During realization of the offered phasic mode of heating the unevenness of the field of temperature on the height of well does not exceed at the end of period self-control 20 °C, while at the existent mode of heating arrives at a size 70 °C.

At consideration of thermal wells the phasic mode of heating came to light more preferable, than existent mode.

In this connection in control system was realized heating of thermal well with the use of the concentrated admission of fuel and taking of products of burning, displaced on the height of working chamber.

At work of burners there is incomplete incineration of gaseous fuel in the working chamber of thermal well, which is supported by the regulator of temperature and by regulator of correlation «fuel-air». Correlation of charges of fuel and air corresponds to the coefficient of expense of primary air $\alpha_1 < 1$. The block of correction of correlation of charges chooses the size of coefficient of expense at which gradient of temperatures between warming gases in a working chamber and on an exit from its will be minimum. With the use of aspirations of atmospheric air (across additional channels) the by volume after-burning of products of the incomplete burning of fuel is executed in the lower part of working chamber of well (in the area of the lowered temperature), even to the same the temperature field on its height. At exceeding of content of oxygen in products of burning of the set size the special block corrects a task to the regulator of pressure in a well which changes negative pressure in a working chamber, increasing aspiration of secondary air. Indignations for pressures in a working chamber, fuels related with the change of expense and air, a regulator of pressure works off affecting drive of choke. Consequently, there is phasic incineration of fuel which provides the even field of temperature in the swept volume of thermal well at the exception of the emission landing of carcinogenic matters in an atmosphere is carried out, that controls a stationary gas analyzer on the oxide of carbon and other matters.

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