

UNITED STATES PATENT OFFICE.

REGINALD SCOTT DEAN, OF CICERO, ILLINOIS, ASSIGNOR TO WESTERN ELECTRIC COMPANY, INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

FUSED SALT BATH FOR HEATING STEEL IN HARDENING.

No Drawing.

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To all whom it may concern:

Be it known that I, REGINALD SCOTT DEAN, a citizen of the United States, residing at Cicero, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Fused Salt Baths for Heating Steel in Hardening, of which the following is a full, clear, concise, and exact description.

10 This invention relates to fused salt baths for heating steel in hardening, and more particularly to a method for maintaining such baths.

15 The object of the invention is to maintain a bath free from foreign substances which have a tendency to pit or otherwise deface the steel which is heated therein for the purpose of tempering it.

20 In accordance with the general features of this invention the iron oxide is removed from the fused salt bath by the addition to the bath of a readily oxidizable material, which modifies and takes up the iron oxide and which may thereafter be removed from 25 the bath.

30 In the use of barium chloride or similar salts in a molten bath for hardening steel, oxidation of the iron or steel occurs and this oxide accumulates in the bath, and as it accumulates, goes into solution or dispersion in the molten bath where it reacts with the iron carbide or other constituents of the steel to form a substance which attacks and pits the steel.

35 In order to remove this iron oxide from the bath a readily oxidizable material such as aluminum may be added, which will reduce the iron oxide to metallic iron, the metallic iron presumably alloying with the aluminum. The metallic aluminum floats on 40 top of the bath and after stirring it in with the bath it rises to the top again and may be skimmed off.

45 The barium chloride appears to be the only practical salt for use in the vicinity of 2000° Fahrenheit, and this is the salt which is most frequently used as a bath for heating steel for hardening.

50 In the heat treatment of high speed steel by the ordinary method of heating in a furnace it is necessary later to remove a coating

of oxide which is formed during the process. In the making of tools this necessitates certain dimensional allowances and on parts like taps it is necessary to remove this oxide 55 or scale from the hardened steel by sand-blasting, grinding, or similar means. With the fused barium chloride bath properly controlled the parts can be worked to practically absolute dimensions, making unnecessary 60 further machining or finishing operations following the hardening. The saving in tool room costs by the use of the barium chloride bath, maintained by the removal of the iron oxide in accordance with this invention, is 65 very great.

What is claimed is:

1. The method of maintaining a fused salt bath in a non-oxidizing condition for the heating of steel in hardening, which consists 70 in adding a readily oxidizable material to the molten bath.

2. The method of maintaining a fused salt bath in a non-oxidizing condition for the heating of steel in hardening, which consists 75 in adding a readily oxidizable material to the molten bath and skimming off the residue or permitting it to settle in the bottom of the container.

3. The method of removing iron oxide 80 from a fused salt bath used for heating steel in hardening, which consists in adding to the bath a material which will reduce the iron oxide to metallic iron which will alloy 85 with the material added.

4. The method of removing iron oxide from a fused salt bath used for the heating of steel in hardening, which consists in adding to the bath a readily oxidizable material 90 of less density than the material of the bath, thoroughly mixing or stirring the bath with the added material, permitting it to rise to the top, and skimming from the bath.

5. The method of removing iron oxide from a molten bath of barium chloride used 95 for heating steel in hardening, which consists in adding aluminum to the bath, stirring the bath with the aluminum in, and removing the resulting oxide from the bath.

In witness whereof, I hereunto subscribe 100 my name this 5th day of May A. D., 1921.

REGINALD SCOTT DEAN,