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EVAN JAMES LEWIS, OF CANONSBURG, PENNSYLVANIA.

PROCESS FOR DETEMPERING STEEL.

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The present invention relates to detempering or softening steel, and is applicable to the treatment of various kinds of steel, including ordinary carbon steel, and also various high speed steels. The object of the invention is a process for quickly softening hard steel, so that the same can be readily cut with ordinary iron working tools, and for accomplishing this result without the production of water cracks in the steel under treatment, and accomplish the process in a very short time.

At the present time, in order to sharpen certain kinds of tools the common practice is to first heat the tool to a high temperature, and then allow the same to cool very slowly, in an annealing furnace, then sharpen the tool in the usual manner and then harden the same. The step of softening the steel of the tool, by the methods now commonly in use, requires from 18 to 24 hours, depending upon the size of the steel piece being treated. In accordance with the present invention this amount of time can be cut down to one-half hour, more or less, thereby saving not only the amount of time in question, but the use of the tool, (and in some cases also the use of the machine on which the said tool is employed) for a considerable amount of time.

In carrying out the process of my invention, the hard steel tool or other article, of any character of steel, is first heated in any suitable manner, for example, in a blacksmith's forge, and thereafter is dropped into a liquid as described below, such liquid being already at a temperature of about 150° F., and in which the steel tool is allowed to cool rapidly. The tool can then be ground or sharpened in any suitable manner and then hardened in the usual manner.

The liquid in which the tool is quenched constitutes the essence of the present invention. This liquid is preferably prepared by dissolving three pounds of soda ash and one-quarter of a pound of soap, in five gallons of hot water, and then allowing the mixture to cool, for example, to about 150° F., at which temperature it is to be used. If the liquid is cooled to room temperature, it should be heated to 150° F., before use. It will be obvious that in place of dissolving the materials in the quantity of water specified they can be mixed with a sufficient amount of hot water to produce a paste, which can be cooled (and shipped if desired) and this subsequently can be added to more water (e. g. hot water) to give the dilution and temperature above referred to.

The soap used can be soft soap or hard soap, ordinary cheap laundry soap, such as is used for washing clothing and the like, gives good results. In place of the soda ash, pure sodium carbonate can be employed and in some cases other alkalies, such as caustic soda, caustic potash, potassium carbonate, etc., which are not incompatible with soap.

Example 1.

When treating ordinary tool steel (carbon steel) it is advisable to use a specific maximum temperature. The steel tool is first heated, for example by means of a fire in the blacksmith's forge, preferably being heated slowly, until it is at about a moderate red heat, (as seen in a darkened room). The temperature will then be around 975° F. This steel is then allowed to cool off somewhat, until it is at a temperature corresponding to a very dull glow (as seen in a dark room), say a temperature of about 775° F. The article is then dropped into the solution at about 150° F., as above described, for 5 or 10 minutes. When taken out it will be found that the steel is very soft, so that it can be machined in a lathe or planer or milling machine, or can be ground on an emery wheel or grindstone, and then can be again tempered.

Example 2.

When detempering or softening high speed steel, a similar procedure is followed. The steel is heated up to a bright cherry red heat, say about 1832° F., and at this temperature is then dropped into the warm liquid. The liquid should be at about 150° F. when the hot steel is dropped in.

I have repeatedly softened hard pieces of high speed tool steel in the manner above described, and in some instances the softened steel was soft enough to be drilled with a common twist drill. The high speed tool steel softened in the manner above described, was free from water-cracks, on its surface, whereas if plunged into water or most other liquids at the same temperature as above

referred to, the entire surface would be covered with cracks, some of which would be quite deep, and the strength of the steel would accordingly be very greatly diminished.

I claim—

1. A process of softening hard steel which comprises heating the same and when at a temperature of about 775° F., quenching the same in a solution of soap, alkali and water, at about 150° F.

2. A process of softening hard steel which comprises heating the same to a temperature above 950° F., cooling to about 775° F., quenching the same in a solution of soap, alkali and water, at a temperature of about 150° F.

3. A process which comprises quenching hot steel, in water containing soap and alkali, at about 150° F., whereby softened steel, free from water-cracks, is formed.

4. A composition for softening hard steel, the same being an aqueous solution containing about three pounds of soda ash and one quarter of a pound of soap, to each five gallons of water.

In testimony whereof I affix my signature.

EVAN JAMES LEWIS.