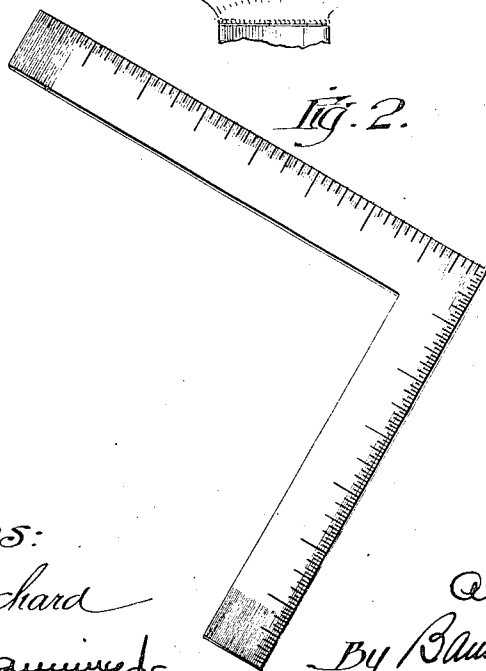
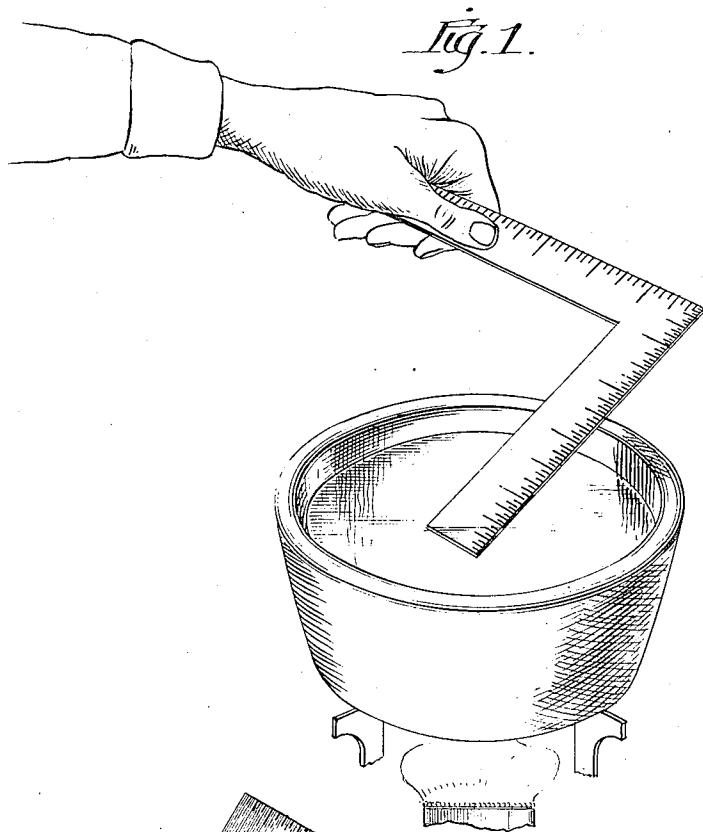


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PROCESS OF HARDENING CARPENTERS' SQUARES AND THE LIKE.
APPLICATION FILED JAN. 17, 1910.

1,008,261.

Patented Nov. 7, 1911.



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UNITED STATES PATENT OFFICE.

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1,008,261.

Specification of Letters Patent.

Patented Nov. 7, 1911.

Application filed January 17, 1910. Serial No. 538,422.

To all whom it may concern:

Be it known that I, ALBERT A. HARVIE, a citizen of the United States, residing at Ottumwa, in the county of Wapello and State of Iowa, have invented a certain new and useful Process for the Hardening of Carpenters' Squares and the Like, of which the following is a specification.

This invention relates to a new and useful process for hardening carpenters' squares and similar devices in which there is danger of warping or otherwise permanently throwing the hardened portion out of true due to the manner in which the hardening heat is now applied to the portion being treated.

It is well known that the wearing portions of blades of carpenters' squares and other objects cannot well be hardened until they have been finished in other respects, due to the great difficulty in working them when hard, and heretofore it has been found extremely difficult if not impracticable to harden them after they are otherwise finished, owing to the above stated reason.

The blades of carpenters' squares are especially subject to wear along their working edges and on the corners adjacent to them, but it is unnecessary to harden any other portions of them. In like manner the only portions of many tools and other objects which need to be hardened are their edges, corners, or comparatively small portions of them. The difficulties heretofore experienced in hardening such tools and objects due to their warping have been encountered by reason of the necessity heretofore experienced of heating them in their entirety, or in such manner as to warp them.

The object of this invention is to provide a process whereby carpenters' squares and similar devices can be hardened in those portions which especially require hardening without the necessity of heating those portions which do not require hardening, and thereby so localizing the heating effect that it will not permanently warp them.

The process consists in the features and steps as hereinafter described and claimed.

This process, although of general application to devices in which the hardening is to be only local, and which it is desired heat only at and immediately adjacent to those parts hardened, is especially applicable to the blades of carpenters' squares, and for

that reason I will now describe it as it would be used in the hardening of the working edge and corners of such a square.

In the drawings, Figure 1 represents a square in which the corner is being treated by my improved process; and Fig. 2 is a perspective of the treated square, showing by the cross shading the corners and edges hardened by my process.

My process is one which may be termed a local case hardening process, and consists in the introduction of carbon or other hardening agent into those portions of the steel intended to be hardened, the hardening agent being supplied by any suitable form of cyanogen or similar substance which will release its carbon or hardening agent to the steel when at a moderately high temperature. The preferred substance is cyanid of potassium.

The method of introducing the hardening agent, preferably carbon, is as follows: The substance, preferably cyanid of potassium, and preferably in the form of crystals or powder, is placed in a suitable vessel, such as a pottery retort, and is heated until it melts which is a very high temperature. The portion of the object to be hardened is then dipped into the melted cyanid of potassium or other substance and allowed to remain long enough for it to become heated to the temperature of the liquid. It is then withdrawn from the cyanid, wiped off, and cooled, and then it will be found to have absorbed sufficient carbon from the cyanid to render the dipped portion extremely hard. I find that the portion being treated does not need to be left in the melted cyanogen much longer than for it to become heated to the temperature of the melted cyanogen, and in the case of a carpenter's square the total time is found to be about 20 or 30 seconds, in case the metal is introduced cold, but the time will necessarily depend largely upon the object being treated. In case the metal is warm before introduction, the time required for the submerged portion to become heated will be less. However, if the object is pre-heated before submerged, it must not be heated to an extent which will in any way injure it by warping or otherwise, and the pre-heating should be local. In any case I find that the final heating should be done by the melted or liquid

hardening substance so as not to heat those portions which are not intended to be hardened any more than is absolutely necessary.

It will be seen that my process provides a novel and efficient as well as a simple method of hardening only those portions of the carpenter's square or other devices sought to be hardened, without the necessity of heating other portions of them than those to be hardened. The heating being local, the danger from permanently warping or otherwise damaging the object is much reduced, and objects which it has not been heretofore feasible to harden may be hardened locally by my process.

This process lends itself especially to the hardening of the edges and corners of the blades of carpenters' squares and similar devices, which, by reason of being relatively thin, are especially apt to be warped when heated in their entirety. In fact, it has been heretofore considered impractical to harden such devices for this reason and the hardening of their edges and corners will materially increase their length of usefulness.

I do not wish to limit myself to the use of cyanid of potassium in this hardening process, but find that any hardening substance may be used which possesses carbon, or other hardening agent in a form which will be readily given up to steel and which will melt, and which when melted may be brought to a sufficient temperature to cause the carbon or hardening agent to enter the steel.

I claim:

1. The process of locally hardening a comparatively thin, broad and elongated steel device which consists in dipping the portion to be hardened, and none other, into a bath of melted hardening substance having a chemical affinity for the steel and leaving said portion submerged in said melted substance just long enough for the submerged portion to become heated to the temperature of the melted substance, and then withdrawing the device from the melted substance and allowing the device to cool, whereby only that portion of the device is heated which is submerged in the melted hardening substance, and whereby the steel device is not thereby warped, substantially as described.

2. The process of locally hardening a relatively thin, broad and elongated steel device which consists in dipping a comparatively small portion thereof in a bath of melted cyanogen salt and leaving said portion submerged therein only long enough to become heated substantially to the temperature of the melted salt and no longer, and then withdrawing the device from the melted cyanogen salt and allowing the device to cool, whereby only that portion of the device is heated which is under treatment, and whereby the device is not thereby warped, substantially as described.

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