May 22, 1934. M. F. VERITY 1,959,650

METHOD OF HEAT TREATING METAL ARTICLES

Filed Aug. 12, 1933

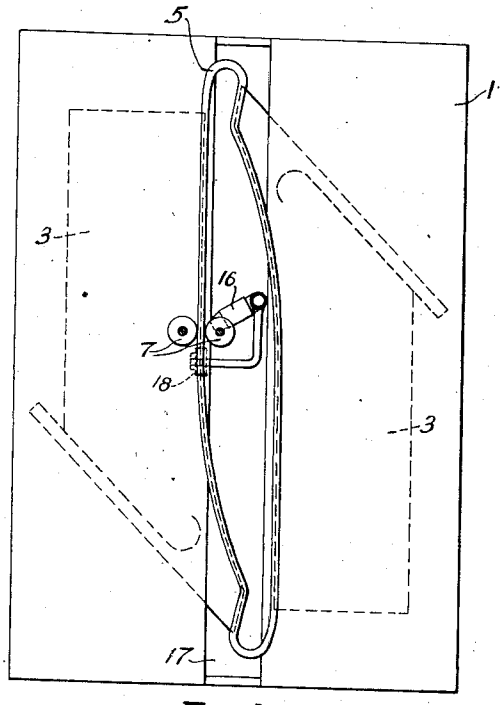



Fig.1

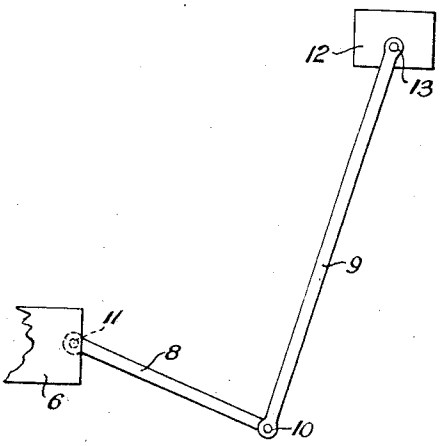



Fig.3

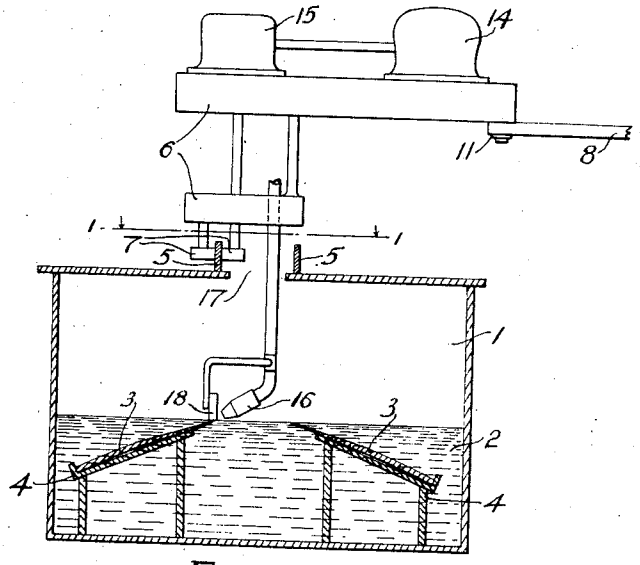



Fig. 2

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Patented May 22, 1934

1,959,650

# UNITED STATES PATENT OFFICE

1,959,650

## METHOD OF HEAT-TREATING METAL ARTICLES

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Application August 12, 1933, Serial No. 684,779

1 Claim. (Cl. 148—21)

This invention relates to a method of heat-treating metal articles and has for its principal object to provide a method for local hardening of the wearing or cutting edges of such articles while retaining a softer characteristic in the main body of the metal.

The invention consists in a method which comprises immersing the article to be treated in a quenching medium, the portion to be local-hardened being but slightly under the surface of the quenching medium, and directing a source of heat and pressure towards such portion whereby the pressure displaces the quenching medium and the source of heat effects a local heating of the portion.

The source of heat and pressure and the article may be mounted for movement with respect to each other, and as movement takes place, the quenching medium instantly flows to its normal level, thus quenching the heated portion instantaneously. It has been found that such an instantaneous quenching of the heated portion is a very important and useful step in the local-hardening of the wearing and cutting edges of metal articles.

In order to obtain uniform and constant results in the heat treatment, it is necessary to heat the treated portion of the article above the critical range to a constant temperature, while maintaining a constant pressure directed thereat. The quenching medium should, of course, be maintained at a constant temperature also.

The heat and pressure required may be developed from the same source as, for instance, by means of an oxy-acetylene flame. If a source of heat such as an electric arc is employed, it would be necessary to provide a supplementary air blast in advance of the arc in order to displace the quenching medium.

The present process may be applied to the treatment of numerous metal articles such as plowshare edges, knives of various kinds, cultivator points and the like.

In the accompanying drawing, which illustrates, by way of example, means for applying the process to the treatment of plowshares,

Figure 1 is a plan view on line 1—1 of Figure 2 of the apparatus employed;

Figure 2 is a sectional end view of the apparatus, and

Figure 3 is a plan view of a supporting structure for the apparatus.

In the drawing, 1 is a tank containing the quenching medium 2 and the plowshares or articles to be treated 3, supported by racks 4 in such a manner that their edges are but slightly under the surface of the quenching medium. A continuous track 5 conforming to the shape of the plowshare edges is mounted on the top of the tank 1. A carrier structure 6 provided with rollers 7 adapted for engagement with the track 5 is suspended in a fixed vertical position above the tank by means of arms 8 and 9 which are pivoted at 10 and pivotally connected to the carrier at 11 and to a suitable support 12 at 13 to permit horizontal movement of the carrier. The vertical position of the carrier may, of course, be adjustable.

The rollers 7 are driven by means of an electric motor 14 and a speed regulator 15 mounted on the carrier 6, and propel the carrier in a cycle around the track 5.

An oxy-acetylene torch 16 is mounted on the carrier 6 and projects into the tank through an opening 17, the head of the torch being positioned adjacent the edges of the plowshare, as shown. Due to the curved shape of the plowshare, its edges are not in the same horizontal plane, and in order to keep the same at the proper level in the quenching medium, a roller 18 may be mounted to travel just ahead of the torch. This roller 18 bears on the edge of the share, tilting the same so that the edge is at the proper level in the medium for treatment. If the article to be treated were entirely in a fixed horizontal plane, such a device would not be required.

In operation, the plowshares 3 are placed in the quenching medium and the torch 16 placed in proper relation to the edges thereof. The carrier 6 is then propelled at the proper speed around the track by means of the motor 14, the torch displacing the quenching medium and heating the edges of the shares to the proper temperature. As the torch is moved along the edges by the carrier, the quenching medium flows back to its normal level, thus effecting an instantaneous quenching of the article. It will be observed that the quenching medium is withdrawn from the portion being heated only and automatically returns as the torch is moved along to heat successive portions. The area of heat treatment is thus greatly localized and only the desired portion of the article is affected thereby.

It will be obvious that various modifications of the above-described apparatus may be made and that it may be altered in numerous ways to adapt it for treatment of different articles. In a great many cases, for instance, it would only be necessary to alter the shape of the track 5 to conform

to the cutting edges of the articles treated to adapt the apparatus for treatment of such articles.

Moreover, in some cases, for instance, when treating a circular cutting edge, it is obvious that it would be simpler to mount such an article for rotation in the quenching medium, the torch in this instance being held in a fixed position.

I claim:

A method of treating plowshares and like metal articles to provide a hardened wearing or cutting edge which comprises adjustably mounting the article within a quenching medium with one edge thereof disposed to present successive portions of said edge under, but adjacent, the surface of the quenching medium for heat treatment, moving an edge-positioning device and an oxy-acetylene flame along said edge to displace the quenching medium on, and heat successive portions of, the edge, the advancing movement of the flame permitting the quenching medium to immediately re-submerge the successively heated portions of the edge to immediately cool the same.

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