

UNITED STATES PATENT OFFICE.

ELI SWEET, OF BINGHAMTON, NEW YORK, ASSIGNOR TO JOSEPH W. BOYD, OF DENVER, COLORADO.

METAL-HARDENING COMPOUND.

1,032,438.

Specification of Letters Patent.

Patented July 16, 1912.

No Drawing.

Application filed October 6, 1911. Serial No. 653,207.

To all whom it may concern:

Be it known that I, ELI SWEET, a citizen of the United States, residing at Binghamton, in the county of Broome and State of New York, have invented certain new and useful Improvements in Metal-Hardening Compounds, of which the following is a specification.

This invention relates to compounds for use in hardening and toughening iron or steel.

The object which I have in view is to produce a compound for use in quenching iron or steel after being heated, which will not only impart a hardness either throughout the article or for any depth upon the surface thereof, but which will also have the effect of toughening the metal to a greater extent than has been possible heretofore in the treatment of metals for similar purposes.

I have found that in order to meet the requirements of a quenching compound for the purpose described oils, or a combination of oils which individually or in combination are slow to ignite or to carbonize is of particular advantage. Experiments and practice have demonstrated that the following compound of oils in about the proportions specified has particular advantages for the purposes; crude petroleum 1 gal.; kerosene 1 qt.; palm oil 4 oz.; Atlantic red 2 oz. If desired the kerosene may be omitted. Its functions in the compound is to effect the rapid solution of the palm oil and the Atlantic red, though I have found that a continued stirring of a compound the same as that specified above with the kerosene omitted will effect substantially the same result as that obtained when the kerosene is incorporated.

In the use of the compound it is preferably introduced into a receptacle containing water, the latter being maintained at a low temperature in any suitable way. The compound before having the article to be hardened introduced into it is preferably thoroughly agitated in order to insure a perfect mixture of the parts. Iron or steel to be hardened is first heated in any suitable way, preferably by immersing the same in a fluid to which animal charcoal has been added,

as described in an application for Letters Patent of the United States filed by me on October 6th, 1911 Serial No. 653206.

When iron or steel has been heated to the proper degree it is introduced into the oil compound. If the article is to be hardened throughout, it is passed through the oil compound and into the water as rapidly as possible, and allowed to remain in the water until cooled. Should it be desired to give only a thin hard surface the article is maintained stationary in the oil compound until cool. To obtain a deeper hardened shell the article is introduced into the oil compound and is agitated until cooled.

The peculiar characteristic of iron or steel tempered by the use of my compound is that while the same or a greater hardness is given the metal than that obtained by the usual tempering methods, a much greater degree of toughness is imparted to the hardened portion. This is demonstrated by the fact that a piece of steel hardened by the use of the compound for a short distance inward from its surface, may be bent without cracking the hardened surface, although such surface is as hard or harder than that obtained in any of the well known tempering methods.

The quantities of the oils employed need not be exactly as specified, as good results can be obtained by the use of larger or smaller quantities of the ingredients specified, and if desired the kerosene may as suggested be dispensed with.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is:—

1. A metal hardening compound containing crude petroleum, palm oil and Atlantic red, in substantially the quantities specified.

2. A metal hardening compound containing crude petroleum, palm oil, kerosene, and Atlantic red in substantially the quantities specified.

In testimony whereof I affix my signature in presence of two witnesses:

ELI SWEET.

Witnesses:

F. C. CARL,
EDNA T. MANGAN.