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ALLOY STEEL.

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My invention relates to that class of steels generally known as "high carbon" or "hard" steels. I have invented a steel of this type alloyed with certain metallic elements which give many desirable characteristics to the high carbon steel.

One of the objects of my invention is to provide a steel which upon heat treatment will be especially adapted for tools and more particularly adapted for that type of tool whose utility is dependent upon its ability to keep a good cutting edge. My steel, besides fulfilling this requirement, also possesses a high strength and good ductility and can be mechanically worked with success.

It is these properties which make the steel of this invention especially adapted for saw blades. A saw made from this steel will hold its cutting edge for a remarkably long time. If a steel is treated to obtain the same degree of hardness as is customary, then tools made from this steel will hold their cutting edge approximately fifty per cent longer than products made from the steel now in use. Conversely, a steel can be made fifty per cent softer than is customary and still hold its cutting edge for the same length of time as the steel normally employed.

The alloy steel, according to this invention, contains besides the normal constituents of steel, nickel and molybdenum. The percentages of these elements may vary and the resulting product will be within the scope of the invention. The steel may be described as a nickel-molybdenum high carbon steel. The term, " high carbon steel", used throughout the specification and claims covers that class of steels so known to the art, that is to say it covers steels whose lower carbon content is in the vicinity of .55% or .60% and whose upper carbon limit depends somewhat upon the percentage of alloying materials present but may in all cases be defined as that percentage of carbon where the material ceases to be what is commonly known as steel and becomes cast iron, a well recognized division. The manganese and silicon are kept low and well within the ranges usually found in steel and for this reason are not considered alloying elements. Furthermore, the phosphorus and sulphur are kept low. It is deemed inadvisable to allow the carbon content to fall below .55%. The upper limit may be 1.0% or even greater without detracting from the finished product.

The alloying elements, to wit molybdenum and nickel, are added in such proportions that they will give to the steel the desired properties. The nickel is usually present in amounts less than 1.50%, while the molybdenum may be present up to .7% or even higher. In order to have an appreciable effect on the steel, the lower limit should not be below .1% in either case. These proportions are not limiting for the invention includes the addition of nickel and molybdenum to high carbon steels in such proportions that a product will result which upon heat treatment gives a steel which has a high tensile strength and a high elongation and capable of keeping its cutting edge.

The addition of further alloying material is not contemplated, but through inadvertence or otherwise certain extraneous elements may be present in the product. These, if they are present in small amounts, do not detract from the steel and such products are included within the invention.

By describing the use of this steel for tools, it is not intended that the invention should be confined to this class, but the invention does cover high carbon steels alloyed with such percentages of nickel and molybdenum which will give the properties heretofore mentioned.

I claim:

1. A high carbon tool steel containing only nickel and molybdenum as alloying elements, the nickel content ranging from .1% to 1.5% and the molybdenum content ranging from .1% to .7%.

2. A high carbon tool steel having a carbon content of from .55% to 1.00% and containing only nickel and molybdenum as alloying elements, the nickel content ranging from .60% to .90% and the molybdenum content ranging from .1% to .35%.

3. A high carbon tool steel having a carbon content of from .55% to 1.00% and containing only nickel and molybdenum as alloying elements, the nickel content ranging from .1% to 1.5% and the molybdenum content ranging from .1% to .7%.

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