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PROCESS OF ALLOY KNIFE HARDENING OR TEMPERING

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To all whom it may concern:

Be it known that I, THOMAS B. LASHAR, of Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in a Process of Alloy Knife Hardening or Tempering, of which the following is a specification.

The present invention relates to a process of hardening or tempering alloy table knife blades, while the blades are at a natural temperature.

It is common practice, in the process of manufacturing cutlery to apply successive blows to the metal used to produce the blades of table knives, these blows shaping to some extent the blades and imparting thereto approximately the required cross-section. These many blows have a tendency to raise the temperature of the alloy and anneal the blade rendering it too soft to require subsequent treatment, such as to harden or temper and sharpen it.

Such processes are expensive, requiring considerable time, labor and the prolonged use of machinery.

One of the principal objects of the present invention is to simultaneously form and harden or temper the cutting edge portion of the alloy blade of table knives by striking the blade, without pre-heating it, and while the constituents of the alloy are in homogeneous mass, but not fully condensed, between surfaces so shaped and disposed as to simultaneously compress the alloy at the marginal portion of the blade and impart the desired cross-section thereto, thus giving the blade a hardened or tempered cutting edge which may or may not require sharpening in order to render it useful as a cutting element.

Other objects of the invention are to provide blades of table or carving knives of alloy, which are inexpensive, durable and require little if any finishing after the striking of the blades in carrying out the process, thus avoiding the annealing action which takes place when the cutting end portions must be ground to the desired contour; and to so form the cutting edge portion of the alloy blade that it is of uniform texture and density.

Referring to the attached drawings forming a part of this specification, showing the unfinished article and apparatus by which the process may be carried out:

Figure 1 is an elevation of an unfinished alloy table knife, the blade of which is to be acted upon.

Figure 2 is a cross-sectional view on the lines 2—2 of Figure 1, the dots indicating its porosity.

Figure 3 is a fragmentary sectional view on an enlarged scale transversally through complementary dies for shaping, hardening and sharpening the alloy blade, the dies being separated and the blade therebetween.

Figure 4 is a view similar to Figure 3, with the dies together, showing the blade compressed.

Figure 5 is a plan view of one of the dies.

In carrying out the process, the alloy blade 6 which may be composed, as by way of example, of copper 50%; zinc 25%; and nickel 25% or other nickel silver or German silver composition; is primarily shaped or formed to substantially the shape in plan of the finished product as shown in Figure 1 of the drawing, by way of example, but thicker with the alloy not fully condensed, or in other words of a slightly porous texture as indicated in Figure 2. The blade thus shaped or formed is subjected to a striking blow confining the slightly porous alloy in a cavity in cross section substantially that of the desired cross-section of the finished blade. This may be accomplished by the use of complementary dies 7 and 8 which have depressions 9 and 10 in their respective confronting faces, in plan corresponding to the plan of the finished blade and tapering or varying in depth as indicated at 11 from one longitudinal margin toward the other longitudinal margin and also at the rounded end portion as indicated at 12, so that when the slightly porous alloy, which may be of substantially uniform cross section, is struck between the dies it will be compressed in general, but that portion which provides the cutting
edge will not only be shaped but also hardened,—rendered more dense. It is to be understood that I do not confine myself to the striking of the alloy forming the entire blade since that portion to provide the cutting edge may alone be struck between hard surfaces, the confronting faces of which are so formed as to compress the alloy rendering it dense and shapely.

By the term "natural temperature" I refer to that temperature which may exist without pre-heating the material. This may vary according to the temperature of the room or place where the process is carried out in contra-distinction to subjecting the material to artificial heat.

An alloy using copper as a basic element with a proportion of zinc not exceeding 35% or 40% does not have much effect upon its malleability. In fact the zinc gives it fluidity and also acts as an excellent deoxidizing agent for the copper. Hence my process is well adapted to table and carver knife blades made of alloy which has some fluidity so as to fill any minute voids, when compressed, and adapts itself to dies or other forming means. The presence of nickel in the alloy assists greatly in the hardening thereof under the blow. The nickel is usually in a comminuted state when prepared with the zinc and copper for mixing in the crucible and its tenacious quality assists in holding together the mass when flexed.

By experiment it has been found that a single blow or striking of the alloy will in most instances give the required shape, angle, hardness and density to the portion of the blade providing the knife edge and rarely are more than three blows necessary. Any flash or bur which may exist after the striking of the alloy, may be removed as by the use of carborundum without materially heating the alloy or annealing it.

I claim:
1. That process of shaping and hardening nickel silver alloy knife blades which consists in subjecting the alloy while at a natural temperature to a striking blow and confining the alloy in a cavity of a cross section substantially that desired for the finished blade.
2. That process of shaping and hardening nickel silver alloy knife blades which consists in first shaping the alloy in a slightly porous state to the desired plan of the finished blade and subsequently while at a natural temperature subjecting the same to a striking blow and confining the alloy in a cavity of a cross section substantially that desired for the finished blade.
3. That process of hardening or tempering the cutting edge of nickel silver alloy knife blades which consists in subjecting a longitudinal marginal portion of the alloy blade to a striking lateral blow throughout the portion it is desired to harden and confining said portion in a cavity of predetermined shape.
4. That process of sharpening and hardening nickel silver alloy knife blades which consists in striking the alloy while at a natural temperature between compleumental dies providing a cavity of substantially the shape desired for the finished blade.
5. That process of sharpening and hardening nickel silver alloy knife blades which consists in striking the alloy while at a natural temperature by a die which is tapered to give the edge the desired angle.

THOMAS B. LASHAR.