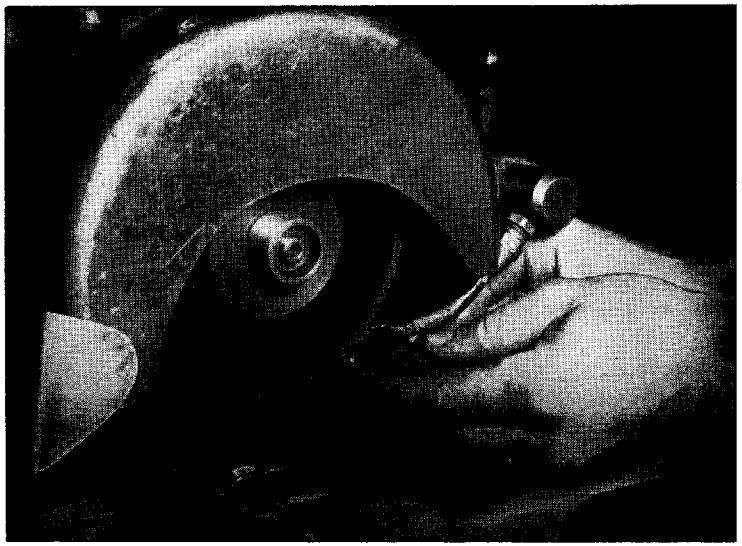

Opening up the cutting face of a vitrified bonded diamond wheel with a Crystolon stick after truing

then to the other, in a manner to avoid rounding the corners of the wheel, until the wheel, when stationary, feels sharp to the touch. Never force the Crystolon stick straight into the wheel with the full width of the stick as this will tend to break down the sharp corners of the wheel left by the cylindrical grinding operation.

It is good practice to touch up the wheel in this manner with the Crystolon stick every few chip breakers that are ground.

CHAPTER VI

Hand Honing of Carbide Tools

The life of carbide tools between regrinds can often be prolonged by touching them up with a diamond hand hone at the first signs of dulling, without removal from the lathe or other machine tool. Care must be taken, of course, to hold the hone flat against the surface being honed so as not to round over the cutting edge or change the relief angle. To be sure, this hand stoning cannot be continued indefinitely; after a time the tool will have lost its original cutting angle and will require regrinding with a wheel.

While most shops today are finish grinding their carbide tools on fine grit diamond wheels, where suitable equipment for diamond wheels may not be available, the use of a fine grit diamond hone is recommended for stoning the cutting edge to remove any slight burr or surface roughness that may have been left by the silicon carbide wheel. A few light strokes with this hone will produce a keener, firmer and more durable edge.

Still another use for diamond hones is for supplementing diamond wheels in shaping out special contours on carbide form tools. They can be made in suitably small sizes for this work.

Diamond Vitrified Hand Hones

The Norton vitrified bonded diamond hand hone has proved to be up to 50% faster cutting than ordinary resinoid

bonded diamond hones and even more compared to metal bonded types. At the same time, it is exceptionally wear resistant, exhibiting up to double the life of resinoid bonded hones for the same diamond depth, as well as unusual resistance to grooving.

Because of their characteristic sharper cutting surface, vitrified bonded diamond hones require only occasional dressing to remove any slight glaze or steel load that may have been picked up.

For best all-around results, 320 grit in the single end hone (type DH1) and 220/320 in the double end (type DH2) are most satisfactory. Coarser grit sizes, such as 100, 120 and 150 are available, if desired, as well as 400 and 500 in a very fine grit size.

The intelligent use of a diamond hand hone cannot but extend the life of carbide tools between regrinds, as a result of which savings in both carbide tools and grinding wheels are realized and the nominal cost of the diamond hone itself is soon absorbed.

To dress or true a vitrified bonded diamond hone, hand lap the diamond surface carefully on a flat metal plate. Use water and Crystolon grain of approximately the same size as the diamond in the hone.

CHAPTER VII

Sharpening Single-Point Tools (High-Speed Steel and Cast Alloy)

High-Speed Steel Tools

The prime characteristic of high-speed steels is their property of "red hardness" or the ability of the tool to maintain a cutting edge when heated to a temperature that would destroy the cutting qualities of the carbon steels formerly used.

Of the various types of high-speed tool steels made today, two are quite common: the well known tungsten type such as 18-4-1 or T1 (AISI-SAE designation), and the newer and increasingly popular molybdenum type such as M2 in which molybdenum is substituted for a portion of the tungsten. Larger percentages of vanadium are also used in present day high-speed steels to give greater hardness as, for example, M3 and M4 type tool steels.

For a comprehensive discussion of the present day tool steels—their classification in terms of their grinding characteristics, and a new method of selecting wheels for grinding them, write for a copy of Norton booklet F-1158.

In grinding high-speed steel tools there are certain precautions to observe. Wet grinding is preferable to dry, provided the supply of water is sufficient to flood the work; a small dribble of water is worse than no water at all. When grinding dry, softer wheels should be used than when grinding wet. Furthermore, the grinding wheel should be run toward the cutting edge—from the tip to the shank of the tool, wherever